Derbyshire NHS bowel cancer screening programme health equity audit

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What was already known on this topic?

- Uptake of the NHS Bowel Cancer Screening Programme in Derbyshire, including Derby City, was 61.7% in 2014. This is above the achievable target of 60%.
- Although uptake is above the achievable target, the average masks wide variations between GP practices across the county and city.
- Evidence suggests that uptake is lower in men, more deprived populations and in ethnic minority groups. This understanding is drawn from national data, is a number of years old and is not specific to Derbyshire.
- Factors that discourage participation or generate negative perceptions of screening include lack of knowledge about the causes of colorectal cancer, low health literacy, having to sample and temporarily store faeces, completing the kit at home rather than in a formal health setting, and concern about the result of the screening test.
- Uptake can be improved through targeted programmes such as a GP endorsement letter and telephone advice.
- The aim of this equity audit was to determine the equity of access, uptake and outcomes from the NHS Bowel Cancer Screening Programme in Derbyshire, including Derby City, in order to increase uptake and narrow the gap in health outcomes.

What does this work add to our knowledge?

- Uptake in Derby City was 55.68% and positivity was 2.46%. In Derbyshire County the uptake was 61.81% and positivity was 2.08%.
- There is wide variation in uptake by GP Practice, between 31.63% and 72.32%.
- Test positivity was generally higher in places with lower uptake, although the reasons for this are uncertain. For example, it could be that cancer rates are higher in these areas or that people with suspicions (e.g. a symptom such as blood in the stool) may be more likely to complete the screening test.
- Uptake incrementally and significantly increased across the deprivation deciles – uptake was 44.68% in the most deprived group in comparison to 69.75% in the least deprived group. The most deprived IMD deciles also had the greatest proportion of positive screening test results.
- Mosaic groups with the lowest uptake were Urban Cohesion (Group I) (40.42%) and Municipal Challenge (Group O) (43.85%). In general, the more deprived Mosaic Groups had a higher proportion of positive screening results.
- Only 10.17% of people that have overlooked previous screening invitations were adequately screened in this screening round. This may suggest that repeated postal invitations to participate in the screening programme sent to individuals who have not previously responded to an invite to participate is likely to be an inefficient way to engage this population in bowel cancer screening.
- Uptake of bowel and breast cancer screening programmes in England is also lower among people living in more deprived communities and in ethnic minority groups, which may suggest there are certain populations in whom low uptake is not specific to the NHS BCSP, but rather uptake of cancer screening programmes in general.

Contents

1. Preamble

This report builds upon previous work conducted in Derbyshire and Derby City to understand local variations in Bowel Cancer Screening uptake and how to reduce inequalities in uptake. Herein Derbyshire is used to denote both Derbyshire County and Derby City.

In October 2015, a report was submitted to the Derbyshire Health Protection Board on the impact of the NHS Bowel Cancer Screening Programme in Derbyshire. This report highlighted the following key areas:

- While local uptake of bowel cancer screening was 61.7% in Derbyshire for 2014 and significantly higher than the England average uptake of 58.3%, there was geographical variation in the uptake rates across the CCGs in Derbyshire as well as between GP practices within CCGs.
- Better than average uptake rates for the NHS Bowel Cancer Screening Programme (NHSBCSP) seen in Derbyshire are therefore masking significant inequities in access to the programme and contributing to the known health inequalities in these communities.

The 2015 report identified Health Equity Audit (HEA) as a tool which could be used to better understand those population groups in Derbyshire with lower rates of access to the NHS Bowel Cancer Screening Programme.

In September 2016, in response to the report presented to the Derbyshire Health Protection Board in October 2015, further work was conducted to understand variations in bowel cancer screening uptake and reduce inequalities in uptake between defined communities and practice populations across Derbyshire. The 2016 report highlighted the following key areas:

- Evidence shows that there are a range of equality characteristics that are associated with lower uptake of the NHSBCSP and include: socio-economic deprivation, BME background, younger age groups, men, Muslim religion and people with learning disabilities.
- Derby City has a significantly higher proportion of BME communities compared to the rest of Derbyshire. Derby City, Amber Valley, Bolsover, Chesterfield, Erewash and North East Derbyshire, and Erewash and Hardwick CCGs have more socio-economically deprived populations compared to both the Derbyshire and England average. These are the areas that may require more targeted approaches in terms of developing strategies to increase uptake.
- There are a variety of evidence-based interventions that have been shown to improve uptake of the NHSBCSP including GP endorsement letters, enhanced patient leaflet, telephone advice, Cancer Research UK campaign (advertising, kit enhancement & flyer) and face to face health promotion.
- It is important to design activity to address the barriers to access and inequalities that apply to the population eligible for bowel cancer screening across Derbyshire. In order to achieve this, patient-level data is needed in order to establish where the specific inequalities to access lie locally.

This report (February 2018) explores local variations in uptake and outcomes from the NHSBCSP in Derbyshire, using patient-level data to understand local inequalities in uptake of bowel screening. This information is used to make recommendations to improve local uptake among communities in which uptake is low.

2. Background

The NHS National Screening Programmes are part of the NHS Public Health Functions Agreement (Section 7A) of the NHS Health and Social Care Act 2006. NHS England's first objective under this agreement is to commission high quality public health services in England, with efficient use of Section 7A resources, seeking to achieve positive health outcomes and reducing inequalities in health.

NHS England has four Regional Teams and it is these teams that are currently responsible for the direct commissioning (planning, securing and monitoring) of the screening services according to service specifications. The Regional Teams, in collaboration with Clinical Commissioning Groups (CCGs) and local authorities, ensure that these services are commissioned in a way that supports consistently high standards of quality across the country and reflects local need.

Public Health Section 7A Commissioning Intentions, 2016/17 (NHS England 2016a) lays out the objectives of all screening programmes, the key deliverables of which should include:

- "Screening should be delivered in a way which addresses local health inequalities, tailoring and targeting interventions when necessary
- A Health Equity Impact Assessment should be undertaken as part of both the commissioning and review of this screening programme, including equality characteristics, socio-economic factors and local vulnerable populations
- The service should be delivered in a culturally sensitive way to meet the needs of local diverse populations
- User involvement should include representation from service users with equality characteristics reflecting the local community including those with protected characteristics
- Providers should exercise high levels of diligence when considering excluding people with equality protected characteristics in their population from the programme and follow equality, health inequality and screening guidance when making such decisions."

Furthermore, it is stated that the provider must demonstrate what systems are in place to address health inequalities and ensure equity of access to screening, subsequent diagnostic testing and outcomes. The provider must also have procedures in place to identify and support those persons who are considered vulnerable or hard-to-reach.

2.1 NHS Bowel Cancer Screening Programme (NHS BCSP)

1 in 14 men and 1 in 19 women will be diagnosed with bowel cancer during their lifetime. Bowel cancer is the fourth most common cancer and the second most common cause of death from cancer in the UK (ONS 2015). Population subgroups at higher risk of developing bowel cancer and dying from it include (CRUK & NCIN 2014):

- Men (50% more likely to develop and to die from bowel cancer than women)
- Older adults (incidence rises with increasing age and peaks in those aged 85-89 years old; mortality is highest in those aged over 90 years old)
- People living in the most deprived quintile (mortality rates are 30% higher for men and 15% higher for women when compared with the least deprived quintile)
- People of white ethnicity (age-standardised incidence rates are significantly lower in black and Asian men and women)

Regular bowel cancer screening has been shown to reduce the risk of dying from bowel cancer by 16% (Hewitson et al. 2008).

The NHSBCSP is a nationally co-ordinated programme that aims to identify bowel cancer at an early stage before it becomes symptomatic. The programme has now been rolled out locally for a number of years and there is an interest in understanding who is taking up the screening and whether there are any inequities in the system that make some people less likely to take up the offer of screening.

2.1.1 Aim of NHS BCSP

The aim of the NHSBCSP is to reduce mortality from bowel cancer in the population covered by the programme. This will be achieved by ensuring the screening programme (NHS England 2016b):

- Identifies the eligible population and ensures efficient delivery with optimal coverage;
- Is safe, effective, high quality, externally and independently monitored, and quality assured;
- Prevents cancer where possible, and leads to earlier detection, appropriate referral, and improved outcomes;
- Is delivered and supported by suitably trained, competent, and qualified, clinical and non-clinical staff who, where relevant, participate in recognised ongoing professional training; and
- Has audit embedded in the service.

2.1.2 Summary of the Service Specification (NHS England 2016b)

The FOBt screening programme invites men and women aged 60-74 and who are registered with an NHS general practice (and with a functioning bowel) to complete a faecal occult blood test (FOBt) every two years. The testing kit is posted to them at their homes. People found to have abnormal tests are then referred to their local Screening Centre for further assessment with most going on to have a colonoscopy. People whose FOBt proves to be normal are advised in writing that they will be sent another kit in 2 years if they are still under 75. Patients aged ≥75 years can self-refer for screening.

The provider must ensure that non-responders to the initial invite to participate in screening are sent a reminder letter, but if that individual does not respond to this reminder, he/she will be sent another screening kit in two years during the next screening cycle. See the Appendices (page 36 onwards) for a screening pathway diagram (Figure 9.1) and key performance indicators (Table 9.1) for the service.

2.1.3 Local Delivery

The local programme hub is the Eastern Hub based at Queen's Medical Centre, Nottingham. The role of the hub is to organise and manage the first stage of the programme pathway (i.e. the postal FOBt testing). The Hub's main responsibilities are to send out kits and test returned kits, to call and recall subjects for screening, sending out results letters to subjects and GPs, analysing data (including performance monitoring) and supporting research and development projects.

There are also a number of local initiatives that aim to increase uptake of the bowel cancer screening programme in Derbyshire. These are described in detail in Section 4.3 (page 26) and include initiatives such as working with GP practices with low uptake to share best practice in raising bowel cancer screening uptake and embedding members of the bowel screening team at local flu clinics.

There are two screening centres that provide bowel cancer follow-up tests for patients with an abnormal postal kit test result in Derbyshire. Providers of this service are North Derbyshire Bowel Cancer Screening Centre in Chesterfield Royal Hospital NHS Foundation Trust and South Derbyshire Bowel Cancer Screening Centre in the Derby Teaching Hospitals NHS Foundation Trust.

2.1.4 Future Developments

The UK National Screening Committee has recently recommended a change to the screening test used in the NHS BCSP. The use of Faecal Immunochemical Test (FIT) as the primary test for bowel cancer will replace faecal occult blood test (FOBt), which may help to address inequalities in uptake as FIT is a more acceptable test, requiring only one faecal sample (three separate samples are required for FOBt) and is easier to use. This new test will be rolled out across Derbyshire from April 2018.

3. Methods

3.1 Aim

The aim of this Health Equity Audit is to determine the equity of access, uptake and outcome from the NHSE Bowel Cancer Screening Programme in Derbyshire in order to narrow the gap in health outcomes and increase uptake.

3.2 Objectives

The specific objectives of the HEA are to:

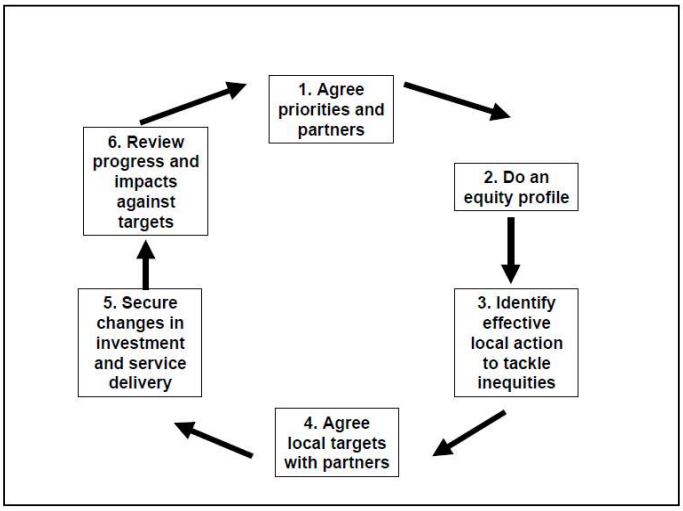
- Establish current access, uptake and outcomes from the NHS Bowel Cancer Screening Programme in Derbyshire.
- Undertake equity profiling of the NHS BCSP in Derbyshire in relation to specific population characteristics, including age, gender, geography and deprivation.
- Use evidence from the HEA to inform decisions on investment, service planning, commissioning and delivery of the NHS Bowel Cancer Screening Programme in Derbyshire.
- Recommend joint local strategic action to address inequalities in access and promote awareness of bowel screening.
- Establish a process to review the impact of actions taken in response to the results of the HEA on inequalities.

The HEA will be used to identify and analyse how access, uptake and outcomes from the NHS Bowel Cancer Screening Programme in Derbyshire are distributed in relation to the health needs of different groups of people, in different geographical areas.

3.3 Methods

HEA is a cyclical process whereby local partners systematically review inequities in causes of ill health and access to services and how the outcomes of such inequities impact upon a defined population. There are six stages involved in a HEA as shown in Figure 3.1 (taken from: Hamer et al. 2003).

Figure 3.1: The cycle of a health equity audit



Stage 1: Agree priorities and partners

The priorities for this HEA were developed with relevant partners including Derbyshire County Council, Derby City Council, Public Health England and the local CCGs via the Derbyshire Health Protection Board.

The scope of this project was agreed which includes:

- To consider the NHS BCSP only (i.e. not to include bowel scope screening).
- To focus the analysis on people who are invited to participate in the BCSP (i.e. people aged 60-74 years old).
- To exclude local data on Glossop, which is linked to the Western Bowel Hub and would have required additional data access approval.

Stage 2: Do an equity profile – baseline data collection and analysis

Data from the Eastern Hub for the period 1st April 2014 to 31st March 2016 was analysed to understand variations in uptake across Derbyshire and Derby City. Specifically, anyone registered with a GP in one of the 4 Derbyshire CCGs (Erewash, Hardwick, North Derbyshire and Southern Derbyshire) was included in the analysis. Residents of Derby City or Derbyshire with a GP outside of the area covered by the 4 Derbyshire CCGs were excluded. Conversely, some people who live outside of Derbyshire but who are registered with a GP in Derbyshire or Derby City were included in the analysis.

The data was prepared by the Eastern Hub and outsourced to the Public Health team at Derby City Council for analysis. The following data was shared by the Hub for each screening invitation:

- Gender
- Age at invite
- GP code
- CCG code
- Episode sequence number
- Lower super output area (LSOA) (derived by the Hub using postcode data)
- Mosaic codes (assigned by the Hub using postcode data)
- Invitation count

- Whether the invitation was a self-referral
- Whether the invitation resulted in an adequate screen (used to calculate uptake)
- Whether or not the result was abnormal

The Mosaic Public Sector segmentation tool offers insights into the demographic, lifestyle and behavioural traits of people living in small geographies, 'segmenting' the population into 15 Groups and 66 Types. This information can be used to identify communities within which uptake is particularly low (and/or positivity is higher), and to design appropriate strategies to support those communities to increase screening uptake.

Descriptive analyses are presented in Section 4 below. As the NHS BSCP is an NHS programme, analysis would normally focus on uptake and outcomes by CCGs and GPs. However, the Public Health team at Derby City Council was able to deliver a more detailed analysis looking at, for example, district and county level uptake. The analysis below presents some of the most interesting and important aspects of variation in uptake and outcome across Derbyshire and Derby City identified; however, the opportunity is there with this data to conduct further analysis as required by different stakeholders.

Challenges in accessing the NHS BCSP data

The process for gaining access to data from the NHSE Bowel Hub was lengthy and complex. After we had identified the need to undertake a Health Equity Audit advice was sought from the PHE BCSP Research Advisory Committee and the PHE Office of Data Release (ODR). In total the process of advice to approval took eighteen months and included challenges such as:

- A lack of protocols or guidance for the approval process, despite the project being a standard HEA.
- Several approval processes, applications and committees were required, rather than one unified system.
- Long periods of time between submissions and feedback. Additionally, feedback received was different following each submission and often difficult to interpret.
- Active discouragement to request postcode level data despite a range of data protection processes established in the project. Amendments were made to the project to limit any possible identifiable data; however, due to the lack of demographics within screening data and the geographical nature of Derbyshire, access to low level data was essential.

These experiences have been shared with NHSE and PHE and actions taken to improve the experience of those making data requests to support routine work around health inequalities in the future.

Stage 3: Use evidence to identify effective local action

A rapid review of the evidence was conducted to establish what is already known about health inequalities in relation to access to the NHS BCSP, including how to target public health action to improve uptake among population subgroups with lower rates of uptake of the NHSBCSP. Recommendations are made on the basis of identified need, and according to the evidence of what works elsewhere in England.

Stages 4 to 6

Stages 4-6 are not presented in this report. Nevertheless, this report will inform stages 4 to 6, which will take place in due course.

4. Results

4.1 Bowel Cancer Screening Uptake and Outcomes in Derbyshire

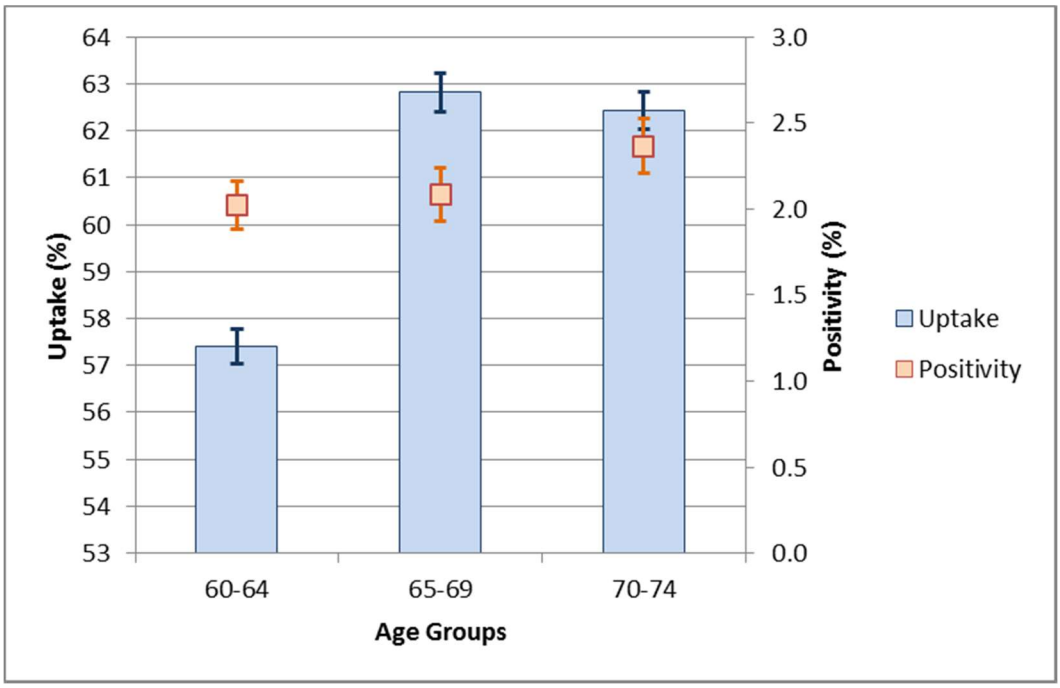
4.1.1 Overview

Between 1st April 2014 and 31st March 2016 there were 180,176 invitations to screen sent out from the Eastern Hub to people registered with a Derbyshire County or Derby City GP. A total of 109,099 screens were adequately completed, an uptake rate of 60.55%. Of those screens that were adequately completed, 2,347 (2.15%) were abnormal (positive) and the individual was invited for further testing.

Uptake was 62.70% in females and the positivity was 1.83%. In males the uptake was 58.34% and the positivity was 2.51%. The difference in both uptake and positivity between males and females is statistically significant; men are significantly less likely to participate in screening than women, and are significantly more likely to have an abnormal result from screening.

The highest screening uptake was among 65-69 year olds (62.82%), slightly higher than the uptake in 70-74 year olds (62.42%) and significantly higher than men and women aged 60-64 years old (57.40%). The positivity of screens was not significantly different across the groups, but there was a slight upward trend with increasing age (see Figure 4.1).

Figure 4.1: Uptake and positivity by age group



4.1.2 Geographical Variations in Uptake and Outcome

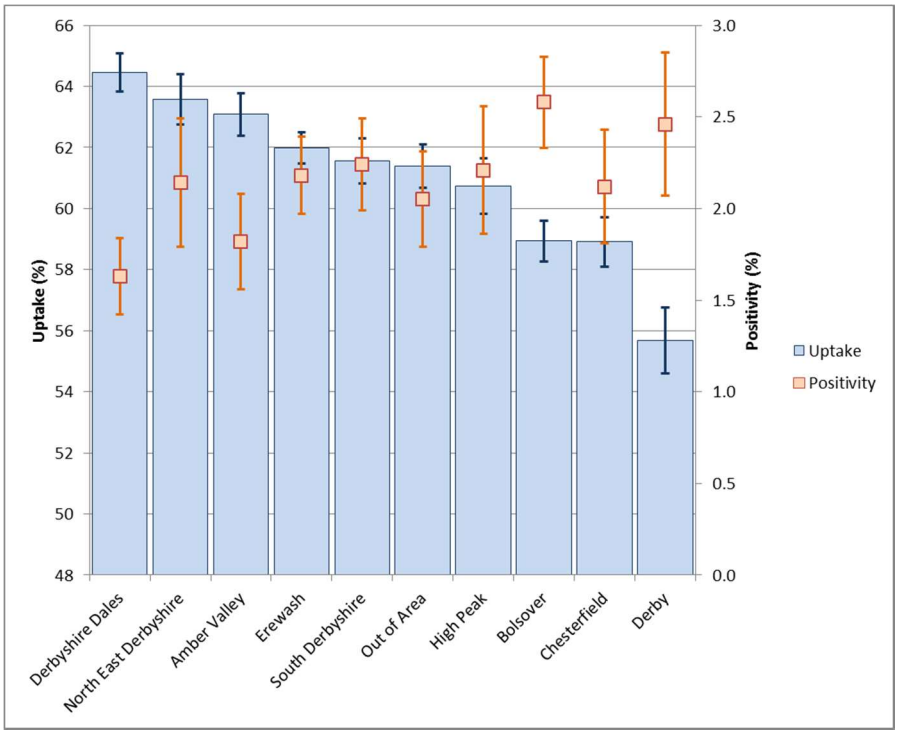
Uptake in Derby City was 55.68% and positivity was 2.46%. In Derbyshire County the uptake was 61.81% and positivity was 2.08%. Approximately 5% of invitations were 'Out of Area' which indicates people who have a Derbyshire GP but who live outside of Derbyshire.

Table 4.1 shows the invitation count, adequate screens and positivity by District in Derbyshire County, as well as Derby City. The highest screening uptake was in Derbyshire Dales (64.45%), North East Derbyshire (63.57%) and Amber Valley (63.08%). The lowest screening uptake was in Derby (55.68%), Bolsover (58.94%) and Chesterfield (58.91%). Districts with the lowest screening uptake had some of the highest positivity results (Bolsover 2.58%; Derby 2.46%), and conversely Derbyshire Dales (1.63%) and Amber Valley (1.82%) had the lowest (see Figure 4.2).

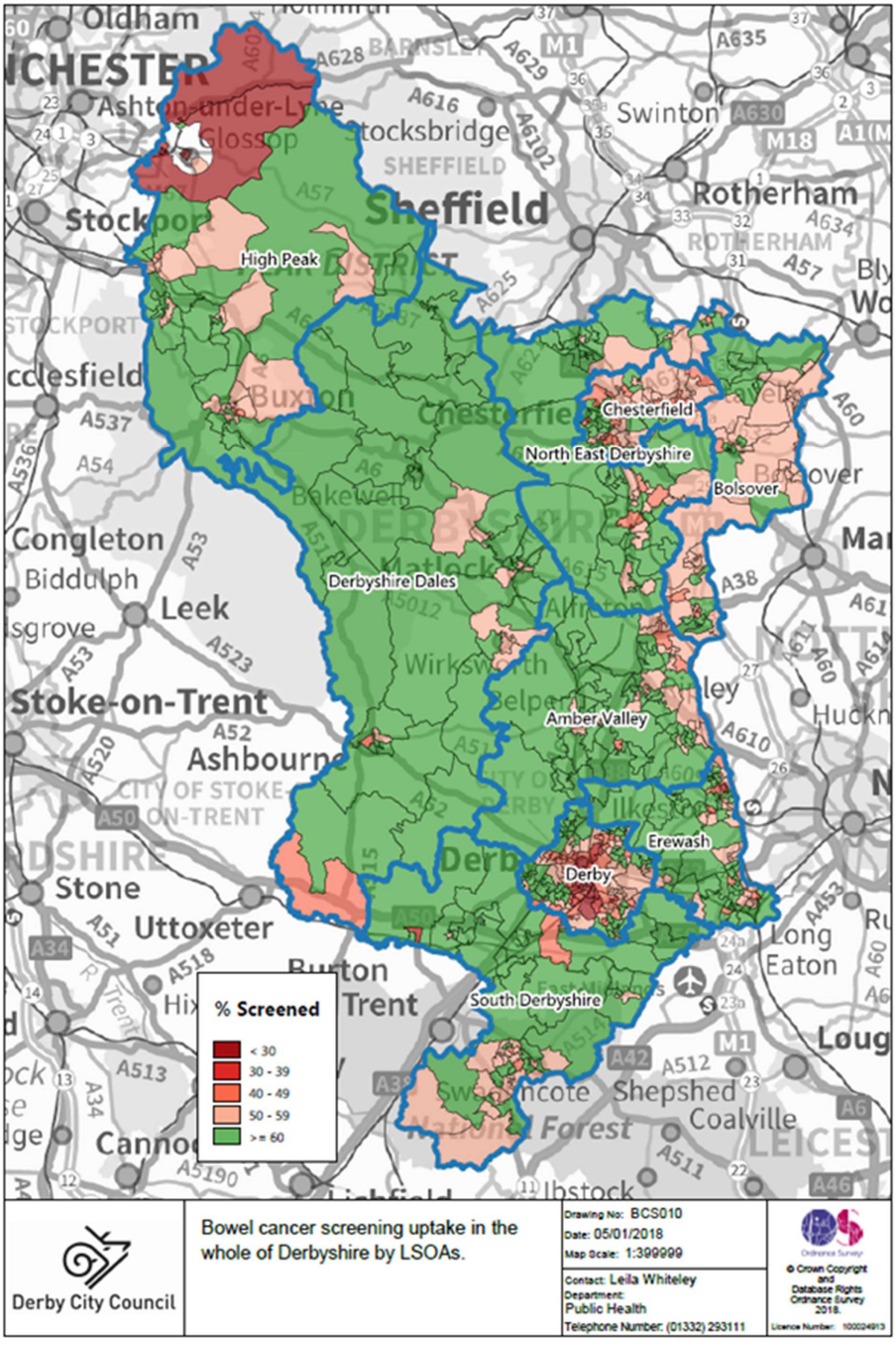
Table 4.1: Uptake and positivity by geographical district

	Invitation count	Adequately Screened	LL CI (%)	UL CI (%)	Abnormal count	Positivity	LL CI (%)	UL CI (%)
Amber Valley	23,635	63.08%	62.46	63.7	272	1.82%	1.62	2.05
Bolsover	13,277	58.94%	58.1	59.78	202	2.58%	2.24	2.96
Chesterfield	19,194	58.91%	58.21	59.61	240	2.12%	1.86	2.41
Derby	36,335	55.68%	55.17	56.19	498	2.46%	2.25	2.68
Derbyshire Dales	15,386	64.45%	63.69	65.21	162	1.63%	1.39	1.9
Erewash	18,541	61.98%	61.27	62.68	251	2.18%	1.92	2.47
High Peak	11,189	60.73%	59.82	61.64	150	2.21%	1.87	2.59
North East Derbyshire	20,096	63.57%	62.9	64.24	273	2.14%	1.89	2.4
South Derbyshire	13,837	61.56%	60.74	62.37	191	2.24%	1.94	2.58
Out of Area	7,929	61.39%	60.31	62.47	100	2.05%	1.67	2.49
N/A	757	60.9%			8	1.74%		
Total	**180,176**	**60.55%**			**2,347**	**2.15%**		

Figure 4.2: Uptake and positivity by geographical district



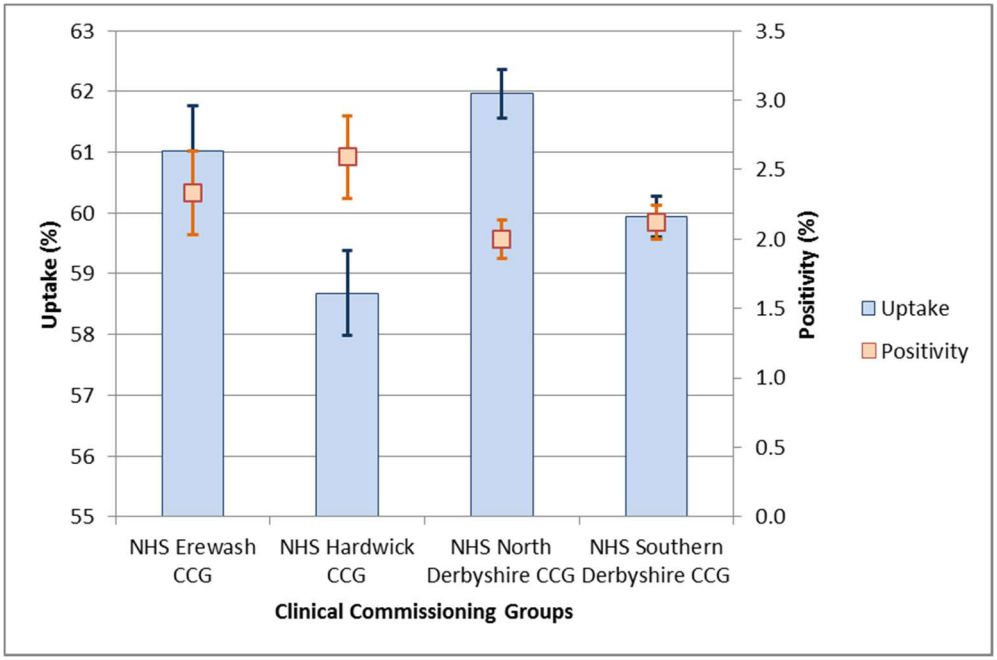
Map 4.1: Bowel cancer screening uptake by LSOA in Derbyshire



Analysis is also available by Place. Please see the Appendix (page 39) for the analysis of uptake and outcome across Places in Derbyshire and Derby City.

The highest uptake was in NHS North Derbyshire CCG (61.96%). This was significantly higher than NHS Hardwick CCG (58.68%) and NHS Southern Derbyshire CCG (59.94%), but not significantly different to NHS Erewash CCG (61.02%) (Figure 4.3). In comparison, the highest positivity was recorded in NHS Hardwick CCG (2.59%), and this was significantly greater than NHS North Derbyshire CCG (2.00%) and NHS Southern Derbyshire CCG (2.12%).

Figure 4.3: Uptake and positivity by Derbyshire Clinical Commissioning Group



4.1.3 Variations in Uptake and Outcome by General Practice (GP)

There are wide variations in screening uptake and positivity by General Practice across Derbyshire. Table 4.2 shows the GPs with the highest and lowest uptake in the 4 Derbyshire CCGs. The widest variation in uptake is in Southern Derbyshire, where uptake across 56 GPs ranges from 31.63% to 72.32%.

Table 4.2: Highest and lowest uptake and positivity by GP in each Derbyshire CCG

	GP Practice Uptake			
	Highest (FOBt positivity)	**Invitation Count**	**Lowest (FOBt positivity)**	**Invitation Count**
NHS Erewash	64.07% (1.45%)	1,620	52.61% (2.45%)	951
NHS Hardwick	72.02% (0.96%)	865	50.83% (4.07%)	242
NHS North Derbyshire	68.98% (1.71%)	2,115	53.22% (2.30%)	3,914
NHS Southern Derbyshire	72.32% (1.45%)	2,009	31.63% (9.68%)	196

To understand if variation in uptake by GP Practice is associated with the deprivation we used the GP Practice IMD Decile (a form of average GP IMD Decile) to examine uptake and positivity in GP Practices by CCG.

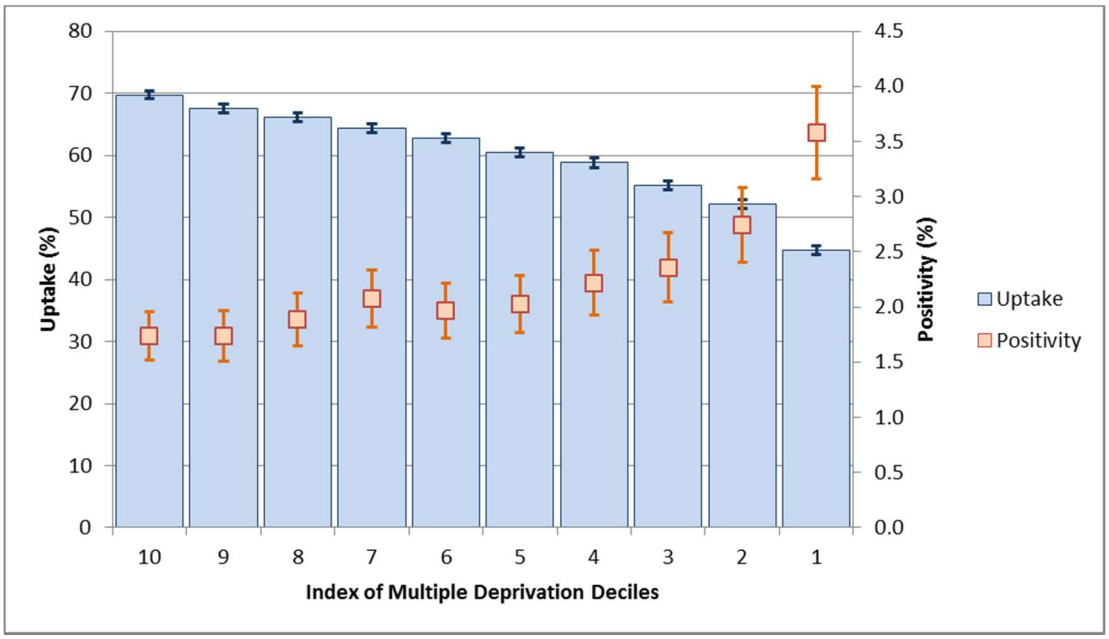
There is no significant variation in uptake or positivity by GP Practice IMD Decile in Erewash CCG (see Figure 9.3 in Appendix 5 on page 41). There is some variation in Hardwick CCG, although the pattern is not clear. For example, whilst a GP Practice in IMD 9 has significantly higher uptake than almost all the other practices, a GP Practice in IMD 7 is not statistically significantly different from practices in IMD 3, 4 and 5 (see Figure 9.4). Both North Derbyshire and Southern Derbyshire CCGs have a much clearer gradient in uptake across GP Practices in the different IMD Deciles, although there is also a clear gradient within IMD Deciles as well (see Figures 9.5 and 9.6). In Southern Derbyshire there are three GP Practices in the two most deprived deciles that have an uptake of less than 40%.

4.1.4 Variations in Uptake and Outcome by Index of Multiple Deprivation

Screening uptake incrementally increased with each index of multiple deprivation (IMD) decile (see Figure 4.4). IMD Decile 1 is the most deprived group with screening uptake at 44.68%, in comparison to 69.75% for Decile 10, the least deprived group. Each confidence interval for the deciles was significantly different which suggest that differences in uptake between each IMD decile are significant.

The most deprived IMD deciles had the greatest proportion of positive screening test results. The confidence interval for Decile 1 does not overlap with the other confidence intervals, which suggests that positivity among people in the most deprived decile is significantly higher than in other groups.

Figure 4.4: Uptake and positivity by IMD decile



4.1.5 Variations in Uptake and Outcome by Mosaic Group and Type

Screening uptake varied widely across the Mosaic Groups (see Figure 4.5).

The highest uptake (83.87%) was recorded for Group C (City Prosperity), but this was based on a small sample. The other groups with high uptake were Group B (Prestige Positions) (71.59%) and Group F (Senior Security) (69.42%). Excluding Group C data from analysis would show Group B uptake as significantly higher than all other Mosaic Groups. In contrast, Groups with the lowest uptake included Group I (Urban Cohesion) (40.42%) and Group O (Municipal Challenge) (43.85%). Figure 4.6 below provides a brief description of each Mosaic Group and Type as an illustration of the types of people within these different groups.

Figure 4.5 also shows positivity by Mosaic group. In general, more deprived Mosaic Groups had a higher proportion of positive screening results, although Group I (Urban Cohesion) deviated from this trend.

Figure 4.5: Uptake and positivity by Mosaic Group

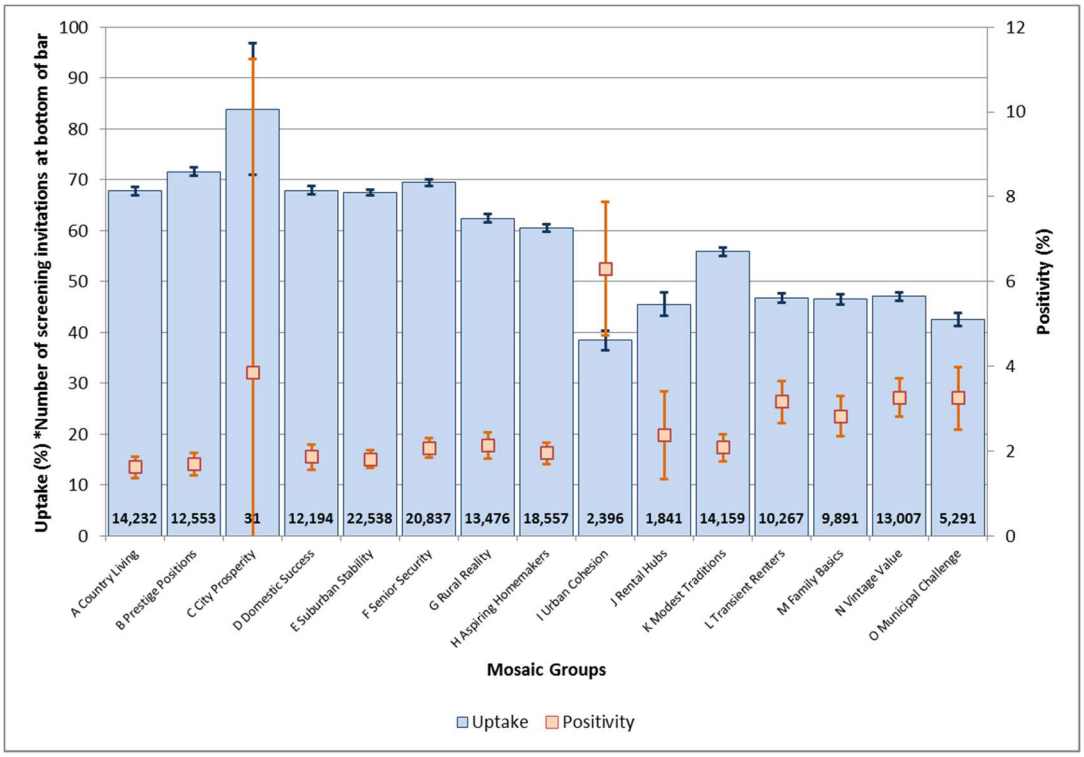


Table 4.3 shows uptake and positivity for the Mosaic Types with screening uptake below the 60% achievable target where the invitation count was >100.

The Mosaic Types with the lowest uptake include Asian Heritage (uptake = 33.02%; positivity = 7.71%), Renting a Room (uptake = 36.32%; positivity = 4.56%), Streetwise Singles (uptake = 36.99%; positivity = 4.56%), and Dependent Greys (uptake = 39.46%; positivity = 3.19%). Table 4.3 also indicates the percentage of people in each of these Mosaic Types who are eligible for the NHS BCSP. Other Mosaic Types with a low screening uptake and in which a large proportion of the Type are eligible for screening include Low income workers (uptake = 44.31%; positivity = 2.89%), Pocket Pensions (uptake = 46.89%; positivity = 3.77%), Estate Veterans (uptake = 47.03%; positivity = 2.61%), and Community Elders (uptake = 47.52%; positivity = 3.85%). The importance of focussing efforts to improve uptake in these groups is discussed further in Section 6 of this report.

Table 4.3: Mosaic Types with an invitation count >100[1] and uptake <60%

Mosaic Type	Invitation count	Adequately screened	% Screened	LL CI	UL CI	Definitive abnormal count	% Abnormal Results	LL CI	UL CI	% of Type NHS BCSP eligible
I38 Asian Heritage	1,611	532	33.02	30.73	35.38	41	7.71	5.59	10.31	6.38%
L50 Renting a Room	2,051	745	36.32	34.24	38.45	34	4.56	3.18	6.32	4.05%
O63 Streetwise Singles	1,303	482	36.99	34.36	39.68	22	4.56	2.88	6.83	5.00%
M55 Families with Needs	2,770	1,067	38.52	36.70	40.36	34	3.19	2.22	4.42	0.63%
N60 Dependent Greys	1,589	627	39.46	37.05	41.91	20	3.19	1.96	4.88	48.25%
M56 Solid Economy	167	74	44.31	36.64	52.19	3	4.05	0.84	11.39	2.58%
O62 Low Income Workers	3,988	1,767	44.31	42.76	45.87	51	2.89	2.16	3.78	26.05%
J45 Bus-Route Renters	828	368	44.44	41.02	47.90	7	1.90	0.77	3.88	4.98%
J42 Learners & Earners	595	266	44.71	40.66	48.80	11	4.14	2.08	7.28	7.22%
L49 Disconnected Youth	501	225	44.91	40.50	49.38	8	3.56	1.55	6.89	0.13%
N59 Pocket Pensions	5,775	2,708	46.89	45.60	48.19	102	3.77	3.08	4.55	47.71%
N61 Estate Veterans	3,013	1,417	47.03	45.23	48.83	37	2.61	1.85	3.58	45.10%
I37 Community Elders	383	182	47.52	42.42	52.65	7	3.85	1.56	7.76	38.20%
L51 Make Do & Move On	5,028	2,402	47.77	46.38	49.16	74	3.08	2.43	3.85	0.12%
M53 Budget Generations	4,018	1,974	49.13	47.57	50.69	57	2.89	2.19	3.73	3.01%
N57 Seasoned Survivors	2,110	1,061	50.28	48.13	52.44	37	3.49	2.47	4.77	35.35%
M54 Childcare Squeeze	2,936	1,488	50.68	48.86	52.51	36	2.42	1.7	3.33	0.29%
J40 Career Builders	311	162	52.09	46.38	57.76	2	1.23	0.15	4.39	0.64%
L52 Midlife Stopgap	2,687	1,426	53.07	51.16	54.97	36	2.52	1.77	3.48	4.99%
I39 Ageing Access	332	181	54.52	48.99	59.96	7	3.87	1.57	7.81	41.01%
K46 Self Supporters	4,326	2,375	54.90	53.40	56.39	50	2.11	1.57	2.77	16.29%
G28 Local Focus	2,317	1,277	55.11	53.06	57.15	33	2.58	1.79	3.61	1.50%
H32 Flying Solo	725	404	55.72	52.02	59.38	3	0.74	0.15	2.15	0.22%
K48 Down-to-Earth Owners	6,496	3,620	55.73	54.51	56.94	75	2.07	1.63	2.59	56.30%
H35 Primary Ambitions	719	411	57.16	53.45	60.81	9	2.19	1.01	4.12	0.39%
K47 Offspring Overspill	3,337	1,913	57.33	55.63	59.01	40	2.09	1.5	2.84	24.30%
G27 Outlying Seniors	3,652	2,178	59.64	58.03	61.24	48	2.20	1.63	2.91	53.56%
H34 Contemporary Starts	1,118	667	59.66	56.72	62.55	13	1.95	1.04	3.31	1.13%
N58 Aided Elderly	520	311	59.81	55.45	64.05	4	1.29	0.35	3.26	31.87%

[1] Data for Mosaic Types with a very low invitation count were excluded because of the statistical unreliability inherent with only a small number of events.

Figure 4.6: Mosaic Group and Type Descriptions

Group/Type	Group/Type Name	One-Line Description
A	Country Living	Well-off owners in rural locations enjoying the benefits of country life
B	Prestige Positions	Established families in large detached homes living upmarket lifestyles
C	City Prosperity	High status city dwellers living in central locations and pursuing careers with high rewards
D	Domestic Success	Thriving families who are busy bringing up children and following careers
E	Suburban Stability	Mature suburban owners living settled lives in mid-range housing
F	Senior Security	Elderly people with assets who are enjoying a comfortable retirement
G	Rural Reality	Householders living in inexpensive homes in village communities
H	Aspiring Homemakers	Younger households settling down in housing priced within their means
I	Urban Cohesion	Residents of settled urban communities with a strong sense of identity
J	Rental Hubs	Educated young people privately renting in urban neighbourhoods
K	Modest Traditions	Mature homeowners of value homes enjoying stable lifestyles
L	Transient Renters	Single people privately renting low cost homes for the short term
M	Family Basics	Families with limited resources who have to budget to make ends meet
N	Vintage Value	Elderly people reliant on support to meet financial or practical needs
O	Municipal Challenge	Urban renters of social housing facing an array of challenges
A01	Rural Vogue	Country-loving families pursuing a rural idyll in comfortable village homes while commuting some distance to work
A02	Scattered Homesteads	Older households appreciating rural calm in stand-alone houses within agricultural landscapes
A03	Wealthy Landowners	Prosperous owners of country houses including the rural upper class, successful farmers and second-home owners
A04	Village Retirement	Retirees enjoying pleasant village locations with amenities to service their social and practical needs
B05	Empty-Nest Adventure	Mature couples in comfortable detached houses who have the means to enjoy their empty-nest status
B06	Bank of Mum and Dad	Well-off families in upmarket suburban homes where grown-up children benefit from continued financial support
B07	Alpha Families	High-achieving families living fast-track lives, advancing careers, finances and their school-age children's development
B08	Premium Fortunes	Influential families with substantial income established in large, distinctive homes in wealthy enclaves
B09	Diamond Days	Retired residents in sizeable homes whose finances are secured by significant assets and generous pensions
C10	World-Class Wealth	Global high flyers and families of privilege living luxurious lifestyles in the most exclusive locations of the largest cities
C11	Penthouse Chic	City workers renting premium-priced flats in prestige central locations, living life with intensity
C12	Metro High-Flyers	Ambitious people in their 20s and 30s renting expensive apartments in highly commutable areas of major cities
C13	Uptown Elite	High status households owning elegant homes in accessible inner suburbs where they enjoy city life in comfort
D14	Cafés and Catchments	Affluent families with growing children living in upmarket housing in city environs
D15	Modern Parents	Busy couples in modern detached homes balancing the demands of school-age children and careers
D16	Mid-Career Convention	Professional families with children in traditional mid-range suburbs where neighbours are often older
D17	Thriving Independence	Well-qualified older singles with incomes from successful professional careers living in good quality housing

Group/Type	Group/Type Name	One-Line Description
E18	Dependable Me	Single mature owners settled in traditional suburban semis working in intermediate occupations
E19	Fledgling Free	Pre-retirement couples with respectable incomes enjoying greater space and spare cash since children left home
E20	Boomerang Boarders	Long-term couples with mid-range incomes whose adult children have returned to the shelter of the family home
E21	Family Ties	Active families with teenage and adult children whose prolonged support is eating up household resources
F22	Legacy Elders	Elders now mostly living alone in comfortable suburban homes on final salary pensions
F23	Solo Retirees	Senior singles whose reduced incomes are satisfactory in their affordable but pleasant owned homes
F24	Bungalow Haven	Seniors appreciating the calm of bungalow estates designed for the elderly
F25	Classic Grandparents	Lifelong couples in standard suburban homes enjoying retirement through grandchildren and gardening
G26	Far-Flung Outposts	Inter-dependent households living in the most remote communities with long travel times to larger towns
G27	Outlying Seniors	Pensioners living in inexpensive housing in out of the way locations
G28	Local Focus	Rural families in affordable village homes who are reliant on the local economy for jobs
G29	Satellite Settlers	Mature households living in expanding developments around larger villages with good transport links
H30	Affordable Fringe	Settled families with children owning modest, 3-bed semis in areas of more affordable housing
H31	First-Rung Futures	Pre-family newcomers who have bought value homes with space to grow in affordable but pleasant areas
H32	Flying Solo	Young singles on starter salaries choosing to rent homes in family suburbs
H33	New Foundations	Occupants of brand new homes who are often younger singles and couples with children
H34	Contemporary Starts	Young singles and partners setting up home in developments attractive to their peers
H35	Primary Ambitions	Forward-thinking younger families who sought affordable homes in good suburbs which they may now be out-growing
I36	Cultural Comfort	Thriving families with good incomes in multi-cultural urban communities
I37	Community Elders	Established older households owning city homes in diverse neighbourhoods
I38	Asian Heritage	Large extended families in neighbourhoods with a strong South Asian tradition
I39	Ageing Access	Older residents owning small inner suburban properties with good access to amenities
J40	Career Builders	Singles and couples in their 20s and 30s progressing in their field of work from commutable properties
J41	Central Pulse	Youngsters renting city centre flats in vibrant locations close to jobs and night life
J42	Learners & Earners	Inhabitants of the university fringe where students and older residents mix in cosmopolitan locations
J43	Student Scene	Students living in high density accommodation close to universities and educational centres
J44	Flexible Workforce	Young renters ready to move to follow worthwhile incomes from service sector jobs
J45	Bus-Route Renters	Singles renting affordable private flats away from central amenities and often on main roads

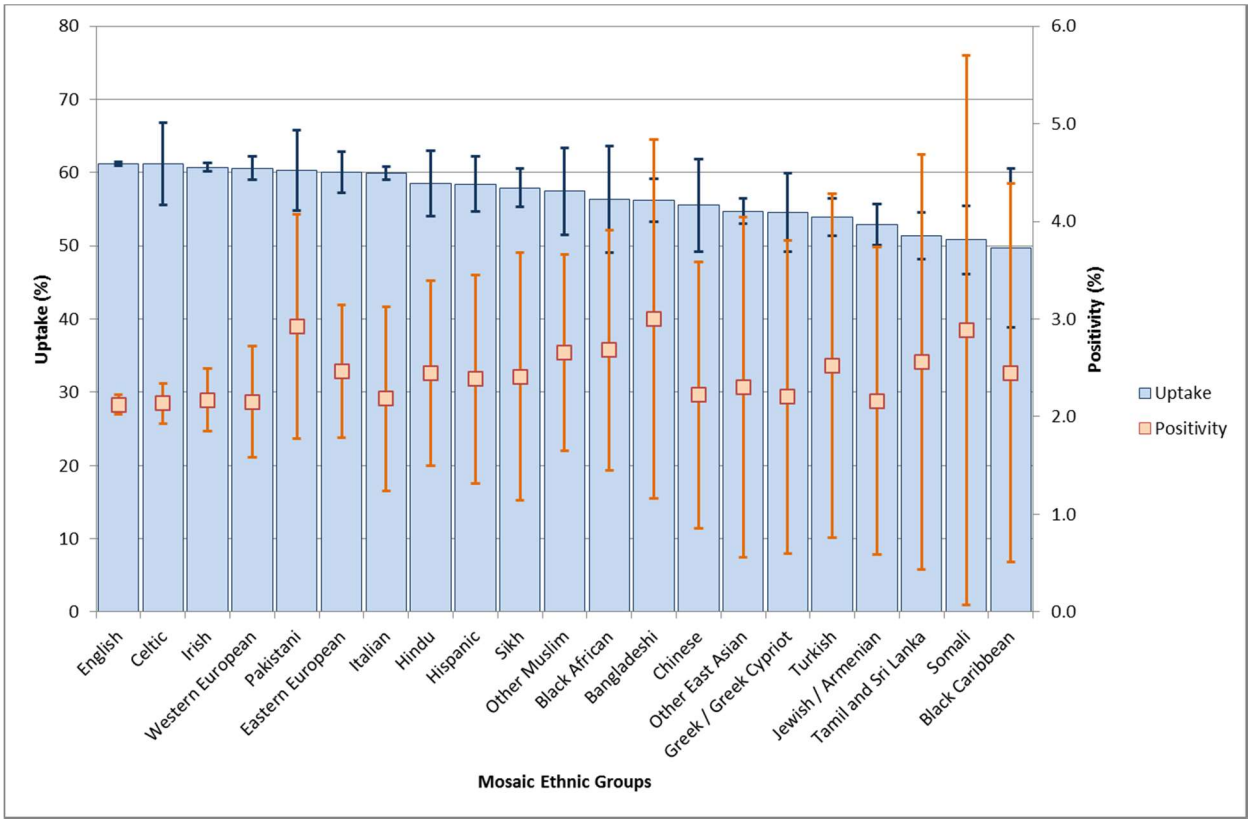
Group/Type	Group/Type Name	One-Line Description
K46	Self Supporters	Hard-working mature singles who own budget terraces manageable within their modest wage
K47	Offspring Overspill	Lower income owners whose adult children are still striving to gain independence meaning space is limited
K48	Down-to-Earth Owners	Ageing couples who have owned their inexpensive home for many years while working in routine jobs
L49	Disconnected Youth	Young people endeavouring to gain employment footholds while renting cheap flats and terraces
L50	Renting a Room	Transient renters of low cost accommodation often within subdivided older properties
L51	Make Do & Move On	Yet to settle younger singles and couples making interim homes in low cost properties
L52	Midlife Stopgap	Maturing singles in employment who are renting short-term affordable homes
M53	Budget Generations	Families supporting both adult and younger children where expenditure can often exceed income
M54	Childcare Squeeze	Younger families with children who own a budget home and are striving to cover all expenses
M55	Families with Needs	Families with many children living in areas of high deprivation and who need support
M56	Solid Economy	Stable families with children renting better quality homes from social landlords
N57	Seasoned Survivors	Deep-rooted single elderly owners of low value properties whose modest home equity provides some security
N58	Aided Elderly	Supported elders in specialised accommodation including retirement homes and complexes of small homes
N59	Pocket Pensions	Elderly singles of limited means renting in developments of compact social homes
N60	Dependent Greys	Ageing social renters with high levels of need in centrally located developments of small units
N61	Estate Veterans	Longstanding elderly renters of social homes who have seen neighbours change to a mix of owners and renters
O62	Low Income Workers	Older social renters settled in low value homes in communities where employment is harder to find
O63	Streetwise Singles	Hard-pressed singles in low cost social flats searching for opportunities
O64	High Rise Residents	Renters of social flats in high rise blocks where levels of need are significant
O65	Crowded Kaleidoscope	Multi-cultural households with children renting social flats in over-crowded conditions
O66	Inner City Stalwarts	Long-term renters of inner city social flats who have witnessed many changes

4.1.6 Variations in Uptake and Outcome by Ethnicity (using Mosaic data)

Ethnicity population proportions from Mosaic were applied to the data to develop a better understanding of screening uptake and positivity in different ethnic groups (see Figure 4.7).

Screening uptake was lowest in Black Caribbean (49.72%), Somali (50.82%), and Tamil and Sri Lanka (51.38%) ethnicities. Uptake in these groups (and also among Jewish/Armenian, Turkish, Greek/Greek Cypriot, Other East Asian, and Bangladeshi groups) was significantly lower than among people of White English ethnicity. Positivity was highest among Bangladeshi (3.00%), Pakistani (2.92%) and Somali (2.89%) groups. However, it should be noted that the invitation count for many of these ethnic groups was small and there were no significant differences in positivity between the ethnic groups.

Figure 4.7: Uptake and positivity by ethnic group (Mosaic categories)



4.1.7 District Focused Analysis

In addition to the geographical variations in uptake and outcomes presented in Section 4.1.2, the data was used to examine variations in screening uptake within the 8 Derbyshire Districts and Boroughs and Derby City. Figure 4.8 illustrates, across the 9 geographical sub-regions of Derbyshire, the population subgroups in which screening uptake is below the achievable target of 60%. Subgroups with an uptake of <60% are shaded in red, 60+% in green, and where the sub-group is not present in the district the shading is greyscale.

Figure 4.8: Summary of low screening uptake (<60%)

		Derby	Bolsover	Chesterfield	Amber Valley	Derbyshire Dales	Erewash	High Peak	North East Derbyshire	Southern Derbyshire
Subject Gender	Female									
	Male									
Age Groups	60-64									
	65-69									
	70-74									
IMD Deciles	1									
	2									
	3									
	4									
	5									
	6									
	7									
	8									
	9									
	10									
Mosaic Groups	A Country Living									
	B Prestige Positions									
	C City Prosperity									
	D Domestic Success									
	E Suburban Stability									
	F Senior Security									
	G Rural Reality									
	H Aspiring Homemakers									
	I Urban Cohesion									
	J Rental Hubs									
	K Modest Traditions									
	L Transient Renters									
	M Family Basics									
	N Vintage Value									
	O Municipal Challenge									

Derby City

In Derby, there was low screening uptake (<60%) for both males and females, all three age groups, IMD deciles 1-5, and Mosaic Groups H-O. The subcategories with very low screening uptake included: males; age 60-64 years; IMD deciles 1-3; Mosaic Groups I-J and L-O. See Map 9.1 in Appendix 6 (page 44) for uptake in Derby City by LSOA.

Bolsover

In Bolsover, there was low screening uptake (<60%) for both males and females, the age group 60-64 years, the IMD deciles 1-3 and the Mosaic Groups H, K-O. The subcategories with very low screening uptake included: IMD deciles 1-2; Mosaic Groups L-O. See Map 9.2 in Appendix 6 (page 45) for uptake in Bolsover by LSOA.

Chesterfield

In Chesterfield, there was low screening uptake (<60%) for females, the age groups 60-64 and 70-74 years, the IMD deciles 1-4 and the Mosaic Groups G, J-O. The subcategories with very low screening uptake included: IMD deciles 1-2; Mosaic Groups G, J, L-O. See Map 9.3 in Appendix 6 (page 46) for uptake in Chesterfield by LSOA.

Amber Valley

In Amber Valley, there was low screening uptake (<60%) for the IMD deciles 1-3 and the Mosaic Groups G, J-O. The subcategories with very low screening uptake included: IMD deciles 1-2; Mosaic Groups G, J, L-O. See Map 9.4 in Appendix 6 (page 47) for uptake in Amber Valley by LSOA.

Derbyshire Dales

In Derbyshire Dales, there was low screening uptake (<60%) for the IMD deciles 1 and 3 and the Mosaic Groups H, J-K, M-O. The subcategories with very low screening uptake included: IMD decile 1; Mosaic Groups J-K, M-N. See Map 9.5 in Appendix 6 (page 48) for uptake in Derbyshire Dales by LSOA.

Erewash

In Erewash, there was low screening uptake (<60%) for males, the age group 60-64 years, the IMD deciles 1-5 and the Mosaic Groups J-O. The subcategories with very low screening uptake included: IMD deciles 1-2; Mosaic Groups J, L-O. See Map 9.6 in Appendix 6 (page 49) for uptake in Erewash by LSOA.

High Peak

In High Peak, there was low screening uptake (<60%) for males, the age group 60-64 years, the IMD deciles 1-6 and the Mosaic Groups G, I-O. The subcategories with very low screening uptake included: IMD deciles 1-2; Mosaic Groups J, L-O. See Map 9.7 in Appendix 6 (page 50) for uptake in High Peak by LSOA.

North East Derbyshire

In North East Derbyshire, there was low screening uptake (<60%) for the IMD deciles 1-4 and the Mosaic Groups K-O. The subcategories with very low screening uptake included: IMD deciles 1-2; Mosaic Groups K-O. See Map 9.8 in Appendix 6 (page 51) for uptake in North East Derbyshire by LSOA.

Southern Derbyshire

In Southern Derbyshire, there was low screening uptake (<60%) for males, the age group 60-64 years, the IMD deciles 1-5 and the Mosaic Groups H-I, K-O. The subcategories with very low screening uptake included: IMD deciles 1-3; Mosaic Groups I, K-O. See Map 9.9 in Appendix 6 (page 52) for uptake in Southern Derbyshire by LSOA.

4.1.8 Variations in Uptake by Screening Invitation Round

The final analysis examined screening uptake by invitation round. Evidence suggests that people who do not participate the first time they are invited to bowel cancer screening are significantly less likely to respond to future screening invitations (see page 24).

Analysis of data for Derbyshire identified that 53.60% of first round invitations result in participation in the screening programme. This is much lower than the 60.55% overall uptake among the age-eligible population (60-74 year olds). First round uptake is noticeably lower among males (49.06%) when compared with females (58.27%). In the overall age-eligible screening population uptake is 58.34% in males and 62.70% in females. Positivity is also slightly higher among males and in the overall population among first time invitees to the screening programme; 2.15% compared with 2.33% for the overall population, and 2.51% compared with 2.94% for males.

Among screening programme invitees that have not previously responded to a screening invitation (i.e. among second round, third round etc invitees) uptake of the screening programme is very low (see Table 4.4). Only 10.17% of people that have overlooked previous screening invitations go on to participate in a subsequent round of the screening programme at an older age. This means that of 49,562 invitations sent to previous non-responders between 2014 and 2016, only 5,041 resulted in an adequate screen.

Table 4.4: Invitees that responded to the current screening round, having not responded to a previous invitation to be screened

Gender	Sum of Invitation count	Sum of Adequately screened	% Screened	Sum of Definitive abnormal count	% Positivity
Female	23,366	2,318	9.92	61	2.63
Male	26,196	2,723	10.39	109	4.00
Total	49,562	5,041*	10.17	170	3.37

*A small number of first invitation round individuals (n=199) responded to the first invitation very late (6 months or more after the invitation) as so are captured in this figure.

Among previous none responders there is a gradient in subsequent screening uptake by IMD, with over 12% of the least deprived decile participating in the current round despite previous non-response, and less than 9% of invitees in the two most deprived deciles. Similarly, there is variation between Mosaic groups, ranging from 7.75% (Vintage Value) to 13.89% (Urban Cohesion).

This data suggests that repeated invitations to participate in the screening programme sent to individuals who have not previously responded to an invite to participate is likely to be an inefficient way to engage this population in bowel cancer screening. However, in one GP practice the uptake among previous non-responders was 40.94% (double the uptake in the next highest practice), and further examination of this practice may be warranted to understand if and what local work has taken place to boost bowel cancer screening uptake.

4.2 Summary evidence on inequalities in bowel cancer screening uptake and factors that influence screening uptake

A review of the evidence base for inequalities in bowel cancer screening uptake has identified that:

- Uptake is higher in women than men, but that a higher proportion of men have abnormal screening test results (Lo et al. 2014; Moss et al. 2012; Logan et al. 2011).
- Socio-economically deprived groups have lower screening uptake (Lo et al. 2014; Moss et al. 2012; von Wagner et al. 2011).
- Ethnic minority groups have a lower screening uptake, and particularly people from the Indian subcontinent (Moss et al. 2012; von Wagner et al. 2011).
- People who do not participate the first time they are invited to screening are significantly less likely to respond to future screening invitations (Lo et al. 2014; Moss et al. 2010)

These findings are consistent with the results of our analysis in Derbyshire, which found that women are more likely to participate in the NHS BCSP than men, and uptake is lower among people living in more deprived areas and in areas with a higher proportion of ethnic minority residents. This is of particular concern given that cancer registry data suggests that men and people living in more deprived areas are significantly more likely to develop bowel cancer and to die from it (CRUK & NCIN 2014).

Additionally:

- People with a learning disability have significantly lower uptake rates for all three cancer screening programmes in the UK; these differences are more pronounced in more deprived areas (Osborn et al. 2012).
- Deprivation and ethnicity are associated with poorer coverage in both breast and cervical cancer screening programmes in England (Massat et al. 2015; Jack et al. 2015).
- South Asian women are significantly less likely to take up bowel cancer screening and breast cancer screening invitations than non-Asian women (Price et al. 2010).

These findings suggest that there are certain populations in whom uptake of the NHS BCSP is not limited to the bowel screening programme, but rather that uptake across all cancer screening programmes is lower.

Research has also identified a number of factors that influence bowel cancer screening uptake among various population groups. Factors that discourage participation or perceptions of screening include:

- Lack of knowledge about the causes of colorectal cancer, which was more pronounced in adults from an ethnic minority (Robb et al. 2008).
- Low health literacy and misunderstanding the instructions for the screening programme (Kobayashi et al. 2014; von Wagner et al. 2009; Chapple et al. 2008).
- Sampling and storing faeces as a cultural taboo and 'disgusting' (Palmer et al. 2014; Chapple et al. 2008), with embarrassment of particular concern in some population groups (Robb et al. 2008).
- Completing the kit at home rather than in a formal health setting reduced the perceived importance of the screening test (Palmer et al. 2014).
- Concern about the result of the screening test and implications for the future, including past negative experience or fear of colonoscopy (Palmer et al. 2014; Chapple et al. 2008).
- Feeling well, which reduces the perceived relevance of screening (Palmer et al. 2014; Chapple et al. 2008).

Many of these factors are interlinked or overlap to reduce participation in screening, for example a lack of information, time and past negative experiences with testing (Jones et al. 2010a).

And factors that increase participation or perceptions of screening include:

- Talking with family and peers and encouragement from others (Palmer et al. 2014; Chapple et al. 2008)
- Knowing someone with cancer (Chapple et al. 2008).
- Previous bowel problems (Chapple et al. 2008) or current symptoms such as abdominal pain, bleeding and tiredness (Taskila et al. 2009).
- Previous positive experience of cancer screening programmes in the UK (Chapple et al. 2008).
- A sense of civic responsibility (Chapple et al. 2008).

4.3 Rapid Review: Evidence-based Interventions to Improve Bowel Cancer Screening Uptake

A review of the evidence by Cancer Research UK has identified the following measures to increase the uptake of bowel screening:

- GP endorsement letter
- Enhanced patient leaflet
- Telephone advice (in combination with other measures)
- Face to face health promotion (in combination with other measures)
- Enhanced reminder letter
- CRUK London campaign (advertising, kit enhancement & flyer)

A GP endorsement letter or enhanced patient leaflet sent alongside the screening kit can each increase uptake by around 6%, and uptake is increased by around 12% when these two measures are combined (Hewitson et al. 2011). Tailored decision support information can be effective in supporting informed choices and greater involvement in decisions about faecal occult blood testing among adults with low levels of education, without increasing anxiety or worry about developing bowel cancer. Using a decision aid to make an informed choice may, however, lead to lower uptake of screening. (Smith et al. 2010)

Telephone advice and face-to-face health promotion, used in combination with a GP endorsement letter, can increase uptake by around 8% and 5% respectively in areas of low socio-economic status and so and may help address inequalities in screening uptake. As the bowel cancer screening programme does not involve contact with a health professional, the opportunity to have a telephone conversation or to attend a health education session with a trained advocate can be particularly helpful for increasing knowledge and support people to overcome barriers to participation (Shankleman et al. 2014).

The CRUK London campaign increased uptake by 6.1% among people aged 60-69 and 7.3% among people aged 70-74 years old (White et al. 2015). The kit enhancement pack contained a ‘poo catcher’ and gloves and was sent out separately to the NHS test kit, and was used alongside an outdoor advertising campaign and CRUK endorsement flier (sent with the NHS test kit). The kit enhancement pack is believed to be particularly useful for people who have physical difficulties catching a sample, or who are put off by significant feelings of disgust.

Where Providers use multiple strategies uptake is generally increased (Baxter et al. 2017).

A number of other measures to increase bowel screening uptake have been used around the country:

- Community awareness activities
- Personal screening stories
- Numerical/pictorial information
- Concise summarised 'gist' information
- Implementation intention style tips in the NHS kit instructions**
- Text reminders

However, the evaluation of many of these interventions did not test impact on screening uptake and so at this time there is no evidence to support their routine use in practice. For example, many looked at the impact on screening intentions but not the follow-though to screening uptake (e.g. McGregor et al. 2015; Patanwala et al. 2011). Further, no peer reviewed studies on the impact of community awareness activities to increase screening uptake have been identified and so further research is needed in this area.

In addition to published research, there are a range of local initiatives currently underway or recently completed in Derbyshire (see Table 4.4 for examples of local activity) and lessons learnt from these initiatives should be shared across the region.

Table 4.4: Initiatives to increase uptake of the bowel cancer screening programme in Derbyshire

Organisation	Example Projects
Derby City Council & Derbyshire County Council	Projects include: • Working with Age UK to increase uptake of the screening programme. Age UK, public health and a CRUK facilitator are working with a specialist screening nurse to co-ordinate an event. • A leaflet developed for transgender screening – detailed advice to support uptake of all screening programme in the transgender population. • Trans screening materials distributed at Gay Pride in Derby (approximately 40 copies of the material). Initial meeting with LGBT+ to do further promotion.
North Derbyshire CCG and Hardwick CCG	Activities to improve uptake include: • The Commissioning Support Unit trialling a cancer dashboard for GPs, highlighting several cancer metrics. The plan is to provide this for each practice and where performance is below target to add links to projects, support teams etc. • Protected learning sessions in 2018 for members of the Primary Care Community, led by the Cancer Alliance (North Derbyshire) • GP Practices to participate in a project to improve screening uptake. Group 1 to have enhanced kits (including gloves) and supporting letters to non-responders from GP surgery. Group 2 to identify non-clinical screening lead and all non-clinical staff offered training on screening programmes. Group 3 to receive all interventions (Hardwick) • Bowel Screening Team attend flu clinics. This has been piloted with 1 GP Practice and immediate uptake of screening tests was 80%. However this was not maintained (Hardwick)

Table 4.4: Initiatives to increase uptake of the bowel cancer screening programme in Derbyshire

Organisation	Example Projects
South Derbyshire CCG	Initiatives have included: • Workshops on cancer screening and training individuals from within communities to become cancer 'connectors'. 10 workshops delivered, reaching over 200 people • GP cancer data packs including performance against national targets • Attendance at bi-monthly Derbyshire Cancer Steering Group • CRUK facilitator working with practices with low uptake offering education/advice and support • Specialist Screening Practitioners linked to practices to provide advice and support to improve uptake • Education event for GPs including CRUK delivering a session on the uptake of Bowel Cancer Screening • Bid submitted to NHS England requesting funds to hold education events in hard to reach communities
North Derbyshire Screening Centre	A range of programmes including: • Delivering awareness training to care home staff • Healthcare professional oriented presentation on the BCSP and Bowel Scope in various GP Practices and in hospital settings • Awareness raising in various communities (e.g. carers, farmers, etc.) • Promoting cancer screening during flu clinics
South Derbyshire Screening Centre	Initiatives have included: • Use of cancer champions in various settings (e.g. different ethnic communities and carers) • Health promotion community events (e.g. Cancer health & wellbeing at the Indian Community Centre, Age UK Coffee Morning) • Focused work with GP Practices with low uptake • Supporting wider events and initiatives (e.g. Bowel Cancer UK events, Bowel Cancer Awareness month, etc.) • Strategic leadership developed through meeting with CRUK Facilitators and setting up a Bowel Cancer Screening working group • Promotion of the BCSP at flu clinics
Cancer Research UK	CRUK have supported screening uptake in Derbyshire through: • Sharing resources to support the bowel screening programme • Targeted work at GP practice level where uptake is lower than 60% • Supporting local events to increase awareness and uptake, including training and awareness events for PPGs • Developing a programme to support staff working with people with long-term mental ill health to understand cancer screening programmes and how to increase screening uptake
Screening & Immunisation Team	Recent and ongoing activities include: • Work to support screening uptake in Traveller communities (e.g. meeting with the Derbyshire Gypsy Liaison Group) • A GP endorsement banner added to BCSP standard letters. • A programme to improve uptake in Derbyshire and Nottinghamshire for People with Learning Disabilities • Supporting Hardwick CCG and CRUK to implement an intervention to improve uptake amongst none responders • Awareness raising in specific communities (e.g. farmers)

5. Discussion and Conclusions

5.1 Key findings

Overall uptake of the NHS BCSP in Derbyshire (including Derby City) between April 2014 and March 2016 was 60.55%. This average masks wide variations in uptake by gender, geography, ethnicity and deprivation.

Uptake in Derby City was 55.68% and positivity was 2.46%. In Derbyshire County the uptake was 61.81% and positivity was 2.08%. In Derbyshire, the highest screening uptake was in Derbyshire Dales (64.45%) and the lowest screening uptake was in Chesterfield (58.91%). Positivity was generally higher in places with lower uptake, although the reasons for this are uncertain. For example, it could be that cancer rates are higher in these areas or that people with suspicions (e.g. a symptom such as blood in the stool) may be more likely to complete the screening test.

There is wide variation in uptake by GP Practice, with the greatest variation observed in Southern Derbyshire CCG where the lowest uptake is 31.63% and the highest is 72.32%. There are three GP Practices in the two most deprived deciles that have an uptake of less than 40%, which may be one area in which to focus efforts to increase uptake of the NHS BSCP.

Inequalities exist in screening uptake across IMD Deciles. Uptake incrementally and significantly increased across the IMD Deciles – uptake was 44.68% in the most deprived group in comparison to 69.75% in the least deprived group. The most deprived IMD deciles also had the greatest proportion of positive screening test results. This finding aligns to previous research on inequalities in uptake of the NHS BCSP.

Mosaic groups with the highest screening uptake include Prestige Positions (Group B) (71.59%) and Senior Security (Group F) (69.42%). In contrast, groups with the lowest uptake were Urban Cohesion (Group I) (40.42%) and Municipal Challenge (Group O) (43.85%). In general, the more deprived Mosaic Groups had a higher proportion of positive screening results.

The Mosaic Types with the lowest uptake include Asian Heritage (uptake = 33.02%; positivity = 7.71%), Renting a Room (uptake = 36.32%; positivity = 4.56%), Streetwise Singles (uptake = 36.99%; positivity = 4.56%), and Dependent Greys (uptake = 39.46%; positivity = 3.19%). Although a relatively small absolute number of people in Derbyshire who are age-eligible for the NHS BSCP fall into these categories, and so large increases in uptake in these Mosaic Types will have a relatively small impact on overall NHS BCSP uptake in Derbyshire, they are a priority because uptake is so low in people who do make up these Mosaic types.

Other Mosaic Types with a low screening uptake and in which a large proportion of the Type are eligible for screening include Low Income Workers (uptake = 44.31%; positivity = 2.89%), Pocket Pensions (uptake = 46.89%; positivity = 3.77%), Estate Veterans (uptake = 47.03%; positivity = 2.61%), and Community Elders (uptake = 47.52%; positivity = 3.85%). Focusing efforts to increase uptake in these groups could lead to large gains in uptake across the county.

Uptake of the screening programmes is very low among previous non-respondents to screening invitations. Only 10.17% of people that have overlooked previous screening invitations go on to participate in a subsequent round of the screening programme at an older age. This suggests that

repeated invitations to participate in the screening programme sent to individuals who have not previously responded to an invite to participate is likely to be an inefficient way to engage this population in bowel cancer screening.

Uptake of bowel and breast cancer screening programmes in England is also lower among people living in more deprived communities and belonging to an ethnic minority, which may suggest that there are certain populations in whom low uptake is not specific to the NHS BCSP, but rather uptake of cancer screening in general.

Specific factors that influence NHS BCSP uptake include low health literacy, lack of knowledge about colorectal cancer and the screening programme, disgust at collecting and storing samples, concern about the implications of screening test results and a lack of symptoms. These highlight a number of areas for focus of interventions to improve uptake of the screening programme.

Evidence-based interventions which can increase uptake of the NHS BSCP include a GP endorsement letter, an enhanced patient leaflet, telephone advice (in combination with other measures), face to face health promotion (in combination with other measures) and an enhanced reminder letter. Uptake is generally increased further where multiple strategies are used.

5.2 Faecal Immunochemical Test Roll-Out in Derbyshire

From April 2018 a new bowel cancer screening test, the faecal immunochemical test (FIT), will be rolled out in Derbyshire to replace the FOBt.

This new test has many advantages over the current test, including being specific for human blood, detecting haemoglobin at a much lower concentration and with a single faecal sample (Moss et al. 2017). This pilot of the new test found increased uptake of 7% with FIT compared to FOBt, and of particular note is that uptake in previous non-responders almost doubled (23.9% vs 12.5%). The increase in overall uptake was higher in men than women, and observed across all deprivation quintiles. These findings align with earlier studies examining uptake of the NHS BCSP using FIT compared with FOBt (Digby et al. 2013).

Cancer detection rates are higher with FIT than FOBt, suggesting that it is a more accurate test for detecting bowel cancer. However, the test does have higher positivity rates which may challenge the available colonoscopy resource (Moss et al. 2017).

5.3 Limitations of this Equity Audit

In conducting this BHEA, a number of challenges have arisen with the data that it is important to consider when interpreting the findings and recommendations.

There were a number of challenges in accessing data from the Eastern Hub, as documented in Section 3.3 (page 9). The time delay in getting the data to local authority for analysis was a particular challenge and conflicted with adherence to our audit duties. It is anticipated that these challenges have now been resolved, but we will not be certain of that until we arrive at the re-audit phase of our work on bowel cancer screening uptake. Further, we were not able to access a number of data variables originally requested, so the analysis has not been as detailed as might otherwise have been possible.

The NHS BCSP data relates to individual invitation counts, i.e. each line of data relates to an invitation episode rather than an individual person. As such some individuals may appear twice in the dataset, for example if they returned their screening test more than 13 weeks after it was dispatched to them or if they move GP between the kit being dispatched and returning the kit. It is anticipated that these circumstances will arise rarely and therefore have a negligible impact on the results.

Data was provided for people registered with a GP in one of the 4 Derbyshire CCGs. This creates a number of potential challenges for fully understanding local need and for responding with initiatives to improve uptake in Derbyshire. For example, anyone who is not registered with a GP will be excluded from both the data and the BCSP and this may exacerbate health inequalities. Further, any initiatives that target screening uptake outside of the GP practice (e.g. at a District level) may miss people who are registered with a Derbyshire GP but who live outside of the county.

The Mosaic Segmentation tool applied to the data to explore the characteristics of communities less likely to take up the screening programme calculates the proportion of the population living in each area that is likely to belong to each Mosaic Group and Type. However, we cannot be certain that everyone in an area identifies with the Mosaic Group for their area and as such some level of caution should be used when using Mosaic Segmentation tool information to develop actions to improve screening uptake. For example, checking with other sources of data on a particular area to make sure that the Mosaic findings appear logical.

As ethnicity data is not available through the NHS BCSP Hub, the Mosaic Segmentation Tool was used to identify variations in uptake by ethnic groups in Derbyshire. As such, the same limitations as outlined above apply to the ethnicity data in Section 4.1.6. Additionally, the categories used by Mosaic to identify 'ethnicity' are somewhat unusual (e.g. including nationalities, religions, ethnic groups and broad geographies) and so again this data should be interpreted and used with caution and alongside other ethnicity data available for Derbyshire.

5.4 Conclusion

Using data on bowel cancer screening uptake and outcomes for the period April 2014 to March 2016 we have identified wide variations in uptake and positivity by gender, deprivation, ethnicity and Mosaic Group and Type. This information can be used to target efforts to increase awareness and uptake of the NHS BCSP in Derbyshire in communities that have the greatest capacity to benefit.

Section 6 presents nine recommendations to improve bowel cancer screening uptake in Derbyshire and Derby City.

6. Recommendations

The following nine recommendations have been identified to improve uptake of the NHS BCSP across Derbyshire and Derby City.

Recommendation 1

This BHEA has identified wide variations in NHS BCSP uptake across the county and has recommended a number of targeted ways in which we can work locally to increase uptake and reduce inequalities in access to cancer screening. However, acting on these recommendations in a timely manner will require a coordinated effort from partners across Derbyshire. Agreement is needed as to who will take ownership of the findings (e.g. Health and Wellbeing Board; Health Protection Board; Cancer Programme Board; other) and responsibility for delivering the recommendations below. Clear governance processes should be put in place to ensure accountability for following through with the recommendations.

Recommendation 2

Once a governance process has been established, an operational group should be set up. This group should be drawn from stakeholder organisations and will be in a position to take forward the recommendations identified at pace.

Recommendation 3

The majority of evidence-based interventions to increase bowel cancer screening uptake are focused at the level of General Practice. In GPs across Derbyshire with particularly low uptake of the NHS BSCP (e.g. <50%, n=9) consider targeted work with GPs to increase uptake using evidence-based interventions such as a tailored GP endorsement letter or provision of telephone advice. The 9 GPs with uptake <50% are in Southern Derbyshire and all are in GP Practice IMD Deciles 1 and 2, the most deprived 20%.

Recommendation 4

Four Mosaic Types have been identified that have particularly low uptake of the NHS BCSP, as well as high rates of positivity: Asian Heritage, Renting a Room, Streetwise Singles, and Dependent Greys. Although a small absolute number of people in Derbyshire who are age-eligible for the NHS BSCP fall into these categories, and therefore large increases in uptake in these Mosaic Types will have a relatively small impact on overall NHS BCSP uptake in Derbyshire, they are a priority because uptake is so low in people who do make up these Mosaic Types. As such, there is potential for significant health inequalities with respect to bowel cancer screening in these populations.

Other Mosaic Types with a low screening uptake and in which a large proportion of the Mosaic Type are eligible for screening include Low Income Workers, Pocket Pensions, Estate Veterans, and Community Elders. Focusing additional efforts to increase uptake in these groups could lead to large gains in screening uptake across the county.

We recommend a discrete piece of work be completed to identify the main places in which people in these eight Mosaic Types are located, as well as how best to influence them using insight from Mosaic and community engagement work, to inform a highly targeted campaign to increase awareness of the NHS BCSP, and how to participate, in these populations.

Recommendation 5

In some communities uptake of all three cancer screening programmes (bowel, breast and cervical) is low. This is especially the case among people living in more deprived communities and in people from ethnic minority groups. This may suggest that there are certain populations in which low uptake is not specific to the NHS BCSP, but rather reflects uptake of cancer screening in general. Barriers to cancer

screening include lack of knowledge, low health literacy, concern around the implications of screening test results and a lack of symptoms which makes some people think screening is not relevant to them.

Mapping work should be completed to develop a better understanding of the local communities in which bowel, cervical and breast cancer screening uptake are all low. This information can then be used to develop local initiatives to improve uptake.

Although there is an absence of evidence to support the use of community health champions to increase uptake of bowel cancer screening, there is evidence that opportunities to have a face-to-face discussion with someone who is knowledgeable about cancer screening can increase participation by up to 8%. As such, opportunities to increase awareness and knowledge of all three cancer screening programmes should be maximised in places with particularly low uptake. There are programmes in operation in parts of the county that we may be able to work with to deliver this recommendation, for example the 'Be Cancer Safe' project in North Derbyshire and Hardwick.

Additionally, there may be opportunities within the Community Wellness Hubs that are being developed across the county to run some localised awareness raising initiatives around cancer screening.

Recommendation 6

Uptake among first-round invitees and those who have previously not responded to screening invitations is very low. Particularly for previous non-responders, where uptake is only 10%, a postal invite may not be the most appropriate way to engage people in the NHS BCSP. A group should be established to examine this finding further and to inform local initiatives to boost uptake of the NHS BCSP among previous round non-responders. This work should link closely to that in Recommendations 4 and 5.

Recommendation 7

FIT will be rolled out across Derbyshire from April 2018 and this creates an opportunity to increase overall uptake as well as reduce inequalities in uptake by previous non-responders and men. It may be appropriate to use the introduction of FIT to run local campaigns to increase awareness of the new test and how much simpler it is to use than the old test kit. Many of the barriers to uptake cited, for example storing faeces, are avoided with this new test.

Again, there may be opportunities to deliver some of this work through the Community Wellness Hubs.

Recommendation 8

Future activities to promote uptake of the NHS BCSP should be robustly evaluated so that we can grow the evidence base of effective interventions to improve cancer screening uptake. Recognising that there are a number of intermediary steps between many interventions and screening uptake, evaluation should consider the use of a logic model approach to capture changes in activity, output and outcome measures.

Recommendation 9

The actions taken in response to this audit should be monitored and the audit re-run in 2 years to update our understanding of inequalities in access to the NHS BCSP. The reasons for any changes in uptake will be difficult to untangle given the introduction on FIT, nevertheless an update will be important to ensure that we continue to target efforts to increase the uptake of cancer screening programmes appropriately.

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8. Acknowledgements

Data for this study is based on information collected and quality assured by the PHE Population Screening Programmes. Access to the data was facilitated by the PHE Office for Data Release.

We would like to thank colleagues in the NHS England North Midlands Screening and Immunisations team for collaborating with us to develop this work. Andrew Field and colleagues in the NHS BCSP Eastern Hub also provided invaluable support with accessing and understanding the data that made this equity audit possible. Finally, we would like to thank colleagues who worked on previous versions of this audit and in particular Kelly Mckenzie.

9. Appendices

Appendix 1: Glossary and Abbreviations

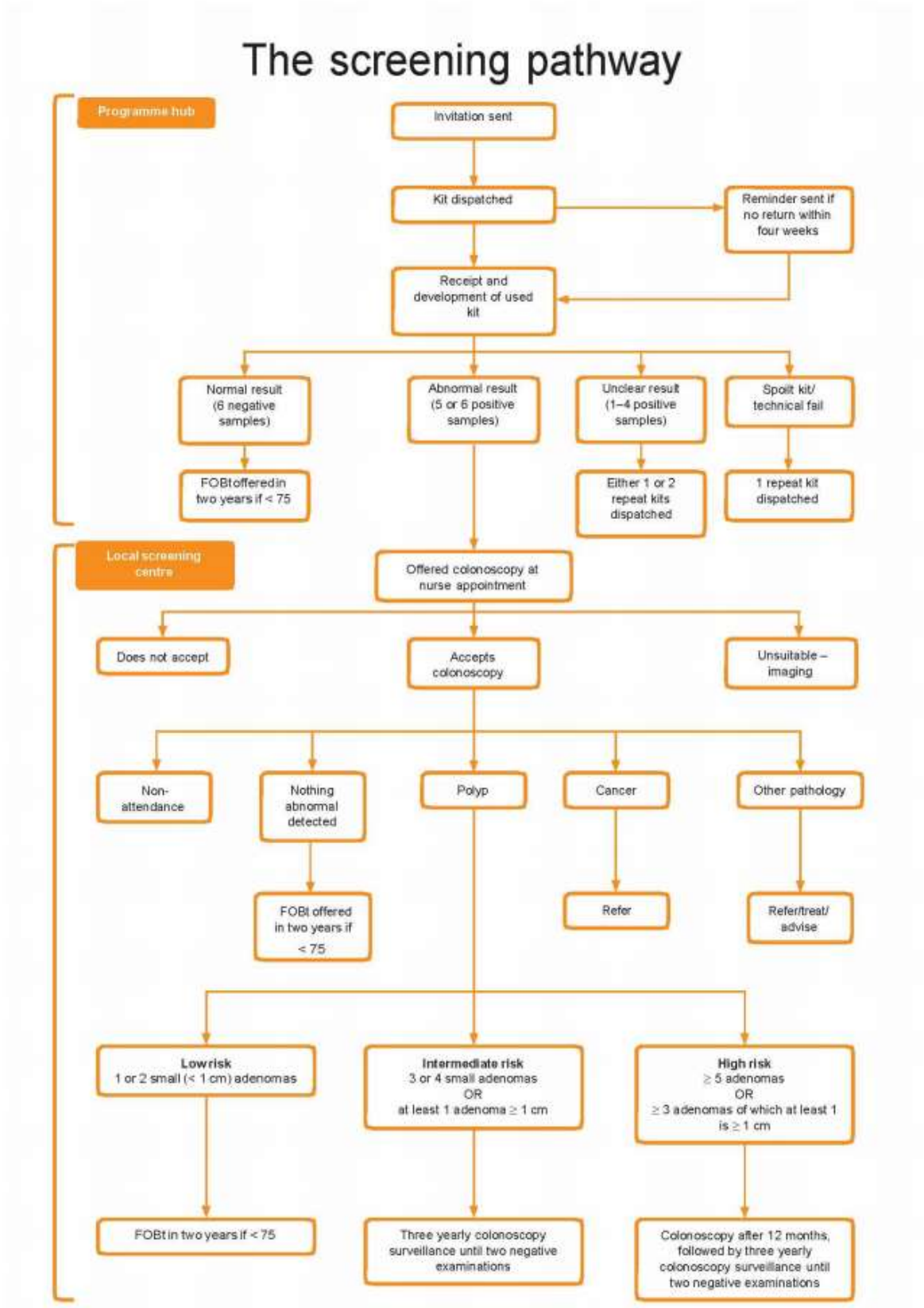
Glossary

NHSBCSP	Describes the entire programme, from identifying subjects to be invited to referral for treatment or return to routine screening as applicable.
Hub	Describes the laboratory which despatches and develops screening kits and deals with the administration of invitations and results. There are currently five of these in England.
Screening centre	Describes the part of the programme where endoscopy takes place. It may deliver endoscopy in a number of different locations, based even in different provider units (e.g. different NHS Trusts).
Provider	Is the NHS Trust or private provider which is contracted to provide hub and/or screening centre activities. If a centre comprises more than one provider, one will be the lead and hold the contract with NHS England.
Coverage	The percentage of people resident and eligible for screening at a particular point in time who had a test with a recorded result at least once within the previous two, three or five years depending on their age and the screening programme.
Uptake	The percentage of people who, after being invited for screening in a time period, responded to the invitation and were adequately screened within a certain time limit.
Positivity	Positivity is a screening test that returns an abnormal result, indicating that further diagnostic testing should be carried out.
Mosaic	The Mosaic Public Sector segmentation tool offers insights into the demographic, lifestyle and behavioural traits of people living in small geographies, 'segmenting' the population into 15 Groups and 66 Types.

Abbreviations

BME	Black and Minority Ethnic
CCG	Clinical Commissioning Group
HEA	Health Equity Audit
FIT	Faecal Immunochemical Test
FOBt	Faecal Occult Blood test
LSOA	Lower Super Output Area
NHSBCSP	NHS Bowel Cancer Screening Programme
SIT	Screening and Immunisation Team

Appendix 2: Figure 9.1: The NHSBCSP Screening Pathway (NHS England 2016b)



Appendix 3: Table 9.1: Key Performance Indicators (KPIs) for the NHSBCSP (NHS England 2016b)

KPIs for FOBt Bowel Cancer Screening to be produced at hub and screening centre level				
KPI	**Definition**	**Minimum standard**	**Reporting period**	**Source of report (provided by QA service)**
1. Invitations sent	The total number of invitations sent (including over-age self-referrers)	N/A	Monthly	OBIEE reports >> Screening Centre/Hub Dashboard >> Invitations & test kits tab Report the "Total invitations" count
2. Kits sent	The total number of kits sent, including self refer, retest kits and new kits requested	N/A	Monthly	OBIEE reports >> Screening Centre/Hub Dashboard >> Invitations & test kits tab Report the "Total kits sent" count
3. Kits returned	The total number of kits returned, including self-refer, retest kits and new kits requested	N/A	Monthly	OBIEE reports >> Screening Centre/Hub Dashboard >> Invitations & test kits tab Report the "Total kits returned" count
4. Uptake	Percentage of people adequately screened out of those invited for FOBt screening	52%	Monthly (3 months in arrears)	OBIEE reports >> Screening Centre/Hub Dashboard >> uptake and positivity tab Report the % Uptake
5. Positivity	Percentage of people with a definitive FOBt outcome of "abnormal" out of those who were adequately screened (via FOBt)	Expected value = 2%	Monthly (3 months in arrears)	OBIEE reports >> Screening Centre/Hub Dashboard >> Uptake and positivity tab Report the % Positivity
6. Coverage	Percentage of people adequately screened in the last 2.5 years out of those who are eligible for FOBt screening	Awaiting data	Quarterly (in arrears by 6 months)	GP practice profiles show coverage by GP practice, aggregated by CCG, and grouped by Area Teams.
7. SSP waiting times	Percentage of people where the elapsed time between the "definitive abnormal FOBt date" (booked date) and the first offered "SSP colonoscopy assessment date" falls within the 14 day specified time limit, out of those given an "SSP colonoscopy assessment date"	100% $\leq$ 14 days	Monthly	OBIEE reports >> Screening Centre/Hub Dashboard >> SSP waits tab Report the % within target and actual count
8. Diagnostic test waiting times	Percentage of people where the elapsed time between the "SSP colonoscopy assessment date" falls within the 14 day specified time limit, out of those given a "SSP colonoscopy assessment date"	100% $\leq$ 14 days	Monthly	OBIEE reports >> Screening Centre Dashboard >> Diagnostic test waits tab Report the % within target and actual count

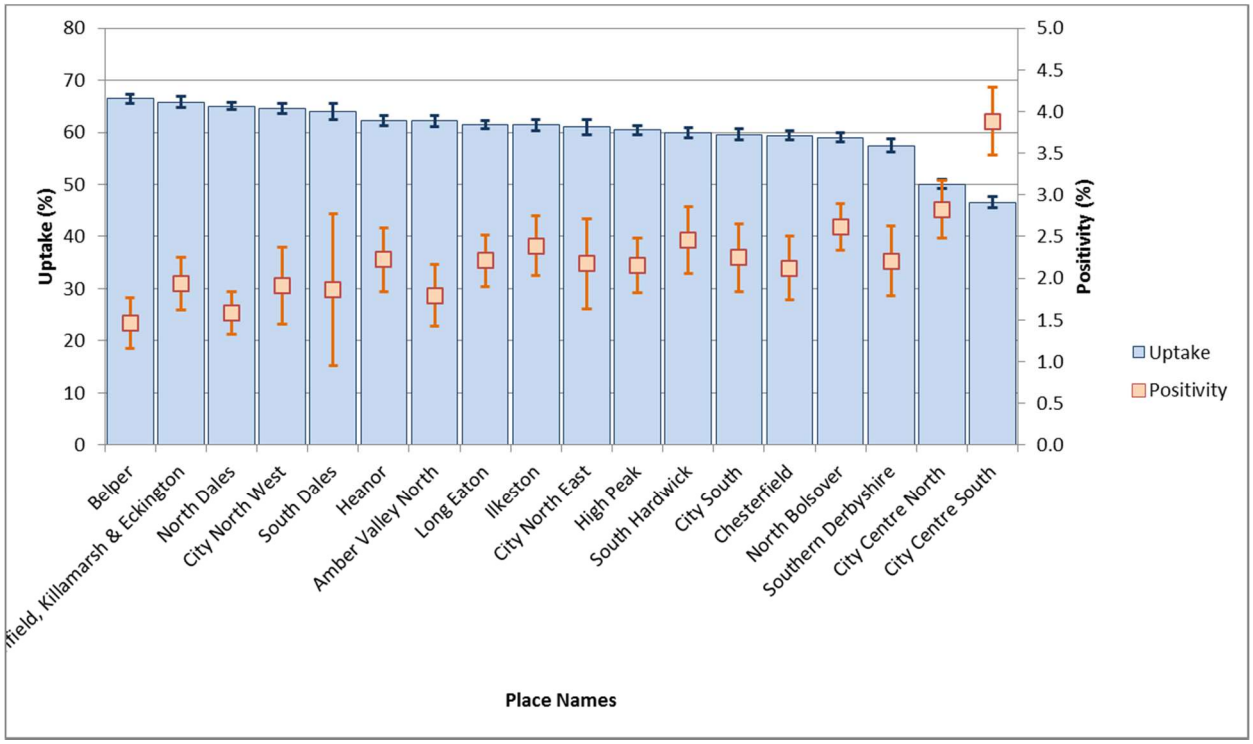
Appendix 4: Screening uptake and outcomes by STP Place

Table 9.2: Uptake and outcome by STP Place

	Invitation count	Screened	LL CI	UL CI	Definitive abnormal count	Positivity	LL CI	UL CI
Amber Valley North	11,859	62.15%	61.27%	63.02%	132	1.79%	1.50%	2.12%
Belper	8,342	66.48%	65.46%	67.50%	81	1.46%	1.16%	1.81%
Chesterfield	21,130	59.40%	58.73%	60.06%	266	2.12%	1.87%	2.39%
City Centre North	9,829	50.07%	49.07%	51.06%	139	2.82%	2.38%	3.33%
City Centre South	3,706	46.57%	44.96%	48.19%	67	3.88%	3.02%	4.90%
City North East	9,725	60.98%	60.00%	61.95%	129	2.18%	1.82%	2.58%
City North West	8,261	64.59%	63.55%	65.62%	102	1.91%	1.56%	2.32%
City South	14,742	59.54%	58.75%	60.34%	197	2.24%	1.94%	2.58%
Dronfield, Killamarsh & Eckington	8,573	65.82%	64.81%	66.83%	109	1.93%	1.59%	2.33%
Heanor	4,559	62.21%	60.78%	63.62%	63	2.22%	1.71%	2.83%
High Peak	11,752	60.43%	59.54%	61.32%	153	2.15%	1.83%	2.52%
Ilkeston	9,139	61.37%	60.37%	62.37%	134	2.39%	2.01%	2.82%
Long Eaton	7,952	61.44%	60.36%	62.52%	108	2.21%	1.82%	2.66%
North Bolsover	11,602	58.98%	58.08%	59.88%	179	2.62%	2.25%	3.02%
North Dales	11,674	65.02%	64.14%	65.88%	120	1.58%	1.31%	1.89%
South Dales	6,306	63.97%	62.77%	65.16%	75	1.86%	1.47%	2.33%
South Hardwick	12,817	59.93%	59.07%	60.78%	189	2.46%	2.13%	2.83%
Southern Derbyshire	8,208	57.47%	56.39%	58.54%	104	2.20%	1.80%	2.67%
Grand Total	**180,176**	**60.55%**			**2,347**	**2.15%**		

The highest screening uptake was in the Places Belper (66.48%), Dronfield, Killamarsh and Eckington (65.82%) and North Dales (65.02%), and the lowest uptake was in City Centre South (46.57%), City Centre North (50.07%) and Southern Derbyshire (57.47%). Generally the Places with higher screening uptake had lower positivity percentages, and lower screening uptake was associated with higher positivity (see Figure 9.2).

Figure 9.2: Uptake and outcome by STP Place



Appendix 5: Screening uptake and outcomes by GP Practice IMD Decile

Figure 9.3: GPs in NHS Erewash CCG

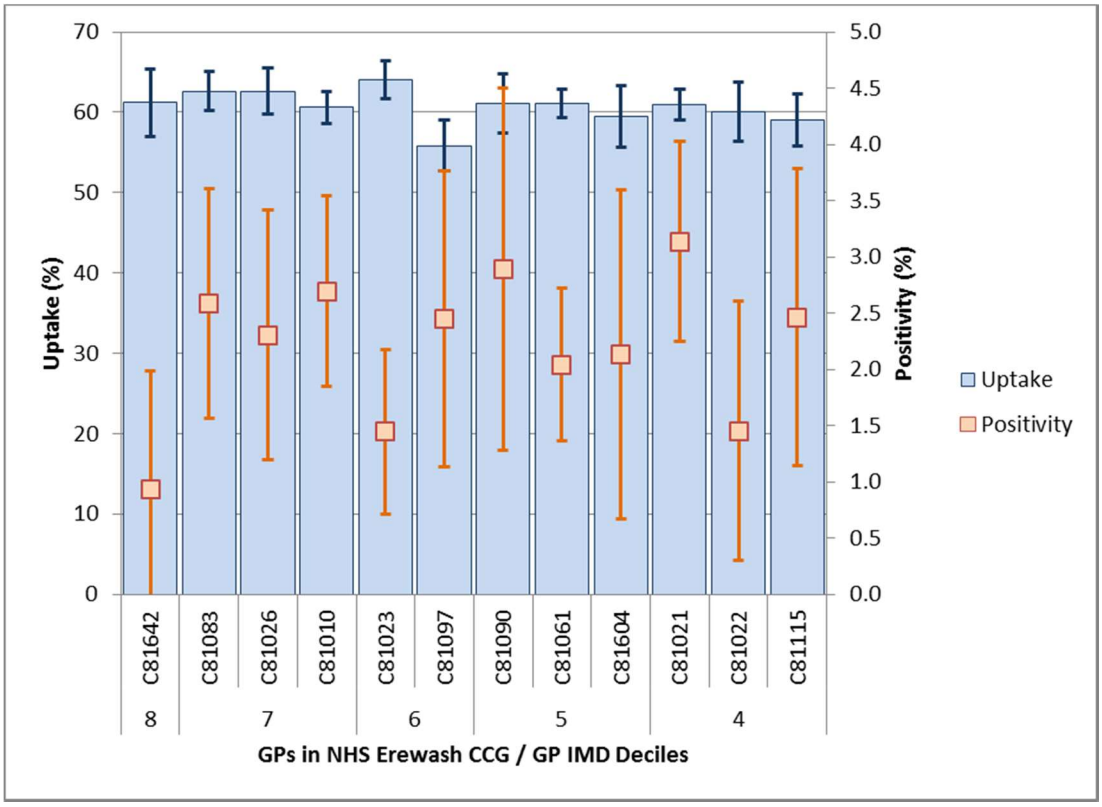


Figure 9.4: GPs in NHS Hardwick CCG

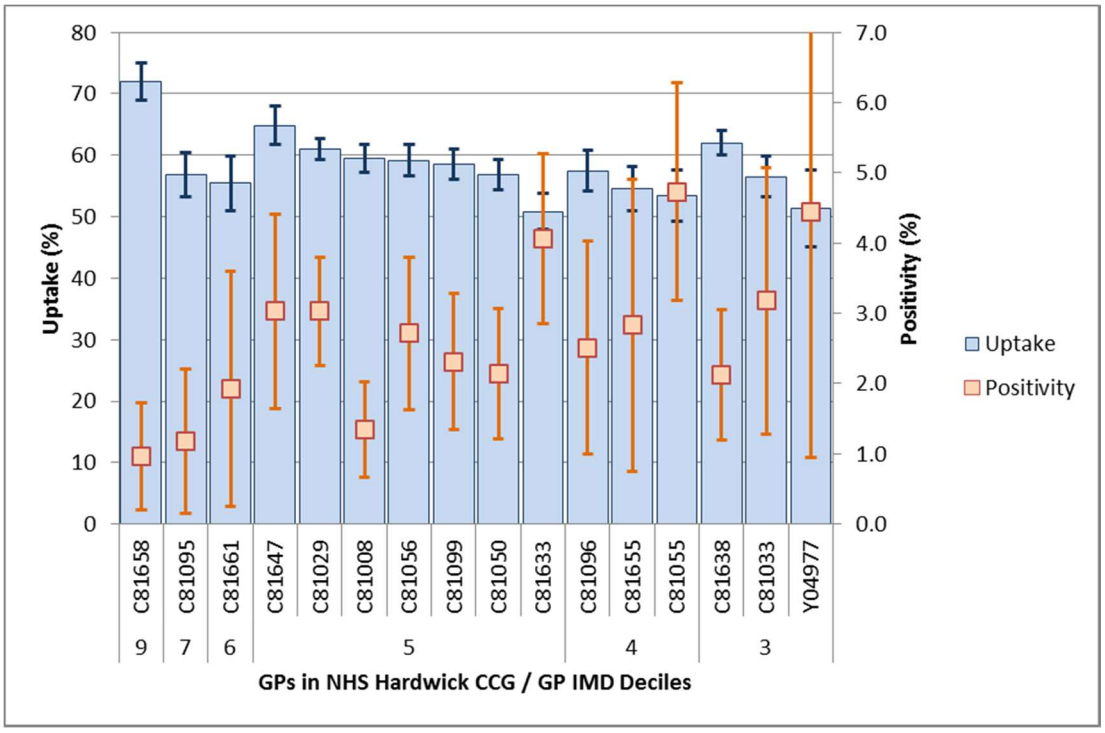


Figure 9.5: GPs in NHS North Derbyshire CCG

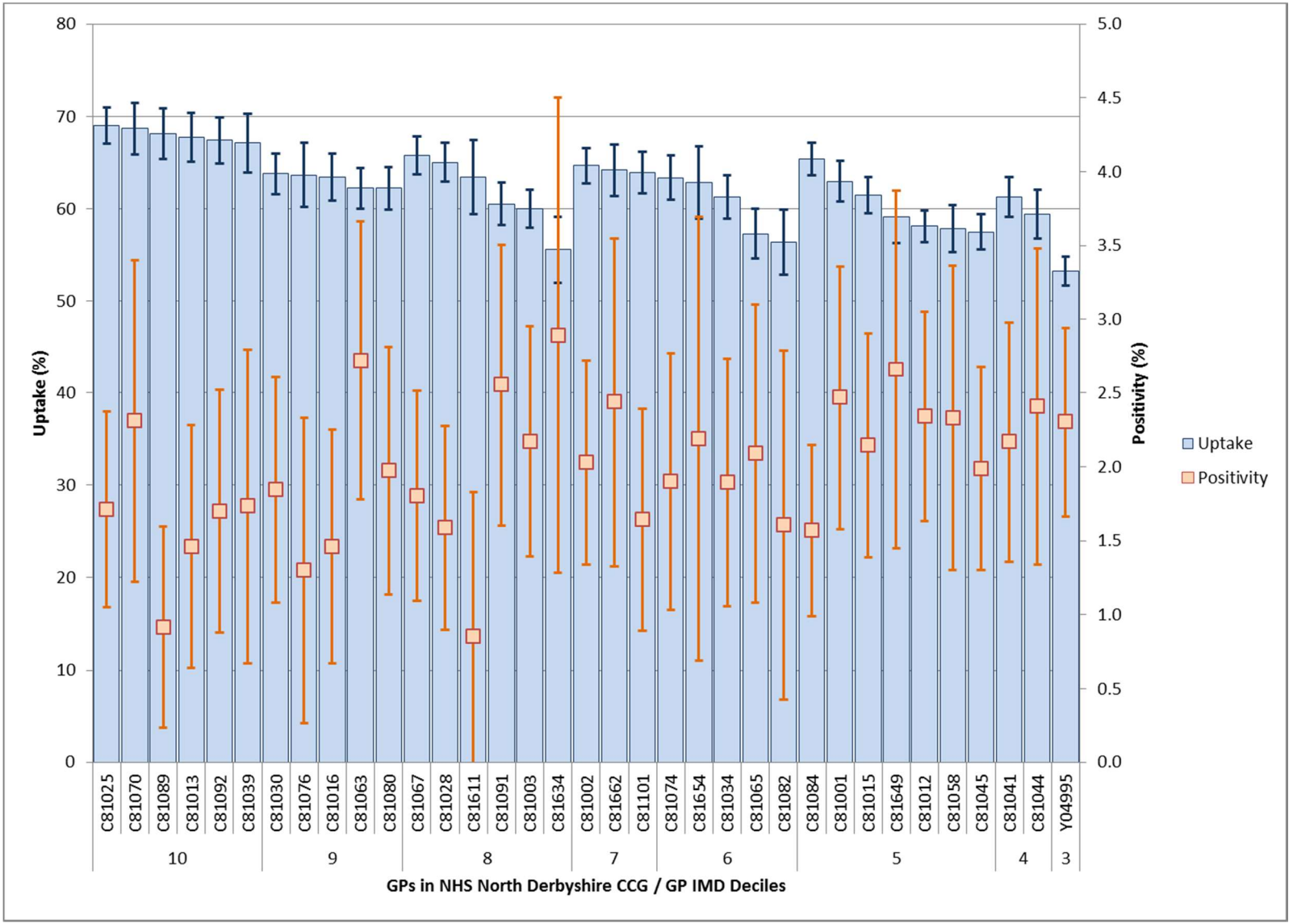
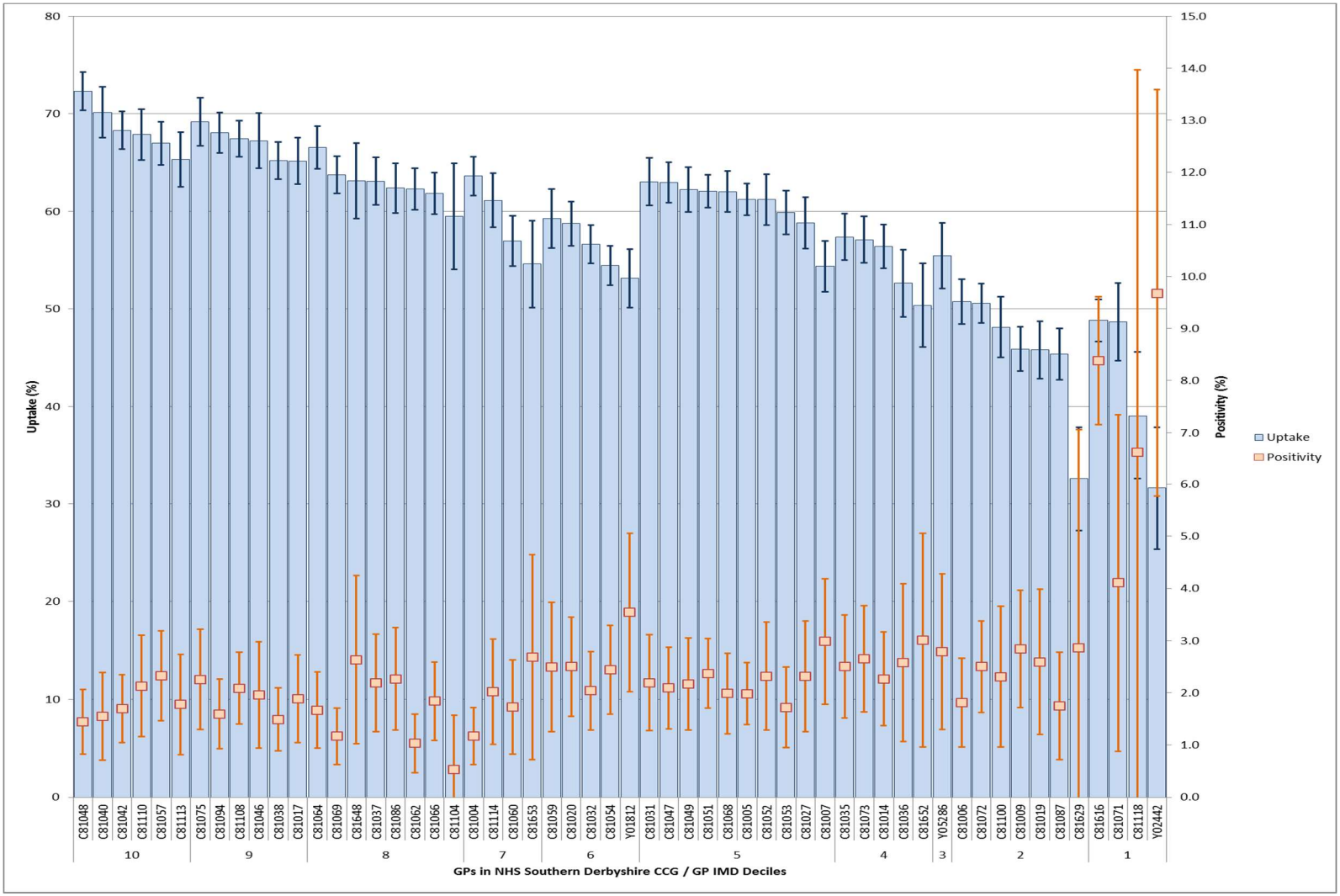
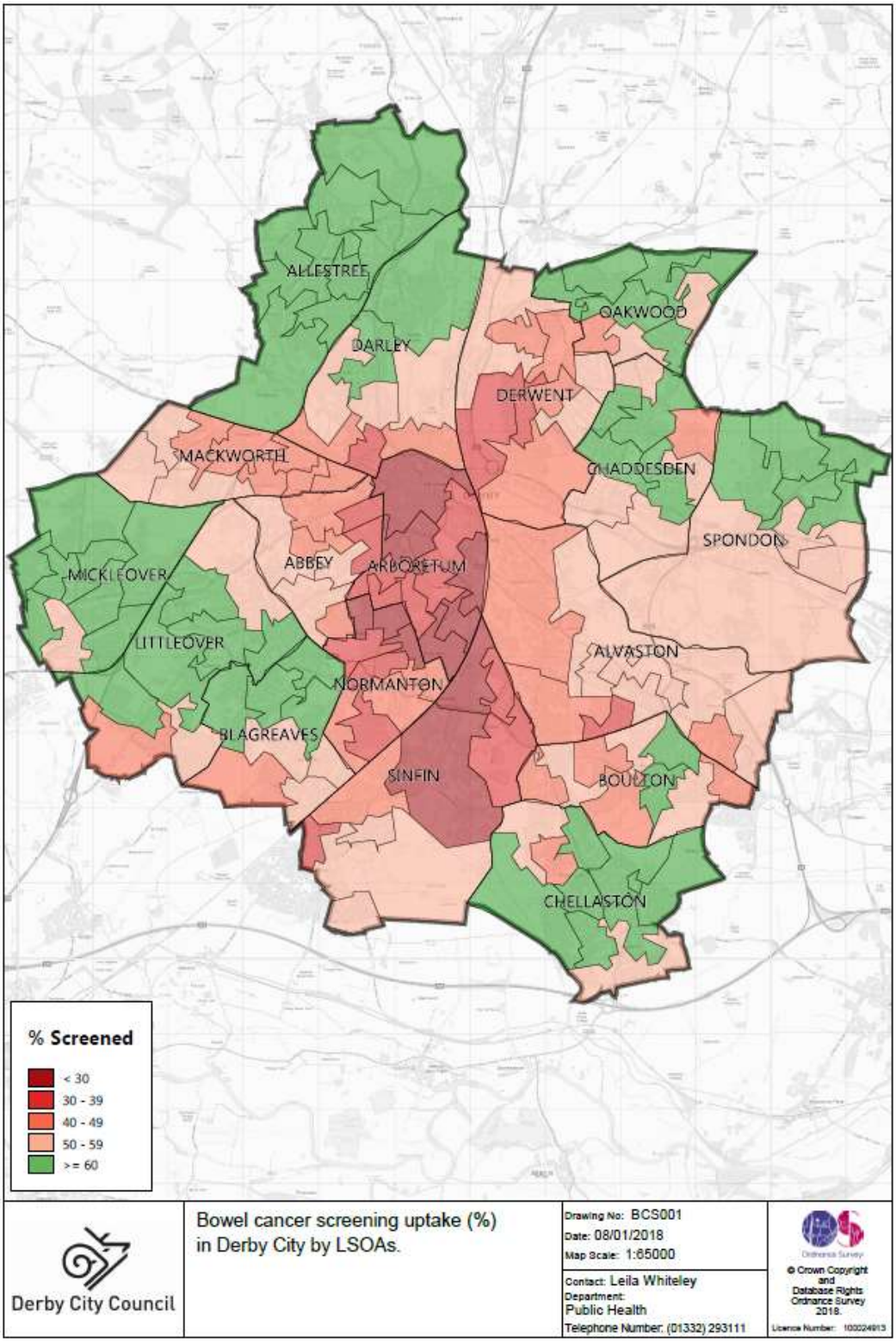


Figure 9.6: GPs in NHS Southern Derbyshire CCG

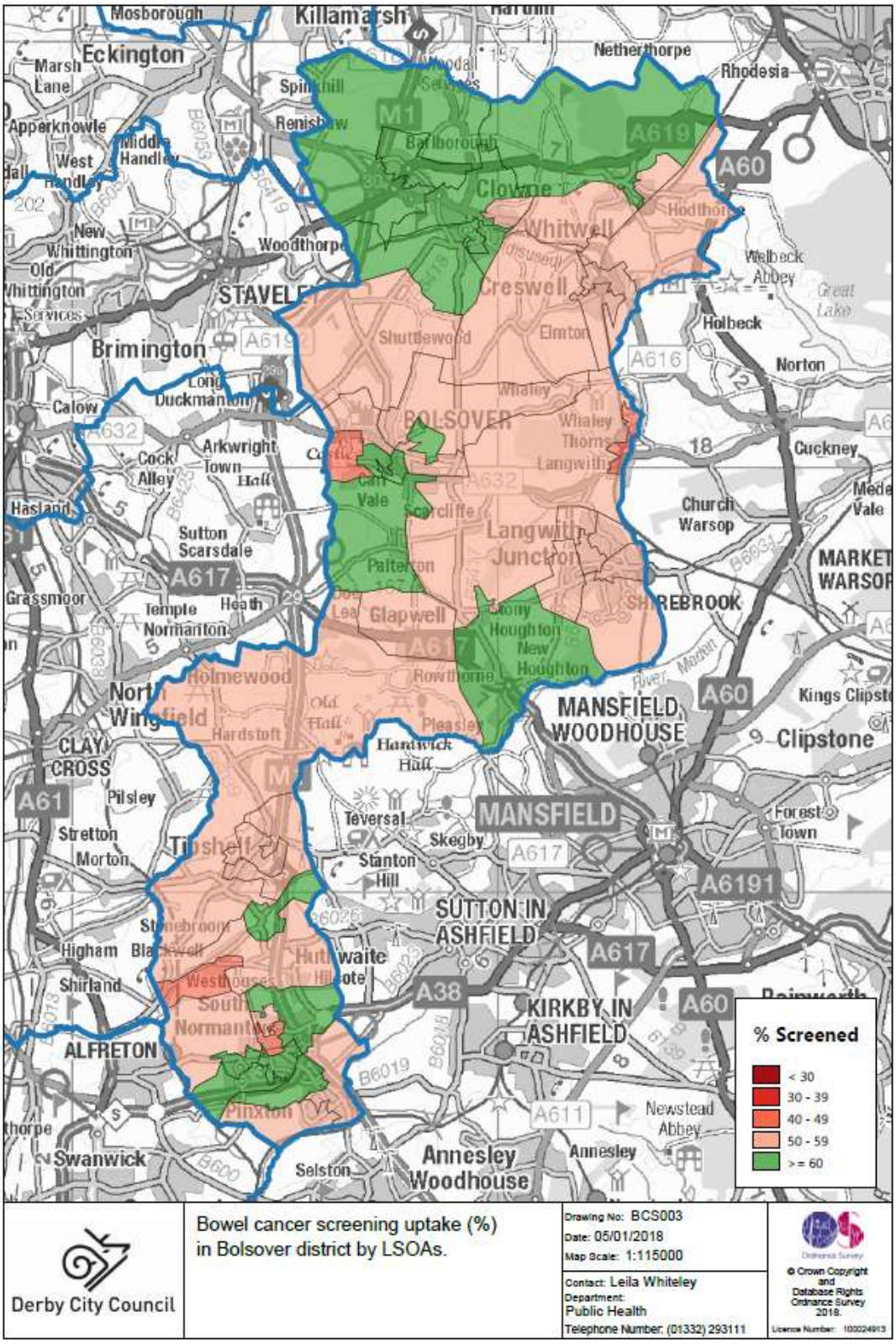


Appendix 6: Bowel cancer screening uptake in Derby City and Derbyshire Districts and Boroughs

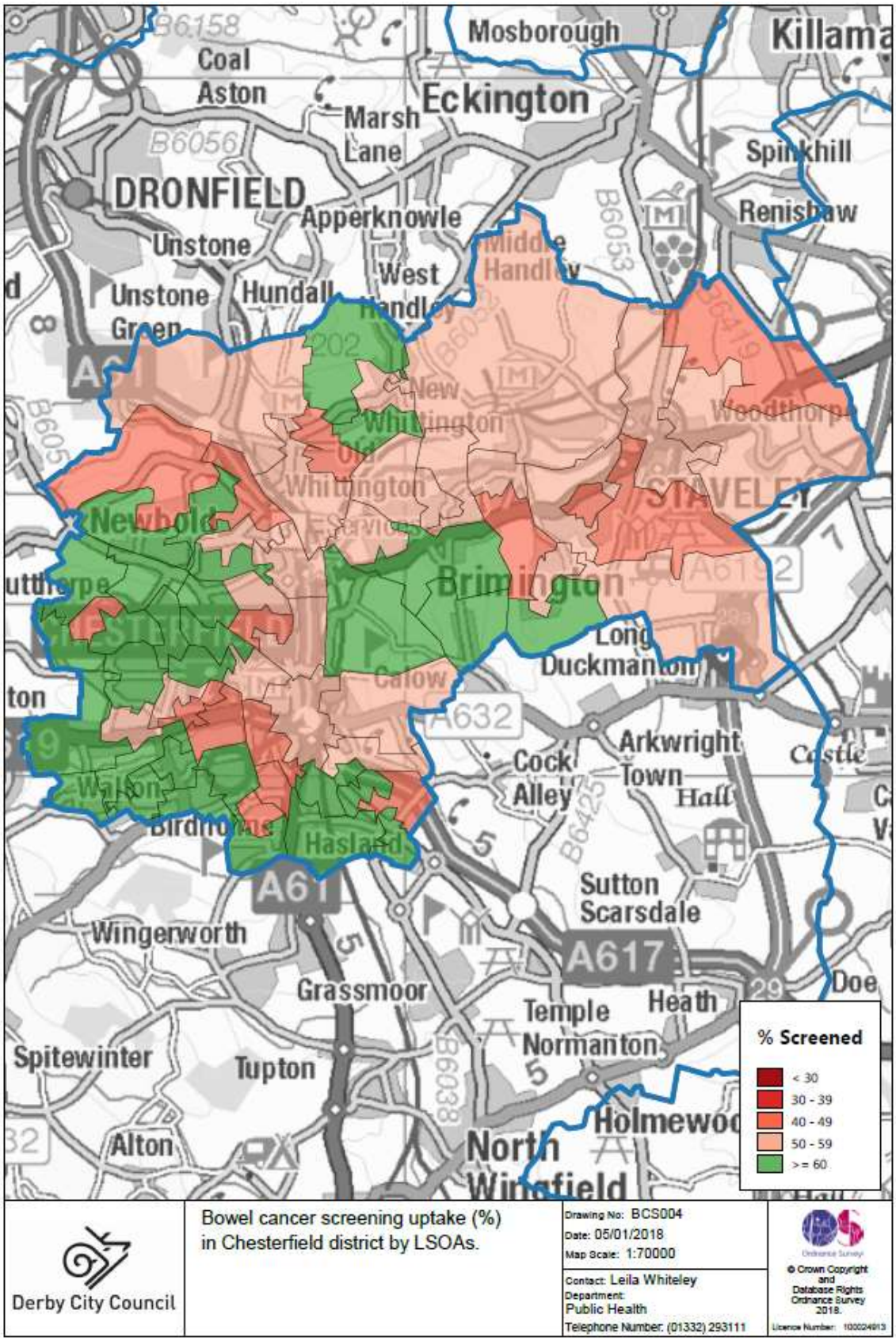
Map 9.1: Derby City



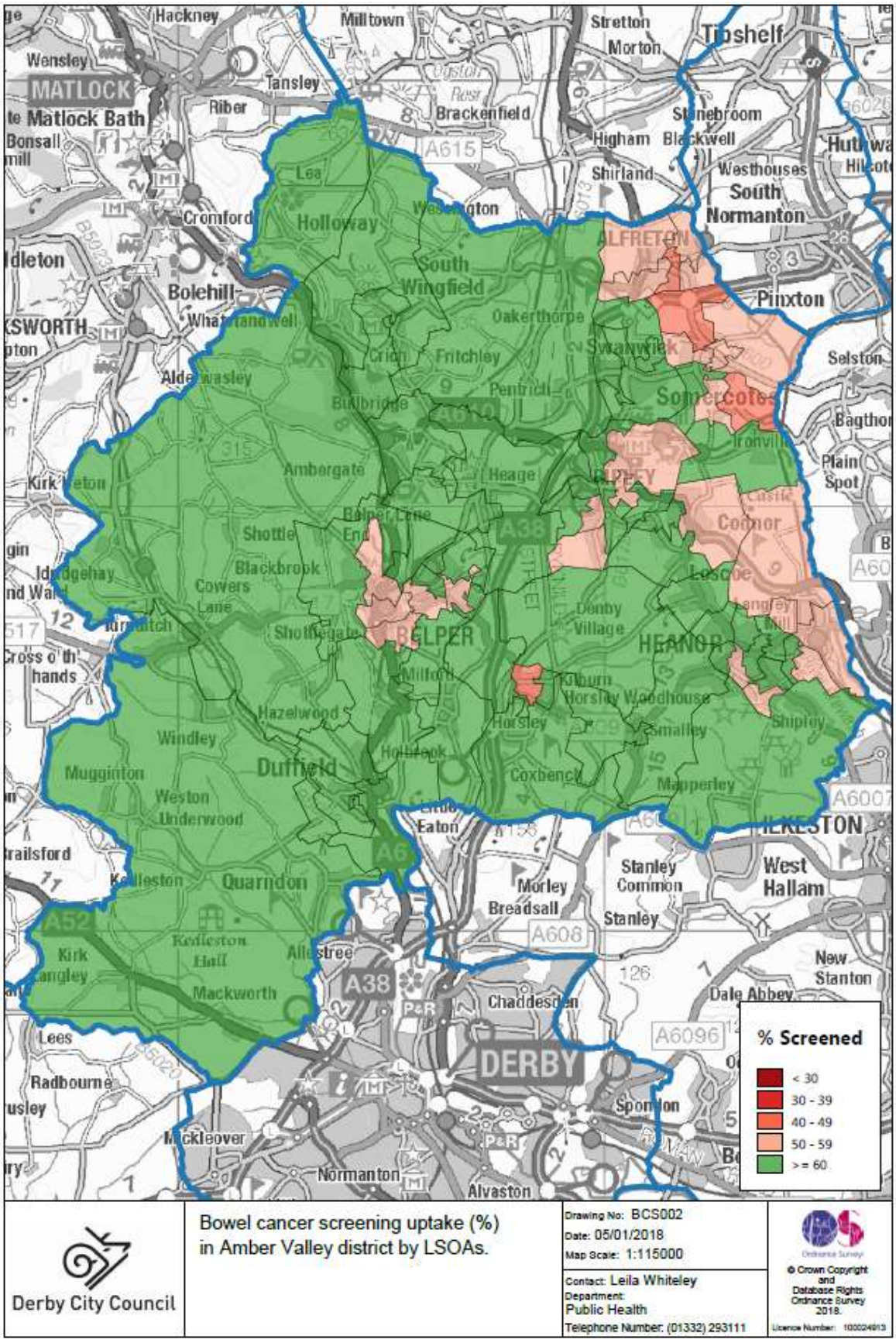
Map 9.2: Bolsover



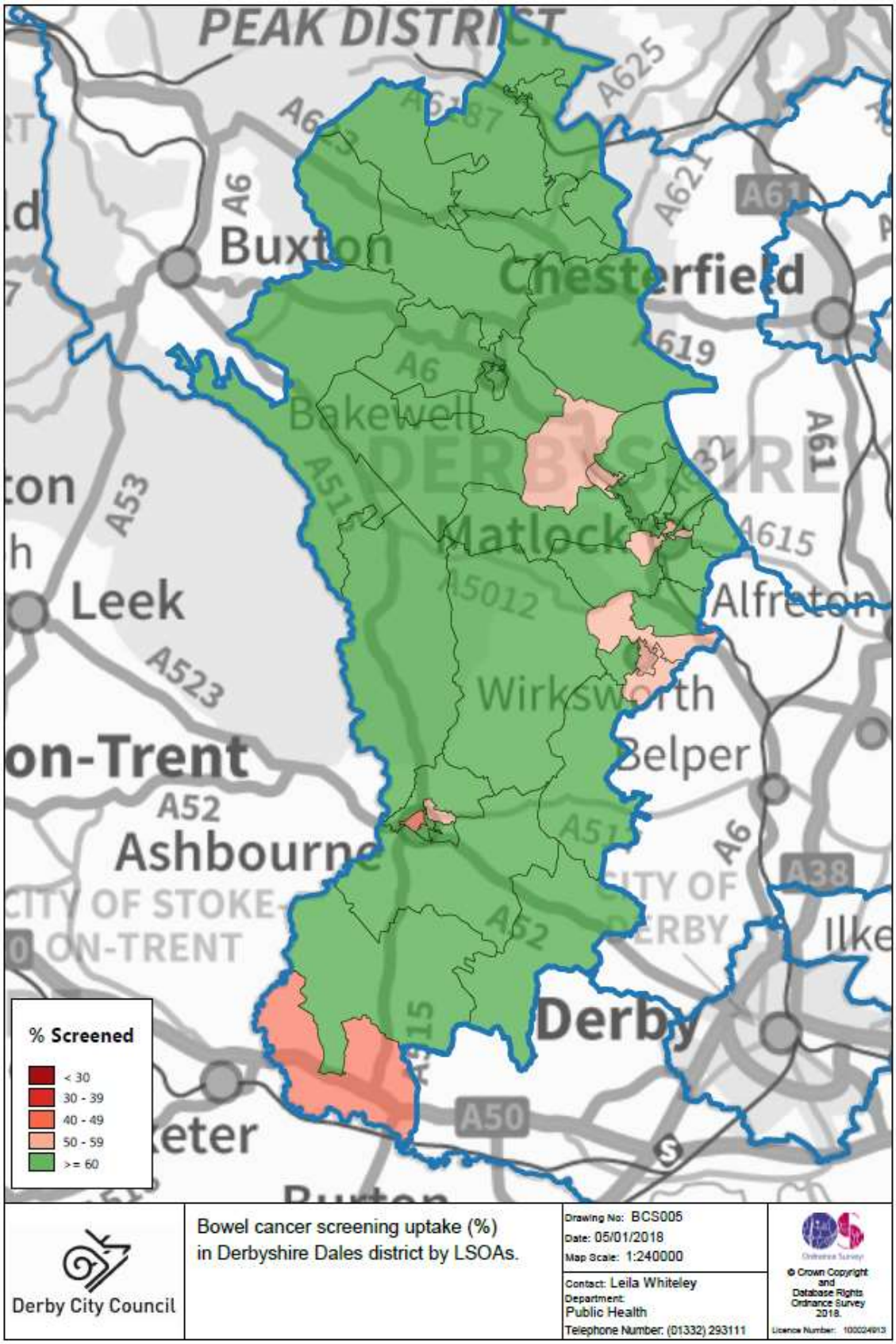
Map 9.3: Chesterfield



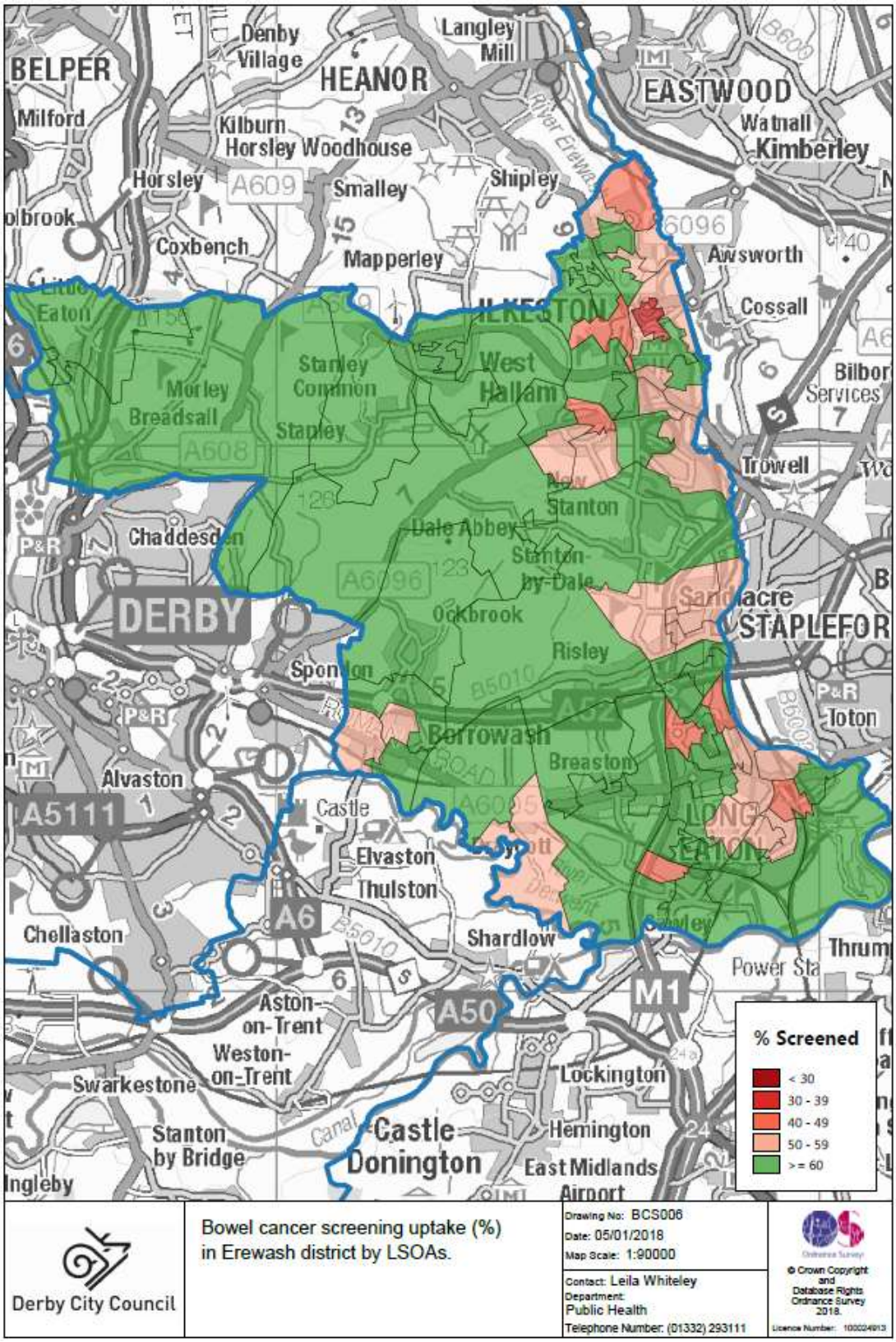
Map 9.4: Amber Valley



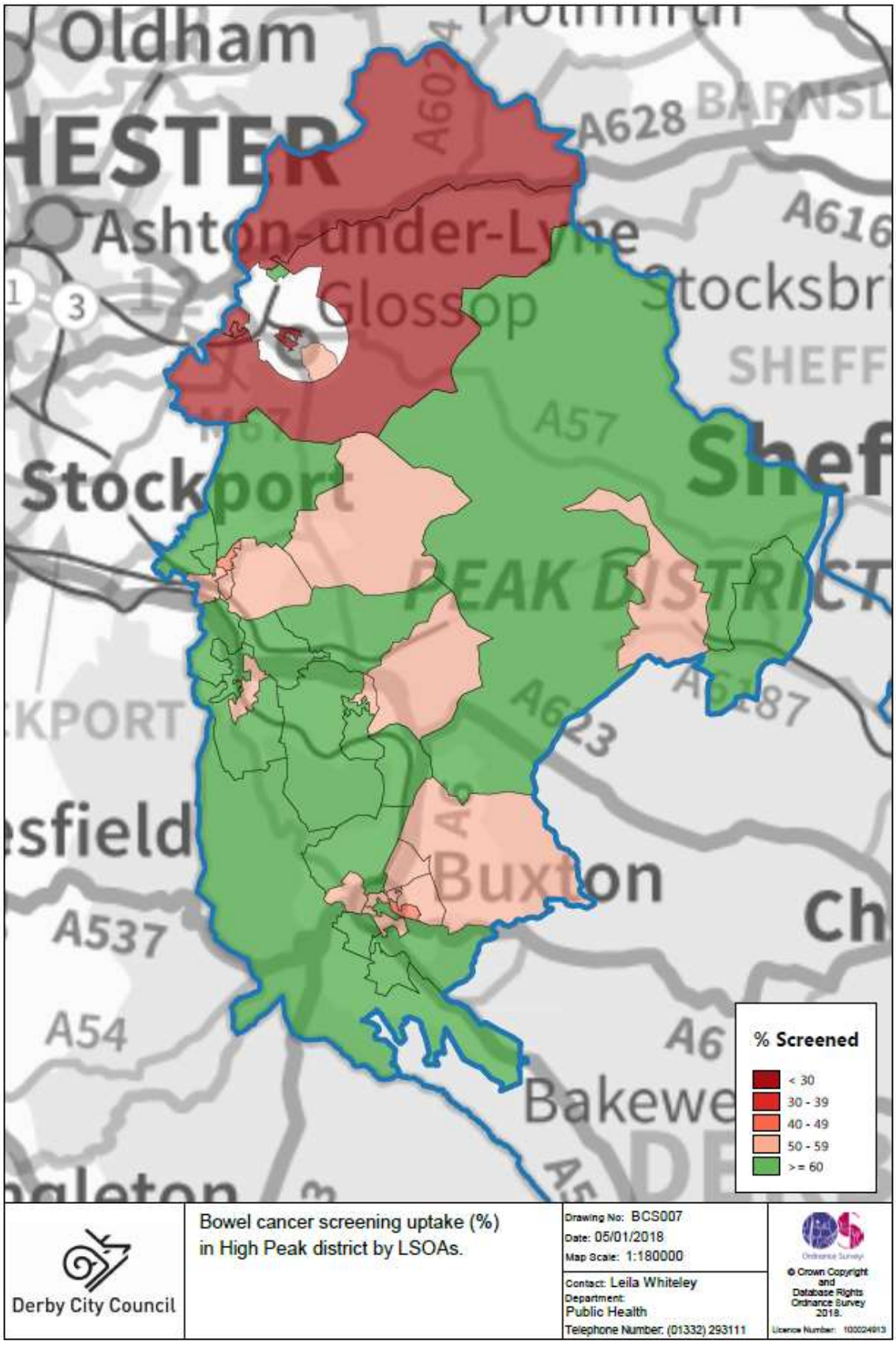
Map 9.5: Derbyshire Dales



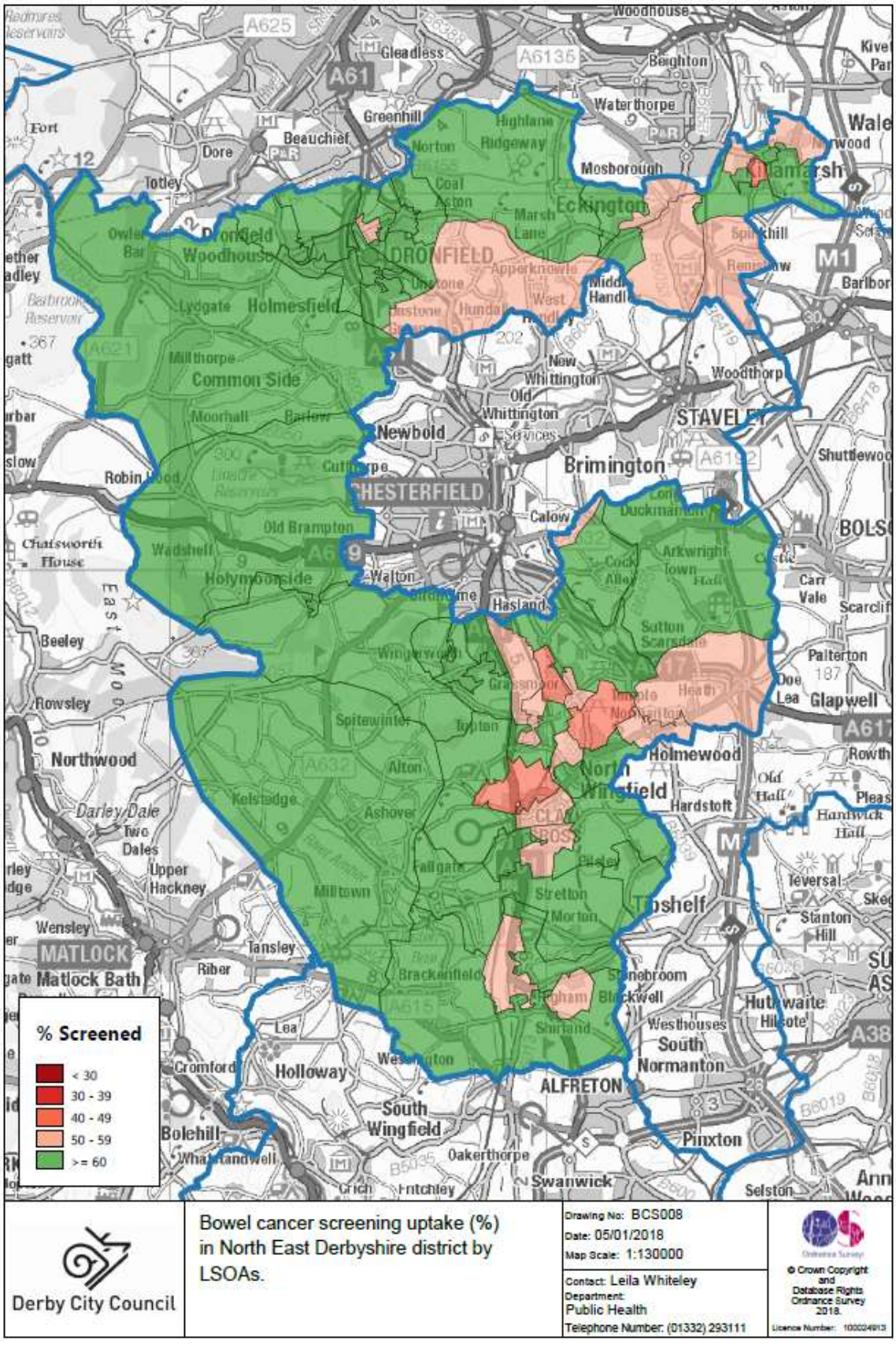
Map 9.6: Erewash



Map 9.7: High Peak



Map 9.8: North East Derbyshire



Map 9.9: Southern Derbyshire