Welcome to the Integrated Research Application System

IRAS Project Filter

The integrated dataset required for your project will be created from the answers you give to the following questions. The system will generate only those questions and sections which (a) apply to your study type and (b) are required by the bodies reviewing your study. Please ensure you answer all the questions before proceeding with your applications.

Please complete the questions in order. If you change the response to a question, please select 'Save' and review all the questions as your change may have affected subsequent questions.

Please enter a short title for this project (maximum 70 characters)
Use of DRS probe and tracking for in-vivo application

1. Is your project research?

(●) Yes ( ) No

2. Select one category from the list below:

( ) Clinical trial of an investigational medicinal product

(●) Clinical investigation or other study of a medical device

( ) Combined trial of an investigational medicinal product and an investigational medical device

( ) Other clinical trial to study a novel intervention or randomised clinical trial to compare interventions in clinical practice

( ) Basic science study involving procedures with human participants

( ) Study administering questionnaires/interviews for quantitative analysis, or using mixed quantitative/qualitative methodology

( ) Study involving qualitative methods only

( ) Study limited to working with human tissue samples (or other human biological samples) and data (specific project only)

( ) Study limited to working with data (specific project only)

( ) Research tissue bank

( ) Research database

If your work does not fit any of these categories, select the option below:

( ) Other study

2a. Is the study sponsored or funded by a device manufacturer or other commercial company?

( ) Yes (●) No

Please select one of the following:

( ) Clinical study of a non-UKCA/CE UKNI/CE marked device where commercialisation of the product is intended

(●) Clinical study of a non-UKCA/CE UKNI/CE marked device for use within the institution, where commercialisation is not intended

( ) Clinical study of one or more UKCA/CE UKNI/CE marked devices for an off-label indication

( ) Clinical study of one or more UKCA/CE UKNI/CE marked devices for a labelled indication, involving a change to

standard care or randomisation between groups

○ Clinical study of one or more UKCA/CE UKNI/CE marked devices for a labelled indication, involving *no* change to standard care or randomisation between groups

○ Pre-clinical device development or performance testing

2b. Please answer the following question(s):

a) Does the study involve the use of any ionising radiation? ○ Yes ◉ No

b) Will you be taking new human tissue samples (or other human biological samples)? ○ Yes ◉ No

c) Will you be using existing human tissue samples (or other human biological samples)? ○ Yes ◉ No

3. In which countries of the UK will the research sites be located? *(Tick all that apply)*

☑ England
☐ Scotland
☐ Wales
☐ Northern Ireland

3a. In which country of the UK will the lead NHS R&D office be located:

◉ England
○ Scotland
○ Wales
○ Northern Ireland
○ This study does not involve the NHS

4. Which applications do you require?

☑ IRAS Form
☐ Medicines and Healthcare products Regulatory Agency (MHRA) Devices Division
☐ Confidentiality Advisory Group (CAG)
☐ Her Majesty's Prison and Probation Service (HMPPS)

5. Will any research sites in this study be NHS organisations?

◉ Yes ○ No

5a. Are all the research costs and infrastructure costs (funding for the support and facilities needed to carry out the research e.g. NHS support costs) for this study provided by a NIHR Biomedical Research Centre (BRC), NIHR Applied Research Collaboration (ARC), NIHR Patient Safety Translational Research Centre (PSTRC), or an NIHR Medtech and In Vitro Diagnostic Co-operative (MIC) in all study sites?

Please see information button for further details.

◉ Yes ○ No

Please see information button for further details.

6. Do you plan to include any participants who are children?

○ Yes ◉ No

7. Do you plan at any stage of the project to undertake intrusive research involving adults lacking capacity to consent for themselves?

○ Yes ◉ No

Answer Yes if you plan to recruit living participants aged 16 or over who lack capacity, or to retain them in the study following loss of capacity. Intrusive research means any research with the living requiring consent in law. This includes use of identifiable tissue samples or personal information, except where application is being made to the Confidentiality Advisory Group to set aside the common law duty of confidentiality in England and Wales. Please consult the guidance notes for further information on the legal frameworks for research involving adults lacking capacity in the UK.

8. Do you plan to include any participants who are prisoners or young offenders in the custody of HM Prison Service or who are offenders supervised by the probation service in England or Wales?

○ Yes ◉ No

9. Is the study or any part of it being undertaken as an educational project?

◉ Yes ○ No

Please describe briefly the involvement of the student(s):
The study is being undertaken as part of a PhD project at Imperial College London. The student will be actively involved in the project and be present at surgery for acquisition of data.

9a. Is the project being undertaken in part fulfilment of a PhD or other doctorate?

○ Yes ◉ No

10. Will this research be financially supported by the United States Department of Health and Human Services or any of its divisions, agencies or programs?

○ Yes ◉ No

11. Will identifiable patient data be accessed outside the care team without prior consent at any stage of the project (including identification of potential participants)?

○ Yes ◉ No

Integrated Research Application System
Application Form for Medical Device Study

The student should complete this form on behalf of the Chief Investigator. Guidance on the questions is available wherever you see this symbol displayed. We recommend reading the guidance first. The complete guidance and a glossary are available by selecting Help.

Please define any terms or acronyms that might not be familar to lay reviewers of the application.

Short title and version number: (maximum 70 characters - this will be inserted as header on all forms)
Use of DRS probe and tracking for in-vivo application

PART A: Core study information

1. ADMINISTRATIVE DETAILS

A1. Full title of the research:

Using a diffuse reflectance spectroscopy probe in-vivo to identify tumour and non-tumour tissue in the gastrointestinal tract to aid margin assessment

A2-1. Educational projects

Name and contact details of student(s):

Student 1

Title Forename/Initials Surname

[TITLE] [FORENAME] [SURNAME]

Address	Hamlyn Centre for Robotic Surgery Imperial College London Exhibition Road, Bessemer Building
Post Code	SW7 2AZ
E-mail	[EMAIL]
Telephone	[TELEPHONE NUMBER]
Fax	[FAX NUMBER]

Give details of the educational course or degree for which this research is being undertaken:

Name and level of course/ degree:
Clinical medicine research (department of surgery and cancer) - full time
PhD degree

Name of educational establishment:
Imperial College London

Student 2

Title Forename/Initials Surname

[TITLE] [FORENAME] [SURNAME]

Address	Room 1049, 10th Floor QEQM building St Mary's Hospital Praed Street

	London
Post Code	W2 1NY
E-mail	[EMAIL]
Telephone	[TELEPHONE NUMBER]
Fax	[FAX NUMBER]

Give details of the educational course or degree for which this research is being undertaken:

Name and level of course/ degree:
PhD degree - department of surgery and cancer - full time

Name of educational establishment:
Imperial College London

Name and contact details of academic supervisor(s):

Academic supervisor 1

Title, Forename/Initials Surname	
	[TITLE] [FORENAME] [SURNAME]
Address	Hamlyn Centre for Robotic Surgery Imperial College London Exhibition Road, Bessemer Building
Post Code	SW7 2AZ
E-mail	[EMAIL]
Telephone	[TELEPHONE NUMBER]
Fax	[FAX NUMBER]

Academic supervisor 2

Title Forename/Initials Surname	
	[TITLE] [FORENAME] [SURNAME]
Address	QEQM building St Mary's Hospital Praed Street London
Post Code	W2 1NY
E-mail	[EMAIL]
Telephone	[TELEPHONE NUMBER]
Fax	[FAX NUMBER]

Please state which academic supervisor(s) has responsibility for which student(s):
Please click"Save now"beforecompletingthistable.Thiswillensurethatallofthestudent and academic supervisor details are shown correctly.

Student(s)		**Academic supervisor(s)**
Student 1	[TITLE] [FORENAME] [SURNAME]	☑ [TITLE] [FORENAME] [SURNAME] ☑ [TITLE] [FORENAME] [SURNAME]
Student 2	[TITLE] [FORENAME] [SURNAME]	☑ [TITLE] [FORENAME] [SURNAME] ☑ [TITLE] [FORENAME] [SURNAME]

A copy of a current CV for the student and the academic supervisor (maximum 2 pages of A4) must be submitted with the application.

A2-2.Who will act as Chief Investigator for this study?

- ○ Student
- ◉ Academic supervisor
- ○ Other

A3-1. Chief Investigator:

Title Forename/Initials Surname	[TITLE] [FORENAME] [SURNAME]
Post	
Qualifications	
ORCID ID	
Employer	Imperial College London
Work Address	10th Floor QEQM building St Mary's Hospital Praed Street
Post Code	W2 1NY
Work E-mail	[EMAIL]
* Personal E-mail	
Work Telephone	[TELEPHONE NUMBER]
* Personal Telephone/Mobile	
Fax	[FAX NUMBER]

** This information is optional. It will not be placed in the public domain or disclosed to any other third party without prior consent.*
A copy of a current CV (maximum 2 pages of A4) for the Chief Investigator must be submitted with the application.

A4. Who is the contact on behalf of the sponsor for all correspondence relating to applications for this project?
This contact will receive copies of all correspondence from REC and HRA/R&D reviewers that is sent to the CI.

Title Forename/Initials Surname	[TITLE] [FORENAME] [SURNAME]
Address	Imperial College London and Imperial College Healthcare NHS Trust Room 221 | Level 2 | Medical School Building | Norfolk Place London
Post Code	W2 1PG
E-mail	[EMAIL]
Telephone	[TELEPHONE NUMBER]
Fax	[FAX NUMBER]

A5-1. Research reference numbers. *Please give any relevant references for your study:*

Applicant's/organisation's own reference number, e.g. R & D (if available):	21SM7016
Sponsor's/protocol number:	21SM7016

Protocol Version: 1.2
Protocol Date: 14/07/2021
Funder's reference number (enter the reference number or state not applicable):
Project website: n/a

Registry reference number(s):
TheUK Policy Framework forHealth and Social Care Research sets out the principle of making information about research publicly available. Furthermore: Article 19 of the World Medical Association Declaration of Helsinki adopted in 2008 states that "every clinical trial must be registered on a publicly accessible database before recruitment of the first subject"; and the International Committee of Medical Journal Editors (ICMJE) will consider a clinical trial for publication only if it has been registered in an appropriate registry. Please see guidance for more information.

International Standard Randomised Controlled Trial Number (ISRCTN):
ClinicalTrials.gov Identifier (NCT number):

Additional reference number(s):

Ref.Number Description	Reference Number

A5-2.Is this application linked to a previous study or another current application?

(●) Yes ( ) No

Please give brief details and reference numbers.
Previous study of ex-vivo samples - REC reference: 08/H0719/37

2. OVERVIEW OF THE RESEARCH

To provide all the information required by review bodies and research information systems, we ask a number of specific questions. This section invites you to give an overview using language comprehensible to lay reviewers and members of the public. Please read the guidance notes for advice on this section.

A6-1. Summary of the study. *Please provide a brief summary of the research (maximum 300 words) using language easily understood by lay reviewers and members of the public. Where the research is reviewed by a REC within the UK Health Departments' Research Ethics Service, this summary will be published on the Health Research Authority (HRA) website following the ethical review. Please refer to the question specific guidance for this question.*

Cancers of the gastrointestinal (GI) tract remain a major contributor to the global cancer risk, with approximately 2.8million cases of colorectal and stomach cancer worldwide. These malignancies continue to pose a major threat to public health. The aim of surgery is for complete resection of tumour with clear margins, whilst preserving as much surrounding tissue as possible. A positive circumferential resection margin (CRM) is associated with local recurrence of the tumour and poorer long-term survival, so it is paramount to establish tissue margins accurately.

Diffuse reflectance spectroscopy (DRS) is a technique that allows discrimination of normal and abnormal tissue and presents a promising advancement in cancer diagnosis. Light emitted using a DRS probe is absorbed and scattered by different structures within tissue and emitted back onto the probe. The wavelength and intensity of this collected light is specific to each tissue type, and in this way, different tissue can be distinguished based on spectral data.

We have developed an optical tracking system to overcome single-point spectral measurements, for use intra-operatively to aid margin assessment. This system is able to process thousands of spectra in a small timeframe, which can be used in real-time to distinguish tumour and non-tumour tissue.

A benchtop ex vivo study on upper GI specimens has successfully tested these approaches.

Participants undergoing elective GI cancer surgery at Imperial NHS trust will be recruited by the clinical care team through clinic. Patients willing to take part in the study will be consented. The study involves a probe emitting harmless visible light being used on the organ that will be removed during the operation just before it is resected. This should

not interfere with the operation being carried out and will take 5-15mins in total.

The study is funded by Cancer research UK.

A6-2. Summary of main issues. *Please summarise the main ethical, legal, or management issues arising from your study and say how you have addressed them.*

Not all studies raise significant issues. Some studies may have straightforward ethical or other issues that can be identified and managed routinely. Others may present significant issues requiring further consideration by a REC, R&D office or other review body (as appropriate to the issue). Studies that present a minimal risk to participants may raise complex organisational or legal issues. You should try to consider all the types of issues that the different reviewers may need to consider.

A spectroscopic probe is a sensor designed to illuminate and gather light directly from the tissue while touching it. The probe contains optical fibres, some which illuminate the surface of the tissue with harmless visible (white) light, and others that collects the light that has been reflected from inside the tissue. The reflected light is collected by fibre optics (light conduits) and routed towards an instrument that separates the white light into thousands of colours. As we track the position of the probe, we can create spectroscopic images with richer colour information, allowing surgeons to differentiate between different types of tissue, such as normal or cancerous regions.

The spectroscopic probe, either sterilised or covered with a sterile probe cover, will be used on the tissue as part of the patient's operation, inside the body itself. The tissue will be sampled using the spectroscopic probe before the surgeons remove the tissue from the body. The research team will be in the operating theatre. The surgeon or a member of the research team will use the optical probe on the tissue samples. This will involve taking pictures and videos of the sample while the research team scan the samples with the spectroscopic probe.

Any data (spectroscopic data, pictures and videos) collected will be completely anonymised to protect the patient's identity. The data collected by the probe will not be used to make any surgical decisions, and therefore will not affect the patient's treatment. Anonymised data might be used in future studies or presentations.

It will not be painful because the spectroscopic probe does not damage the tissue samples, as it only uses harmless white light. It is not harmful, and the patient will have the same recovery period as someone who is not involved in the study. The use of the spectroscopic probe might extend the normal surgery time by 5 to 15 minutes. This delay, however, will not interfere with the patient's surgery nor its outcome.

The spectroscopic probe will be a sterilisable tool or covered by a sterile probe cover, and will be used in an aseptic technique by a scrubbed member of the team. There should be no introduction of infection during this process.

3. PURPOSE AND DESIGN OF THE RESEACH

A7. Select the appropriate methodology description for this research.*Please tick all that apply*:

- [ ] Case series/ case note review
- [ ] Case control
- [ ] Cohort observation
- [ ] Controlled trial without randomisation
- [ ] Cross-sectional study
- [ ] Database analysis
- [ ] Epidemiology
- [x] Feasibility/ pilot study
- [ ] Laboratory study
- [ ] Metanalysis
- [ ] Qualitative research
- [ ] Questionnaire, interview or observation study
- [ ] Randomised controlled trial

☐ Other (please specify)

A10.What is the principal research question/objective? *Please put this in language comprehensible to a lay person.*

Theobjective is to use the DRS probe tracking system via a sterilisable tool in vivo to differentiate tumour and non-tumour GI tissue in real-time and aid intra-operative analysis of circumferential resection margins (CRMs).

A11. What are the secondary research questions/objectives if applicable?*Please put this in language comprehensible to a lay person.*

- To differentiate tumour and non-tumour GI tissue in real-time in-vivo using the DRS probe tracking system
- To test a sterile tool in vivo during GI cancer resection
- To collect in vivo data to validate and assess tumour and non-tumour tissue in vivo
- To classify tumour and non-tumour GI tissue in vivo during surgery

A12. What is the scientific justification for the research?*Please put this in language comprehensible to a lay person.*

Cancers of the gastrointestinal (GI) tract remain a major contributor to the global cancer risk, with approximately 2.8million cases of colorectal and stomach cancer worldwide. These malignancies continue to pose a major threat to public health. The aim of surgery is for complete resection of tumour with clear margins, whilst preserving as much surrounding tissue as possible. A positive circumferential resection margin (CRM) is associated with local recurrence of the tumour and poorer long-term survival, so it is paramount to establish tissue margins accurately. This can be difficult due to scar tissue as a result of chemoradiotherapy. Currently, the intra-operative technique available for assessment of CRM, using frozen sections, is time-consuming, costly and lengthens the operative time, affecting both patient outcome and theatre efficiency.

Diffuse reflectance spectroscopy (DRS) is a technique that allows discrimination of normal and abnormal tissue and presents a promising advancement in cancer diagnosis. Light emitted using a DRS probe is absorbed and scattered by different structures within tissue and emitted back onto the probe. The wavelength and intensity of this collected light is specific to each tissue type, and in this way, different tissue can be distinguished based on spectral data. When compared to sophisticated micro-endoscopic probes, DRS has lower costs, and is simpler because it does not require lasers or magnification optics.

Although DRS can discriminate tissue types, it does so by providing single-point spectral measurements and leaves no marks on the tissue during scanning. In this way, it is not possible to localise the area that has been in contact with the probe when optical biopsy takes place.

A benchtop ex-vivo study has shown successful use of a DRS probe and tracking system in differentiating tumour and non-tumour tissue to aid surgical resection margin assessment. A total of 7,082 spectra gathered from specimens of 20 patients has shown an overall diagnostic accuracy of the DRS probe in differentiating tumour tissue from non-tumour tissue of 88.1% for the stomach and 91.4% for the oesophagus.

References:
[1] M. Arnold et al., “Global Burden of 5 Major Types of Gastrointestinal Cancer,” Gastroenterology, vol. 159, no. 1, pp. 335-349.e15, Jul. 2020, doi: 10.1053/j.gastro.2020.02.068.
[2] M. Arnold, J. Ferlay, M. I. Van Berge Henegouwen, and I. Soerjomataram, “Global burden of oesophageal and gastric cancer by histology and subsite in 2018,” Gut, vol. 69, no. 9, pp. 1564–1571, Sep. 2020, doi: 10.1136/gutjnl-2020-321600.
[3] W. H. Allum, J. M. Blazeby, S. M. Griffin, D. Cunningham, J. A. Jankowski, and R. Wong, “Guidelines for the management of oesophageal and gastric cancer,” doi: 10.1136/gut.2010.228254.
[4] W. R. C. Knight et al., “Prediction of a positive circumferential resection margin at surgery following neoadjuvant chemotherapy for adenocarcinoma of the oesophagus,” BJS Open, vol. 3, no. 6, pp. 767–776, Dec. 2019, doi: 10.1002/bjs5.50211.
[5] E. J. M. Baltussen, H. J. C. M. Sterenborg, T. J. M. Ruers, and B. Dashtbozorg, “Optimizing algorithm development for tissue classification in colorectal cancer based on diffuse reflectance spectra,” Biomed. Opt. Express, vol. 10, no. 12, p. 6096, Dec. 2019, doi: 10.1364/boe.10.006096.
[6] G. Zonios et al., “Diffuse reflectance spectroscopy of human adenomatous colon polyps in vivo,” Appl. Opt., vol. 38, no. 31, p. 6628, Nov. 1999, doi: 10.1364/ao.38.006628.
[7] S. Akter, M. G. Hossain, I. Nishidate, H. Hazama, and K. Awazu, “Medical applications of reflectance spectroscopy in the diffusive and sub-diffusive regimes,” J. Near Infrared Spectrosc., vol. 26, no. 6, pp. 337–350, Dec. 2018, doi:

10.1177/0967033518806637.
[8] D. Bouget, M. Allan, D. Stoyanov, and P. Jannin, “Vision-based and marker-less surgical tool detection and tracking: a review of the literature,” Medical Image Analysis, vol. 35. Elsevier B.V., pp. 633–654, Jan. 01, 2017, doi: 10.1016/j.media.2016.09.003.

A13. Please summarise your design and methodology. *It should be clear exactly what will happen to the research participant, how many times and in what order. Please complete this section in language comprehensible to the lay person. Do not simply reproduce or refer to the protocol. Further guidance is available in the guidance notes.*

Study design
A prospective, cohort, in-vivo study using upper and lower GI specimens will be undertaken at Imperial College NHS trust in the UK.

Patients will be anaesthetised for their operation. Once the specific organ is accessed by the surgeons, the study will be started. Data will be collected from upper and lower GI specimens in vivo intra-operatively immediately before surgical resection. The duration of data collection with the DRS probe should be no longer than 5 minutes and should have minimal effect on the workflow of the surgeons.

A sterilisable DRS probe and tracking system will be used on normal tissue within the surgical field and on macroscopically cancerous or fibrosed tissue to obtain spectral information. The DRS emits visible light and is not harmful.

After acquisition of all spectra and surgical resection by the surgeons, the tissue specimen will be sent to the histopathology department where diagnosis will be made according to standard protocols. he probe will be sent off for sterilisation following each procedure.

The DRS system

The DRS system consists of a reflection probe (Ocean Optics Inc., QR600-7-SR-125F) that collects the DRS spectra. A tungsten halogen light source (Ocean Optics Inc., HL-2000-HP) will be used for the illumination of the tissue samples which provides incident light of wavelengths in the range of 360 – 2,400 nm. This light source is connected to a spectrometer (Ocean Optics Inc., USB4000) which acquires spectral information regarding light intensity at each wavelength component.

The DRS probe contains optical fibres, some which illuminate the surface of the tissue with harmless visible light, and others that collect the light that has been reflected from inside the tissue. The reflected light is collected by fibre optics (light conduits) and routed towards an instrument that separates the white light into thousands of colours. As we track the position of the probe, we can create spectroscopic images with richer colour information, allowing surgeons to differentiate between different types of tissue, such as normal or cancerous regions.

The spectroscopic probe will be a sterilisable tool or covered by a sterile probe cover, and will be used in an aseptic technique by a scrubbed member of the team.

For open surgical procedures the DRS probe will be used directly onto the tissue. The probe will be held by the surgeon and used to scan along the tissue for 1-2 minutes. A member of the research team will be present in the operating room.

For laparoscopic procedures, the probe will be put through one of the laparoscopic ports and be held using a laparoscopic instrument via another port. The laparoscopic camera will be used to collect data.

Participants

Consecutive adults (>18yrs) who have surgical resection for upper GI or lower GI cancer and who give consent to take part in the study will be eligible.

We will collect data from consecutive patients undergoing upper and lower GI cancer resection surgery.

Patients will be recruited by the clinical team from clinic. If patients are willing to know more about the study, then they will be given a patient information sheet (PIS) and consent form. They will also be given the contact details of the research team if they need more information or have any questions.

Patients will have at least 2 weeks to decide whether or not they want to take part in the study. Consent will be gained from patients in writing before their operation by a member of the research team.

Inclusion criteria:
• Patients undergoing primary upper GI cancer resection surgery
• Patients undergoing primary lower GI (colorectal) cancer resection surgery
• Patients >18 years of age
• Patients who consent to take part in the study

Exclusion criteria:
• Patients who do not consent to the study or decline to participate
• Patients who do not meet the inclusion criteria
• Patients who lack capacity
• Patients undergoing emergency lower or upper GI cancer surgery
• Patients undergoing re-operation for cancer surgery
• Pregnant women

Statistical analysis

A user interface has been developed using Python 3.6 and Qt5 to integrate the acquisition and processing of the spectral data, as well as the tracking of the DRS fibre probe. Python 3.6 will be used for data processing, visualisation, Machine Learning classification and statistical analysis.

Obvious errors in spectral data due to acquisition, poor contact with tissue or wrongly labelled data will be excluded. A linear Support Vector Machine (SVM) will be used for classification of the spectral data.

Machine Learning classifiers will be used for calculating sensitivity, specificity, overall accuracy and the area under the curve (AUC). Receiver-operator characteristics (ROC) curves will be plotted.

Study sample size – 20
This sample size is based on the fact that this is a feasibility study, and on the number of cancer operations that occur in the department. This is an adequate sample size to be able to collect adequate data within the duration of the study.

A14-1. In which aspects of the research process have you actively involved, or will you involve, patients, service users, and/or their carers, or members of the public?

- [x] Design of the research
- [x] Management of the research
- [ ] Undertaking the research
- [ ] Analysis of results
- [ ] Dissemination of findings
- [ ] None of the above

Give details of involvement, or if none please justify the absence of involvement.
We will be setting up a session with a PPI group to get feedback from the public and/or patients about this study. We will use this information to make changes to the project as necessary.

4. RISKS AND ETHICAL ISSUES

RESEARCH PARTICIPANTS

A15. What is the sample group or cohort to be studied in this research?

Select all that apply:

- [ ] Blood
- [x] Cancer

- [ ] Cardiovascular
- [ ] Congenital Disorders
- [ ] Dementias and Neurodegenerative Diseases
- [ ] Diabetes
- [ ] Ear
- [ ] Eye
- [ ] Generic Health Relevance
- [ ] Infection
- [ ] Inflammatory and Immune System
- [ ] Injuries and Accidents
- [ ] Mental Health
- [ ] Metabolic and Endocrine
- [ ] Musculoskeletal
- [ ] Neurological
- [ ] Oral and Gastrointestinal
- [ ] Paediatrics
- [ ] Renal and Urogenital
- [ ] Reproductive Health and Childbirth
- [ ] Respiratory
- [ ] Skin
- [ ] Stroke

Gender:	Male and female participants
Lower age limit: 18	Years Years
Upper age limit: 99	

A17-1. Please list the principal inclusion criteria (list the most important, max 5000 characters).

• Patients undergoing primary upper GI cancer resection surgery
• Patients undergoing primary lower GI (colorectal) cancer resection surgery
• Patients >18 years of age
• Patients who consent to take part in the study

A17-2. Please list the principal exclusion criteria (list the most important, max 5000 characters).

• Patients who do not consent to the study or decline to participate
• Patients who do not meet the inclusion criteria
• Patients who lack capacity
• Patients undergoing emergency lower or upper GI cancer surgery
• Patients undergoing re-operation for cancer surgery
• Pregnant women

RESEARCH PROCEDURES, RISKS AND BENEFITS

A18. Give details of all non-clinical intervention(s) or procedure(s) that will be received by participants as part of the research protocol. *These include seeking consent, interviews, non-clinical observations and use of questionnaires.*

Please complete the columns for each intervention/procedure as follows:

1. Total number of interventions/procedures to be received by each participant as part of the research protocol.
2. If this intervention/procedure would be routinely given to participants as part of their care outside the research, how many of the total would be routine?
3. Average time taken per intervention/procedure (minutes, hours or days)
4. Details of who will conduct the intervention/procedure, and where it will take place.

Intervention or procedure	1	2	3	4
Provision of patient information sheet	1	0	15mins	Surgeons or research team - Imperial NHS trust
Informed consent	1	0	10mins	Surgeons or research team - Imperial NHS trust

A19. Give details of any clinical intervention(s) or procedure(s) to be received by participants as part of the research protocol. *Theseinclude usesof medicinal productsordevices,other medical treatments orassessments,mental health interventions,imaging investigationsand takingsamplesofhuman biological material. Includeprocedureswhich mightbe received as routine clinical care outside of the research.*

Please complete the columns for each intervention/procedure as follows:

1. Total number of interventions/procedures to be received by each participant as part of the research protocol.
2. If this intervention/procedure would be routinely given to participants as part of their care outside the research, how many of the total would be routine?
3. Average time taken per intervention/procedure (minutes, hours or days).
4. Details of who will conduct the intervention/procedure, and where it will take place.

Intervention or procedure	1	2	3	4
Applying DRS probe and tracking system to tissue	1	0	15mins	Surgeons or research team - Imperial NHS trust

A20.Will you withhold an intervention or procedure, which would normally be considered a part of routine care?

○ Yes ◉ No

A21.How long do you expect each participant to be in the study in total?

Fromthe point of gaining consent until the end of the operation. There will be no post-operative interventions.

A22. What are the potential risks and burdens for research participants and how will you minimise them?

For all studies, describe any potential adverse effects, pain, discomfort, distress, intrusion, inconvenience or changes to lifestyle. Only describe risks or burdens that could occur as a result of participation in the research. Say what steps would be taken to minimise risks and burdens as far as possible.

The spectroscopic probe will be used on the tissue as part of the patient's operation, inside the body itself. This is after the patient is fully anaesthetised. The tissue will be sampled using the spectroscopic probe before the surgeons remove the tissue from the body. The research team will be in the operating theatre. A member of the surgical or research team will use the optical probe on the tissue samples. This will involve taking pictures and videos of the sample while the samples are scanned with the spectroscopic probe.

The process will not be painful because the spectroscopic probe does not damage the tissue samples, as it only uses harmless white light. It is harmless, and the patient will have the same recovery period as someone who is not involved in the study. The use of the spectroscopic probe might extend the normal surgery time by 5 to 15 minutes. This delay, however, should not interfere with the patient's surgery nor its outcome.

The spectroscopic probe will be a sterilisable tool or covered by a sterile probe cover and will be used in an aseptic technique. There should be no introduction of infection during this process.

There is the risk that the probe will break, leaving exposed glass fibres or fragments. This risk will be minimised through careful handling of the probe. If the probe is covered with a probe cover this risk will be minimised further.

The patient will be surrounded by a medical team at all times in theatre in case of any adverse events.

A23. Will interviews/ questionnaires or group discussions include topics that might be sensitive, embarrassing or upsetting, or is it possible that criminal or other disclosures requiring action could occur during the study?

○ Yes ◉ No

A24. What is the potential for benefit to research participants?

None.

A25. What arrangements are being made for continued provision of the intervention for participants, if appropriate, once the research has finished? *May applytoany clinical intervention,including a drug, medicaldevice,mentalhealth intervention,complementarytherapy, physiotherapy, dietary manipulation,lifestyle change, etc.*

Given that this is a feasibility study, the best clinical care is the operation and histopathology diagnosis. Our study will not supersede this. If however any incidental findings come about, we will inform the clinical team.

A26.What are the potential risks for the researchers themselves? *(if any)*

Thespectroscopic probe emits harmless white light and its handling should not be a risk to the researchers.

RECRUITMENT AND INFORMED CONSENT

In this section we ask you to describe the recruitment procedures for the study. Please give separate details for different study groups where appropriate.

A27-1. How will potential participants, records or samples be identified? Who will carry this out and what resources will be used?*Forexample,identification may involvea disease register,computerised search ofsocialcareorGPrecords, orreviewofmedical records.Indicatewhether thiswill bedone bythedirectcareteam orby researchersactingunder arrangements with the responsible care organisation(s).*

Potentially eligible patients will be identified at a multi-disciplinary team cancer meeting held at Imperial College Healthcare NHS Trust.

They will be patients who fall under the care of the consultant upper GI or colorectal surgeons at Imperial NHS Trust. Their notes and previous investigations would have been checked by the clinical, radiology and pathology team prior to making a consideration as to their suitability for this study.

A27-2. Will the identification of potential participants involve reviewing or screening the identifiable personal information of patients, service users or any other person?

◉ Yes ○ No

Please give details below:
Patient's hospital notes will be reviewed as part of the information gathering aspect of the study and to collect information about their pathology and stage of their disease and to confirm the eligibility criteria for the study.

A27-3. Describe what measures will be taken to ensure there is no breach of any duty of confidentiality owed to patients, service users or any other person in the process of identifying potential participants*Indicate whatstepshave beenor willbe takento informpatients and service usersofthe potentialuseof theirrecordsfor thispurpose.Describe the arrangements to ensure that the wishes of patients and service users regarding access to their records are respected. Please consult the guidance notes on this topic.*

The confidentiality issue will be explained to the patient during the discussion with the surgeon, as well as appearing

on the patient information sheet. Anonymity will be maintained throughout using non-identifiable index (codes) and data will be protected via encryption. Any images or videos stored will also be anonymised in the same way.

A27-4. Will researchers or individuals other than the direct care team have access to identifiable personal information of any potential participants?

○ Yes ◉ No

A28.Will any participants be recruited by publicity through posters, leaflets, adverts or websites?

○ Yes ◉ No

A29.How and by whom will potential participants first be approached?

Thepatients will be approached by the operating surgeon, after their cases have been discussed at a multi-disciplinary cancer team meeting. An invitation to partake in the study will be sent alongside patient information leaflet in conjunction with letters informing patients about their admission details for surgery.

Strict inclusion and exclusion criteria will be adhered to. Then, at the pre-operative consultation, the operating surgeon will explain clearly the study, the risks or benefits associated with their participation and point out its voluntary nature. Patients will be approached at least two weeks before the surgery. They will have until the day of surgery to consider whether they want to participate. Patients who agree to participate will be asked to sign a consent form at the day of operation to document their agreement.

A30-1. Will you obtain informed consent from or on behalf of research participants?

◉ Yes ○ No

If you will be obtaining consent from adult participants, please give details of who will take consent and how it will be done, with details of any steps to provide information (a written information sheet, videos, or interactive material). Arrangements for adults unable to consent for themselves should be described separately in Part B Section 6, and for children in Part B Section 7.

If you plan to seek informed consent from vulnerable groups, say how you will ensure that consent is voluntary and fully informed.

Patients will be recruited by the clinical team from clinic. If patients are willing to know more about the study, then they will be given a patient information sheet (PIS) and consent form. They will also be given the contact details of the research team if they need more information or have any questions.

Having received the patient information sheet at least 2 weeks in advance and discussed the details of the study with the operating surgeon, patients will be asked to sign the consent form on the morning of their operation. At the same time, a member of the clinical or research team with knowledge of the protocol will re-explain and re-discuss the study with them with the help of the patient information sheet, answering any further questions they might have and ensuring them that they can change their mind at any time without any further effects on the standard of care they will receive.

We will only be obtaining consent for this study from patients who have full capacity to consent.

If you are not obtaining consent, please explain why not.

Please enclose a copy of the information sheet(s) and consent form(s).

A30-2. Will you record informed consent (or advice from consultees) in writing?

◉ Yes ○ No

A31.How long will you allow potential participants to decide whether or not to take part?

Theywill be allowed to consider their involvement in the study from the time of decision for the patient to undergo the surgery. The patient information document will be sent out to them at least two weeks prior to their involvement, alongside admission details for their primary surgical procedure. On the day of surgery, they will be approached about the study and the study will be explained to them in detail, using the information sheet. They will then be allowed questions and time to consider their involvement in the study. Patients will be able to withdraw at any time prior to anaesthesia without a reason.

A32. Will you recruit any participants who are involved in current research or have recently been involved in any research prior to recruitment?

- ○ Yes
- ○ No
- ◉ Not Known

If Yes, please give details and justify their inclusion. If Not Known, what steps will you take to find out?

We will discuss the type of research with the patient and see if it interferes with the data we would be collecting. If not, then we will recruit into the study if the patient gives consent.

A33-1. What arrangements have been made for persons who might not adequately understand verbal explanations or written information given in English, or who have special communication needs? *(e.g. translation, use of interpreters)*
These patients will be given information on the study at the time of obtaining consents for their surgical procedure and hence a translator, interpreter or sign language expert will already have been considered and be booked for this purpose, by the clinical or administration team. It is important that the patient is able to make an informed decision about participation in this study, and it will be sought to clearly identify this via the translator/interpreter, who will also be

asked to counter-sign the consent form having ensured that the patient is in full agreement with participation and has no further questions.
Should there be any doubts or concerns regarding understanding or inability to provide consent due to language barriers, the patient will not be recruited into the study.

A34. What arrangements will you make to ensure participants receive any information that becomes available during the course of the research that may be relevant to their continued participation?

Participants will not be required to continue their participation beyond the surgical operation itself.

A35. What steps would you take if a participant, who has given informed consent, loses capacity to consent during the study? *Tick one option only.*

- ○ The participant and all identifiable data or tissue collected would be withdrawn from the study. Data or tissue which is not identifiable to the research team may be retained.
- ○ The participant would be withdrawn from the study. Identifiable data or tissue already collected with consent would be retained and used in the study. No further data or tissue would be collected or any other research procedures carried out on or in relation to the participant.
- ○ The participant would continue to be included in the study.
- ○ Not applicable – informed consent will not be sought from any participants in this research.
- ◉ Not applicable – it is not practicable for the research team to monitor capacity and continued capacity will be assumed.

Further details:

Patients are not physically involved with any aspect of this study apart from the day of the surgical procedure when the data will be collected. Therefore, no further clinical interventions will be carried out on the participant and no new images/data will be collected. The data collected at the day of the procedure, for which the patient had given informed consent to participate, prior to the onset of incapacity, will be retained.
These data will be kept and used, provided that, their use still falls within the possible uses that the patient, prior losing

capacity to consent, agreed upon. If this is not the case, data will be excluded.

CONFIDENTIALITY

In this section, personal data means any data relating to a participant who could potentially be identified. It includes pseudonymised data capable of being linked to a participant through a unique code number.

Storage and use of personal data during the study

A36. Will you be undertaking any of the following activities at any stage (including in the identification of potential participants)? *(Tick as appropriate)*

- [x] Access to medical records by those outside the direct healthcare team
- [ ] Access to social care records by those outside the direct social care team
- [x] Electronic transfer by magnetic or optical media, email or computer networks
- [ ] Sharing of personal data with other organisations
- [ ] Export of personal data outside the EEA
- [ ] Use of personal addresses, postcodes, faxes, emails or telephone numbers
- [ ] Publication of direct quotations from respondents
- [ ] Publication of data that might allow identification of individuals
- [ ] Use of audio/visual recording devices
- [x] Storage of personal data on any of the following:
  - [x] Manual files (includes paper or film)
  - [x] NHS computers
  - [ ] Social Care Service computers
  - [ ] Home or other personal computers
  - [ ] University computers
  - [ ] Private company computers
  - [x] Laptop computers

Further details:
The laptop interfacing with the cameras of the system during the acquisition, uses FileVault to encrypt its contents automatically (this would mean that it would require a login password to access the data. Should the password be forgotten, the data will be irretrievably lost). The images acquired during surgery and corresponding data will be immediately stored encrypted in a USB (SafeStick)

Members of the research team at Imperial College London may also have access to the anonymised data collected during surgery. Access to these images will only be available through the Department of Surgery and Cancer, Imperial College London. The named custodians [NAME / [NAME] will be formally responsible for the safe keeping, control of use and disposal of data (where no longer required) in accordance with the consent given by the participants. They will be officially responsible to ensure that procedures and security arrangements are sufficient to prevent breaches of confidentiality. [NAME] / [NAME] will be responsible for keeping proper records of all uses that have been made of the material, whether by themselves or by others.

Medical history information, histology and blood test results , including the consent forms will be stored in research folders kept in a secured room (on site at the NHS hospital).

A37. Please describe the physical security arrangements for storage of personal data during the study?

Participant data will be stored electronically and on paper. Research folders containing consent forms, histology

reports and data about participants will be stored in ring binders locked in a filing cabinet in a locked room.

Access to this locked room requires security gained access. Data stored on hard drives will be encrypted and password protected.

A38. How will you ensure the confidentiality of personal data?*Please provide a general statement of the policy and procedures for ensuring confidentiality, e.g. anonymisation or pseudonymisation of data.*

All participant data will be collected according to the data protection act 2018 and in line with general data protection regulation (GDPR). This study will use de-identified data. Participants' names/dates of birth will not be stored with the research information. Each participant will be given a unique research number, and the research team at the hospital will maintain a record between the research ID and the participant's real details.

All researchers involved in the study are made aware of the document Confidentiality-
NHS Code of Practice (Nov 2003)and are asked to refer to this whenever considering dealing with participant personal data.

A40. Who will have access to participants' personal data during the study?*Where access is by individuals outside the direct care team, please justify and say whether consent will be sought.*

Only direct care medical team and primary researchers will have access to the participants' personal data during the study. The Sponsor Representatives and the NHS Trust may audit the study and therefore access personal data. Consent will be obtained for this.

Storage and use of data after the end of the study

A41.Where will the data generated by the study be analysed and by whom?

The anonymised data and all feedback will be assessed by [NAME] / [NAME], and members of their research teams.

A42. Who will have control of and act as the custodian for the data generated by the study?

Title Forename/Initials Surname

[TITLE] [FORENAME] [SURNAME]

Post	Consultant surgeon
Qualifications	FRCS PHD
Work Address	10th Floor QEQM building St Mary's Hospital Praed Street London
Post Code	W2 1NY
Work Email	[EMAIL]
Work Telephone	[TELEPHONE]
Fax	[FAX]

A43.How long will personal data be stored or accessed after the study has ended?

- ◯ Less than 3 months
- ◯ 3 – 6 months
- ◯ 6 – 12 months
- ◯ 12 months – 3 years

◉ Over 3 years

If longer than 12 months, please justify:
It is College policy that all data relating to research be stored for 10 years (archived).

A44. For how long will you store research data generated by the study?

Years: 10
Months:

A45.Pleasegivedetailsofthelongtermarrangementsforstorageofresearchdataafter the study has ended. *Say where data will be stored, who will have access and the arrangements to ensure security.*

All data will be stored and processed by Imperial College in line with GDPR guidelines for the processing of de-identified data.
Research projects applying for access to this database will not normally receive access to these pseudonymous identifiers, and will instead receive a fully de-identified copy of the dataset.
Data will be archived as per Sponsor's standard operating procedures- any data stored on computers will be stored on Trust computers.

INCENTIVES AND PAYMENTS

A46. Will research participants receive any payments, reimbursement of expenses or any other benefits or incentives for taking part in this research?

○ Yes ◉ No

A47. Will individual researchers receive any personal payment over and above normal salary, or any other benefits or incentives, for taking part in this research?

○ Yes ◉ No

A48. Does the Chief Investigator or any other investigator/collaborator have any direct personal involvement (e.g. financial, share holding, personal relationship etc.) in the organisations sponsoring or funding the research that may give rise to a possible conflict of interest?

○ Yes ◉ No

NOTIFICATION OF OTHER PROFESSIONALS

A49-1. Will you inform the participants' General Practitioners (and/or any other health or care professional responsible for their care) that they are taking part in the study?

○ Yes ◉ No

If Yes, please enclose a copy of the information sheet/letter for the GP/health professional with a version number and date.

PUBLICATION AND DISSEMINATION

A50-1. Will the research be registered on a public database?

The UK Policy Framework for Health and Social Care Research sets out the principle of making information about research publicly available. Furthermore: Article 19 of the World Medical Association Declaration of Helsinki adopted in 2008 states that "every clinical trial must be registered on a publicly accessible database before recruitment of the first subject"; and the International Committee of Medical Journal Editors (ICMJE) will consider a clinical trial for publication only if it has been registered in an appropriate registry. Please see guidance for more information.

(●) Yes ( ) No

Please give details, or justify if not registering the research.
Wewill applyforregistrationon clinicaltrials.govtoallowinterested parties to follow study progression and be made aware of publications resulting from the study

Please ensure that you have entered registry reference number(s) in question A5-1.

A51.How do you intend to report and disseminate the results of the study?*Tick as appropriate:*

- [x] Peer reviewed scientific journals
- [x] Internal report
- [x] Conference presentation
- [x] Publication on website
- [ ] Other publication
- [ ] Submission to regulatory authorities
- [ ] Access to raw data and right to publish freely by all investigators in study or by Independent Steering Committee onbehalf of all investigators
- [ ] No plans to report or disseminate the results
- [ ] Other (please specify)

A52. If you will be using identifiable personal data, how will you ensure that anonymity will be maintained when publishing the results?

No identifiable personal data will be published.

A53. How and when will you inform participants of the study results?

If there will be no arrangements in place to inform participants please justify this.
We will not routinely inform participants of the results.We will provide them with contact details of the research team that they can contact if they wish to find out more information after the end of the study but they will not routinely be sent this information.

5. Scientific and Statistical Review

A54-1. How has the scientific quality of the research been assessed?*Tick as appropriate:*

- [ ] Independent external review
- [ ] Review within a company
- [ ] Review within a multi−centre research group
- [x] Review within the Chief Investigator's institution or host organisation
- [x] Review within the research team
- [x] Review by educational supervisor
- [ ] Other

Justify and describe the review process and outcome. If the review has been undertaken but not seen by the

researcher, give details of the body which has undertaken the review:
Theresearchprotocolforthis projectwillbesubmittedtotheImperialCollege Peer Review Office. Reviewers will assess the scientific quality of the research.

For all studies except non-doctoral student research, please enclose a copy of any available scientific critique reports, together with any related correspondence.

For non-doctoral student research, please enclose a copy of the assessment from your educational supervisor/ institution.

A56.How have the statistical aspects of the research been reviewed? *Tick as appropriate:*

- ☐ Review by independent statistician commissioned by funder or sponsor
- ☐ Other review by independent statistician
- ☐ Review by company statistician
- ☐ Review by a statistician within the Chief Investigator's institution
- ☑ Review by a statistician within the research team or multi−centre group
- ☐ Review by educational supervisor
- ☐ Other review by individual with relevant statistical expertise
- ☐ No review necessary as only frequencies and associations will be assessed – details of statistical input not required

In all cases please give details below of the individual responsible for reviewing the statistical aspects. If advice has been provided in confidence, give details of the department and institution concerned.

Title Forename/Initials Surname	[TITLE] [FORENAME] [SURNAME]
Department	The Hamlyn Centre for Robotic Surgery; Department of Surgery and Cancer
Institution	Imperial College London
Work Address	Bessemer Building, South Kensington Campus
	London
Post Code	SW7 2AZ
Telephone	[TELEPHONE]
Fax	[FAX]
Mobile	
E-mail	[EMAIL]

Please enclose a copy of any available comments or reports from a statistician.

A57. What is the primary outcome measure for the study?

Sensitivity, specificity and diagnostic accuracy of a DRS fibre probe and tracking system in differentiating tumour and non-tumour tissue in vivo.

A58. What are the secondary outcome measures?*(if any)*

Circumferential resection margin assessment.
Diagnosis of pre-cancerous tissue.
Early cancer detection.

A59. What is the sample size for the research? *How many participants/samples/data records do you plan to study in total? If there is more than one group, please give further details below.*

Total UK sample size: 20
Total international sample size (including UK):0
Total in European Economic Area: 0

Further details:
This is an evaluation of a device in vivo in a pilot study aiming to differentiate tissue type. This sample size will be sufficient to evaluate this device.

A60. How was the sample size decided upon? *If a formal sample size calculation was used, indicate how this was done, giving sufficient information to justify and reproduce the calculation.*

This sample size is sufficient for this in vivo pilot study focusing on comparison of DRS signals with histology results. The number of patients involved in this study is small since there is no comparison of patient groups in order to assess the success of the device, 20 individual cases will be enough to fulfil the aims of the study.

A61-1. Will participants be allocated to groups at random?

○ Yes ◉ No

A62. Please describe the methods of analysis (statistical or other appropriate methods, e.g. for qualitative research) by which the data will be evaluated to meet the study objectives.

The acquired spectral data are normalised and then processed by methods for feature extraction and dimensionality reduction. Machine Learning and Deep Learning techniques are employed for the classification of the spectral data.

6. MANAGEMENT OF THE RESEARCH

A63. Other key investigators/collaborators. *Please include all grant co−applicants, protocol co−authors and other key members of the Chief Investigator's team, including non-doctoral student researchers.*

Title, Forename/Initials Surname	[TITLE] [FORENAME] [SURNAME]
Post Qualifications	
Employer	Imperial College London
Work Address	Bessemer Building, South Kensington Campus London
Post Code	SW7 2AZ
Telephone	[TELEPHONE]
Fax	[FAX]
Mobile	
Work Email	[EMAIL]

Title Forename/Initials Surname	[TITLE] [FORENAME] [SURNAME]
Post Qualifications	Consultant Surgeon FRCS
Employer	Imperial College London

Work Address	10th Floor QEQM building St Mary's Hospital Praed Street London
Post Code	W2 1NY
Telephone	[TELEPHONE]
Fax	[FAX]
Mobile	
Work Email	[EMAIL]

A64. Details of research sponsor(s)

A64-1. Sponsor

Lead Sponsor

Status:
- ○ NHS or HSC care organisation
- ◉ Academic
- ○ Pharmaceutical industry
- ○ Medical device industry
- ○ Local Authority
- ○ Other social care provider (including voluntary sector or private organisation)
- ○ Other

Commercial status: Non-Commercial

If Other, please specify:

Contact person

Name of organisation	Imperial College London
Given name	FORENAME]
Family name	[SURNAME]
Address	Research Governance and Integrity Team (RGIT) Norfolk Place,
Town/city	London
Post code	W2 1PG
Country	
Telephone	[TELEPHONE]
Fax	[FAX]
E-mail	[EMAIL]

Legal representative for clinical investigation of medical device (studies involving Northern Ireland only)
Clinical Investigations of Medical Devices that take place in Northern Ireland must have a legal representative of the sponsor that is based in Northern Ireland or the EU

Contact person

Name of organisation

Given name
Family name
Address
Town/city
Post code
Country
Telephone
Fax
E-mail

A65. Has external funding for the research been secured?

Please tick at least one check box.

- [x] Funding secured from one or more funders
- [ ] External funding application to one or more funders in progress
- [ ] No application for external funding will be made

What type of research project is this?

- (•) Standalone project
- ( ) Project that is part of a programme grant
- ( ) Project that is part of a Centre grant
- ( ) Project that is part of a fellowship/ personal award/ research training award
- ( ) Other

Other – please state:

Please give details of funding applications.

Organisation	Cancer research UK
Address	CRUK Imperial Centre Sir Alexander Fleming Building, South Kensington Campus London
Post Code	SW7 2AZ
Telephone	[TELEPHONE]
Fax	
Mobile	[FAX]
Email	[EMAIL]

Funding Application Status: (•) Secured ( ) In progress

Amount:

Duration
Years: 4
Months:

If applicable, please specify the programme/ funding stream:

What is the funding stream/ programme for this research project?
CRUK Imperial Centre Convergence Science PhD Programme

A66. Has responsibility for any specific research activities or procedures been delegated to a subcontractor (other than a co-sponsor listed in A64-1) ? *Please give details of subcontractors if applicable.*

○ Yes ◉ No

A67. Has this or a similar application been previously rejected by a Research Ethics Committee in the UK or another country?

○ Yes ◉ No

Please provide a copy of the unfavourable opinion letter(s). You should explain in your answer to question A6-2 how the reasons for the unfavourable opinion have been addressed in this application.

A68-1. Give details of the lead NHS R&D contact for this research:

Title Forename/Initials Surname

[TITLE] [FORENAME] [SURNAME]

Organisation	Imperial College London
Address	Room 221, Level 2, Medical School Building Norfolk Place London
Post Code	W2 1PG
Work Email	[EMAIL]
Telephone	[TELEPHONE]
Fax	[FAX]
Mobile	

Details can be obtained from the NHS R&D Forum website: http://www.rdforum.nhs.uk

A68-2. Select Local Clinical Research Network for NHS Organisation identified in A68-1:

North West London

For more information, please refer to the question specific guidance.

A69-1. How long do you expect the study to last in the UK?

Planned start date:02/08/2021
Planned end date:01/08/2024
Total duration:
Years:3 Months:0 Days:0

A71-1. Is this study?

◉ Single centre
○ Multicentre

A71-2. Where will the research take place? *(Tick as appropriate)*

☑ England
☐ Scotland
☐ Wales
☐ Northern Ireland
☐ Other countries in European Economic Area

Total UK sites in study

Doesthis trialinvolve countries outside the EU?
○ Yes ◉ No

A72. Which organisations in the UK will host the research? *Please indicate the type of organisation by ticking the box and give approximate numbers if known:*

☑ NHS organisations in England
☐ NHS organisations in Wales
☐ NHS organisations in Scotland
☐ HSC organisations in Northern Ireland
☐ GP practices in England
☐ GP practices in Wales
☐ GP practices in Scotland
☐ GP practices in Northern Ireland
☐ Joint health and social care agencies (eg community mental health teams)
☐ Local authorities
☐ Phase 1 trial units
☐ Prison establishments
☐ Probation areas
☐ Independent (private or voluntary sector) organisations
☐ Educational establishments
☐ Independent research units
☐ Other (give details)

Total UK sites in study: 0

A73-1. Will potential participants be identified through any organisations other than the research sites listed above?

○ Yes ◉ No

A74. What arrangements are in place for monitoring and auditing the conduct of the research?

Monitoring will be conducted on a 6 monthly basis by the head of surgery at Imperial who will attend one of the study sessions and monitor the study as it is conducted.
RGIT may audit at any time in their remit as sponsor.

A75-1. What arrangements will be made to review interim safety and efficacy data from the trial? Will a formal data monitoring committee or equivalent body be convened?

Any adverse events during the study including data collection will be collected and appropriate management will be applied.

No formal monitoring committee will be convened

If a formal DMC is to be convened, please forward details of the membership and standard operating procedures to the Research Ethics Committee when available. The REC should also be notified of DMC recommendations and receive summary reports of interim analyses.

A75-2. What are the criteria for electively stopping the trial or other research prematurely?

The study will be stopped if adverse effects of the study /intervention outweigh the aims of the study.

A76. Insurance/ indemnity to meet potential legal liabilities

Note: in this question to NHS indemnity schemes include equivalent schemes provided by Health and Social Care (HSC) in Northern Ireland

A76-1. What arrangements will be made for insurance and/or indemnity to meet the potential legal liability of the sponsor(s) for harm to participants arising from the management of the research? *Pleasetick box(es) asapplicable.*

Note: Where a NHS organisation has agreed to act as sponsor or co-sponsor, indemnity is provided through NHS schemes. Indicate if this applies (there is no need to provide documentary evidence). For all other sponsors, please describe the arrangements and provide evidence.

☐ NHS indemnity scheme will apply (NHS sponsors only)

☑ Other insurance or indemnity arrangements will apply (give details below)

Imperial College London will provide insurance and indemnity.

Please enclose a copy of relevant documents.

A76-2. What arrangements will be made for insurance and/ or indemnity to meet the potential legal liability of the sponsor(s) or employer(s) for harm to participants arising from the design of the research? *Please tick box(es) as applicable.*

Note: Where researchers with substantive NHS employment contracts have designed the research, indemnity is provided through NHS schemes. Indicate if this applies (there is no need to provide documentary evidence). For other protocol authors (e.g. company employees, university members), please describe the arrangements and provide evidence.

☐ NHS indemnity scheme will apply (protocol authors with NHS contracts only)

☑ Other insurance or indemnity arrangements will apply (give details below)

Imperial College London will provide insurance and indemnity.

Please enclose a copy of relevant documents.

A76-3. What arrangements will be made for insurance and/ or indemnity to meet the potential legal liability of investigators/collaborators arising from harm to participants in the conduct of the research?

Note: Where the participants are NHS patients, indemnity is provided through the NHS schemes or through professional

indemnity. Indicate if this applies to the whole study (there is no need to provide documentary evidence). Where non-NHS sites are to be included in the research, including private practices, please describe the arrangements which will be made at these sites and provide evidence.

☑ NHS indemnity scheme or professional indemnity will apply (participants recruited at NHS sites only)

☐ Research includes non-NHS sites (give details of insurance/ indemnity arrangements for these sites below)

Please enclose a copy of relevant documents.

A77. Has the sponsor(s) made arrangements for payment of compensation in the event of harm to the research participants where no legal liability arises?

○ Yes ◉ No

Please enclose a copy of relevant documents.

A78.Could the research lead to the development of a new product/process or the generation of intellectual property?

◉ Yes ○ No ○ Not sure

Part B: Section 2

A. General information

Information in this sub-section will be included in applications to the Research Ethics Committee and NHS R & D offices at the research sites.

1. Is the manufacturer (or other organisation responsible for developing the device) the same organisation named as lead sponsor for this study?

○ Yes ◉ No

If No, please give details of the manufacturer or other organisation responsible for developing the device below:

Organisation	Ceram Optec SIA
Address	Skanstes iela 7, k-1
Post Code	1013
Country	Latvia
Telephone	[TELEPHONE]
Fax	[FAX]
Mobile	
E-mail	[EMAIL]

2. Details of the medical devices to be used in the study

Name of the manufacturer: Ceram Optec SIA

Manufacturer's trade name for the

device:

Device identification name and/or number:

Name:	Bundle with 7 fibers UVNSS 600/660/710CP; NA= 0.22
Number:	05781-REVB
Generic name of device and principal intended use(s):	Fibre bundle for diffuse reflectance spectroscopy.
Length of time since device came into use:	NA

3-1. Further details of the purpose of the study

Does the study involve:

- (●) Investigation of a new medical device
- ( ) Investigation of new implantable material
- ( ) Use of an existing product outside the terms of its UKCA/CE UKNI/CE marked intended purpose
- ( ) Use of a modified product
- ( ) Use of an existing product within its UKCA/CE UKNI/CE marked intended purpose

3-2. Please give further details below including the following:

Description of any new device, materials, method of use or operation with a summary of the intended purpose.

Light emitted using a diffuse reflectance spectroscopy fibre probe it is absorbed and scattered by different structures within tissue and emitted back onto the probbe. The wavelength and intensity of this collected light is specific to each tissue type and in this way we are able to use this device to distinguish different tissue based on spectral data. This probe is sterilisable and can therefore be used in vivo to assess tissue type.
This specific probe has not been CE marked.

Composition of any new implantable materials, including summary of biocompatibility findings from studies to date.

NA

A summary of any modifications to UKCA/CE UKNI/CE marked devices.

NA

A summary of any proposed changes to the UKCA/CE UKNI/CE marked intended purpose.

NA

For all products with UKCA/CE UKNI/CE mark please attach instructions for use.

4. Please describe the arrangements for manufacture of the investigational device. *Include details of the quality assurance system in place within the legal entity. Give details of any collaboration with a commercial manufacturer or other sub- contractor and enclose a copy of the contract.*

Device has been purchased from a manufacturer.
The study is not sponsored or supported by the manufacturer, there is no agreement in place with the manufacturer to share the data generated in the study, and the device has been purchased for use in the study only.

5. What safety and performance testing has been undertaken on the investigational device and its constituents? *Pleasegive summariseddetailsofappropriatetests(includingoutcomei.e.pass/fail),e.g.mechanical,electrical,biological, toxicological, sterilisation.*

Device has been purchased - device is currently sold as a spectroscopic probe. Manufacturer has tested safety of

probe before purchase by the Imperial research team.

6. Please describe the sponsor's plans for further development and use of the device. *Indicate whether the plans include making it available (whether for a fee or not) to other legal entities or working with a device manufacturer or other company to commercialise the product.*

This study is an early feasibility study investigating the potential use of the spectroscopy probe technology to identify tissue, and there is no intention to commercialise the product using the data generated from this study.
The probe has been purchased (it was not provided for free). There are no arrangements to share any of the data gathered with the manufacturer.

7. Declaration

This declaration should be authorised by the head of clinical engineering or equivalent at the institution developing the device.

I confirm that the information provided in this section is accurate to the best of my knowledge. I take full responsibility for ensuring that the device has been manufactured to the standards expected of an equivalent UKCA/CE UKNI/CE marked device and that all relevant testing to demonstrate compliance with these standards has been undertaken.

Name: .....

Post: .....

Organisation: .....

Date: .....

9. Has the study been the subject of a scientific review/opinion (Expert Panel)?

◯ Yes ◉ No

If yes, please provide a copy of the review as part of your application.

PART C: Overview of research sites

Please enter details of the host organisations (Local Authority, NHS or other) in the UK that will be responsible for the research sites. *For further information please refer to guidance.*

Investigator identifier	Research site		Investigator Name	
IN1	◉ NHS/HSC Site ◯ Non-NHS/HSC Site		Forename	[FORENAME]
			Middle name	
			Family name	[SURNAME]
	Organisation name	IMPERIAL COLLEGE HEALTHCARE NHS TRUST	Email	[EMAIL]

Address	THE BAYS ST MARYS HOSPITAL SOUTH WHARF ROAD LONDON	Qualification (MD...)	FRCS
		Country	United Kingdom
Post Code	W2 1BL		
Country	ENGLAND		