

Childhood cancers

Every child and adolescent deserves an equal chance

DECEMBER 2023

HIGHLIGHTS

- Childhood cancers are rare and have high overall survival, but remain the first cause of death from disease in children and adolescents.
- In 2022 in Europe, a total of 14 thousand new cancer cases were estimated in children and adolescents (aged 0-19 years) and over 2 thousand were estimated to die from this disease. Adolescents and very small children are the most affected.
- The most common childhood cancers are leukaemia, lymphomas and brain tumours. Cancer incidence, mortality rates, and survival percentages considerably vary among EU countries and regions.
- Discrepancies can be seen in access to essential cancer medicines and to clinical trials for children and adolescents throughout the EU.
- Research is needed into the origins of childhood cancer and to advance tailored treatments. Equal access to standard of care and innovative therapies, as well as improved policies for childhood cancer survivors are needed.

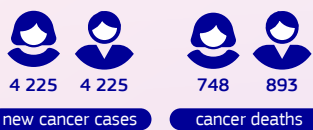
CHALLENGES

Cancer burden in children and adolescents

Despite childhood cancer being a rare disease (occurring less than 1 in 2 thousand cases), approximately a quarter of all deaths in children are due to cancer¹. It is estimated that in 2022, over 9 thousand **children aged 0 to 14 years** were diagnosed with cancer and over 1.6 thousand died from cancer in Europe*². The 5-year cancer survival during the period 2010-2014 was 81%³ (Fig. 1). In **children and adolescents aged 0 to 19 years** cancer burden estimates increased to 14 thousand new cancer cases and over 2.1 thousand cancer deaths².

Figure 1 - On the left: Estimated 2022 incidence and mortality figures for all cancers but non-melanoma skin cancer for children aged 0 to 14 (boys and girls) in EU-27 plus Norway and Iceland (source: [ECIS 2022 estimates](#)). On the right: 5-year survival from all cancers combined in Europe for ages 0 to 14, period analysis 2010-2014 (Source: [EUROCARE-6 study](#)).

Burden of childhood (0-14y) cancer 2022



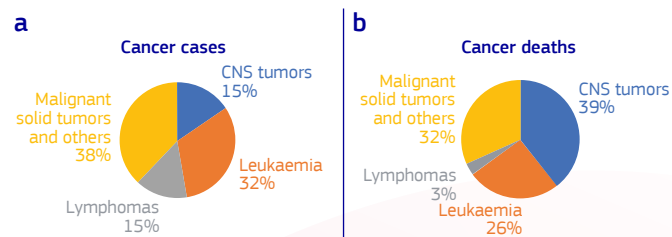
5-year survival 2010-2014



The most common cancer diagnoses among children between 0 to 14 years were: leukaemias, cancers of the central nervous system

(CNS) and lymphomas (Fig. 2a). Nearly 40% of cancer deaths were due to CNS tumours (Fig. 2b). There are more than 60 different paediatric malignancies.

Figure 2 - Estimated distribution of new cancer cases (a) and cancer deaths (b) in 2022 for children aged 0 to 14 by cancer grouping** in EU-27 + Norway + Iceland (Source: [ECIS 2022 estimates](#)).



Aetiology and risk factors for cancer in children and adolescents

Childhood cancers are different from adult cancers in their aetiology, treatment and prognosis. The causes of childhood cancers are poorly understood. Less than 10% of these cancers occur in patients with a known genetic predisposition syndrome. Viral infections and radiation exposure are potential risk factors. Limited evidence exists for the effect of lifestyle and environmental factors on the development of childhood cancers⁴. However, parental exposure to chemicals or environmental factors around conception and during pregnancy may play a role in childhood cancer development⁵.

* In this factsheet Europe refers to EU-27+EFTA excluding Liechtenstein
 ** Cancer grouping is based on ICD-10 classification for disease. Solid tumours include all other cancers than blood or brain and other central nervous system (CNS) cancers
 *** The figures are presented for those countries with an estimated 50 or more new cancer cases in 2022 to ensure robust comparability between countries
 **** Countries that provided national cancer registry data and with available incidence time series of at least 30 years in 2012

INEQUALITIES

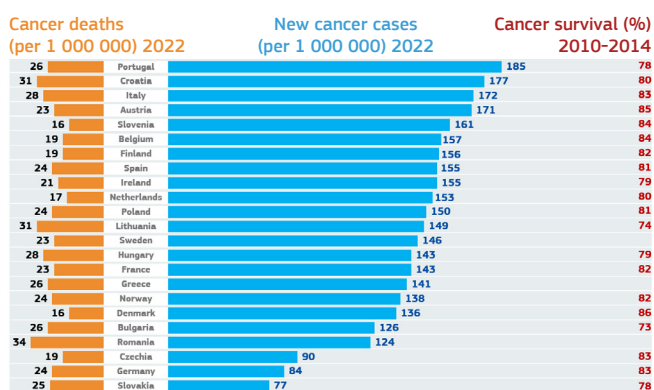
GEOGRAPHICAL INEQUALITIES

Cancer incidence, mortality and survival by country

The estimated childhood cancer incidence for 2022 varied across EU countries, with rates ranging from 77 to 185 per million children. Similarly, estimated mortality rates ranged from 16 to 34 per million children (Figure 3).

Relatively large variations in 5-year survival were also observed among European countries. For the analyses period between 2010-2014, the 5-year survival ranged from 70 to 90% across Europe³ (Figure 3).

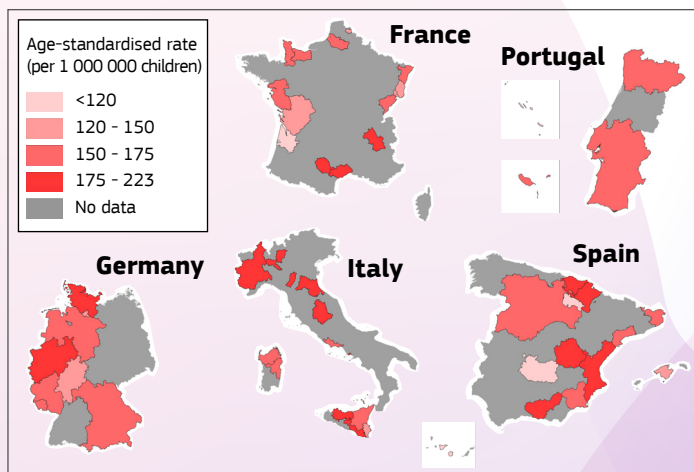
Figure 3 - Estimated cancer mortality (orange) and incidence (blue) (age-standardised rate- ASR, all cancers but non-melanoma skin cancer) in 2022 in EU *** (Source: [ECIS 2022 estimates](#)) and 5-year survival from EURO CARE-6 study for the analyses period of 2010-2014³ for children aged 0 to 14.



Cancer incidence by region

Data from cancer registries reporting historical cancer incidence for 12 cancer diagnostic groups for children, coded with the International Classification for Childhood Cancers (ICCC)⁶ definitions are available at regional level for some countries. Data reported by 3-year periods, up to 2012 shows that even within countries there can be variations in childhood cancer incidence.

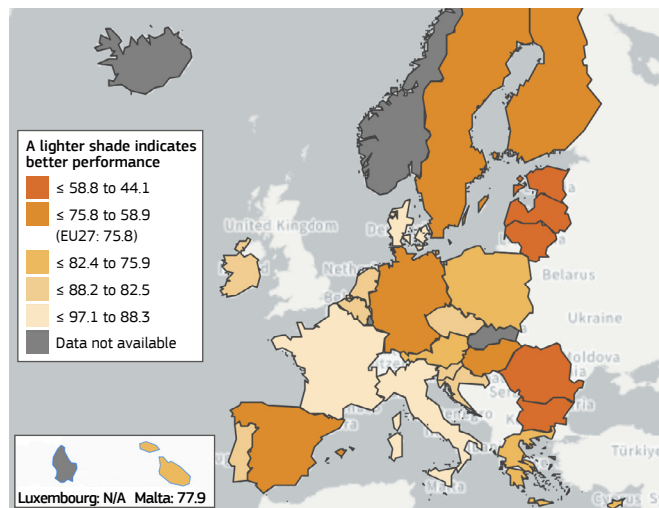
Figure 4 - Incidence rates (ASR per 1 000 000) in children aged 0 to 14 for all cancers by region: examples from France (2009-2011), Germany (2010-2012), Italy (2008-2011), Portugal (2008-2010) and Spain (Castilla y Leon 2010-2012, all others 2008-2010) (Source: [ECIS Childhood incidence historical data](#)).



Essential medicines for childhood cancers

A total of 68 medicines have been proposed as essential for treating childhood cancers⁷. Across the EU, on average, 75.8% of these medicines were always available over the reported 2 years period⁷. More anticancer medicines were available in Italy (97%), France (96%) and Denmark (93%), while in some other countries less than half of the essential anticancer medicines were always available. Shortages are the main cause of unavailability.

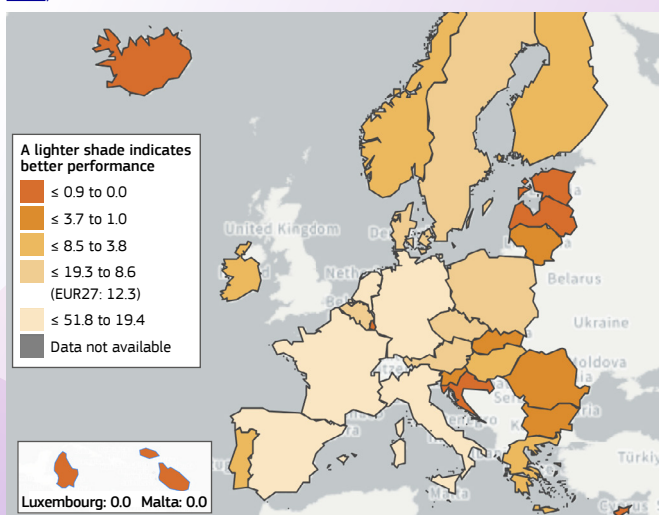
Figure 5 - Percentage availability of essential medicines to treat childhood cancers (2018) by country (Source: Vassal et al., 2021⁷, available on [ECIR](#)).



Oncology clinical trials for children

The percentage of available trials open to participation in each EU country can serve as an indirect surrogate for patient's access to research and innovative treatments. In total, 436 clinical trials were available in Europe to children and adolescents with cancer in the period of 2010-2022. However, the proportion of oncological clinical trials available to children and adolescents under the age of 18 varied considerably between countries, ranging from none to over 50% (Fig. 6).

Figure 6 - Percentage of oncology clinical trials available to children and adolescents (in years 2010-2022) by country (Source: [clinicaltrials.gov](#), work performed by SIOP Europe as part of [UNCAN.eu](#) project, available on [ECIR](#)).



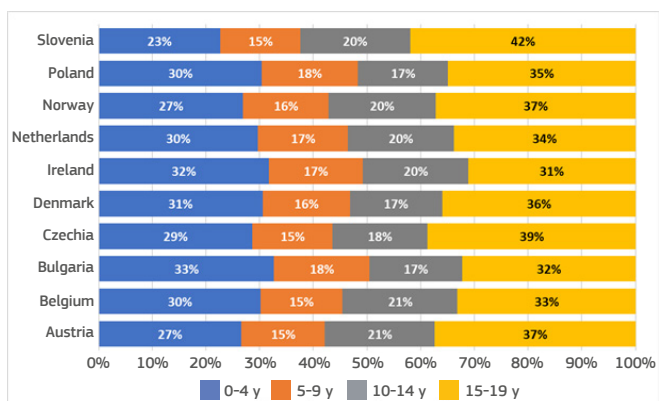
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INEQUALITIES BY AGE

Cancer incidence

Considering only countries with reporting through national registries, in most countries higher cancer incidence was observed for the 15 to 19 years old age group, followed by the 0 to 4 years old group (Figure 7). Most frequent cancers in 0 to 4 and 5 to 9 year old groups were leukaemias, while lymphomas were most common in the older age groups.

Figure 7 - Cancer cases (all diagnostic groups, according to ICC coding⁶) distribution by age group in 2010-2012 for EU countries that provided national cancer registry data for children and adolescents aged 0-19 (Source: ECIS Childhood incidence historical data).



Cancer survival

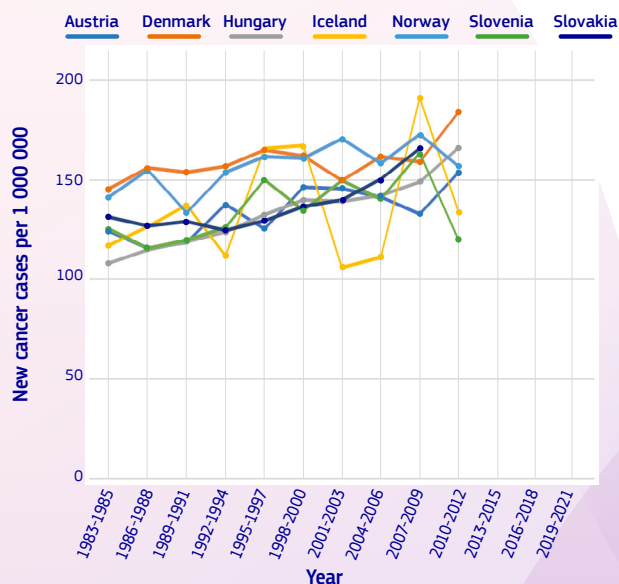
There were no major differences in 5-year survival³ among the different age groups for children in Europe. The highest overall survival was for children aged 1 to 4 years (83%), while for the other age groups it was around 80%. Lymphomas had the highest 5-year age-adjusted survival (over 90%), while CNS tumours the lowest (around 60%)³.

TIME TRENDS

Cancer incidence

Temporal trends for childhood cancer incidence showed a slight increase or relative stability in Europe over 30 years (Figure 8), but data for the last decade is still lacking to see more recent incidence trends.

Figure 8 - Time trends in cancer incidence rates (ASR, all diagnostic groups according to ICC coding⁶) for children aged 0-14 during the period 1983 to 2012 for some EU countries**** (Source: ECIS Childhood incidence historical data).



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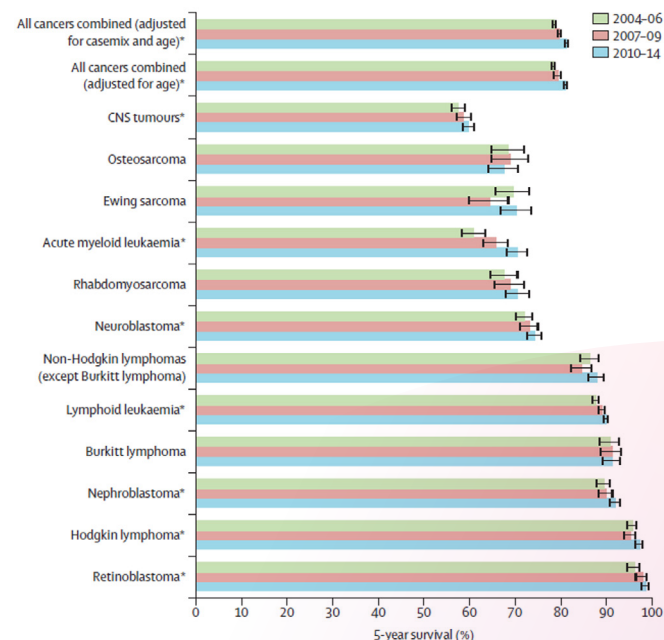
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Cancer survival

For all cancers combined, the 5-year survival for children aged 0 to 14 years improved over time from 78% in 2004-2008 to 81% in 2010-2014 in Europe (Figure 9). Acute myeloid leukaemia (AML) showed the greatest improvement in survival over time from 61% to 70%.

Figure 9 - Age-adjusted 5-year observed survival for all childhood cancers combined and major diagnostic groups for the follow-up periods 2004-2006, 2007-2009, and 2010-2014 (Source: EUROCARE-6 study⁸).



CLOSING THE GAP

Europe's Beating Cancer Plan puts childhood cancer under the spotlight. In 2021 the 'Helping Children with Cancer Initiative' was launched to ensure better access to rapid and optimal detection, diagnosis, treatment, and care. The 'Cancer Survivor Smart-Card' addresses health outcomes of cancer treatments, care quality and long-term follow-up in childhood cancer survivors. The 'EU Network of Youth Cancer' aims to connect young cancer survivors and their families. Another example, is the 'Cancer Diagnostic and Treatment for All initiative' project, which is looking to improve diagnostics and survival for all children with AML.

Similarly, the Mission on Cancer identifies childhood cancer and cancer in adolescents and young adults (AYA) as a major transversal priority to improve the understanding of cancer and boost the transformation of paediatric cancer care, by providing evidence-based information to advance diagnostics, treatment and survivorship support. Actions supported by the Cancer Mission target the whole cancer continuum, from innovation of anti-cancer medication for childhood cancers, improved understanding of the causes of childhood cancers, development and spread of poorly understood cancers occurring in children and supporting quality of life of childhood cancer survivors.

What is needed to help tackling the existing inequalities?

- **Prevention and early detection:** Better understanding of the causes of childhood cancers to set up prevention and early detection programmes throughout the EU. Strengthening childhood cancer registration and linking to clinical and environmental datasets. More detailed, timely, harmonised, comprehensive and comparable data collected regularly and across the EU are needed.
- **Diagnosis and treatment:** More research on innovative cancer treatments accessible to all, and specific treatments tailored to the needs of children and adolescents to improve cancer survival inequalities and quality of life of young patients.
- **Quality of life:** Policies for young cancer patients, their caregivers and survivors, supporting equal access to quality healthcare throughout the EU, including psychosocial support are needed with specific focus on facilitating educational and professional progress for children and adolescents.

FOR MORE INFORMATION

- The [European Cancer Inequalities Registry](#) provides sound and reliable data on cancer prevention and care to identify trends, disparities and inequalities between Member States and regions.
- The [European Cancer information System \(ECIS\)](#) is the reference point for monitoring and projecting the burden of cancer in Europe.
- The European Reference Network [PeadCan](#) aims to reduce inequalities across Member States by facilitating the exchange of knowledge and expertise and enabling access to up to date diagnostics and treatments.
- The [European Society for Paediatric Oncology \(SIOP Europe or SIOPE\)](#) is the only pan-European organisation representing all professionals working in the field of childhood cancers. With more than 2,500 members across 35 European countries, SIOPE is leading the way to ensure the best possible care and outcomes for all children and adolescents with cancer in Europe.
- Several projects and calls for proposals have been launched to support the EU actions on childhood cancer, e.g. [SurPass](#), [EU-CAYAS-NET](#), [OACCUs](#), [IHLGiS](#), [CHIP-AML22](#), [PREVENT](#), [SEAWave](#), [MELCAYA](#), [UNCAN](#), [UNICA4EU](#).
- World Health Organization (2021). [CureAll framework: WHO global initiative for childhood cancer: increasing access, advancing quality, saving lives](#). The World Health Organisation has been running a Global Initiative on Childhood Cancer since 2018 with the aim of saving one million additional lives globally by 2030.

REFERENCES

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🐦 #EUCancerPlan #EU_ScienceHub

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