Study Title: **A randomised controlled trial comparing current Barrett's oesophagus surveillance endoscopy practice with a dedicated service.**

Short Title: **Dedicated Endoscopy for Barrett's Oesophagus (DEBO) pilot**

Sponsored by:

Northern Care Alliance NHS Foundation Trust

Salford I Oldham I Bury I Rochdale

Study Protocol

Version 3.1
Date 18 November 2021

IRAS ID: 261043

Funder Ref: ERP-2019-11987

Sponsor ID: S20GAS01-S

*Sponsor's representative: Dr Steve Woby, Managing Director of R&I
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SIGNATURE PAGE

The undersigned confirm that the following protocol has been agreed and accepted and that the Chief Investigator agrees to conduct the study in compliance with the approved protocol and will adhere to the principles outlined in the Declaration of Helsinki, the Sponsor's SOPs, and other regulatory requirement.

I agree to ensure that the confidential information contained in this document will not be used for any other purpose other than the evaluation or conduct of the investigation without the prior written consent of the Sponsor

I also confirm that I will make the findings of the study publically available through publication or other dissemination tools without any unnecessary delay and that an honest accurate and transparent account of the study will be given; and that any discrepancies from the study as planned in this protocol will be explained.

For and on behalf of the Study Sponsor:

Signature:

Date: 19/11/2021

Name: Beverley Greenhalgh

Position: Sponsorship Support & Compliance Manager

Chief Investigator:

Signature:

Date: 19/11/2021

Name: Professor Yeng Ang

Contents

1 Study summary

Background

Barrett's oesophagus (BO) is a common pre-malignant condition which is a risk factor for oesophageal adenocarcinoma (OAC) with a progression rate of 0.33% per annum. Surveillance endoscopy programmes have been widely adopted, without strong evidence, in the hope of detecting cases of OAC in the dysplastic or pre-invasion stage. Surveillance is costly both to the health service and to patients due to its invasive nature and psychological burden. Preliminary studies suggest current surveillance practice in the NHS is not meeting standards set out in the British Society of Gastroenterology (BSG) 2013 guideline.

This study aims to assess the efficacy of a dedicated BO surveillance service compared to current standards of practice. This research question was ranked 4th in a recent research priority setting exercise which engaged both research users and healthcare providers.

A randomised prospective pilot study is proposed. Patients with BO will be recruited prior to their surveillance endoscopy and randomly routed to either a dedicated BO endoscopy list or normal service list. Dedicated lists will be conducted by a gastroenterologist or nurse endoscopist with a specialist interest in BO. The control group will be the non-dedicated list which represent a real-world comparison and be undertaken by any JAG accredited endoscopist. For this pilot, measures of trial success will be used to judge it's efficacy to be expanded to a larger trial. The larger trial would then use the following outcome measures: 1) Clinical outcomes, including intestinal metaplasia, dysplasia and OAC detection rates. 2) Key endoscopic performance indicators outlined in the British Society of Gastroenterology (BSG) guidelines. 3) Patient centred outcomes, including Health related quality of life (HRQOL) measurement and patient satisfaction with services.

2 Study Team Roles and Responsibilities

2.1 Contributorship

Study conceived by Prof Yeng Ang and Dr James Britton. Supporting information and writing by Prof Shaheen Hamdy, Prof John McLaughlin and Dr Elizabeth Ratcliffe.

Statistical support will be provided by Paraskevi Taxiarchi and Calvin Heal from the University of Manchester and Prof Andy Vail.

Authors Dr James Britton, Prof Yeng Ang, Dr Elizabeth Ratcliffe, Prof Shaheen Hamdy, Prof John McLaughlin

2.2 Sponsor contact information

Northern Care Alliance NHS Foundation Trust has accepted the responsibilities of Sponsorship for the study. The sponsor's representative is Professor Steve Woby

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2.3 Funding

Medtronic have agreed to fund this study with £33,469 over a two year period. This would be released in instalments according to agreement when the contracts have been completed. The proposed instalments from Medtronic would be £5000 after signing of the contract, £10,000 1 year from contract execution, £15,000 after year 2 and £3,469 at publication of the results.

2.4 Organisational Structure and Responsibilities

Chief Investigator: Professor Yeng Ang

Design and conduct of study
Preparation of protocol and revisions
Recruitment of participants
Reviewing progress of the study and agreeing to changes in the protocol if necessary
Oversight of patient safety by conducting regular meetings with study team
Publication of study reports
Study budget holder
Responsible for data management plan

Principal Investigator: Dr Elizabeth Ratcliffe

Design and conduct of study
Preparation of protocol and revisions
Recruitment of participants
Organising study meetings
Review of participants laboratory results
Reviewing progress of the study and agreeing to changes in the protocol if necessary
Publication of study reports

Sub-investigators: Prof John McLaughlin, Prof Shaheen Hamdy, Dr Neeraj Prasad, Dr Richard Keld

Design and conduct of study
Preparation of protocol and revisions
Recruitment of participants
Reviewing progress of the study and agreeing to changes in the protocol if necessary
Publication of study reports

Study Co-ordinator: Dr Elizabeth Ratcliffe

Design and conduct of study
Preparation of protocol and revisions
Recruitment of participants
Organising study meetings
Review of participants laboratory results
Reviewing progress of the study and agreeing to changes in the protocol if necessary

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4 Background Information and Rationale

The incidence of gastroesophageal reflux disease and Barrett's oesophagus is rising, as a direct precursor to oesophageal adenocarcinoma (OAC) this has huge implications on the population[1]. Currently outcomes for OAC are still extremely poor with a less than 13% five year survival overall for cases after invasion[2]. Though there have been no randomised controlled trials supporting surveillance (awaiting output from the Barrett's Oesophagus Surveillance versus endoscopy at need Study(BOSS) trial[3]), retrospective studies have shown surveillance can increase the number of cases which are discovered at an earlier stage where other modalities of treatment can be utilised. This has led to the development of BO surveillance guidelines in both Europe[4,5] and the US [6,7]. The efficacy of endoscopic therapy for dysplasia and early OAC is now well established with increasingly durable long-term data [8]. One major difficulty with BO is identifying those at risk of disease progression. Considering current research into individual risk stratification is likely to take years to reach routine clinical use surveillance endoscopy remains best practice for detecting changes. A number of studies have focused their efforts on advanced endoscopic modalities to detect dysplasia more readily, with mixed results. One major issue with these techniques is the transferability out of tertiary centres and the additional training or equipment required[9]. In the meantime, we have limited knowledge of current surveillance practices across the UK.

Firstly, a prior literature review of HRQOL in BO and an exploratory qualitative study, have highlighted key areas of BO disease impact[11,12]. The latter also found a significant discrepancy between patient follow up experiences and engagement of professionals to address it. In particular patients sought enhanced communication, structure and continuity of

care. They clearly valued interaction with a specialist and the concept of direct access to a dedicated service in-between endoscopy was reassuring to them.

Secondly, a single centre cohort study demonstrated that a dedicated list adhered more closely to the BSG guidelines when compared to current and past non-dedicated endoscopies respectively[13]; Prague classification (100% vs 87.3% vs 82.5%, p<0.0001), hiatus hernia delineation (100% vs 64.8% vs 63.3%, p<0.0001), location and number of biopsies recorded (99.5% vs 5.6% vs 6.9%, p<0.0001), Seattle protocol adherence (72% vs 42% vs 50%, p<0.0001) and surveillance interval adherence (dedicated 100% vs prior endoscopy 75%, p<0.0001).

These preliminary qualitative and quantitative studies suggest the post-BSG guideline era of BO surveillance remains suboptimal in terms of patient needs and current best practice metrics. A dedicated service could be a means to improve the accuracy and consistency of surveillance care, although it remains unclear whether such a service can consistently improve clinical and patient centred outcomes. Although other studies from single centre audits show promise, we believe a randomised blinded study will provide the most robust evidence. This approach will eliminate bias in assignment and generate prospective data for robust analysis. We acknowledge this will carry challenges in design and implementation therefore we propose a pilot study to test whether a randomised prospective, multicentre study is feasible.

5 Aims of the proposed research

Primary Objective:

- To assess the feasibility of a randomised controlled trial comparing a dedicated endoscopy service for Barrett's surveillance verses current normal practice
- To assess the feasibility of collecting data for the below:
- Adherence to best practice guidelines for Barrett's oesophagus surveillance and upper GI endoscopy.
- Clinical outcome measures, including dysplasia and OAC diagnosis rates.
- Patient centred outcome measures, including satisfaction with services and health related quality of life.

6 Study Design

Design: A prospective, pilot randomised controlled trial.

Setting: This study will be conducted solely within the UK NHS and is designed to reflect and compare against real world practice. The Initial site to open will be Northern Care Alliance NHS Foundation Trust (NCAFT) as they have an established dedicated service which will allow ease of study initiation. Once this is established we can possibly open Wrightington Wigan and Leigh NHS trust as there is a full time clinical research fellow running a dedicated service there. This will be part of the pilot as it will allow us to test the feasibility of running the study in more than one site.
Methodology and Recruitment;

Each site will have a dedicated Barrett's endoscopy list which we expect to be run by a research fellow, consultant or nurse endoscopist with a special interest in BO. This is defined by a self-declared interest and regular experience of performing surveillance. The list should be scheduled appropriately and include only Barrett's patients. The non-dedicated lists any other list performed by an endoscopist who is accredited by the Joint Advisory group to perform upper GI endoscopy who does not have a specialist interest in Barrett's and does not

attend upper GI multidisciplinary meetings. All endoscopists must be accredited in diagnostic gastroscopy by the Joint Advisory Group (JAG). Both study arms will be expected to use high definition white light endoscopy as outlined in the BSG guidelines. Use of further imaging modalities, such as narrow band imaging, will be at the discretion of the endoscopist on a case by case basis, this is in line with their current usual care outside of the research study.

Participants will be identified from hospital booking databases and invited to participate around 6-8 weeks prior to their planned surveillance endoscopy. If they would like to be involved in the study they may be invited to attend a meeting or receive a telephone call with one of the study team, to discuss any concerns and then be recruited with either written consent or may be asked to complete consent over the telephone, for example in situations where to protect the safety of the participant and staff, it is not appropriate to bring the participant into a clinical setting for the consent process (e.g during the COVID-19 pandemic).

The participants will be randomly allocated either to the dedicated service or to any other endoscopy list performed by a JAG accredited upper GI endoscopist (current normal care). The endoscopists will all be blinded to the participant's involvement in the study. The randomisation will be performed by the clinical trials assistant and the appointments made on an appropriate list by the endoscopy booking team. The participants will not be informed of which list they are allocated and they will receive an appointment as per their usual surveillance. The justification for blinding the participants is that this will avoid bias in their completion of the post-endoscopy questionnaire. Blinding the endoscopists aims to avoid a trial effect eg. a change in practice such as better adherence to the guidelines. This will be achievable as both study sites have a dedicated service established, the study will not significantly alter from normal care as Barrett's surveillance cases often are routed to different lists due to availability and timing.

Following the endoscopy, all participants will be asked to complete a Health related quality of life (HRQOL) questionnaire around the time of their surveillance test, this is not part of their routine care and is for the research study only.

Key endoscopic performance data and clinical data will be collected prospectively;

Key endoscopic performance data

- BSG endoscopic reporting dataset for BO surveillance
- Hiatus hernia delineation (cm between diaphragmatic pinch and top of gastric folds)
- Prague classification (CnMn)
- Visible island description (size and distance from incisors)
- Visible lesion description (Paris classification)
- Seattle protocol biopsies (number and distance from incisors)
- Other performance data
- Oesophageal withdrawal time
- Comfort scores
- Sedation rates
- Intestinal metaplasia, dysplasia and OAC at histology

Clinical Data

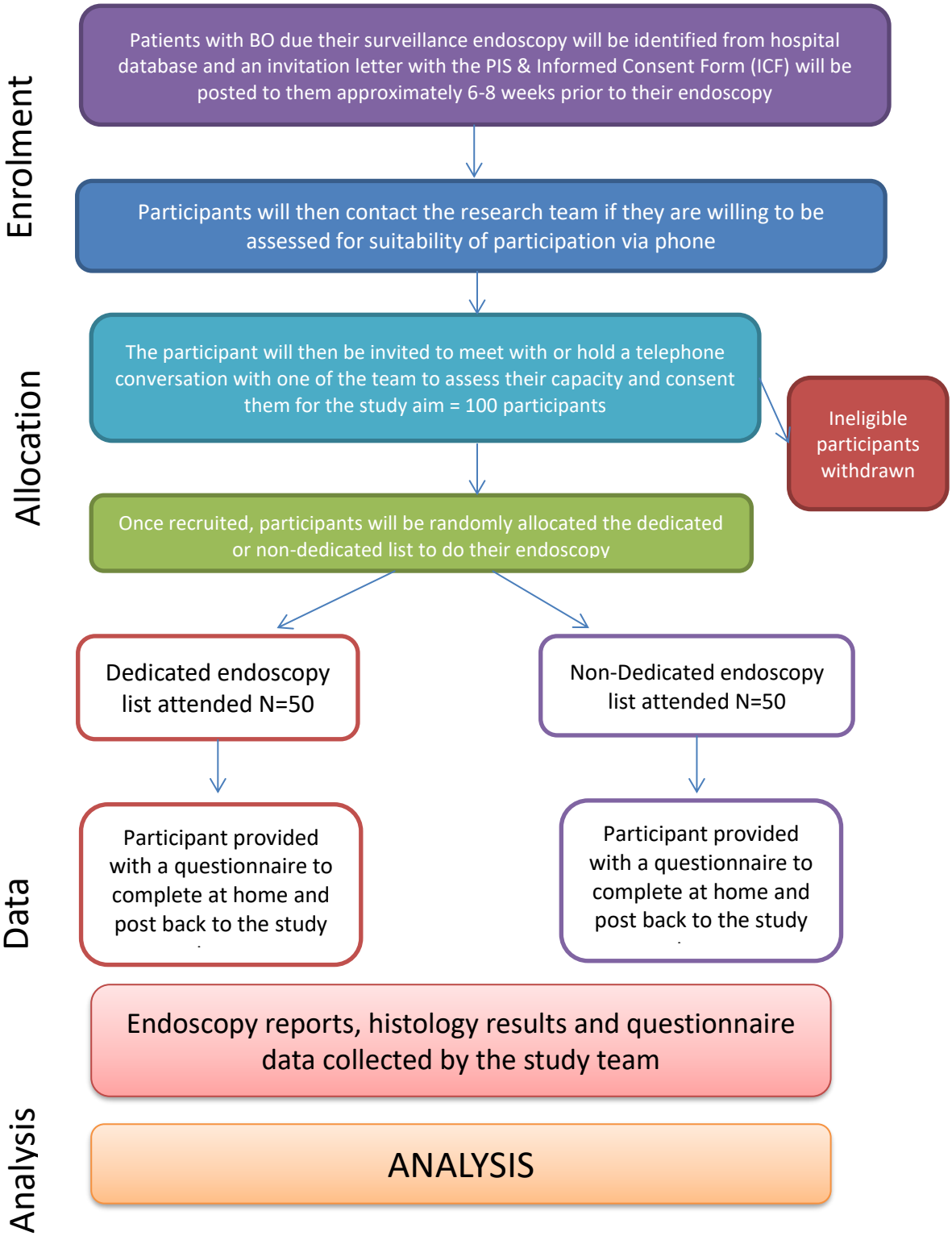
- Participant demographics including potential confounding factors such as co-morbidities, smoking status, BMI and family history of OAC.
- Seattle protocol adherence (histology reported biopsy numbers)
- Surveillance interval adherence
- Histology results (intestinal metaplasia, dysplasia and OAC)
- Discharges from surveillance

HRQOL measurement

As there is no validated patient reported outcome measure for Barrett's oesophagus we plan to use a number of measures based on our prior literature review and qualitative research. These will likely include a generic QOL measurement tool (e.g. the Short Form 36), worry of cancer assessment (cancer worry scale), a symptom measure (e.g. gastrointestinal symptom rating scale) and assessment of psychological burden (e.g. Hospital anxiety and depression scale).
Statistical analysis

As this is a pilot study descriptive statistics will be used to analyse measures of study success. These will include aspects like recruitment rates, retention of participants, ease of randomisation, drop-out rates and data completion. The study size will be 100 participants for a pilot study based on previously recorded optimum study sizes for feasibility/pilot studies.

6.1 Flow Diagram



7 Detailed Plan of Investigation

7.1 Recruitment procedure

Participants who are due to be attending for their scheduled Barrett's surveillance will be identified from a local database by the chief investigator, principle investigator, research fellow or research nurses as part of the clinical care team. Potential participants will be contacted with an invitation letter alongside a participant information sheet and informed consent form by post inviting them to participate in the study. If a participant contacts the study team interested in participating they may be invited to meet one of the study team in person to go through the written consent and check their capacity to be in the study, this will be a stand-alone meeting separate from their usual care as they would not usually be seen in clinic prior to their surveillance test. Or in some circumstances the participant may be asked to complete consent over the telephone. For example, in situations where to protect the safety of the participant and staff, it is not appropriate to bring the participant into a clinical setting for the consent process (e.g. during the COVID-19 pandemic). They will be randomly routed to a dedicated or non-dedicated endoscopy list for their surveillance and will not be informed of which they will be attending. The participants will be consented for the fact that they will not know which arm they are attending and the reasoning behind this.

7.2 Study protocol

7.2.1.1 Inclusion/Exclusion Criteria

Eligibility for inclusion/exclusion will be decided by the consenting clinician.

Inclusion Criteria:

- Must have capacity to give informed consent
- >18 years old. No upper age limit.
- Meet the diagnostic criteria for Barrett's Oesophagus without dysplasia prior to this endoscopy:
    - *Non-Dysplastic Barrett's Oesophagus*. All patients enrolled in surveillance who have been given a diagnosis of BO irrespective of current histology (lack of intestinal metaplasia on latest biopsies is not a criterion for exclusion providing future surveillance is indicated/recommended)

Exclusion Criteria:

- Lacks capacity to give informed consent
- Less than 18 years old

7.3 Study duration

	Year 1				Year 2			
Activities	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Phase 1 – opening initial site at NCAFT								
Phase 2 – opening WWL, recruitment and randomisation of participants								
Phase 3 – Data cleaning and analysis								
Phase 4 – Final data reporting and dissemination								

Monitoring 1 – Site visits	*	*	*	*	*		*	
Monitoring 2 – teleconferencing with study sites		*	*	*	*	*	*	*

7.5 Consent procedure

Participants will be approached via letter of invitation or telephone call. They will be sent a Participant information sheet (PIS) and Informed Consent Form (ICF) and then if interested in participating they can contact the study team or will have a follow up phone call to see if they are interested. If they would like to be involved they may either be invited to meet or have a telephone call with one of the study team to be allowed to ask questions, go through the consent procedure and be informed of their right to withdraw at any stage. This meeting/telephone call will be separate from their normal care as they would not usually be seen prior to their surveillance test in clinic. If consent is via telephone, the researcher will use a telephone script/consent form to ensure the process is documented appropriately. The contact will include a clear verbal explanation of the study (e.g. by talking through the PIS and ll the sections of the ICF. Only when the potential participant has had the opportunity to ask questions and had these answered satisfactorily, will he/she be asked to verbally confirm consent to participate. The telephone consent will be documented by the researcher/consent taker.

They will be informed that they will be randomised to normal practice or a dedicated service endoscopy and given a questionnaire about their care before and afterwards. They will be made aware that they will not be told which list they are attending and that so far there is no evidence of either being superior to avoid any concerns. They will be made aware of the distribution plan and that their data will be anonymised and safely stored and that they can be informed of the outcome of the study. They will be informed that at any stage if they wish to withdraw from the study this will have no effect on their ongoing NHS care.

7.6 Outcome measurement

This pilot study aims to test the feasibility of running a full scale RCT. Therefore, our outcome measures will be the test of study success such as recruitment and retention rates, ease of data collection and troubleshooting of issues.

7.8 Withdrawal criteria

Participants will be allowed to withdraw from the study at any point and it will be made clear in the participant information sheet that this will not affect their routine care in any way. We will not collect any further data from this participant however we will use data available during their time in the study for the final study analysis. If it is in the participant's best interest the clinician in charge of the study may also choose to withdraw the participant.

8 Regulatory and Ethical Considerations

8.1 Study conduct

- The study will be conducted in accordance with the UK Policy Framework for Health and Social Care Research and other applicable guidance.
- The study will not commence until all regulatory approvals are in place, which will include HRA Approval, REC Approval and confirmation from local R&D that the Trust has capacity and capability to carry out the research.

8.2 Monitoring and audit

- The study will be subject to the standard procedures for monitoring and auditing of studies by the sponsor.
- Any changes to the protocol will be agreed with the sponsor prior to submission to NHS research ethics committee for review with the exception of where urgent safety measures apply.
- All staff working in the study will have completed appropriate training to undertake the duties delegated to them by the Principal investigator such an ICH-GCP.

8.3 Protocol deviations

- Any deviations to the protocol will be reported to the sponsor within 24 hours of the occurrence to allow an impact assessment to be completed.
- Consideration will be given to the nature of the deviation, its causes and the potential impact on the study.
- Where necessary, a deviation from the protocol may lead to an amendment to the protocol

8.4 Study progress reports

The PI and research team will submit progress reports to the Sponsor as requested and prior to submission to NHS REC, in accordance with the terms and condition of the study approval.

8.5 Stopping rules

It is not anticipated that the study will be stopped prior to its intended end-date. However, the study will be halted if:

- New information comes to light which means that the aims of the study are futile.
- Safety issues come to light regarding the intervention.
- Resources to conduct the study are no longer available.

9 Record Keeping and Data Management

All eligible patients approached to participate in this study will be recorded on a screening log. This log will be maintained and only accessible by the trial team. All study data collected from participants will be transferred and recorded onto a database. Each participant will be allocated a unique study identification code, after which all patient identifiable information (e.g. names, DOB, addresses, NHS number) will be removed, stored separately and only accessible by the trial team. This will allow data inputting and analysis to be conducted on a fully anonymised dataset.

All electronic datasets will be password protected and stored on NHS hospital computers. Anonymised data may be transferred beyond the hospital site via NHS email accounts or via an encrypted USB memory device to facilitate data inputting and analysis.

All hard copies of participant data, for example questionnaires and consent forms, will be stored by the trial team and archived after completion of the trial. A further copy of the signed consent form will be placed within the participants medical records (electronic or paper records)

10 Statistical Analyses and Data Handling

For the pilot study we will be collecting data on study success, this will include aspects such as recruitment rates, retention rates and participant demographics. We will also be checking the ease of collection of the data which we intend to use in the full study, looking at clinical and patient reported data. For this we have used measurements which are clearly defined including dysplasia detection rates and from the British Society of Gastroenterologist's reporting dataset for Barrett's surveillance key performance indicators which are measured in all upper gastrointestinal endoscopy. For the questionnaires there is no validated patient reported outcome measure for Barrett's oesophagus. We plan to use a number of measures based on our prior literature review and qualitative research. These will likely include a generic QOL measurement tool (e.g. the Short Form 36), worry of cancer assessment (cancer worry scale), a symptom measure (e.g. gastrointestinal symptom rating scale) and assessment of psychological burden (e.g. Hospital anxiety and depression scale).

In order to facilitate the shared use of the data set we will use standardised units of measurement, common terminology and for the health related quality of life data, all participating hospitals will have access to the validated questionnaires that we will be using to understand the data source. All abbreviations will be clarified at least once on each document shared between research groups. Site visits will also be undertaken when recruiting and during the data collection period to ensure all parties have clarity over the data set and how it is used. All aspects of the data set will be clarified in a formal document providing minimum information and describing each data column which will be circulated to researchers. All participating hospitals will use the same standardised spreadsheet and clinical report form with anonymized data which can then be used together for final data analysis.

Statistical analysis plan has been outlined above; this will be facilitated with the use of a statistician on a fully anonymised data set.

11 Dissemination of Results and Publication Policy

The findings of this research will be disseminated via publication and conference presentation. I expect 1 publication in a suitable journal such as GUT, Endoscopy or The Lancet Gastroenterology and Hepatology. If the findings of the study are satisfactory we would seek to pursue an NIHR grant to do a full scale study to test the dedicated BO service.
The study and results may be promoted and publicised more widely via the 'Take Part' section of the Sponsor Trust's Research & Innovation website

12 References

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13. Appendix 1 – Clinician behaviours and attitudes sub-study

Clinicians behaviours and Barrett's oesophagus surveillance

Background

Further to this study we want to explore the role the clinician plays in completion of BO surveillance. Studies have shown despite the BSG BO surveillance guidelines there is still a lack of adherence to the surveillance protocols(1). Clinicians routinely under-sample particularly when Barrett's segments are longer(2) and adherence to guidelines is mixed (3,4) A survey (5) of attitudes and practice of Barrett's surveillance in UK gastroenterology clinicians was performed prior to the most recent BSG guidelines by the research group for the AspECT trial (a large multicentre study exploring the role of aspirin and esomeprazole as chemoprevention of OAC(6)). The research team sent surveys to 401 with 228 responses, of which 57 were from centres engaged in the AspECT study. They found 90% of responders would perform inadequate biopsy numbers, most would refer HGD to surgery and 92% stated their lack of adherence to guidelines was due to the poor quality of evidence backing up guidelines at that time. Another survey, this of French gastroenterologists' surveillance practice, was published in 2007(7). They surveyed 246 clinicians in the Rhones-Alpes area with a response rate of 81.3%. Their data showed practice of biopsy protocol in line with the Seattle protocol was reported by 58%, and their management of LGD was at the time consistent with their guidelines. In terms of expertise, they found younger gastroenterologists and those working in university hospitals were more likely to follow guidelines.

Successful behavioural interventions are those that are underpinned by psychological theory (8). Behaviour change theory is a key requirement in trying to understand a behaviour within its context, understand why behaviours are as they are and what needs to be modified for the desired change to occur in a particular behaviour (9).

Behaviour change theory proposes change at three levels: population level (government), community level (organisations) and individual level (clinician) (National Institute for Health and Clinical Excellence, 2007). This study is focussed on change at the individual level. As demonstrated from the studies described above there is a significant proportion of incomplete adherence to the guidelines for Barrett's surveillance particularly adherence to biopsy protocols. In this study we seek to identify clinician attitudes to Barrett's surveillance practice to seek targets for individual behaviour change in this field.

Existing psychological models/theories only explain some aspects of behaviour change. Michie et al suggest that a comprehensive and better structured model or framework is necessary to (i) understand the behaviour and (ii) specifically identify what changes are required to take place. The Capability Opportunity Motivation Behaviour change (COM-B) model and the Theoretical Domains Framework (TDF) appear to offer a clearer structure in understanding the behaviour and the specific the aspects requiring change(10). The framework consists of a 14-point framework addressing aspects of behaviour such as motivation, emotion, knowledge, optimism and memory.

This framework has been used in prior studies to look at healthcare interventions such as adenoma detection in lower GI endoscopy(11) and the use of chemoprevention in Breast cancer(12). Using this framework as a guide, we will undertake semi-structured interviews of endoscopists who perform Barrett's surveillance to look at what factors influence the performance of BO surveillance. The themes drawn from this will be used to create a quantitative survey to gather the wider experience from more endoscopists.

Aims
The overall aim of this study is to identify and explore clinician factors influencing the delivery of BO surveillance

Objectives
To:
1. identify clinicians' attitudes and thoughts regarding Barrett's surveillance
2.Identify barriers from the clinician perspective to adherence to Barrett's surveillance guidelines
3. Identify positive reinforcing behaviours in those who adhere to Guidelines.

Ethical approval
A substantial amendment for this addition has been requested from the ethics committee.

Methods
Design
A sequential mixed methods study (13) using (i) semi-structured interviews, underpinned by the TDF, to explore clinician factors involved in the delivery of Barrett's surveillance and (ii) a cross sectional
Survey, based on the findings of study 1, of endoscopy units in the UK.

Setting
This study will be undertaken on a secure teleconferencing software remotely within the UK of endoscopists who work in the NHS and on an online anonymised survey platform.

Sample and sample size
We aim to identify clinicians involved in Barrett's surveillance, gastroenterologists, surgeons and nurse endoscopists. We expect to need 10-20 interviews however interim analysis of the interviews will look for data saturation as detailed below.

Data collection
An interview schedule will be based on the TDF framework

Purposeful sampling will be used to recruit endoscopists of different disciplines e.g. Nurse endoscopist, gastroenterologists and surgeons. They will be interviewed via a secure teleconferencing platform and recordings with consent will be obtained anonymised and transcribed via a transcription service. The transcripts will be reviewed and coded for key domains as per the theoretical domains framework by two of the study team, a research fellow and Prof Maria Horne. This will be analysed, and key factors will be taken forward to design a survey to be more widely used to explore the influence of these factors on BO surveillance performance. This will be distributed on an anonymised online survey software and analysed thereafter.

Recruitment procedure
Qualitative
Purposive sampling(14) will be used to recruit a range of endoscopists, of differing backgrounds, experience, demographics and experience Recruitment will continue until data saturation has occurred (15) However, the standard number required for an observational study per group is 10 (16)) but interviews will be stopped when thematic saturation has been reached. Participants will be invited though regional networks and advertisement via social media and only participants who have had no prior connection to the study team will be interviewed to avoid bias.

Quantitative
The quantitative survey will be developed based on phase 1 study findings. The survey distributed via email and advertised through specialist groups e.g. BSG, Dukes club/surgical

speciality networks and nursing groups e.g. Gastrointestinal nursing. Consent for their data to be used will be implied by completion of the anonymous survey.

Inclusion criteria/exclusion criteria
Qualitative
Inclusion
- For the qualitative study - endoscopists working in the NHS who have had no connection to the study team
- Must have capacity to provide informed consent

Exclusion criteria
- Clinicians who have a connection to the research team or knowledge of them.

Quantitative
Inclusion
- any UK NHS endoscopists who perform or has had experience of undertaking Barrett's surveillance - this will be decided by the initial question on the survey and anyone who answers "no" will end the survey.

Consent procedure

Participants will be contacted by a postal letter or email with invitation containing a participant information sheet and will be invited to contact the study team if interested. Potential participants will then be contacted via telephone, informed of the study process (that they will have a video conversation with the study team and audio recording will be taken and anonymised). provided with the opportunity to ask any further study questions and provided with a consent form to post back to the study team should they wish to participate. Participants will be informed that they can withdraw consent to participate at any time during the process.

Outcome measurement

This is an observational study; hence measures will be descriptive and will be performed by reviewing the transcripts by two of the study researchers. A coding protocol will be agreed prior to the study, once the interviews have been performed and transcribed the two researchers will separately review the transcript and code it according to the agreed protocol in line with the theoretical domains framework. Key themes/factors will be coded for and quotations will be reviewed, and a conceptual model of the key themes or factors will be created. Thereafter this will be used to create a survey questionnaire to get an assessment of the wider experience of these factors in an anonymised electronic survey.

Withdrawal criteria

Participants will be allowed to withdraw from the study at any point and it will be made clear in the participant information sheet. We will not collect any further data from this participant however we will use data available during their time in the study for the final study analysis

Record keeping and data management

All participants approached will be recorded on a screening log, this will be maintained in a secure setting by the study team and accessible only by them. Data collected will be stored and linked to a unique study log number and kept on password protected NHS computers. The recordings will be fully anonymised prior to transfer to the transcription software and all survey data will be collected anonymously at the point of collection.

Data analysis
Qualitative

Audio recordings will be transcribed, these will be reviewed by two researchers against a coding strategy devised prior to the interviews and reviewed alongside field notes collected during the interviews. NVivo will be used for data storage and retrieval. This will allow for structured descriptive analysis of the themes which present from the interviews and look for key factors in the provision of BO surveillance.

Quantitative
Statistical analysis

For the quantitative survey, descriptive statistics will be performed to look for means, medians, normal distribution curves and standard deviations. Trends in the data will be tested for significance with multiple regression analysis.

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