North Tyneside

Joint strategic needs assessment

Bowel cancer screening

December 2023

North Tyneside Council

1. Introduction

Bowel cancer is the 4th commonest type of cancer in the UK with 42,900 new cases a year and is common in both men and women, with approximately 23,900 and 19,000 new cases a year respectfully[1]. The England age standardised bowel cancer incidence rate in 2015-2019 was 69.4/100,000, and slightly lower in North Tyneside with an age standardised incidence rate of 68/100,000 for the same period. Both nationally and locally, this varies considerably between men and women, with the disparity being greater in North Tyneside than what is seen nationally. The age standardised incidence rate per 100,000 for bowel cancer for men in North Tyneside is 90.2 compared to 84.4 in England whilst for women it is 51.5 in North Tyneside compared to 56.7 in England[2].

There are multiple risk factors for bowel cancer, some of which are unpreventable such as ageing, family history and adult attained height whereas others such as alcohol, tobacco, diet and physical activity are modifiable risk factors[3, 4]. Modifiable risk factors are considered with ongoing work through the relevant lifestyle alliances in the borough and region. JSNAAs for these factors are available.

As with other cancers, the earlier bowel cancer is detected and diagnosed, the better the prognosis[5]. If bowel cancer (including colon, colorectal and rectal) is diagnosed at Stage 1, age-standardised 1-year net survival is approximately 97.8% for all persons, compared to 45% if diagnosed at Stage 4[5]. This pattern continues at 5-year survival, if diagnosed at Stage 1, age standardised 5-year net survival is 91.5% compared to 10.5% if diagnosed at Stage 4[5]. That is, if diagnosed at Stage 1, 9 out of 10 will survive for 5 years compared to 1 out of 10 if diagnosed at Stage 4.

Within North Tyneside, between 2013-2019 approximately 16% of bowel cancers (colon and rectum) were diagnosed at Stage 1, with about 25% being diagnosed at Stages 2 and 4 and the majority (30%) diagnosed at Stage 3[5].

Meeting the 2028 NHS Long Term Plan goal of 75% of all cancers being diagnosed early[6] will be missed in North Tyneside unless there is a substantial shift in the Stage at which cancer is diagnosed.

The screening programme was introduced in 2006 and aims to both diagnose bowel cancer early and also prevent bowel cancer[7] (by the removal of incidental findings such as polyps during colonoscopy[8]).

All screening programmes are a choice as they carry some risk[9]. It is estimated that around 2 out of every 100 people participating in the bowel screening programme will need further tests, usually a colonoscopy. Most people requiring a follow up colonoscopy will not go on to receive a diagnosis for bowel cancer, instead it is common for polyps to be found and removed, which further reduces the risk of developing bowel cancer[10].

The aim of the bowel cancer screening programme is to reduce bowel cancer morbidity and mortality by preventing and diagnosing bowel cancer early[7, 10]. The bowel cancer screening programme is available to all those aged 60 – 74, with those 74+ able to opt in to continue to be screened. The age is being reduced to 50 from 2020 following an evidence review[11]. In North Tyneside this began with 56-year-olds in 2021-22 and will be fully extended to all those 50-60 by 2025[12]. The bowel cancer screening programme aims to find bowel cancers at an early stage when it is not yet creating detectable signs or symptoms. The screening is carried out at home, using a Faecal Immunochemical test (FIT) which detects blood in faeces. Healthy adults with no symptoms aged 60-74 should be invited to screen every 2 years[10].

2. Key Issues

Inequality in Screening Uptake - Nationally, bowel screening uptake is not equal across the eligible population, and this is the case in North Tyneside with uptake ranging from

66.4 – 78.3% between practices where the national acceptable target is > 60%[13]. This has improved vastly in recent years due to the introduction of the FIT test, with 2020-21 average for England of 66.8% and for North Tyneside 71.8%, Tables 1 and 2.

There is variation within bowel cancer screening uptake and some of this variation is associated with deprivation, with lower uptake in communities experiencing more deprivation as well as ethnicity, having a learning disability or severe mental illness [15,16]. As screening aims to prevent and diagnose bowel cancer at an early stage when prognosis is best, not accessing screening exacerbates inequalities in morbidity and mortality in communities with high deprivation.
Having said that, nationally and locally within North Tyneside, bowel screening uptake amongst people with a learning disability is higher, though variable, and almost comparable to the rest of the population, unlike the other screening programmes [16,17] Table 2.

Adapting the National Screening Programme for Local Implementation - All national screening programmes are overseen by the National Screening Committee18 and commissioned through NHSE/I to ensure a universal offer to those eligible which is key to equity within the offer.
Several interventions which could be locally implemented have been evaluated to increase uptake to national screening programmes[19]. For example, unlike the other screening programmes, invitations for the bowel screening programme do contain a GP endorsement as well as contact details to request assistance or opt out. However, GP practices are still not informed that someone is being invited to screen, instead being informed once they have been classed as a non-responder, 15 weeks after the initial informational letter [12].

Impact of Pandemic on the Bowel Cancer Screening Programme - Pre-pandemic, invitations to screen would be sent out, with a positivity rate of 2% requiring further investigative tests, usually a colonoscopy [13]. However, if the positivity rate was higher, and so colonoscopy lists were at capacity, there is a window of 17 weeks from the date last test was returned 2 years ago, within which invitations need to be

sent out. This allows the Bowel Screening Hub to be responsive to variation in the positivity rate, and so capacity within secondary care [8,20].

In response to the pandemic, the bowel cancer screening programme was paused in March 2020. Colonoscopy is an aerosol procedure and so capacity was reduced to 30-40% of pre-pandemic capacity. Consequently, bowel screening recovered more slowly than cervical screening, only inviting those at highest risk over summer 2020, returning to more than pre-pandemic capacity by December 2020[21].
In July 2020, the UK National Screening Committee also permanently discontinued the bowel scope test for screening as it was unclear if it had any additional benefits alongside the FIT test. The bowel scope test is also a lot more intrusive. Discontinuing the bowel scope in July 2020 also enabled the screening programme to recover more quickly from being paused at the beginning of the pandemic [22].

3. High Level Priorities

Historically, bowel cancer screening uptake has been significantly lower than the cervical and breast cancer screening programmes, though significant improvement has been made with the introduction of the FIT test [23]. Bowel cancer screening uptake in North Tyneside has closely mimicked the England trend, albeit at 5-10% higher uptake than England [14].

Despite North Tyneside having higher uptake than the England trend, there is still variation in uptake within North Tyneside, from 66.4 - 78.3% (Tables 1)[14]. Similarly, to the rest of England[23] this variation is aligned to social deprivation within the borough[14].

The priority for North Tyneside is therefore to increase bowel cancer screening uptake by increasing awareness of screening, removing existing barriers to screening and improving the notification process between the national bowel cancer screening programme (NBCSP) and the local system.

Increase awareness of screening programme

- **Professional partners -** Local healthcare and partners have different ways of reaching and communicating with the communities they serve. For them to endorse and answer any questions about the screening programme as trusted voices in their communities, it is essential they are informed of when and how the national programme operates. This allows them to plan any interventions and raise awareness within their communities through informational and promotional resources[19].
- **General population -** The bowel cancer screening programme is not available to everyone, but most people know someone who is eligible. Therefore, raising general population awareness of the programme may impact on uptake as it may enable conversations within families and communities.

Remove barriers to screening

Known barriers for bowel cancer screening include[24]:

- Fear and denial around the test outcome
- A misconception that the test is not applicable if you don't have any apparent symptoms of bowel cancer
- Concerns around the practicalities and cleanliness of the test
- Individual perceived risk being low or consideration of future consequences of bowel cancer
- The fact that it takes place away from the usual health care settings
- Low health literacy and numeracy
- Gender - on the whole, males were less likely to take part in screening
- People from lower socioeconomic group
- People from ethnic minor communities – note disparity varies by ethnic minority group
- People with severe mental illness

While screening should always be a choice, it is likely that the uptake and variation seen across North Tyneside is not a reflection of informed choice given the association seen with communities with more deprivation and less uptake[16,19,23,25].

Improve the notification processes

The current process for sending, receiving, and testing bowel cancer screening FIT kits, is managed by the North East Bowel Screening Hub which covers the North East, Humber and North Yorkshire, South Yorkshire, West Yorkshire and part of Bassetlaw[20].

The Bowel Screening Hub process relies on GP records being accurate and complete for contact details and any reasonable adjustments which may be required by individuals[20].

An individual is an 'open episode' within the Hub system for a total of 15 weeks from the initial informational letter being sent. Once the episode is closed, the GP is informed that the individual has not responded to the invitation to screen[12, 13, 20].

4. Those at Risk

Early detection and diagnosis of bowel cancer significantly improves the prognosis, with 9 out of 10 of those diagnosed at Stage 1 surviving for 5 years compared to 1 out of 10 of those diagnosed at Stage 4[1,2].
The national bowel cancer screening programme is estimated to avoid 2,400 bowel cancer deaths annually[18] through early detection and diagnosis.
Nationally and locally, screening uptake varies by deprivation, gender, and ethnicity[16,19, 23,25], with those least likely to screen, more likely to die from bowel cancer1. Nationally, the incidence rate of bowel cancer is 9% higher in males in the most deprived quintile compared to the least, though this correlation with deprivation is not seen in females[25]. Given the higher risk of developing bowel cancer amongst these cohorts, it is critical that concerted efforts are undertaken to increase screening uptake to secure better outcomes. The gender and ethnicity disparity in uptake is not routinely recorded at a local level. However, variation between GP practices may be used as a proxy indicator for socioeconomic deprivation[14].

The National Bowel Cancer Screening Service

The NHSE/I commission the national bowel cancer screening service (NBCSP) to be delivered by the North East Bowel Cancer Screening Programme Hub which covers the Humber and North Yorkshire, South Yorkshire, West Yorkshire, and part of Bassetlaw[20].

The NBCSP introduced the FIT test in 2019 and the bowel scope was withdrawn from the programme in 2020 due to the effectiveness of FIT screening and lack of clarity whether using the two tests in conjunction provided any additional benefit[11,22].

The incidence rate of bowel cancer has been remained stable in the UK between 1993-1995 and 2016-2018, reducing by 2% for women and 3% for men in that period[26].

Simultaneously, uptake for bowel cancer screening has increased from 35% in England and 45.3% in North Tyneside in 2009-10 to 66.8% and 71.8% for England and North Tyneside respectfully in 2021-21[14].

Despite this improvement, within North Tyneside, only approximately 41% of bowel cancers were diagnosed at Stage 1 or 2 between 2013-2019[5], needing an improvement of 34% to reach the NHS LTP goal of 75% of all cancers being diagnosed early[6].

5. Level of Need

Bowel cancer screening uptake data is collected to the practice level, while incidence or mortality data is not. This limits how targeted interventions can be to improve bowel cancer outcomes.

When the national screening programme was developed in 2006, the national acceptable threshold of uptake was set at 60%[13] which has been exceeded nationally and locally since 2016-17. In 2021/22, the uptake for England was 70.3% while in North Tyneside uptake was 72.0%[14], with recent improvements in uptake due to the introduction of the FIT test in 2018-19.

Despite the high borough level uptake of 72.0%, screening uptake is not equal across the eligible population or borough[14].

For example, the variation in uptake within some of the primary care networks may suggest varying practices, interventions or processes are impacting upon screening uptake which warrants further exploration.

Table 1: 2020-2021 Bowel Cancer Screening Uptake for England, Borough and PCNs, showing the variation within each PCN[14]

	National	NT CCG	North Shields PCN	North West PCN	Wallsend PCN	Whitley Bay PCN
2020-2021	70.3	72.0	69.8	72.9	69.4	75.3
Highest and Lowest Uptake for each PCN/ across the Borough (%)		66.4 – 78.3	68.6 – 71.1	71.8 – 74.0	67.5 – 71.2	74.1 – 76.5

Modifiable risk factors for bowel cancer include a diet with a lot of red and processed meat, alcoholic drinks, and adult body fatness[4] which are more prevalent in communities with higher deprivation[27,28,29].

In North Tyneside, bowel cancer screening is high amongst people with a learning disability. However, there is significant variation between GP practices in North Tyneside, with more than half recording that 0% of the eligible population living with a learning disability have been screened, compared to a fifth of all GP practices reporting that 100% of the eligible population living with a learning disability have participated in the bowel screening programme[17].

Table 2: North Tyneside CCG Bowel Screening Uptake amongst Residents with a Learning Disability[17]

	All Patients		LD Patients		
Year/ Quarter	**2019/20**	**2020/21**	**2019/20 Q4**	**2020/21 Q1**	**2020/21 Q2**
Bowel screening uptake (% of eligible population)	66%	72%	64%	54%	51%

No other data is currently recorded around disability and either bowel cancer mortality or screening uptake.

6. Unmet Needs

Uptake varies considerably in North Tyneside, Table 1, and leaves 21.7 - 33.6 % of the eligible population registered with a GP not screened[14]. Bowel cancer is associated with deprivation, as are modifiable risk factors such as obesity, diets with a reliance on ultra-processed foods, smoking and alcohol use. Given this, it is critical that those not currently opting in to the bowel screening programme are supported to ensure informed decision making and accessibility.

This unmet need is higher for those living with a learning disability, Table 2.

Mechanisms for Unmet Need

The bowel cancer screening programme invitation process, operates on a regional footprint and is not routinely integrated into primary care [12,20]. Despite this, GP practices are monitored for their eligible patient cohort's uptake for bowel cancer screening, with data collected for screened in last 30 months (2.5-year coverage %)[14]. Given the separateness of the invitation and notification processes from local healthcare, it is plausible that it does not meet the needs of all those it is intended for. Examples of where there may be unmet needs include:

GP Lists and Reasonable Adjustments- The bowel cancer screening regional hub pulls GP practice lists of who is eligible for bowel cancer screening every 24 hours[8]. This informs the Hub who is eligible and if any reasonable adjustments are necessary. This relies on accurate information being held by GP Practices and the Hub manually checking for anyone needing reasonable adjustments[20].

Notification Processes - GP Practices are not informed prior to the informational letter or kit being sent to an individual. Instead, they are only informed of a result or if a patient does not return a kit within 14 weeks[12,20]. This limits how proactive primary care can be in increasing the uptake of screening with individuals.

Screening Population – the incidence rate of bowel cancer almost doubles between the 45-49 age cohort and the 50-55 age cohort[30]. Therefore, the National Screening Committee UK recommended increasing the screening population from 60-74 to 50-74[12, 22] in 2018. This is being implemented by adding in another age until 2025, Table 3, and consequently those aged 50-55 and 57-59 (approximately more than 10,000 people[31,32]) are at an increased risk due to their age and are not yet being screened. The age extension over the next 3 years will seek to address this, though it will require increased capacity across the screening pathway.

***Table 3 - North East Hub Scheduled Implementation to Increase the Screening Population*[12]**

Financial Year	Screening Extended to Age	Impact on Programme
2021-22	56	No significant impact
2022-23	58	Expected increase in positivity and so increased colonoscopy capacity necessary
2023-24	54	Increased capacity as more people aged 54 compared to 74
2024-25	51 and 52	No significant impact expected

7. Projected Need and Demand

Bowel cancer screening uptake is increasing, unlike the other cancer screening programmes, likely due to the introduction of the more acceptable FIT test in 2018-19 leading to an initial 3% increase in uptake, both nationally and locally, which seems to be continuing, Figure 1[14]. Compounding this is the recommendation to extend the screening population to include those aged 50-59[11,22] and the impact this is predicted to have on the system, Table 3. North Tyneside has proportionately more 50 – 74 year olds than other parts of the North East, and England[31], which adds further local demand to the screening programme. Due to these systematic changes, the demand for the screening programme will continue to increase.

Since the introduction of the screening programme in 2006, the age-standardised incidence rate of bowel cancer has decreased by 6%[30]. This reduction tentatively illustrates the effectiveness of the screening programme to not only diagnose bowel cancer early, but to also prevent bowel cancer by the removal of incidental findings such as polyps.

As the screening population is extended to 50–59-year-olds, the volume of people going through the programme will increase with varying projected impact on the programme and a potential

increase in the number of people requiring secondary care follow up may increase, even if the positivity rate remains at 2% or even reduces. The projected positivity rate is not currently publicly available. It will be critical for the regional screening and immunisations teams to work closely with regional Hubs and bowel screening services within secondary care to ensure capacity is built into the system as the age extension continues.

As modifiable risk factors for bowel cancer continue to be more common in deprived communities it is critical that specific targeted work is done jointly to address these modifiable risk factors and increase screening simultaneously. Therefore, increasing uptake in these communities is critical to reducing health inequalities.

8. Community Assets and Services

The North Tyneside Cancer Prevention Network (CPN) brings together professional partners such as the ICB, PCN cancer leads and coordinators and voluntary and community organisations.

The CPN have worked to increase uptake through novel approaches and collaboration. Areas of focus include unpacking the variation in screening uptake between the rest of eligible population and those with a learning disability. Increasing awareness of bowel screening through the development of screening resources and disseminating the process for requesting a FIT kit for asymptomatic patients wishing to participate in screening. Easy read information for the whole pathway has also been disseminated.

Key stakeholders include primary care networks, Healthwatch North Tyneside, LDNE, Coping with Cancer, patient engagement groups and VODA. This is not an exhaustive list and the CPN is working with other partners as well on the bowel cancer screening agenda.

There are numerous cancer patient engagement groups/networks in North Tyneside who are committed to improving the services involved in the cancer journey. Some operate on regional footprints as well:

- Northern Cancer Voices
- North of Tyne and Gateshead Patient and Professional Group
- North Tyneside CCG Patient Forum

These groups are contributing to establishing the remit of the Cancer Prevention Network and the CPN is providing data and public health expertise for their activity as well.

As well as this, there are many other organisations providing support to those on a cancer journey, such as Coping with Cancer and FACT. The Cancern Network covers many of the cancer support organisations operating across the North East and North Cumbria footprint.

9. Evidence for Interventions

There are a variety of best practice interventions[33] that could be employed to increase screening uptake. These interventions rely on the bowel cancer screening service working in close collaboration with local partners such as public health and primary care networks. Unlike the breast and cervical screening programmes, the information and invitation letters for bowel screening both already contain an endorsement from the individual's GP practice and contact details for further queries and/or to opt out of screening[20].

- Notify primary care prior to sending information and kit to individuals so that primary care can pre-endorse (text, letter, opportunistic conversation)
- Remind patients to complete the kit via text message[33]
- Electronically informing GP Practices of risk of non-response when Hub sends reminder letter out[34]
- Non-responders
    - Personalised reminders[34]
    - GP reminder letter (very large effects)[33]

10. Views

The Cancer Awareness Measure (CAM) is a validated survey developed by Kings University, UCL and Cancer Research UK. The CAM was carried out in North Tyneside in winter 2021 with over 400

individuals surveyed, making up a representative sample of the borough population. The CAM covers awareness of signs and symptoms of cancer, factors affecting making an appointment, risk factors for cancers and awareness of the cancer screening programmes.

Awareness of the bowel cancer screening programme is 2 out of 3 amongst the over 60s, which is in line with the borough screening uptake of 71.8%[14].

This data shows that awareness is lowest amongst the routine manual and non-working population and men which mirrors national evidence of bowel screening awareness and uptake. It is similarly expected that awareness of the bowel cancer screening programme is highest amongst those who are invited to participate. It is therefore reasonable to expect awareness of the bowel cancer screening programme to increase amongst the 30-59 age group as the screening population is extended to 50–59-year-olds in the coming years.

The geographical variation noted was not statistically significant but may benefit from further exploration to understand the lower reported awareness in the Killingworth/ North West locality of the borough. The uptake within this primary care network varies by a similar amount to the rest of the borough, with only one primary care network seeming to have less internal variation, Table 1.

11. Additional Needs Assessments Required

Bowel cancer screening is a service which aims to reduce bowel cancer mortality by preventing bowel cancers from developing and diagnosing bowel cancers early.

Understanding the context of this needs assessment could be further supported by a broader cancer needs and assets assessment. Many risk factors exist for cancers, and this is true for bowel cancer as well. Preventable risk factors for bowel cancer include alcohol and tobacco consumption and obesity[4], for which there are separate

JSNAs. The prevalence of these preventable risk factors, and the negative impact of them due to less socioeconomical capital, is significantly higher in north Tyneside's more deprived communities.

Given the variation in bowel screening uptake in North Tyneside, it is incumbent to carry out targeted investigations and interventions with cohorts such as the Learning-Disabled community as well as men and those working in routine and manual occupations.

As the difference in uptake within North Tyneside is largest between our most and least deprived communities, targeted work with communities living with high levels of deprivation is necessary to creating any change in uptake and therefore mortality.

Working in collaboration with organisations and communities is essential for identifying assets which can be maximised to increase breast cancer screening uptake.

12. Key Contacts

Key Contact	Chris Woodcock
Job Title	Consultant in Public Health
E-mail	Chris.woodcock@northtyneside.gov.uk
Telephone	(0191) 643 2120

13. References

1. Cancer Research UK (2022) Bowel Cancer Statistics. Available at: https://www.cancerresearchuk.org/health-professional/cancer-statistics/statistics-by-cancer-type/bowel-cancer#heading-Zero [accessed 22/07/2022]
2. Cancer Data (2022) Adult Cancer Incidence and Mortality. Available at: https://www.cancerdata.nhs.uk/incidence_and_mortality [accessed 22/07/2022]

3. Cancer Data UK (2022) Bowel Cancer Risks and Causes of Bowel Cancer. Available at: https://www.cancerresearchuk.org/about-cancer/bowel-cancer/risks-causes [accessed 22/07/2022]
4. World Cancer Research Fund/ American Institute for Cancer Research (2018) *Diet, nutrition, Physical Activity and Cancer: a global perspective*. Continuous Update Project Expert Report 2018. Available at www.dietandcancerreport.org [accessed 13/06/2022]
5. Office for National Statistics (2019) Cancer Survival in England – adults diagnosed. Available at: https://www.ons.gov.uk/peoplepopulationandcommunity/healthandsocialcare/conditionsanddiseases/datasets/cancersurvivalratescancersurvivalinenglandadultsdiagnosed [accessed 01/08/2022]
6. NHS (2019) The NHS Long Term Plan. Available at: https://www.longtermplan.nhs.uk/publication/nhs-long-term-plan/ [accessed 14/06/2022]
7. Cancer Research UK (2022) Bowel Cancer Incidence Statistics – Bowel cancer incidence by age. Available at: https://www.cancerresearchuk.org/health-professional/cancer-statistics/statistics-by-cancer-type/bowel-cancer/incidence#heading-Six [accessed 12/08/2022]
8. Bowel Screening Service for North of Tyne (2022) Conversation with Heather Dixon – Lead Specialist Screening Practitioner. (14/06/2022)
9. UK Government (2021) The Pros and Cons of Screening. Available at: https://www.gov.uk/guidance/the-pros-and-cons-of-screening [accessed 01/08/2022]
10. Bowel Cancer UK (2021) Bowel Cancer Screening – benefits and risks of bowel cancer screening. Available at: https://www.bowelcanceruk.org.uk/about-bowel-cancer/screening/ [accessed 01/08/2022]
11. Whyte S, Thomas C, Kearns B et al. (2018) *Optimising Bowel Cancer Screening. Phase 1: Optimising the cost effectiveness of repeated FIT screening and screening strategies combining bowel scope and FIT screening*. National Screening Committee. Available at: https://view-health-screening-

recommendations.service.gov.uk/bowel-cancer/ [accessed 01/08/2022]

12. NHSE (2022) Conversation with Veronica Latham – Commissioning for Screening and Immunisations Lead for Bowel Cancer Screening. [19/05/2022]
13. Public Health England (2021) Guidance: Bowel Cancer Screening Programme Standards: valid for data collected from 1 April 2018. Available at: https://www.gov.uk/government/publications/bowel-cancer-screening-programme-standards/bowel-cancer-screening-programme-standards-valid-for-data-collected-from-1-april-2018#bcsp-s02-uptake [accessed 11/08/2022]
14. PHE/ OHID (2022) Fingertips: Public Health Profiles. Indicator: Persons, 60-74, screened for bowel cancer in last 30 months (2.5% year coverage, %) 2020-2021. Available at: https://fingertips.phe.org.uk/search/bowel%20screening#page/3/gid/1/pat/167/par/E38000127/ati/7/are/A86041/iid/92600/age/280/sex/4/cat/-1/ctp/-1/yrr/1/cid/4/tbm/1 [accessed 01/08/2022]
15. Cancer Research UK (2022) Bowel Cancer Screening – reducing inequalities in bowel cancer screening. Available at: https://www.cancerresearchuk.org/health-professional/screening/bowel-cancer-screening#BCscreening2 [accessed 01/08/2022]
16. Public Health England (2020) *PHE Screening Inequalities Strategy*. Available at: https://www.gov.uk/government/publications/nhs-population-screening-inequalities-strategy/phe-screening-inequalities-strategy [accessed 11/08/2022]
17. North Tyneside Clinical Commissioning Group Business Intelligence (2022) Learning Disabilities Cancer Screening. Available upon request from Public Health Team at North Tyneside Council or the North Tyneside Clinical Commissioning Group. [data reviewed on 11/01/2022].
18. OHID (2022) NHS Screening Programmes in England: 2019 to 2020. Available at: https://www.gov.uk/government/publications/nhs-screening-programmes-annual- report/nhs-screening-programmes-in-england-2019-to-2020 [accessed 15/06/2022]

19. OHID (2022) Population screening: review of interventions to improve participation among underserved groups. Available at: https://www.gov.uk/government/publications/population-screening-improving-participation-in-underserved-groups/population-screening-review-of-interventions-to-improve-participation-among-underserved-groups#contents [accessed 16/06/2022]
20. North East Hub (2022) Conversation with Hannah Gustard - Screening Team Leader, North East Bowel Cancer Screening Programme Hub. [22/07/2022]
21. NHS (2020) NHS Cancer Programme – Cancer Services Recovery Plan. Publications approval reference 001559. Available at: https://www.england.nhs.uk/coronavirus/documents/covid-19-cancer-services-recovery-plan-14-december-2020/ [accessed 02/08/2022]
22. UK National Screening Committee (2020) Adult Screening Programme – Bowel Cancer. Available at: https://view-health-screening-recommendations.service.gov.uk/bowel-cancer/ [accessed 02/08/2022]
23. Von Wagner C, Baio G, Raine R et al (2011) Inequalities in participation in an organized national colorectal cancer screening programme: results from the first 2.6 million invitations in England. *International Journal of Epidemiology*, **40**(3), pp. 712-718. DOI: https://doi.org/10.1093/ije/dyr008
24. Cancer Research UK (2022) Bowel Cancer Screening – barriers in bowel cancer screening participation. Available at: https://www.cancerresearchuk.org/health-professional/screening/bowel-cancer-screening#BCscreening1 [accessed 11/08/2022]
25. Young B, Bedford L, Kendrick D et al. (2017) Factors Influencing the decision to attend screening for cancer in the UK: a meta-ethnography of qualitative research. *Journal of Public Health* **40**(2): 315/339. DOI https://doi.org/10.1093/pubmed/fdx026
26. Cancer Research UK (2022) Bowel cancer Incidence Statistics – bowel cancer incidence trends over time. Available at: https://www.cancerresearchuk.org/health-professional/cancer-statistics/statistics-by-cancer-type/bowel-cancer/incidence#heading-Two [accessed 11/08/2022]

27. PHE/OHID (2022) Fingertips: Public Health Profiles. Indicator Proportion of the population meeting the recommended '5-a-day' on a 'usual day' (adults). Available at: https://fingertips.phe.org.uk/search/5%20a%20day#page/4/gid/1/pat/15/ati/6/are/E12000001/iid/93077/age/164/sex/4/cat/-1/ctp/-1/yrr/1/cid/4/tbm/1 [accessed 12/08/2022]
28. PHE/OHID (2022) Fingertips: Local Alcohol Profiles for England. Indicator: Alcohol-specific mortality. Directly Standardised Rate per 100,00. Available at: https://fingertips.phe.org.uk/profile/local-alcohol-profiles/data#page/4/gid/1938132984/pat/15/par/E92000001/ati/402/are/E08000022/iid/91380/age/1/sex/4/cat/-1/ctp/-1/yrr/1/cid/4/tbm/1/page-options/car-do-0 [accessed 21/06/2022]
29. PHE/OHID (2022) Fingertips: Public Health Profiles. Indicator Obesity: QOF prevalence (18+) proportion %. Available at: https://fingertips.phe.org.uk/search/obesity#page/4/gid/1/pat/167/par/E38000127/ati/204/are/U91110/iid/92588/age/168/sex/4/cat/-1/ctp/-1/yrr/1/cid/4/tbm/1/page-options/tre-ao-1 [accessed 21/06/2022]
30. Cancer Research UK (2022) Bowel Cancer Incidence Statistics – Bowel Cancer Incidence by Age. Available at: https://www.cancerresearchuk.org/health-professional/cancer-statistics/statistics-by-cancer-type/bowel-cancer/incidence#heading-One [accessed 12/08/2022]
31. PHE/OHID (2022) Local Authority Health Profiles – Population age profile – resident population 2019. Available at: https://fingertips.phe.org.uk/profile/health-profiles/data#page/12/gid/1938132695/pat/6/par/E12000001/ati/202/are/E08000022/iid/11001/age/1/sex/4/cat/-1/ctp/-1/yrr/3/cid/4/tbm/1 [accessed 12/08/2022]
32. ONS (2014) 2014-based Sub-National Population Projections, 2014 – 2039. North Tyneside. Available at: https://onsvisual.github.io/dvc334/pyramids/pyramids/index.html [accessed 12/08/2022]

33. OHID (2022) Population screening: review of interventions to improve participation among underserved groups. Available at: https://www.gov.uk/government/publications/population-screening-improving-participation-in-underserved-groups/population-screening-review-of-interventions-to-improve-participation-among-underserved-groups#contents [accessed 16/06/2022]

34. Duffy S, Myles J, Maroni R et al (2017) Rapid review of evaluation of interventions to improve participation in cancer screening services. *Journal of Medical Screening* **24**(3) 127-145 DOI: 10.1177/0969141316664757