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National Cancer Registration and Analysis Service

Be Clear on Cancer: Regional and national oesophageal and gastric cancer awareness campaigns 2014 and 2015

Final evaluation results

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Be Clear on Cancer: Regional and national oesophageal and gastric cancer awareness campaigns 2014 and 2015

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1. Foreword

It gives me great pleasure to introduce this evaluation report on the impact of the Be Clear on Cancer regional and national oesophago-gastric (OG) cancer awareness campaigns which ran in 2014 and 2015. It represents the culmination of a huge amount of work by staff in PHE, the Department of Health and Social Care (DHSC) and NHS England (NHSE), together with significant contributions from partner organisations, particularly Cancer Research UK. I would like to thank all those involved in this innovative programme. A complex range of analyses and interpretations of data from a large number of sources provide us with insight into the potential impact of the regional and national OG campaigns across the patient pathway, from awareness of symptoms in the general public, through to GP attendance and survival.

This document examines the evaluation metrics published on the National Cancer Registration and Analysis Service (NCRAS) website and takes a close look at the findings in the wider context of what we know about OG cancer and early diagnosis. The results are of great interest, though not straightforward to interpret. What is clear is that these campaigns have raised awareness of heartburn and difficulty swallowing as being the two key symptoms of OG cancer, prompting people to see their GPs. This led to an increase in the number of referrals for suspected upper gastrointestinal (upper GI) cancer and may have led to an increase in the number of cases of oesophageal cancer diagnosed during the national campaign period. This is balanced against the fact that we have not been able to demonstrate an effect on diagnoses of cancers at an early stage or on the number of cancers diagnosed as emergencies. These outcomes are discussed at some length later in the last chapter of the report under final conclusions and recommendations. The lack of a national registry for routinely collecting data on Barrett's oesophagus (the principle precursor of oesophageal cancer) has limited the ability to analyse the campaign effects on this condition.

Since its creation in 2010 Be Clear on Cancer has become a well-established, award-winning brand, working to improve cancer outcomes and reduce health inequalities. The Independent Cancer Taskforce supported our work in the 2015 Strategy for England, recognising how Be Clear on Cancer is making a real difference to people's lives by improving outcomes and increasing awareness of the fact that many cancers are treatable if caught early. Early diagnosis is crucial to improving outcomes from cancer and other serious diseases. Be Clear on Cancer is part of the national drive to tackle cancer, contributing towards making earlier diagnosis a reality for the thousands of people diagnosed with cancer each year.

The Be Clear on Cancer programme is run by PHE in partnership with DHSC and NHSE, working closely with Cancer Research UK, clinical colleagues and the wider academic and charity sectors.

PHE has been responsible for the development, marketing and evaluation of all campaigns run since April 2013. They have carried out careful evaluation, often using bespoke analyses of complex datasets in order to establish as best they can the impact of the campaigns.

Professor Chris Harrison
National Clinical Director for Cancer, NHS England
Chair of the Be Clear on Cancer Steering Group (April 2016 to September 2018)

Note: Structure of report

This report has been written with a wide range of audiences in mind and includes many sets of individual results and analyses. If read in full, it is very long. It has therefore been divided into clear sections, not all of which will be of interest to every reader. The Executive Summary outlines all the major findings, followed by the main body of the report which gives details of individual results and discusses the extent of campaign impact within the context of the overall patient pathway.

NCRAS also provides a separate paper, ‘Be Clear on Cancer evaluation metrics: methodology’ which may be of interest as a reference source to some readers. The paper is available on the NCRAS Be Clear on Cancer webpage.

2. Executive summary

Oesophageal and stomach cancers were diagnosed in over 12,500 people in England in 2017(1). The UK has the highest rate of oesophageal adenocarcinoma (ACA) in Europe. However, the incidence of oesophageal and stomach cancer in the UK is too low for population screening.

Overall survival from both oesophageal and stomach cancer has improved slightly over the last 40 years, but less than 20% of patients survive for 5 years, despite improvements in treatments. Over 60% of patients present with disease which is too advanced for curative treatments.

The symptoms of oesophageal and stomach cancer are often nonspecific. Not only do patients fail to recognise the importance of their symptoms but also referral for investigation is often delayed because GPs may initially attempt to treat symptoms based on clinical experience before considering referral.

There is therefore a need for education of both the public and medical professionals.

Upper gastrointestinal endoscopy (Oesophago-gastro duodenoscopy (OGD) or Gastroscopy) is the principle technique for diagnosis. However, there are pressures on endoscopy services, which need to be considered carefully in any programme aimed at earlier diagnosis.

The national Be Clear on Cancer (BCoC) OG cancer awareness campaign ran for four weeks from 26 January to 22 February 2015 in England following an effective regional campaign in the North East of England which ran from 10 February to 9 March 2014. Both campaigns were designed to raise public awareness of the symptoms of oesophageal and stomach cancers and encourage those with symptoms to go to their General Practitioner (GP). This is particularly relevant to oesophageal and stomach cancer where symptoms are common and non-specific and are often self-treated as many people do not think they are at risk of cancer.

Campaign recognition and public awareness

Regional campaign

The research was conducted through pre- and post-campaign surveys in test and control areas. The test area was the North East for the OG cancer campaign. The rest of England (excluding the North West, as a similar ovarian cancer regional campaign

ran at the same time in this area) provided the control area. Samples of approximately 300 adults aged 50 years and over were interviewed face-to-face in the campaign area at both pre- and post-campaign stages.

The research was conducted by TNS-BMRB, an independent market research agency specialising in social research. The survey was a face-to-face survey among a representative sample of adults aged 50 years and over in England. This was supplemented with additional face-to-face interviews in the North East campaign region. The pre-campaign interviews took place between 13 January 2014 and 2 February 2014 and the post campaign interviews took place between 17 March 2014 and 6 April 2014.

- A quarter (25%) of the pre- and post-campaign survey respondents were confident in their knowledge of OG cancer symptoms before the campaign and this increased to more than one in three (35%) in the region after the campaign. The control region did not experience this increase, suggesting that the positive results were a consequence of the campaign.

- The proportion of pre- and post-campaign survey respondents who stated that persistent heartburn was a definite warning sign of OG cancer increased from one in ten (11%) before the campaign to three in ten (31%) after, and food sticking increased from 23% to 38%.

National campaign

There was an increase in the proportion of respondents who said they had seen symptom publicity about the key campaign symptoms (heartburn for three weeks or more and food sticking), from one in ten interviewed pre-campaign (10%) to four in ten (40%) post-campaign. The most recalled symptom was heartburn (6% to 33%), which saw the biggest increase.

The overall proportion of the interviewed public who thought persistent heartburn was a warning sign increased from 66% to 77% comparing responses to surveys before and after the national campaign, with a smaller increase in understanding of the role of food sticking from 75% to 79%.

Seven in ten respondents (72%) recognised at least one element of the national campaign, with the majority recalling the television advert (63%). The proportion recognizing the other advertising modalities were:

- radio (23%)
- BCoC advertisements in local and national newspapers (20%)

- leaflets distributed via events in shopping centres, through GP surgeries and other community settings (15%)
- YouTube pre-roll advert (13%) (video commercial that appears prior to an online video)

GP attendances

Regional campaign

There was a small, but not statistically significant, increase in the average number of GP attendances per practice per week recorded for target symptoms (1.39 February to March 2013 compared with 1.56 February to March 2014), for those aged 50 years and over living within the campaign area.

National campaign

The number of attendances for dyspepsia increased by 26.1% (statistically significant, $p<0.001$) from 2.49 visits per practice per week in 2013 to 3.14 visits per practice per week in 2015.

The number of attendances for dysphagia increased by 46.2% (statistically significant, $p<0.001$) from 0.42 attendances per practice per week in 2013 to 0.62 attendances per practice per week in 2015.

For people aged 50 years and over there was a statistically significant increase of 33.9% in the number of GP attendances for the target symptoms (dyspepsia and dysphagia combined) during and following the campaign when compared with the same months in 2013. This was greatest in men with a 44.6% increase compared with an 18% increase for women.

Urgent GP referrals for suspected upper GI cancers

Regional campaign

There was a statistically significant increase in urgent GP referrals for suspected upper GI cancers, comparing February to April 2013 with February to April 2014, with a 52% increase in the regional campaign area compared with 17% in the control area.

Larger increases in suspected upper GI cancer referrals were found for those aged in their 50s (85%) and 60s (69%), with a smaller increase for those aged 80 years and over (18%).

National Campaign

There was a statistically significant 84% increase in referrals for suspected upper GI cancers (comparing February to March 2015 with February to March 2013), which was much greater than the 32% increase in referrals for other suspected cancers.

In the three months following the campaign, April to June 2015, although the number of suspected upper GI cancer referrals decreased in comparison to the campaign period; these numbers remained greater than for the equivalent three months in 2013 (with an increase of 47% between these periods in 2013 and 2015, compared to 29% for other suspected cancers).

Cancer diagnoses resulting from an urgent GP referral for suspected cancer

Regional campaign

Comparing February to April 2013 to February to April 2014, there were no statistically significant changes in the number of oesophageal, stomach or upper GI cancer diagnoses resulting from an urgent GP referral for suspected upper GI cancer.

National campaign

From February to March 2013 to February to March 2014, there was a statistically significant 12% increase in the number of upper GI cancers diagnosed following an urgent GP referral for suspected upper GI cancers.

There was a statistically significant 20% increase in the number of oesophageal cancer diagnoses when comparing February to March 2013 (544 cancers) and February to March 2015 (655 cancers).

There were no statistically significant differences in the number of stomach cancer diagnoses for either February to March 2015 or April to June 2015 when compared to the same months in 2013.

This suggests that the national campaign may have had an impact on the number of oesophageal cancer diagnoses, but not stomach cancer diagnoses, following urgent GP referrals for suspected upper GI cancer.

There is however no clear evidence of a persisting or later impact on the numbers of oesophageal, stomach or upper GI cancers resulting from an urgent GP referral for suspected upper GI cancers (April to June 2015 data).

Conversion rate[a] of urgent GP referrals for suspected upper GI cancers

Regional campaign

Comparing February to April 2014 with February to April 2013,
there were statistically significant decreases in the stomach and upper GI cancer conversion rates, but not oesophageal.

The stomach cancer conversion rate decreased significantly from 0.9% to 0.4% and for upper GI cancer the conversion rate decreased significantly from 4.1% to 3.0%. However, long-term trends showed decreasing conversion rates for urgent GP referrals both for the regional campaign area and control area.

National campaign

Between February to March 2013 and February to March 2015, there were statistically significant decreases in the oesophageal, stomach and upper GI cancer conversion rates.

Although there has been a gradual decreasing trend in the oesophageal, stomach and upper GI cancer conversion rates since January 2013, the rates for February and March 2015 do appear to be lower than would be expected from this trend, particularly for oesophageal cancer and upper GI cancers.

Cancer diagnoses recorded in the Cancer Waiting Times (CWT) database

Regional campaign

Although there were small decreases in the number of the oesophageal (6%), stomach (10%) and upper GI (4%) cancer diagnoses recorded in the CWT database for March to May 2014 compared to the same months in 2013, these were not significant as overall the number of new cases was small.

National campaign

There were no statistically significant changes in the number of oesophageal, stomach or upper GI cancer diagnoses recorded in the CWT database, when March to April 2015 was compared with the same months in 2013.

[a] Percentage of urgent GP referrals (for suspected GI cancer or GI symptoms) resulting in a diagnosis of GI cancer

Detection rate[b] for upper GI cancers

Regional campaign

There were increases in the detection rates comparing March to May 2014 with the same months in 2013, ranging from 3.3% for upper GI cancer to 9.5% for oesophageal cancer; however, none of these changes were statistically significant nor were there any changes by sex.

There were statistically significant increases in the detection rates for those aged 60 to 69 for both oesophageal and stomach cancers, as well as all upper GI cancers combined. The detection rate increased in:

- oesophageal cancer, from 46% to 86%
- stomach cancer, from 21% to 71%
- upper GI cancer, from 35% to 64%

This is considered to be a possible impact of the campaign in this age cohort, although the number of cases is small.

National campaign

Increases in detection rates for oesophageal and stomach cancer were seen when comparing March to April 2015 with the same months in 2013, with statistically significant increases of 6% in the oesophageal cancer detection rate and 9% in the stomach cancer detection rate. There was also a statistically significant 4% increase in upper GI cancer detection rates in England.

This impact on the detection rate appears to have persisted into the initial months after the campaign for stomach cancer but not for oesophageal cancer.

Emergency presentations

Comparing the months between 2013 and 2014 for the regional campaign and months between 2013 and 2015 for the national campaign, there were no statistically significant differences in the proportions of oesophageal or stomach cancer cases diagnosed through emergency presentation.

Cancers diagnosed

There was no impact on the incidence of oesophageal or stomach cancer during either the regional or national campaign period.

[b] Percentage of GI cancer diagnoses recorded in the CWT database which resulted from an urgent GP referral for suspected GI cancer or GI symptoms

Early stage at diagnosis

Regional campaign

There was a sustained period (weeks 17 to 21) with higher than expected proportions of early stage oesophageal or stomach cancers diagnosed during/after the campaign. However, caution must be applied in the interpretation of the significance as these results are based on very low numbers.

National campaign

There were no sustained periods where the proportion of early stage oesophageal and stomach cancers diagnosed during or immediately after the national campaign exceeded the expected for 2014 to 2015 when compared with 2013 to 2014.

There was therefore no impact of either the regional or the national campaign on the numbers of patients diagnosed with early stage oesophageal or stomach cancer.

Diagnostics in secondary care

Regional campaign

Although the percentage of requests for diagnostic radiology and endoscopies increased by 4.8% for all ages (February to May 2014 compared with April to July 2013), this was not statistically significant.

National campaign

A similar non-significant increase (4.6%) in the use of diagnostic radiology and endoscopies in secondary care was seen before, during and after the national campaign (January to April 2015 compared with January to April 2014).

Gastroscopy

National campaign[c]

The average number of gastroscopies per month increased by a statistically significant 23% between February to April 2013 and the same months in 2015. There was an initial slight increase in February 2015 which was much steeper in March 2015.

The number of gastroscopies remained higher per month than the previous 12 months for the rest of 2015 although this did not remain at the same level observed in the month of March.

[c] Data not available at regional level to enable analysis of regional campaign

Proton pump inhibitor (PPI) prescriptions

There has been a steady increase (13%) in the number of PPI prescriptions from 2013 through 2015 (from 11,913,439 to 13,457,603). This rate did not seem to be significantly affected by the national campaign[d].

One-year survival

Regional campaign

There were no significant differences in one-year survival for men, women or persons aged 50 years and over diagnosed with oesophageal or stomach cancer combined between the analysis period (March 2014 to April 2014) and comparison period (January, February, May to December 2014).

One-year survival for persons diagnosed during the analysis period was 48.9% compared with 47.5% for those diagnosed in the comparison period.

National campaign

There were no significant differences in one-year survival for men, women or persons aged 50 years and over diagnosed with oesophageal or stomach cancer combined between the analysis period (February 2015 to April 2015) and comparison period (January, February, May to December 2015).

One-year survival for persons diagnosed during the analysis period was 44.7% compared with 44.5% for those diagnosed in the comparison period.

Conclusion

The BCoC OG campaign results are in keeping with the other BCoC campaigns in that the increased awareness has changed behaviour with a greater number of people seeking medical advice and as a result, undergoing investigations. There was no increase in the number of newly diagnosed cancers, however there was an impact on the number of gastroscopies performed. The challenge for OG cancer is to maintain these effects with appropriate infrastructure as well as developing a more specific strategy for those at greatest risk with a focus on earlier diagnosis.

[d] Data not available at regional level

3. Introduction

For each BCoC campaign there is a comprehensive evaluation process. Each campaign is tested locally, with a view to rolling it out regionally and then nationally if it proves to be effective at each stage.

Data is collected on a number of metrics to reflect possible campaign impact. These include whether

- campaigns are raising awareness of signs and symptoms of cancer
- more people are being referred urgently for suspected cancer
- there is an increase in diagnostic activity
- those referred urgently for suspected cancer are diagnosed with cancer
- there are increases in the number of cancers diagnosed and
- if there is evidence of a shift towards earlier stage disease

The national BCoC OG cancer awareness campaign ran for 4 weeks from 26 January to 22 February 2015 in England following an effective regional campaign in the North East of England which ran from 10 February to in 9 March 2014. Both campaigns were designed to raise public awareness of the symptoms of oesophageal and stomach cancers and encourage those with symptoms to go to their GP. This is particularly relevant to oesophageal and stomach cancer where symptoms are common and non-specific and are often self-treated as many people do not think they are at risk of cancer.

The campaign was designed to promote the target symptoms of:

- Heartburn most days for three weeks or more
- Food sticking on swallowing

Recording of urgent GP referrals for suspected cancer is based on a limited number of broad cancer types. The analyses in this report therefore not only consider diagnoses of oesophageal cancer (ICD10 C15[e])(3) and stomach cancer (ICD10 C16), but also urgent GP referrals for suspected upper GI cancers (which includes oesophageal and stomach cancers, together with liver, gallbladder and pancreatic cancers, ICD10 C15-C16, C22-C25).

[e] The ICD10 codes listed are the international standard diagnostic classification system 2. World Health Organisation. International Classification of Diseases - 10th Revision. Geneva: WHO; 1990.2.

This report uses data from PHE and NCRAS sources as well as the CWT database. Data on Barrett's oesophagus (see below) is not collected for the whole of the country. There are some local Barrett's registers, but this data is collected on a small scale and cannot be extrapolated to a national picture. In addition, since Barrett's can be present without symptoms, incidence and prevalence data are not available. As a result, it has not been possible to include the effect of the regional and national campaigns on rates of diagnosis of Barrett's oesophagus and this is recognised as a limitation of the report.

This report describes the effect and outcome of both the regional and the national campaigns expanding on the previously published interim reports by NCIN(4) and NCRAS(5).

4. Background to the campaigns

4.1 Oesophageal and stomach cancer

The regional and national campaigns have focused on diagnosing the commonest cancer (adenocarcinoma) which affects the lower third of the oesophagus, the oesophago-gastric junction and the stomach (box in Figure 1).

The oesophagus is a tubular structure measuring 40cm in length and transmits food on swallowing from the mouth to the stomach. It is situated in the back of the chest and is divided into three sections, upper (cervical), middle (thoracic) and lower (abdominal). The lower section merges with the stomach at the OG junction.

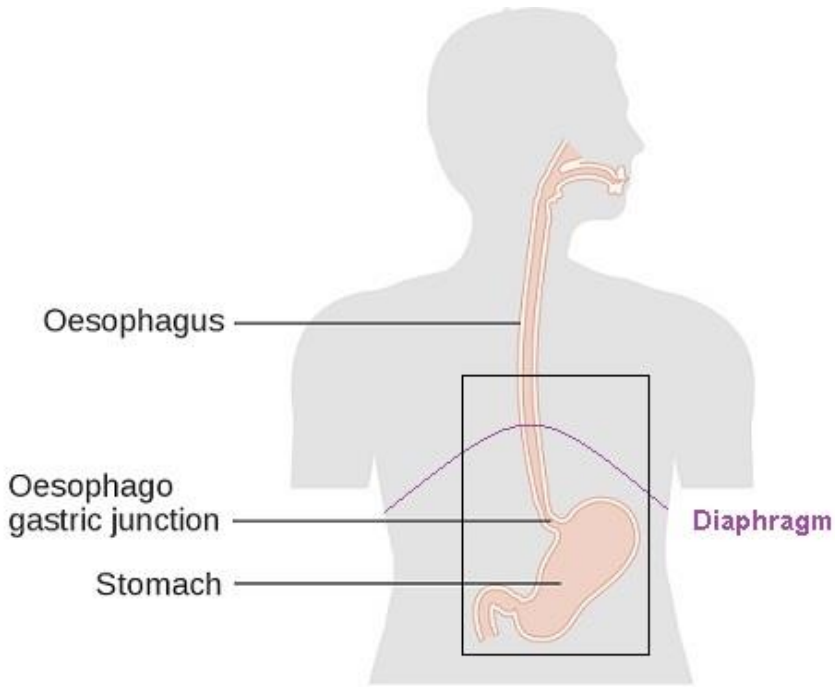


Figure 1: Anatomy of the oesophagus and stomach

Source: Cancer Research UK(6)

4.2 Incidence of oesophageal and oesophagogastric junctional adenocarcinoma (ACA)

The incidence rate of oesophageal and OG junctional ACA in the United Kingdom (UK) is the second highest in Europe. In 2017 there were 7569 new cases of oesophageal cancer in England affecting 5280 men and 2289 women(1). It is more common in white

people than black or Asian people. The incidence rises with age with 60% of cases being diagnosed over the age of 70(7). In England there has been an increase in the age-standardised incidence of lower third oesophageal and OG junctional cancer from 9.5 per 100,000 in 2001 to 11.0 per 100,000 in 2017(8). It is predicted that overall incidence rates will fall by 3% in the UK between 2014 and 2035 to 18 per 100,000(7) although this decrease may be confined to women.

4.3 Incidence of stomach cancer

The vast majority of stomach cancers are adenocarcinomas. In contrast with oesophageal cancer, stomach cancer is fourth lowest in incidence in the UK when compared to other European countries. In 2017 there were 5,143 new cases of stomach cancer in England affecting 3,379 men and 1,764 women. Stomach cancer is more common in black than white people and least common in Asian people. Like oesophageal cancer it is a disease of ageing with 51% of cases being diagnosed in those over the age of 75. Since the early 1990s stomach cancer incidence has fallen by 50% reflecting improvements in diets with greater fresh food consumption and understanding of the role of the bacterium Helicobacter pylori as a causative agent. This rate of decrease is expected to continue with estimated incidence rates of 11 cases per 100,000 in 2035(7).

For both oesophageal and stomach cancer there is an apparent geographical variation with higher incidence in the north of England(9).

4.4 Presentation

Routes to diagnosis

The principle routes to diagnosis for both oesophageal and stomach cancers are shown in Table 1. Most patients present symptomatically either via their general practitioner or as a result of investigations for non-specific symptoms which identify an oesophageal or stomach cancer. The rates of emergency presentation are greater for stomach cancer compared with oesophageal cancer. This is likely to reflect the late stage at presentation, which is also illustrated by the low rate of patients undergoing curative treatment at 38%.

Table 1: Routes to diagnosis for oesophageal and stomach cancer, 2016 England

	Two week wait	GP referral	Other outpatient	Inpatient elective	Emergency	Death certificate only	Not Known
Oesophageal	44%	19%	6%	8%	20%	0%	2%
Stomach	32%	22%	8%	6%	30%	0%	3%

Source: NCRAS(10)

4.5 Symptoms

The non-specific nature of the symptoms of oesophageal and stomach cancer is the main reason for the frequently late presentation. Although difficulty in swallowing (dysphagia) and pain on swallowing (odynophagia) are common in oesophageal and proximal stomach cancer, dyspepsia, indigestion and heartburn frequently precede these more specific symptoms.

Terms used to describe symptoms arising from the stomach are varied and have different meanings to both lay individuals and medical professionals. These include dyspepsia, indigestion and heartburn which are extremely common and are related to many other benign and functional conditions. It is estimated that 1 in 5 people will experience such symptoms each week. Many will ignore or self-treat. In the UK in 2006, 41.2 million prescription items were written for various forms of medication to combat acid reflux, equating to more than 110,000 every day and corresponding to over £575 million. These figures exclude the additional cost of over-the-counter purchases. The vast majority of this population will not develop oesophageal or stomach cancer although it is estimated that 375,000 people in the UK will have Barrett's oesophagus(11). The challenge is to identify those at risk and manage their presentation appropriately.

There is also lack of clarity about the definition of these symptoms, which is not restricted to the public. In a survey of GP approaches to these symptoms, it was found that the majority of GPs did not differentiate between heartburn and dyspepsia. Those that did, had a greater interest in the management of upper GI disorders.

In addition to symptoms related to the upper GI tract, oesophageal and stomach cancer can present with iron deficiency anaemia, weight loss and non-specific abdominal pain. Establishing a diagnosis for such presentations can be challenging and there is a

significant professional educational requirement to ensure appropriate awareness of the potential for underlying oesophageal or stomach cancer as the cause.

The presenting symptoms of oesophageal and stomach cancer are not uncommonly a reflection of stage of disease. In Japan where mass asymptomatic screening is well established and there are the highest rates of diagnosis at an early stage, 50% of those identified with early stomach cancer had dyspeptic type symptoms. Dysphagia and epigastric pain are usually associated with locally advanced disease and when in combination with significant weight loss, most will have metastatic disease.

4.6 Outcomes of treatment

The type of treatment for oesophageal and stomach cancer depends on the stage at diagnosis. Since the disease presents frequently at a late stage (see section 4.5), 62% of newly diagnosed patients undergo palliative therapy. The curative modalities include resection, either endoscopic or surgical, chemotherapy and radiotherapy. Surgical resection is undertaken in 22% of patients with curative intent with additional perioperative chemotherapy in over 80% of the surgical cohort. Chemoradiotherapy with curative intent is undertaken in the remaining 16%(12).

Survival for oesophageal and stomach cancer has shown improvements over the past 40 years increasing from 4% to 12%(13) and 4% to 15%(14) respectively. This is likely due to a combination of:

- earlier diagnosis
- multidisciplinary management with better treatment selection
- improvements in the results of curative therapies including surgery and chemotherapy
- better cancer registration

However, the overall survival is still low in comparison to other common cancers (Table 2).

Table 1: Age-standardised net survival for oesophageal and stomach cancer compared to breast, lung and bowel cancer (adults diagnosed between 2013 and 2017)

	1-year net survival	5-year net survival
Oesophageal Cancer	46.5%	17.0%
Stomach Cancer	47.4%	21.6%
Breast Cancer	95.8%	85.0%
Lung Cancer	40.6%	16.2%
Bowel Cancer	78.3%	58.4%

Source: Office for National Statistics (15)

Survival by cancer stage (extent of spread) show a steady decrease as stage increases (Table 3).

Table 2: One-year age-standardised net survival according to stage at presentation (adults diagnosed between 2013 and 2017)

Stage	Oesophageal Cancer	Stomach Cancer
I	84.5%	88.5%
II	68.3%	71.4%
III	54.8%	63.2%
IV	20.8%	21.4%

Source: Office for National Statistics(15)

Survival is also affected by the route to diagnosis (Table 4).

Table 3: One-year net survival according to route to diagnosis (adults diagnosed between 2012 and 2016)

	Oesophageal Cancer	Stomach Cancer
Two week wait	46.2%	46.6%
GP Referral	54.6%	56.7%
Other Outpatient	55.6%	59.2%
Inpatient elective	59.9%	60.9%
Emergency	18.3%	24.2%
Unknown	47.4%	43.7%

Source: NCRAS(16)

4.7 Gastroscopy

Gastroscopy (upper gastrointestinal endoscopy or oesophago-gastroduodenoscopy) is the principle investigation for diagnosis of oesophageal and stomach cancer. It combines direct visualisation of the lining (mucosal epithelium) of the oesophagus, stomach and duodenum and the ability to take biopsies for pathological examination.

The demand for gastroscopy is high with an estimated 3000 examinations performed per 250,000 population(17). This approximates to at least 60 examinations weekly in most hospitals.

In order to minimise variation in practice and quality assure services, auditable key performance indicators have been defined(17). This is particularly important in oesophageal and stomach cancer as the average failure rate to diagnose a cancer is approximately 11% and up to 15% of patients will have had a “normal” gastroscopy in the three years before their cancer is detected(18). The performance indicators cover different aspects of the patient pathway including pre-procedure evaluation, procedure performance, disease specific details and post-procedure management.

Upper GI endoscopy services are currently under particular strain. A combination of rising demand and limited numbers of trained workforce is requiring units to add extra lists as well as seven day working. Service developments and improvement have been put in place to support productivity and efficiency. There is variation in the functionality and reliability of existing datasets to record activity and outcome as well as access, both of which are required to ensure an appreciation of the extent to which future demand

will affect service provision. This also should take into consideration new technologies and their impact on numbers of examinations.

The Department of Health's *Improving Outcomes: a Strategy for Cancer and Achieving World-Class Cancer Outcomes*(19) report highlights the need to improve access to diagnostics to increase numbers of cancers identified at an early stage and strongly recommends greater investment by central Government. In the Health Education England report – *Cancer Workforce Plan* (20) there is confirmation of a commitment to increase the number of clinical endoscopists together with gastroenterology and histopathology consultants to increase capacity for access to diagnostic endoscopy and potentially for earlier diagnosis.

5. Oesophago-gastric cancer awareness campaigns

5.1 History and aims of Be Clear on Cancer oesophago-gastric cancer awareness campaigns

Local

In 2012 a local pilot campaign, to raise awareness of the symptoms of oesophageal and stomach cancers in the over-55-year-old age group, was run in 7 pilot sites across 25 primary care trusts in the North of England; County Durham and Darlington; Dudley; Sandwell and Wolverhampton; Anglia; Hertfordshire, Luton and South Bedfordshire; and Wandsworth. The campaign used radio and press advertising, local events and distribution of leaflets and posters, supported by a website. The main message for the public was: Tell your doctor if you have difficulty swallowing food or have had indigestion or heartburn most days for three weeks. Engagement with health professionals (GPs and pharmacists) also took place.

Regional

The regional campaign to raise awareness of OG cancer ran in the North East of England (Tyne Tees TV and Borders TV regions) from 10 February to 9 March 2014. It targeted men and women aged over 50 years from lower socioeconomic groups, with a secondary audience of their key influencers such as family and friends.

The campaign included television, radio, press, out of home (on GP television screens and pharmacy bags, and outdoor such as bus shelters) and online advertising, alongside face-to-face events in shopping centres and sports grounds and a public relations campaign. A direct mailshot (letter and leaflet) was sent to men aged 50 years and over in the region. Leaflets were distributed via the events, and also through GP surgeries and other community settings and the campaign website (www.nhs.uk./ogcancer) was developed further.

Following a review of the local pilot campaign, the messaging for the regional campaign was amended slightly. The primary key message was: “Having heartburn, most days, for three weeks or more could be a sign of cancer – tell your doctor”, with a secondary message of “Food sticking when you swallow could be a sign of cancer - tell your doctor”.

National

The national BCoC OG awareness campaign ran for four weeks from 26 January to 22 February 2015 in England, again with the aim of raising public awareness of symptoms of oesophageal and stomach cancers and encouraging those with symptoms to go to their GP.

The target audience and the key messages were the same as for the regional campaign.

The campaign activity comprised advertising, face-to-face public relations and partnership activity. Advertising channels included television, press, radio, online and out of home advertising (pharmacy bags and on GP television screens). Public relations activity was used to communicate the key messages with the support of case studies and clinical spokespeople. Face-to-face events ran in public settings such as shopping centres and football grounds. There was also support from key partners, particularly pharmacies. The campaign website was updated, and leaflets were distributed via GP surgeries and at the face-to-face events. Campaign materials, including leaflets and posters (Figure 2), were made available to partner organisations for distribution locally.

In previous BCoC campaigns the training of medical professionals was supplemented with focussed modules within the education portal of the website www.doctors.net.uk. A new module was developed which was broad-based, covering several aspects of oesophageal and stomach cancer including Barrett's oesophagus. This tool was promoted in briefings to support GPs in particular during the campaign.

Figure 2: Be Clear on Cancer – Oesophago-gastric campaign awareness publicity information

5.2 Evaluation metrics

The evaluation of the regional and national OG campaigns is based on the metric analyses defined in Table 5. The ICD10 codes(21) listed in this table are the international standard diagnostic classification system for all general epidemiological and many health management purposes (22).

An explanation of the methodological approach for metrics can be found in Appendix 1 of this report. Further details are available in the National Cancer Registration and Analysis Service Be Clear on Cancer evaluation metrics: methodology document. 95% confidence intervals are included in some charts where appropriate.

Table 4: List of campaign evaluation metrics and their descriptions

Metric	Description	Codes used
Campaign recognition and public awareness	Public awareness and recognition of the campaigns and public knowledge regarding OG cancer in men aged 50 and over	N/A
GP attendances	The number of visits to their GP by people with the target oesophageal and gastric symptoms	Table 19: List of OG campaign related symptom Read codes
Cancer Waiting Times (CWT) data:		
Urgent GP referrals	Number of urgent GP referrals for suspected upper GI cancers, also known as Two Week Wait (TWW) referrals	N/A
Cancer diagnoses resulting from urgent referrals	Number of upper GI cancer diagnoses resulting from an urgent GP referral for suspected upper GI cancers, also known as: Two Week Wait (TWW) cancers, 62 day waits and 62-day cancers	Oesophageal: ICD-10 C15 Stomach: ICD-10 C16 Upper GI[f]: ICD-10 C15 to C16, C22 to C25
Conversion rate	Percentage of urgent GP referrals for suspected upper GI cancers resulting in a diagnosis of upper GI cancer	

[f] Includes oesophageal and stomach cancers, together with liver, gallbladder and pancreatic cancers

Diagnoses in CWT database	Number of upper GI cancer diagnoses recorded in the CWT database, also known as: CWT cancers, 31 day waits and 31-day cancers	
Detection rate	Percentage of upper GI cancer diagnoses recorded in the CWT database which resulted from an urgent GP referral for suspected upper GI cancer	
Emergency presentations	Proportion of people diagnosed with oesophageal or stomach cancers who first presented as an emergency (the Hospital Episode Statistics (HES) derived emergency presentation metric is calculated from inpatient data)	Oesophageal: ICD-10 C15 Stomach: ICD-10 C16
Diagnostics in secondary care	The number of imaging tests conducted by the NHS, obtained from the Diagnostic Imaging Dataset (DID) held on NHS Digital's iView system(23). These include diagnostic radiology and endoscopies conducted for suspected OG cancer and other medical conditions	DID imaging codes (see appendix 7.7.1)
Cancers diagnosed	The proportion of people living with the disease in the population either diagnosed during the campaign period or newly diagnosed before the campaign started	Oesophageal: ICD-10 C15 Stomach: ICD-10 C16
Early stage at diagnosis	The proportion of patients diagnosed with early stage (stage I & II) oesophageal or stomach cancer; data extracted from the National Cancer Registration and Analysis Service	
Gastroscopy[g]	The number of gastroscopies performed during and in the initial months after the campaign sourced from NHS Monthly Diagnostic Waiting Times and Activity dataset (24)	Diagnostic ID 15 – Gastroscopy

[g] Metric not evaluated for the regional campaign due to data constraints

Proton Pump Inhibitor prescriptions[g]	The number of prescriptions of proton pump inhibitors recorded in OpenPrescribing.net (25)	N/A
One-year survival rate	One-year age-specific net survival was calculated using the methodology outlined in the Office for National Statistics: Cancer Survival Statistical Bulletins (26) using data from the National Cancer Registration and Analysis Service. Persons were followed up until December 2016 to obtain their last known vital status	Oesophageal: ICD-10 C15, Stomach: ICD-10 C16 combined

5.3 Public awareness and knowledge

5.3.1 Awareness and recall

Local

Spontaneous awareness of difficulty swallowing as a symptom of cancer increased following the campaign although in some of the test sites there was already a high level of understanding of the significance of the symptom. The awareness of indigestion increased more significantly since in most sites before the campaign many people had had limited concern about indigestion.

Regional

Over eight in ten (84%) people reported having seen the cancer publicity before the campaign in the campaign region with a similar proportion having seen it in the control region (79%). An indicative increase occurred following the campaign among campaign region respondents (from 84% to 87%). This resulted in a significantly higher level of awareness for campaign region respondents when compared to the control suggesting that the campaign had an impact on awareness levels.

There was a significant increase in the proportion of respondents in the campaign region who had seen the publicity relating to heartburn (0% to 13%). Recall of this publicity remained at zero in the control region both pre and post campaign, indicating that the increase in the campaign region was a result of the campaign. There was also an increase in those in the campaign region recalling publicity that encouraged them to see their doctor (6% to 13%) while the corresponding results remained static among the control group.

National

There was a significant increase in the proportion saying they had seen symptom publicity about the key symptoms, from one in 10 (10%) to four in 10 (40%), demonstrating clear campaign impact. The most recalled symptom was heartburn (6% to 33%), which saw the biggest increase and reflects the fact that this was the main symptom in the messaging.

Recollection of food sticking as a symptom also increased post campaign but to relatively low levels (13%).

5.3.2 Prompted recognition

Regional

Eight in ten (79%) recognised at least one of the advertisements from the campaign. This was the highest level of recognition compared to the other six cancer sites in which regional campaigns have been undertaken. The television (69%) and press advertisements (35%) achieved above average recognition, while recognition of the radio advertising (26%) and leaflet (19%) was in line with average.

National

Seven in ten respondents (72%) recognised at least one element of the national campaign with the majority of this being driven by the television advert (63%). One in four (23%) recognised the radio advert, one in five (20%) the press advert, one in seven (15%) the leaflet and one in seven (13%) the YouTube pre-roll advert (video commercial that appears prior to an online video).

5.3.3 Campaign communication

Local

Feedback from pharmacists demonstrated that their involvement was an important way in which patient discussions could stimulate awareness. Over half of pharmacists reported that their staff had had conversations with customers about oesophageal and stomach cancer and this included making appointments to see their GP.

Regional

The call to action message (‘go to the doctor’) was spontaneously mentioned by over half of respondents (56%) after seeing the advertisements. The messages concerning

symptoms were less commonly received. Less than one in six (15%) mentioned being aware of signs or symptoms and only 7% mentioned heartburn or indigestion for three weeks or more. When prompted, almost nine in ten recognised messages relating to heartburn and food sticking.

National

The ‘call to action’ and ‘act early’ messages were successfully conveyed by the advertisements and people were easily able to make the link between the campaign symptoms and cancer.

The call to action (“go to the doctor”) was well recalled and was mentioned by over half (54%) after seeing the advertisements. The act early/quickly message (“see your doctor early/act quickly, don’t delay”) was mentioned by one in five (19%).

Only one in 20 respondents (6%) spontaneously mentioned heartburn for three weeks or more but, when prompted, around eight in ten (83%) agreed that the advertisements made them realise that the key symptoms could be signs of cancer. It was widely agreed that it is important that advertisements like this are shown and the same proportion agreed that the advertisements were clear and easy to understand (91% each) in line with previous BCoC campaigns.

Encouragingly, the campaign delivered high levels of ‘new news’ (62% agreed). This is likely to be related to the low pre-existing knowledge of the heartburn symptom which genuinely represented ‘new news’ for many people.

5.3.4. Knowledge and attitudes

Regional

A quarter of the population (25%) were confident in their knowledge of OG cancer symptoms before the campaign and this increased to more than one in three (35%) in the campaign region after the campaign. Positive increases in prompted knowledge of key symptoms were seen among those in the campaign region. There was a statistically significant increase in the proportion of pre- and post- campaign survey respondents who stated that persistent heartburn and food sticking was a definite warning sign of OG cancer. For persistent heartburn this increased from one in ten (11%) before the campaign to three in ten (31%) after, and for food sticking this increased from 23% before the campaign to 38% after. None of these increases in understanding were seen among those in the control region, pointing to the campaign as responsible for this change.

National

The existing spontaneous knowledge of the 'food sticking' symptom was high, and this remained stable after the campaign (20% to 22%). For heartburn there was lower existing knowledge beforehand, with one in ten (9%) aware, but this increased significantly after the campaign to 17% and is what we might expect given persistent heartburn was the lead symptom.

There was no change in the proportion indicating that they did not know any symptoms of oesophageal or stomach cancer (42% to 43%). This may indicate low awareness in general rather than a lack of knowledge of the symptoms.

The proportion of people who thought that persistent heartburn was a definite symptom of oesophageal or stomach cancer increased significantly after the campaign, from 13% to 24%.

Therefore, the overall proportion who thought persistent heartburn was a warning sign increased from 66% to 77%. Knowledge of the food sticking symptom started at higher level and also increased, albeit by a much smaller amount (75% to 79%), reflecting its lower prominence in the campaign materials.

5.3.5 Campaign impact

Regional

Eight in ten (82%) agreed that the advertising would make them more likely to go to the GP with any symptoms featured in the campaign. This was around the average level compared to other BCoC regional campaigns. One in six (16%) of those who recognised the campaign stated that they had taken some action, with the most common action being to talk to friends or family members to advise them (7%). Just fewer than one in twenty (4%) said they had made an appointment with their GP.

National

The campaign had a good call to action, with eight in 10 (82%) agreeing that the advertising would persuade them to go to the GP if they had the symptoms and were concerned about them, consistent with previous BCoC campaigns. Encouragingly, one in four (23%) of those who recalled the campaign publicity stated that they had taken

some action as a result. This is higher than other BCoC national campaigns in which the average was 19%.

The most common action taken was making a GP appointment, which around 8% said they had done, and this is higher than has been observed in this type of campaign previously. The second most common action was talking to friends or family about symptoms (6%) followed by talking to friends or family to advise about the information in the advertisements (5%) and thinking about making a GP appointment (4%).

GP awareness

Between the launch of the campaign on 21 January 2015 and 25 February 2015, 362 doctors, including 324 GPs, undertook the training module. Of those who completed the module, 96.7% agreed that they had increased their awareness of the risk factors for oesophageal and stomach cancer and 64% reported that they intended to change practice including on providing advice on reducing risks.

5.4 Impact on referrals and diagnosis of oesophageal and stomach cancer by regional and national campaigns

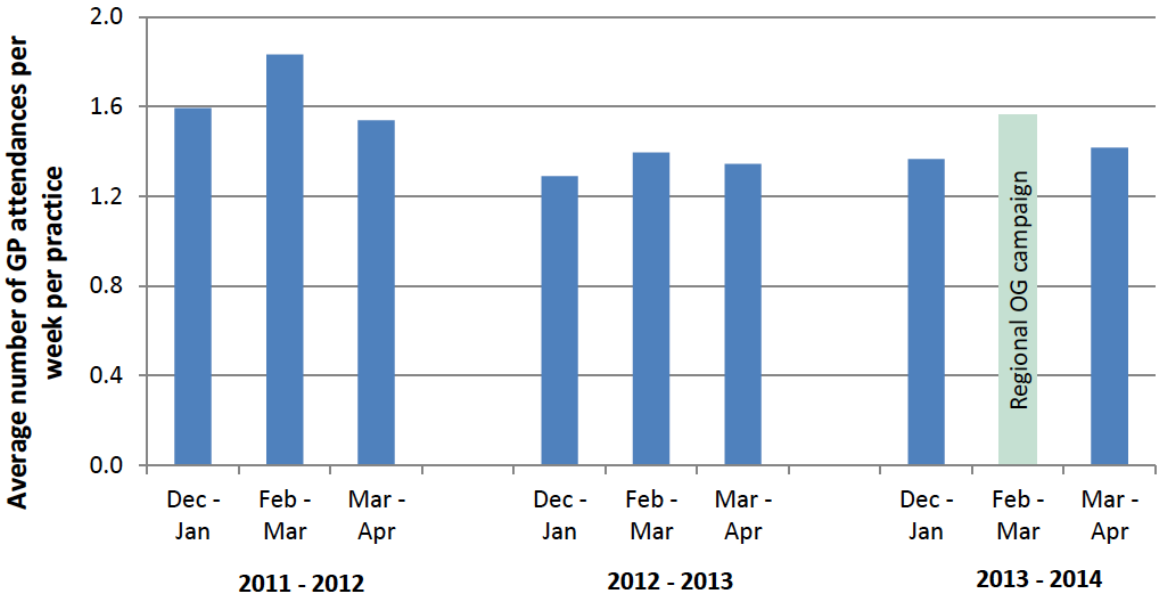
5.4.1 GP attendances

The number of people in the campaign area attending a GP with the target symptoms.

Regional

The number of attendances for target symptoms during the campaign period (325 attendances) was not statistically significantly different from the average during all the other periods combined (302.3 attendances after adjustment, p=0.36).

For people aged 50 years and over living in the campaign area, the number of GP attendances for target symptoms per week per practice was slightly higher during the campaign period than in the same weeks in 2013 but lower than in 2012 (Figure 3). Comparing the campaign period to the corresponding period in 2013, there was a 12% increase (not statistically significant, p=0.158) in the average number of attendances for target symptoms per week per practice (from 1.39 to 1.56, Figure 3). Over the same period, there was a statistically significant 14% increase (p=0.003) in average attendances in the campaign area for those aged 50 and over who were subsequently referred with suspected upper GI cancers.



Source: The Health Improvement Network

Figure 3: Average number of GP attendances for target OG symptoms per week per practice (adjusted for bank holidays) for people aged 50 years and over in the campaign area during the pre-, live and post-campaign periods, compared with corresponding periods in the previous two years

These increases should be considered in the context of decreases in the average number of attendances in the control area (4% decrease in target symptom attendances, non-significant, p=0.894) and for control symptoms (1% decrease in attendances in the campaign area, non-significant, p=0.68).

When comparing the campaign period with the corresponding period in 2013, the increase in attendances for target symptoms was larger for those aged under 50 years (31%, statistically significant, p=0.005). It was also larger for females rather than for males (17%, p=0.133, compared to 5%, p=0.700, for those aged 50 years and over, both not statistically significant).

In conclusion there was a small, but not statistically significant, increase in the number of GP attendances recorded for target symptoms, for those aged 50 years and over living within the campaign area, during the regional OG cancer awareness campaign.

National

During the 2015 campaign period, the combined number of GP attendances for symptoms of dyspepsia and dysphagia showed a statistically significant increase of

28.8% (p<0.001), from 2.91 visits per practice per week to 3.75 visits per practice per week, when compared with the same period in 2013 (Figure 4). In comparison, results for the control symptom (back pain) showed a small decrease which was not statistically significant (1.3% decrease, p=0.208), from 11.00 visits per GP practice per week in 2013 to 10.86 visits per practice per week during the 2015 campaign period. The combined number of GP attendances for dyspepsia and dysphagia remained higher in the weeks just after the campaign but appeared to return to their pre-campaign levels within 12 weeks.

For dyspepsia, during the 2015 campaign period the number of attendances increased by 26.1% (statistically significantly, p<0.001) from 2.49 visits per practice per week in 2013 to 3.14 visits per practice per week in 2015. For dysphagia, the number of attendances increased by 46.2% (statistically significantly, p<0.001) from 0.42 attendances per practice per week in 2013 to 0.62 attendances per practice per week in 2015.

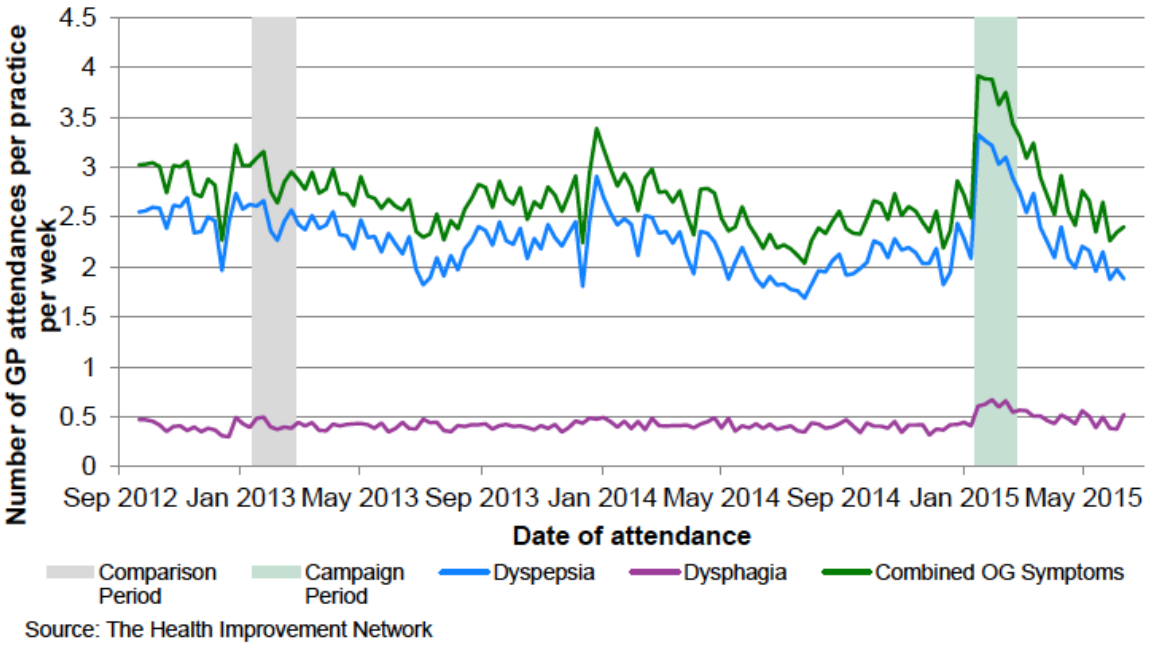


Figure 4: Average number of GP attendances, per practice per week, for dyspepsia, dysphagia and both symptoms combined (OG symptoms), 1 October 2012 to 28 June 2015, all ages

The increase in the combined number of GP attendances for symptoms of dyspepsia and dysphagia during the campaign, when compared with the same period two years earlier, was larger for men than for women (44.6% for men compared to 18.0% for women, both statistically significant, p<0.001).

For people aged 50 years and over, there was a statistically significant ($p<0.001$) increase of 33.9% in the combined number of attendances for dyspepsia and dysphagia during the campaign, when compared with the same period two years earlier.

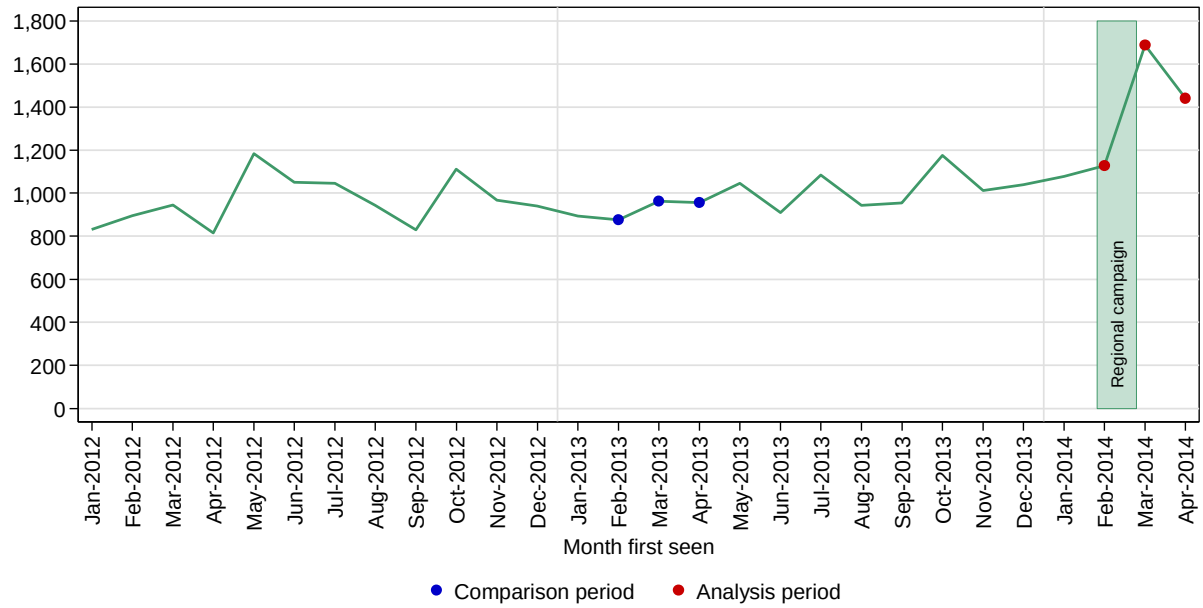
In conclusion, there was a large, statistically significant, increase in the number of GP attendances for the target symptoms (dyspepsia and dysphagia) during and following the national campaign for OG cancers.

5.4.2 Urgent GP referrals for suspected cancer

Urgent GP referrals for suspected upper GI cancers, presented by month first seen (also known as two week wait (TWW) referrals).

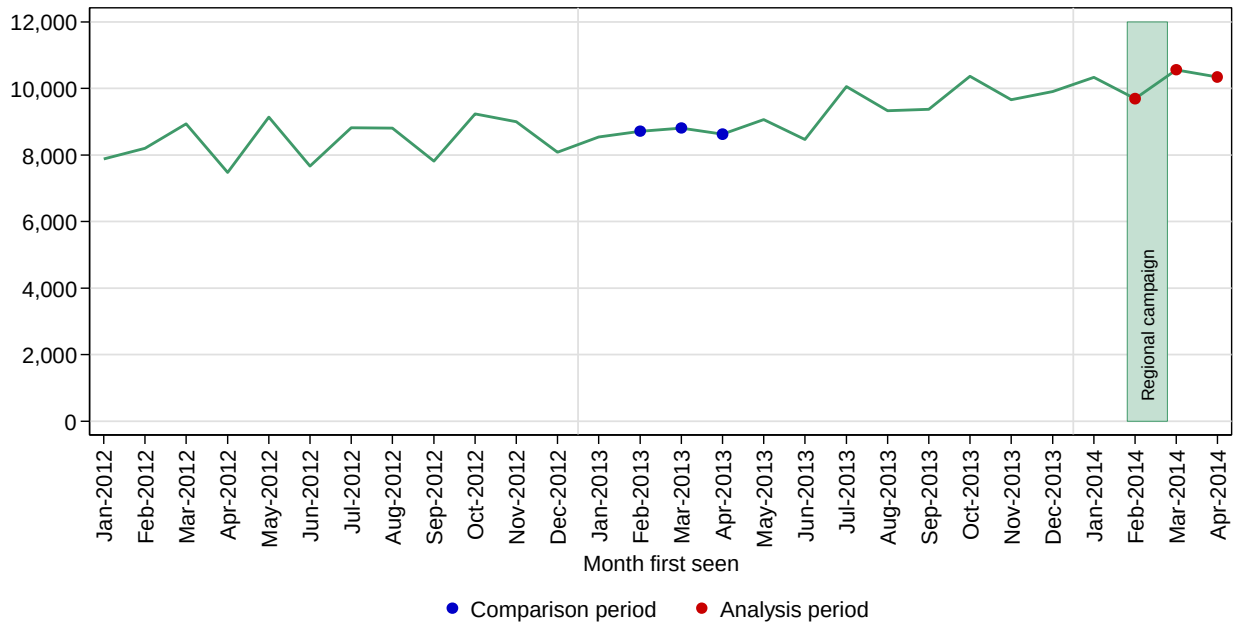
Regional

Figures 5 and 6 both show a general upward trend in referrals for suspected upper GI cancers. In the regional campaign area (Figure 5), there was also a notable increase in February to April 2014, particularly in March. This result is also demonstrated in Table 6, with statistically significant increases in urgent GP referrals for suspected upper GI cancers for both the regional campaign area and the control area for February to April 2014 compared to the same months in 2013. However, the 52% increase within the regional campaign area, from 2,795 referrals in February to April 2013 to 4,257 referrals in the same months in 2014, was much larger than the 17% increase in the control area.



Source: NCRAS, PHE. Cancer Waiting Times data provided by NHS England and NHS Digital

Figure 5: Monthly number of urgent GP referrals for suspected upper GI cancers from January 2012 to April 2014, regional campaign area



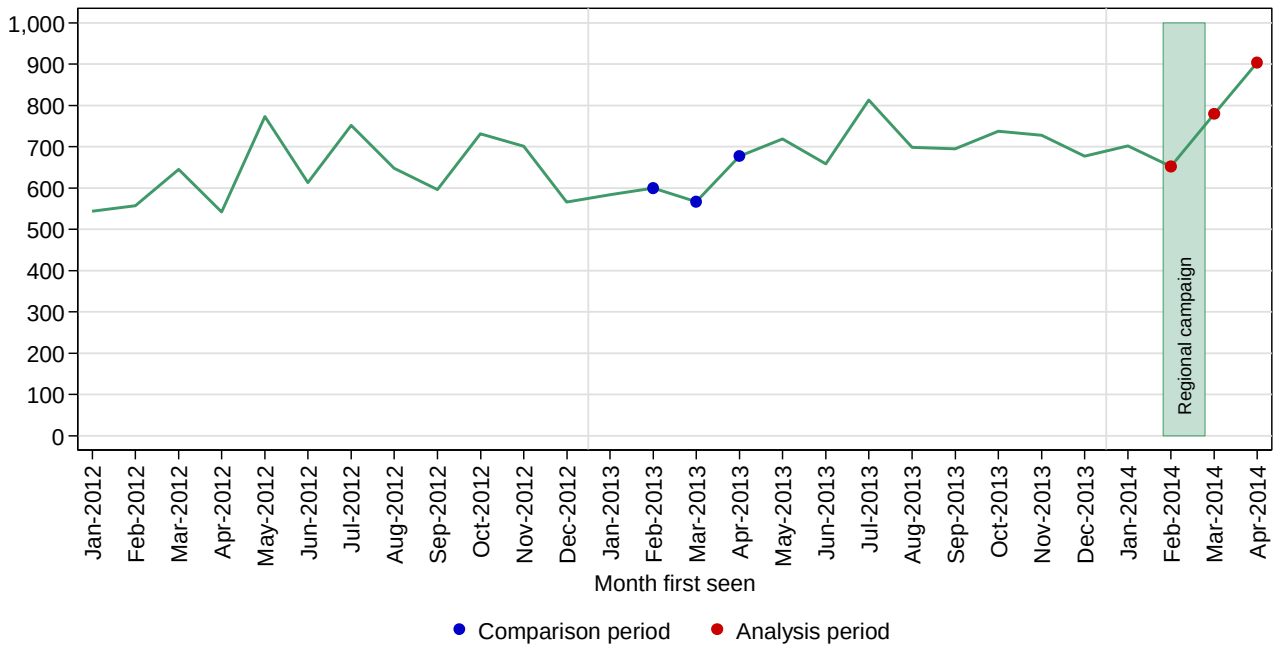
Source: NCRAS, PHE. Cancer Waiting Times data provided by NHS England and NHS Digital

Figure 6: Monthly number of urgent GP referrals for suspected upper GI cancers from January 2012 to April 2014, control area

Table 5: Number of urgent GP referrals for suspected upper GI cancers, with referral rate and percentage change in number of referrals, from February to April 2013 and February to April 2014

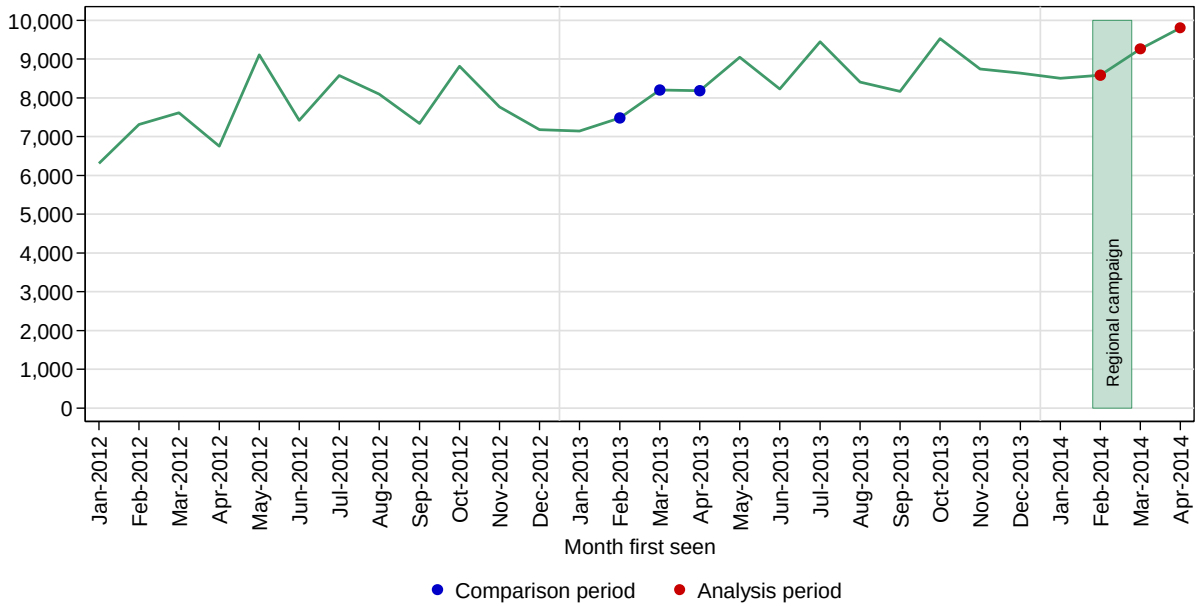
Area		February to April				
		Referrals	% Change in number	P-value	Referral rate	
					Estimate	95% CI
Regional campaign	2013	2,795	52.3	<0.001	401.4	(386.5, 416.7)
	2014	4,257			611.7	(593.3, 630.6)
Control	2013	26,143	17.0	<0.001	280.8	(277.4, 284.3)
	2014	30,585			327.9	(324.2, 331.6)

Referrals for suspected head and neck cancers, the control referral group, also exhibit a generally increasing trend (Figures 7 and 8). Table 7 shows that comparing 2013 and 2014 there was a 27% increase in referrals in the campaign area as opposed to 16% in the control area. The rate of head and neck referrals were similar to oesophageal and gastric cancer in the control area.



Source: NCRAS, PHE. Cancer Waiting Times data provided by NHS England and NHS Digital

Figure 7: Monthly number of urgent GP referrals for suspected head and neck cancers from January 2012 to April 2014, regional campaign area



Source: NCRAS, PHE. Cancer Waiting Times data provided by NHS England and NHS Digital

Figure 8: Monthly number of urgent GP referrals for suspected head and neck cancers from January 2012 to April 2014, control area

Table 6: Number of urgent GP referrals for suspected head and neck cancers, with referral rate and percentage change in number of referrals, from February to April 2013 and February to April 2014

Area		February to April				
		Referrals	% Change in number	P-value	Referral rate	
					Estimate	95% CI
Regional campaign	2013	1,844	26.6	<0.001	259.7	(247.9, 272.0)
	2014	2,335			331.2	(317.8, 345.0)
Control area	2013	23,860	15.9	<0.001	246.2	(243.1, 249.4)
	2014	27,647			285.8	(282.4, 289.3)

National

In the campaign period there was an 84% increase in urgent GP referrals for suspected upper GI cancers in England from 21,521 (February to March 2013) to 39,604 referrals (February to March 2015) (Table 8). There was also a substantial increase in urgent GP referrals for other suspected cancers in England with a 32% increase from 97,242 to 128,353 referrals during the same comparative periods (Table 9). However, this increase in other referrals was much smaller than the increase in upper GI referrals and seemed broadly in line with the long-term trend.

Table 7: Number of urgent GP referrals for suspected upper GI cancers, with referral rate and percentage change in number of referrals, from February to March 2013 and February to March 2015, England

Overall		February to March				
			% Change in number	P-value	Referral rate	
		Referrals			Estimate	95% CI
England	2013	21,521	84.0	<0.001	279.7	(275.9, 283.5)
	2015	39,604			488.6	(483.8, 493.5)

Table 8: Number of urgent GP referrals for other suspected cancers, with referral rate and percentage change in number of referrals, from February to March 2013 and February to March 2015, England

Overall		February to March				
			% Change in number	P-value	Referral rate	
		Referrals			Estimate	95% CI
England	2013	97,242	32.0	<0.001	1,237.6	(1,229.7, 1,245.4)
	2015	128,353			1,558.0	(1,549.4, 1,566.7)

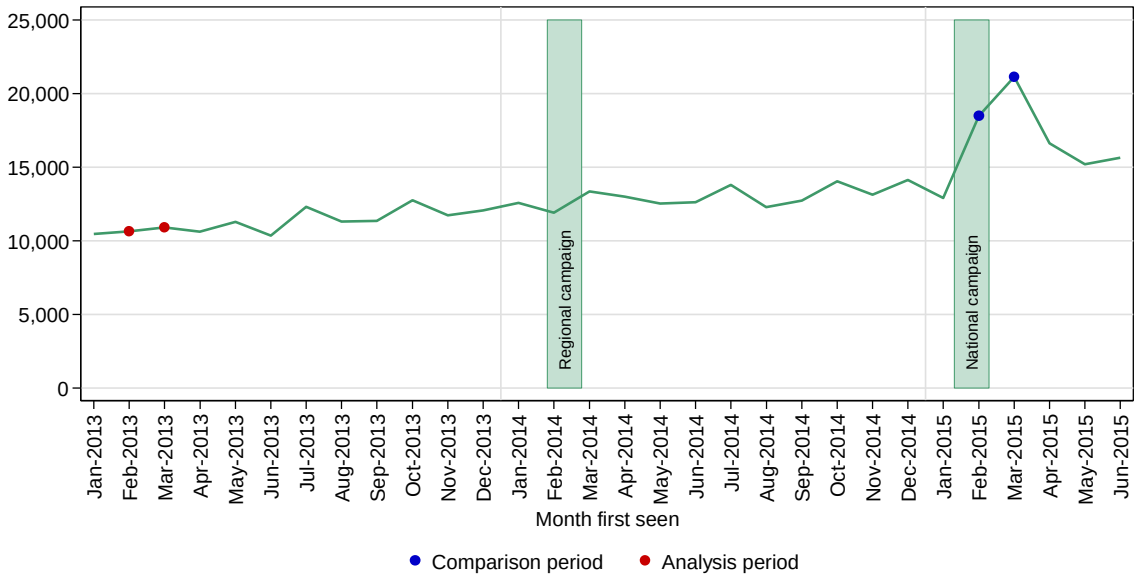
In the post-campaign period, there was a statistically significant increase in urgent GP referrals for suspected upper GI cancers in England of 47%, from 32,245 (April to June 2013) to 47,424 referrals (April to June 2015). There was a 29% increase in urgent GP

referrals for other suspected cancers in England from 158,916 (April to June 2013) to 204,952 (April to June 2015).

There has been a gradual upward trend in the number of referrals for suspected upper GI cancers nationally, but the increase after the campaign period was much larger than the long-term trend (Figure 9). The numbers of referrals decreased in the post-campaign period following the clear peak during the campaign period in February and March 2015.

However, compared to the long-term trend, the number of referrals remained notably higher in April 2015 and also appeared to be slightly higher in May and June 2015.

In summary, the national campaign appears to have resulted in a large increase in referrals during the campaign period and it may have had a small continuing impact on urgent GP referrals for suspected upper GI cancers for April to June 2015.



Source: NCRAS, PHE. Cancer Waiting Times data provided by NHS England and NHS Digital

Figure 9: Monthly number of urgent GP referrals for suspected upper GI cancers from January 2013 to June 2015, England

Larger increases in urgent GP referrals for suspected upper GI cancers were found for those aged in their 50s (111% for the campaign period and 65% for the post-campaign period), with smaller increases for those aged 80 and over (58% and 30% respectively).

The campaign period increase in urgent GP referrals for suspected upper GI cancers was a little larger for men (87%) than for women (82%). In contrast, the post-campaign increase for women (49%) was a little higher than that for men (45%). However, there was not enough evidence of a clear difference between the genders in the impact of the campaign.

5.4.3 Cancer diagnoses resulting from an urgent GP referral for suspected cancer

Those upper GI cancer diagnoses (ICD10 C15-C16, C22-C25) resulting from an urgent GP referral for suspected upper GI cancers, presented by month first seen. Also known as two week wait (TWW) cancers, or 62-day cancers.

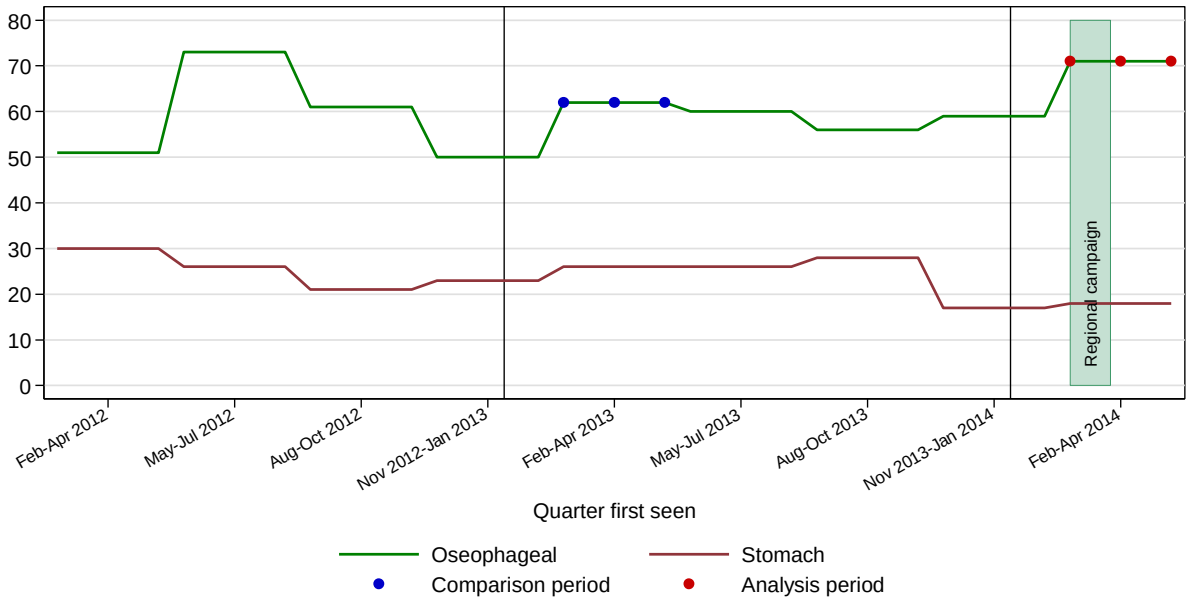
Regional

There were no statistically significant changes in the number of oesophageal, stomach or upper GI cancer diagnoses resulting from an urgent GP referral for suspected upper GI cancers comparing February to April 2014 with the same months in 2013 (Table 10) in the regional campaign area. Similarly, there were no significant changes in the control area.

Table 9: Number of oesophageal, stomach and upper GI cancer diagnoses resulting from urgent GP referrals for suspected upper GI cancers, with percentage change in number of cancers, from February to April 2013 and February to April 2014

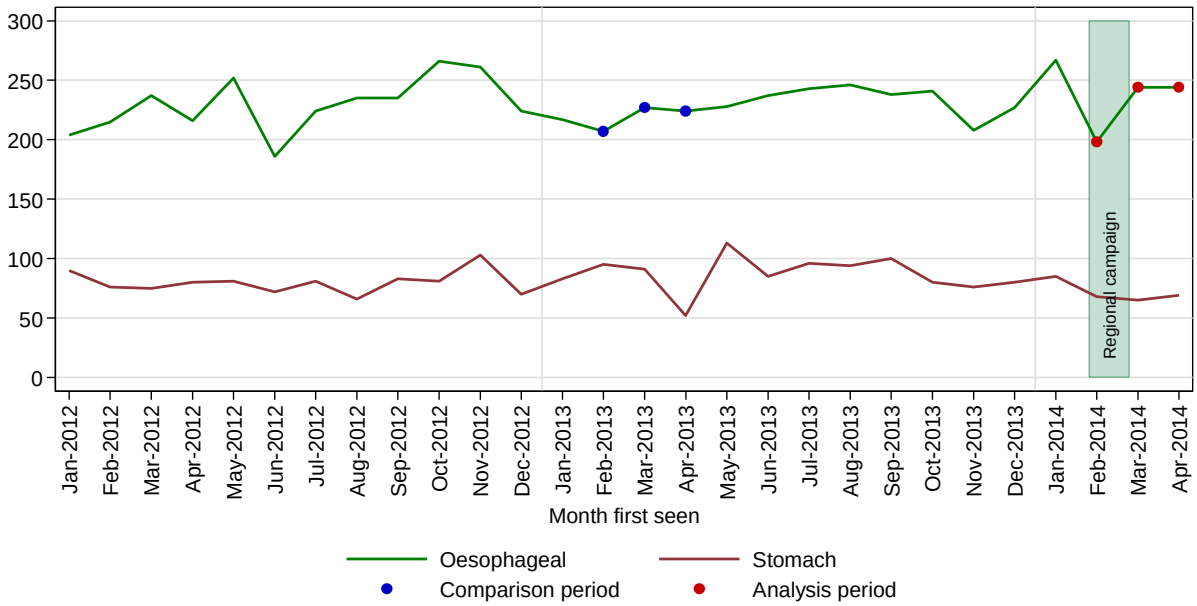
Cancer type	Area	February to April			
		TWW cancers		% Change in number	P-value
		2013	2014		
Oesophageal	Regional campaign	62	71	14.5	0.435
	Control	658	686	4.3	0.445
Stomach	Regional campaign	26	18	-30.8	0.227
	Control	238	202	-15.1	0.086
Upper GI	Regional campaign	114	126	10.5	0.438
	Control	1,341	1,304	-2.8	0.472

There was a large amount of natural monthly and quarterly variation in the number of diagnoses resulting from an urgent GP referral for suspected upper GI cancers, reflecting the relatively small numbers of such cases in the regional campaign area (Figures 10 and 12). However, there was also a reasonable amount of variation apparent in the larger control area. (Figures 11 and 13).



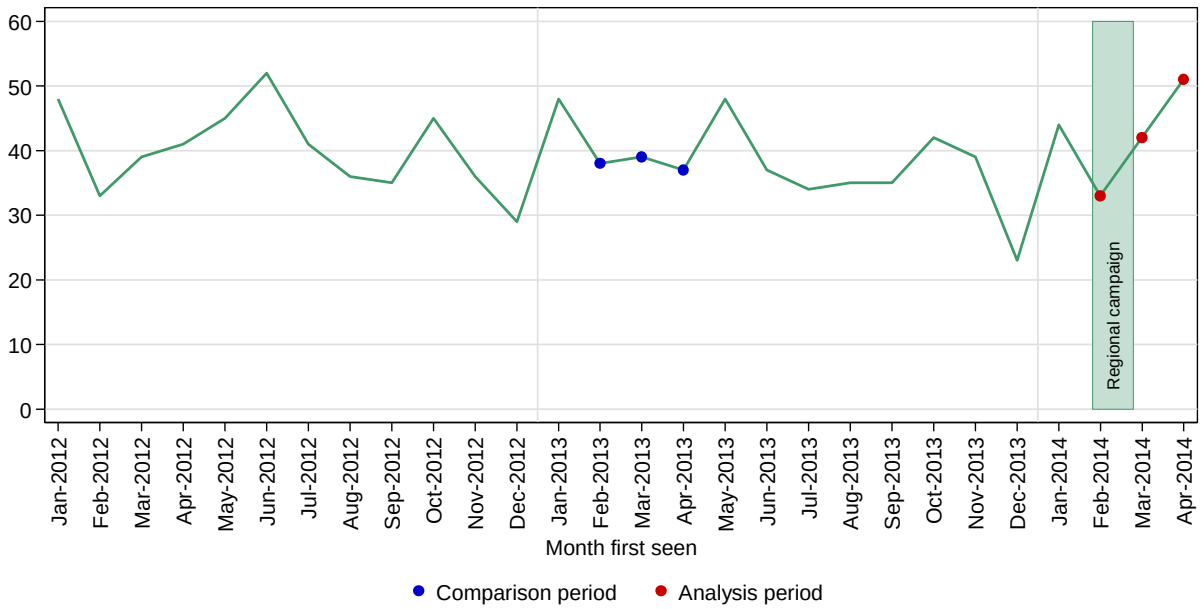
Source: NCRAS, PHE. Cancer Waiting Times data provided by NHS England and NHS Digital

Figure 10: Quarterly number of oesophageal and stomach cancer diagnoses resulting from an urgent GP referral for suspected upper GI cancers from February 2012 to April 2014, regional campaign area – regional campaign



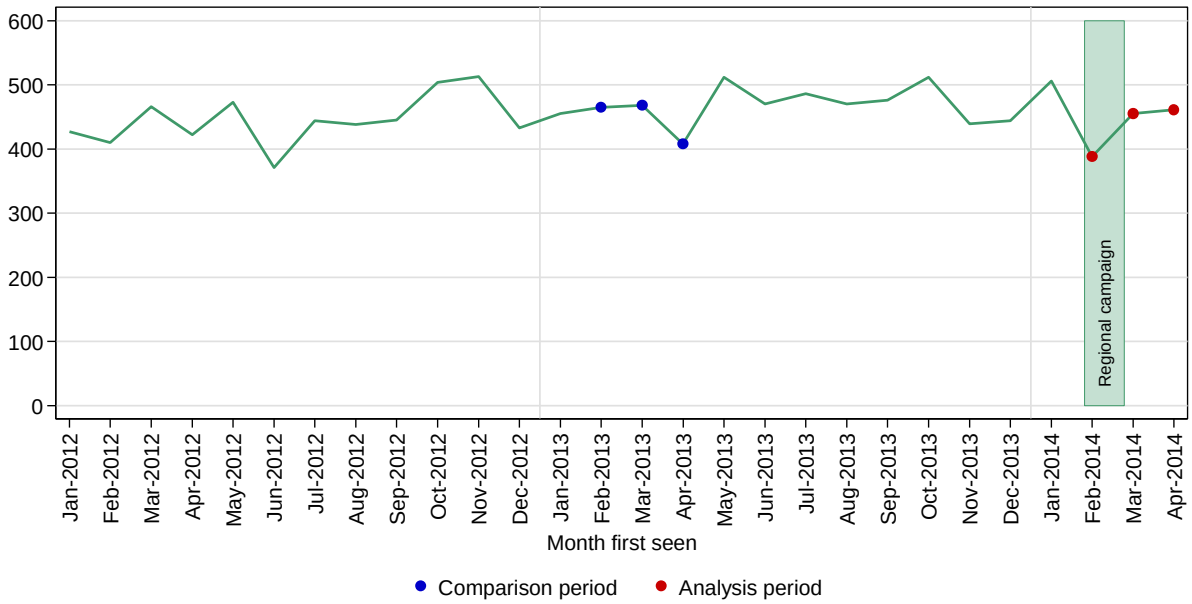
Source: NCRAS, PHE. Cancer Waiting Times data provided by NHS England and NHS Digital

Figure 11: Monthly number of oesophageal and stomach cancer diagnoses resulting from an urgent GP referral for suspected upper GI cancers from January 2012 to April 2014, control area – regional campaign



Source: NCRAS, PHE. Cancer Waiting Times data provided by NHS England and NHS Digital

Figure 12: Monthly number of upper GI cancer diagnoses resulting from an urgent GP referral for suspected upper GI cancers from January 2012 to April 2014, regional campaign area – regional campaign



Source: NCRAS, PHE. Cancer Waiting Times data provided by NHS England and NHS Digital

Figure 13: Monthly number of upper GI cancer diagnoses resulting from an urgent GP referral for suspected upper GI cancers from January 2012 to April 2014, control area – regional campaign

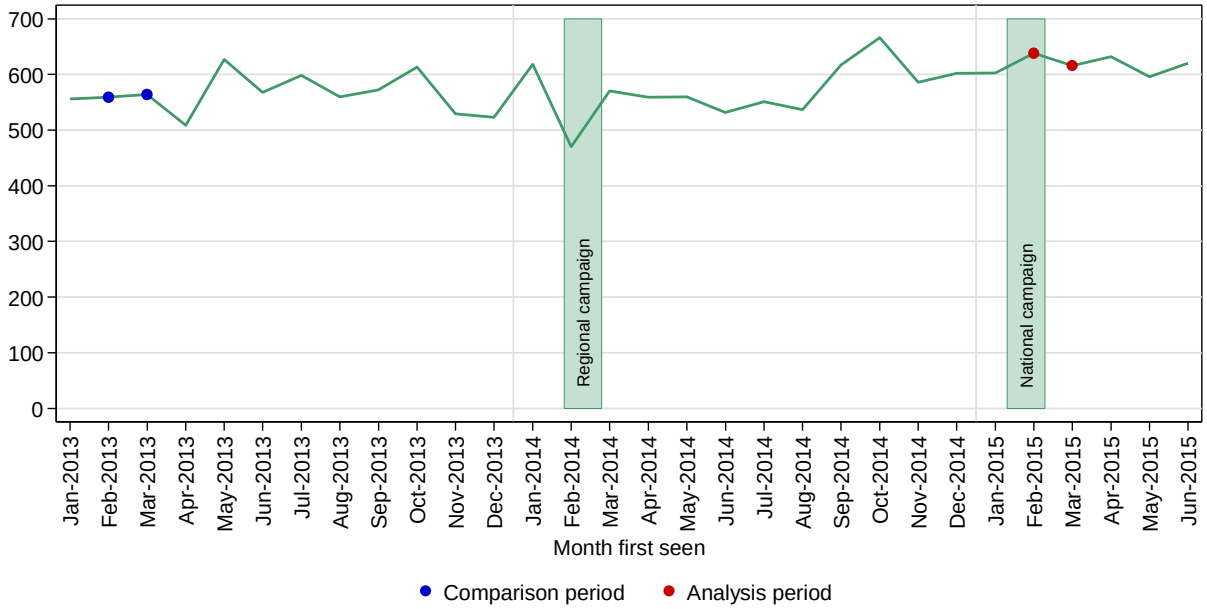
National

During the campaign period of February to March 2015, there was a statistically significant 12% increase in the number of upper GI cancers diagnosed following an urgent GP referral for suspected upper GI cancers compared to February to March 2013 (Table 11). For the three months after the campaign (April to June 2015) there was a statistically significant 8.5% increase in the number of upper GI cancer diagnoses in comparison with April to June 2013.

Table 10: Number of oesophageal, stomach and upper GI cancer diagnoses resulting from urgent GP referrals for suspected upper GI cancers, with percentage change in number of cancers, from February to March 2013 and February to March 2015, England

Site	February to March			
	TWW Cancers		% Change in number	P-value
	2013	2015		
Oesophageal	544	655	20.4	0.001
Stomach	216	225	4.2	0.668
Upper GI	1,123	1,254	11.7	0.007

However, there was no obvious peak in the number of upper GI cancer diagnoses in February and March 2015, with the largest number of diagnoses seen in October 2014, several months before the campaign, however these numbers were only slightly higher than after the campaign (Figure 14). The number of diagnoses each month for February 2015 to June 2015 appears consistent with the long-term trend and the monthly variability in these numbers.



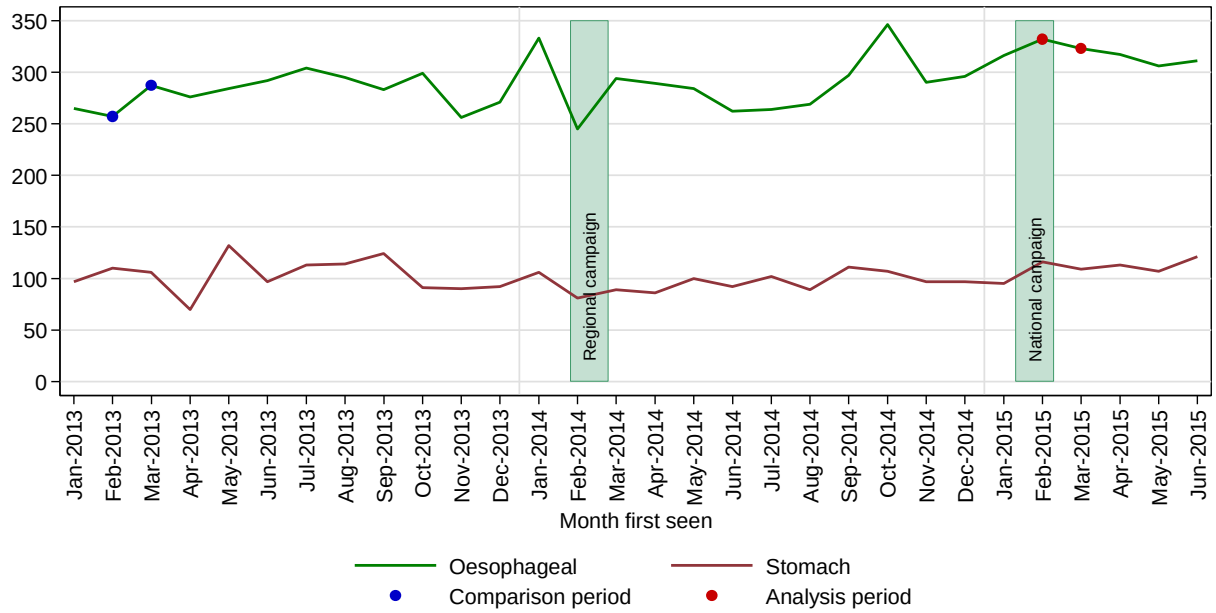
Source: NCRAS, PHE. Cancer Waiting Times data provided by NHS England and NHS Digital

Figure 14: Monthly number of upper GI cancer diagnoses resulting from an urgent GP referral for suspected upper GI cancers from January 2013 to June 2015, England

There was also a statistically significant 20% increase in the number of oesophageal cancer diagnoses resulting from an urgent GP referral for suspected upper GI cancers when comparing February to March 2013 (544 cancers) and February to March 2015 (655 cancers). Although the number of cancers in February and March 2015 were higher than in the preceding few months, there had been higher or similar numbers in January 2014 and October 2014 (Figure 15). The number of these diagnoses appeared to be consistent with the underlying trend and the variability in this trend.

There were no statistically significant differences in the number of stomach cancer diagnoses resulting from urgent GP referrals for suspected upper GI cancers for either February to March 2015 or April to June 2015 when compared to the same months in 2013. The number of these stomach cancer diagnoses did appear to peak in February and March 2015 for England when compared to the previous few months (Figure 15).

However, there was notable variation in the long-term trend and particularly in 2013, with a higher number of these diagnoses in some months in 2013 than in either February or March 2015.



Source: NCRAS, PHE. Cancer Waiting Times data provided by NHS England and NHS Digital

Figure 15: Monthly number of oesophageal and stomach cancer diagnoses resulting from an urgent GP referral for suspected upper GI cancers from January 2013 to June 2015, England

This suggests that the national campaign may have had an impact on the number of oesophageal cancer diagnoses resulting from urgent GP referrals for suspected upper GI cancer although there had previously been higher numbers of these cancers in occasional months before the campaign. There was no clear evidence that it had an impact on the number of stomach cancer diagnoses resulting from an urgent GP referral for suspected upper GI cancer. Neither is there any clear evidence of a persisting or later impact on the numbers of oesophageal, stomach or upper GI cancers resulting from an urgent GP referral for suspected upper GI cancers (April to June 2015 data).

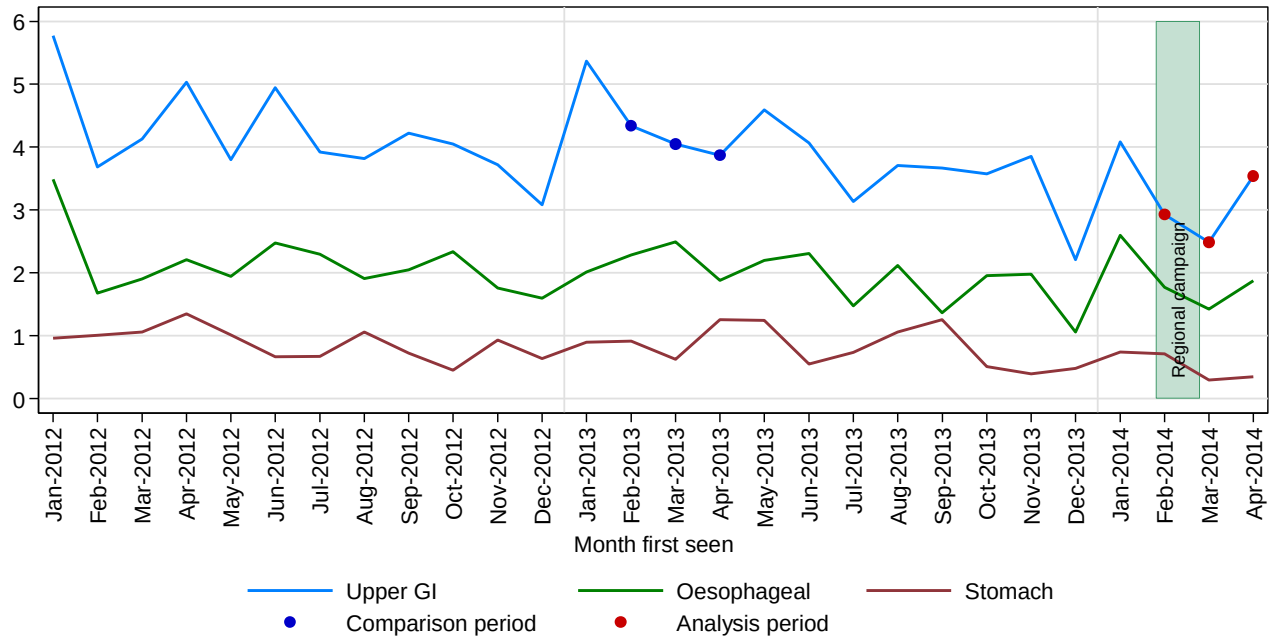
5.4.4 Conversion rate

Percentage of urgent GP referrals for suspected upper GI cancers resulting in a diagnosis of upper GI cancer, presented by month first seen. The numerator is the

number of cancers diagnosed and the denominator is the total number of urgent referrals.

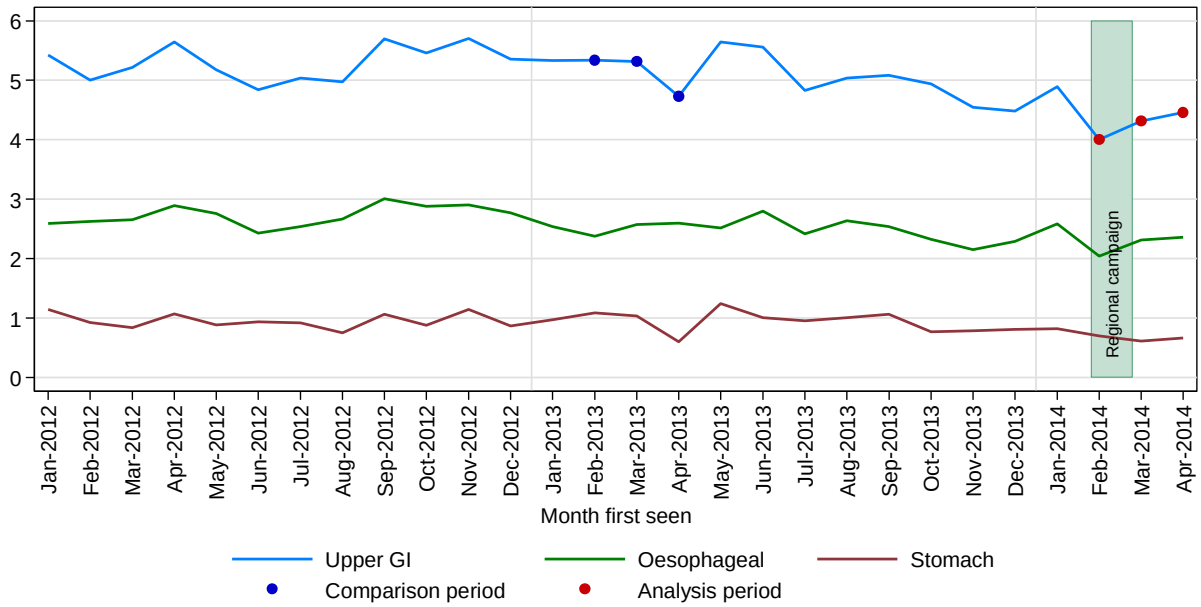
Regional

Conversion rates for urgent GP referrals for suspected upper GI cancer to a diagnosis of oesophageal or stomach cancer show an overall longer-term decreasing trend (Figures 16 and 17).



Source: NCRAS, PHE. Cancer Waiting Times data provided by NHS England and NHS Digital

Figure 16: Monthly oesophageal cancer conversion rates for urgent GP referrals for suspected upper GI cancers from January 2012 to April 2014, regional campaign area



Source: NCRAS, PHE. Cancer Waiting Times data provided by NHS England and NHS Digital

Figure 17: Monthly oesophageal cancer conversion rates for urgent GP referrals for suspected upper GI cancers from January 2012 to April 2014, control area – regional campaign

For February to April 2014, compared to February to April 2013, Table 12 shows that there were statistically significant decreases in the stomach and upper GI cancer conversion rates within the regional campaign area; the stomach cancer conversion rate decreased by 0.5 percentage points, from 0.9% to 0.4%; the upper GI cancer conversion rate decreased by 1.1 percentage points, from 4.1% to 3.0%. These changes were similar, although slightly larger, than the decreases for the control area, for which there was also a significant decrease in the oesophageal cancer conversion rate. This suggests that the long-term decreasing trend accounts for much of the decrease in conversion rates, although there may have been a small additional decrease related to the large increases in referrals in the regional campaign area during the campaign period.

Table 11: Oesophageal, stomach and upper GI cancer conversion rates for urgent GP referrals for suspected upper GI cancers, with change, from February to April 2013 and February to April 2014

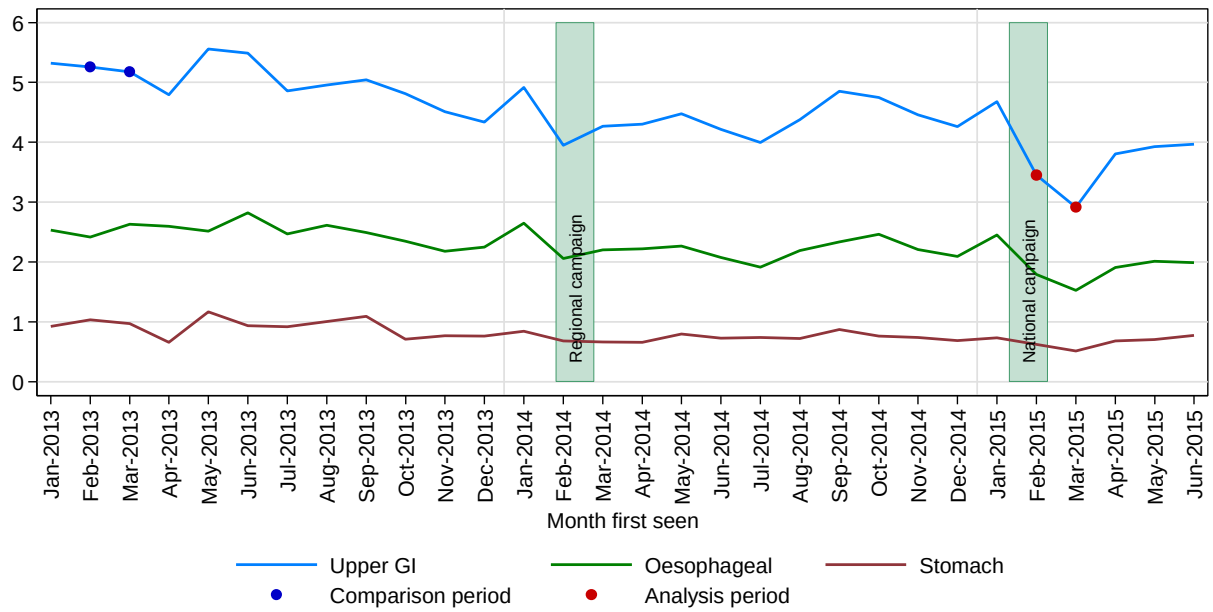
Cancer type	Area	February to April					
		2013		2014			
		Conv. rate (%)	95% CI	Conv. rate (%)	95% CI	%-point change	P-value
Oesophageal	Regional campaign	2.2	(1.7, 2.8)	1.7	(1.3, 2.1)	-0.6	0.097
	Control	2.5	(2.3, 2.7)	2.2	(2.1, 2.4)	-0.3	0.032
Stomach	Regional campaign	0.9	(0.6, 1.4)	0.4	(0.3, 0.7)	-0.5	0.008
	Control	0.9	(0.8, 1.0)	0.7	(0.6, 0.8)	-0.2	<0.001
Upper GI	Regional campaign	4.1	(3.4, 4.9)	3.0	(2.5, 3.5)	-1.1	0.011
	Control	5.1	(4.9, 5.4)	4.3	(4.0, 4.5)	-0.9	<0.001

National

Between February to March 2013 and the campaign period, there were statistically significant decreases in the oesophageal, stomach and upper GI cancer conversion rates, with the largest decrease of 2.1 percentage points seen for the conversion rate for upper GI cancers combined (Table 13). There has been a gradual decreasing trend in the oesophageal, stomach and upper GI cancer conversion rates shown since January 2013 (Figure 18). However, particularly for oesophageal cancer and upper GI cancers, there appeared to be a larger decrease in conversion rate for February 2015 with a similar rate for March 2015.

Table 12: Oesophageal, stomach and upper GI cancer conversion rates for urgent GP referrals for suspected upper GI cancers, with change, from February to March 2013 and February to March 2015, England

Site	February to March					
	2013		2015			
	Conv. Rate (%)	95% CI	Conv. Rate (%)	95% CI	%-Point Change	P-value
Oesophageal	2.5	(2.3, 2.7)	1.7	(1.5, 1.8)	-0.9	<0.001
Stomach	1.0	(0.9, 1.1)	0.6	(0.5, 0.6)	-0.4	<0.001
Upper GI	5.2	(4.9, 5.5)	3.2	(3.0, 3.3)	-2.1	<0.001



Source: NCRAS, PHE. Cancer Waiting Times data provided by NHS England and NHS Digital

Figure 18: Monthly oesophageal, stomach and upper GI cancer conversion rates for urgent GP referrals for suspected upper GI cancers from January 2013 to June 2015, England

The oesophageal, stomach and upper GI cancer conversion rates for April to June 2015 were also statistically significantly lower than for the same months in 2013. However, the conversion rates for April to June 2015 do appear in line with the long-term

decreasing trend. For the oesophageal and upper GI cancer conversion rates, this reflects a return to expected levels following the decrease during the campaign period.

The national OG cancer awareness campaign appears to have had an impact on conversion rates to upper GI cancers for the campaign period. The campaign may have resulted in a decrease in the conversion rate as the number of cancers has remained the same, but the number of urgent GP referrals has increased most likely as a result of increased awareness. However, this impact does not appear to have persisted with evidence of a return to levels expected from the underlying trend for April to June 2015.

The statistically significant decreases in the conversion rates were seen for most age groups with the exception of the younger age groups (particularly those aged under 50 years).

There were larger decreases in the conversion rates for men than for women. For example, the upper GI cancer conversion rate decreased by three percentage points for men compared to a 1.4 percentage point decrease for women.

5.4.5 Cancer diagnoses recorded in the Cancer Waiting Times (CWT) database

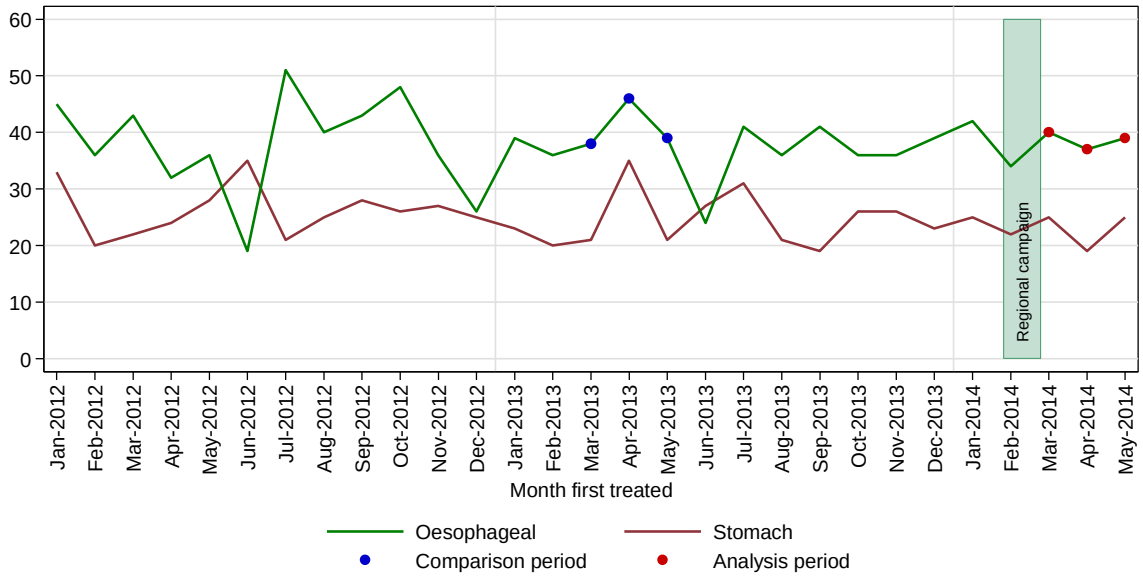
All upper GI cancer diagnoses recorded in the CWT database, presented by month of first treatment. These are sometimes referred to as CWT cancers.

Regional

There were small decreases in the number of the oesophageal (6%), stomach (10%) and upper GI (4%) cancer diagnoses recorded in the CWT data, for March to May 2014 compared to the same months in 2013 (Table 14). However, there were relatively small numbers of cases and these changes were not statistically significant. Similarly, for the control area, the changes were not significant (Figures 19 to 22)

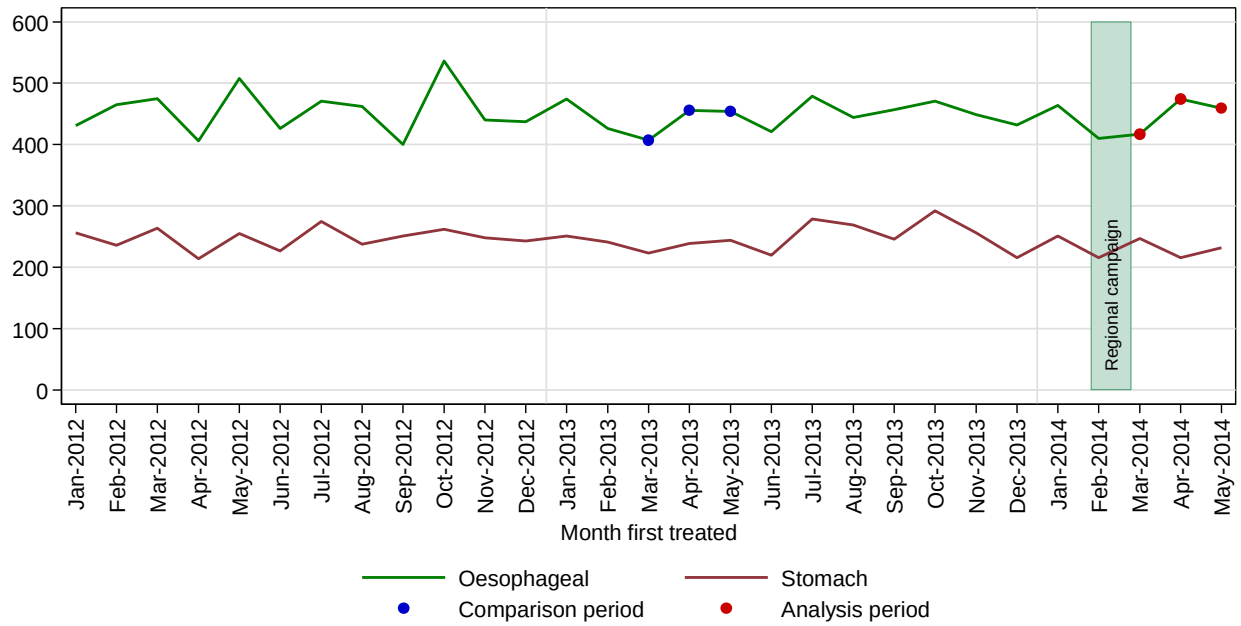
Table 13: Number of oesophageal, stomach and upper GI cancer diagnoses recorded in the CWT database, with percentage change in number of cancers, from March to May 2013 and March to May 2014

Cancer type	Area	March to May			
		CWT cancers		% Change in number	P-value
		2013	2014		
Oesophageal	Regional campaign	123	116	-5.7	0.651
	Control	1,317	1,350	2.5	0.523
Stomach	Regional campaign	77	69	-10.4	0.508
	Control	706	695	-1.6	0.769
Upper GI	Regional campaign	317	305	-3.8	0.630
	Control	3,819	3,826	0.2	0.936



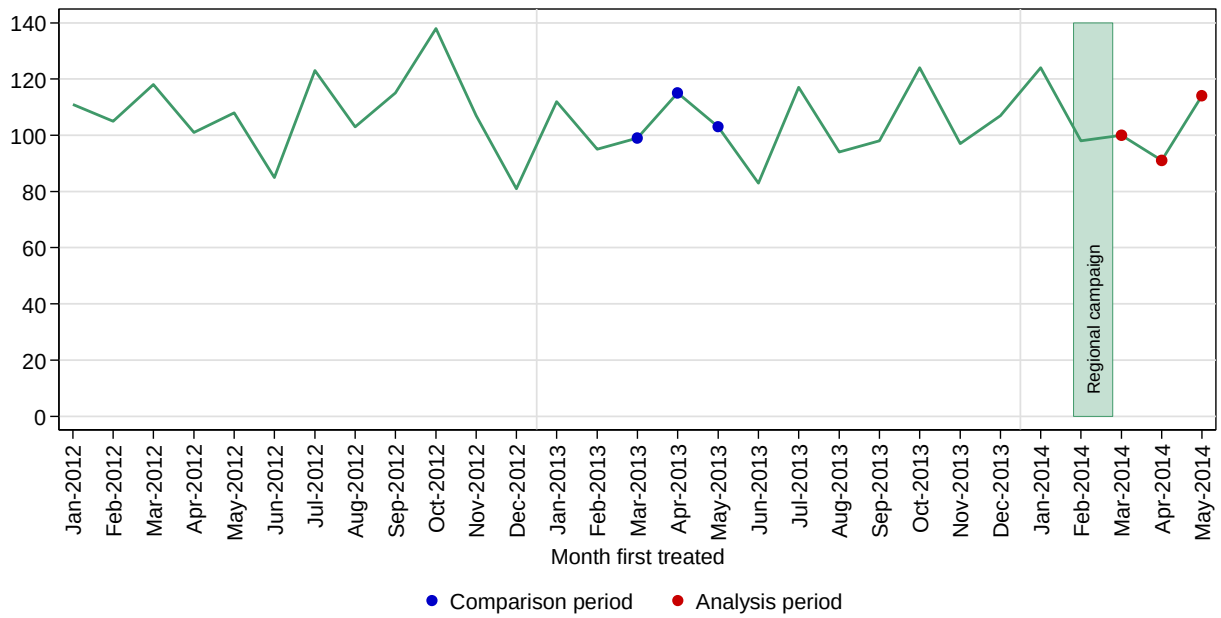
Source: NCRAS, PHE. Cancer Waiting Times data provided by NHS England and NHS Digital

Figure 19: Monthly number of oesophageal and stomach cancer diagnoses recorded in the CWT database, from January 2012 to May 2014, regional campaign area – regional campaign



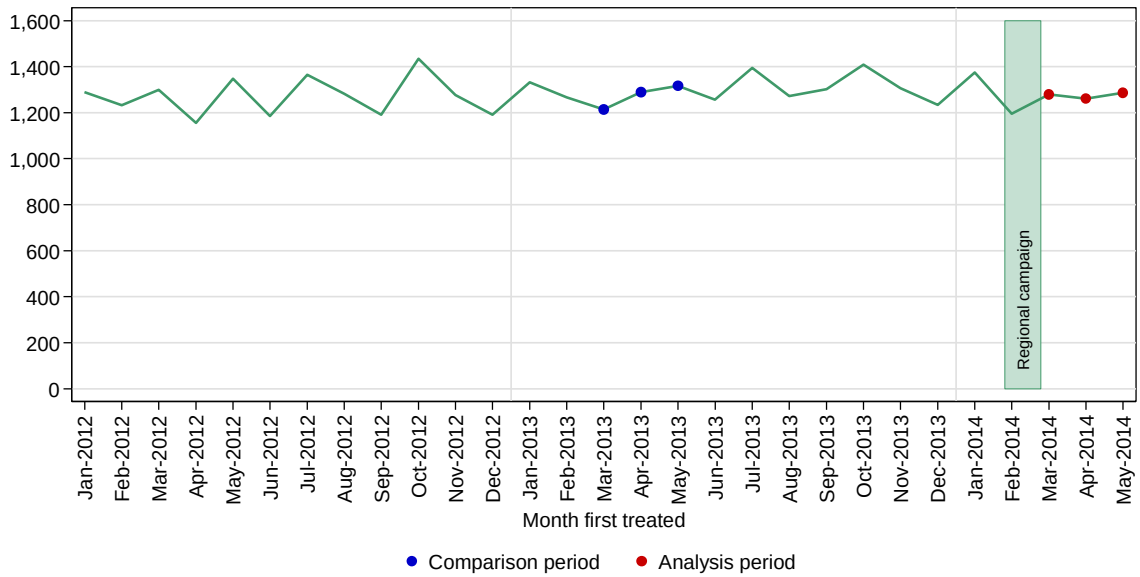
Source: NCRAS, PHE. Cancer Waiting Times data provided by NHS England and NHS Digital

Figure 20: Monthly number of oesophageal and stomach cancer diagnoses recorded in the CWT database, from January 2012 to May 2014, control area – regional campaign



Source: NCRAS, PHE. Cancer Waiting Times data provided by NHS England and NHS Digital

Figure 21: Monthly number of upper GI cancer diagnoses recorded in the CWT database, from January 2012 to May 2014, regional campaign area – regional campaign



Source: NCRAS, PHE. Cancer Waiting Times data provided by NHS England and NHS Digital

Figure 22: Monthly number of upper GI cancer diagnoses recorded in the CWT database, from January 2012 to May 2014, control area - regional campaign

National

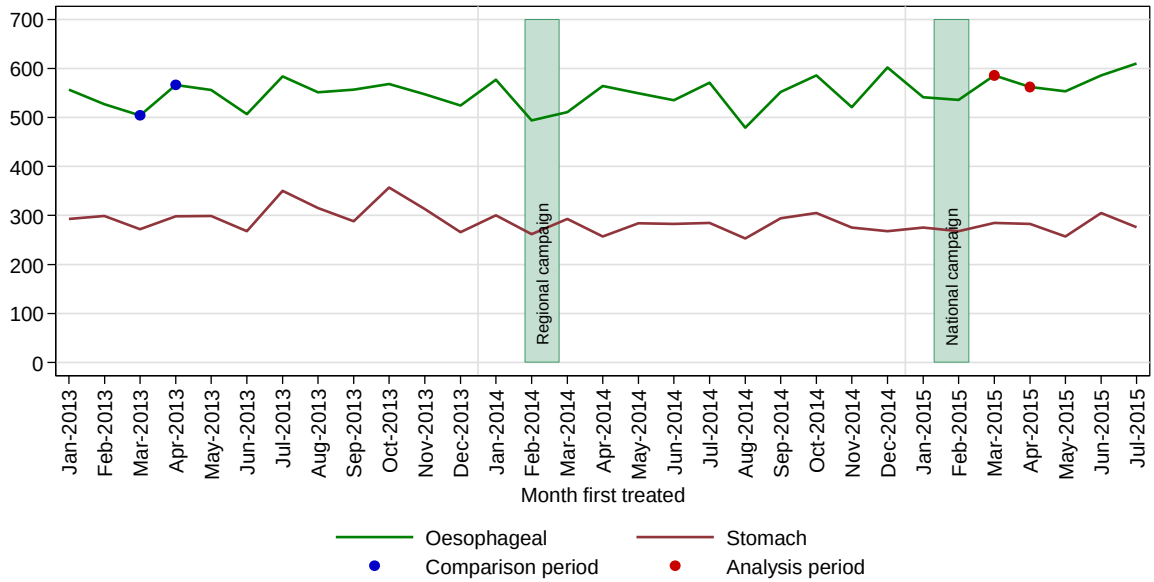
There were no statistically significant changes in the number of oesophageal, stomach or upper GI cancer diagnoses recorded in the CWT database, when March to April 2015 was compared with the same months in 2013 (Table 15). Neither were there any statistically significant changes for May to July 2015 compared with May to July 2013.

Table 14: Number of oesophageal, stomach and upper GI cancer diagnoses recorded in the CWT database, with percentage change in number of cancers, from March to April 2013 and March to April 2015, England

Site	March to April			
	CWT cancers		% Change in number	P-value
	2013	2015		
Oesophageal	1,070	1,148	7.3	0.098
Stomach	570	568	-0.4	0.953
Upper GI	3,038	3,181	4.7	0.070

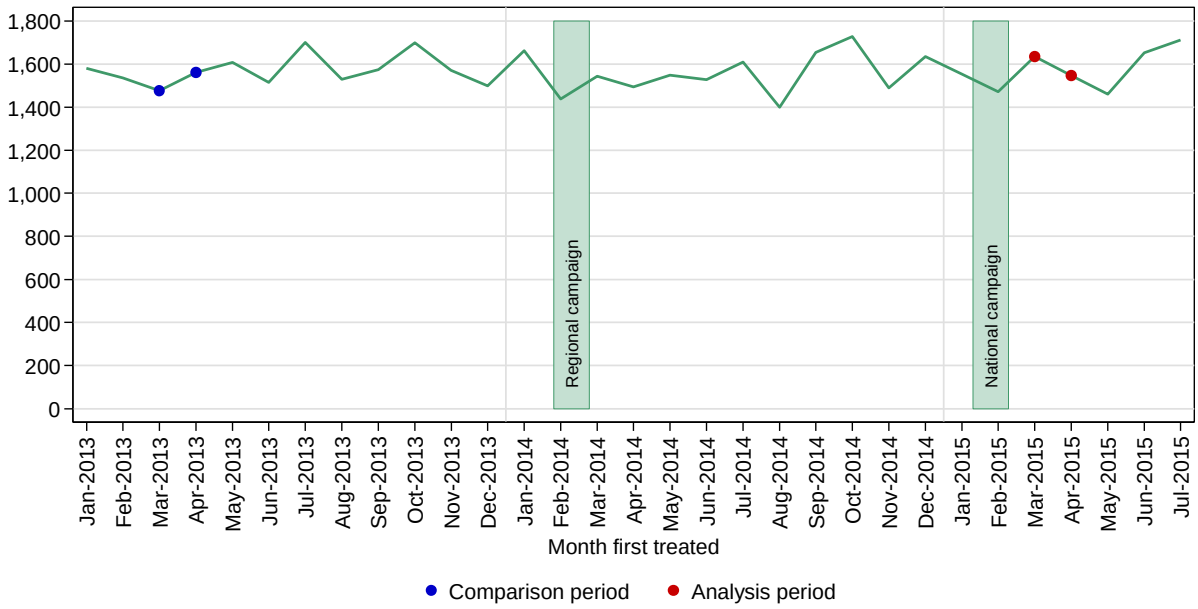
The number of oesophageal and upper GI cancer diagnoses recorded in the CWT database appear to have been relatively stable over time, although with considerable monthly variation (Figures 23 and 24). The number of stomach cancer diagnoses may have decreased slightly over time although there was more monthly variation in these numbers (Figure 23).

The national campaign does not appear to have had an impact on the number of oesophageal, stomach or upper GI cancer diagnoses recorded in the CWT database.



Source: NCRAS, PHE. Cancer Waiting Times data provided by NHS England and NHS Digital

Figure 23: Monthly number of oesophageal and stomach cancer diagnoses recorded in the CWT database, from January 2013 to July 2015, England



Source: NCRAS, PHE. Cancer Waiting Times data provided by NHS England and NHS Digital

Figure 24: Monthly number of upper GI cancer diagnoses recorded in the CWT database, from January 2013 to July 2015, England

5.4.6 Detection rate

Percentage of CWT database recorded upper GI cancer diagnoses which resulted from an urgent GP referral for suspected upper GI cancers, presented by month of first treatment.

Regional

The variability in the monthly oesophageal, stomach and upper GI cancer detection rates was greater in the regional campaign area compared with the control area, but this is likely to reflect the smaller size of the population in the regional campaign area (Figures 25 and 26). For March to May 2014, compared to the same months in 2013, there were increases in the detection rates in the regional campaign area:

- oesophageal cancer, a 9.5 percentage point increase
- stomach cancer, a 3.5 percentage point increase
- upper GI cancer, a 3.3 percentage point increase

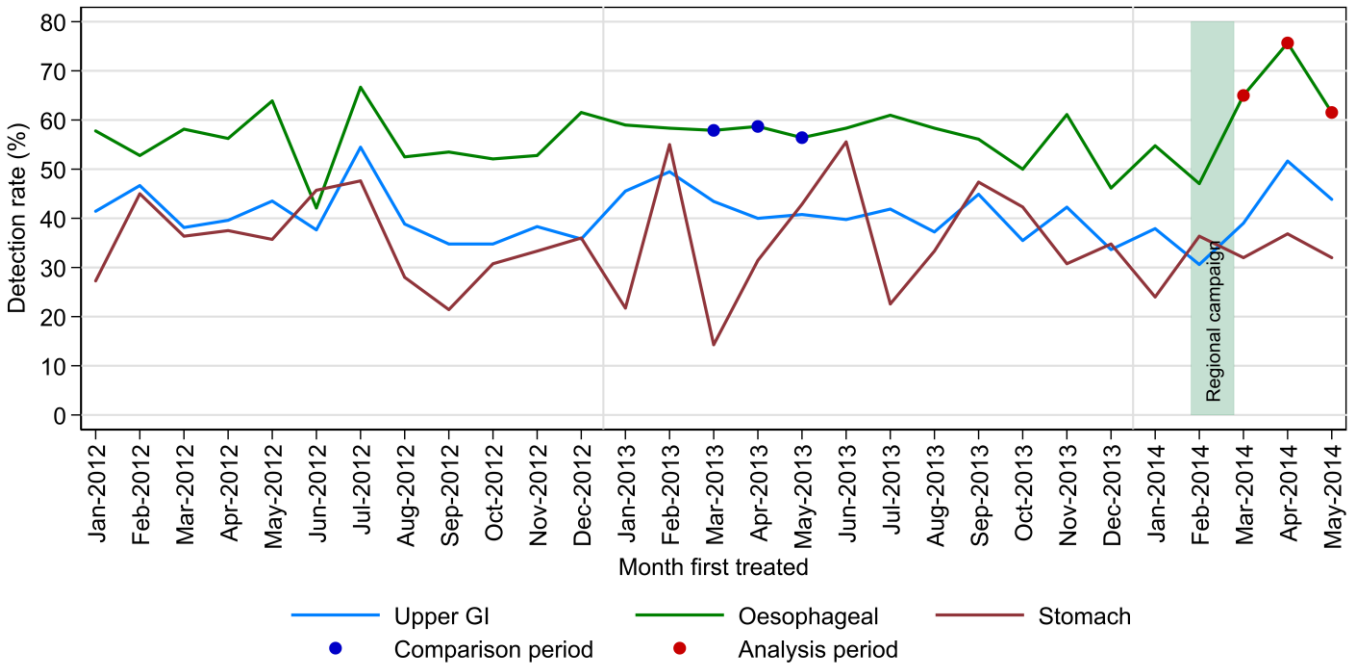
However, none of these changes were statistically significant (Table 16).

There were statistically significant increases in the detection rates for those aged 60 to 69 for both oesophageal and stomach cancers, as well as all upper GI cancers combined. The detection rate increased in:

- oesophageal cancer, from 46% to 86%

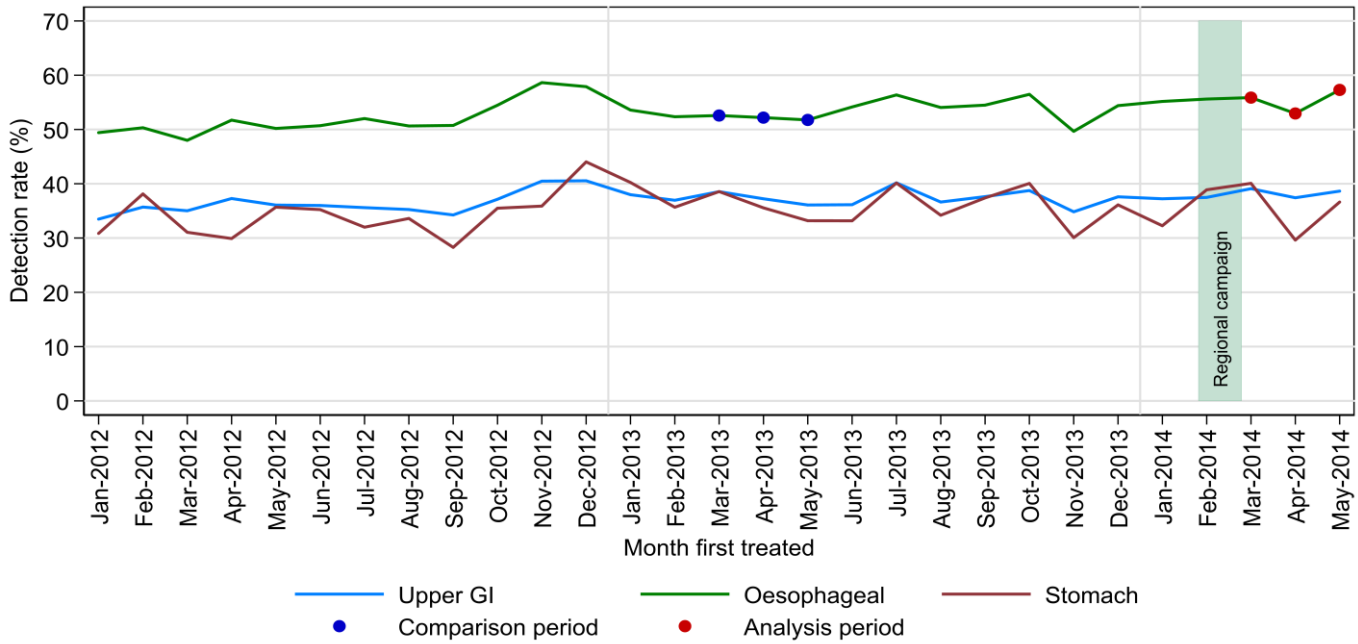
- stomach cancer, from 21% to 71%
- upper GI cancer, from 35% to 64%

This is considered to be a possible impact of the campaign in this age cohort, although the number of cases is small.



Source: NCRAS, PHE. Cancer Waiting Times data provided by NHS England and NHS Digital

Figure 25: Monthly detection rate for oesophageal, stomach and upper GI cancer diagnoses, from January 2012 to May 2014, regional campaign area - regional campaign



Source: NCRAS, PHE. Cancer Waiting Times data provided by NHS England and NHS Digital

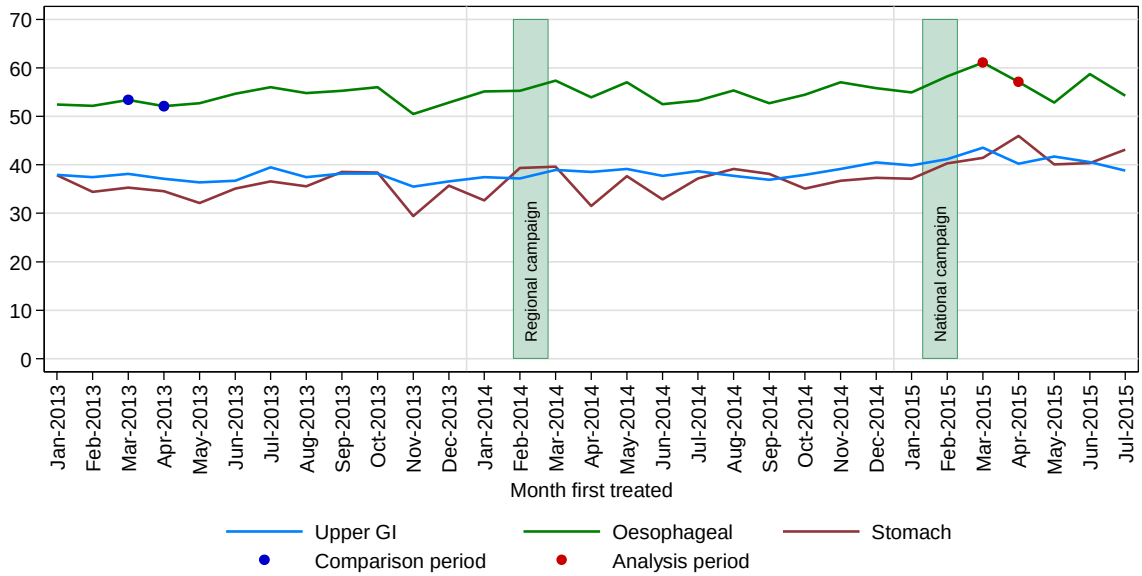
Figure 26: Monthly detection rate for stomach cancer diagnoses, from January 2012 to May 2014, control area - regional campaign

Table 15: Detection rate for oesophageal, stomach and upper GI cancer diagnoses, with change, from March to May 2013 and March to May 2014

Cancer type	Campaign area	March to May					
			2013		2014		
		Det. rate (%)	95% CI	Det. rate (%)	95% CI	%-point change	P-value
Oesophageal	Regional campaign	57.7	(48.9, 66.1)	67.2	(58.3, 75.1)	9.5	0.129
	Control	52.2	(49.5, 54.9)	55.3	(52.7, 58.0)	3.2	0.101
Stomach	Regional campaign	29.9	(20.8, 40.8)	33.3	(23.4, 45.1)	3.5	0.653
	Control	35.7	(32.2, 39.3)	35.7	(32.2, 39.3)	-0.0	0.997
Upper GI	Regional campaign	41.3	(36.0, 46.8)	44.6	(39.1, 50.2)	3.3	0.411
	Control	37.3	(35.7, 38.8)	38.4	(36.9, 39.9)	1.1	0.307

National

The oesophageal, stomach and upper GI cancer detection rates appear to have been relatively stable over 2013 and 2014 (Figure 27). There seems to have been a slight increase in the rates for oesophageal and upper GI cancers since November 2014 with a peak in March 2015. There has been some increase in the stomach cancer detection rate after January 2015.



Source: NCRAS, PHE. Cancer Waiting Times data provided by NHS England and NHS Digital

Figure 27: Monthly detection rate for oesophageal, stomach and upper GI cancer diagnoses, from January 2013 to July 2015, England

When comparing March to May 2013 with March to May 2015, increases in detection rates for oesophageal and stomach cancer were seen, with a 6% increase in the oesophageal cancer detection rate to 59% (p=0.002) and a 9% increase in the stomach cancer detection rate to 44% (p=0.003). There was also a statistically significant 4% increase in upper GI cancer detection rates in England when March to April 2013 and the same months in 2015 were compared (Table 17).

For May to July 2015, compared to May to July 2013 the detection rates for stomach and upper GI cancer diagnoses were statistically significantly higher but the small change in the oesophageal cancer detection rate was not statistically significant. For stomach cancer, the detection rate of 41% for May to July 2015 was 6.5 percentage points higher than for the same months in 2013. Although this rate was a little lower than during the campaign period, it still appeared to be a little higher than expected from the long-term trend. For upper GI cancer, the 40% detection rate for May to July 2015 was lower than during the campaign period and appeared to be consistent with the long-term trend.

Table 16: Detection rate for oesophageal, stomach and upper GI cancer diagnoses, with change, from March to April 2013 and March to April 2015

Cancer type	March to April					
		2013		2015		
	Det. Rate (%)	95% CI	Det. Rate (%)	95% CI	%-Point Change	P-value
Oesophageal	52.7	(49.7, 55.7)	59.1	(56.3, 62.0)	6.4	0.002
Stomach	34.9	(31.1, 38.9)	43.7	(39.6, 47.8)	8.7	0.003
Upper GI	37.6	(35.9, 39.3)	41.9	(40.2, 43.7)	4.3	<0.001

The national campaign does appear to have had an impact on the detection rate for oesophageal, stomach and upper GI cancers during the campaign period. For stomach cancer, this impact on the detection rate appears to have persisted in the initial months after the campaign.

5.4.7 Emergency presentations

This metric considers whether the regional or national OG campaigns had an impact on the proportion of people diagnosed with oesophageal or stomach cancers who first presented as an emergency.

Regional

In 2013, 107 out of 618 (17%) patients diagnosed with oesophageal cancer presented as emergencies compared with 91 out of 592 (15%) patients in 2014 (Figure 28). There were no significant differences in the monthly proportions of oesophageal cancers diagnosed via emergency presentation for the regional campaign area in 2014 compared to 2013. The proportions of patients with oesophageal cancer diagnosed via emergency presentation during the regional campaign period were 26% in February 2014 and 17% in March 2014 compared to 16% for the same two months in 2013.

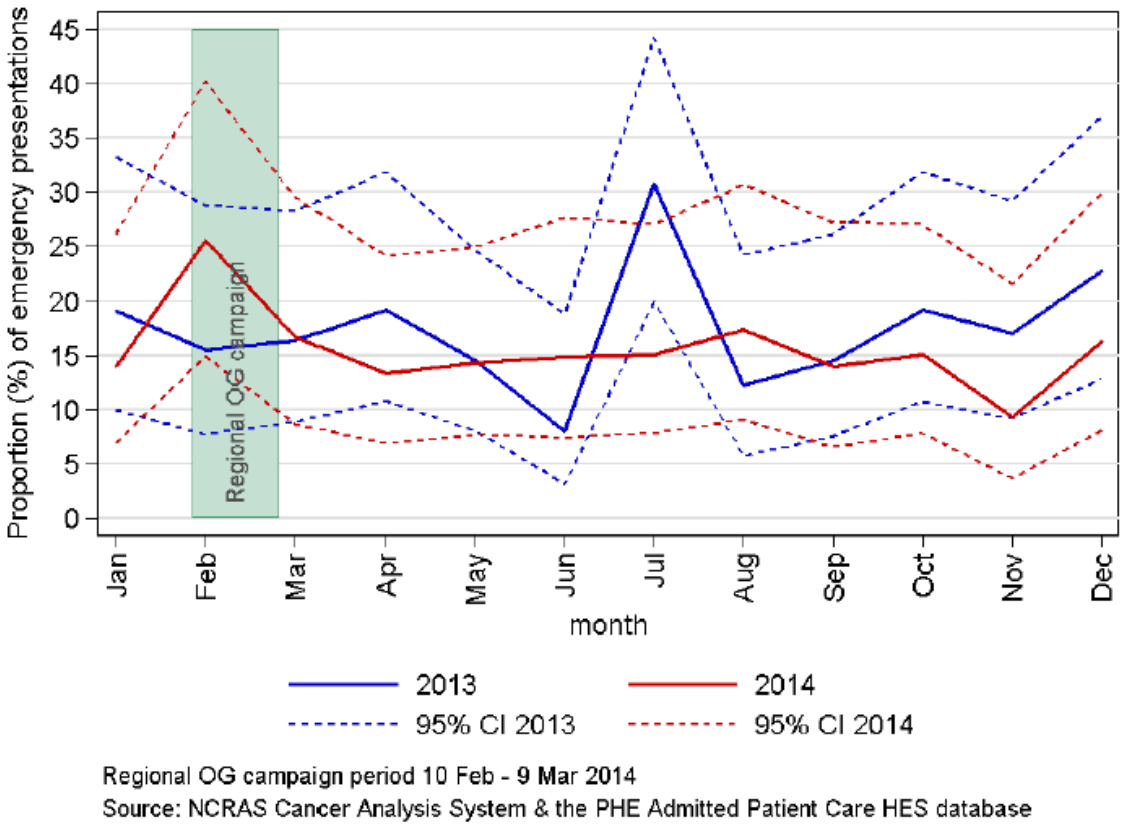


Figure 28: Proportion of emergency presentations and 95% confidence intervals for oesophageal cancer, regional campaign – North of England, 2013 & 2014

In 2013, 144 out of 479 (30%) of patients diagnosed with stomach cancer presented as emergencies compared with 152 out of 457 (33%) in 2014 (Figure 29). There were no significant differences in the monthly proportions of stomach cancers diagnosed via emergency presentation for the regional campaign area in 2014 compared to 2013 (Figure 29). The proportions of patients with stomach cancer diagnosed via emergency presentation during the regional campaign period were 42% in February and 31% in March compared to 14% and 34% for the same two months in 2014. The variation for February reflects non-significant monthly variation due to the small numbers of cases.

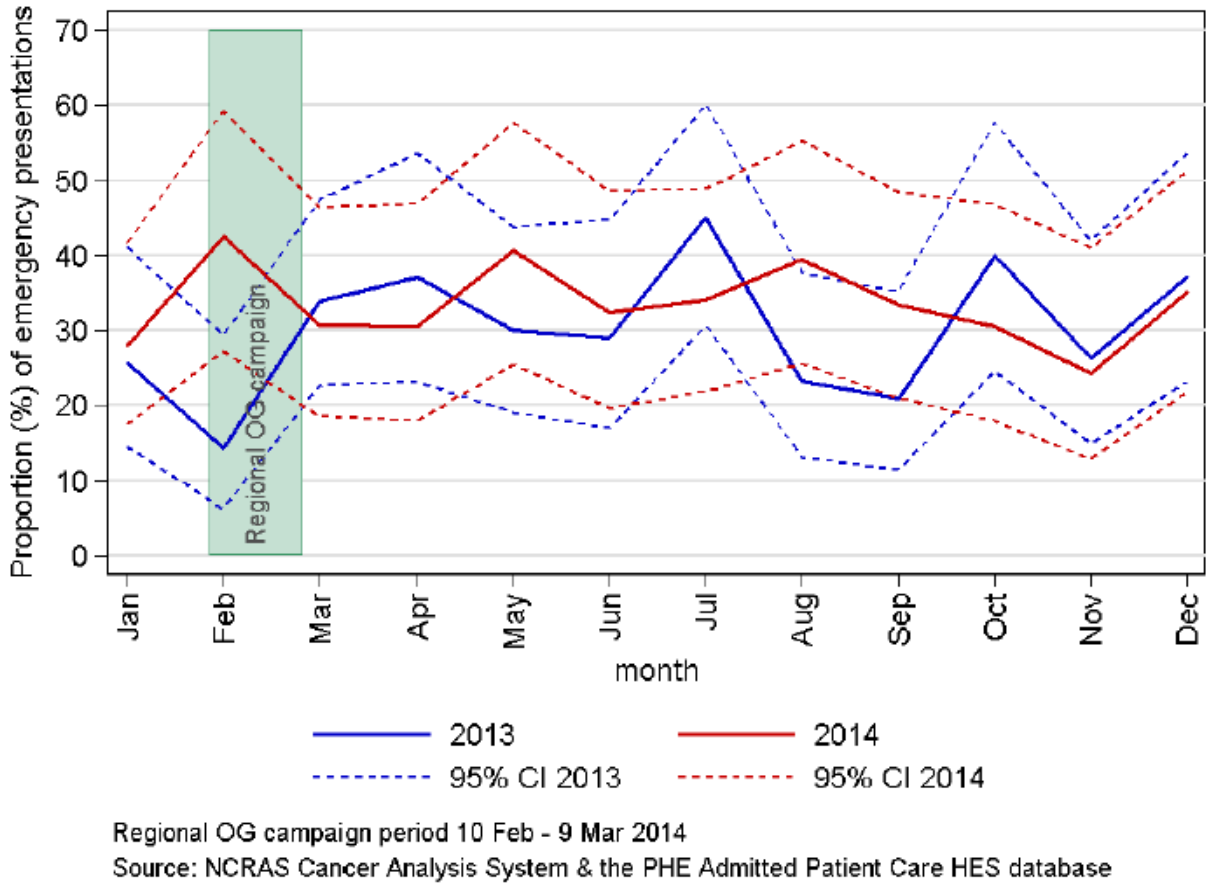


Figure 29: Proportion of emergency presentations and 95% confidence intervals for stomach cancer by month, regional campaign

National

In 2013 1,308 out of 6,823 (19%) patients diagnosed with oesophageal cancer presented as emergencies compared with 1,375 out of 7,106 (19%) in 2015 (Figure 30). There were no significant differences in the monthly proportions of oesophageal cancers diagnosed via emergency presentation for 2015 compared to 2013. The proportion of oesophageal cancers diagnosed via emergency presentation during the campaign period was 19% in February compared to 20% for the same month in 2013.

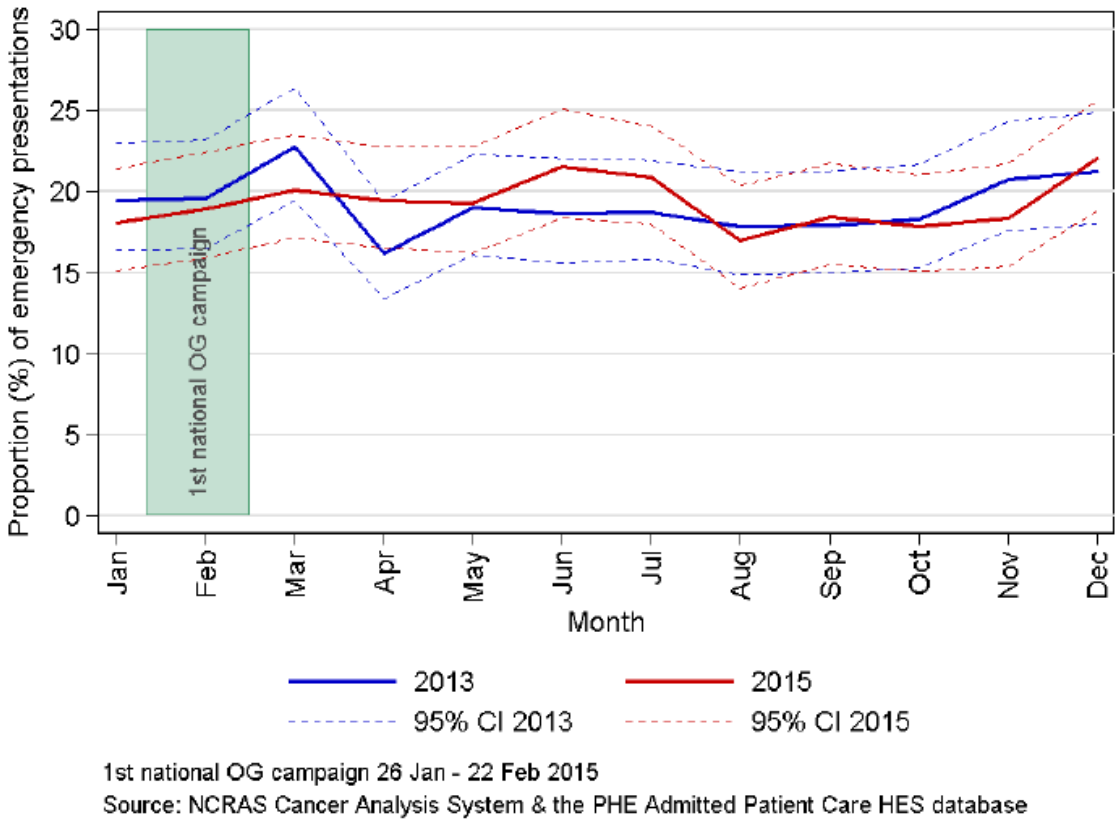


Figure 30: Proportion of emergency presentations and 95% confidence intervals for oesophageal cancer, first national campaign - England, 2013 & 2015

In 2015, 1,458 out of 4,692 (31%) of patients diagnosed with stomach cancer presented as emergencies compared with 1,522 out of 4,723 (32%) in 2013 (Figure 31). There were no significant differences in the monthly proportions of stomach cancers diagnosed via emergency presentation for 2015 compared to 2013. The proportion of stomach cancers diagnosed via emergency presentation during the campaign period was 32% in February compared to 34% for the same month in 2013.

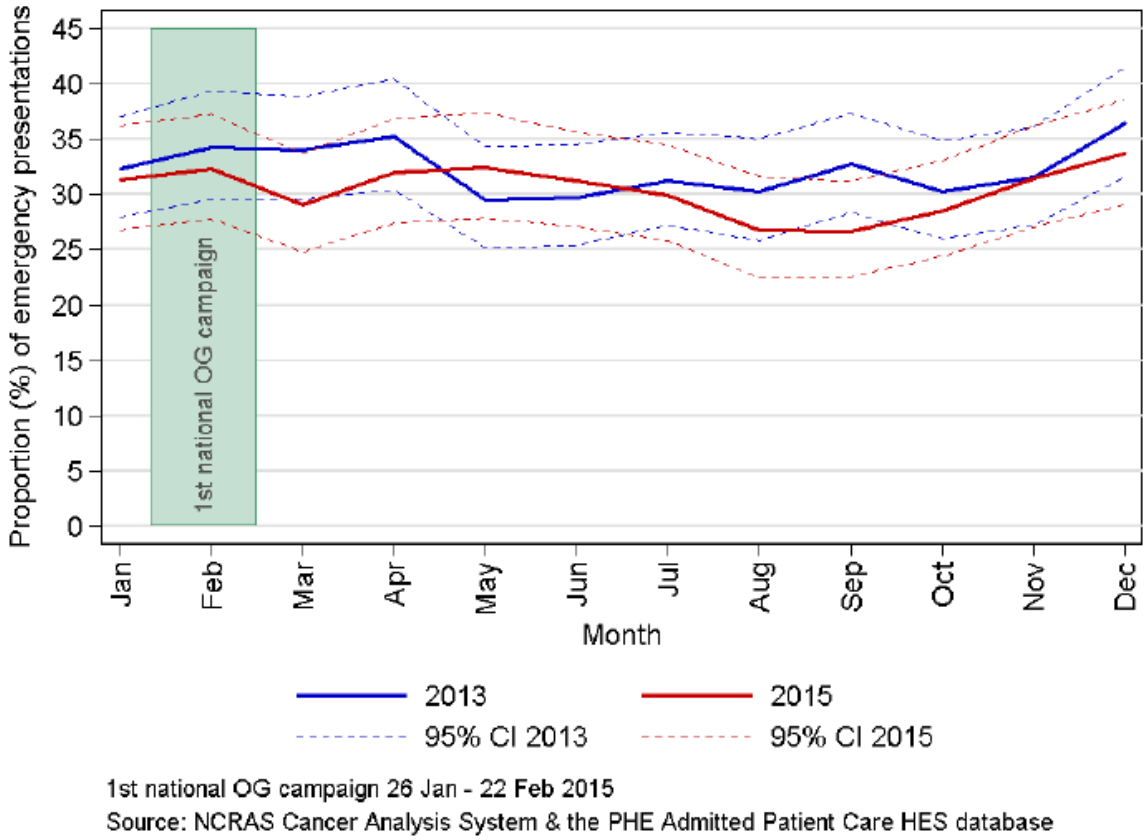


Figure 31: Proportion of emergency presentations and 95% confidence intervals for stomach cancer by month, first national campaign - England, 2013 & 2015

In both the regional and the national campaigns, the rates of emergency presentation of oesophageal and gastric cancer remained constant when compared to the control period of 2013.

5.4.8 Cancers diagnosed

This metric considers whether the OG cancer campaigns had an impact on the number of newly diagnosed cases of oesophageal cancer (ICD-10 C15) and stomach cancer (ICD-10 C16), for men and women aged 50 and over, and all ages combined.

Regional

There were no sustained periods when the numbers of oesophageal or stomach cancers were the same as or higher than the 2013 to 2014 median (Figures 32 and 33). The regional campaign does not appear to have had an impact on the incidence of newly diagnosed oesophageal or stomach cancers.

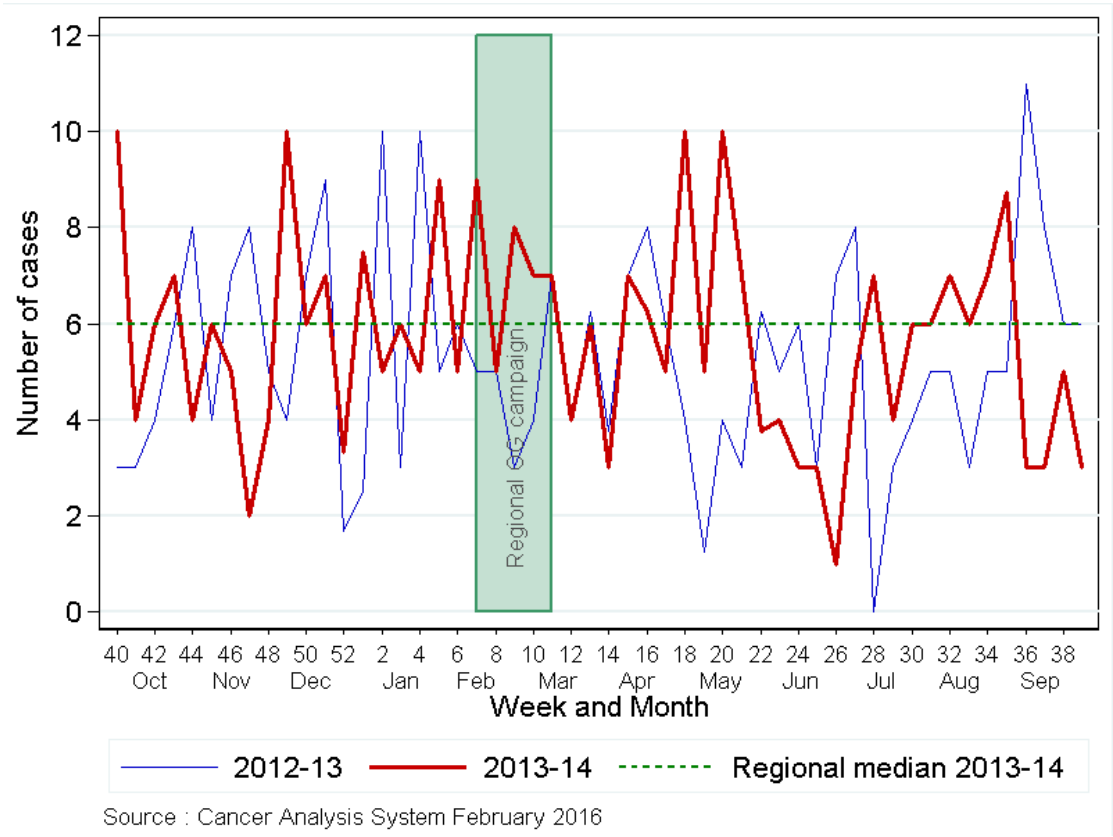


Figure 32: Number of newly diagnosed cases of oesophageal cancer by week, North of England Cancer Network, October 2012 to September 2014

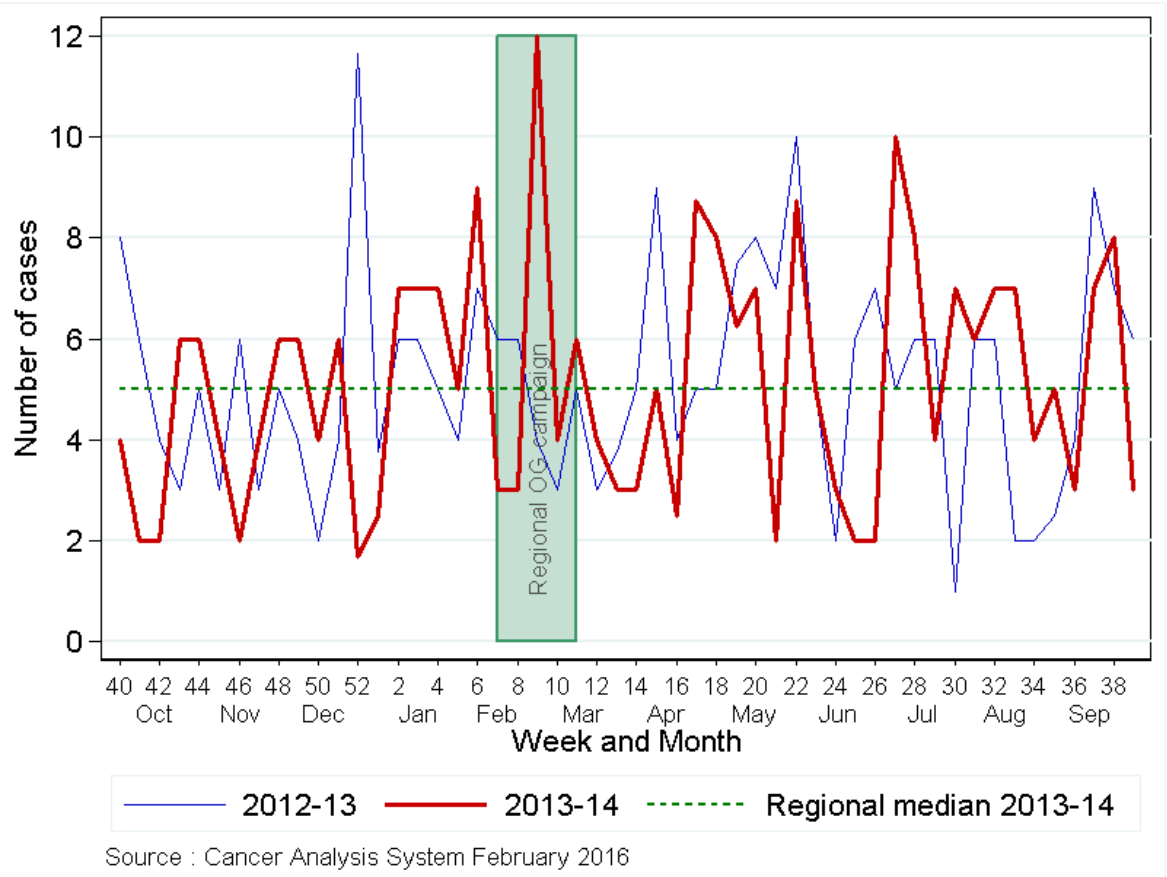


Figure 33: Number of newly diagnosed cases of stomach cancer by week, North of England Cancer Network, October 2012 to September 2014

National

There were no sustained periods when the numbers of oesophageal or stomach cancers were the same as or higher than the 2014 to 2015 median (Figures 34 and 35). The OG national campaign does not appear to have had an impact on the incidence of newly diagnosed oesophageal or stomach cancers for persons aged 50 and over, or for all ages combined.

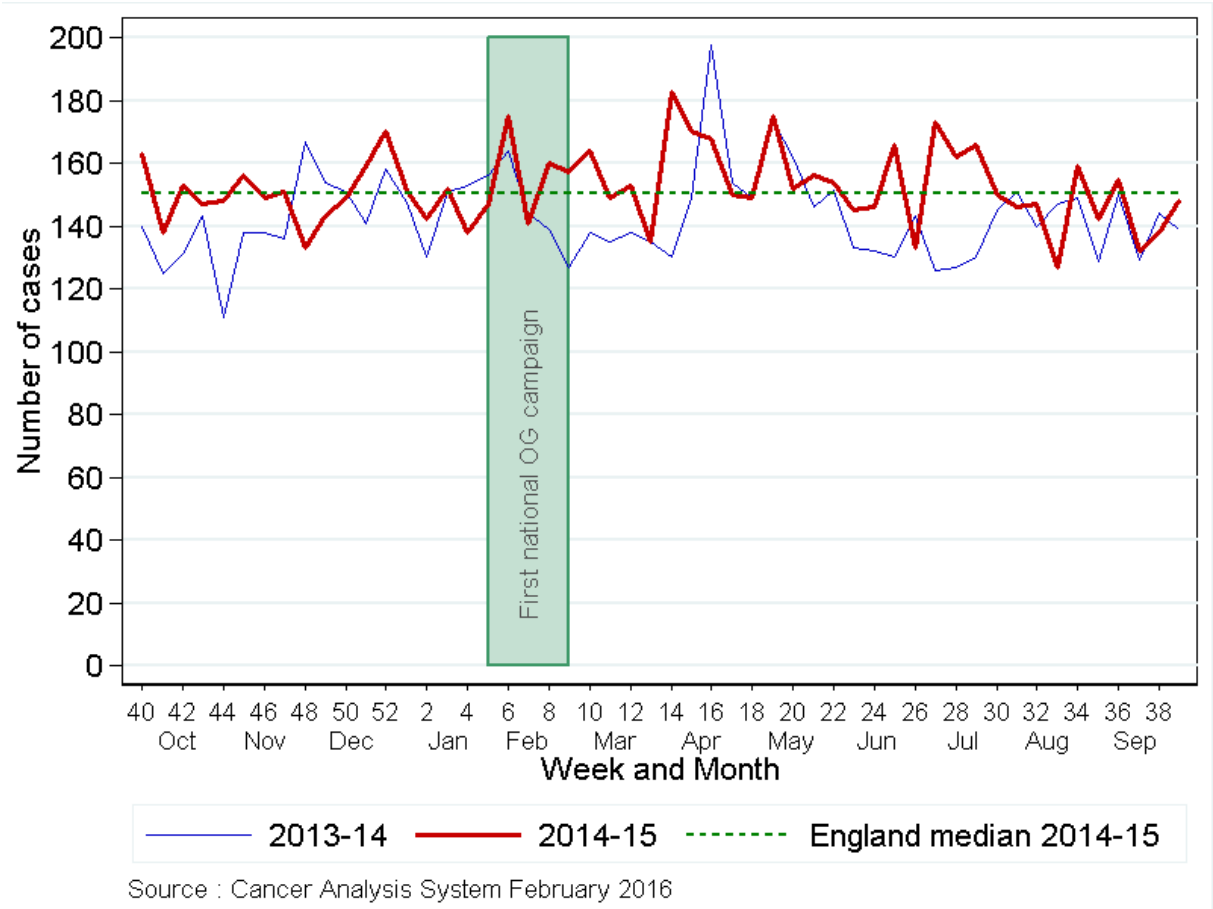


Figure 34: Number of newly diagnosed cases of oesophageal cancer by week, England, October 2013 to September 2015

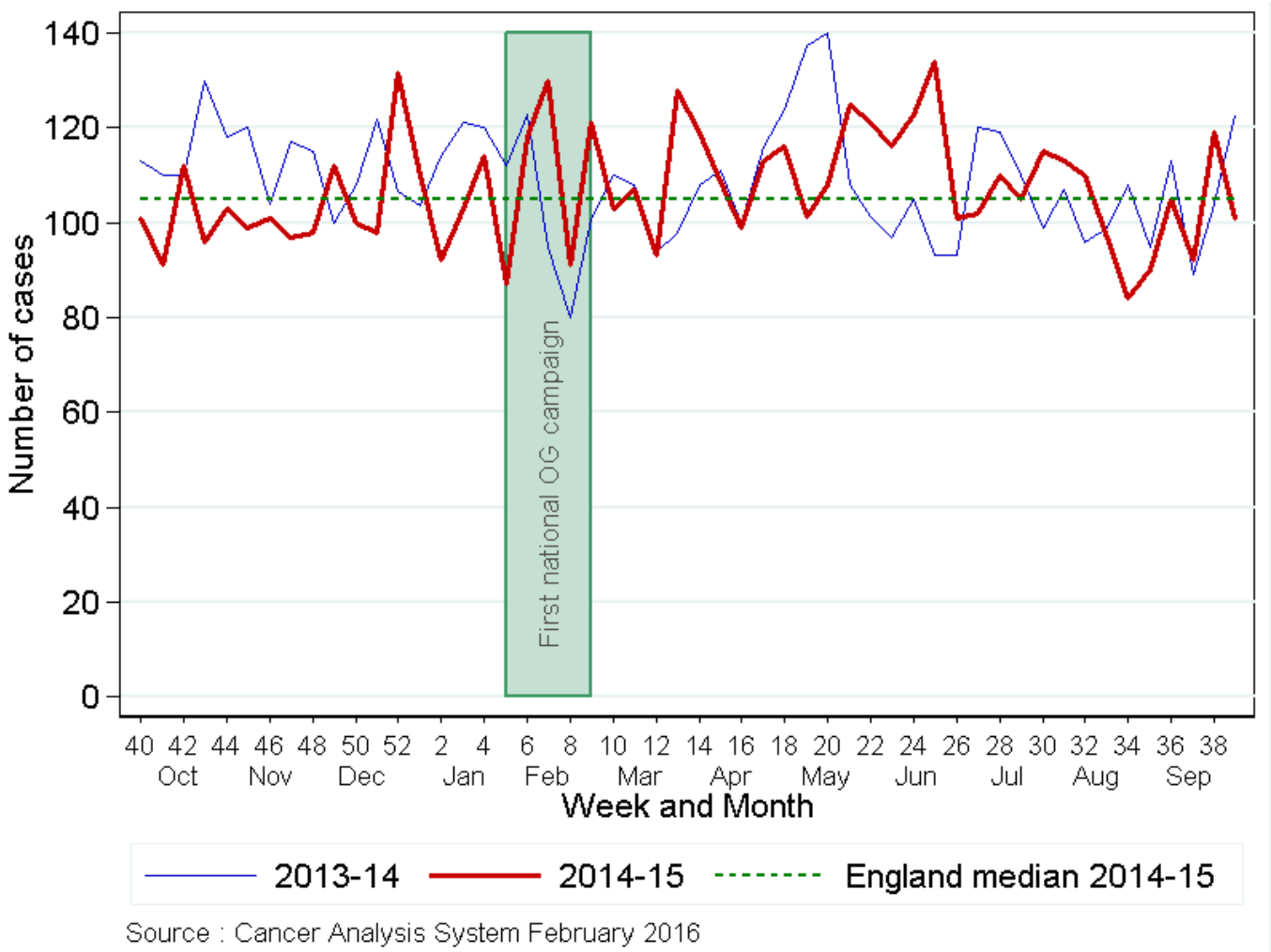


Figure 35: Number of newly diagnosed cases of stomach cancer by week, England, October 2013 to September 2015

5.4.9 Early stage at diagnosis

This metric considers whether the OG cancer campaigns had an impact on the proportion of oesophageal cancer (ICD-10 C15) and stomach cancer (ICD-10 C16) diagnosed at an early stage of I or II, for men and women aged 50 years and over, and all ages combined.

Regional

During the analysis period, the proportion of early stage oesophageal cancer was the same as or higher than the median number of cases diagnosed in 2013 to 2014 for five consecutive weeks (weeks 17 to 21 of 2014). During this five-week period, an additional

3 cases were diagnosed at an early stage compared with the expected number based on the median (7 cases).

The proportion of early stage stomach cancer was the same as or higher than the 2013 to 2014 median figure for 8 consecutive weeks (weeks 18 to 24 of 2014). During this 8-week period, an additional 5 cases were diagnosed at an early stage compared with the expected number based on the median (4 cases).

Although these results suggest the regional campaign may have had an effect on the proportion of early stage cancers diagnoses, these data should be considered cautiously in view of the small numbers.

National

The proportion of early staged cases diagnosed per week during the analysis period was compared with the overall median proportion for October 2014 to September 2015. There were no sustained periods where the proportions of early stage oesophageal or stomach cancer were the same as or higher than the 2014 to 2015 median.

5.5 Effect on practice - diagnostics in secondary care

This metric considers whether the OG cancer campaigns had an impact on the number of imaging tests conducted by the NHS. These include diagnostic radiology, gastroscopies and endoscopies conducted for suspected OG cancer and other medical conditions (further referred to as diagnostic tests).

Regional

There was a 0.7% increase in the number of diagnostic tests for individuals aged 50 and over, and a 4.8% increase in the number of diagnostic tests in all ages combined (Table 18, Figure 36). However, the changes in the number of diagnostic tests were not statistically significant.

Table 17: Number of diagnostic tests in April to July 2013 and February to May 2014

Age Group	April to July 2013	February to May 2014	Percentage change
50 and over	690	695	0.7
All ages	930	975	4.8

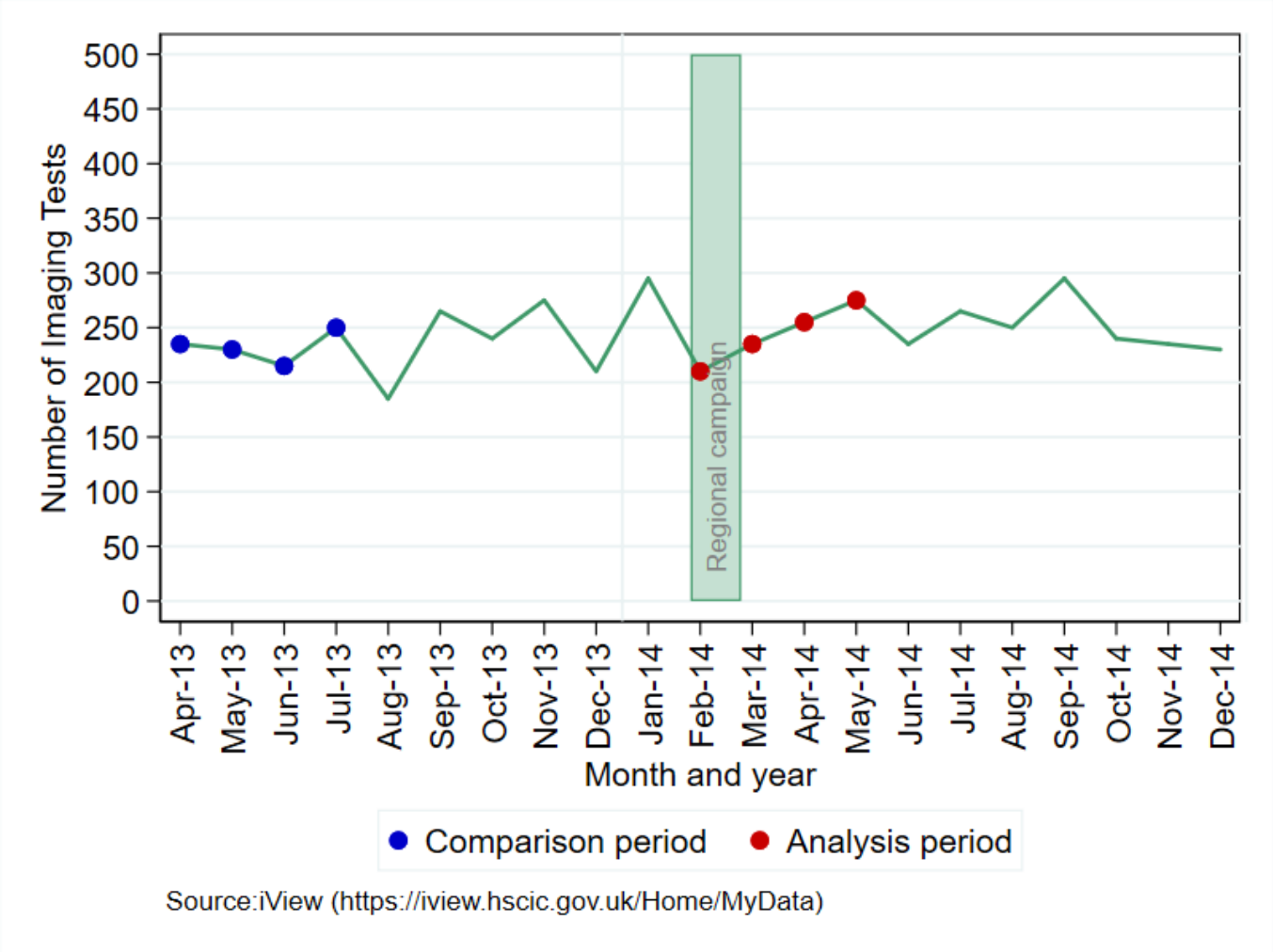


Figure 36: Monthly number of diagnostic tests in April 2013 to December 2014

National

The monthly number of diagnostic tests requested between the analysis period of January to April 2015 were compared with the number requested between January to April 2014 (Figure 37).

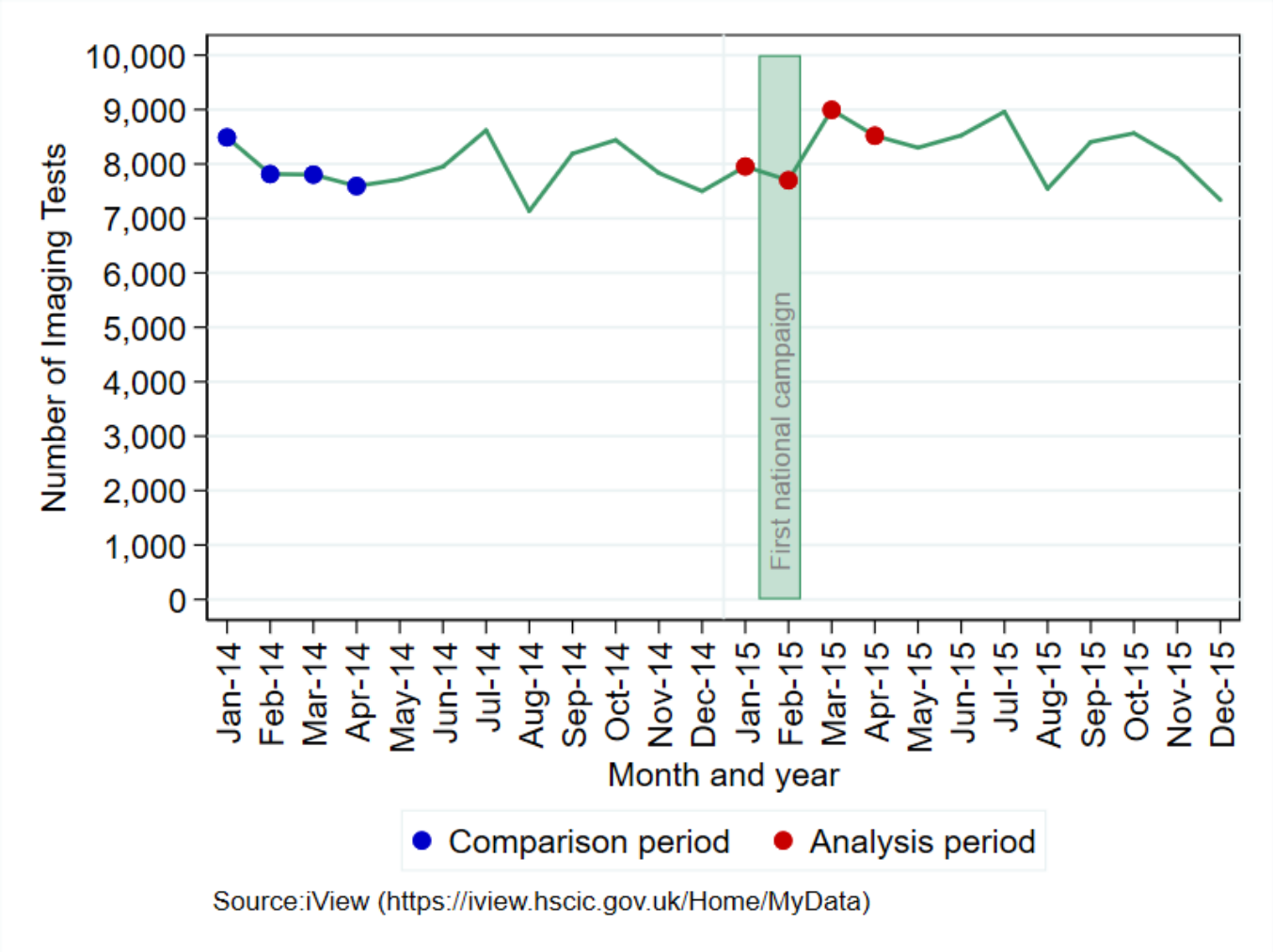


Figure 37: Monthly number of diagnostic tests in January 2014 to December 2015, England

There was a 5.6% increase in the number of diagnostic tests for individuals aged 50 and over, and a 4.6% increase in the number of diagnostic tests in all ages combined (Table 19). However, the changes in the number of diagnostic tests were not statistically significant. Figure 37 shows that the trend in the number of diagnostic tests was fairly stable from January 2014 to December 2015.

Table 18: Number of diagnostic tests in January 2014 to April 2014 and January 2015 to April 2015, England

Age Group	January 2014 to April 2014	January 2015 to April 2015	Percentage change
50 and over	20,775	21,935	5.6
All ages	31,705	33,170	4.6

5.6 Gastroscopy

Data on the number of Gastroscopies were also sourced from the NHS Monthly Diagnostic Waiting Times and Activity Dataset(27).

Regional

There is no data available to assess the effect on gastroscopy rates for the regional campaign area in the regional analysis.

National

Comparing the months February to April 2015 with February to April 2013, there was a statistically significant difference in the average number of gastroscopies per month (p=0.015). The average number of gastroscopies per month increased by 23% from 46,407 in February to April 2013 to 57,417 in February to April 2015. Figure 38 shows that the number of gastroscopies increased slightly up until February 2015; this is followed by a steeper increase in March 2015.

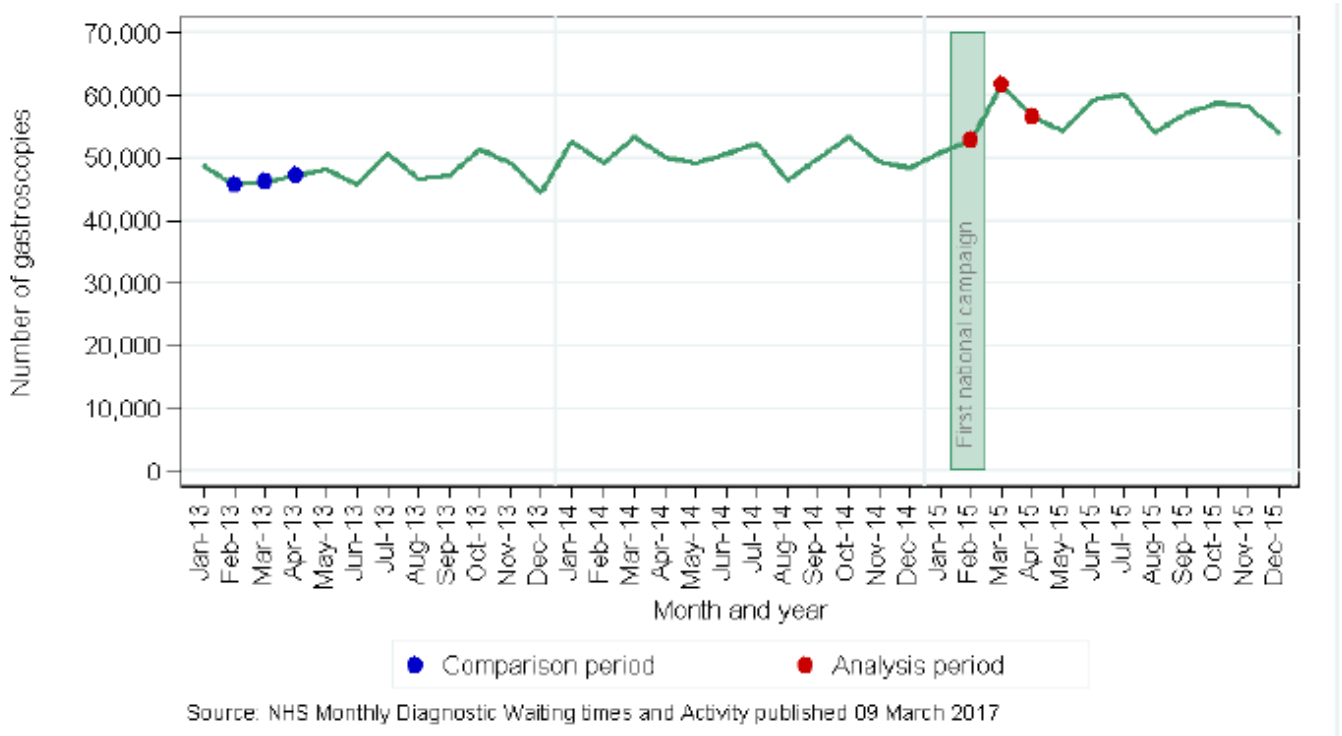
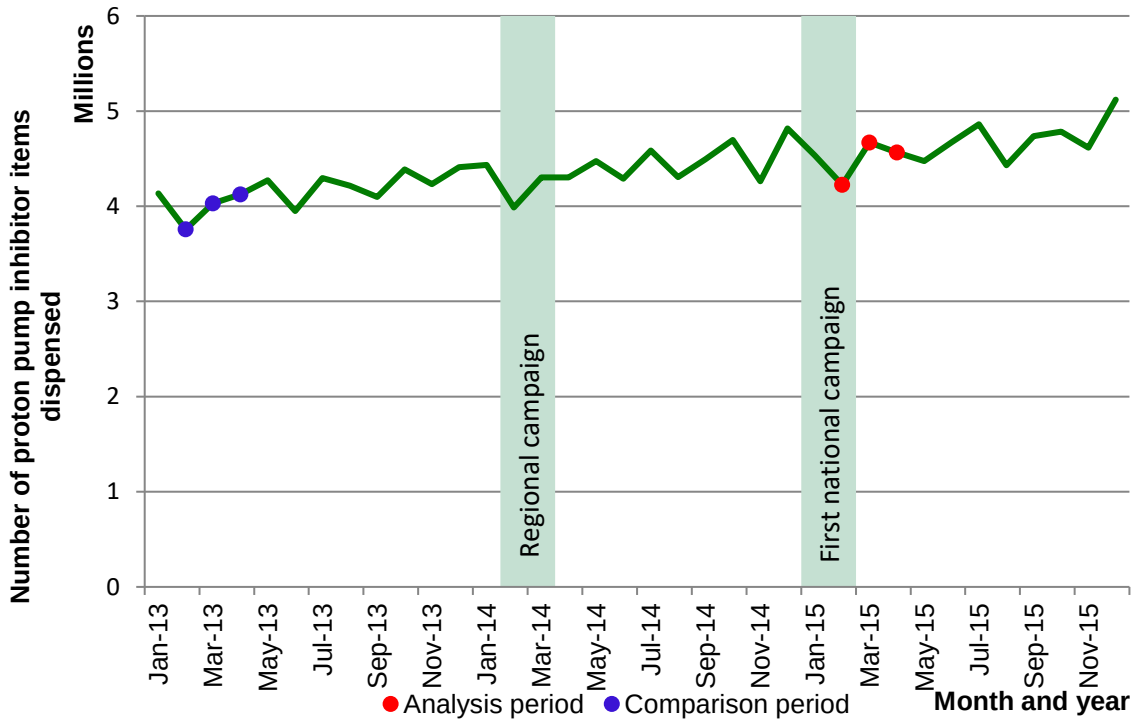


Figure 38: Monthly number of gastroscopies, January 2013 to December 2015, all ages, England.

5.7 Proton pump inhibitor prescriptions

The impact on the number of proton pump inhibitor prescriptions was analysed only in the national campaign evaluation.

There was an increasing trend in the number of proton pump inhibitor prescriptions between 2013 and 2015 in England (Figure 39). Comparing the months February to April 2013 with February to April 2015, there was a 13% statistically significant increase in the number of prescriptions, from 11,913,439 to 13,457,603 respectively; however, this appears to be in line with the long-term trend.



Source: openprescribing.net, December 2017

Figure 39: Number of proton pump inhibitors prescribed, England, January 2013 to December 2015

5.8 Outcome – one-year survival

Regional

There were no significant differences in one-year survival for men, women or persons aged 50 years and over diagnosed with oesophageal or stomach cancer combined between the analysis period (March 2014 to April 2014) and comparison period (January, February, May to December 2014). One-year survival for persons diagnosed

during the analysis period was 48.9% compared with 47.5% for those diagnosed in the comparison period.

National

There were no significant differences in one-year survival for men, women or persons aged 50 years and over diagnosed with oesophageal or stomach cancer combined between the analysis period (February 2015 to April 2015) and comparison period (January, February, May to December 2015). One-year survival for persons diagnosed during the analysis period was 44.7% compared with 44.5% for those diagnosed in the comparison period.

6. Discussion and conclusions

The early diagnosis of oesophageal and stomach cancer is particularly challenging largely because of the nonspecific nature of the associated symptoms, which are commonly experienced by many people. Previous studies have evaluated open access to endoscopy for those with any symptom referable to the upper digestive tract with varying effect.

The BCoC for OG cancer awareness campaigns aimed to increase public and professional awareness of two specific symptoms, heartburn most days for 3 weeks or more and difficulty swallowing, in the over 50 years age group. It was hoped that increased awareness would lead to more patients with these symptoms presenting at their GP, potentially increasing the number of curable cancers diagnosed.

The principle findings of this evaluation have been reassuringly consistent for both the regional and national campaigns. The awareness campaigns have increased public understanding of the importance of the two key symptoms. The most effective medium for these has been television advertising, both at regional and national level. The marketing analyses however were completed at the time of the campaign and it is not possible to state whether the enhanced understanding has been sustained once the media advertising had finished.

Engagement of professional groups including pharmacists and GPs has also shown an increased awareness of OG cancer and its presentation, which is likely to need reinforcement with continued professional development. Members of the public have appreciated the need to seek medical advice should they or a member of their family experience the key symptoms. Indeed, this has had an effect on practice both in terms of the significant increase in GP attendances and the very significant increase in urgent GP referrals for suspected cancer which continued, albeit at a lower rate, in the initial months after the end of the campaign.

This increase in urgent referrals for suspected cancer has translated into an increased use of diagnostic gastroscopy which is not surprising, although interestingly there has not been an increase in the use of other diagnostics. This is likely to reflect the fact that the role of barium meal radiology has been almost totally replaced by gastroscopy. Although arrangements were put in place to cover the expected increase in diagnostic gastroscopy during the campaigns, these service needs have not been sustained within what is an already high demand area. The increased awareness with the associated

change in patient behaviour and the increased GP attendance and onward urgent referral reinforce the need to expand gastroscopy services.

Another effect possibly attributed to the national campaign has been the increase in prescriptions of proton pump inhibitors (PPIs) for treatment of the key and related symptoms. This rate has been increasing irrespective of the campaigns, but the rate of increase may have been influenced by the campaign. This can be interpreted in two ways: either, the numbers of patients with an established endoscopic diagnosis of a benign condition are now being treated symptomatically with PPIs or, by contrast and potentially of greater concern, patients are being treated with PPIs either instead of or before undergoing endoscopy. This can be detrimental to early diagnosis as a course of PPIs delays appropriate referral and investigation. Furthermore, the increase in availability and advertising of “over the counter” PPIs increases the chances of self-treatment and delay in seeking medical advice. Appropriate advice and warnings on packaging should be carefully considered and evaluated as well as raising the importance of pharmacists advising accordingly.

However, how have these campaigns actually affected OG cancer diagnosis? There certainly does appear to have been an increase in detection rates in both regional and national campaigns for both oesophageal and stomach cancer and particularly in the commonest “at risk group” of 60-69 years. As each campaign was essentially a “snapshot” for four weeks, the cancers diagnosed may have been prevalent in the population and the awareness of the symptoms has simply prompted patients to present earlier than they would otherwise have done.

There has been no effect on the diagnoses of cancers at an early stage and furthermore, although not surprisingly in view of the short duration of the campaign, the number of cancers diagnosed as emergencies for the calendar year has not been affected. Both earlier stage at diagnosis and emergency presentations have been influenced by the initiatives in the National Cancer Plan(28). For example, the proportions of emergency presentations have decreased over the past 10 years possibly, in part, due to the introduction of NICE guidelines on symptoms for referral suspicious of an underlying cancer and the “two-week rule”. The lack of measurable effect of the campaigns on earlier diagnosis is borne out by the lack of effect on one-year survival which again is not surprising, although a more longitudinal follow-up would be appropriate to confirm this lack of effect.

There is no doubt that increasing public awareness of what is a relatively uncommon cancer with a poor prognosis is extremely important. The campaigns have focused on two key symptoms and the fact that there has been a behaviour change in seeking medical advice implies the potential for opportunities for further patient education on

lifestyle factors related to OG cancer such as diet and obesity. However, the focus on symptoms in the campaign has confirmed results from previous approaches that symptoms are non-specific, and that diagnosis of earlier stage disease needs a more specific strategy to have an effect on OG cancer outcome.

The major limitation of these campaigns has been the missed opportunity to gather more information on Barrett's oesophagus, the principle precursor of oesophageal cancer. Unfortunately, there is currently no comprehensive national registry which routinely records all cases of Barrett's to enable population-based analysis of its natural history - the practicalities of developing such a registry would need to be considered. In parallel to these campaigns have been innovative studies of a less intrusive approach to diagnosing Barrett's as well as selecting those for diagnostic and possible interventional endoscopy. Professional guidelines have significantly influenced the specific management of Barrett's and related histological changes.

In parallel with focussing on high risk groups there must be an adequately resourced programme to use more basic techniques to better understand the natural history of OG cancer. More tailored treatments are being established for OG cancer based on molecular pathology and these principles should be extrapolated to earlier diagnosis and prognostic prediction.

In conclusion the BCoC oesophageal and gastric cancer awareness campaigns have clearly demonstrated the effect of focusing awareness of the symptoms of a relatively uncommon cancer among the general public. The results are in keeping with the other BCoC campaigns in that the increased awareness has changed behaviour with a greater number seeking medical advice and undergoing investigation. There was no increase in the number of newly diagnosed cancers, however there was an impact on services particularly in terms of gastroscopies. The challenge for OG cancer is to maintain these effects with appropriate infrastructure as well as developing a more specific strategy for those at greatest risk.

7. Appendix 1 - Methodology

Public awareness and knowledge

Local

Public awareness of the significance of dysphagia and indigestion as symptoms of cancer was evaluated in 5 of the 7 pilots using both pre- and post-campaign data. Feedback from pharmacists in the pilot areas was also collected.

Regional

The research in the North East region was conducted through pre- and post-campaign surveys and was conducted by TNS-BMRB, an independent market research agency specialising in social research. The rest of England (excluding the North West, as a similar ovarian cancer regional campaign ran at the same time in this area) provided the control area. Samples of approximately 300 adults aged 50 years plus were interviewed face-to-face in the regional campaign area at both pre- and post-campaign stages. The pre-campaign interviews took place between 13 January 2014 and 2 February 2014 and the post-campaign interviews took place between 17 March 2014 and 6 April 2014.

National

The national campaign used similar methodology to the regional. The range of topics covered awareness of cancer advertising and symptoms, beliefs and attitudes towards cancer and early diagnosis and knowledge and recognition of the relevant campaign material. Face-to-face surveys were conducted among a representative sample of adults aged 50 and over in England. Samples of approximately 900 adults aged 50 years and over were interviewed at both pre- and post-campaign stages.

GP attendances

This metric considers whether the regional and national campaigns had an impact on the number of people attending a GP with the target symptoms which were heartburn (dyspepsia), food sticking (dysphagia) and both symptoms combined. Table 20 defines the specific Read codes which were analysed for this campaign.

Table 19: List of OG campaign related symptom Read codes

Dyspepsia		Dysphagia	
Code	**Description**	**Code**	**Description**
171J.00	Reflux cough	14C1.00	H/O: peptic ulcer
195..00	Indigestion symptoms	14C1.11	H/O: duodenal ulcer
1954.00	Indigestion	14C1.12	H/O: gastric ulcer
1955.00	Heartburn	194..00	Swallowing symptoms
1955.11	Heartburn symptom	194..11	Dysphagia
1956.00	Peptic ulcer symptoms	1942.00	Difficulty swallowing solids
1957.00	Gastric reflux	1943.00	Difficulty swallowing liquids
1958.00	Undiagnosed dyspepsia	1944.00	Painful swallowing
195Z.00	Indigestion symptom NOS	1944.11	Odynophagia
1DC1.00	Burning pain	1946.00	Chokes when swallowing
8Hl0.00	Referral to dyspepsia specialist nurse	194Z.00	Swallowing symptom NOS
Eu45318	[X]Psychogenic dyspepsia	1CB4.00	Feeling of lump in throat
E264400	Psychogenic dyspepsia	1CB4.11	Constriction in throat
J1...00	Oesophageal, stomach and duodenal diseases	1CB4.12	Tightness in throat
J10..00	Diseases of oesophagus	D00y000	Sideropenic dysphagia
J10y400	Oesophageal reflux without mention of oesophagitis	J1...00	Oesophageal, stomach and duodenal diseases
J10y411	Oesophageal reflux	J10..00	Diseases of oesophagus
J10y412	Gastro-oesophageal reflux	J101.00	Oesophagitis
J10y413	Acid reflux	J101100	Reflux oesophagitis
J10y500	Laryngopharyngeal reflux	J101114	Peptic oesophagitis
J101.00	Oesophagitis	J101115	Regurgitant oesophagitis
J101100	Reflux oesophagitis	J101200	Chemical oesophagitis
J101111	Acid reflux	J101300	Postoperative oesophagitis
J101112	Gastro-oesophageal reflux with oesophagitis	J101400	Gangrenous oesophagitis
J101113	Oesophageal reflux with oesophagitis	J101500	Phlegmonous oesophagitis
J101114	Peptic oesophagitis	R072.00	[D]Dysphagia
J101115	Regurgitant oesophagitis	R072z00	[D]Dysphagia NOS
J101200	Chemical oesophagitis	R072000	[D]Difficulty in swallowing
J101300	Postoperative oesophagitis	ZV41600	[V]Problem with swallowing or mastication
J101400	Gangrenous oesophagitis	ZV41612	[V]Problems with swallowing
J101500	Phlegmonous oesophagitis		
J16y400	Dyspepsia		
J16y411	Flatulent dyspepsia		

J16y412	Indigestion NOS		
J16yA00	Non-ulcer dyspepsia		
J16yA11	Functional dyspepsia		
R071.00	[D]Heartburn		
R071z00	[D]Heartburn NOS		
SH72.00	Burn of the oesophagus		

Regional campaign

Data on GP attendances for target OG symptoms[h], related OG symptoms[i] and control symptoms[j] was collected from 265 practices (52 in the campaign area, with the remaining 213 outside this area acting as a control group) for nine defined periods between December 2011 and May 2014. These were the eight-week pre–campaign period (16 December 2013 to 9 February 2014), the four-week campaign period (10 February 2014 to 9 March 2014) and the eight-week post–campaign period (10 March 2014 to 4 May 2014), and the same weeks in the previous two years. Data was adjusted to account for bank holidays and the number of weeks in each period.

National campaign

Data on GP attendances for dyspepsia, dysphagia and a control symptom (back pain) were sourced from The Health Improvement Network (THIN) database for the period 1 October 2012 to 28 June 2015. The data was grouped into weeks and adjusted to account for bank holidays. Data was also extracted on the number of GP practices submitting data to THIN each week (which decreased from 421 to 277 practices over the period considered), to enable the calculation of the average number of attendances per practice per week.

Analysis considered three periods: a 12-week pre-campaign period (3 November 2014 to 25 January 2015), a 6-week campaign period (26 January 2015 to 8 March 2015) and a 12-week post-campaign period (9 March 2015 to 31 May 2015). It compared the average number of GP attendances per practice per week during these periods in 2014/15 with the same periods two years earlier, in 2012/13.

[h] Target OG symptoms were indigestion or heartburn and; problems with swallowing

[i] Related OG were oesophageal reflux or dyspepsia; painful swallowing or dysphagia; abdominal, epigastric, subcostal or retrosternal pain and; inflammation of the oesophagus, stomach or duodenum (oesophagitis, gastritis and duodenitis)

[j] Control symptoms were headache or migraine; knee, shoulder or neck pain and; urinary tract infection

Cancer Waiting Times

Defining the campaign period

Regional

The campaign ran from 10 February to 9 March 2014. Therefore, we might expect an impact on referrals first seen during the campaign months (February and March) and, allowing for reasonable delays from campaign activity to referral, in the month following the end of the campaign (April). These delays may occur for several reasons, for example, some patients may need to see the campaign materials multiple times before reacting; some patients may need to wait for a GP appointment, especially if they prefer a convenient time or a specific GP, and so may be seen by the GP after the campaign ended.

Dates are based on ‘date first seen’ as recorded in the CWT database, reflecting the date seen in secondary care rather than primary care, and referrals made towards the end of the campaign may not have been seen in secondary care until after the campaign ended.

Therefore, the period from February to April 2014 was considered as the ‘campaign period’ for referrals, and also for cancer diagnoses resulting from an urgent GP referral for suspected cancer and for the conversion rate, as these were defined using the date first seen recorded for the referral.

There is a necessary period of time between the date first seen following an urgent GP referral for suspected cancer and the start of treatment. This is because the time required to perform diagnostic tests or to plan and arrange treatment, for example, will vary for different patients and trusts. This meant that for cancer diagnoses recorded in the CWT database and the detection rate, it was not possible to identify a clear period relating directly and specifically to the campaign. Diagnoses in the early campaign months could include those resulting from referrals prior to the campaign or at the beginning of the campaign. Similarly, diagnoses in the months after the campaign could include those resulting from referrals during the campaign or after the end of the campaign. Taking into consideration the average interval from date first seen to treatment start date and the waiting times target of 62 days from urgent GP referral to first treatment, the period from March to May was thought to be most representative of the campaign effect. This period should include many of the diagnoses resulting from campaign period referrals without too many diagnoses from pre- or post-campaign referrals.

Therefore, the period from March to May 2014 was considered as the 'campaign period' for upper GI cancer diagnoses recorded in the CWT database and for the detection rate. Table 21 outlines the campaign and comparison periods for the regional campaign[k].

Table 20 Comparison and campaign periods for CWT data analysis, regional campaign

Period	- **Urgent GP referrals for suspected cancer** - **Cancer diagnoses resulting from an urgent GP referral for suspected cancer** - **Conversion rate**	- **Cancer diagnoses recorded in the CWT database** - **Detection rate**
Campaign	February – April 2014	March – May 2014
Comparison	February – April 2013	March – May 2013

National

Considering that the campaign ran from 26 January to 22 February 2015, it is unlikely that many of the referrals first seen in January were related to the campaign (as the campaign started in late January most would have already been seen or referred for their appointment before the campaign). Also, the impact of the regional OG cancer awareness campaign (February to March 2014) on the number of referrals and related figures for February 2014 onwards would make a one-year comparison difficult to interpret. Therefore, the campaign, post-campaign and comparison periods were defined as follows:

[k] Post campaign analysis is not undertaken for local or regional campaigns.

Table 21 Comparison, campaign, post-campaign and post-campaign comparison periods for CWT data analysis, first national campaign

Period	- **Urgent GP referrals for suspected cancer** - **Cancer diagnoses resulting from an urgent GP referral for suspected cancer** - **Conversion rate**	- **Cancer diagnoses recorded in the CWT database** - **Detection rate**
Campaign	February – March 2015	March – April 2015
Comparison	February – March 2013	March – April 2013
Post campaign	April – June 2015	May – July 2015
Post campaign comparison	April – June 2013	May – July 2013

The number of urgent GP referrals for suspected cancer has continued to increase year-on-year, so it is likely that some changes in the number of referrals will be due to this underlying trend. To provide an indication of the increase in referrals that was not associated with the campaign, results for urgent GP referrals for suspected upper GI cancers were compared to results for urgent GP referrals for other suspected cancers (excluding referrals for suspected upper GI, head and neck, breast, urological or testicular cancers and referrals for non-cancer breast symptoms).

Analysis

Full methodology details are provided in the National Cancer Registration and Analysis Service Be Clear on Cancer evaluation metrics: methodology document, with the following campaign-specific notes.

For the regional campaign period (February to April 2014) the number of urgent GP referrals for suspected upper GI cancers were presented, alongside comparable results for the same months in the previous year. Year-on-year percentage change figures were calculated based on these referral counts, as this reflected the absolute change in levels of activity. A referral rate was also presented, in order to provide some context to explain how differences in the percentage change between areas (or ages) may relate to differing referral patterns. Differences in referral rates would suggest there may be underlying differences in referral practices or cancer incidence between groups. It was

not possible to assess whether any apparent campaign impact may have resulted from these underlying differences.

Data for upper GI cancer diagnoses resulting from an urgent GP referral for suspected upper GI cancers and conversion rate were presented for the campaign period (February to April 2014), alongside comparable results for the same months in the previous year and the year-on-year percentage point change in the rate.

Data for upper GI cancer diagnoses recorded in the CWT database and detection rate were presented for the campaign period (March to May 2014), alongside comparable results for the same months in the previous year and the year-on-year percentage point change in the rate.

For the purposes of analysis, the regional campaign area was defined using the former North of England Cancer Network area. For overall results, comparison is made to a control area, which was defined as England excluding both the regional campaign area and local pilot areas. For the OG campaign, the local pilot areas were the following 25 former Primary Care Trusts (PCTs): Dudley; County Durham; Darlington; Sandwell; Wolverhampton City; Wandsworth; Newcastle; North Tyneside; Northumberland Care Trust; Cumbria Teaching; South Tyneside; Gateshead; Sunderland Teaching; Hartlepool; Middlesbrough; Redcar and Cleveland; Stockton-on-Tees Teaching; Bedfordshire; Cambridgeshire; Peterborough; Suffolk; Norfolk; Great Yarmouth and Waveney; Hertfordshire; and Luton.

Statistical methods

Two-week wait referrals for suspected upper GI cancer, and diagnoses following these referrals, were compared between the intervention sites using data from the Trent Cancer Registry which was compared with all other PCTs in England (control PCTs) for the months of the local pilot campaigns (April to July 2012) and compared with the same months in the previous year.

Significance of any differences was tested across periods and between areas using rate ratios.

Conversion rates of referrals which resulted in a diagnosis of cancer were tested for significance using two-sample test of proportions.

Emergency presentations

The Hospital Episode Statistics (HES) derived emergency presentation metric is calculated from inpatient data and uses the methodology set out in the cancer outcomes metric specification. It measures the proportion of people with oesophageal or stomach cancers who first presented as an emergency.

Regional campaign

Data were extracted on 19 October 2016 for persons admitted in 2013 and 2014, in the former North of England Cancer Network with a primary diagnosis of oesophageal cancer (ICD-10 C15) or stomach cancer (ICD-10 C16). Numbers do not include persons diagnosed via other routes, for example outpatient or general practice settings.

For each month, the proportion was calculated as the number of first inpatient admissions with oesophageal or stomach cancer presenting through an emergency route, divided by the total number of first inpatient admissions with oesophageal or stomach cancer, multiplied by 100. Binomial confidence intervals were calculated using the Wilson score method. Results for the campaign year (2014) were compared with the previous year (2013).

National campaign

Data were extracted on 19 October 2016 for persons admitted in 2013 and 2015, in England with a primary diagnosis of oesophageal cancer (ICD-10 C15) or stomach cancer (ICD-10 C16). Numbers do not include persons diagnosed via other routes, for example outpatient or general practice settings.

For each month, the proportion was calculated as the number of first inpatient admissions of persons with oesophageal or stomach cancer presenting through an emergency route, divided by the total number of first inpatient admissions with oesophageal or stomach cancer, multiplied by 100. Binomial confidence intervals were calculated using the Wilson score method. As an earlier wave of the OG campaign ran in 2014, results for the campaign year (2015) were compared with those for 2013.

Early stage at diagnosis

This metric considers whether the regional and national oesophago–gastric cancer campaigns had an impact on the proportion of oesophageal cancer (ICD-10 C15) and stomach cancer (ICD-10 C16 diagnosed at an early stage of 1 or 2, for men and women of all ages combined.

Regional campaign

Data was extracted from the national cancer analysis system for the diagnosis period October 2012 to September 2014. The analysis period was defined as two weeks after the start of the campaign (week 9 of 2014) to two months after the end of the campaign (week 20 of 2014). The proportion of early staged cases per week during the analysis period was compared with the overall median for October 2013 to September 2014. The campaign was considered to have a possible impact if a) the proportion per week was the same or higher than the median for five or more consecutive weeks, and b) this sustained period started during analysis the period.

National campaign

Data was extracted from the national cancer analysis system for the diagnosis period October 2013 to September 2015. The analysis period was defined as two weeks after the start of the campaign (week 7 of 2015) to two months after the end of the campaign (week 18 of 2015). The proportion of early staged cases per week during the analysis period was compared with the overall median proportion for October 2014 to September 2015. The campaign was considered to have a possible impact if a) the proportion per week was the same or higher than the median for five or more consecutive weeks, and b) this sustained period started during analysis of the period.

Cancers diagnosed

This metric considers whether the regional oesophago–gastric cancer campaign had an impact on the number of newly diagnosed cases of oesophageal cancer (ICD-10 C15) and stomach cancer (ICD-10 C16), for men and women of all ages combined.

Regional campaign

Data was extracted from the national cancer analysis system for the diagnosis period October 2012 to September 2014. The analysis period was defined as two weeks after the start of the campaign (week 9 of 2014) to two months after the end of the campaign (week 20 of 2014). The numbers of cases diagnosed per week in the analysis period were compared with the overall median for October 2013 to September 2014. The campaign was considered to have a possible impact if a) the numbers of cases per week were the same or higher than the median for five or more consecutive weeks, and b) this sustained period started during the analysis period.

National campaign

Data was extracted from the national cancer analysis system for the diagnosis period October 2013 to September 2015. The analysis period was defined as two weeks after the start of the campaign (week 7 of 2015) to two months after the end of the campaign (week 18 of 2015). The numbers of cases diagnosed per week in the analysis period were compared with the overall median for October 2014 to September 2015. The campaign was considered to have a possible impact if a) the numbers of cases per week were the same or higher than the median for five or more consecutive weeks, and b) this sustained period started during the analysis period.

Diagnostics in secondary care

DID Imaging code list used in the analysis of the impact on diagnostic imaging

NICIP Codes

UABDO	US Abdomen
UABPE	US Abdomen and pelvis
UADRB	US Adrenal Both
UABDA	US Anterior Abdominal Wall
ULABD	US Lower abdomen
UUPPA	US Upper abdomen
CABDO	CT Abdomen
CABPE	CT Abdomen and pelvis
CABPEC	CT Abdomen and pelvis with contrast
CABDOC	CT Abdomen with contrast
MPELV	MRI Pelvis
MPEGY	MRI Pelvis gynaecological
MRECT	MRI Pelvis rectum
MSIJB	MRI Pelvis SIJ Both
MPELVC	MRI Pelvis with contrast
FBAME	Barium meal
FBASW	Barium swallow
FBASM	Barium swallow and meal
EGASTY	Gastroscopy
EUGIE	Upper GI endoscopy

SNOMED codes

45036003	US Abdomen
420052009	US Lower abdomen
418398002	US Upper abdomen
432853001	US Anterior abdominal wall
313631000000108	US Anterior abdominal wall
418394000	US Abdomen and pelvis
184391000000107	US Abdomen and pelvis
241480000	US Adrenals
169070004	CT Abdomen
32962002	CT Abdomen with contrast
419394006	CT Abdomen and pelvis
432370003	CT Abdomen and pelvis with contrast
183881000000104	CT Abdomen and pelvis
310111000000101	CT Abdomen and pelvis with contrast
2690005	MRI Pelvis
826591000000107	Gynaecological MRI Pelvis
314571000000106	MRI Pelvis with contrast
433138001	MRI Pelvis with contrast
241629006	MRI Rectum
420078000	MRI Sacroiliac joints
241153001	Barium meal
168821007	Barium swallow
241153001	Barium swallow and meal
386831001	Gastroscopy
265371001	Upper GI endoscopy

Regional campaign

This metric compares the difference in the monthly number of diagnostic radiology tests performed between the analysis period of February to May 2014 and the comparison period of April to July 2013. The comparison period of April to July 2013 was used for this analysis because of the lack of data on the numbers of diagnostic radiology tests and endoscopies carried out in the months of February to March 2013 in the North West of England (Greater Manchester, Lancashire & South Cumbria, Cheshire & Merseyside).

The data on the total number of diagnostic radiology tests conducted for suspected OG cancer and other medical conditions was obtained from the Diagnostic Imaging Dataset (DID) held on NHS Digital's iView system (29). The data contains details of referrals by GPs, consultants and other referral types.

National campaign

The data on the total number of diagnostic radiology tests conducted for suspected OG cancer and other medical conditions was obtained from the Diagnostic Imaging Dataset (DID) held on NHS Digital's iView system (29)). The data contains details of referrals by GPs, consultants and other referral types.

Gastroscopies

This metric considers whether the national OG awareness campaign had an impact on the number of gastroscopies performed by the NHS. Data was sourced from the NHS Monthly Diagnostic Waiting Times and Activity dataset (27) as published on 9 March 2017. The analysis period was February to April 2015 and this was compared to the same months in 2013 (as an earlier OG campaign ran over the same months in 2014).

Number of proton pump inhibitor prescriptions

This metric considers whether the national OG cancer campaign had an impact on the number of items prescribed for proton pump inhibitor.

Data on prescriptions for people of all ages was extracted from OpenPrescribing.net, EBM DataLab, University of Oxford, 2017 (30) for the period January 2013 to December 2015. This metric compares the difference in the monthly number of proton pump inhibitors prescribed between the analysis period of February to April 2015 and the comparison period of February to April 2013.

The campaign was considered to have a possible impact if the difference between the two periods was significant (*the likelihood ratio test was used to evaluate significance)*.

One-year survival

This metric considers whether the regional and national OG campaigns had an impact on one-year survival for persons, aged 50 and over with their first oesophageal (ICD10 C15) or stomach (ICD10 C16) cancer diagnosed during and following the campaign, compared with the rest of the year.

Regional campaign

Data on residents in the regional campaign area (North of England Cancer Network) was extracted from the national cancer analysis system. Persons were followed up until December 2016 to obtain their last known vital status. The analysis period was defined as two weeks from the start of the campaign (1 March 2014) to two months from the end of the campaign (30 April 2014). One-year age specific net survival was calculated using the methodology outlined in the Office for National Statistics: Cancer Survival Statistical Bulletins (31). Net survival refers to the probability of surviving cancer accounting for other causes of death. The one-year survival of those in the analysis period was compared with those diagnosed from 1 January to 28 February 2014 and from 1 May to 31 December 2014.

National campaign

Data was extracted from the national cancer analysis system. Persons were followed up until December 2016 to obtain their last known vital status. The analysis period was defined as two weeks from the start of the campaign (9 February 2015) to two months from the end of the campaign (30 April 2015). One-year age specific net survival was calculated using the methodology outlined in the Office for National Statistics: Cancer Survival Statistical Bulletins**Error! Bookmark not defined.**. Net survival refers to the probability of surviving cancer accounting for other causes of death. The one-year survival for those diagnosed in the analysis period was compared with those diagnosed from 1 January to 8 February 2015 and from 1 May to 31 December 2015.

8. Appendix 2 - Detailed context within oesophageal and stomach cancer

Epidemiology

Approximately 25 years ago the natural history of oesophageal and stomach cancer appeared well defined. Oesophageal cancer essentially arose in the lining cells of the oesophagus (squamous cell cancer, SCC) and was a disease of low socio-economic populations reflecting high intake of tobacco and alcohol. Stomach cancer similarly affected lower socio-economic groups. It tended to be found in the lower stomach and was thought to be due to stomach irritants such as salt, alcohol and preserved foods. Evidence accumulated to support a key role for the bacterium Helicobacter pylori (HP) in causing the disease.

The majority view amongst epidemiologists proposed that health strategies to reduce smoking and alcohol as well as eradicating Helicobacter would significantly reduce the incidence of both diseases. However, cancer registries began to report increases in the incidence of adenocarcinoma (ACA) of the oesophagus. During the early 1990s it became obvious that this was a general problem and oesophageal adenocarcinoma became the most rapidly increasing cancer in Western countries. Concurrently there was an increase in cancer of the gastric cardia of the stomach with a parallel reduction in cancers of the lower stomach.

There are three main types of oesophageal and stomach cancer: SCC of the oesophagus, ACA of the lower third of the oesophagus and the oesophagogastric junction including the cardia and non-cardia ACA of the stomach. Each presents a major health problem in different parts of the world, and much effort has been directed to improving our understanding of aetiology and natural history and methods of detecting disease at an early and treatable stage. Preventative strategies have been studied with varying degrees of success. More recently, as understanding of cancer genetics has evolved, there has been considerable interest in evaluating genetic mutations within gastric cancer families and patients who develop gastric cancer at an early age.

The overall poor results of treatment have reflected the advanced stage of most cases at presentation. Those parts of the world with high incidence have developed and pursued active mass screening campaigns. These have certainly identified precursor lesions and premalignant conditions. Indeed, application of these campaigns has

produced a significant improvement in survival rates for stomach cancer, particularly in Japan. Knowledge of these changes and underlying conditions has enabled areas of lower incidence such as the UK to pursue examination of those assessed to be at high risk and as a result to increase the number of cancers diagnosed at an early stage.

Aetiology

Many aetiological factors for oesophageal and stomach cancer are shared although their effect varies (Table 23). SCC accounts for about 40% of oesophageal cancers in the UK and tends to occur in the middle to upper oesophagus whereas ACA tends to occur in the lower end near the junction with the stomach. The vast majority of stomach cancers are ACA(1).

	Smoking	Alcohol	Dietary influences	Socioeconomic status	H. Pylori
SCC	++	++	++	++	-
Oesophageal/ OGJ ACA	-	+	++	+	+
Gastric ACA	++	+	++	++	++

Table 22: Aetiological factors for oesophageal and gastric cancer

Key: ++ Strong relationship
+ Moderate relationship
- No relationship

Source: Allum (32)

Oesophageal and oesophago-gastric junctional cancer

The striking increase in incidence of lower oesophageal and oesophageal junctional ACA over the last 30 years is strongly related to the adverse effect of gastro-oesophageal reflux and the rise in obesity. In addition, these cancers tend to occur in a more affluent and educated population, which is consistent with these nutritional changes. However, the effect of socio-economic class may not be independent as, when adjusted for gastro-oesophageal reflux disease, BMI and smoking, the effect was found to be less apparent (33).

Gastro-oesophageal reflux disease (GORD)

Gastro-oesophageal reflux is now the most common symptomatic presentation of all conditions affecting the upper gastrointestinal tract. Estimates suggest that 4–9% of all adults experience daily heartburn and up to 20% experience symptoms on a weekly basis (34). Of these 60% have no endoscopic abnormality, 30% have oesophagitis and 10% have Barrett's columnar lined oesophagus. Many are self-treated and do not attend for further investigation.

The relationship of GORD and oesophageal ACA has been evaluated in case–control studies (35).The individual cancer risk is small because of the high frequency of GORD. However a study from Sweden (36) estimated the risk of developing ACA of the oesophagus by scoring symptoms of heartburn and regurgitation (alone or in combination), timing of symptoms (particularly at night) and frequency of symptoms. Among those with recurrent symptoms of reflux, the odds ratio of developing cancer was 7.7 in comparison with those without symptoms. More frequent, more severe and longer-lasting symptoms of reflux were associated with a much greater risk (odds ratio 44). The risk associated with GORD is related to the development of Barrett's metaplasia, which is greatest among Caucasian males with a history of alcohol consumption and continuous smoking.

Obesity

In the last 20 years the incidence of junctional cancer has increased in parallel with the epidemic of obesity. There is a three- to six-fold excess risk among overweight individuals (37). Obesity predisposes to hiatus hernia and reflux, and hence contributes mechanically to increase risk of cancer. However, data from a number of studies demonstrate an effect independent of reflux. A 67% increase in the risk of oesophageal ACA has been reported in patients with a body mass index (BMI) greater than 25, and this increases with increasing BMI. This effect was noted irrespective of the presence of reflux symptoms (38).

There appears to be a sex difference in that the effect was only found in women with a BMI greater than 30, whereas in men it was observed in both overweight (BMI >25) and obese individuals. Furthermore 50% of cases of oesophageal adenocarcinoma in postmenopausal women in the Million Women study have been attributed to obesity (39).

Evidence is accumulating to support different types of obesity. The distribution of abdominal fat tends to be central and in the back of the abdomen. This acts as a potent source of growth factors, hormones and regulators of the cell cycle. Such individuals develop the metabolic syndrome, which is linked to raised serum cholesterol and

triglycerides, hypertension and hyperglycaemia. In the general population the metabolic syndrome occurs in 10–20%. By comparison 46% of those with Barrett's oesophagus and 36% of those with GORD have features of the metabolic syndrome (40).

Gastric cancer and diet

The nutritional effect of salt preservation of foods and vitamin deficiencies (riboflavin, vitamin A and C) are key components of the progression of superficial mucosal inflammation to chronic gastritis and atrophy increasing susceptibility to other carcinogens (41). High carbohydrate intake has also been implicated. Populations in areas of the world with high incidence tend to have diets with a high dietary carbohydrate content and a low protein intake. Protein deficiency will impair natural gastric lining repair and indeed high carbohydrate/low protein may impair defence mechanisms against injurious agents.

Fresh vegetables and fruit theoretically act to protect the stomach lining. Vitamins A, C and E reduce damage from ingested substances and related products of intragastric metabolism. Although dietary studies have failed to confirm these proposed effects, it is possible that prolonged exposure is more relevant, supporting the philosophy of a balanced diet rather than one supplemented with a potentially beneficial foodstuff. Gradual improvements in dietary fresh vegetables and food preservation have reduced gastric cancer numbers in high incidence countries.

Helicobacter pylori

In 1994 the International Agency for Research on Cancer designated *H. pylori* to be a type I carcinogen for gastric cancer (42). The initial effect of *H. pylori* is acute inflammation. Since the infection does not resolve spontaneously, an effect is likely to persist and may proceed to chronic gastritis, associated mucosal atrophy and intestinal metaplasia, dysplasia and eventually cancer.

The evidence for its role is from a number of sources. Areas of high cancer incidence have a high rate of *H. pylori* infection, which tends to occur early in life. These early rates of infection are linked to populations with low income, poor education, poor sanitation and overcrowding. There is also a progressive fall in rates of H. pylori serology positivity in studies conducted over time, which have paralleled the decline in gastric cancer incidence.

Although the evidence for *H. pylori* inducing gastric cancer is convincing, not all those infected develop the disease. The risk of malignant transformation appears to be enhanced by bacterial virulence (43) and host factors. It is likely that *H. pylori* induces an environment which promotes malignant cell development not only by stimulating

production of carcinogens but also by reducing the production of gastric juice ascorbic acid which normally suppresses cancer promoting cells. As a result of these effects of H pylori, eradication campaigns have been associated with a reduction in cancer incidence.

The role of *H. pylori* infection in the aetiology of junctional cancer is unclear but appears to be evolving. It has been suggested that the reduction in acid production secondary to *H. pylori* induced gastric atrophy could, in association with ammonia production from urea by the bacteria, protect the lower oesophagus by changing the content of the refluxing gastric juice. In countries with an increase in junctional cancer, there has been a corresponding decrease in incidence of *H. pylori* infection. Furthermore community-based approaches to eradicate *H. pylori* infection in the treatment of ulcer and non-ulcer dyspepsia may be inadvertently contributing to the increase in these cancers.

Barrett's oesophagus

Definition

Barrett's oesophagus or columnar lined oesophagus (CLO) is defined as an abnormal change (metaplasia) in the lining (epithelium) of the lower oesophagus from the normal squamous epithelium to columnar cells, which are usually found in the stomach and lower gastrointestinal tract (44). It is a result of chronic inflammation usually caused by reflux of gastric acid into the lower oesophagus. The significance of Barrett's oesophagus is the potential to progress to adenocarcinoma.

Natural history

Barrett's oesophagus is associated histologically with non-dysplastic cells, low grade dysplasia, high grade dysplasia and ACA. The development of Barrett's can take up to 10 years in patients with GORD, although Barrett's can develop without symptoms. High risk groups for the development of Barrett's include being male, over the age of 45 years, having a longer duration of living with GORD, and experiencing GORD from an early age (45).

Prevalence

The prevalence of Barrett's in the population is approximately 1% and is diagnosed in about 12% undergoing an endoscopy for GORD.

Dysplasia develops in around 5% of patients known to have Barrett's. Approximately 10% of patients with confirmed low-grade dysplasia may progress to high-grade dysplasia and ACA over 2 to 5 years.

The overall proportion of those with Barrett's who go on to develop ACA is low, approximating to 0.2 to 0.5% per patient year (46). This implies that a 30-year-old developing Barrett's has a 25% chance of developing oesophageal cancer before reaching 80 years of age; a 50-year-old's equivalent risk would be 15%.

Early diagnosis of Barrett's oesophagus currently remains an unachieved goal which if effected would decrease mortality from ACA.

Diagnosis

Barrett's oesophagus has a characteristic appearance endoscopically with a change in colour of the lining epithelium to a salmon pink. The assessment has been comprehensively described in the British Society of Gastroenterology guidelines (44). The length of the affected oesophagus should be recorded together with any associated hiatus hernia and mucosal changes including inflammation, nodularity and ulceration. It is recommended that serial biopsies should be taken from all four quadrants of the circumference of the oesophagus at 2cm intervals.

The approach to follow-up is determined by the associated histological changes. In patients with less than 3cm of Barrett's (short segment) in whom there is no associated intestinal metaplasia or dysplasia and these findings are confirmed at a second examination, there is no need for surveillance. In those with short segment Barrett's and intestinal metaplasia, follow-up endoscopy is recommended every 3 to 5 years. In patients with long segment (> 3cm) surveillance should be every 2 to 3 years. In patients with an equivocal diagnosis of dysplasia, there should be optimal treatment of any reflux symptoms and a repeat endoscopy performed at 6 months. If that examination including histology is normal there is no need for further surveillance.

The management of low-grade dysplasia has been unclear until recently. Because of the risk of progression of low-grade dysplasia in some patients, a repeat endoscopy after 6 months is recommended. If low grade change is still present the patient should be considered for endoscopic ablative therapy. If this is not undertaken, then 6 monthly surveillance is recommended. Patients in whom high grade dysplasia is diagnosed should be treated with endoscopic ablation and in the presence of nodule should undergo endoscopic resection in view of the high risk of an associated cancer. In all cases of low- and high-grade dysplasia biopsy specimens should be reviewed by two expert GI pathologists. In addition to conventional techniques of pathological assessment, examination for the p53 marker should be considered as this can enhance diagnostic accuracy.

Endoscopic techniques

Patients undergoing gastroscopy in whom Barrett's is diagnosed usually have reflux symptoms. High resolution endoscopy is the investigation of choice and advanced modalities such as chromoendoscopy are not recommended for surveillance examinations. Screening for Barrett's is not routinely recommended although high risk groups should be considered particularly if there is a family history.

Many patients with GORD and Barrett's never progress to develop high risk histological changes. A challenge therefore is to identify those who are at risk without necessarily submitting them to OGD. A novel technique (the Cytosponge) in which lining cells are harvested from the oesophageal mucosa is under investigation in a population with Barrett's (47).This technique involves swallowing a sponge, which is retrieved using an attached thread. Smears are made from the sponge surface and these can be analysed for cytological abnormalities, which can then indicate a formal OGD. This is at an early stage of development but may well have implications for mass screening.

Previous approaches to early diagnosis

Dyspepsia has been classified as uncomplicated or complicated by alarm symptoms including weight loss, anorexia, vomiting, dysphagia and signs of anaemia or an abdominal mass. Further classification according to age has been studied as early gastric cancer tends to present approximately 10 years younger than advanced disease (48). Although such studies have increased rates of detection of early gastric cancer to approximately 15–20% of all cancers diagnosed, many patients with uncomplicated dyspepsia have undergone normal examinations (49).

Studies of open access to endoscopy for GPs investigating dyspepsia have resulted in reducing the length of time between presentation to diagnosis compared with conventional symptomatic referral. Rates of diagnosis of cancer from such series were low at approximately 5%. However patients with potentially at risk pathologies were identified and these formed a group for close follow-up with a small proportion eventually diagnosed with early cancer (50).

Such approaches to unselected dyspepsia provided a diagnostic service but the lack of specificity of the symptoms resulted in many non-contributory investigations with associated inefficiency within the greater health economy.

Suspected cancer referrals

The National Institute for Health and Care Excellence (NICE) established a Guideline Development Group (GDG) to develop guidance for the referral of patients with symptoms suspicious for an underlying cancer (51).These guidelines have been based on a “risk threshold” model, in which the level of risk of a set of symptoms being due to cancer was determined and investigation was recommended for symptoms above that level. The positive predictive value (PPV) of symptoms for a specific cancer was used to set the level. A PPV less than 3% was agreed in the context of financial and clinical constraints for urgent direct access to endoscopy.

The symptoms recommended for urgent referral (within two weeks) for direct access upper gastrointestinal endoscopy for suspected oesophageal or gastric cancer is as follows:

- dysphagia or
- aged 55 and over with weight loss and any of the following:
    - upper abdominal pain
    - reflux
    - dyspepsia

Non-urgent referral for upper GI endoscopy is recommended for:

- treatment-resistant dyspepsia at any age or
- upper abdominal pain with low haemoglobin levels or
- raised platelet count with any of the following:
    - nausea
    - vomiting
    - weight loss
    - reflux
    - dyspepsia
    - upper abdominal pain, or
- nausea or vomiting with any of the following:
    - weight loss
    - reflux
    - dyspepsia
    - upper abdominal pain.

Patients presenting with an upper abdominal mass were recommended to be referred for an urgent opinion (within two weeks).

Although the two week rule referrals account for 46% and 32% of all diagnoses for oesophageal and gastric cancer respectively in 2015, the rates of emergency presentation were 19% (oesophageal) and 30% (gastric) (52).

NICE have also developed guidance for the investigation of gastro-oesophageal reflux and dyspepsia with referral for endoscopy (53). This guidance recommends urgent specialist referral for patients presenting with dyspepsia with acute upper GI bleeding. Referral for endoscopy should be considered to diagnose Barrett's for those with GORD in the context of risk factors including long duration of symptoms, increased frequency of symptoms, previous oesophagitis, previous hiatus hernia, oesophageal stricture or oesophageal ulcers, or being male. Endoscopic surveillance for Barrett's should be considered for those with dysplasia and risk factors including male gender, older age and length of the Barrett's segment.

These guidelines have been instituted to improve rates of earlier diagnosis by attempting to introduce investigation at an earlier stage in the natural history of the disease. Critics have pointed out that many of the so-called alarm symptoms are those of advanced disease. Studies have shown that patients diagnosed via the "two-week rule" had an up to 60% chance of having advanced disease. Furthermore, focusing on reducing the time from presentation to the primary care physician to diagnosis may be only part of the story. The initiation of treatment without a diagnosis is one component with studies showing over half of patients being treated medically before referral and the effect of proton pump inhibitors "healing" the ulcerating component of a gastric cancer with associated symptom relief (54). Studies have also shown that longer symptom history is more commonly associated with earlier cancers. The cell doubling time in early gastric cancer is between 18 months and 10 years contrasting with 2 months and 1 year in advanced disease (55).

Strategies to improve rates of earlier diagnosis need to be multifaceted in the context of these findings. Patient understanding including the importance of significant symptoms and urgent referral by primary care without empirical treatment are important areas for education. In addition, the socio-economic background does contribute to outcome as there is clear evidence of the effect of social deprivation on lower rates of referral for endoscopy which independently relate to emergency presentation and overall survival.

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