



Children's  
Cancer and  
Leukaemia  
Group

the EXPERTS  
in CHILDHOOD  
CANCER

# Childhood cancer: Health of survivors

Healthcare information for general practitioners (GPs) who are involved in the care of a child or teenager with cancer

In partnership with



Grace Kelly  
Childhood  
Cancer Trust

## About childhood cancer survivors

Improvements in treatment since the 1970s mean that more children are surviving their cancer diagnosis. For those diagnosed in 2012-2016, the five-year survival rate is 84%.<sup>1</sup>

However, the trend of survival is not uniform. There are several cancers with poorer prognosis with little improvement such as certain brain tumours types, liver tumours and Ewing sarcoma

Survivors may present with one or more of a unique set of **long-term medical and psychological challenges** (called **late effects**) and the spectrum of these is ever-changing as primary therapies evolve. Furthermore, the impact of biological ageing on these late effects is yet to be fully understood.

Death rates in survivors exceed age-matched controls, with death from **subsequent cancer, pulmonary and cardiac complications** being the most frequent.

In view of these excess risks, **lifelong follow-up of survivors should be in place**, in a risk-stratified manner, to ensure that they receive early diagnosis, counselling and, where possible, timely initiation of appropriate treatments or interventions for these late effects.<sup>2</sup> This requires a multi-disciplinary team approach with cooperation between primary, secondary and tertiary care.

## Long-term follow-up care

Specialist late effects or aftercare services exist to provide expert, evidence-based clinical care that aims to reduce the frequency and severity of late side effects of treatment. All children's, teenage and young adult cancer units in the UK are required to provide these long-term follow-up services for survivors.

These services exist to interpret the risks related to the cancer and its treatment, and to identify opportunities for intervention, recommend appropriate surveillance and co-ordinate the management of the consequences of treatment. These services should be seen to supply information not only to the survivor but to make that knowledge available to other health care professionals.

Information to the patient is usually provided in the form of a:

- treatment summary, outlining what has happened and what late side effects may develop in the future
- care plan describing recommendations for future surveillance and follow-up care

During childhood and teenage years, this care is usually delivered by the cancer-treating team but, for adult survivors, it is usually transitioned to age-appropriate adult providers. Here, GPs will have a pivotal role in the ongoing follow-up with guidance where applicable from a late effects team.

### GP care

Currently, the average general practice would be expected to have around four childhood cancer survivors on their list.<sup>6</sup> GPs need to be aware that survivors of childhood cancer have additional requirements and health risks compared to the general population.

## Late effects

Around 60–75% of survivors have at least one recognisable chronic illness or adverse outcome directly related to their previous cancer or its treatment.<sup>3</sup> These include both issues that would not have happened (or would be unlikely) without prior cancer treatment, such as sarcoma in a radiation field, growth hormone insufficiency after cranial radiotherapy or aortic valve disease after mediastinal radiotherapy, or those issues that are an exaggeration or earlier onset of a chronic adult onset disease like obesity, hypertension or cardiovascular disease. Strikingly, the cumulative incidence of severe health complaints reported by 50-year-old survivors was 53.6% compared to 19.8% of siblings at the same age.<sup>4</sup>

**The risk of late effects** is related to the cancer type, location of the primary cancer, age of patient when treated and the treatments received by the patient:

- cytotoxic drugs (chemotherapy) generally have a dose-related toxicity, and may result in organ dysfunction or secondary malignancies
- radiotherapy may result in secondary malignancies, organ dysfunction, or growth failure dependent on the location that received the treatment<sup>5</sup>
- surgery may result in motor or neurological deficits, bone deformities or growth problems; children may require amputations, complex radical surgeries and reconstructions as part of the treatment of their primary cancer, leaving them with long term effects
- long-term toxicities of newer therapies, for example, immunotherapies, are not yet well understood

## Specific late effects of treatment

This is not an exhaustive list of the complications of childhood cancer treatment as any organ or system can be affected. This list encompasses the most common issues that may require intervention or support from the GP.

### Malignancy

Childhood cancer survivors are both at **increased risk of subsequent primary tumours and late recurrence** too. These may not present with typical red flags and GPs should have a high index of suspicion for investigating survivors for subsequent cancers. Referral should be via the site specific two-week wait pathway.

Some individuals (and their families) will have underlying genetic abnormalities that make them at increased risk of subsequent primary cancers, such as Li-Fraumeni, neurofibromatosis and hereditary retinoblastoma. GPs should note that the childhood cancer survivor may be the index case for a family that may all have an increased genetic risk.

### Hormonal effects

Chemotherapy and radiotherapy can affect **growth, pubertal development and endocrine function**. Monitoring of growth and puberty should take place in long-term follow-up appointments and those at risk of hypothalamic and pituitary dysfunction will be under paediatric endocrinology. Individuals requiring adult growth hormone replacement should stay under endocrine care. If you detect growth or pubertal concerns in a person treated for childhood cancer, please contact their original treating cancer service who will advise. GPs should be aware that individuals who received radiotherapy to the neck, spine or brain should have regular (annual) thyroid hormone monitoring and neck palpation for life.

### Cardiac/vascular

Survivors of childhood cancer are at increased risk of cardiac problems including **cardiomyopathy, arrhythmia, valvular defects** and **ischaemic heart disease**.

Those who received either anthracyclines (such as doxorubicin) or radiation to a field that included the heart should be under long-term monitoring using echocardiograms to monitor cardiac function every three to five years.<sup>5,7</sup> GPs should be aware of the need to actively monitor and treat for other predisposing cardiac risk factors like hypertension, diabetes

and hypercholesterolaemia. Pregnant patients should also be monitored as they are at a higher risk of developing cardiomyopathy. These patients should receive consultant-led care or shared care during pregnancy.

Early onset stroke can be associated with cranial radiotherapy, and managing cardiac risk factors are also important in this group.

### Metabolic syndrome

Childhood cancer survivors are at increased risk of developing **obesity** and **metabolic syndrome** compared to the general population.<sup>5</sup> This is especially the case for those who were treated for brain tumours, acute lymphoblastic leukaemia (ALL) or had a bone marrow transplant. Management of this should follow the evidence-based guidance used for the general population, and lifestyle and dietary advice given. GPs should note that survivors of childhood bone marrow transplantation conditioned with total body irradiation may have metabolic syndrome and high cardiovascular risk even if their BMI is normal or they are underweight.

### Pulmonary

**Lung fibrosis** is a serious consequence of lung radiotherapy and may occur after childhood cancer treatment. Little can be done to reverse the decline in symptomatic individuals.

### Cognitive and psychosocial impacts

Childhood cancer treatment can lead to **early neurocognitive decline**. Children that received cranial irradiation and/or intrathecal chemotherapy at a young age are particularly susceptible to these problems. GPs should be aware of cognitive decline in survivors attending with memory problems, and should consider assessing survivors using frailty tools established for cognitive decline in the elderly.<sup>7,8,9</sup>

Many survivors of childhood brain tumour treatment remain dependent on their parents as carers even in adulthood, and the ageing of these parents should be taken into account when supporting these individuals. Treatment for childhood cancer can affect social function making integration with peers hard, compounded by the fact that the child has spent so much time away from everyday life. Problems with social function and isolation are more likely where memory has been affected.<sup>10</sup>

**There is a higher rate of mental illness in childhood cancer survivors and their families.**<sup>11</sup> They are more likely to suffer from anxiety, depression and post-traumatic stress disorder as well as fear of recurrence.

### Fertility and pregnancy issues

Concerns about **future fertility** are one of the most common worries for childhood cancer survivors and specialist referral may be required. Increasingly, young people are offered fertility preservation techniques, such as semen cryopreservation and cryopreservation of ovarian tissue. However, this is not possible in all cases, nor have these techniques been available for older survivors.<sup>5</sup>

Assessment of fertility for women needs the healthcare professional not only to think about the functioning of the ovaries but also the health of the woman to maintain a pregnancy including, but not limited to, assessment of cardiac and respiratory function, endocrine function and the health of the uterus since an irradiated uterus may not carry a pregnancy to term.

Before, or in parallel, to a referral for IVF services, the GP should ensure that all medical conditions are being well managed and all medications that a survivor is prescribed can be taken in pregnancy. Specific advice may be required from other healthcare professionals, e.g. neurologists, cardiologists and endocrinologists to manage this. In cases where survivors have many complex conditions, advice may be required from an expert at managing complex maternal health in pregnancy since IVF services usually focus on getting pregnant rather than the management of medical conditions in pregnancy.

## Bone health

Some survivors are at increased risk of **low bone mineral density**. Those most at risk are those who have had prolonged use of steroids during treatment, post-bone marrow transplant or post-cranial irradiation.

In general practice, it is important to encourage weight-bearing exercise (where possible), a healthy diet and other lifestyle factors that can aid bone density. **Osteonecrosis** (avascular necrosis), usually of weight-bearing joints (hips and knees), may also occur and is more frequent in teenage survivors of childhood leukaemia.<sup>5</sup> It may be debilitating and necessitate early joint replacement.

## Dental health

Childhood cancer survivors who receive head and neck radiotherapy are at increased risk of **problems with orofacial development and dental growth**.<sup>5,12,13</sup>

Childhood cancer survivors even when treated with chemotherapy alone are more likely to have problems with tooth mineralisation and in the development of crowns and roots of teeth compared to peers, making maintaining excellent oral hygiene important. Survivors have a lifelong risk of osteoradionecrosis of the jaw if they have received radiotherapy to this area. Dental care providers should be made aware of a history of jaw irradiation.

## What can GPs do to help adult survivors of childhood cancer?

- Be aware that childhood cancer survivors have additional health needs compared to the general population and a greater all-cause mortality.
- Listen to their concerns and act on risk factors or symptoms promptly as required.
- Since many excess deaths are due to cancer and cardiovascular disease in this group, consultations should provide the opportunity to:
  - encourage a **healthy diet and lifestyle**
  - identify **health problems early**
  - encourage **patient awareness and reporting of symptoms**
  - encourage **participation in national screening programmes**
  - have a **low threshold for referral for suspected cancer**
- Please note that late effects clinics offer advice and guidance on late effects and usually have capacity for annual review appointments. New medical problems should be reported to the appropriate specialty and not back to late effects.
- Consideration should be given to coding these patients for an annual review, to keep up to date with their health care needs.

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## i FURTHER INFORMATION

**Childhood cancer information for healthcare professionals** is available from CCLG, including further information for GPs and those who are supporting a child with cancer in the community

[www.cclg.org.uk/professionals](http://www.cclg.org.uk/professionals)

[www.cclg.org.uk/outreach-information](http://www.cclg.org.uk/outreach-information)

**Resources for healthcare professionals** are available from the Grace Kelly Childhood Cancer Trust, including further information for GPs on early diagnosis and care of children with cancer in the community

[www.gkctt.org.uk/clinicians](http://www.gkctt.org.uk/clinicians)

**PanCare** This pan-European collaboration focuses on the care of survivors of childhood and adolescent cancer and produces guidelines to support best practice in long-term follow-up

[www.pancare.eu](http://www.pancare.eu)

### Information for patients, parents and carers

Written by experts for survivors of childhood cancer, including a guide titled 'Living beyond cancer', information on CCLG's website and factsheets about different late effects. This package provides key and comprehensive information to help childhood cancer survivors. Available to order or download free of charge.

[www.cclg.org.uk/living-beyond-cancer](http://www.cclg.org.uk/living-beyond-cancer)









**Children's Cancer and Leukaemia Group (CCLG) is a leading national charity and expert voice for all childhood cancers.**

Each week in the UK and Ireland, more than 30 children are diagnosed with cancer. Our network of dedicated professional members work together in treatment, care and research to help shape a future where all children with cancer survive and live happy, healthy and independent lives.

We fund and support innovative world-class research and collaborate, both nationally and internationally, to drive forward improvements in childhood cancer. Our award-winning information resources help lessen the anxiety, stress and loneliness commonly felt by families, giving support throughout the cancer journey.

CCLG publications on a variety of topics related to children's cancer are available to order or download free of charge from our website. If you have any comments on this booklet, please email us at [publications@cclg.org.uk](mailto:publications@cclg.org.uk).

We are grateful to all those who have contributed to this publication. We make every effort to ensure that information provided is accurate and up-to-date at time of printing. We do not accept responsibility for information provided by third parties, including those referred to or signposted to.

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**The Grace Kelly Childhood Cancer Trust is a national charity based in Worcestershire which provides vital support to families affected by childhood cancer.**

The Trust was set up in memory of four-year-old Grace Kelly who passed away in 2014 from a rare form of childhood cancer.

We fund research into rare childhood cancers, work to educate families and clinicians about the signs and symptoms of childhood cancer and produce information booklets that are written by medics to explain to parents and children about the treatments they are facing.

We provide financial, practical, and emotional support to local families through our family support service at the charity, giving families a listening ear at the time when they need it most.

Our information booklets and further information can be downloaded or ordered free of charge from our website.

Because the children of today all deserve a tomorrow.

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