

# Reproductive function in teenage and young adult cancer survivors

<b>Submission date</b> 09/01/2023	<b>Recruitment status</b> No longer recruiting	<input type="checkbox"/> Prospectively registered <input type="checkbox"/> Protocol
<b>Registration date</b> 03/03/2023	<b>Overall study status</b> Ongoing	<input type="checkbox"/> Statistical analysis plan <input type="checkbox"/> Results
<b>Last Edited</b> 28/01/2025	<b>Condition category</b> Cancer	<input type="checkbox"/> Individual participant data <input checked="" type="checkbox"/> Record updated in last year

## Plain English Summary

### Background and study aims

The treatment of cancer in young people is increasingly turning from focusing purely on survival to recognition of the long-term effects of treatment on subsequent quality of life. These issues are extremely important to patients and all involved in their care. In a recent UK research priority-setting initiative, research into the consequences of cancer was rated as a top priority by patients, their families, and healthcare professionals. That cancer treatment, including cytotoxic therapies, radiotherapy and surgery has adverse effects on fertility has long been recognised. In the ovary, chemotherapeutic agents affect growing follicles resulting in amenorrhea and in the longer-term loss of fertility and premature ovarian insufficiency (POI). For males, sperm counts can be very low after treatment, but in some there can be full or partial recovery.

### Who can participate?

Any patient aged 13-25 years old with a new cancer diagnosis or presenting with a recurrence of cancer that requires treatment

### What does the study involve?

A single blood sample and data collection are conducted at baseline, and 1-, 2- and 3-year follow-up. Where possible, the study visits will coincide with a clinical visit.

### What are the possible benefits and risks of participating?

Patients will not benefit from participating in the study. As this is an observational study, no adverse events are expected. There is a risk of minor bruising after a blood sample is taken.

### Where is the study run from?

University of Edinburgh (UK)

### When is the study starting and how long is it expected to run for?

January 2021 to January 2027

### Who is funding the study?

Medical Research Council (UK)

Who is the main contact?

Audrey Kuchnowski [audrey.kuchnowski@ed.ac.uk](mailto:audrey.kuchnowski@ed.ac.uk) (UK)

## Contact information

### Type(s)

Principal Investigator

### Contact name

Prof Richard A Anderson

### ORCID ID

<http://orcid.org/0000-0002-7495-518X>

### Contact details

Professor of Clinical Reproductive Science  
Centre for Reproductive Health  
Institute of Regeneration & Repair  
University of Edinburgh  
4-5 Little France Drive  
Edinburgh  
United Kingdom  
EH16 4UU  
+44 (0) 131 242 2694  
[richard.anderson@ed.ac.uk](mailto:richard.anderson@ed.ac.uk)

### Type(s)

Public, Scientific

### Contact name

Mrs Audrey Kuchnowski

### Contact details

Centre for Reproductive Health  
Institute of Regeneration & Repair  
University of Edinburgh  
4-5 Little France Drive  
Edinburgh  
United Kingdom  
EH16 4UU  
+44 (0)131 242 2669  
[audrey.kuchnowski@ed.ac.uk](mailto:audrey.kuchnowski@ed.ac.uk)

## Additional identifiers

### EudraCT/CTIS number

Nil known

### IRAS number

285290

**ClinicalTrials.gov number**

Nil known

**Secondary identifying numbers**

CPMS 49696, IRAS 285290

## Study information

**Scientific Title**

Reproductive function in teenage and young adult cancer patients in the UK

**Acronym**

The PROTECT study

**Study hypothesis**

This study will undertake an analysis of the effects of cancer treatments on reproductive function in teenagers and young adults (TYA) to address the hypothesis that cancer diagnosis, cancer treatment and age at treatment affect fertility-related biomarkers and hence long-term fertility/reproductive health in survivors. This is a multi-centre clinical prospective observational cohort study open to clinical centres directly involved in the care of TYA (aged 13-25) with cancer. Previous studies are retrospective thus assessing historical treatments, and mostly rely on questionnaire-based self-reported outcomes, introducing the opportunity for bias and inaccuracy. Additionally, there is a need for data specific to this post-pubertal age group, distinct from children.

**Ethics approval required**

Old ethics approval format

**Ethics approval(s)**

Approved 19/07/2021, South West - Frenchay Research Ethics Committee (Ground Floor, Temple Quay House, 2 The Square Bristol, BS1 6PN, UK; +44 (0)207 104 837; frenchay.rec@hra.nhs.uk), ref: 21/SW/0039

**Study design**

Prospective observational cohort study

**Primary study design**

Observational

**Secondary study design**

Cohort study

**Study setting(s)**

Hospital, Laboratory, Medical and other records

**Study type(s)**

Prevention

**Participant information sheet**

Not available in web format, please use the contact details to request a patient information sheet

## **Condition**

Cancer and reproductive health

## **Interventions**

This is a multi-centre clinical prospective observational cohort study open to all clinical centres directly involved in the care of teenage and young adults (aged 13-25) with cancer.

Potentially eligible patients will be identified by the research team and/or clinical team looking after them. After an initial assessment, potentially eligible patients will be assessed for study inclusion by the assessing clinician and/or member of the research team. If the patient fulfils the study eligibility criteria and is deemed to be competent and have the capacity to consent, an appropriately delegated member of the study team will take written informed consent. It will be documented in the patient's medical notes that they were deemed eligible and capable of providing written informed consent. There will be the option for parents/guardians to provide consent on behalf of those patients who are eligible and willing to take part in the study but are not capable of providing written informed consent.

The study aims to recruit 1000 participants over a period of 5 years, approx. equally males and females.

Participants' demographics, clinical data including PMH, diagnosis information, treatment information and biological samples will be collected locally at study sites at the following timepoints: baseline, one year after diagnosis and annually thereafter for five years (in the first instance with the intention to extend follow-up). An additional blood sample will be obtained as part of the study to measure anti-Mullerian hormone (AMH) in serum (in females) and Inhibin B in serum (in males). These samples will be transported to the lead site (Edinburgh) for storage and analysis.

This study is proposed in collaboration with the Teenage and Young Adult CSG of the National Cancer Research Institute (NCRI). The NCRI is a UK-wide partnership which promotes collaboration in cancer research. Study documentation will be reviewed by the Teenage and Young Adult group of the National Cancer Research Institute (NCRI).

## **Intervention Type**

Other

## **Primary outcome measure**

Prevalence of reproductive failure and of gonadal dysfunction measured using diagnosis /treatment regimen at 2 years after diagnosis

## **Secondary outcome measures**

Uptake of fertility preservation services, and long-term reproductive outcomes including ongoing ovulation/spermatogenesis, conception, age at menopause, and the need for hormone replacement. The prevalence of reproductive failure and of gonadal dysfunction by diagnosis /treatment regimen at 1 and 3 years after diagnosis. A blood sample is collected at baseline, and 1-, 2- and 3-year follow-up. In females, anti-Mullerian hormone (AMH) levels will be measured in

serum, data will be analysed in conjunction with follicle-stimulating hormone (FSH), luteinizing hormone (LH) and estradiol (E2) levels. For males, Inhibin B will be measured in serum. Inhibin B data will be analysed in conjunction with FSH/LH/testosterone levels.

**Overall study start date**

05/01/2021

**Overall study end date**

31/01/2027

## Eligibility

**Participant inclusion criteria**

Current inclusion criteria as of 28/01/2025:

1. Willing and able to provide written informed consent (including by parent/guardian where appropriate)
2. Aged 13-25 years
3. First cancer diagnosis or relapse of same diagnosis
4. Requires cancer treatment with targeted, immunological and cell-based therapies (surgery, chemotherapy and radiotherapy are permitted if part of this treatment or if the initial treatment plan changes)

Previous inclusion criteria:

1. Willing and able to provide written informed consent (including by parent/guardian where appropriate).
2. Aged 13-25 years old
3. First cancer diagnosis
4. Requires cancer treatment (surgery, chemotherapy including targeted therapies, radiotherapy, bone marrow transplant).

**Participant type(s)**

Patient

**Age group**

Mixed

**Lower age limit**

13 Years

**Upper age limit**

25 Years

**Sex**

Both

**Target number of participants**

Planned Sample Size: 1000; UK Sample Size: 1000

**Total final enrolment**

532

**Participant exclusion criteria**

1. Inability to provide informed consent
2. Does not require cancer treatment
3. Where treatment is not given with the intention of cure or long-term survival

**Recruitment start date**

28/01/2022

**Recruitment end date**

30/12/2024

**Locations****Countries of recruitment**

England

Scotland

United Kingdom

Wales

**Study participating centre****Addenbrookes Hospital**

Hills Road

Cambridge

United Kingdom

CB2 0QQ

**Study participating centre****St James's University Hospital**

Beckett Street

Leeds

United Kingdom

LS9 7TF

**Study participating centre****John Radcliffe Hospital**

Headley Way

Headington

Oxford

United Kingdom

OX3 9DU

**Study participating centre**  
**Gartnavel Royal Hospital**  
1055 Great Western Road  
Glasgow  
United Kingdom  
G12 0XH

**Study participating centre**  
**Queens Medical Centre**  
Derby Road  
Nottingham  
United Kingdom  
NG7 2UH

**Study participating centre**  
**University College London Hospital**  
250 Euston Road  
London  
United Kingdom  
NW1 2PG

**Study participating centre**  
**Cambridge University Hospitals NHS Foundation Trust**  
Cambridge Biomedical Campus  
Hills Road  
Cambridge  
United Kingdom  
CB2 0QQ

**Study participating centre**  
**Queen Elizabeth Hospital**  
Mindelsohn Way  
Edgbaston  
Birmingham  
United Kingdom  
B15 2GW

**Study participating centre**  
**Royal Sussex County Hospital**  
Eastern Road

Brighton  
United Kingdom  
BN2 5BE

**Study participating centre**

**University Hospitals Bristol and Weston NHS Foundation Trust**

Trust Headquarters  
Marlborough Street  
Bristol  
United Kingdom  
BS1 3NU

**Study participating centre**

**Cardiff & Vale University Lhb**

Woodland House  
Maes-y-coed Road  
Cardiff  
United Kingdom  
CF14 4HH

**Study participating centre**

**Royal Devon and Exeter Hospital**

Barrack Road  
Exeter  
United Kingdom  
EX2 5DW

**Study participating centre**

**Royal Marsden Hospital**

Fulham Road  
London  
United Kingdom  
SW3 6JJ

**Study participating centre**

**Sheffield Children's Hospital**

Western Bank  
Sheffield  
United Kingdom  
S10 2TH



**Study participating centre**  
**Northern General Hospital**  
Herries Road  
Sheffield  
United Kingdom  
S5 7AU

**Study participating centre**  
**James Cook University Hospital**  
Marton Road  
Middlesbrough  
United Kingdom  
TS4 3BW

**Study participating centre**  
**Southampton General Hospital**  
Tremona Road  
Southampton  
United Kingdom  
SO16 6YD

**Study participating centre**  
**Bristol Haematology & Oncology Centre**  
Horfield Road  
Bristol  
United Kingdom  
BS2 8ED

**Study participating centre**  
**Bristol Royal Hospital for Children**  
Paul O'Gorman Building  
St Michaels Hill  
Bristol  
United Kingdom  
BS2 8BJ

**Study participating centre**  
**Castle Hill Hospital**  
Castle Road

Cottingham  
United Kingdom  
HU16 5JQ

**Study participating centre**

**Churchill Hospital**

Old Road  
Headington  
Oxford  
United Kingdom  
OX3 7LE

**Study participating centre**

**Derriford Hospital**

Derriford Road  
Plymouth  
United Kingdom  
PL6 8DH

**Study participating centre**

**Freeman Road Hospital**

Freeman Road  
High Heaton  
Newcastle upon Tyne  
United Kingdom  
NE7 7DN

**Study participating centre**

**Great North Children's Hospital, (Royal Victoria Infirmary)**

Victoria Wing  
Newcastle upon Tyne  
United Kingdom  
NE1 4LP

**Study participating centre**

**Leeds Children's Hospital**

Leeds General Infirmary  
Clarendon Wing  
Great George Street

Leeds  
United Kingdom  
LS1 3EX

**Study participating centre**  
**Nottingham University Hospitals - City Campus**  
Nottingham City Hospital  
Hucknall Road  
Nottingham  
United Kingdom  
NG5 1PB

**Study participating centre**  
**Royal Hospital for Children and Young People**  
50 Little France Crescent  
Edinburgh  
Lothian  
United Kingdom  
EH16 4TJ

**Study participating centre**  
**St. Bartholomews Hospital**  
West Smithfield  
London  
United Kingdom  
EC1A 7BE

**Study participating centre**  
**Beatson West of Scotland Cancer Centre**  
1053 Great Western Road  
Glasgow  
United Kingdom  
G12 0YN

**Study participating centre**  
**Christie Hospital**  
Wilmslow Road  
Manchester  
United Kingdom  
M20 4BX

**Study participating centre**  
**University Hospital of Wales**  
Heath Park  
Cardiff  
United Kingdom  
CF14 4XW

**Study participating centre**  
**Weston Park Hospital**  
The University of Sheffield  
Whitham Rd  
Broomhall  
Sheffield  
United Kingdom  
S10 2SJ

## **Sponsor information**

**Organisation**  
University of Edinburgh and NHS Lothian

**Sponsor details**  
The Queen's Medical Research Institute  
The University of Edinburgh  
47 Little France Crescent  
Edinburgh  
Scotland  
United Kingdom  
EH16 4TJ  
+44 (0)131 242 9447  
enquiries@accord.scot

**Sponsor type**  
Hospital/treatment centre

**Website**  
<http://www.ed.ac.uk/schools-departments/medicine-vet-medicine/about/little-france/qmri>

## **Funder(s)**

**Funder type**  
Research council

**Funder Name**

Medical Research Council

**Alternative Name(s)**

Medical Research Council (United Kingdom), UK Medical Research Council, MRC

**Funding Body Type**

Government organisation

**Funding Body Subtype**

National government

**Location**

United Kingdom

## Results and Publications

**Publication and dissemination plan**

1. Planned publication in a high-impact peer reviewed journal
2. Presentation of the findings at reproductive medicine and cancer scientific meetings

**Intention to publish date**

31/01/2028

**Individual participant data (IPD) sharing plan**

The datasets generated during and/or analysed during the current study are/will be available upon request from Professor Anderson, including anonymised IPD, from credentialed academic researchers

**IPD sharing plan summary**

Available on request