Yorkshire Specialist Register of Cancer in Children and Young People

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Abstract

Cancer is a rare disease in children and young people and one that places a considerable burden not only upon the patients themselves but also on their families and the health care system. Little is known about the causes of malignant conditions in this young age group. The Yorkshire Specialist Register of Cancer in Children and Young People is an established population-based register of tumours diagnosed in the childhood, adolescent and young adult age ranges. The Register currently contains information on 8500 young people diagnosed with cancer while living within the former Yorkshire Regional Health Authority. Data on children under 15 years has been collected since 1974, whilst data accrual for 15-29 year olds began in 1990.

The primary aim of the Register is to investigate the causes of cancer through the application of epidemiological analyses. This includes monitoring time trends and investigating geographical patterns of disease across the region. Secondly, our aim is to investigate the delivery of care to young people with cancer in Yorkshire to ensure the best treatment is available; for example by looking at pathways of care and factors that influence survival. The Register data are also available to ensure optimum planning of cancer services for children and young people in the region and to provide clinicians with an information service on their patients. To undertake this, the Register will continue to collect complete and accurate information on a prospective basis.

Funding for the project has been provided by the Leeds Candlelighters’ Trust since 1984.
1. Aims of the Register

The work of the Register falls into two main areas, the aims of which are

- To investigate the causes of cancers in children and young people through comprehensive epidemiological and molecular analyses describing patterns of cancer incidence. This includes investigations of the effects of environmental factors and population characteristics such as deprivation, ethnicity and other socio-demographic variables that might explain any differences in incidence rates. The timing of exposure to these potential risk factors, which may influence the onset of disease, is considered from the time of conception up to diagnosis.
- To investigate the delivery of care to young people with cancer in Yorkshire to ensure the best treatment is available; for example by looking at pathways of care and factors that might influence survival.
- To help inform the planning of cancer services for young people in the Yorkshire Region and to provide clinicians with relevant and timely information about their patients.

In order to achieve the above aims the Register needs

- To continue to collect complete, accurate and timely population-based data on children and young people diagnosed with malignant disease whilst resident in the Yorkshire and the Humber Strategic Health Authority.
- To continue to monitor the cohort in an active follow-up of all patients registered through consultants, General Practitioners (GP) and the NHS Central Register (NHSCR) in order to carry out relevant survival analyses.
- To make use of other routine health related databases such as Hospital Episode Statistics, primary care data and hospital data from long term follow-up clinics to facilitate research into health care pathways pre and post cancer diagnosis and describe the prevalence of late health effects of treatment.

- To provide an information service for local clinicians and to advocate the use of the Register in health services research projects across Yorkshire in collaboration with regional consultants.
2. Background

Cancer in children and young people is extremely rare and different to that found in adults (1). Despite wide-ranging research over recent decades, surprisingly few risk factors have been consistently identified in association with paediatric cancers. Moreover, little attention has been focused on large-scale epidemiological studies of cancer in older adolescents and young adults. This study therefore aims to extend an established database collecting information on patients’ demographics, together with their type of cancer, treatment and survival stretching back over 40 years.

The Yorkshire Register remains one of only four specialist databases covering the paediatric age range, and the only one of its kind in England covering all patients diagnosed under the age of 30 (2). Uniquely, the Register includes information on treatment and follow-up missing from the former regional Cancer Registries.

Although the descriptive epidemiology of paediatric cancer is well documented (1,3), malignant disease is similarly rare in adolescence but remains poorly described, despite accounting for a sizeable morbidity and mortality in the older age range. It is recognised that teenagers and adolescents with cancer are a particularly challenging group for the health care services and only recently have the needs of this group been addressed in a systematic manner. Cancer patients in this age group have differing requirements, with children and older adults both needing specific psychological, educational and social support. The Expert Advisory Group in Cancer to the Chief Medical Officers of England and Wales has recognised these needs and recommends the formation of specialist units for adolescents with cancer (4). Underpinning this requirement is the need for good information on this group of young people in order to document incidence and survival and clearly identify the special support necessary for delivery of comprehensive care (5-6). The Yorkshire Register is therefore in an excellent position to evaluate the delivery of care in this older age group.

The value of the Yorkshire Register accumulates with time providing a database of increasing numbers for analyses of this rare condition. Epidemiological analyses require large numbers of cases in order to ensure high statistical power and that the results are applicable to the general population. Because the epidemiology of paediatric and young adult cancers is still poorly understood, data is usually presented in biologically distinct diagnostic subgroups. It is therefore
imperative that the Register continues to collect accurate information on the diagnosis of young people with cancer in Yorkshire.

The technical aspects of inputting, validating and securing the computerised database have been extensively refined over recent years. Standardised procedures are in place for data collection, validation, ascertainment cross-checks with other data sources, extraction and follow-up. Not only is the information used to identify incidence and survival trends across the Region but also to underpin health services research projects including the delivery of care in important areas such as adolescent cancer and to act as a clinical resource used by local oncologists and research staff.

Recent research data from the Register have shown that:

- Five-year survival rates for children who relapsed with leukaemia or lymphoma were around 46%, much lower than those who did not relapse (79%) [XV].
- Areas with high incidence rates of childhood leukaemia also exhibit high rates of childhood diabetes suggesting that both conditions may have a common aetiology [XIII].
- Children living in areas of high population mixing have lower rates of leukaemia [V].
- The incidence of the most common form of childhood leukaemia has not increased since the 1970s although there was a sharp rise in the number of newly diagnosed cases during the 1980s [III].
3. Data collection

The computerised Register and accompanying forms are held within the Division of Epidemiology and Biostatistics, School of Medicine, University of Leeds (http://medhealth.leeds.ac.uk/info/545/yorkshire_specialist_cancer_register). The security of the data are described in detail in section 6.

The geographical area covered by the Register aligns with the Yorkshire and the Humber Strategic Health Authority (SHA). The Region covers a population of 5.1 million, 1.9 million of whom are aged under 30 years. Subjects diagnosed with a malignancy aged 0-29 years whilst living in the Yorkshire and the Humber SHA are eligible for inclusion on the Register.

Historically, cancer registration records have been identified primarily through hospital records involving manual abstraction of information from hospital notes. More recently and in the future we have been establishing a secure, electronic feed of information from local patient management and pathology systems, the National Cancer Registration Service and Northern and Yorkshire Cancer Teams (Public Health England), as well as primary care datasets, in order to improve the efficiency of data collection. Where essential data on cancer diagnosis and treatment are missing or incomplete from the electronic data sources, we manually abstract information from local hospital notes and patient management systems. Registry data will on occasion and for the purposes of quality assurance be crosschecked and validated against other datasets held by the National Cancer Registration Service and Northern and Yorkshire Cancer Teams (Public Health England). The data comprises personal and demographic information (e.g. name, date of birth, address, postcode, height, weight) along with diagnostic and clinical data on treatment (drugs, radiotherapy, surgery). A field also identifies whether patients were treated on a Teenage Cancer Trust (TCT) unit to evaluate the impact on survival compared to those receiving care in non-specialist centres. Copies of diagnostic pathology reports, cytogenetic and molecular genetic diagnostics are retained to provide comprehensive information on diagnosis and facilitate future research should diagnostic classifications change.

Follow-up information is derived from specific contacts with:

i. The treating consultants and the patient’s GP.
ii. Northern and Yorkshire Cancer Teams (Public Health England), who provide an annual notification of deaths occurring among the Register cohort including cause, place and date of death.
Patients for whom we are unable to obtain follow-up information are traced using their local Health Authority; otherwise we trace the patient’s whereabouts and current GP through the NHS Central Register (NHSCR)/Office for National Statistics (ONS) and the NHS Clinical Spine Application (CSA) to ascertain the status of those lost to follow-up. Information is provided on whether the patients are dead, embarked or untraceable; death certificates are also sent to us listing cause of death.

As part of our ongoing research into the long term health outcomes of children and young people diagnosed with cancer we collect additional information for patients on the register attending the long term follow-up clinics at Leeds Teaching Hospitals Trust. Patients attending these clinics complete a holistic needs assessment which includes the completion of the distress thermometer and a problems check list. These data items are used as a measure of psychological health to assess the prevalence of distress in long term cancer survivors and the associations between patient characteristics and levels of distress.

Over recent years, we have successfully completed an exercise linking individual patients on the Register with their NHS numbers for more accurate matching to other registry databases and the CSA, enabling us to track the current health status of the patient more effectively.

Information on any subsequent primary tumours for patients in the register are obtained through cross checks with the National Cancer Registration Service to obtain information on all tumours diagnosed throughout the patient’s lifetime. This will enable us to examine the incidence and risk of developing a subsequent primary tumour in long term survivors of cancer in children and young adults.

**Diagnostic classification** - the epidemiological investigation of childhood and adolescent cancers are generally based on groupings by histological type of tumour and not the site of the cancer as is common in adult cancer epidemiology. All diagnoses on the Register are coded according to ICD-O versions 2 and 3 (based on ICD10/ICD11) using morphology and site. As part of the process for checking data accuracy, a computer program from the International Agency for Research on Cancer (IARC) called ‘child check’ is used to validate the diagnostic coding and permit the allocation of diagnostic groupings for ICD-O-2/ICD-O-3 with the International Classification of Childhood Cancer (ICCC) (9) which updates the previous Birch and Marsden (10) categories. Teenagers and Young Adults (TYA) are classified separately using an algorithm designed by Birch and colleagues (11) and sub-divided into 10 main diagnostic groups.
**Internal validation** exercises are carried out annually to ensure the diagnostic codes are compatible with different morphological and topographical combinations, and checks on dates of birth/diagnosis performed with data from the Northern and Yorkshire Cancer Teams (Public Health England). The data are also routinely validated for elimination of duplicates, consistency, accuracy and diagnostic coding, the latter using the ICCC program.

All addresses and postcodes at diagnosis are verified using Quick Address. Each postcode is then mapped to a small area Census code (sascode) using the National Statistics Postcode Directory and assigned to a census enumeration district (ED) or Output Area (OA). ED/OAs are then aggregated up into electoral wards (EW) or lower super output areas, county districts, counties or Primary Care Trusts within the Yorkshire Region, dependent on the geographical level of analysis. This permits the characterisation of geographical areas by social class, ethnic group and other variables such as population mixing, at different scales using census data.
4. Ethical approval
The work of the register is only undertaken with the approval of a Multi Centre Research Ethics Committee. Approval was originally obtained from the Northern and Yorkshire MREC (Ref MREC/0/1/3) in May 2000 and amendments submitted for approval thereafter. Current approval was provided in March 2014 reflecting a change to the study protocol, notably around changes to data security, the study team (addition of a Data Manager), the research work programme, plans to exploit primary care data and taking advantage of electronic data flows in relation to registration information..

5. Statistical Analysis
Incidence rates are calculated using mid-year population estimates and are usually age-sex standardised in any regional analysis. Rates are then broken down into 12 main ICCC and TYA diagnostic groups (leukaemia, lymphoma, CNS, etc.) to facilitate comparison with other regional, national and international data.

Ecological analyses are usually performed at EW or lower super output area level and Poisson regression used to model the heterogeneity across these small areas. The effects from areal-based measures such as socioeconomic status, population density and proportion of non-white individuals are then calculated and summarised using incidence rate ratios. Survival analyses are carried out based on the date the patient was last seen (or date of death) and modelled in relation to socioeconomic status and ethnicity. Allowance is usually made for the diagnostic staging of the disease and the period of diagnosis. Multiple imputation techniques are implemented in cases where stage at diagnosis or other prognostic variables are missing.
6. Data security and patient consent

**Data security** - Extreme care and attention is paid to maintaining the security and confidentiality of the Register data. The Register has its own Steering Group which includes representation from the following areas – university research, public health, clinical medicine, health care professionals, patients and lay persons. The Steering Group is responsible for ensuring that appropriate procedures are in place to ensure the physical security of the data and its release. Data security is managed through adherence to the Secure Electronic Environment for Data (SEED) Information Governance Policy v3.0.

In summary the following physical precautions are in place to protect the database

- Only those essential members of staff who work on the Register and require direct access to the database are granted authorisation.
- All users of the SEED system must sign a confidentiality agreement, which includes stipulating that security and confidentiality must be maintained. Certain breaches of security could lead to disciplinary and legal action being taken.
- The database is held on an encrypted firewall-protected area of the University of Leeds Storage Area Network.
- Daily back ups are taken to ensure the integrity of the data.
Personally identifiable information is also held subject to the following conditions

- No information is ever published in which individuals can be identified.
- No individuals on the Register are ever approached directly.
- Data are only released according to the requirements of the Information Governance Policy which specifies the circumstances for data release.

Data will be held indefinitely enabling the accrual of an ever-increasing dataset relating to cancer in young people and allowing more powerful statistical comparisons to be performed and the effects of risk factors estimated more precisely.

**Patient consent** - Consent for the transfer of personal information is a requirement of the Data Protection Act 1998, the Human Rights Act 1998 and the common law. However, the National Information and Governance Board for Health and Social Care (NIGB) previously the Patient Information Advisory Group (PIAG), exempted the UK Association of Cancer Registries (UKACR), of which the Yorkshire Specialist Register is a member, from gaining informed patient consent for the holding of personal information through Section 251 of the NHS Act 2006 (originally enacted under Section 60 of the Health and Social Care Act 2001). We have subsequently been advised by the National Cancer Registration Service to submit a bespoke NIGB application to the Confidentiality Advisory Group (CAG) following its recent move to Public Health England; this application was successfully approved on 13th August 2014 (Reference Number: CAG 1-07(b)/2014). The Yorkshire Registry can therefore continue to be used to process cancer registry and related data for the purposes of epidemiological and health services research.
**Access to medical records** - Clinical governance has now imposed conditions on the conduct of research within the NHS. This has resulted in our data collection manager requiring individual honorary contracts with each of the 11 different NHS Trusts in order to gain access to patients’ medical records. This process never involves any patient contact. Contracts were agreed with every NHS Trust in the Yorkshire and Humber SHA and are currently being renewed to run until 2017. Other members of staff working on specific Registry research projects will seek separate R&D approval and honorary contracts/access letters with relevant NHS Trusts to scrutinise medical records.
7. Dissemination of information

Information about the implementation and findings from the Register include:

- **Procedure Manual and Documentation** - A procedure manual covering all aspects of data collection and computerisation for the Register, ranging from data abstraction (using a standard data collection form – Appendix I) to inputting, follow-up, maintenance and validation has been produced and is available online (http://medhealth.leeds.ac.uk/downloads/545/yorkshire_specialist_cancer_register/). This will facilitate the operation of the database and ensure the continued collection of high quality data. An automated system for identifying and chasing patient follow-up has been established. Technical documentation has also been included and made available on the website describing each data field stored in the Access database.

- **The DocDat website** (http://www.icapp.nhs.uk/docdat/) is a national database providing details of active clinical databases in the field of health in the UK. Over 150 databases are currently registered and its aim is to provide information about them and to give some idea of their range of data and its quality. The Yorkshire Register is one of the entries on this site and has been involved in the development of generic data security policies for clinical databases.

- **Informing patients and health care professionals** about the Register and its research involves regular updates to the Register website (http://medhealth.leeds.ac.uk/info/545/yorkshire_specialist_cancer_register). Furthermore, patient and parental information leaflets are distributed to patients and families via the core information pack given out by Macmillan nurses and TYA nurse specialists at diagnosis (Appendix II).
8. Recent results from the Register

- **Epidemiology by ethnic group [XXIII, XXVI]** – Two research papers looking into childhood and young adult cancer have shown interesting differences by ethnic group. We found that the average rate of increase in cancer incidence was much higher (7% per year) amongst south Asians compared to non-south Asians (2% per year). Furthermore, south Asians diagnosed with leukaemia and lymphoma have poorer survival rates compared to non-south Asians.

- **Delivery of care and impact on survival for germ cell tumours [XXIV]** – We demonstrated that significant changes occurred in the treatment for teenagers and young adults with germ cell tumours since 1990, and varied according to age. However these changes were not mirrored by a significant improvement in survival rates.

- **Epidemiology of haematological cancers [XVIII]** – A combined analysis of registry data from Yorkshire and the Northern Region showed that survival rates were significantly lower for 15-24 year olds compared to 0-14 year olds with leukaemia and lymphoma. Part of this discrepancy was explained by lower accrual rates into clinical trials for those aged under 15 compared to 15-24 year olds.

- **Geographical epidemiology [XIII]** – We investigated the spatial distribution of childhood acute lymphoblastic leukaemia (ALL) and Type 1 diabetes across Yorkshire using a sophisticated Bayesian smoothing approach. We found substantially lower rates of ALL and diabetes in West Yorkshire compared to North Yorkshire. We also discovered that small areas with high rates of ALL also displayed high rates of diabetes suggestive of a common aetiology.
9. Future projects

- **Gender differences in outcomes** – Through links with Prof Alan White (collaborator), a leading researcher in men’s health, we aim to explore reasons for generally poorer outcomes for males. We plan to determine whether the lack of improvement in survival for females with ALL can be explained by adverse cytogenetics or an interaction with ethnicity, since south Asian children in Yorkshire have poorer survival rates than their non-south Asian counterparts.

- **Risk of late effects of cancer treatment** – The aims of this work programme are to produce a comprehensive picture of the health profile of children and young people diagnosed with cancer by linking information on patient outcomes from primary care, secondary care (including inpatient, outpatient, A&E and mental health admissions) and other routine datasets.

- **Patient pathways** – *are there any delays in diagnosis amongst children and young adults with cancer in Yorkshire? Does this vary by diagnostic groups or in relation to survival outcomes? What are the long and short term effects of treatment post cancer diagnosis? How do delays impact on disease severity and NHS costs?*

One of the key areas of concern depicted in the cancer reform strategy of 2007 is that of delays in diagnosis of cancer, and how this may impact upon survival and other outcomes amongst children and young adults. As well as considering pathways to diagnosis, it has become increasingly important to consider the critical post-diagnosis time window. Over 75% of children diagnosed with cancer become long term survivors, and this is a cohort which is at risk of developing a range of co-morbidities as a result of treatments received during their childhood. These research questions can be answered using the Register’s detailed data on treatment in combination with linked Hospital Episode Statistics (HES) and primary care data to examine medical data both pre and post cancer diagnosis.

Other specific objectives include:

- To determine whether the lack of improvement in female acute lymphoblastic leukaemia (ALL) survival is explained by adverse cytogenetics or ethnic group through collaboration with the Yorkshire (Haematological) Malignancy Research Network.
- To evaluate survival for primitive neuroectodermal tumours (PNET) among 0-29 year olds, focusing on medulloblastoma.
• To investigate neurological problems among CNS tumours and assess associations with changes in treatment practice and socio-demographic factors to improve services.
• To determine whether there has been an improvement in survival for high grade non-metastatic osteosarcoma following the introduction of mifamurtide treatment and describe the additional hospital services required for these patients.
• To link the Register to the Yorkshire Congenital Anomalies Register comparing the prevalence and risk of cancer occurring in children with congenital anomalies, looking for known and new differences by ethnic group.
• To identify the risks of late effects for lymphoma, central nervous system (CNS) tumours, bone and soft tissue sarcoma and germ cell tumours, and to consolidate international collaboration with the Danish cancer survivorship research group comparing long-term effects with the Yorkshire population.
• To compare clinical management and subsequent hospital activity for individuals with ALL between males and females and track changes over time.
• To assess rehabilitation outcomes for CNS and bone tumours through a new collaboration with physiotherapy services.
• To secure external funding to explore patient satisfaction for CNS tumour survivors requiring palliative care.
• To investigate the impact of MDT involvement in care planning introduced for teenagers and young adults in 2008 on survival and hospital admissions.

One other national project is ongoing which ties in closely with the ongoing epidemiological and health services research using data from the Yorkshire Register focusing on teenagers and young adults (TYA) with cancer.

• **Infectious aetiology of Teenage and Young Adult cancer in England**

This project exploits national data on TYA cancer to test the hypothesis of an infectious aetiology for certain TYA cancers (leukaemia, lymphoma, central nervous system tumours) by examining evidence of seasonality of birth, non-linear changes in incidence rates over time and the association with proxies for infection at the small-area level. The study is funded by Children with Cancer.
• **External liaison** - Maintaining links with other registries and outside bodies is seen as a key function of the Register. Particular links have been established and combined with research projects developed with the NRYPMDR at Newcastle (Dr Richard McNally) and the Manchester Children’s Cancer Registry (Professor Jillian Birch)

**Examples include:**

- Epidemiology of bone tumours in northern England (PI Dr R McNally). The project uses data from the Yorkshire and Northern Region Registers to examine incidence and survival trends among children, teenagers and young adults since the 1970s. The project was funded by the Bone Cancer Research Trust.

- International Study of Embryonal Tumours (PI Prof JM Birch). This planned study aims to combine population-based data on children diagnosed with embryonal tumours across Europe, the US and Asia to investigate their epidemiology and identify environmental and genetic risk factors. Subjects from Yorkshire will be included using the Register to identify eligible cases. The work is part funded by the International Agency for Research on Cancer (IARC) and further funding is being applied for from Cancer Research UK.

- UK Study of Childhood, Teenage and Young Adult Brain Tumours (UK CYAB): a pilot study (Joint PI: Prof PA McKinney/JM Birch). This pilot case-control study collected information on diet and health during early life, along with mobile phone usage to determine whether a full study can be implemented in order to identify possible causes of brain tumours in young people. Eligible individuals from the Yorkshire Register were identified and asked to participate through their GP. Funding was obtained from the Samantha Dickson Brain Tumour Trust.

• **Hypothesis testing** – the Register is available for testing hypotheses generated by other independent studies and other *ad hoc* data requests.

10. **Funding**

The Leeds Candlelighters’ Trust has financially supported the data collection for the Register since 1984 and has also included funding for a research statistician since 1996. It has also supported a data manager since 2014.
11. Glossary

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<th>Acronym</th>
<th>Full Form</th>
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<tr>
<td>CCLG</td>
<td>Children’s Cancer and Leukaemia Group</td>
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<tr>
<td>ED</td>
<td>Enumeration District: the smallest areal denominator available from the 1981 and 1991 Census</td>
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<tr>
<td>EW</td>
<td>Electoral Ward: areas defined by the amalgamation of EDs, more suited to epidemiological studies, usually containing approximately 5500 people.</td>
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<tr>
<td>HMDS</td>
<td>Haematological Malignancy Diagnostic Service</td>
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<td>IARC</td>
<td>International Agency for Research on Cancer</td>
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<td>ICCC</td>
<td>International Classification of Childhood Cancer</td>
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<td>NIGB</td>
<td>National Governance Information Board for Health and Social Care</td>
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<td>NRCT</td>
<td>National Registry of Childhood Tumours</td>
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<td>NRYPMDR</td>
<td>Northern Region Young Person’s Malignant Disease Register</td>
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<td>NYCRIS</td>
<td>Northern and Yorkshire Cancer Registry and Information Service</td>
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<td>PIAG</td>
<td>Patient Information Advisory Group</td>
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<td>UKACR</td>
<td>UK Association of Cancer Registries</td>
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12. References

13. Recent Publications from the Register (1999-2014)


14. Presentations from the Register

Cardiovascular Late Effects in Survivors of Childhood and Young Adult Cancer. M.van Laar. Paediatric Oncology Breakfast Seminar, October 2013 (Oral).


Smart use of existing data - Cardiotoxicity in long term survivors of childhood cancer.
M. van Laar.
West Yorkshire Patient and Public Involvement Group, Leeds, June 2013 (Oral).

M. van Laar, S.E. Kinsey, S.V. Picton, R.G. Feltbower
44th Congress of the International Society of Paediatric Oncology, October 2012, London (Poster)

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Teenage Cancer Trust Conference, June 2012, London (Poster).

M. van Laar, S.E. Kinsey, S.V. Picton, R.G. Feltbower
Childhood Cancer Conference, April 2012, London (Poster).

UK Case Control Study of Brain Tumours in Children, Teenagers and Young Adults: a Pilot Study.
RG Feltbower, PA McKinney, RD Alston, SJ Fleming, JM Birch
NCRI Cancer Conference, November 2011, Liverpool (Poster)

M. van Laar, S.E. Kinsey, S.V. Picton, Catherine O’Hara, R.G. Feltbower
NCRI Cancer Conference, November 2011, Liverpool (Poster)

M. van Laar, S.E. Kinsey, S.V. Picton, Catherine O’Hara, R.G. Feltbower
43rd Congress of the International Society of Paediatric Oncology, October 2011, Auckland, NZ (Oral)

Transition of care for survivors of childhood cancer to adult cancer care
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Cardiovascular sequelae in long term survivors of childhood and young adult cancer
Simms AD, van Laar M, Birch RJ, Gale CP, Glaser AW, Bowen DT, Oliver SE, Feltbower RG. European Society of Cardiology Congress, August 2011, Paris (Poster)

Multiple Imputation and Survival Analysis: - an example using cancer registry data
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Multiple Imputation and Survival Analysis using cancer registry data
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Cardiovascular sequelae in long term survivors of childhood and young adult cancer
van Laar M, Birch RJ, Gale CP, Glaser AW, Bowen DT, Oliver SE, Feltbower RG.
TYAC Winter Education Day, December 2010, Bristol (Oral) :- cancelled due to weather

Differences in hospital inpatient patterns between attendees and non-attendees at a paediatric and adolescent long-term follow-up clinic in Yorkshire, UK.
Birch RJ, van Laar M, Glaser AW, Stark DP, Lewis IJ, Feltbower RG.
TYAC Winter Education Day, December 2010, Bristol (Oral) :- cancelled due to weather

Incidence rates and survival trends of cancer in 0-29 year olds by ethnic group in Yorkshire, UK
TYAC Winter Education Day, December 2010, Bristol (Oral) :- cancelled due to weather

International teenage and young adult cancer care – a survey of professional opinions
Birch RJ, Stark DP, Lewis IJ, West RM, Forman D, Feltbower RG.
TYAC Winter Education Day, December 2010, Bristol (Oral) :- cancelled due to weather
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American Heart Association, Scientific Sessions November 2010, Chicago (Poster)

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