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Summer 2024

LESS
LATE EFFECTS
SURVEILLANCE SYSTEM

STUDY SCAN

Childhood Cancer Survivorship Magazine

Childhood Cancer Models of Survivorship Care

Modifiable Cardiometabolic Risk Factors in Survivors

Childhood Cancer Survivors: Current Challenges

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HELLO!

Another three months have gone and so here is our new issue of Study Scan!

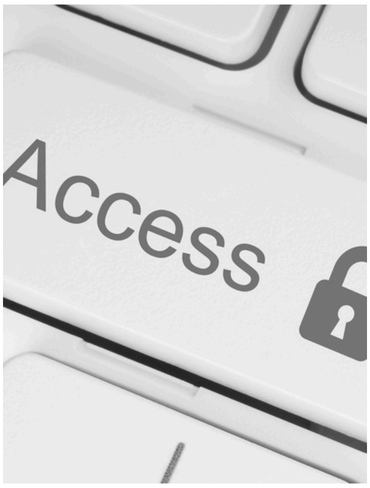
We hope you will find interesting articles for your research activities in childhood cancer survivorship.

Again more than 100 pages show the hard work done by so many research groups for childhood cancer survivors. Thank you for everything you have done and for everything you will do.

We wish you a beautiful summer time or winter time – dependend on your place.

Christian Müller

Prof. Dr. med. Thorsten Langer



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RESEARCH >

CARDIOMETABOLIC RISK FACTORS

The growing community of childhood cancer survivors faces a heavy burden of late onset morbidities and mortality, with cardiovascular diseases being the leading noncancer cause. In addition to demographics and cancer treatment exposures, cardiometabolic risk factors and frailty potentiate the risk of morbidity and mortality associated with chronic health conditions.

In a review, the prevalence of, risk factors for, current survivor-specific recommendations, and gaps in knowledge to mitigate potentially modifiable cardiometabolic risk factors and frailty among survivors of childhood cancer are discussed.

Find out more on page 30 or scan the following qr-code.

Childhood cancer survivorship is a journey for a lifetime.

CHILDHOOD CANCER SURVIVOR (ANONYMOUS)

RECOMMENDATIONS FOR SURVEILLANCE OF PULMONARY DYSFUNCTION AMONG CHILDHOOD, ADOLESCENT, AND YOUNG ADULT CANCER SURVIVORS: A REPORT FROM THE INTERNATIONAL LATE EFFECTS OF CHILDHOOD CANCER GUIDELINE HARMONIZATION GROUP

Maria Otth, Rahel Kasteler, Renée L Mulder, Jennifer Agrusa, Saro H Armenian, Dana Barnea, Anne Bergeron, Neel S Bhatt, Stephen J Bourke, Louis S Constine, Myrofora Goutaki, Daniel M Green, Ulrike Hennewig, Veronique Houdouin, Melissa M Hudson, Leontien Kremer, Philipp Latzin, Antony Ng, Kevin C Oeffinger, Christina Schindera, Roderick Skinner, Grit Sommer, Saumini Srinivasan, Dennis C Stokes, Birgitta Versluys, Nicolas Waespe, Daniel J Weiner, Andrew C Dietz, Claudia E Kuehni

EClinicalMedicine; doi: 10.1016/j.eclinm.2024.102487

ABSTRACT

Childhood, adolescent, and young adult (CAYA) cancer survivors are at risk of pulmonary dysfunction. Current follow-up care guidelines are discordant. Therefore, the International Late Effects of Childhood Cancer Guideline Harmonization Group established and convened a panel of 33 experts to develop evidence-based surveillance guidelines. We critically reviewed available evidence regarding risk factors for pulmonary dysfunction, types of pulmonary function testing, and timings of surveillance, then we formulated our recommendations. We recommend that CAYA cancer survivors and healthcare providers are aware of reduced pulmonary function risks and pay vigilant attention to potential symptoms of pulmonary dysfunction, especially among survivors treated with allogeneic haematopoietic stem cell transplantation, thoracic radiotherapy, and thoracic surgery. Based on existing limited evidence and current lack of interventions, our panel recommends pulmonary function testing only for symptomatic survivors. Since scarce existing evidence informs our recommendation, we highlight the need for prospective collaborative studies to address pulmonary function knowledge gaps among CAYA cancer survivors.

TEMPORAL CHANGES IN TREATMENT AND LATE MORTALITY AND MORBIDITY IN ADULT SURVIVORS OF CHILDHOOD GLIOMA: A REPORT FROM THE CHILDHOOD CANCER SURVIVOR STUDY

Peter M K de Blank, Katharine R Lange, Mengqi Xing, Sedigheh Mirzaei Salehabadi, Deokumar Srivastava, Tara M Brinkman, Kirsten K Ness, Kevin C Oeffinger, Joseph Neglia, Kevin R Krull, Paul C Nathan, Rebecca Howell, Lucie M Turcotte, Wendy Leisenring, Gregory T Armstrong, M Fatih Okcu, Daniel C Bowers

Nat Cancer; doi: 10.1038/s43018-024-00733-0

ABSTRACT

Pediatric glioma therapy has evolved to delay or eliminate radiation for low-grade tumors. This study examined these temporal changes in therapy with long-term outcomes in adult survivors of childhood glioma. Among 2,501 5-year survivors of glioma in the Childhood Cancer Survivor Study diagnosed 1970-1999, exposure to radiation decreased over time. Survivors from more recent eras were at lower risk of late mortality (≥5 years from diagnosis), severe/disabling/life-threatening chronic health conditions (CHCs) and subsequent neoplasms (SNs). Adjusting for treatment exposure (surgery only, chemotherapy, or any cranial radiation) attenuated this risk (for example, CHCs (1990s versus 1970s), relative risk (95% confidence interval), 0.63 (0.49-0.80) without adjustment versus 0.93 (0.72-1.20) with adjustment). Compared to surgery alone, radiation was associated with greater than four times the risk of late mortality, CHCs and SNs. Evolving therapy, particularly avoidance of cranial radiation, has improved late outcomes for childhood glioma survivors without increased risk for late recurrence.

RADIATION THERAPY TECHNOLOGY ADVANCES AND MITIGATION OF SUBSEQUENT NEOPLASMS IN CHILDHOOD CANCER SURVIVORS

Camilla H Stokkevåg, Neige Journy, Ivan R Vogelius, Rebecca M Howell, David Hodgson, Søren M Bentzen

Int J Radiat Oncol Biol Phys; doi: 10.1016/j.ijrobp.2024.01.206

PURPOSE

In this Pediatric Normal Tissue Effects in the Clinic (PENTEC) vision paper, challenges and opportunities in the assessment of subsequent neoplasms (SNs) from radiation therapy (RT) are presented and discussed in the context of technology advancement.

METHODS AND MATERIALS

The paper discusses the current knowledge of SN risks associated with historic, contemporary, and future RT technologies. Opportunities for research and SN mitigation strategies in pediatric patients with cancer are reviewed.

RESULTS

Present experience with radiation carcinogenesis is from populations exposed during widely different scenarios. Knowledge gaps exist within clinical cohorts and follow-up; dose-response and volume effects; dose-rate and fractionation effects; radiation quality and proton/particle therapy; age considerations; susceptibility of specific tissues; and risks related to genetic predisposition. The biological mechanisms associated with local and patient-level risks are largely unknown.

CONCLUSIONS

Future cancer care is expected to involve several available RT technologies, necessitating evidence and strategies to assess the performance of competing treatments. It is essential to maximize the utilization of existing follow-up while planning for prospective data collection, including standardized registration of individual treatment information with linkage across patient databases.

ETHICAL, LEGAL, SOCIAL, AND POLICY ISSUES OF OVARIAN TISSUE CRYOPRESERVATION IN PREPUBERTAL GIRLS: A CRITICAL INTERPRETIVE REVIEW

Aliya O Affdal, Mahmoud Salama, Vardit Ravitsky

J Assist Reprod Genet; doi: 10.1007/s10815-024-03059-z

PURPOSE
Despite the increasing number of childhood cancer survivors, significant advances in ovarian tissue cryopreservation (OTC) technique and medical societies' recommendations, fertility preservation (FP) and FP discussions are not always offered as a standard of care in the pediatric context. The aim of this literature review is to understand what ethical, legal, social, and policy issues may influence the provision of FP by OTC in prepubertal girls with cancer.

METHODS
A critical interpretive review of peer-reviewed papers published between 2000 and January 2023 was conducted, guided by the McDougall's version of the critical interpretive synthesis (Dixon-Woods), to capture recurring concepts, principles, and arguments regarding FP by OTC for prepubertal girls.

RESULTS
Of 931 potentially relevant papers, 162 were included in our analysis. Data were grouped into seven thematic categories: (1) risks of the procedure, (2) unique decision-making issues in pediatric oncofertility, (3) counseling, (4) cultural and cost issues, and (5) disposition of cryopreserved reproductive tissue.

CONCLUSION
This first literature review focusing on ethical, legal, social, and policy issues surrounding OTC in prepubertal girls highlights concerns in the oncofertility debate. Although OTC is no longer experimental as of December 2019, these issues could limit its availability and the child's future reproductive autonomy. This review concludes that specific actions must be provided to enable the offer of FP, such as supporting families' decision-making in this unique and complex context, and providing pediatric patients universal and full access to free or highly subsidized OTC.

HEALTH-RELATED QUALITY OF LIFE AND DNA METHYLATION-BASED AGING BIOMARKERS AMONG SURVIVORS OF CHILDHOOD CANCER

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J Natl Cancer Inst; doi: 10.1093/jnci/djae046

BACKGROUND
Childhood cancer survivors are at high risk for morbidity and mortality and poor patient-reported outcomes, typically health-related-quality-of-life (HRQOL). However, associations between DNA methylation (DNAm)-based aging biomarkers and HRQOL have not been evaluated.

METHODS
DNAm was generated with Infinium EPIC BeadChip on blood-derived DNA (median[range] for age at blood draw = 34.5[18.5-66.6] years) and HRQOL was assessed with age at survey (32.3[18.4-64.5] years) from 2,206 survivors in the St Jude Lifetime Cohort. DNAm-based aging biomarkers, including epigenetic age using multiple clocks (eg, GrimAge) and others (eg, DNAmB2M beta-2-microglobulin; DNAmADM: adrenomedullin), were derived from the DNAm Age Calculator (https://dnamage.genetics.ucla.edu). HRQOL was assessed using the Medical Outcomes Study 36-Item Short-Form Health Survey to capture eight domains, and physical and mental component summaries (PCS and MCS). General linear models evaluated associations between HRQOL and epigenetic age acceleration (EAA, eg, EAA_GrimAge) or other age-adjusted DNAm-based biomarkers (eg, ageadj_DNAmB2M) after adjusting for age at blood draw, sex, cancer treatments, and DNAm-based surrogate for smoking pack-years. All P values were 2-sided.

RESULTS
Worse HRQOL was associated with greater EAA_GrimAge (PCS β[95%CI]=-0.18[-0.251,-0.11] years, P = 1.85 × 10-5; and four individual HRQOL domains), followed by ageadj_DNAmB2M (PCS: -0.08[-0.124,-0.037], P = .003; and three individual HRQOL domains), and ageadj_DNAmADM (PCS: -0.082[-0.125,-0.039], P = .002; and two HRQOL domains). EAA_Hannum (Hannum clock) was not associated with any HRQOL.

CONCLUSIONS
Overall and domain-specific measures of HRQOL are associated with DNAm measures of biological aging. Future longitudinal studies should test biological aging as a potential mechanism underlying the association between poor HRQOL and increased risk of clinically assessed adverse health outcomes.

RELIABILITY AND VALIDITY OF SELF-REPORT QUESTIONS FOR ASSESSING LEVELS OF PHYSICAL ACTIVITY AND SEDENTARY TIME IN ADULT CHILDHOOD CANCER SURVIVORS

Camilla H Stokkevåg, Neige Journy, Ivan R Vogelius, Rebecca M Howell, David Hodgson, Søren M Bentzen

BMC Sports Sci Med Rehabil; doi: 10.1186/s13102-024-00851-3

BACKGROUND
Regular physical activity and limited sedentary time are recommended for adult childhood cancer survivors. The Swedish National Board of Health and Welfare designed a questionnaire to assess levels of physical activity (BHW-Q), including two questions: one on vigorous physical activity (BHW-Q VPA) and one on moderate physical activity (BHW-Q MPA). Furthermore, a single-item question was developed to measure sedentary time (SED-GIH-Q). These questions are recommended for clinical practice and have been found valid for the general population but have so far not been tested in adult childhood cancer survivors. The aim of the study was to assess test-retest reliability, agreement and criterion-related validity of the BHW-Q and the SED-GIH-Q in adult childhood cancer survivors.

METHOD
A non-experimental methodological study. In total 60 participants (50% women), median age 28 (min-max 18-54) years were included at the Long-Term Follow-Up Clinic at Sahlgrenska University Hospital. Participants were instructed to wear an accelerometer for seven days, and to answer the BHW-Q and the SED-GIH-Q before and after the seven days.

Test-retest reliability and criterion-related validity comparing the BHW-Q and SED GIH-Q with accelerometer data were calculated with weighted Kappa (k) (agreement) and by using Spearman´s rho (r) (correlation).

RESULTS
Test-retest reliability regarding the SED-GIH-Q showed a high agreement (k = 0.88) and very strong correlation (r = 0.93), while the BHW-Q showed a moderate agreement and moderately strong correlation, BHW-Q VPA (k = 0.50, r = 0.64), BHW-Q MPA (k = 0.47, r = 0.58). Both the agreement and the correlation of the criterion-related validity were interpreted as fair for the BHW-Q VPA (k = 0.29, r = 0.45), while the agreement for BHW-Q MPA was interpreted as low (k = 0.07), but the correlation as fair (r = 0.37). The agreement of the SED-GIH-Q (k = 0.13) was interpreted as low and the correlation as poor (r = 0.26).

CONCLUSION
These simple questions assessing physical activity and sedentary time can be used as screening tools in clinical practice to identify adult childhood cancer survivors in need of support to increase physical activity level. Further development is needed on the design of a sufficiently valid question measuring sedentary time.

CARE MODELS AND BARRIERS TO LONG-TERM FOLLOW-UP CARE AMONG CHILDHOOD CANCER SURVIVORS AND HEALTH CARE PROVIDERS IN ASIA: A LITERATURE REVIEW

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JCO Glob Oncol; doi: 10.1200/GO.23.00331

ABSTRACT

Most available data evaluating childhood cancer survivorship care focus on the experiences of high-income Western countries, whereas data from Asian countries are limited. To address this knowledge deficit, we aimed to characterize survivorship care models and barriers to participation in long-term follow-up (LTFU) care among childhood cancer survivors (CCSs) and health care providers in Asian countries. Twenty-four studies were identified. Most institutions in China and Turkey adopt the oncology specialist care model, whereas in Japan, India, Singapore, and South Korea, after completion of therapy LTFU programs are available in some institutions. In terms of survivor barriers, findings highlight the need for comprehensive age-appropriate education and support and personalized approaches in addressing individual preferences and challenges during survivorship. Health care professionals need education about potential late effects of cancer treatment, recommended guidance for health surveillance and follow-up care, and their role in facilitating the transition from pediatric to adult-focused care. To optimize the delivery of cancer survivorship care, efforts are needed to increase patient and family awareness about the purpose and potential benefits of LTFU care, improve provider education and training, and promote policy change to ensure that CCSs have access to essential services and resources to optimize quality of survival.

POLYGENIC RISK SCORES, RADIATION TREATMENT EXPOSURES AND SUBSEQUENT CANCER RISK IN CHILDHOOD CANCER SURVIVORS

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Nat Med; doi: 10.1038/s41591-024-02837-7

ABSTRACT

Survivors of childhood cancer are at increased risk for subsequent cancers attributable to the late effects of radiotherapy and other treatment exposures; thus, further understanding of the impact of genetic predisposition on risk is needed. Combining genotype data for 11,220 5-year survivors from the Childhood Cancer Survivor Study and the St Jude Lifetime Cohort, we found that cancer-specific polygenic risk scores (PRSs) derived from general population, genome-wide association study, cancer loci identified survivors of European ancestry at increased risk of subsequent basal cell carcinoma (odds ratio per s.d. of the PRS: OR = 1.37, 95% confidence interval (CI) = 1.29-1.46), female breast cancer (OR = 1.42, 95% CI = 1.27-1.58), thyroid cancer (OR = 1.48, 95% CI = 1.31-1.67), squamous cell carcinoma (OR = 1.20, 95% CI = 1.00-1.44) and melanoma (OR = 1.60, 95% CI = 1.31-1.96); however, the association for colorectal cancer was not significant (OR = 1.19, 95% CI = 0.94-1.52). An investigation of joint associations between PRSs and radiotherapy found more than additive increased risks of basal cell carcinoma, and breast and thyroid cancers. For survivors with radiotherapy exposure, the cumulative incidence of subsequent cancer by age 50 years was increased for those with high versus low PRS. These findings suggest a degree of shared genetic etiology for these malignancy types in the general population and survivors, which remains evident in the context of strong radiotherapy-related risk.

OBESITY PREDISPOSES ANTHRACYCLINE-TREATED SURVIVORS OF CHILDHOOD AND ADOLESCENT CANCERS TO SUBCLINICAL CARDIAC DYSFUNCTION

Ian A George, BriAnna Souder, Amy Berkman, David H Noyd, M Jay Campbell, Piers C A Barker, Michael Roth, Michelle A T Hildebrandt, Kevin C Oeffinger, Andrew W McCrary, Andrew P Landstrom

Pediatr Cardiol; doi: 10.1007/s00246-024-03423-x

ABSTRACT

Anthracyclines are effective chemotherapeutics used in approximately 60% of pediatric cancer cases but have a well-documented risk of cardiotoxicity. Existing cardiotoxicity risk calculators do not include cardiovascular risk factors present at the time of diagnosis. The goal of this study is to leverage the advanced sensitivity of strain echocardiography to identify pre-existing risk factors for early subclinical cardiac dysfunction among anthracycline-exposed pediatric patients. We identified 115 pediatric patients with cancer who were treated with an anthracycline between 2013 and 2019. Peak longitudinal left ventricular strain was retroactively calculated on 495 surveillance echocardiograms via the TOMTEC AutoSTRAIN software. Cox proportional hazards models were employed to identify risk factors for abnormal longitudinal strain (> - 16%) following anthracycline treatment. High anthracycline dose (≥ 250 mg/m² doxorubicin equivalents) and obesity at the time of diagnosis (BMI > 95th percentile-for-age) were both significant predictors of abnormal strain with hazard ratios of 2.79, 95% CI (1.07-7.25), and 3.85, 95% CI (1.42-10.48), respectively. Among pediatric cancer survivors, patients who are obese at the time of diagnosis are at an increased risk of sub-clinical cardiac dysfunction following anthracycline exposure. Future studies should explore the incidence of symptomatic cardiomyopathy 10-15 years post-treatment among patients with early subclinical cardiac dysfunction.

VALIDATION OF SELF-REPORTED CARDIOVASCULAR PROBLEMS IN CHILDHOOD CANCER SURVIVORS BY CONTACTING GENERAL PRACTITIONERS: FEASIBILITY AND RESULTS

Eva-Maria Hau, Tomáš Sláma, Stefan Essig, Gisela Michel, Laura Wengenroth, Eva Bergstraesser, Nicolas X von der Weid, Christina Schindera, Claudia E Kuehni

BMC Prime Care; doi: 10.1186/s12875-024-02322-7

BACKGROUND

Epidemiological studies often rely on self-reported health problems and validation greatly improves study quality. In a study of late effects after childhood cancer, we validated self-reported cardiovascular problems by contacting general practitioners (GPs). This paper describes: (a) the feasibility of this approach; and (b) the agreement between survivor-reports and reports from their GP.

METHODS

The Swiss Childhood Cancer Survivor Study (SCCSS) contacts all childhood cancer survivors registered in the Swiss Childhood Cancer Registry since 1976 who survived at least 5 years from cancer diagnosis. We validated answers of all survivors who reported a cardiovascular problem in the questionnaire. Reported cardiovascular problems were hypertension, arrhythmia, congestive heart failure, myocardial infarction, angina pectoris, stroke, thrombosis, and valvular problems. In the questionnaire, we further asked survivors to provide a valid address of their GP and a consent for contact. We sent case-report forms to survivors' GPs and requested information on cardiovascular diagnoses of their patients. To determine agreement between information reported by survivors and GPs, we calculated Cohen's kappa (κ) coefficients for each category of cardiovascular problems.

RESULTS

We used questionnaires from 2172 respondents of the SCCSS. Of 290 survivors (13% of 2172) who reported cardiovascular problems, 166 gave consent to contact their GP and provided a valid address. Of those, 135 GPs (81%) replied, and 128 returned the completed case-report form. Survivor-reports were confirmed by 54/128 GPs (42%). Of the 54 GPs, 36 (28% of 128) confirmed the problems as reported by the survivors; 11 (9% of 128) confirmed the reported problem(s) and gave additional information on more cardiovascular outcomes; and seven GPs (5% of 128) confirmed some, but not all cardiovascular problems. Agreement between GPs and survivors was good for stroke (κ = 0.79), moderate for hypertension (κ = 0.51), arrhythmias (κ = 0.41), valvular problems (κ = 0.41) and thrombosis (κ = 0.56), and poor for coronary heart disease (κ = 0.15) and heart failure (κ = 0.32).

CONCLUSIONS

Despite excellent GP compliance, it was found unfeasible to validate self-reported cardiovascular problems via GPs because they do not serve as gatekeepers in the Swiss health care system. It is thus necessary to develop other validation methods to improve the quality of patient-reported outcomes.

PSYCHOSOCIAL INTERVENTIONS FOR CHILDHOOD CANCER SURVIVORS: SYSTEMATIC REVIEW AND META-ANALYSIS OF RANDOMIZED CONTROL TRIALS

Tuba Arpaci, Naime Altay

Eur J Oncol Nurs; doi: 10.1016/j.ejon.2024.102541

PURPOSE

This study was aimed to review and analyze the evidence of the psychosocial interventions for survivors of childhood cancer.

METHODS

Electronic databases (PubMed, Embase, Medline, Web of Science, Science Direct, and Scopus) and manuel search were performed for psychosocial randomised controlled trials (RCTs) conducted with survivors who were diagnosed under the age of 18 and have completed treatment. Meta-analyses were performed to evaluate the effects of interventions on psychosocial health outcomes. The trials were published in English between 1 January 2000 to 30 June 2022 were included. Extracted data were analyzed using Review Manager 5.4.

RESULTS

Ten trials conducted with 955 childhood cancer survivors were included in the systematic review. Meta-analysis of six RCTs showed no difference in the general quality of life (SMD, 0.07; 95% CI: [-0.09 to 0.23], I2 0%, ($p > 0.05$)) and three RCTs showed no difference in the physical activity self-efficacy (SMD, 0.12; 95% CI: [-0.35 to 0.58], I2 75%, ($p > 0.05$)) between intervention and control group. Interventions longer than 24 weeks (including follow-up) were effective in the quality of life and physical activity self-efficacy of the survivors. The overall quality of the evidence was low due to overall low risk of bias for only half of the studies (50%).

CONCLUSIONS

Psychosocial interventions were not effective on quality of life and physical activity self-efficacy of childhood cancer survivors, however, long-term interventions provided improvement in these outcomes.

IMPACT OF RISK-BASED THERAPY ON LATE MORBIDITY AND MORTALITY IN NEUROBLASTOMA SURVIVORS: A REPORT FROM THE CHILDHOOD CANCER SURVIVOR STUDY

Danielle Novetsky Friedman, Pamela J Goodman, Wendy M Leisenring, Lisa R Diller, Susan L Cohn, Rebecca M Howell, Susan A Smith, Emily S Tonorezos, Suzanne L Wolden, Joseph P Neglia, Kirsten K Ness, Todd M Gibson, Paul C Nathan, Lucie M Turcotte, Brent R Weil, Leslie L Robison, Kevin C Oeffinger, Gregory T Armstrong, Charles A Sklar, Tara O Henderson

J Natl Cancer Inst; doi: 10.1093/jnci/djae062

BACKGROUND
Early efforts at risk-adapted therapy for neuroblastoma are predicted to result in differential late effects; the magnitude of these differences have not been well-described.

METHODS
Late mortality, subsequent malignant neoplasms (SMN), and severe/life-threatening chronic health conditions (CHCs), graded according to CTCAE v4.03, were assessed among 5-year CCSS survivors of neuroblastoma diagnosed 1987-1999. Using age, stage at diagnosis, and treatment, survivors were classified into risk groups (low [n = 425]; intermediate [n = 252]; high [n = 245]). Standardized mortality ratios (SMR) and standardized incidence ratios (SIR) of SMNs were compared to matched population controls. Cox regression models estimated hazard ratios (HR) and 95% confidence intervals (CI) for CHC compared to 1,029 CCSS siblings.

RESULTS
Among survivors (49.8% male; median age 21 years, range 7-42; median follow-up 19.3 years, range 5-29.9), 80% with low-risk disease were treated with surgery alone, while 79.1% with high-risk disease received surgery, radiation, chemotherapy ± autologous stem cell transplant (ASCT). All-cause mortality was elevated across risk groups (SMRhigh=27.7 [21.4-35.8]; SMRintermediate=3.3 [1.7-6.5]; SMRlow=2.8 [1.7-4.8]). SMN risk was increased among high- and intermediate-risk survivors (SIRhigh=28.0 [18.5-42.3]; SIRintermediate=3.7 [1.2-11.3]), but did not differ from the US population for survivors of low-risk disease. Compared to siblings, survivors had an increased risk of grade 3-5 CHCs, particularly among those with high-risk disease (HRhigh=16.1 [11.2-23.2]; HRintermediate=6.3 [3.8-10.5]; HRlow=1.8 [1.1-3.1]).

CONCLUSIONS
Survivors of high-risk disease treated in the early days of risk stratification carry a markedly elevated burden of late recurrence, SMN, and organ-related multi-morbidity, while survivors of low/intermediate-risk disease have a modest risk of late adverse outcomes.

SUPPORTING PERSONAL GROWTH IN CHILDHOOD, ADOLESCENT AND YOUNG-ADULT CANCER SURVIVORS THROUGH CHALLENGES IN NATURE - A QUALITATIVE STUDY OF WAYA WILDERNESS PROGRAMME PARTICIPATION

Mats Jong, Trine Stub, Miek C Jong

Glob Adv Integr Med Health; doi: 10.1177/27536130241238150

BACKGROUND
Childhood, adolescent and young-adult (AYA) cancer survivors often experience health problems due to late or long-term effects of their cancer or the treatment thereof. The general population gains health benefits from immersion in nature, and nature-based programmes seem to be an intervention that can promote health among childhood and AYA cancer survivors.

OBJECTIVE
To explore the impact of the WAYA wilderness programme on the health of childhood and AYA cancer survivors.

METHODS
The study had a qualitative approach, with data from individual interviews (n = 18) 3 months after completion of the WAYA programme. In addition, case report data was collected during follow-up talks (1, 2 and 12 months after the programme) (n = 19). The WAYA programme consisted of an 8-day expedition, followed 3 months later by a 4-day base camp. The programme included activities such as hiking, backpacking, kayaking, rock climbing, bushcraft and mindfulness. Data was analysed according to a qualitative content analysis. The consolidated criteria for reporting qualitative research (COREQ) were followed.

RESULTS
An overarching theme was identified: "Personal growth from challenges in nature supported by deep connections with others". In 4 additional themes, participants' experiences describe how deep personal connections arose, as they developed a feeling of being able and competent in nature. Nature provided a space that supported relaxation and respite from everyday challenges and stimuli, which also led to an experience of being more connected to nature.

CONCLUSION
The WAYA programme was experienced as being of support to childhood and AYA cancer survivors. The programme provided them with skills and tools to be safe in nature. When connected to nature, the participants developed trust and self-confidence, personal growth, relaxation and recovery from stress. Their engagement in outdoor activities continued after completion of the programme, when they returned to everyday life at home.

NEUROCOGNITIVE OUTCOME AND ASSOCIATED FACTORS IN LONG-TERM, ADULT SURVIVORS OF CHILDHOOD ACUTE LYMPHOBLASTIC LEUKEMIA, TREATED WITHOUT CRANIAL RADIATION THERAPY

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Int J Neuropsychol Soc; doi: 10.1017/S1355617724000080

OBJECTIVE

There is limited research on neurocognitive outcome and associated risk factors in long-term, adult survivors of childhood acute lymphoblastic leukemia (ALL), without treatment of cranial radiation therapy. Moreover, the impact of fatigue severity and pain interference on neurocognition has received little attention. In this cross-sectional study, we examined neurocognitive outcome and associated factors in this population.

METHOD

Intellectual abilities, verbal learning/memory, processing speed, attention, and executive functions were compared to normative means/medians with one sample t tests or Wilcoxon signed-rank tests. Associations with risk factors, fatigue severity, and pain interference were analyzed with linear regressions.

RESULTS

Long-term, adult survivors of childhood ALL ($N = 53$, 51% females, mean age = 24.4 years, $SD = 4.4$, mean = 14.7 years post-diagnosis, $SD = 3.4$) demonstrated above average intellectual abilities, but performed below average in attention, inhibition, processing speed, and shifting ($p < 0.001$). Executive functioning complaints were significantly higher than normative means, and positively associated with fatigue ($p < 0.001$). There was no interaction between sex and fatigue and no neurocognitive impairments were associated with pain interference, risk group, age at diagnosis, or sex.

CONCLUSIONS

Long-term, adult survivors of ALL treated without cranial radiation therapy, demonstrate domain-specific performance-based neurocognitive impairments. However, continued research on the neurocognitive outcome in this population as they age will be important in the coming years. Executive functioning complaints were frequently in the clinical range, and often accompanied by fatigue. This suggests a need for cognitive rehabilitation programs.

VERY LONG-TERM OUTCOMES OF PEDIATRIC PATIENTS TREATED FOR OPTIC PATHWAY GLIOMAS: A LONGITUDINAL COHORT STUDY

Alice Morin, Rodrigue Allodji, Dulanjalee Kariyawasam, Philippe Touraine, Stéphanie Puget, Kevin Beccaria, Emilie De Carli, Virginie Kieffer, Sophie Rivollet, Samuel Abbou, Chiraz Fayech, Vincent Souchard, Christelle Dufour, Florent De Vathaire, Stéphanie Bolle, Jacques Grill, Brice Fresneau

Neuro Oncol; doi: 10.1093/neuonc/noae045

BACKGROUND
Optic pathway gliomas (OPG) represent 5% of childhood brain tumors. Successive relapses lead to multiple treatments exposing to late complications.

METHODS
We included patients treated at Gustave Roussy (GR) between 01.1980 and 12.2015 for OPG, before 18 years-old and alive at 5 years from diagnosis. Mortality and physical health conditions data were extracted from medical data files and updated thanks to the GR long-term follow-up program and French national mortality registry for patients included in the French Childhood Cancer Survivor Study.

RESULTS
We included 182 5y-OPG-childhood survivors in the analysis (sex-ratio M/F 0.8, 35% with NF1). With a median follow-up of 17.2y (range=5-41), we registered 82 relapses, 9 second malignancies and 15 deaths as first events after 5 years, resulting in 20-y conditional overall survival (C-OS) and late events-free survival (LEFS) of 79.9% (95%CI=71-86) and 43.5% (95%CI=36-51) respectively. NF1 (Hazard ratio HR=3, 95%CI=1.4-6.8), hypothalamic involvement (HR=3.2, 95%CI=1.4-7.3), and radiotherapy (HR=2.8, 95%CI=1.1-6.7) were significantly associated with C-OS in multivariable analyses. Ninety-five percent of 5y-OPG survivors suffered from any health condition, especially visual acuity "<1/10" (n=109), pituitary deficiency (n=106) and neurocognitive impairment (n=89). NF1 (HR 2.1) was associated with precocious puberty. With a median time post diagnosis of 4.2 years, 33 cerebrovascular events were observed in 21 patients.

CONCLUSION
Late relapses, second malignancies and cerebrovascular diseases are severe late events resulting in premature mortality. Morbidity is high and needing after-cancer care to improve quality of life. Risk factors could be considered to better stratify long-term follow-up.

LONGITUDINAL ADHERENCE TO SURVEILLANCE FOR LATE EFFECTS OF CANCER TREATMENT: A POPULATION-BASED STUDY OF ADULT SURVIVORS OF CHILDHOOD CANCER

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CMAJ; doi: 10.1503/cmaj.231358

BACKGROUND
Adult survivors of childhood cancer are at elevated risk of morbidity and mortality compared to the general population, but their adherence to lifelong periodic surveillance is suboptimal. We aimed to examine adherence to surveillance guidelines for high-yield tests and identify risk factors for nonadherence in adult survivors of childhood cancer.

METHODS
In this retrospective, population-based cohort study, we used health care administrative data from Ontario, Canada, to identify adult survivors of childhood cancer diagnosed between 1986 and 2014 who were at elevated risk of therapy-related colorectal cancer, breast cancer, or cardiomyopathy. Using a Poisson regression framework, we assessed longitudinal adherence and predictors of adherence to the Children's Oncology Group surveillance guideline.

RESULTS
Among 3241 survivors, 327 (10%), 234 (7%), and 3205 (99%) were at elevated risk for colorectal cancer, breast cancer, and cardiomyopathy, respectively. Within these cohorts, only 13%, 6%, and 53% were adherent to recommended surveillance as of February 2020. During a median follow-up of 7.8 years, the proportion of time spent adherent was 14% among survivors at elevated risk for colorectal cancer, 10% for breast cancer, and 43% for cardiomyopathy. Significant predictors of adherence varied across the risk groups, but higher comorbidity was associated with adherence to recommended surveillance.

INTERPRETATION
Survivors of childhood cancer in Ontario are rarely up to date for recommended surveillance tests. Tailored interventions beyond specialized clinics are needed to improve surveillance adherence.

HYPOGONADISM AND NEUROCOGNITIVE OUTCOMES AMONG CHILDHOOD CANCER SURVIVORS

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Eur J Endocrinol; doi: 10.1093/ejendo/lvae027

OBJECTIVE
Childhood cancer survivors are at risk for hypogonadism. Impact of hypogonadism on neurocognitive impairment and emotional distress in the non-cancer population has been shown, however, the relationship among childhood cancer survivor population is unknown. We aimed to evaluate the contribution of hypogonadism to neurocognitive impairment and emotional distress among survivors.

DESIGN
Cross-sectional study using retrospective cohort.

METHODS
3628 survivors who completed standard neurocognitive tests (six domains: processing speed, memory, executive function, attention, academics, global cognition) and self-reported emotional distress were included in our study. Participants were stratified by sex and gonadal status. Outcomes were compared between hypogonadal and eugonadal groups by multivariable analysis, adjusting for established predictors, and mediation analyses to determine the direct/indirect effects of hypogonadism on outcomes.

RESULTS
The hypogonadal group exhibited higher prevalence of neurocognitive impairment across domains, but no difference in emotional distress. Hypogonadal females exhibited higher relative risk (1.7, 95% confidence interval 1.2-2.5) for impaired visual processing speed, compared to eugonadal females after adjusting for cancer-related variables. In mediation models, hypogonadism had significant direct ($P < 0.01$) and indirect (from $P < 0.01$) impact on impairment in visual processing speed among females. Males demonstrated direct ($P = 0.03$) and indirect ($P = 0.04$) impact of hypogonadism on motor processing speed.

CONCLUSION
Processing speed may be the most vulnerable neurocognitive domain associated with hypogonadism in survivors, while other domains were mainly impacted by cancer-related variables. Our findings support the need for further evaluation of the impact of sex hormone replacement therapy on neurocognitive function.

HEALTH INSURANCE NAVIGATION TOOLS INTERVENTION: A PILOT TRIAL WITHIN THE CHILDHOOD CANCER SURVIVOR STUDY

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JCO Oncol Pract; doi: 10.1200/OP.23.00680

PURPOSE
Childhood cancer survivors are at increased risk for underinsurance and health insurance-related financial burden. Interventions targeting health insurance literacy (HIL) to improve the ability to understand and use health insurance are needed.

METHODS
We codeveloped a four-session health insurance navigation tools (HINT) intervention, delivered synchronously by a patient navigator, and a corresponding booklet. We conducted a randomized pilot trial with survivors from the Childhood Cancer Survivor Study comparing HINT with enhanced usual care (EUC; booklet). We assessed feasibility, acceptability, and preliminary efficacy (HIL, primary outcome; knowledge and confidence with health insurance terms and activity) on a 5-month survey and exit interviews.

RESULTS
Among 231 invited, 82 (32.5%) survivors enrolled (53.7% female; median age 39 years, 75.6% had employer-sponsored insurance). Baseline HIL scores were low (mean = 28.5; 16-64; lower scores better); many lacked knowledge of Affordable Care Act (ACA) provisions. 80.5% completed four HINT sessions, and 93.9% completed the follow-up survey. Participants rated HINT's helpfulness a mean of 8.9 (0-10). Exit interviews confirmed HINT's acceptability, specifically its virtual and personalized delivery and helpfulness in building confidence in understanding one's coverage. Compared with EUC, HINT significantly improved HIL (effect size = 0.94. P < .001), ACA provisions knowledge (effect size = 0.73, P = .003), psychological financial hardship (effect size = 0.64, P < .006), and health insurance satisfaction (effect size = 0.55, P = .03).

CONCLUSION
Results support the feasibility and acceptability of a virtual health insurance navigation program targeted for childhood survivors to improve HIL. Randomized trials to assess the efficacy and sustainability of health insurance navigation on HIL and financial burden are needed.

LIFESTYLE AND SUBSEQUENT MALIGNANT NEOPLASMS IN CHILDHOOD CANCER SURVIVORS: A REPORT FROM THE ST. JUDE LIFETIME COHORT STUDY

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Cancers (Basel); doi: 10.3390/cancers16050864

INTRODUCTION
This study aimed to assess longitudinal associations between lifestyle and subsequent malignant neoplasms (SMNs) in young adult childhood cancer survivors.

METHODS
Members of the St. Jude Lifetime Cohort (SJLIFE) aged ≥18 years and surviving ≥5 years after childhood cancer diagnosis were queried and evaluated for physical activity, cardiorespiratory fitness (CRF), muscle strength, body mass index (BMI), smoking, risky drinking, and a combined lifestyle score. Time to first SMN, excluding nonmalignant neoplasms and nonmelanoma skin cancer, was the outcome of longitudinal analysis.

RESULTS
Survivors (n = 4072, 47% female, 29% smokers, 37% risky drinkers, 34% obese, and 48% physically inactive) had a mean (SD) time between baseline evaluation and follow-up of 7.0 (3.3) years, an age of 8.7 (5.7) years at diagnosis, and an age of 30 (8.4) years at baseline lifestyle assessment. Neither individual lifestyle factors nor a healthy lifestyle score (RR 0.8, 0.4-1.3, p = 0.36) were associated with the risk of developing an SMN.

CONCLUSIONS
We did not identify any association between lifestyle factors and the risk of SMN in young adult childhood cancer survivors.

EXPLORING CHILDHOOD CANCER SURVIVOR, PARENT, HEALTHCARE AND COMMUNITY PROFESSIONALS' EXPERIENCES OF, AND PRIORITIES FOR, USING DIGITAL HEALTH TO ENGAGE IN PHYSICAL ACTIVITY: A MIXED METHODS STUDY

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J Cancer Surviv; doi: 10.1007/s11764-024-01560-z

PURPOSE

Digital health interventions provide an innovative way to engage childhood cancer survivors in physical activity, yet few studies have explored the priorities of key stakeholders regarding using digital health. We aimed to investigate survivor, parent, and healthcare and community professional (HCP) experiences, priorities, and perceived importance of using digital health to promote physical activity behaviours for survivors.

METHODS

Participants rated the importance of digital health features to promote physical activity in a survey. Guided by survey responses, we facilitated online focus groups or semi-structured interviews to discuss participants' experiences, priorities, and suggestions in-depth. We transcribed the data verbatim and conducted directed content analysis.

RESULTS

Forty participants took part in focus groups or interviews (including 9 childhood cancer survivors aged 8-21 years, 13 parents, and 18 HCP). Four key priorities were identified: health behaviour education, peer and parent involvement, goalsetting, and support from an HCP. There was a strong preference for digital mediums to facilitate physical activity due to its accessibility and convenience. Common intervention suggestions included earlier intervention (before the survivorship period), tailored and age-appropriate programs, a combined diet and exercise approach, and concise education delivery.

CONCLUSIONS

This study identified key priorities that may help to promote physical activity behaviours among childhood cancer survivors. Further research is needed to integrate these priorities into health behaviour interventions and evaluate their feasibility and efficacy.

EFFECTIVENESS OF A HEALTHY LIFESTYLE PROGRAM BASED ON A MOBILE SERIOUS GAME FOR CHILDHOOD CANCER SURVIVORS: A QUASI-RANDOMIZED TRIAL

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J Pediatr Nurs; doi: 10.1016/j.pedn.2024.03.006

PURPOSE
This study aimed to develop and evaluate the effectiveness of a healthy lifestyle program based on a mobile serious game (HLP-MSG) to enhance the lifestyles of childhood cancer survivors (CCSs).

METHODS
This program proceeded in two stages: development and evaluation, using a non-synchronized design with a quasi-randomized trial. The participants were CCSs aged 6-13 years whose treatment was terminated at least 12 months prior. Data were collected at baseline, and post-intervention, with a follow-up after four weeks using the Child Healthy Lifestyle Profile (CHLP). The experimental (n = 26) and control groups (n = 25) were compared. Data were analyzed using descriptive statistics, chi-squared tests, t-tests, and repeated-measures ANOVA.

RESULTS
The HLP-MSG promoted a healthy lifestyle by solving 26 quests, including seven sub-elements (nutrition, exercise, hygiene, interpersonal relationships, stress management, meaning of life, and health responsibility). This study revealed significant differences in the interaction between measurement time and group assignment in the CHLP ($p = .006$) and physical activity ($p = .013$), one of the seven sub-dimensions.

CONCLUSIONS
A healthy lifestyle program based on a mobile serious game is a feasible health education modality to enhance the physical, psychological, social, and spiritual health of CCSs.

SEQUELAE AND POST-THROMBOTIC SYNDROME AFTER VENOUS THROMBOEMBOLISM IN ACUTE LYMPHOBLASTIC LEUKEMIA SURVIVORS TREATED ON THE NOPHO ALL2008 PROTOCOL

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Pediatr Blood Cancer; doi: 10.1002/pbc.30937

ABSTRACT

The treatment of acute lymphoblastic leukemia (ALL) is frequently complicated by toxicity, including venous thromboembolism (VTE) affecting roughly 8% of patients. VTE can lead to post-thrombotic syndrome (PTS), a group of signs and symptoms developed as a complication to deep venous thrombosis (DVT), imposing risk of permanent disability and reduced quality of life (QoL). PTS prevalence ranges from 0% to 70%, reflecting very heterogenous cohorts and assessment tools. We aimed to estimate sequelae, including PTS and QoL in children and adults (<45 years old) who had a DVT during ALL treatment. PTS and QoL scores were obtained through use of Villalta and Modified Villalta Scale, PedsQL, and Short Form-36 questionnaires. The cohort comprised 20 children (<18 years) and seven adults (median age: 12.9 years, range: 2-44 years) at the time of DVT diagnosis. In total, 25 ALL survivors underwent PTS examination. The examination took place when survivors were 7-48 years (median age: 20.3 years, median follow-up time 6.8 years). QoL was assessed correlating cases with three matching ALL survivors without VTE. Two adults (15.4%) showed mild or moderate PTS. Eight children (66.7%) were diagnosed with mild PTS, while three cases had collaterals as sole symptoms. Pain or symptoms affecting daily life were reported by 16%. No difference in QoL was found (p = .9). This study underscores the need for comprehensive population-based investigations with validation of PTS instruments in ALL survivors.

SEVERE SEPSIS DURING TREATMENT FOR CHILDHOOD LEUKEMIA AND SEQUELAE AMONG ADULT SURVIVORS

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IMPORTANCE
Children undergoing treatment for leukemia are at increased risk of severe sepsis, a dysregulated immune response to infection leading to acute organ dysfunction. As cancer survivors, they face a high burden of long-term adverse effects. The association between sepsis during anticancer therapy and long-term organ dysfunction in adult survivors of childhood cancer has not been examined.

OBJECTIVE
To determine whether severe sepsis during therapy for leukemia in childhood is associated with subsequent chronic health conditions in adult survivors.

STUDY DESIGN
This cohort study included 644 adult survivors of childhood leukemia who were diagnosed between January 1, 1985, and July 19, 2010, and participated in the St Jude Lifetime Cohort Study. Participants were excluded if they received hematopoietic cell transplant or had relapsed leukemia. Data collection ended June 30, 2017. Data were analyzed from July 1, 2020, to January 5, 2024.

EXPOSURES
Severe sepsis episodes, defined according to consensus criteria as septic shock, acute respiratory distress syndrome, or multiorgan dysfunction associated with infection occurring during anticancer therapy, were abstracted by medical record review for all participants.

MAIN OUTCOMES AND MEASURES
Common Terminology Criteria for Adverse Events-defined chronic health condition outcomes were independently abstracted. Associations between sepsis and cumulative incidence of chronic health conditions (eg, cardiovascular, pulmonary, kidney, neurological, and neurocognitive outcomes) were compared by adjusted hazard ratios from Cox proportional hazards logistic regression. Inverse propensity score weighting was used to adjust for potential confounders, including age, year of diagnosis, and leukemia type.

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RESULTS
The study sample consisted of 644 adult survivors of pediatric leukemia (329 women [51.1%] and 315 men [48.9%]; including 56 with a history of acute myeloid leukemia and 585 with a history of acute lymphoblastic leukemia) who were most recently evaluated at a median age of 24.7 (IQR, 21.2-28.3) years at a median time after leukemia diagnosis of 17.3 (IQR, 13.7-21.9) years. Severe sepsis during treatment of acute childhood leukemia occurred in 46 participants (7.1%). Participants who experienced severe sepsis during treatment were more likely to develop moderate to severe neurocognitive impairment (29 of 46 [63.0%] vs 310 of 598 [51.8%]; adjusted hazard ratio, 1.86 [95% CI, 1.61-2.16]; $P < .001$) significantly affecting attention, executive function, memory and visuospatial domains. Sepsis was not associated with long-term risk of cardiovascular, pulmonary, kidney, or neurological chronic health conditions.

CONCLUSIONS AND RELEVANCE
In this cohort study of long-term outcomes in survivors of pediatric leukemia, severe sepsis during anticancer therapy for leukemia was associated with a selectively increased risk for development of serious neurocognitive sequelae. Efforts to reduce the effects of anticancer therapy on long-term function and quality of life in survivors might include prevention of severe sepsis during therapy and early detection or amelioration of neurocognitive deficits in survivors of sepsis.

PRESENCE AND UTILITY OF ELECTROCARDIOGRAPHIC ABNORMALITIES IN LONG-TERM CHILDHOOD CANCER SURVIVORS

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Heart; doi: 10.1136/heartjnl-2023-323474

BACKGROUND
We assessed the prevalence and diagnostic value of ECG abnormalities for cardiomyopathy surveillance in childhood cancer survivors.

METHODS
In this cross-sectional study, 1381 survivors (≥5 years) from the Dutch Childhood Cancer Survivor Study part 2 and 272 siblings underwent a long-term follow-up ECG and echocardiography. We compared ECG abnormality prevalences using the Minnesota Code between survivors and siblings, and within biplane left ventricular ejection fraction (LVEF) categories. Among 880 survivors who received anthracycline, mitoxantrone or heart radiotherapy, logistic regression models using least absolute shrinkage and selection operator identified ECG abnormalities associated with three abnormal LVEF categories (<52% in male/<54% in female, <50% and <45%). We assessed the overall contribution of these ECG abnormalities to clinical regression models predicting abnormal LVEF, assuming an absence of systolic dysfunction with a <1% threshold probability.

RESULTS
16% of survivors (52% female, mean age 34.7 years) and 14% of siblings had major ECG abnormalities. ECG abnormalities increased with decreasing LVEF. Integrating selected ECG data into the baseline model significantly improved prediction of sex-specific abnormal LVEF (c-statistic 0.66 vs 0.71), LVEF <50% (0.66 vs 0.76) and LVEF <45% (0.80 vs 0.86). While no survivor met the preset probability threshold in the first two models, the third model used five ECG variables to predict LVEF <45% and was applicable for ruling out (sensitivity 93%, specificity 56%, negative predictive value 99.6%). Calibration and internal validation tests performed well.

CONCLUSION
A clinical prediction model with ECG data (left bundle branch block, left atrial enlargement, left heart axis, Cornell's criteria for left ventricular hypertrophy and heart rate) may aid in ruling out LVEF <45%.

MODIFIABLE CARDIOMETABOLIC RISK FACTORS IN SURVIVORS OF CHILDHOOD CANCER: JACC: CARDIOONCOLOGY STATE-OF-THE-ART REVIEW

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JACC CardioOncol; doi: 10.1016/j.jaccao.2023.12.008

ABSTRACT

The growing community of childhood cancer survivors faces a heavy burden of late onset morbidities and mortality, with cardiovascular diseases being the leading noncancer cause. In addition to demographics and cancer treatment exposures, which cannot be altered, cardiometabolic risk factors (obesity, hypertension, diabetes, and dyslipidemia) and frailty potentiate the risk of morbidity and mortality associated with chronic health conditions. Important opportunities exist to target these risk factors and improve late health outcomes for survivors. Unfortunately, limited evidence exists on the optimal methods to prevent, screen, and treat cardiometabolic risk factors among survivors, resulting in significant underdiagnosis and undertreatment. In this review, we discuss the prevalence of, risk factors for, current survivor-specific recommendations, and gaps in knowledge to mitigate potentially modifiable cardiometabolic risk factors and frailty among survivors of childhood cancer.

ASSESSING QUALITY OF LIFE IN CHILDHOOD CANCER SURVIVORS AT RISK FOR HEARING LOSS: A COMPARISON OF HEAR-QL AND PROMIS MEASURES

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Front Oncol; doi: 10.3389/fonc.2024.1362315

BACKGROUND

Childhood cancer survivors (CCS) exposed to platinum chemotherapy are at an increased risk of developing hearing loss and reporting decreased quality of life (QOL). This study compared two QOL measures; one developed for children with hearing loss, The Hearing Environments and Refection on Quality of Life (HEAR-QL), and one validated in CCS, the Patient-Reported Outcomes Measurement Information System (PROMIS), to assess their ability to evaluate QOL deficits in this population.

METHODS

Subject eligibility were restricted to CCS exposed to platinum-based chemotherapy but who were free of known risk factors for cognitive impairment, (non-central nervous system tumor, no cranial radiation, or intrathecal chemotherapy). Participants had to be between 8-17 years, have completed anti-cancer therapy for at least 6 months, and have an audiogram within 1 year, Participants completed the HEAR-QL-26 (7-12 years) or the HEAR-QL-28 (13-18 years) and the PROMIS. Independent samples and/or one sample T-tests were utilized to compare participants with normal hearing and hearing loss, and to compare outcome measures to normative HEAR-QL and PROMIS data. Non-parametric correlations were utilized to evaluate the relationship between QOL and demographic and medical variables, and QOL and severity of hearing loss.

RESULTS

Fifty-four CCS were evaluable. The mean age was 12.0 years. Twenty-eight participants (51.9%) received cisplatin, 30 (55.6%) carboplatin, and 4 (7.4%) received both. Twenty participants (37%) demonstrated hearing loss. Participants with hearing loss scored significantly lower on the HEAR-QL than those with normal hearing (mean: 70.3, SD: 21.7, vs mean: 88.0, SD: 9.3, p =.004 for the HEAR-QL-26; mean: 84.7, SD: 10.2 vs mean: 94.8, SD: 3.4, p =.040 for the HEAR-QL-28). Participants with normal hearing scored significantly lower on the HEAR-QL-26 than the normative mean (mean: 88, SD: 9.3, normative mean: 98, SD: 5, p =.000). The PROMIS failed to identify any differences in QOL between participants based on hearing status, or when compared to the normative mean.

CONCLUSION

The HEAR-QL was more sensitive than the PROMIS in identifying QOL deficits in CCS at risk for hearing loss. The HEAR-QL should be considered in studies seeking to improve the QOL of CCS with hearing loss.

CLINICAL, DEMOGRAPHIC FACTORS, AND SUBSTANCE USE AMONG HISPANIC AND NON-HISPANIC YOUNG ADULT CHILDHOOD CANCER SURVIVORS

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J Psychosoc Oncol; doi: 10.1080/07347332.2024.2326148

PURPOSE
The purpose of this study is to examine the protective and risk factors of substance use behaviors (tobacco, marijuana, e-cigarette, and alcohol) among young adult childhood cancer survivors. The study focused on clinical (receipt of cancer-related follow-up care, treatment intensity, late effects, depressive symptoms, self-rated health) and demographic (race/ethnicity, neighborhood socioeconomic status) factors and their associations with substance use.

METHODS
Participants were from the Project Forward cohort, a population-based study of young adult survivors of childhood cancers. Participants (N = 1166, M_age = 25.1 years) were recruited through the Los Angeles Cancer Surveillance Program (Cancer Registry covering Los Angeles County, California). Multivariate path analyses were performed with substance use as the outcome variables and clinical and demographic factors as independent variables. Covariates included age and sex.

FINDING
Substance use was positively associated with depressive symptoms, and inversely associated with cancer-related follow-up care, female sex, age, Hispanic ethnicity, treatment intensity, and self-rated health. Neighborhood SES was inversely associated with tobacco use, while being positively associated with binge drinking and e-cigarette use. The results highlight the interrelationship between the clinical and demographic variables and their associations with different substance use.

CONCLUSION
Findings support the need for effective interventions targeting substance use behavior among CCS. This will help improve long-term outcomes and mitigate the risk for early morbidity.

SCALING UP AND IMPLEMENTING THE DIGITAL SURVIVORSHIP PASSPORT TOOL IN ROUTINE CLINICAL CARE - THE EUROPEAN MULTIDISCIPLINARY PANCARESURPASS PROJECT

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Eur J Cancer; doi: 10.1016/j.ejca.2024.114029

BACKGROUND
Childhood cancer survivors (CCS), of whom there are about 500,000 living in Europe, are at an increased risk of developing health problems and require lifelong Survivorship Care. There are information and knowledge gaps among CCS and healthcare providers (HCPs) about requirements for Survivorship Care that can be addressed by the Survivorship Passport (SurPass), a digital tool providing CCS and HCPs with a comprehensive summary of past treatment and tailored recommendations for Survivorship Care. The potential of the SurPass to improve person-centred Survivorship Care has been demonstrated previously.

METHODS
The EU-funded PanCareSurPass project will develop an updated version (v2.0) of the SurPass allowing for semi-automated data entry and implement it in six European countries (Austria, Belgium, Germany, Italy, Lithuania and Spain), representative of three infrastructure healthcare scenarios typically found in Europe. The implementation study will investigate the impact on person-centred care, as well as costs and processes of scaling up the SurPass. Interoperability between electronic health record systems and SurPass v2.0 will be addressed using the Health Level Seven (HL7) International interoperability standards.

RESULTS
PanCareSurPass will deliver an interoperable digital SurPass with comprehensive evidence on person-centred outcomes, technical feasibility and health economics impacts. An Implementation Toolkit will be developed and freely shared to promote and support the future implementation of SurPass across Europe.

CONCLUSIONS
PanCareSurPass is a novel European collaboration that will improve person-centred Survivorship Care for CCS across Europe through a robust assessment of the implementation of SurPass v2.0 in different healthcare settings.

REINTEGRATION INTO SCHOOL, KINDERGARTEN AND WORK IN FAMILIES OF CHILDHOOD CANCER SURVIVORS AFTER A FAMILY-ORIENTED REHABILITATION PROGRAM

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Front Pediatr; doi: 10.3389/fped.2024.1288567

OBJECTIVE
To describe the situation of childhood cancer survivors and their parents before and one year after a family-oriented rehabilitation program (FOR) and to identify factors influencing reintegration.

METHODS
We included parents of children diagnosed with leukemia or central nervous system tumor. We assessed parental functioning using the functioning subscale of the Ulm Quality of Life Inventory for Parents (ULQIE) and children's school/kindergarten related quality of life (parental assessment, subscale KINDL-R). Descriptive analyses, group comparisons and multiple regression analyses on data of 285 parents of 174 children diagnosed with leukemia or central nervous system tumor.

RESULTS
Parents reported changes in their work situation (e.g., reduction of working hours) due to their child's diagnosis. Parental functioning increased significantly over time. Children's leukemia diagnosis and shorter time since the end of treatment were associated with higher functioning in parents one year after FOR. Parents reported difficulties in the child's work pace, concentration, stress resilience and empathy. The school/kindergarten-related quality of life (QoL) of the children was lower than in the general population. One year after FOR, most children reintegrated fully in school/kindergarten, partly with support (e.g., integration assistant). No significant predictors for children's reintegration were identified.

DISCUSSION
Parents and children experience major changes in their work/school/kindergarten life. One year after FOR most parents reported a reintegration of their children, however the children's school/kindergarten-related QoL remained below average compared to norm values. Even after rehabilitation families of childhood cancer survivors might benefit from psychosocial and practical support offers to support families with the reintegration into work/school/kindergarten.

REGISTRATION, INCIDENCE PATTERNS, AND SURVIVAL TRENDS OF CENTRAL NERVOUS SYSTEM TUMORS AMONG CHILDREN IN GERMANY 1980-2019: AN ANALYSIS OF 40 YEARS BASED ON DATA FROM THE GERMAN CHILDHOOD CANCER REGISTRY

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Pediatr Blood Cancer; doi: 10.1002/pbc.30954

BACKGROUND
Tumors of the central nervous system (CNS) are the second most common type of pediatric cancer in Germany. We aimed to describe registration practice, incidence, and survival patterns for childhood CNS tumors in Germany for the past 40 years.

PROCEDURE
Including all CNS tumor cases in children diagnosed at ages 0-14 years registered at the German Childhood Cancer Registry (GCCR) in 1980-2019 (for survival analysis 1980-2016), we calculated age-specific and age-standardized incidence rates (ASIR) over time, average annual percentage changes (AAPC), and 1- and 5-year overall survival.

RESULTS
While we observed a pronounced increase in ASIR after the establishment of the GCCR during the 1980s, ASIR for all pediatric CNS tumors combined continued to increase markedly from 28.6 per million in 1990-1999 to 43.3 in 2010-2019 (AAPC = 2.7% in 1991-2010, AAPC = 0.3% in 2010-2019). The 5-year overall survival from CNS tumors improved from 63% in the 1980s, 70% in the 1990s to 79% in 2010-2016. These improvements have occurred across all age groups. Children diagnosed with ependymomas and choroid plexus tumors experienced the strongest increase (from 54% to 81%).

CONCLUSIONS
Observed increases in incidence rates for pediatric CNS tumors are likely only partially caused by actual increasing case numbers. The majority is a function of improved registration and, to a minor extent, improvements in diagnostics. Survival from pediatric CNS tumors has, by and large, improved consistently, leading to a growing population of childhood cancer survivors with diverse health biographies and risk of lifelong adverse impact on health and wellbeing.

ASSOCIATIONS OF SEVEN MEASURES OF BIOLOGICAL AGE ACCELERATION WITH FRAILTY AND ALL-CAUSE MORTALITY AMONG ADULT SURVIVORS OF CHILDHOOD CANCER IN THE ST. JUDE LIFETIME COHORT

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Nat Cancer; doi: 10.1038/s43018-024-00745-w

ABSTRACT

Survivors of childhood cancer may experience accelerated biological aging, resulting in premature frailty and death. We used seven measures of biological age in the St. Jude Lifetime (SJLIFE) Cohort to compare biological age acceleration between the SJLIFE Cohort and the third United States National Health and Nutrition Examination Survey controls, explore trajectories of biological age according to cancer treatment and type, and test associations of biological age acceleration with frailty and death (mean follow-up of 26.5 years) among survivors. Survivors of cancer aged 5% faster per year and measured, on average, 0.6-6.44 years biologically older compared to controls and 5-16 years biologically older compared to age-matched individuals at the population level. Survivors treated with hematopoietic cell transplant and vinca alkaloid chemotherapy evidenced the fastest trajectories of biological aging. Biologically, older and faster-aging survivors consistently and robustly had a higher risk of frailty and died earlier than those with slower biological aging, suggesting a potential opportunity to intervene on excess aging.

DIFFERENT SUBTYPES OF CHRONIC FATIGUE IN CHILDHOOD CANCER SURVIVORS: A DCCSS LATER STUDY

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Pediatr Blood Cancer; doi: 10.1002/pbc.30951

INTRODUCTION
The aim of the current study was to investigate whether subtypes of chronic fatigue (CF) can be identified in childhood cancer survivors (CCS), and if so, to determine the characteristics of participants with a specific subtype.

METHODS
Participants were included from the nationwide DCCSS LATER cohort. The Checklist Individual Strength (CIS) was completed to assess fatigue. Participants with CF (scored ≥35 on the fatigue severity subscale and indicated to suffer from fatigue for ≥6 months) were divided into subgroups using two-step cluster analysis based on the CIS concentration, motivation, and physical activity subscales. Differences between groups on demographics, psychosocial, lifestyle, and treatment-related variables were determined using ANOVA and chi-square analyses (univariable) and multinomial regression analysis (multivariable).

RESULTS
A total of 1910 participants participated in the current study (n = 450 with CF; n = 1460 without CF). Three CF subgroups were identified: Subgroup 1 (n = 133, 29% of participants) had CF with problems in physical activity; Subgroup 2 (n = 111, 25% of participants) had CF with difficulty concentrating; and Subgroup 3 (n = 206, 46% of participants) had multi-dimensional CF. Compared to Subgroup 1, Subgroup 2 more often reported sleep problems, limitations in social functioning, and less often have more than two comorbidities. Subgroup 3 more often reported depression, sleep problems, a lower self-esteem, and limitations in social functioning and a lower educational level compared to Subgroup 1.

CONCLUSION
Different subgroups of CCS with CF can be identified based on fatigue dimensions physical activity, motivation and concentration. Results suggest that different intervention strategies, tailored for each subgroup, might be beneficial.

CONCURRENT BRAIN STRUCTURAL AND FUNCTIONAL ALTERATIONS IN THE THALAMUS OF ADULT SURVIVORS OF CHILDHOOD BRAIN TUMORS: A MULTIMODAL MRI STUDY

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Brain Res Bull; doi: 10.1016/j.brainresbull.2024.110937

ABSTRACT

Adult survivors of childhood brain tumors often present with cognitive deficits that affect their quality of life. Studying brain structure and function in brain tumor survivors can help understand the underlying mechanisms of their cognitive deficits to improve long-term prognosis of these patients. This study analyzed voxel-based morphometry (VBM) derived from T1-weighted MRI and the amplitude of low-frequency fluctuation (ALFF) from resting-state functional magnetic resonance imaging (rs-fMRI) to examine the structural and functional alterations in 35 brain tumor survivors using 35 matching healthy individuals as controls. Compared with healthy controls, brain tumor survivors had decreased gray matter volumes (GMV) in the thalamus and increased GMV in the superior frontal gyrus. Functionally, brain tumor survivors had lower ALFF values in the inferior temporal gyrus and medial prefrontal area and higher ALFF values in the thalamus. Importantly, we found concurrent but negatively correlated structural and functional alterations in the thalamus based on observed significant differences in GMV and ALFF values. These findings on concurrent brain structural and functional alterations provide new insights towards a better understanding of the cognitive deficits in brain tumor survivors.

NEUROPSYCHOLOGICAL TASK OUTCOMES AMONG SURVIVORS OF CHILDHOOD ACUTE LYMPHOBLASTIC LEUKEMIA IN MALAYSIA

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Sci Rep; doi: 10.1038/s41598-024-58128-1

ABSTRACT

This study intended to explore the neuropsychological ramifications in childhood acute lymphoblastic leukemia (ALL) survivors in Malaysia and to examine treatment-related sequelae. A case-control study was conducted over a 2-year period. Seventy-one survivors of childhood ALL who had completed treatment for a minimum of 1 year and were in remission, and 71 healthy volunteers were enlisted. To assess alertness (processing speed) and essential executive functioning skills such as working memory capacity, inhibition, cognitive flexibility, and sustained attention, seven measures from the Amsterdam Neuropsychological Tasks (ANT) program were chosen. Main outcome measures were speed, stability and accuracy of responses. Mean age at diagnosis was 4.50 years (SD ± 2.40) while mean age at study entry was 12.18 years (SD ± 3.14). Survivors of childhood ALL underperformed on 6 out of 7 ANT tasks, indicating poorer sustained attention, working memory capacity, executive visuomotor control, and cognitive flexibility. Duration of treatment, age at diagnosis, gender, and cumulative doses of chemotherapy were not found to correlate with any of the neuropsychological outcome measures. Childhood ALL survivors in our center demonstrated significantly poorer neuropsychological status compared to healthy controls.

A COMPREHENSIVE PEDIATRIC CARDIO-ONCOLOGY PROGRAM: A SINGLE INSTITUTION APPROACH TO CARDIOVASCULAR CARE FOR PEDIATRIC PATIENTS WITH CANCER AND CHILDHOOD CANCER SURVIVORS

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Cardiooncology; doi: 10.1186/s40959-024-00211-7

ABSTRACT

Cardiovascular complications related to cancer therapies are broad and variable in onset. These complications are the leading cause of non-cancer related morbidity and mortality in childhood cancer survivors and can also impact ongoing cancer treatment. Despite this understanding, dedicated cardio-oncology programs are lacking in pediatric cardiology. In an attempt to respond to these concerns, a risk-stratified, comprehensive cardio-oncology program was established to address the cardiovascular needs including prevention, early diagnosis, and management of patients with and at risk for cardiovascular complications of cancer therapy.

This manuscript describes a single institution's experience of building and managing a multidisciplinary pediatric cardio-oncology program with close collaboration among cardiologists, oncologists, advanced cardiology and oncology practice providers, and allied health providers such as a dietitian and psychologist to provide comprehensive cardiovascular care for childhood cancer patients and survivors. In developing this program, emphasis was on the childhood cancer survivor population, as various cardiovascular complications can present many years after cancer treatment.

AVAILABILITY AND ADAPTION OF EXERCISE PROGRAMS IN PEDIATRIC ONCOLOGY DURING THE COVID-19 PANDEMIC AND BEYOND: A NATIONWIDE FOLLOW-UP SURVEY OF PROVIDERS IN GERMANY

Sabine Kesting, Dominik Gaser, Jennifer Queisser, Miriam Götte, Irene von Luettichau, Christiane Peters, Renate Oberhoffer-Fritz, Gabriele Gauß

Front Pediatr; doi: 10.3389/fped.2024.1372261

BACKGROUND

The COVID-19 pandemic has presented major challenges to clinical practice and delivery of care programs throughout all health care systems. Exercise programs, that are implemented in most centers for pediatric oncology in Germany, are a relatively new care program however with high clinical impact and health benefits.

OBJECTIVE

The impact and consequences of the pandemic on the delivery and availability of exercise programs in Germany for pediatric cancer patients and survivors are unknown. A national survey analyzed restrictions, challenges and novel approaches of exercise program delivery and scientific research.

METHOD

A two-stage online survey was distributed to providers of exercise programs (acute clinics, non-clinical institutions, rehabilitation facilities) via the established Network ActiveOncoKids. Data was collected during the pandemic in 2022 and 2023 using a combination of open and closed questions.

RESULTS

In total, n = 27 (response rate: 82%) and n = 17 (response rate: 63%) providers participated in the first and second survey, respectively. Findings pointed out restrictions in 85% of all exercise programs in 2020 and 2021, with slight reductions in 2022. During pandemic, restrictions with major impact arose within exercise offers during follow-up and declined gradually. Whereas restrictions within the setting of acute therapy had medium or minor impact but persisted beyond. Delivery of provided exercise programs necessitated adaptions, including digital methods, supervised interventions from a distance and change of locations.

DISCUSSION

The findings highlight the adaptability, the demand and the potential of exercise programs in pediatric oncology. We assume that exercise professionals have used the pandemic-related challenges to review and modify existing concepts and made adaptations according to local conditions and novel tools for the provision of exercise programs. Nevertheless, a conspicuous lack of exercise-related care has become evident in certain patients and survivors. Further expansion of programs is imperative to address and accommodate all pertinent needs.

ST. JUDE SURVIVORSHIP PORTAL: SHARING AND ANALYZING LARGE CLINICAL AND GENOMIC DATASETS FROM PEDIATRIC CANCER SURVIVORS

Gavriel Y Matt, Edgar Sioson, Kyla Shelton, Jian Wang, Congyu Lu, Airen Zaldivar Peraza, Karishma Gangwani, Robin Paul, Colleen Reilly, Aleksandar Acić, Qi Liu, Stephanie R Sandor, Clay McLeod, Jaimin Patel, Fan Wang, Cindy Im, Zhaoming Wang, Yadav Sapkota, Carmen L Wilson, Nickhill Bhakta, Kirsten K Ness, Gregory T Armstrong, Melissa M Hudson, Leslie L Robison, Jinghui Zhang, Yutaka Yasui, Xin Zhou

Cancer Discov; doi: 10.1158/2159-8290.CD-23-1441

ABSTRACT

Childhood cancer survivorship studies generate comprehensive datasets comprising demographic, diagnosis, treatment, outcome, and genomic data from survivors. To broadly share this data, we created the St. Jude Survivorship Portal (https://survivorship.stjude.cloud), the first data portal for sharing, analyzing, and visualizing pediatric cancer survivorship data. Over 1,600 phenotypic variables and 400 million genetic variants from over 7,700 childhood cancer survivors can be explored on this free, open-access portal. Summary statistics of variables are computed on-the-fly and visualized through interactive and customizable charts. Survivor cohorts can be customized and/or divided into groups for comparative analysis. Users can also seamlessly perform cumulative incidence and regression analyses on the stored survivorship data. Using the portal, we explored the ototoxic effects of platinum-based chemotherapy, uncovered a novel association between mental health, age, and limb amputation, and discovered a novel haplotype in MAGI3 strongly associated with cardiomyopathy specifically in survivors of African ancestry.

SECOND MALIGNANT NEOPLASMS WITHIN 5 YEARS FROM FIRST PRIMARY DIAGNOSIS IN PEDIATRIC ONCOLOGY PATIENTS IN CANADA: A POPULATION-BASED RETROSPECTIVE COHORT STUDY

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Front Oncol; doi: 10.3389/fonc.2024.1376652

INTRODUCTION

From the advancement of treatment of pediatric cancer diagnosis, the five-year survival rate has increased significantly. However, the adverse consequence of improved survival rate is the second malignant neoplasm. Although previous studies provided information on the incidence and risk of SMN in long term survivors of childhood cancer, there is still scarce information known for short term (< 5 years) prognosis. This study aims to assess the incidence, characteristics, management, and outcome of children who develop SMN malignancies within 5 years of diagnosis of their initial cancer.

METHOD

This is a retrospective cohort study of early Second Malignant Neoplasms (SMN) in pediatric oncology patients. The Cancer in Young People - Canada (CYP-C) national pediatric cancer registry was used and reviewed pediatric patients diagnosed with their first cancer from 2000-2015.

RESULTS

A total of 20,272 pediatric patients with a diagnosis of a first malignancy were analyzed. Of them, 0.7% were diagnosed with a SMN within the first 5 years following their first cancer diagnosis. Development of a SMN impacted survival, shown by an inferior survival rate in the SMN cohort (79.1%) after three years compared to that of the non-SMN cohort (89.7%). Several possible risk factors have been identified in the study including the use of epipodophyllotoxins, exposure to radiation, and hematopoietic stem cell 169 transplant.

DISCUSSION

This is the first national study assessing the incidence, 170 characteristics, risk factors and outcome of early SMN in Canadian children 171 from age 0-15 from 2000-2015.

PREVALENCE OF SURVIVORS OF CHILDHOOD CANCER BASED ON A POPULATION-BASED CANCER REGISTRY IN OSAKA, JAPAN

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Int J Cancer; doi: 10.1002/ijc.34961

ABSTRACT

Although the survival rate of patients with childhood cancer has greatly improved, long-term survivors face specific problems such as the late effects of cancer treatment. In this study, we estimated the number of people who had experienced childhood cancer to predict their needs for medical care and social resources. Using data from the population-based Osaka Cancer Registry, we identified children aged 0-14 years who were diagnosed with cancer between 1975 and 2019. We estimated the prevalence on December 31, 2019, and the 5- and 10-year prevalence (i.e., the number of survivors living up to 5 or 10 years after the diagnosis of cancer) over time. The prevalence proportion was age-standardized using a direct standardization method. The prevalence estimates for Osaka were applied to the national population to determine the national prevalence in Japan.

Among 8186 patients diagnosed with childhood cancer in Osaka, 5252 (987 per million) survived until December 31, 2019. The 5-year prevalence per million increased from 194 in 1979 to 417 in 2019 (+116%), while the 10-year prevalence increased from 391 in 1984 to 715 in 2019 (+83%). Based on the long-term registry data, an estimated 73,182 childhood cancer survivors were living in Japan by the end of 2019. The increasing 5-year and 10-year prevalence proportions indicate the continued need for cancer survivorship support for children, adolescents, and young adults. These estimates of the prevalence of childhood cancer survivors, including long-term survivors, may be useful for policymakers and clinicians to plan and evaluate survivorship care.

ASSOCIATION OF INSULIN-LIKE GROWTH FACTOR-1 WITH BONE MINERAL DENSITY IN SURVIVORS OF CHILDHOOD ACUTE LEUKEMIA

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Cancers (Basel); doi: 10.3390/cancers16071296

ABSTRACT

In this study, we investigated bone mineral deficits in children who survived childhood acute leukemia and explored the association between the insulin-like growth factor-1 (IGF-1) level and bone mineral density (BMD). This retrospective analysis enrolled 214 patients treated for acute leukemia, measuring various factors including height, weight, body mass index (BMI), and lumbar spine BMD after the end of treatment. The study found an overall prevalence of low BMD in 15% of participants. Notably, IGF-1 levels were significantly different between patients with low BMD and those with normal BMD, and correlation analyses revealed associations of the IGF-1 level and BMI with lumbar spine BMD. Regression analyses further supported this relationship, suggesting that higher IGF-1 levels were associated with a decreased risk of low BMD. The study findings suggest that IGF-1 may serve as a valuable tool for evaluating and predicting osteoporosis in survivors of childhood acute leukemia.

HEALTH-RELATED QUALITY OF LIFE OF ADOLESCENT AND YOUNG ADULT-AGED CHILDHOOD CANCER SURVIVORS IN A SOUTH AFRICAN COHORT: A PILOT STUDY USING THE MINNEAPOLIS-MANCHESTER QUALITY OF LIFE INSTRUMENT

Anel Van Zyl, Mariana Kruger, Sandile Ndlovu, Paul C Rogers

J Adolesc Young Adult Oncol; doi: 10.1089/jayao.2023.0123

PURPOSE
We investigated the health-related quality of life (HRQoL) of an adolescent and young adult (AYA)-aged South African childhood cancer survivor (CCS) cohort.

METHODS
Participants completed the Minneapolis-Manchester Quality of Life adolescent and adult forms. The overall Cronbach's alpha coefficients were 0.81 (adolescent form) and 0.92 (adult form). The scale-level content validity indexes were acceptable (0.88 and 0.89 for the adolescent and adult forms, respectively). The total domain and overall HRQoL scores were calculated.

RESULTS
Sixty-two survivors completed the adolescent form and 30 completed the adult form. The median age was 17.5 years (range 13-34 years), and the median time from diagnosis was 12 years (male:female ratio 1:1.2). Risk factors for poor physical functioning included age at study visit ($p = 0.015$), solid tumor diagnosis ($p = 0.012$), radiotherapy ($p = 0.021$), and surgery ($p = 0.006$). Six or more late effects impacted most domains negatively; severe late effects ($p = 0.020$) decreased physical functioning. Lower socioeconomic status was associated with poorer physical ($p = 0.006$) and cognitive ($p = 0.047$) functioning. The adult form cohort had poorer psychological ($p = 0.014$) and social functioning ($p = 0.005$) and body image ($p = 0.016$) than the adolescent form cohort.

CONCLUSION
Older age, radiotherapy, surgery, solid tumor diagnosis, and the number and severity of late effects negatively influenced HRQoL in AYA-aged CCSs. A long-term follow-up (LTFU) risk stratification system should include HRQoL status to assist with holistic LTFU care.

IMPACT OF ELECTRONIC CIGARETTES ON PEDIATRIC, ADOLESCENT AND YOUNG ADULT LEUKEMIA PATIENTS

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Pediatr Med; doi: 10.21037/pm-23-43

ABSTRACT

Electronic cigarettes, which deliver an aerosolized, nicotine-containing product upon inhalation, are a public health issue that continue to gain popularity among adolescents and young adults in the United States. Use of electronic cigarettes is wide, and extends to pediatric patients with multiple comorbidities, including childhood cancer, leaving them vulnerable to further negative health outcomes. Acute leukemias are the most common type of cancer in pediatric populations, and treatment outcomes for these patients are improving; consequently, there is an increased emphasis on the effect of behavioral lifestyle factors on quality of life in survivorship. The rate of electronic cigarette use is higher among pediatric patients with a history of cancer than those without a history of cancer. Because electronic cigarettes are relatively new, much about their acute and long-term consequences remains unknown, as is their effect on therapy outcomes and long-term survivorship. This review article summarizes current knowledge about electronic cigarettes, including their composition and the trends in use among pediatric patients. Furthermore, this review provides a comprehensive description of the impact electronic cigarettes have on leukemia development, treatment and survivorship and highlights gaps in knowledge that will be necessary for developing recommendations, management strategies, and tailored treatments for pediatric leukemia patients and survivors who use these nicotine products.

A 14-YEAR-OLD GIRL WITH PREMATURE OVARIAN INSUFFICIENCY BUT WITH A POSITIVE PREGNANCY TEST

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J Pediatr Endocrinol Metab; doi: 10.1515/jpem-2024-0019

OBJECTIVES

Childhood cancer survivors are at risk for premature ovarian insufficiency, especially after treatment with alkylating agents. The objective of this report is to highlight a case in which this phenomenon caused a false-positive pregnancy test.

CASE PRESENTATION

A workup was performed in a 14-year-old girl with a positive pregnancy test. She was diagnosed with stage IV neuroblastoma of the left adrenal gland at the age of 4 years. She received extensive treatment, including alkylating agents, and had been diagnosed with premature ovarian insufficiency. An LH/hCG suppression test was performed using high dose 17 bèta-estradiol: hCG levels normalized.

CONCLUSIONS

The pregnancy test was false-positive due to production of low amounts of hCG by the pituitary gland as a result of high LH concentrations following premature ovarian insufficiency. It may be helpful to perform the LH/hCG suppression test to prove pituitary origin of the hCG overproduction.

EFFICACY OF A WEB-BASED PSYCHOEDUCATIONAL INTERVENTION, FEX-CAN SEX, FOR YOUNG ADULT CHILDHOOD CANCER SURVIVORS WITH SEXUAL DYSFUNCTION: A RANDOMIZED CONTROLLED TRIAL

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Internet Interv; doi: 10.1016/j.invent.2024.100739

BACKGROUND

No web-based interventions addressing sexual problems are available for young adult survivors of childhood cancer.

AIM

This study aimed to test the efficacy of a web-based psychoeducational intervention, Fex-Can Sex, to alleviate sexual problems in young adults treated for cancer during childhood.

METHOD

This randomized controlled trial tested the effects of a 12-week, self-help, web-based intervention. Young adults (aged 19-40) reporting sexual dysfunction were drawn from a population-based national cohort of childhood cancer survivors and randomized to either an intervention group (IG, n = 142) or a wait-list control group (CG, n = 136). The primary outcome was 'Satisfaction with sex life' assessed by the PROMIS® SexFS v 2.0. Secondary outcomes included other SexFS domains, body image (BIS), emotional distress (HADS), health-related quality of life (EORTC QLQ-C30), and sex-related self-efficacy. Surveys were completed at baseline (T0), directly after the intervention (T1), and three months later (T2). The effects of the intervention were tested using t-test and linear mixed models, including intention-to-treat (ITT) and subgroups analysis. Adherence was based on log data extracted from the website system. The intervention included an open-ended question about perceived sexual problems.

RESULTS

No effect of the intervention was found in the primary outcome. Regarding secondary outcomes, the IG reported less vaginal dryness (Lubrication subscale) than the CG at T1 ($p = 0.048$) and T2 ($p = 0.023$). Furthermore, at T1, the IG reported less emotional distress than the CG ($p = 0.047$). Subgroup analyses showed that those with greater sexual problems at T0 improved over time (T1 and T2), regardless of group allocation. Overall, adherence to the intervention was low and participants' activity levels did not change the results. Additionally, some members of the IG reported increased understanding and acceptance of their sexual problems.

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CONCLUSION
The Fex-Can Sex intervention shows potential to improve sexual function, especially among those with greater dysfunction. To increase adherence and effect, we recommend the intervention to be further developed including more tailored content.

ASSOCIATIONS BETWEEN MITOCHONDRIAL COPY NUMBER, EXERCISE CAPACITY, PHYSIOLOGIC COST OF WALKING, AND CARDIAC STRAIN IN YOUNG ADULT SURVIVORS OF CHILDHOOD CANCER

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J Cancer Surviv; doi: 10.1007/s11764-024-01590-7

PURPOSE
Childhood cancer survivors are at risk for cardiac dysfunction and impaired physical performance, though underlying cellular mechanisms are not well studied. In this cross-sectional study, we examined the association between peripheral blood mitochondrial DNA copy number (mtDNA-CN, a proxy for mitochondrial function) and markers of performance impairment and cardiac dysfunction.

METHODS
Whole-genome sequencing, validated by quantitative polymerase chain reaction, was used to estimate mtDNA-CN in 1720 adult survivors of childhood cancer (48.5% female; mean age = 30.7 years, standard deviation (SD) = 9.0). Multivariable logistic regression was performed to evaluate the associations between mtDNA-CN and exercise intolerance, walking inefficiency, and abnormal global longitudinal strain (GLS), adjusting for treatment exposures, age, sex, and race and ethnicity.

RESULTS
The prevalence of exercise intolerance, walking inefficiency, and abnormal GLS among survivors was 25.7%, 10.7%, and 31.7%, respectively. Each SD increase of mtDNA-CN was associated with decreased odds of abnormal GLS (adjusted odds ratio (OR) = 0.88, $p = 0.04$) but was not associated with exercise intolerance (OR = 1.02, $p = 0.76$) or walking inefficiency (OR = 1.06, $p = 0.46$). Alkylating agent exposure was associated with increased odds of exercise intolerance (OR = 2.25, $p < 0.0001$), walking inefficiency (OR = 2.37, $p < 0.0001$), and abnormal GLS (OR = 1.78, $p = 0.0002$).

CONCLUSIONS
Increased mtDNA-CN is associated with decreased odds of abnormal cardiac function in childhood cancer survivors.

PLEUROPARENCHYMAL FIBROELASTOSIS AS A LATE COMPLICATION OF CHILDHOOD CANCER THERAPY: A CASE SERIES

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Pediatr Blood Cancer; doi: 10.1002/pbc.31004

ABSTRACT

Pleuroparenchymal fibroelastosis (PPFE) is a rare interstitial pneumonia with distinct clinicopathologic features. It has been associated with exposure to hematopoietic stem cell transplantation (HSCT) and classical alkylating agents. Here, we highlight PPFE as a late complication of childhood cancer therapy by describing the cases of four survivors of childhood cancer with a diagnosis of treatment-related PPFE. All patients received high-dose alkylating agents. PPFE should be considered in the differential diagnosis of restrictive lung disease in patients with history of exposure to alkylating agents or HSCT. Development of PPFE-specific, noninvasive diagnostic tools and disease-modifying therapies will clinically benefit these patients.

RURALITY, CARDIOVASCULAR RISK FACTORS, AND EARLY CARDIOVASCULAR DISEASE AMONG CHILDHOOD, ADOLESCENT, AND YOUNG ADULT CANCER SURVIVORS

David H Noyd, Anna Bailey, Amanda Janitz, Talayeh Razzaghi, Sharon Bouvette, William Beasley, Ashley Baker, Sixia Chen, David Bard

Rs Sq (Preprint); doi: 10.21203/rs.3.rs-4139837/v1

ABSTRACT

Cardiovascular risk factors (CVRFs) later in life potentiate risk for late cardiovascular disease (CVD) from cardiotoxic treatment among survivors. This study evaluated the association of baseline CVRFs and CVD in the early survivorship period. Methods This analysis included patients ages 0-29 at initial diagnosis and reported in the institutional cancer registry between 2010 and 2017 (n = 1228). Patients who died within five years (n = 168), those not seen in the oncology clinic (n = 312), and those with CVD within one year of diagnosis (n = 17) were excluded. CVRFs (hypertension, diabetes, dyslipidemia, and obesity) within one year of initial diagnosis, were constructed and extracted from the electronic health record based on discrete observations, ICD9/10 codes, and RxNorm codes for antihypertensives. Results Among survivors (n = 731), 10 incident cases (1.4%) of CVD were observed between one year and five years after the initial diagnosis. Public health insurance (p = 0.04) and late effects risk strata (p = 0.01) were positively associated with CVD. Among survivors with public insurance(n = 495), two additional cases of CVD were identified from claims data with an incidence of 2.4%. Survivors from rural areas had a 4.1 times greater risk of CVD compared with survivors from urban areas (95% CI: 1.1-15.3), despite adjustment for late effects risk strata. Conclusions Clinically computable phenotypes for CVRFs among survivors through informatics methods were feasible. Although CVRFs were not associated with CVD in the early survivorship period, survivors from rural areas were more likely to develop CVD. Implications for Survivors: Survivors from non-urban areas and those with public insurance may be particularly vulnerable to CVD.

TRANSLATING A MOTIVATIONAL INTERVIEWING INTERVENTION FOR CHILDHOOD CANCER SURVIVORS INTO AN EHEALTH TOOL: A USER-CENTERED DESIGN PROCESS

Sienna Ruiz, Nicole Ackermann, Julia Maki, April Idalski Carcone, Melissa M Hudson, Matthew J Ehrhardt, Danielle Cloakey, Danielle DuChateau, Stanford A Griffith, Allison Johnson, Aaron Phillips, Erika A Waters

Transl Behav Med; doi: 10.1093/tbm/ibae014

ABSTRACT

Childhood cancer survivors have a higher risk of developing cardiomyopathy than members of the general population. Screening echocardiograms can facilitate early detection and treatment of cardiomyopathy. Furthermore, motivational interviewing can increase uptake of cardiac screening. However, such approaches are time- and resource-intensive, which limits their reach to the survivors who need them. We describe how we utilized a user-centered design process to translate an in-person motivational interviewing intervention into an eHealth tool to improve cardiac screening among childhood cancer survivors. We used an iterative, three-phase, user-centered design approach: (i) setting the stage (convening advisory boards and reviewing the original intervention), (ii) content programming and development (writing and programming intervention text and flow), and (iii) intervention testing (research team testing and cognitive interviews.) For cognitive interviews, participants were recruited via institutional participant registries and medical records. Data were analyzed using rapid qualitative analysis. During Phase 1, we identified survivor and provider advisors and outlined elements of the in-person intervention to change for the eHealth tool. During Phases 2 and 3, advisors recommended several modifications that guided the final intervention content and flow. Examples include: acknowledging potential hesitation or apprehension surrounding medical screenings, addressing barriers and facilitators to obtaining screening, and improving the tool's usability and appeal. In Phase 3, cognitive interview participants suggested additional refinements to the intervention language. This translation process shows that continued in-depth engagement of community advisors and iterative testing can improve the applicability of an eHealth to survivors' lived experiences and social contexts.

INCIDENCE AND PREVALENCE OF MUSCULOSKELETAL HEALTH CONDITIONS IN SURVIVORS OF CHILDHOOD AND ADOLESCENT CANCERS: A REPORT FROM THE SWISS CHILDHOOD CANCER SURVIVOR STUDY

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Cancer Med; doi: 10.1002/cam4.7204

PURPOSE

Childhood cancer and its treatment can cause damage to the musculoskeletal system. We aimed to determine the incidence and prevalence of musculoskeletal health conditions (MSHC) in survivors, and to investigate differences by cancer-related characteristics.

METHODS

We used data from the Childhood Cancer Registry and the Swiss Childhood Cancer Survivor Study, including survivors (≥5 years since diagnosis; diagnosed 1976-2015 at <20 years of age) aged ≥15 years at study. Cumulative incidence and prevalence of MSHCs (osteoporosis, limb length discrepancy, limited joint mobility, bone/joint pain, scoliosis, changes to chest/ribs and amputation) were calculated from self-reported data.

RESULTS

We included 2645 survivors (53% men; median age 24 years, range 15-59 years). Prevalence and cumulative incidence of any MSHC was 21% and 26%, respectively. Incidence rate for any MSHC was 15.6/1000 person-years. Scoliosis (8%), bone/joint pain (7%) and limited joint mobility (7%) were the most prevalent MSHC. MSHC co-occurred with other health conditions in 87% of survivors. We found increased rates of MSHC in women (RR = 1.4, 95%CI: 1.2-1.7), bone tumour survivors (RR = 6.0, 95%CI: 4.5-7.9), survivors older at diagnosis (11-15 years: RR = 1.8, 95%CI: 1.5-2.3), after a relapse (RR = 1.5, 95%CI: 1.3-1.9), treatment with surgery (RR = 1.2, 95%CI: 1.0-1.5), chemotherapy (RR = 1.4, 95%CI: 1.1-1.8) or stem cell transplantation (RR = 1.6, 95%CI: 1.0-2.5), and more recent year of diagnosis (2011-2015: RR = 4.3, 95%CI: 2.8-6.8).

CONCLUSION

MSHCs are prevalent in survivors, the risk is increasing in younger survivor cohorts, and MSHCs usually occur in multimorbid survivors. Strengthening of rehabilitation services and appropriate referrals are needed to mitigate the effects of the cancer and cancer treatment.

EXERCISE AND QUALITY DIET AFTER LEUKEMIA (EQUAL): A RANDOMIZED WEIGHT LOSS TRIAL AMONG ADULT SURVIVORS OF CHILDHOOD LEUKEMIA IN THE CHILDHOOD CANCER SURVIVOR STUDY

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Cancer Epidemiol Biomarkers Prev; doi: 10.1158/1055-9965.EPI-23-1601

BACKGROUND
Obesity is prevalent in childhood cancer survivors and interacts with cancer treatments to potentiate risk for cardiovascular (CV) death. We tested a remote weight-loss intervention that was effective among adults with CV risk factors in a cohort of adult survivors of childhood acute lymphoblastic leukemia (ALL) with overweight/obesity.

METHODS
In this phase 3 efficacy trial, survivors of ALL enrolled in the Childhood Cancer Survivor Study with body mass index (BMI)≥25 kg/m2 were randomized to a remotely-delivered weight-loss intervention versus self-directed weight loss, stratified by history of cranial radiotherapy (CRT). The primary endpoint was the difference in weight loss at 24-months in an intent-to-treat analysis. Analyses were performed using linear mixed effects models.

RESULTS
Among 358 survivors (59% female, median attained age: 37 years, IQR: 33-43), baseline mean (SD) weight was 98.6 kg (24.0) for the intervention group (n=181) and 94.9 kg (20.3) for controls (n=177). Adherence to the intervention was poor; 15% of individuals in the intervention completed 24/30 planned coaching calls. Weight at 24-months was available for 274 (77%) participants. After controlling for CRT, sex, race/ethnicity, and age, the mean (SE) change in weight from baseline to 24-months was -0.4 kg (0.8) for intervention and 0.2 kg (0.6) for control participants (p=0.59).

CONCLUSIONS
A remote weight-loss intervention that was successful among adults with CV conditions did not result in significant weight loss among adult survivors of childhood ALL.

CERAMIDES: A POTENTIAL CARDIOVASCULAR BIOMARKER IN YOUNG ADULT CHILDHOOD CANCER SURVIVORS?

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Eur Heart J Open; doi: 10.1093/ehjopen/oeae026

AIMS

The aim of this study was to investigate circulating ceramides involved in cardiovascular disease (CVD) in young adult childhood cancer survivors (CCS) and their correlations to previously reported adverse cardiovascular changes in this cohort.

METHODS AND RESULTS

Fifty-seven CCS and 53 healthy controls (age 20-30 years) were studied. Plasma long-chain ceramides, known to be cardiotoxic (C16:0, C18:0, C24:0, and C24:1), were analysed by mass spectrometry. The coronary event risk test 2 (CERT2) score was calculated from the ceramide data. Cardiac and carotid artery ultrasound data and lipid data available from previous studies of this cohort were used to study partial correlations with ceramide and CERT2 score data. All four analysed ceramides were elevated in CCS compared with controls ($P \leq 0.012$). The greatest difference was noted for C18:0, which was 33% higher in CCS compared with controls adjusted for sex, age, and body mass index (BMI) ($P < 0.001$). The CERT2 score was higher in CCS compared with controls ($P < 0.001$). In the CCS group, 35% had a high to very high CERT2 score (7-12) when compared with 9% in the control group ($P < 0.001$). The CCS subgroup with a CERT2 score ≥ 7 had higher heart rate, systolic blood pressure, and higher levels of apolipoprotein B compared with CCS with a CERT2 score < 6 ($P \leq 0.011$). When adjusted for age, sex, and BMI, CERT2 score was significantly correlated with arterial stiffness, growth hormone, and cranial radiotherapy ($P < 0.044$).

CONCLUSION

Ceramides could be important biomarkers in understanding the pathophysiology of CVD and in predicting CVD disease risk in young adult CCS.

UNHEALTHY LIFESTYLE BEHAVIORS, OVERWEIGHT, AND OBESITY AMONG CHILDHOOD CANCER SURVIVORS IN THE NETHERLANDS: A DCCSS LATER STUDY

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Cancer; doi: 10.1002/cncr.35338

BACKGROUND

The objective of this study was to examine the prevalence of unhealthy lifestyle behaviors, overweight, and obesity in Dutch childhood cancer survivors (CCSs) compared with sibling controls and the Dutch general population. Other aims were to assess associated factors of unhealthy lifestyle behaviors, overweight, and obesity and to identify subgroups of CCSs at risk for these unhealthy statuses.

METHODS

The authors included 2253 CCSs and 906 siblings from the Dutch Childhood Cancer Survivor Study-Late Effects After Childhood Cancer cohort, part 1, and added data from the Dutch general population. Questionnaire data were collected on overweight and obesity (body mass index >25.0 kg/m^2), meeting physical activity guidelines (>150 minutes per week of moderate or vigorous exercises), excessive alcohol consumption (>14 and >21 alcoholic consumptions per week for women and men, respectively), daily smoking, and monthly drug use. Multivariable logistic regression analyses and two-step cluster analyses were performed to examine sociodemographic-related, health-related, cancer-related, and treatment-related associated factors of unhealthy lifestyle behaviors and to identify subgroups of CCSs at risk for multiple unhealthy behaviors.

RESULTS

CCSs more often did not meet physical activity guidelines than their siblings (30.0% vs. 19.3%; $p < .001$). Married as marital status, lower education level, nonstudent status, and comorbidities were common associated factors for a body mass index ≥ 25.0 kg/m^2 and insufficient physical activity, whereas male sex and lower education were shared associated factors for excessive alcohol consumption, daily smoking, and monthly drug use. A subgroup of CCSs was identified as excessive alcohol consumers, daily smokers, and monthly drug users.

CONCLUSIONS

The current results emphasize the factors associated with unhealthy behaviors and the potential identification of CCSs who exhibit multiple unhealthy lifestyle behaviors.

ADULT SURVIVORS' PERCEPTIONS OF THEIR CHILDHOOD AND THE INFLUENCES OF BEING TREATED FOR ACUTE LYMPHOBLASTIC LEUKAEMIA WITH ALLOGENEIC HEMATOPOIETIC STEM CELL TRANSPLANTATION AS A CHILD: A PHENOMENOGRAPHIC STUDY

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Eur J Oncol Nurs; doi: 10.1016/j.ejon.2024.102592

PURPOSE

Adults who had acute lymphoblastic leukaemia (ALL) as children and were treated with allogeneic hematopoietic stem cell transplantation (aHSCT) may have been affected in their lives due to several long-term complications. From a clinical point of view, it is of interest to study how survivors describe their perceptions of their childhood today. The aim was therefore to describe how adults perceived their childhood and the influences of being treated for ALL with aHSCT as a child.

METHOD

Semi-structured telephone interviews were undertaken with 18 adults who had been treated for childhood ALL with aHSCT and were included in a national cohort of childhood ALL survivors, diagnosed between 1985 and 2007 at an age between 0 and 17 years. A phenomenographic analysis was used.

RESULTS

Three categories emerged: Feeling different, Feeling security and Feeling guilty. The informants felt that they had been different from other children but had felt security with the healthcare professionals and in care. They felt guilty because both their siblings' and parents' lives had been affected, but at the same time many perceived that they and their family members had become closer to one another.

CONCLUSIONS

The results emphasised that adults who had been treated for childhood ALL with aHSCT were affected both in negative and positive ways during their childhood. This indicates the importance for early psychosocial care interventions directed to children during their treatment, but also the need for person-centred psychological care in long-term outpatient clinics.

FINANCIAL HARDSHIP & NEIGHBORHOOD SOCIOECONOMIC DISADVANTAGE IN LONG-TERM CHILDHOOD CANCER SURVIVORS

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J NCI Cancer Spectr; doi: 10.1093/jncics/pkae033

BACKGROUND
Long-term survivors of childhood cancer face elevated risk for financial hardship. We evaluate whether childhood cancer survivors live in areas of greater deprivation and the association with self-reported financial hardships.

METHODS
Cross-sectional analysis of data from the Childhood Cancer Survivor Study (CCSS) between 1970 and 1999, and self-reported financial information from 2017-2019. We measured neighborhood deprivation with the Area Deprivation Index (ADI) based on current zip code. Financial hardship was measured with validated surveys that captured behavioral, material/financial sacrifice, and psychological hardship. Bivariate analyses described neighborhood differences between survivors and siblings. Generalized linear models estimated effect sizes between ADI and financial hardship adjusting for clinical factors and personal socioeconomic status.

RESULTS
Analysis was restricted to 3,475 long-term childhood cancer survivors and 923 sibling controls. Median ages at time of evaluation was 39 [IQR 33,46] and 47 [39,59] years, respectively. Survivors resided in areas with greater deprivation (ADI ≥ 50: 38.7% survivors vs 31.8% siblings, P < .001). One quintile increases in deprivation were associated with small increases in behavioral (2nd quintile P = .017) and psychological financial hardship (2nd quintile P = .009; 3rd quintile, P = .014). Lower psychological financial hardship was associated with individual factors including greater household income ($60,000+ income, P < .001) and being single (P = .048).

CONCLUSIONS AND RELEVANCE
Childhood cancer survivors were more likely to live in areas with socioeconomic deprivation. Both neighborhood level disadvantage and personal socioeconomic circumstances should be evaluated when trying to assist childhood cancer survivors with financial hardships.

ANTINEOPLASTIC THERAPY IS AN INDEPENDENT RISK FACTOR FOR DENTAL CARIES IN CHILDHOOD CANCER PATIENTS: A RETROSPECTIVE COHORT STUDY

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Support Care Cancer; doi: 10.1007/s00520-024-08523-1

PURPOSE
To evaluate the antineoplastic therapy (AT) as a risk factor for dental caries lesions independent of other risk factors such as income, family education, stimulated salivary flow rate, hygiene habits, frequency of sugar intake, and microbiota in childhood cancer (CC) patients.

METHODS
72 individuals were divided into CC patients (n=36) and healthy individuals (control group - CT n=36). Demographic data, hygiene habits, frequency of sugar intake, CC type, and AT were collected. Stimulated salivary flow rate was measured and the presence and concentration of Streptococcus mutans were assessed using a real-time polymerase chain reaction (qPCR) technique. Clinical evaluations included plaque index (PI) and decayed-missing-filled-teeth index (dmft/DMFT). Descriptive statistics, T-test, Mann-Whitney test, chi-square test, Fisher's exact test, and two-way analysis of variance were used for data analysis (p<0.05).

RESULTS
At the time of oral evaluation, both groups exhibited similar ages with means of 12.0±3.9 years old for CC and 12.0±4.0 years old for CT patients. All CC patients underwent chemotherapy with nine also undergoing radiotherapy. Significant differences were observed between the groups in terms of color/race, income, family education, and hygiene habits. However, no statistically significant differences were found between groups regarding the frequency of sugar intake, stimulated salivary flow rate, or the concentration of Streptococcus mutans (qPCR technique). For clinical parameters, the DMF (CC:1.80, CT: 0.75), decayed (CC: 0.88, CT: 0.19), missing (CC: 0.25, CT:0), and PI (CC: 30.5%, CT: 22.6%) were higher in the CC group (p<0.05).

CONCLUSION
Childhood cancer (CC) patients undergoing antineoplastic therapy (AT) exhibit a higher prevalence of dental caries, regardless of income/education, frequency of sugar intake, stimulated salivary flow rate, and microbiota.

'IT'S NOT MEANT TO BE FOR LIFE, BUT IT CARRIES ON': A QUALITATIVE INVESTIGATION INTO THE PSYCHOSOCIAL NEEDS OF YOUNG RETINOBLASTOMA SURVIVORS

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BMJ Open; doi: 10.1136/bmjopen-2023-082779

OBJECTIVE AND DESIGN

Retinoblastoma (Rb) is a rare childhood eye cancer, with 45% of individuals impacted by heritable disease and the remainder impacted non-heritably. The condition can leave survivors with life-long psychological and social challenges. This qualitative study examined the psychosocial needs of teenagers and young adults living beyond Rb.

SETTING

A qualitative, exploratory study was conducted using focus groups with teenagers and interviews with young adults. Participants were recruited via the Childhood Eye Cancer Trust and the two national Rb treatment centres in the UK. Reflexive thematic analysis was used to analyse data using exploratory and inductive methods.

PARTICIPANTS

32 young survivors of Rb (10 heritable, 21 non-heritable, 1 unknown; 23 unilateral, 9 bilateral) aged between 13 and 29 years (12 male, 20 female).

RESULTS

Data were rich and spanned the life course: three key themes were generated, containing eight subthemes. Theme 1 describes participants' experiences of childhood and trauma, including survivor guilt, memories from treatment and impact on personality. Theme 2 focuses on the challenges of adolescence, including the psychological impact of Rb, the impact on identity, and the sense of normality and adaptation to late effects. The third theme considered adulthood and the development of acceptance, a state of being widely considered unachievable during childhood, as well as the 'work' needed to feel supported, including seeking out information, peer support and therapeutic strategies.

CONCLUSIONS

This study provides in-depth insight into the experiences of life beyond Rb. Findings highlight the need for specific psychosocial interventions informed by codesign.

IT-RELATED BARRIERS AND FACILITATORS TO THE IMPLEMENTATION OF A NEW EUROPEAN EHEALTH SOLUTION, THE DIGITAL SURVIVORSHIP PASSPORT (SURPASS VERSION 2.0): SEMISTRUCTURED DIGITAL SURVEY

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J Med Internet Res; doi: 10.2196/49910

BACKGROUND
To overcome knowledge gaps and optimize long-term follow-up (LTFU) care for childhood cancer survivors, the concept of the Survivorship Passport (SurPass) has been invented. Within the European PanCareSurPass project, the semiautomated and interoperable SurPass (version 2.0) will be optimized, implemented, and evaluated at 6 LTFU care centers representing 6 European countries and 3 distinct health system scenarios: (1) national electronic health information systems (EHISs) in Austria and Lithuania, (2) regional or local EHISs in Italy and Spain, and (3) cancer registries or hospital-based EHISs in Belgium and Germany.

OBJECTIVE
We aimed to identify and describe barriers and facilitators for SurPass (version 2.0) implementation concerning semiautomation of data input, interoperability, data protection, privacy, and cybersecurity.

METHODS
IT specialists from the 6 LTFU care centers participated in a semistructured digital survey focusing on IT-related barriers and facilitators to SurPass (version 2.0) implementation. We used the fit-viability model to assess the compatibility and feasibility of integrating SurPass into existing EHISs.

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RESULTS
In total, 13/20 (65%) invited IT specialists participated. The main barriers and facilitators in all 3 health system scenarios related to semiautomated data input and interoperability included unaligned EHIS infrastructure and the use of interoperability frameworks and international coding systems. The main barriers and facilitators related to data protection or privacy and cybersecurity included pseudonymization of personal health data and data retention. According to the fit-viability model, the first health system scenario provides the best fit for SurPass implementation, followed by the second and third scenarios.

CONCLUSIONS
This study provides essential insights into the information and IT-related influencing factors that need to be considered when implementing the SurPass (version 2.0) in clinical practice. We recommend the adoption of Health Level Seven Fast Healthcare Interoperability Resources and data security measures such as encryption, pseudonymization, and multifactor authentication to protect personal health data where applicable. In sum, this study offers practical insights into integrating digital health solutions into existing EHISs.

THE DEVELOPMENT OF FATIGUE AFTER TREATMENT FOR PEDIATRIC BRAIN TUMORS DOES NOT DIFFER BETWEEN TUMOR LOCATIONS

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Pediatr Blood Cancer; doi: 10.1002/pbc.31028

BACKGROUND

Children and adolescents treated for a brain tumor suffer from more fatigue than survivors of other types of childhood cancer. As tumor location might be predictive of fatigue, our aim was to investigate the longitudinal development of fatigue in children with brain tumors and risk factors for fatigue separately for different tumor locations.

METHODS

Fatigue was assessed 1235 times for 425 participants. Self-report versions of PedsQL Multidimensional Fatigue Scale were used to repeatedly assess fatigue from the end of treatment up to 8 years later. Mixed models were used to analyze fatigue over time and determinants separately for infratentorial (N = 205), supratentorial hemispheric (N = 91), and supratentorial midline tumors (N = 129).

RESULTS

Cognitive fatigue worsened with time, while sleep-rest and general fatigue first decreased and then increased. There was no difference in fatigue between the tumor locations, but the risk factors differed when stratified by location. Radiotherapy was associated with more fatigue for infratentorial tumors, and centralization of care was associated with less fatigue for the supratentorial midline tumors. For supratentorial hemispheric tumors, female sex was associated with more fatigue. Higher parental education was associated with less fatigue regardless of tumor location.

CONCLUSIONS

The development of fatigue seems to be more related to sociodemographic and treatment variables than to tumor location. Healthcare providers need to be aware that fatigue may develop in the years following end of treatment, and that patients with a low/middle educational family background might be more vulnerable and in need of targeted support.

"YOU CAN BE CURED, BUT CANCER NEVER LEAVES YOU BEHIND": AN INTERDISCIPLINARY APPROACH INTO THE EMBODIED CANCER EXPERIENCES AMONG ADULT COLOMBIAN CHILDHOOD/ADOLESCENT CANCER SURVIVORS

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J Psychosoc Oncol; doi: 10.1080/07347332.2024.2345112

BACKGROUND
Childhood or adolescent cancer survivors (CACS) are an understudied population in Colombia and, in general, in Central and South America. Worldwide, studies typically focus on high-income settings while approaching CACS' experiences from a biomedical or psychological perspective. However, both perspectives miss an important aspect of survivorship after childhood or adolescent cancer: the affected individual's subjective experiences of having a disabled body. This qualitative study aimed to explore the embodied experiences of Colombian adults who survived cancer during their childhood or adolescence to better understand how CACS relate to their altered body and world.

METHODS
By integrating phenomenological insights and conducting comprehensive life-story interviews, we explored the various ways in which survivors' cancer experiences affect their bodily sense of self-from the acute phase of the disease until well into adulthood. A total of ten life-stories interviews and one focus group were carried out with seven CACS. All participants were survivors of a different type of childhood/adolescent cancer. The results were analyzed thematically, focusing on the embodied aspects of participants' experiences.

RESULTS
We developed three main themes regarding the embodied cancer experience among participating CACS: Firstly, participants' body changes because of the cancer and its treatment, which makes them aware of their body. Secondly, they adapt to this experience in different bodily ways. Finally, they carry bodily traces of their cancer experience in the present as well as into the future.

CONCLUSIONS
The CACS participating in this study report that their experience with cancer has been embodied throughout their lives, changing their sense of their body and how they relate to it, and leaving traces into the present and their imagined future.

ASSOCIATION BETWEEN ADVERSE CHILDHOOD EXPERIENCES AND HEALTH RELATED QUALITY OF LIFE IN ADULT CANCER SURVIVORS IN THE UNITED STATES

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J Cancer Surviv; doi: 10.1007/s11764-024-01603-5

PURPOSE
The impact of adverse childhood experiences (ACEs) on health-related quality of life (HRQOL) is increasingly recognized, however, this has not been studied in cancer survivors in the United States. This study investigates if ACEs are associated with HRQOL in cancer survivors.

METHODS
We conducted a cross-sectional analysis of the 2020 Behavioral Risk Factor Surveillance System from states that administered ACEs and Cancer Survivorship modules. Eligibility criteria included being a cancer survivor and not currently receiving cancer treatment. Primary exposure was number of ACEs (categorized as 0, 1-2, 3, or ≥ 4). Primary outcomes were self-reported measures of HRQOL including worse overall health and ≥ 14 unhealthy days (mentally or physically) per month. Mantel-Haenszel stratified analyses were performed and prevalence ratios were adjusted for age.

RESULTS
Of 5,780 participants, 62.0% were female and 67.8% were ≥ 65 years. Prevalence of worse overall health was 22.5% for individuals with no ACEs compared to 30.2% for 2-3 ACEs (aPR = 1.4, 95% CI 1.2, 1.5) and 38.5% for ≥ 4 ACEs (aPR = 1.7, 95% CI 1.5, 2.0). Prevalence of ≥ 14 unhealthy days was 18.1% with no ACEs compared to 21.0% for 1 ACE (aPR = 1.3, 95% CI 1, 1.3), 29.0% for 2-3 ACEs (aPR = 1.6, 95% CI 1.4, 1.8), and 44.8% for ≥ 4 ACEs (aPR = 2.2, 95% CI 2.0, 2.5).

CONCLUSIONS
Our study provides novel evidence of the association of multiple ACEs with higher prevalence of poor HRQOL in cancer survivors.

UNVEILING PERSPECTIVES ON THE PSYCHOSOCIAL IMPACTS OF CHILDHOOD CANCER SURVIVAL ON YOUNG ADULT SURVIVORS' REASSIMILATION JOURNEY: A QUALITATIVE EXPLORATION

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Can Oncol Nurs J; doi: 10.5737/23688076342179

BACKGROUND
Approximately 82% of children with childhood cancer survive more than five years after diagnosis. Living as a cancer survivor elicits a new reality that can include psychosocial impacts. These psychosocial impacts interact collectively, especially regarding reassimilation, and are rarely explored.

OBJECTIVE
To explore the psychosocial impacts of surviving childhood cancer and reassimilation back into society in young adult survivors of childhood cancer.

METHODOLOGY
Individual in-depth semi-structured interviews were conducted with childhood cancer survivors and explored psychosocial aspects associated with returning to work, school, and social environments after remission. Interpretive phenomenological analysis was conducted once interviews were manually transcribed. A group interview with survivors was held to discuss the study's findings and interpretation.

RESULTS
Individual interviews and the group interview revealed three major themes: outlook on reassimilating, outlook on coping, and outlook on cancer.

CONCLUSIONS
This work is a first step to understanding how survivors' personal outlook on coping and healthcare system barriers play influential roles in reassimilation following cancer treatment. Survivors expressed the need for reliable survivorship information and improved communication with healthcare providers regarding what to expect, so they could feel prepared for life post-cancer. These aspects need to be explored more deeply through other qualitative studies.

A CAREGIVERS' PERSPECTIVE ON SOCIAL REINTEGRATION AND STIGMA OF CHILDHOOD CANCER SURVIVORS IN KENYA

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Psychooncology; doi: 10.1002/pon.6345

OBJECTIVES

Childhood cancer survivors' social reintegration may be hampered in low and middle-income countries. The nature and extent of social challenges and prejudices that survivors encounter in such settings are largely unknown. This study explores caregivers' perspectives on social reintegration and stigmatization of Kenyan childhood cancer survivors.

METHODS

Caretakers of childhood cancer survivors (<18 years) were interviewed using mixed-methods questionnaires during home or clinic visits between 2021 and 2022. Stigma was assessed with an adjusted Social Impact Scale and risk factors were investigated.

RESULTS

Caretakers of 54 survivors (median age 11 years) were interviewed. Families' income (93%) decreased since start of treatment. Caretakers (44%) often lost their jobs. Financial struggles (88%) were a burden that provoked conflicts within communities (31%). School fees for siblings became unaffordable (52%). Families received negative responses (26%) and were left or avoided (13%) by community members after cancer disclosure. Survivors and families were discriminated against because the child was perceived fragile, and cancer was considered fatal, contagious, or witchcraft. Survivors repeated school levels (58%) and were excluded from school activities (19%) or bullied (13%). Performance limitations of daily activities ($p = 0.019$), male sex ($p = 0.032$), solid tumors ($p = 0.056$) and a short time since treatment completion ($p = 0.047$) were associated with increased stigma. Caretakers recommended educational programs in schools and communities to raise awareness about cancer treatment and curability.

CONCLUSIONS

Childhood cancer survivors and their families experienced difficulties with re-entry and stigmatization in society. Increasing cancer and survivorship awareness in schools and communities should facilitate social reintegration and prevent stigmatization.

BONE AGE AND DENTAL LATE EFFECTS IN CHILDHOOD CANCER SURVIVORS: RADIOGRAPHIC FINDINGS IN A BRAZILIAN SAMPLE

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Int J Pediatr Dent; doi: 10.1111/ipd.13199

BACKGROUND
Changes in bone age and tooth development are late side effects of cancer therapy and can be identified by imaging examination.

AIM
To evaluate the late effects of antineoplastic treatment on bone age and dental development in childhood cancer survivors.

DESIGN
This is a retrospective case-control study on paediatric cancer survivors of both sexes who underwent antineoplastic treatment with 5-15 years of survival. Carpal radiographs were assessed for bone age and growth curve, and panoramic radiographs were used to evaluate dental development and alterations. Carpal radiographs were analyzed using the Greulich and Pyle inspection method, and the Martins and Sakima method was used to analyze the growth curve. All tests were applied with a confidence level of 95%.

RESULTS
The study and control groups comprised 28 and 56 patients, respectively. There was no significant difference in bone age and growth curve between the study and control groups. Nonetheless, when sex was compared to chronological and bone ages, there was a significant difference in bone age ($p = 0.019$) and an underestimation in both groups and sexes in the Greulich and Pyle method. As to late dental effects, dental agenesia, microdontia, gyroversion, and unerupted teeth were found. Dental shape alterations mainly involve the root region.

CONCLUSION
Close multidisciplinary collaboration is necessary during the follow-up period of young patients who have survived cancer.

MULTILEVEL CHARACTERISTICS OF CUMULATIVE SYMPTOM BURDEN IN YOUNG SURVIVORS OF CHILDHOOD CANCER

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BACKGROUND

Symptom burden and its characteristics among survivors of pediatric cancers aged 8 to 18 years remain understudied.

OBJECTIVE

To examine the prevalence of symptom burden among young childhood cancer survivors and identify associations with sociodemographic, clinical, and psychological resilience skills, and health-related quality of life (HRQOL).

DESIGN, SETTING, AND PARTICIPANTS

A cross-sectional analysis using data collected from November 1, 2017, to January 31, 2019, in a survivorship clinic at a US-based comprehensive cancer center was conducted. Participants included 302 dyads of children aged 8 to 18 years who survived at least 5 years beyond diagnosis and their primary caregivers. Data analysis was performed from March 13, 2023, to February 29, 2024.

EXPOSURES

Diagnosis, caregiver-reported family conflict, self-reported caregiver anxiety, neighborhood-level social vulnerability, and survivor-reported meaning and purpose.

MAIN OUTCOMES AND MEASURES

Novel symptom-level burden, integrating the attributes of severity and daily activity interference using the pediatric version of the Patient-Reported Outcomes Version of the Common Terminology Criteria for Adverse Events, global cumulative symptom burden, and HRQOL using the EuroQol-5D. Multinomial logistic regression identified characteristics associated with symptom burden; linear regression assessed symptom burden and HRQOL associations.

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RESULTS
Among 302 survivors (mean [SD] age, 14.2 [2.9] years, mean [SD] time since diagnosis, 10.9 [2.9] years; 153 [50.7%] male), 186 (62.0%) had low, 77 (25.7%) moderate, and 37 (12.3%) high global cumulative symptom burden. Greater caregiver anxiety was associated with moderate (risk ratio [RR], 1.56; 95% CI, 1.09-2.24) global symptom burden. Greater neighborhood deprivation was associated with moderate global symptom burden (RR, 4.86; 95% CI, 1.29-18.26). Survivors with greater meaning/purpose were less likely to have moderate (RR, 0.42; 95% CI, 0.29-0.61) and high (RR, 0.27; 95% CI, 0.16-0.46) global symptom burden. The burden of individual symptoms displayed similar patterns. Low (Cohen d, -0.60; 95% CI, -0.87 to -0.32) and moderate/high (d, -0.98; 95% CI, -1.53 to -0.43) general pain, moderate/high numbness (d, -0.99; 95% CI, -1.69 to -0.29), and moderate/high worry (d, -0.55; 95% CI, -0.99 to -0.11) were associated with lower HRQOL.

CONCLUSIONS AND RELEVANCE
In this cross-sectional study of young childhood cancer survivors, symptom burden was prevalent. Caregiver anxiety and disparity-related neighborhood factors were associated with greater symptom burden, whereas meaning and purpose was a protective factor. Greater specific symptom burden contributed to poorer HRQOL. The findings suggest that interventions targeting resilience and neighborhood adversity may alleviate symptom burden and improve HRQOL.

MAXIMAL AEROBIC POWER, QUALITY OF LIFE, AND EJECTION FRACTION IN SURVIVORS OF CHILDHOOD CANCER TREATED WITH ANTHRACYCLINES

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Pediatr Exerc Sci; doi: 10.1123/pes.2023-0161

BACKGROUND
Anthracycline-induced cardiotoxicity is a frequent complication that can occur at any stage of treatment, even in survivors.

OBJECTIVE
To determine maximum aerobic power, quality of life, and left ventricular ejection fraction in childhood cancer survivors treated with anthracyclines.

DESIGN
Cross-sectional, observational study.

METHODS
The left ventricular ejection fraction was obtained from the transthoracic echocardiogram report in the medical records. Each patient underwent a 6-minute walk test, assessment of maximum aerobic power on a cycle ergometer, and evaluation of perceived exertion using the EPInfant scale, and finally, their quality of life was evaluated using the pediatric quality of life inventory model.

RESULTS
A total of 12 patients were studied, with an average of 16.2 years of age. All patients exhibited a left ventricular ejection fraction >60%, the mean distance covered in the 6-minute walk test was 516.7 m, and the mean of the maximum aerobic power was 70 W. Low quality of life scores were obtained in the physical and psychosocial aspects. In the Pearson test, a weak correlation without statistical significance was found between all the variables studied.

CONCLUSIONS
Simultaneously with the detection of cardiotoxicity in childhood cancer survivors, it is pertinent to perform physical evaluations as physical condition and cardiotoxicity seem to be issues that are not necessarily dependent.

SEROPREVALENCE OF MEASLES (RUBEOLA) ANTIBODIES IN CHILDHOOD CANCER SURVIVORS

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J Pediatr Hematol Oncol Nurs; doi: 10.1177/27527530231221145

BACKGROUND
Measles is reemerging as a public health threat, raising important questions about disease vulnerability among childhood cancer survivors. This secondary analysis assessed the seroprevalence of anti-measles immunoglobulin G (IgG) antibodies as a marker of immune status in survivors of childhood cancer and associated demographic/treatment variables.

METHOD
Participants were childhood cancer survivors who were free of active disease, having routine blood studies drawn, and could provide documentation of having received two doses of measles, mumps, and rubella vaccine before their cancer diagnosis. Patient record review documented demographic and treatment variables. Antimeasles (rubeola) IgG antibody seroprevalence was assessed by enzyme immunoassay for vaccine-specific antibodies.

RESULTS
Of 270 survivors evaluated, 110 (42%) were female, 196 (75%) were White, and 159 (61%) were leukemia/lymphoma survivors. Of these 262, 110 (42%) had negative measles seroprevalence, suggesting loss of immunity.

CONCLUSION
Measles antibody surveillance and the need for reimmunization for survivors of childhood cancer survivors outside the transplant setting remains controversial. Our analysis indicates that a substantial proportion of survivors lose vaccine-related immunity to measles. Pediatric oncology nurses play important roles in educating cancer survivors regarding their risk of measles infection, evaluating the need for reimmunization, correcting misinformation about vaccine safety and effectiveness, and working to optimize community herd-based immunity.

CHILDHOOD CANCER MODELS OF SURVIVORSHIP CARE: A SCOPING REVIEW OF ELEMENTS OF CARE AND REPORTED OUTCOMES

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J Cancer Surviv; doi: 10.1007/s11764-024-01610-6

PURPOSE

This study aimed to systematically map elements of care and respective outcomes described in the literature for different models of post-treatment care for survivors of childhood cancer.

METHODS

MEDLINE, CINAHL, and Embase were searched with combinations of free text terms, synonyms, and MeSH terms using Boolean operators and are current to January 2024. We included studies that described post-treatment cancer survivorship models of care and reported patient or service level elements of care or outcomes, which we mapped to the Quality of Cancer Survivorship Care Framework domains.

RESULTS

Thirty-eight studies with diverse designs were included representing 6101 childhood cancer survivors (or their parent/caregiver) and 14 healthcare professionals. A diverse range of models of care were reported, including paediatric oncologist-led long-term follow-up, multi-disciplinary survivorship clinics, shared-care, and primary care-led follow-up. Elements of care at the individual level most commonly included surveillance for cancer recurrence as well as assessment of physical and psychological effects. At the service level, satisfaction with care was frequently reported but few studies reported how treatment-related-late effects were managed. The evidence does not support one model of care over another.

CONCLUSIONS

Gaps in evidence exist regarding distal outcomes such as costs, health care utilization, and mortality, as well as understanding outcomes of managing chronic disease and physical or psychological effects. The findings synthesized in this review provide a valuable reference point for future service planning and evaluation.

CHILDHOOD CANCER SURVIVORS: CURRENT CHALLENGES

M Angeles Vázquez López

An Pediatr (Engl Ed); doi: 10.1016/j.anpede.2024.04.013

ABSTRACT

Rates of childhood cancer survival in developed countries have risen to over 80-85 %. In consequence, the population of childhood cancer survivors (CCS) has grown considerably. Nevertheless, CCS present a high morbidity and mortality due to cancer or its treatment, with an increased risk of premature mortality, second primary tumors and late side effects, both physical and psychosocial, all of which decrease the quality of life. Long-term follow-up (LTFU) of CCS is recommended to prevent, detect and treat those health problems. Despite the advances achieved, the management of CCS is still not optimal. Among the areas for improvement discussed in this manuscript are: (1) Quantifying the real burden of morbimortality, by implementing new frequency measures (mean cumulative count and cumulative burden), to obtain more accurate assessments, and using simulation models, to determine individual risks; (2) Assessing the impact of risk factors for late side effects, related to the patient, tumor type, treatments, lifestyle, comorbidities, genetics and ageing; (3) Considering the impact of the international harmonisation of long-term follow-up guidelines, to generate homogeneous, evidence-based recommendations and an individualized LTFU and, (4) Challenges to LTFU implementation, considering models of care adapted to patient risk and needs, with special attention to the transition to adult-care follow-up. Finally, we comment on the situation of CCS in Spain and consider future prospects for improving the health and quality of life of this population.

CHRONIC HEALTH CONDITIONS AND LONGITUDINAL EMPLOYMENT IN SURVIVORS OF CHILDHOOD CANCER

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JAMA Netw Open; doi: 10.1001/jamanetworkopen.2024.10731

IMPORTANCE
Employment is an important factor in quality of life and provides social and economic support. Longitudinal data on employment and associations with chronic health conditions for adult survivors of childhood cancer are lacking.

OBJECTIVE
To evaluate longitudinal trends in employment among survivors of childhood cancer.

DESIGN, SETTING, AND PARTICIPANTS
Retrospective cohort study of 5-year cancer survivors diagnosed at age 20 years or younger between 1970 and 1986 enrolled in the multi-institutional Childhood Cancer Survivor Study (CCSS). Sex-stratified employment status at baseline (2002 to 2004) and follow-up (2014 to 2016) was compared with general population rates from the Behavioral Risk Factor Surveillance System cohort. Data were analyzed from July 2021 to June 2022.

EXPOSURES
Cancer therapy and preexisting and newly developed chronic health conditions.

MAIN OUTCOMES AND MEASURES
Standardized prevalence ratios of employment (full-time or part-time, health-related unemployment, unemployed, not in labor force) among adult (aged ≥25 years) survivors between baseline and follow-up compared with the general population. Longitudinal assessment of negative employment transitions (full-time to part-time or unemployed at follow-up).

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RESULTS
Female participants (3076 participants at baseline; 2852 at follow-up) were a median (range) age of 33 (25-53) years at baseline and 42 (27-65) years at follow-up; male participants (3196 participants at baseline; 2557 at follow-up) were 33 (25-54) and 43 (28-64) years, respectively. The prevalence of full-time or part-time employment at baseline and follow-up was 2215 of 3076 (71.3%) and 1933 of 2852 (64.8%) for female participants and 2753 of 3196 (85.3%) and 2079 of 2557 (77.3%) for male participants, respectively, with declining standardized prevalence ratios over time (female participant baseline, 1.01; 95% CI, 0.98-1.03; follow-up, 0.94; 95% CI, 0.90-0.98; P < .001; male participant baseline, 0.96; 95% CI, 0.94-0.97; follow-up, 0.92; 95% CI, 0.89-0.95; P = .02). While the prevalence of health-related unemployment increased (female participants, 11.6% to 17.2%; male participants, 8.1% to 17.1%), the standardized prevalence ratio remained higher than the general population and declined over time (female participant baseline, 3.78; 95% CI, 3.37-4.23; follow-up, 2.23; 95% CI, 1.97-2.51; P < .001; male participant baseline, 3.12; 95% CI, 2.71-3.60; follow-up, 2.61; 95% CI, 2.24-3.03; P = .002). Among survivors employed full-time at baseline (1488 female participants; 1933 male participants), 285 female participants (19.2%) and 248 male participants (12.8%) experienced a negative employment transition (median [range] follow-up, 11.5 [9.4-13.8] years). Higher numbers and grades of chronic health conditions were significantly associated with these transitions.

CONCLUSIONS AND RELEVANCE
In this retrospective analysis of adult survivors of childhood cancer, significant declines in employment and increases in health-related unemployment among cancer survivors compared with the general population were identified. A substantial portion of survivors in the midcareer age range fell out of the workforce. Awareness among clinicians, caregivers, and employers may facilitate clinical counseling and occupational provisions for supportive work accommodations.

MULTILEVEL SOCIAL DETERMINANTS OF PATIENT-REPORTED OUTCOMES IN YOUNG SURVIVORS OF CHILDHOOD CANCER

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Cancers (Basel); doi: 10.3390/cancers16091661

ABSTRACT

In this study, the social determinants of patient-reported outcomes (PROs) in young survivors of childhood cancer aged <18 years are researched. This cross-sectional study investigated social determinants associated with poor PROs among young childhood cancer survivors. We included 293 dyads of survivors receiving treatment at St. Jude Children's Research Hospital who were <18 years of age during follow-up from 2017 to 2018 and their primary caregivers. Social determinants included family factors (caregiver-reported PROs, family dynamics) and county-level deprivation (socioeconomic status, physical environment via the County Health Rankings & Roadmaps). PROMIS measures assessed survivors' and caregivers' PROs. General linear regression tested associations of social determinants with survivors' PROs. We found that caregivers' higher anxiety was significantly associated with survivors' poorer depression, stress, fatigue, sleep issues, and reduced positive affect ($p < 0.05$); caregivers' sleep disturbances were significantly associated with lower mobility in survivors ($p < 0.05$). Family conflicts were associated with survivors' sleep problems ($p < 0.05$). Residing in socioeconomically deprived areas was significantly associated with survivors' poorer sleep quality ($p < 0.05$), while higher physical environment deprivation was associated with survivors' higher psychological stress and fatigue and lower positive affect and mobility ($p < 0.05$). Parental, family, and neighborhood factors are critical influences on young survivors' quality of life and well-being and represent new intervention targets.

THE ROLE OF DIET IN THE CARDIOVASCULAR HEALTH OF CHILDHOOD CANCER SURVIVORS-A SYSTEMATIC REVIEW

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Nutrients; doi: 10.3390/nu16091315

BACKGROUND

Childhood cancer survivors (CCSs) face an increased risk of cardiovascular disease (CVD). This systematic review aims to provide the first synthesis of observational and interventional studies on the relationship between diet and cardiovascular health in CCSs.

METHODS

A comprehensive search was conducted for studies published between 1990 and July 2023 in PubMed, MEDLINE, CINAHL, Child Development & Adolescent Studies, and Cochrane Library. Eligible studies included observational and interventional studies examining the associations or effects of dietary factors on CVD incidence, cardiac dysfunction, or CVD risk factors in CCSs diagnosed before age 25 years.

RESULTS

Ten studies met the inclusion criteria (nine observational and one interventional). Collectively, they comprised 3485 CCSs (male, 1734; female, 1751). The outcomes examined across observational studies included characteristics of obesity, diabetes biomarkers, hypertension indicators, dyslipidaemia biomarkers, and metabolic syndrome. The evidence suggested that greater adherence to healthy diets was associated with lower body mass index, blood pressure, glucose, and triglycerides and higher high-density lipoprotein cholesterol. The 12-week lifestyle intervention study in childhood leukaemia survivors found no impact on obesity indicators.

CONCLUSION

The review results indicate the potentially protective effects of healthy diets. However, the available research remains preliminary and limited, underscoring the need for more rigorous, adequately powered studies.

IMPLEMENTING A BEHAVIORAL PHYSICAL ACTIVITY PROGRAM IN CHILDREN AND ADOLESCENT SURVIVORS OF CHILDHOOD CANCER: A PILOT RANDOMIZED CONTROLLED TRIAL

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J Behav Med; doi: 10.1007/s10865-024-00497-z

ABSTRACT

We aimed to document the acceptability (enrollment rate) and feasibility (phone call delivery rate) of implementing a behavioral PA intervention over 12 weeks, in addition to documenting its effects on patient-reported outcomes and physical functioning. This study also describes the costs of carrying out a behavioral PA intervention. A total of 40 participants were randomized in a 1:1 ratio. The tailored behavioral PA intervention was developed based on the most recent PA guidelines in pediatric oncology and on the COM-B framework to enact PA behavior changes. The prescription (frequency, intensity, time and type (FITT)) was adjusted each week during the weekly support calls. The control group did not receive the intervention. 26 males and 14 females (13.6 years old on average and 2.9 years post-cancer treatment on average) participated in our study. The acceptability rate was 90.9% and the feasibility rate was > 85%. We found that 85% improved PA frequency, 80% improved PA intensity, 100% improved PA time, and 50.0% achieved the recommended PA guidelines. No adverse events were reported over the duration of the intervention. Physical function improved with longer 6-minute walk distances in the intervention group (465.8 ± 74.5 m) than in the control group (398.7 ± 92.9 m) ($p = 0.016$). PROs scores for all participants were within the limits of the normal range. The estimated cost per participant of carrying out this intervention was USD $126.57. Our 12-week behavioral PA intervention, based on the COM-B framework, was found to be acceptable, feasible and safe in childhood cancer survivors. This study is an important step in the right direction to make exercise standard practice in pediatric oncology.

PREDICTORS OF LOW AND VERY LOW BONE MINERAL DENSITY IN LONG-TERM CHILDHOOD ACUTE LYMPHOBLASTIC LEUKEMIA SURVIVORS: TOWARD PERSONALIZED RISK PREDICTION

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Pediatr Blood Cancer; doi: 10.1002/pbc.31047

BACKGROUND

Cohorts of childhood acute lymphoblastic leukemia (cALL) survivors reaching adulthood are increasing. Approximately 30% of survivors meet criteria for low bone mineral density (BMD) 10 years after diagnosis. We investigated risk factors for low BMD in long-term cALL survivors.

METHODS

We recruited 245 cALL survivors from the PETALE (Prévenir les effets tardifs des traitements de la leucémie aiguë lymphoblastique chez l'enfant) cohort, who were treated with the Dana Farber Cancer Institute protocols, did not experience disease relapse or hematopoietic stem cell transplants, and presented with more than 5 years of event-free survival. Median time since diagnosis was 15.1 years.

RESULTS

Prevalence of low DXA-derived BMD (Z-score ≤-1) ranged between 21.9% and 25.3%, depending on site (lumbar spine (LS-BMD), femoral neck (FN-BMD), and total body (TB-BMD), and between 3.7% and 5.8% for very low BMD (Z-score ≤-2). Males had a higher prevalence of low BMD than females for all three outcomes (26%-32% vs. 18%-21%), and male sex acted as a significant risk factor for low BMD in all models. Treatment-related factors such as cumulative glucocorticoid (GC) doses and cranial radiation therapy (CRT) were associated with lower BMDs in the full cohort and in females at the FN-BMD site.

CONCLUSION

Low and very low BMD is more prevalent in male cALL survivors. Male sex, high cumulative GC doses, CRT, risk group, and low body mass index (BMI) were identified as risk factors for low BMD. A longer follow-up of BMD through time in these survivors is needed to establish if low BMD will translate into a higher risk for fragility fractures through adulthood.

ADVERSE CHILDHOOD EXPERIENCES, RESILIENCE, AND CARDIOVASCULAR DISEASE IN ADULT SURVIVORS OF CHILDHOOD CANCER: A REPORT FROM THE CHILDHOOD CANCER SURVIVOR STUDY

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Cancer Epidemiol Biomarkers Prev; doi: 10.1158/1055-9965.EPI-24-0249

BACKGROUND
The impact of Adverse Childhood Experiences (ACEs: e.g., abuse, neglect and/or household dysfunction experienced before age 18) and resilience on risk for cardiovascular disease (CVD) has not previously been investigated in adult survivors of childhood cancer.

METHODS
We conducted a nested case-control study among long-term, adult-aged survivors of childhood cancer from the Childhood Cancer Survivor Study (CCSS). Self-report questionnaires ascertained ACEs and resilience, and scores were compared between cases with serious/life-threatening CVD and controls without CVD matched on demographic and cardiotoxic treatment factors.

RESULTS
Among 95 cases and 261 controls, the mean ACE score was 1.4 for both groups; 53.4% of survivors endorsed ≥1 ACE. There was no association between ACEs or resilience and CVD in adjusted models.

CONCLUSIONS
ACEs and resilience do not appear to contribute to CVD risk for adult survivors of childhood cancer with cardiotoxic treatment exposures.

IMPACT
Although not associated with CVD in this population, ACEs are associated with serious health issues in other populations. Therefore, future studies could investigate effects of ACEs on other health outcomes affecting childhood cancer survivors.

HEALTH INSURANCE AMONG SURVIVORS OF CHILDHOOD CANCER FOLLOWING AFFORDABLE CARE ACT IMPLEMENTATION

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J Natl Cancer Inst; doi: 10.1093/jnci/djae111

BACKGROUND
The Affordable Care Act (ACA) increased private non-employer health insurance options, expanded Medicaid eligibility, and provided pre-existing health conditions protections. We evaluated insurance coverage among long-term adult survivors of childhood cancer pre/post-ACA implementation.

METHODS
Using the multicenter Childhood Cancer Survivor Study, we included participants from two cross-sectional surveys: pre-ACA (2007-2009; survivors: N = 7,505; siblings: N = 2,175) and post-ACA (2017-2019; survivors: N = 4,030; siblings: N = 987). A subset completed both surveys (1,840 survivors; 646 siblings). Multivariable regression models compared post-ACA insurance coverage and type (private/public/uninsured) between survivors and siblings and identified associated demographic and clinical factors. Multinomial models compared gaining and losing insurance vs staying the same among survivors and siblings who participated in both surveys.

RESULTS
The proportion with insurance was higher post-ACA (survivors pre-ACA 89.1% to post-ACA 92.0% [+2.9%]; siblings pre-ACA 90.9% to post-ACA 95.3% [+4.4%]). Post-ACA insurance coverage was greater among those age 18-25 (survivors: 15.8% vs < 2.3% ages 26+; siblings +17.8% vs < 4.2% ages 26+). Survivors were more likely to have public insurance than siblings post-ACA (18.4% vs 6.9%; odds ratios [OR]=1.7, 95%CI 1.1-2.6). Survivors with severe chronic conditions (OR = 4.7, 95%CI 3.0-7.3) and those living in Medicaid expansion states (OR = 2.4, 95%CI 1.7-3.4) had increased odds of public insurance coverage post-ACA. Among the subset completing both surveys, low/mid income survivors (<$60,000) experienced both insurance losses and gains in reference to highest household income survivors (≥$100,000), relative to odds of keeping the same insurance status.

CONCLUSION
Post-ACA, more childhood cancer survivors and siblings had health insurance, although disparities remain in coverage.

A SCOPING REVIEW EVALUATING PHYSICAL AND COGNITIVE FUNCTIONAL OUTCOMES IN CANCER SURVIVORS TREATED WITH CHEMOTHERAPY: CHARTING PROGRESS SINCE THE 2018 NCI THINK TANK ON CANCER AND AGING PHENOTYPES

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J Cancer Surviv; doi: 10.1007/s11764-024-01589-0

PURPOSE
The primary goal of this scoping review was to summarize the literature published after the 2018 National Cancer Institute think tank, "Measuring Aging and Identifying Aging Phenotypes in Cancer Survivors," on physical and cognitive functional outcomes among cancer survivors treated with chemotherapy. We focused on the influence of chemotherapy on aging-related outcomes (i.e., physical functional outcomes, cognitive functional outcomes, and frailty), given the known associations between chemotherapy and biologic mechanisms that affect aging-related physiologic processes.

METHODS
A search was conducted across electronic databases, including PubMed, Scopus, and Web of Science, for manuscripts published between August 2018 and July 2023. Eligible studies: 1) included physical function, cognitive function, and/or frailty as outcomes; 2) included cancer survivors (as either the whole sample or a subgroup); 3) reported on physical or cognitive functional outcomes and/or frailty related to chemotherapy treatment (as either the whole sample or a subgroup); and 4) were observational in study design.

RESULTS
The search yielded 989 potentially relevant articles, of which 65 met the eligibility criteria. Of the 65 studies, 49 were longitudinal, and 16 were cross-sectional; 30 studies (46%) focused on breast cancer, 20 studies (31%) focused on the age group 60 + years, and 17 (26%) focused on childhood cancer survivors. With regards to outcomes, 82% of 23 studies reporting on physical function showed reduced physical function, 74% of 39 studies reporting on cognitive functional outcomes found reduced cognitive function, and 80% of 15 studies reporting on frailty found increasing frailty among cancer survivors treated with chemotherapy over time and/or compared to individuals not treated with chemotherapy. Fourteen studies (22%) evaluated biologic mechanisms and their relationship to aging-related outcomes. Inflammation was consistently associated with worsening physical and cognitive functional outcomes and epigenetic age increases. Further, DNA damage was consistently associated with worse aging-related outcomes.

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CONCLUSION
Chemotherapy is associated with reduced physical function, reduced cognitive function, and an increase in frailty in cancer survivors; these associations were demonstrated in longitudinal and cross-sectional studies. Inflammation and epigenetic age acceleration are associated with worse physical and cognitive function; prospective observational studies with multiple time points are needed to confirm these findings.

SUPPORTIVE CARE NEEDS OF ADOLESCENTS AND YOUNG ADULTS 5 YEARS AFTER CANCER: A QUALITATIVE STUDY

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Front Psychol; doi: 10.3389/fpsyg.2024.1268113

INTRODUCTION
Adolescent and young adult (AYA) survivors who have been treated for cancer during childhood and adolescence are at great risk of the physical, psychological, and social consequences of cancer and its associated treatments. However, compliance with long-term follow-up is low. One possible explanation is that follow-up care fails to meet the expectations of AYA survivors. This study explored the specific supportive care needs of AYA survivors of childhood and adolescent cancer five years post-diagnosis.

METHODS
Semi-structured interviews were conducted with 15 AYA aged 15 to 25 years old. Thematic analyses were conducted to establish categories of supportive care needs and classify them as being met or unmet.

RESULTS
Participants reported between 2 and 20 specific needs (M = 11), including needs concerning fertility issues and reassurance regarding relapse (each mentioned by 67% of AYA), followed by the need for locomotor care, follow-up coordination and multidisciplinary care (60% of AYA for each). Participants also reported needs regarding social relationships, administration and finance, and academic and professional domains. Most (69%) of these needs were reportedly unmet, including need of information about cancer repercussions and follow-up, support in managing fatigue and sleep problems, psychological assistance, and support from peers.

DISCUSSION
The supportive care needs are still considerable and varied in AYA survivors of childhood and adolescent cancer 5 years post-diagnosis and are largely unmet. As unmet supportive care needs highlight the gap between available care in follow-up and the real needs of AYA survivors, a better understanding of their supportive care needs and unmet needs, thanks to systematic needs assessment, would enable long-term follow-up care to be adapted, thereby improving compliance and quality of life.

PROGNOSIS OF SECOND PRIMARY MALIGNANCIES IN PEDIATRIC ACUTE LYMPHOBLASTIC LEUKEMIA SURVIVORS: A MULTICENTER STUDY BY THE TURKISH PEDIATRIC HEMATOLOGY SOCIETY

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J Pediatr Hematol Oncol; doi: 10.1097/MPH.0000000000002881

ABSTRACT

The improved survival rates of childhood cancers raise the long-term risk of second primary malignancy (SPM) in childhood and adolescent cancer survivors. The intensity of the treatment protocol used, the use of some groups of chemotherapeutics, and radiotherapy were found to be risk factors for the development of second primary malignancies (SPMs). Forty-one patients who developed acute myelocytic leukemia or any solid organ cancer within 25 years of follow-up, after completion of pediatric acute lymphoblastic leukemia (ALL) treatment, were included in the study. The mean duration of initial ALL diagnosis to SPM was 9.3 ± 6.1 years. The 3 most common SPMs were acute myelocytic leukemia, glial tumors, and thyroid cancer. Thirteen (81%) of 16 patients exposed to cranial irradiation had cancer related to the radiation field. In total 13/41 (32%) patients died, and the 5-year overall survival rate was 70 ± 8%. Patients older than 5 years old at ALL diagnosis had significantly worse overall survival than cases younger than 5 years old. In conclusion, children and adolescents who survive ALL have an increased risk of developing SPM compared with healthy populations, and physicians following these patients should screen for SPMs at regular intervals.

PROTOCOL FOR THE 'SUPPORTING YOUNG CANCER SURVIVORS WHO SMOKE' STUDY (PRISM): INFORMING THE DEVELOPMENT OF A SMOKING CESSATION INTERVENTION FOR CHILDHOOD, ADOLESCENT AND YOUNG ADULT CANCER SURVIVORS IN ENGLAND

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PLoS One; doi: 10.1371/journal.pone.0299321

BACKGROUND
Childhood, adolescent and young adult (CAYA) cancer survivors are vulnerable to adverse late-effects. For CAYA cancer survivors, tobacco smoking is the most important preventable cause of ill-health and early death. Yet, effective strategies to support smoking cessation in this group are lacking. The PRISM study aims to undertake multi-method formative research to explore the need for, and if appropriate, inform the future development of an evidence-based and theory-informed tobacco smoking cessation intervention for CAYA cancer survivors.

MATERIALS AND METHODS
PRISM involves three phases of: 1) an environmental scan using multiple strategies to identify and examine a) smoking cessation interventions for CAYA cancer survivors that are published in the international literature and b) current smoking cessation services in England that may be available to, or tailorable to, CAYA cancer survivors; 2) a qualitative study involving semi-structured interviews with CAYA cancer survivors (aged 16-29 years and who are current or recent ex-smokers and/or current vapers) to explore their views and experiences of smoking, smoking cessation and vaping; and 3) stakeholder workshops with survivors, healthcare professionals and other stakeholders to consider the potential for a smoking cessation intervention for CAYA cancer survivors and what such an intervention would need to target and change. Findings will be disseminated to patient groups, healthcare professionals and researchers, through conference presentations, journal papers, plain English summaries and social media.

DISCUSSION
PRISM will explore current delivery of, perceived need for, and barriers and facilitators to, smoking cessation advice and support to CAYA cancer survivors from the perspective of both survivors and healthcare professionals. A key strength of PRISM is the user involvement throughout the study and the additional exploration of survivors' views on vaping, a behaviour which often co-occurs with smoking. PRISM is the first step in the development of a person-centred, evidence- and theory-based smoking cessation intervention for CAYA cancer survivors who smoke, which if effective, will reduce morbidity and mortality in the CAYA cancer survivor population.

EXPLORING THE PERSPECTIVE OF ADOLESCENT CHILDHOOD CANCER SURVIVORS ON FOLLOW-UP CARE AND THEIR CONCERNS REGARDING THE TRANSITION PROCESS-A QUALITATIVE CONTENT ANALYSIS

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Cancer Med; doi: 10.1002/cam4.7234

PURPOSE

In Germany, children diagnosed with cancer survive their initial disease in more than 80%, and the majority will become long-term survivors. Around the age of 18, survivors are transferred to adult healthcare. The transition can be a critical period in the process of care at which many childhood cancer survivors discontinue to participate in regular follow-up care. Hence, the objective of the paper was to explore (a) survivors' attitudes towards pediatric follow-up care and (b) their concerns regarding the transition process to draw conclusions for optimizing pediatric care and transition processes.

METHODS

We conducted semi-structured interviews with 21 adolescent childhood cancer survivors between the ages of 14 and 20. The survivors were recruited via a pediatric oncology department of a university hospital in Germany. Based on the principles of qualitative content analysis, a deductive-inductive method according to Kuckartz was applied.

RESULTS

Based on the interview guide and derived from the exploratory research questions, two key categories were generated: (a) Survivors' attitudes towards pediatric follow-up care, which encompasses all formal and emotional aspects of survivors regarding follow-up care, and (b) their concerns regarding transition from pediatric to adult healthcare, where hindering and facilitating factors for a successful transition occur. Our results show high satisfaction among survivors with follow-up care. Nevertheless, they wish to be more integrated into processes and the organization of their follow-up care. Most adolescent survivors do not feel ready for transition.

CONCLUSION

The integration of survivors into the organization processes and routines, and the promotion of emotional detachment from pediatric health care professionals (HCPs) are important to reduce concerns and uncertainties of adolescent survivors regarding the transition process and to promote subjective readiness for transition. To gain confidence in the adult healthcare, it is crucial to provide tailored education depending on individual requirements and needs and to build trusting relationships between survivors and adult HCPs.

RADIATION DOSE-VOLUME-RESPONSE RELATIONSHIPS FOR ADVERSE EVENTS IN CHILDHOOD CANCER SURVIVORS: INTRODUCTION TO THE SCIENTIFIC ISSUES IN PENTEC

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Int J Radiat Oncol Biol Phys; doi: 10.1016/j.ijrobp.2023.11.028

ABSTRACT

At its very core, radiation oncology involves a trade-off between the benefits and risks of exposing tumors and normal tissue to relatively high doses of ionizing radiation. This trade-off is particularly critical in childhood cancer survivors (CCS), in whom both benefits and risks can be hugely consequential due to the long life expectancy if the primary cancer is controlled. Estimating the normal tissue-related risks of a specific radiation therapy plan in an individual patient relies on predictive mathematical modeling of empirical data on adverse events. The Pediatric Normal-Tissue Effects in the Clinic (PENTEC) collaborative network was formed to summarize and, when possible, to synthesize dose-volume-response relationships for a range of adverse events incident in CCS based on the literature. Normal-tissue clinical radiation biology in children is particularly challenging for many reasons: (1) Childhood malignancies are relatively uncommon-constituting approximately 1% of new incident cancers in the United States-and biologically heterogeneous, leading to many small series in the literature and large variability within and between series. This creates challenges in synthesizing data across series. (2) CCS are at an elevated risk for a range of adverse health events that are not specific to radiation therapy. Thus, excess relative or absolute risk compared with a reference population becomes the appropriate metric. (3) Various study designs and quantities to express risk are found in the literature, and these are summarized. (4) Adverse effects in CCS often occur 30, 50, or more years after therapy. This limits the information content of series with even very extended follow-up, and lifetime risk estimates are typically extrapolations that become dependent on the mathematical model used. (5) The long latent period means that retrospective dosimetry is required, as individual computed tomography-based radiation therapy plans gradually became available after 1980. (6) Many individual patient-level factors affect outcomes, including age at exposure, attained age, lifestyle exposures, health behaviors, other treatment modalities, dose, fractionation, and dose distribution. (7) Prospective databases with individual patient-level data and radiation dosimetry are being built and will facilitate advances in dose-volume-response modeling. We discuss these challenges and attempts to overcome them in the setting of PENTEC.

AGING AND CANCER

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Mol Cancer; doi: 10.1186/s12943-024-02020-z

ABSTRACT

Aging and cancer exhibit apparent links that we will examine in this review. The null hypothesis that aging and cancer coincide because both are driven by time, irrespective of the precise causes, can be confronted with the idea that aging and cancer share common mechanistic grounds that are referred to as 'hallmarks'. Indeed, several hallmarks of aging also contribute to carcinogenesis and tumor progression, but some of the molecular and cellular characteristics of aging may also reduce the probability of developing lethal cancer, perhaps explaining why very old age (> 90 years) is accompanied by a reduced incidence of neoplastic diseases. We will also discuss the possibility that the aging process itself causes cancer, meaning that the time-dependent degradation of cellular and supracellular functions that accompanies aging produces cancer as a byproduct or 'age-associated disease'. Conversely, cancer and its treatment may erode health and drive the aging process, as this has dramatically been documented for cancer survivors diagnosed during childhood, adolescence, and young adulthood. We conclude that aging and cancer are connected by common superior causes including endogenous and lifestyle factors, as well as by a bidirectional crosstalk, that together render old age not only a risk factor of cancer but also an important parameter that must be considered for therapeutic decisions.

ASKING THOSE WHO KNOW THEIR NEEDS BEST: A FRAMEWORK FOR ACTIVE ENGAGEMENT AND INVOLVEMENT OF CHILDHOOD CANCER SURVIVORS AND PARENTS IN THE PROCESS OF PSYCHOSOCIAL RESEARCH-A WORKSHOP REPORT

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Cancer Rep (Hoboken); doi: 10.1002/cnr2.2071

BACKGROUND

Patient and public involvement and engagement (PPIE) in healthcare research is crucial for effectively addressing patients' needs and setting appropriate research priorities. However, there is a lack of awareness and adequate methods for practicing PPIE, especially for vulnerable groups like childhood cancer survivors.

AIMS

This project aimed to develop and evaluate engagement methods to actively involve pediatric oncological patients, survivors, and their caregivers in developing relevant research questions and practical study designs.

METHODS AND RESULTS

An interdisciplinary working group recruited n = 16 childhood cancer survivors and their caregivers to work through the entire process of developing a research question and a practicable study design. A systematic literature review was conducted to gather adequate PPIE methods which were then applied and evaluated in a series of three workshop modules, each lasting 1.5 days. The applied methods were continuously evaluated, while a monitoring group oversaw the project and continuously developed and adapted additional methods. The participants rated the different methods with varying scores. Over the workshop series, the participants successfully developed a research question, devised an intervention, and designed a study to evaluate their project. They also reported increased expertise in PPIE and research knowledge compared to the baseline. The project resulted in a practical toolbox for future research, encompassing the final workshop structure, evaluated methods and materials, guiding principles, and general recommendations.

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CONCLUSION

These findings demonstrate that with a diverse set of effective methods and flexible support, actively involving patients, survivors, and caregivers can uncover patients' unmet disease-related needs and generate practical solutions apt for scientific evaluation. The resulting toolbox, filled with evaluated and adaptable methods (workbook, Supplement 1 and 2), equips future scientists with the necessary resources to successfully perform PPIE in the development of health care research projects that effectively integrate patients' perspectives and address actual cancer-related needs. This integration of PPIE practices has the potential to enhance the quality and relevance of health research and care, as well as to increase patient empowerment leading to sustainable improvements in patients' quality of life.

DENTAL MANAGEMENT OF LONG-TERM CHILDHOOD CANCER SURVIVORS: A SYSTEMATIC REVIEW

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Eur Arch Paediatr Dent; doi: 10.1007/s40368-024-00896-5

PURPOSE
Critically review and summarise existing knowledge on prevalence of oral, dental, and craniofacial side-effects of antineoplastic treatment in childhood cancer survivors (CCS).

METHODS
A literature search was conducted for studies reporting on children aged 4-19 years treated for any type of malignancy up to the age of 15 years and for whom, at the time of the examination, more than 8 months have elapsed since the end of treatment. Data regarding dental late effects on teeth and craniofacial complex were collected and mean prevalence of each defect was reported.

RESULTS
From the 800 articles identified, 17 studies fulfilled inclusion criteria and were included. A total of 983 CCS were examined, with the total number of healthy controls being 1266 children. Haematological malignancy was the most prevalent diagnosis with the age at diagnosis ranging between 0-15 years. Multiple antineoplastic protocols were implemented with the elapsed time being 8 months up to 17 years. One-third of CCS experienced at least one late effect, with corresponding value for the control group being below 25%. Among the defects identified clinically, microdontia, hypodontia and enamel developmental defects were recorded in 1/4 of CCS. Impaired root growth and agenesis were the two defects mostly recorded radiographically. The effect on dental maturity and on salivary glands was unclear.

CONCLUSION
CCS are at risk of developing dental late effects because of their disease and its treatment and therefore, routine periodic examinations are essential to record their development and provide comprehensive oral healthcare.

A BIOMARKER-BASED DIAGNOSTIC MODEL FOR CARDIAC DYSFUNCTION IN CHILDHOOD CANCER SURVIVORS

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JACC CardioOncol; doi: 10.1016/j.jaccao.2024.02.008

BACKGROUND

Childhood cancer survivors at risk for heart failure undergo lifelong echocardiographic surveillance. Previous studies reported the limited diagnostic accuracy of N-terminal pro-B-type natriuretic peptide (NT-proBNP) and high-sensitivity cardiac troponin T (hs-cTnT) in detecting left ventricular (LV) dysfunction. However, potential enhanced diagnostic accuracy through the combination of biomarkers and clinical characteristics has been suggested.

OBJECTIVES

The aim of this study was to develop and internally validate a diagnostic model that combines cardiac biomarkers with clinical characteristics for effectively ruling in or ruling out LV dysfunction in childhood cancer survivors.

METHODS

A multicenter cross-sectional study included 1,334 survivors (median age 34.2 years) and 278 siblings (median age 36.8 years). Logistic regression models were developed and validated through bootstrapping, combining biomarkers with clinical characteristics.

RESULTS

Abnormal NT-proBNP levels were observed in 22.1% of survivors compared with 5.4% of siblings, whereas hs-cTnT levels exceeding 10 ng/L were uncommon in both survivors (5.9%) and siblings (5.0%). The diagnostic models demonstrated improvement upon the addition of NT-proBNP and hs-cTnT to clinical characteristics, resulting in an increased C statistic from 0.69 to 0.73 for LV ejection fraction (LVEF) <50% and a more accurate prediction of more severe LV dysfunction, with the C statistic increasing from 0.80 to 0.86 for LVEF <45%. For LVEF <50% (prevalence 10.9%), 16.9% of survivors could be effectively ruled out with high sensitivity (95.4%; 95% CI: 90.4%-99.3%) and negative predictive value (97.5%; 95% CI: 94.6%-99.7%). Similarly, for LVEF <45% (prevalence 3.4%), 53.0% of survivors could be ruled out with moderate to high sensitivity (91.1%; 95% CI: 79.2%-100%) and high negative predictive value (99.4%; 95% CI: 98.7%-100%).

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CONCLUSIONS

The biomarker-based diagnostic model proves effective in ruling out LV dysfunction, offering the potential to minimize unnecessary surveillance echocardiography in childhood cancer survivors. External validation is essential to confirm these findings. (Early Detection of Cardiac Dysfunction in Childhood Cancer Survivors; A DCOG LATER Study; https://onderzoekmetmensen.nl/nl/trial/23641).

RISK OF INCREASED MORTALITY IN UNDERWEIGHT SURVIVORS: A BRIEF REPORT FROM THE CHILDHOOD CANCER SURVIVOR STUDY

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Pediatr Blood Cancer; doi: 10.1002/pbc.31080

BACKGROUND
Approximately 1 in 10 adult survivors of childhood cancer is underweight. Although the consequences of being overweight or obese have been well described, outcomes among childhood cancer survivors who are underweight are unknown.

OBJECTIVE
To determine whether underweight status increases the risk of mortality.

PROCEDURE
Cohort study: Marginal models with generalized estimating equations to evaluate the associations between body mass index (BMI), serious or life-threatening chronic conditions, and death in the setting of long-term follow-up questionnaires and National Death Index search.

EXPOSURE
Underweight status, defined as body mass index (BMI) < 18.5 kg/m² compared with ideal body weight. Based on available literature on body weight and mortality from the general population, ideal body weight was defined as BMI 22.0-24.9 kg/m².

RESULTS
Of 9454 survivors (median age 35 years old (range, 17-58), an average of 17.5 years from diagnosis), 627 (6.6%) participants were underweight at baseline or follow-up questionnaire. Of 184 deaths, 29 were among underweight survivors. Underweight status was more common among females (9.1% vs. 4.5%, p < .01) and participants with younger age at diagnosis (8.2% for < 5 years vs. 6.1% for ≥5 years, p < .01), lower household income (8.9% for < $20,000 vs. 6.0% for ≥ $20,000, p < .01), or a history of serious chronic condition (p = .05). After adjustment for these factors, in addition to prior smoking and a history of radiation therapy, the risk of all-cause mortality within two years of BMI report was increased (OR 2.85; 95% CI: 1.63-4.97; p < .01) for underweight survivors, compared with ideal-weight survivors.

CONCLUSIONS
Childhood cancer survivors who are underweight are at increased risk for late mortality that appears unrelated to smoking status, recognized chronic disease, or subsequent malignancy. Whether targeted nutritional interventions would ameliorate this risk is unknown.

PHYSICAL IMPAIRMENTS, ACTIVITY LIMITATIONS, AND PARTICIPATION RESTRICTIONS OF CHILDHOOD ACUTE LYMPHOBLASTIC LEUKEMIA SURVIVORS WITH AND WITHOUT HIP OSTEONECROSIS: A PETALE COHORT STUDY

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J Cancer Surviv; doi: 10.1007/s11764-024-01585-4

PURPOSE
Long-term musculoskeletal complications represent a growing burden for survivors of childhood acute lymphoblastic leukemia (cALL). This study aimed to describe physical impairments, activity limitations, and participation restrictions in a high-risk subgroup of cALL survivors of the PETALE cohort.

METHODS
This cross-sectional study, using observational data from the PETALE cohort, included a subgroup of survivors who presented high-risk criteria for late effects. Outcomes measures consisted of hip magnetic resonance imaging, maximal isometric muscle strength (MIMS) or torque (MIMT), range of motion (ROM), Near Tandem Balance (NTB), 6-Minute Walk Test (6MWT), Five Time Sit-to-Stand Test (FTSST), and health-related quality of life. Descriptive statistics and regression analyses were performed.

RESULTS
Survivors (n = 97, 24.2 ± 6.7 years old) showed limited grip strength, FTSST, and NTB performance compared to reference values ($p < 0.001$). Thirteen participants (14.6%, 18 hips) had hip osteonecrosis (ON) (53.8% male). Higher severity hip ON was found in female survivors (66.7% vs. 22.2%). Survivors with hip ON had reduced hip external rotation ROM compared to those without ($p < 0.05$). Relationships were found between MIMS and ROM outcomes ($r = 0.32$, $p < 0.01$) and with 6MWT ($r = 0.39$-0.41, $p < 0.001$). Our multiple linear regression model explained 27.6% of the variance of the 6MWT.

CONCLUSIONS
Survivors in our subgroup had clinically significant physical impairments and activity limitations, and those with hip ON showed worst hip impairment outcomes.

THE INFORMATION NEEDS OF RELATIVES OF CHILDHOOD CANCER PATIENTS AND SURVIVORS: A SYSTEMATIC REVIEW OF QUANTITATIVE EVIDENCE

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Patient Educ Couns; doi: 10.1016/j.pec.2024.108316

OBJECTIVE
We aimed to: (1) summarize the quantitative evidence on the information needs of relatives of childhood cancer patients, survivors, and children deceased from cancer; and (2) identify factors associated with these needs.

METHODS
PubMed, PsycINFO, Scopus, and CINAHL were systematically searched. The methodological quality of all included publications was assessed, and the extracted data were analyzed using narrative synthesis.

RESULTS
Of 5810 identified articles, 45 were included. Information needs were classified as unmet, met (satisfied), and unspecified and categorized into five domains: medical information, cancer-related consequences, lifestyle, family, and support. Most unmet information needs concerned cancer-related consequences (e.g., late effects), while information needs on support were generally met. Migrant background and higher education were associated with higher information needs among parents. Siblings had lower information needs than parents.

CONCLUSION
This systematic review provides a comprehensive overview of the information needs of relatives in the context of childhood cancer, showing that information on cancer-related consequences is needed most often. The socioeconomic background of the relatives needs continued consideration throughout the cancer trajectory.

FEASIBILITY AND ACCEPTABILITY OF A MEDITATION MOBILE APP INTERVENTION FOR ADOLESCENT AND YOUNG ADULT SURVIVORS OF CHILDHOOD CANCER

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Int J Environ Res Public Health; doi: 10.3390/ijerph21050584

BACKGROUND

Adolescent and young adult (AYA) survivors of childhood cancer are increasingly recognized as a vulnerable group with unique emotional, social, and practical needs due to the intersection of cancer survivorship and normal developmental processes. Mindfulness meditation has shown early efficacy in improving psychological distress among cancer patients. However, the overall scientific study of app-based mindfulness-based interventions is still in its early stages. The goal of this study was to evaluate the feasibility and acceptability of a commercially available mindfulness mobile app intervention "Ten Percent Happier" among AYA survivors of childhood cancer.

METHODS

We conducted a single-arm pilot intervention with 25 AYA survivors of childhood cancer ages 18-29 years.

RESULTS

A total of 108 potentially eligible individuals were initially identified for screening. Of the 45 individuals reached (contact rate = 41.67%), 20 declined to participate; 25 were enrolled in the study and completed the baseline survey (enrollment rate = 55.56%). Twenty-one participants completed the study (retention rate = 84%). Changes in several outcomes were promising, with medium to large effect sizes: Mindfulness (d = 0.74), Negative Emotion (d = 0.48), Perceived Stress (d = 0.52), and Mental Health (d = 0.45). Furthermore, results suggested that participants with consistent app usage showed greater improvement in reported outcomes than those who stopped their usage (e.g., Mindfulness: d = 0.74, Perceived Stress: d = 0.83, Mental Health: d = 0.51; Meaning and Purpose: d = 0.84; and Sleep Disturbance: d = 0.81). Qualitative feedback indicated high satisfaction, but participants suggested adding group or individual peer support to improve their experience with the app.

CONCLUSION

AYA survivors can be difficult to reach, but a mindfulness app was feasible and acceptable to this group. In particular, the robust retention rate and high satisfaction ratings indicate that the meditation mobile app was well received. Preliminary results suggest positive changes in health-related quality of life outcomes, warranting a larger efficacy trial.

USING AN MHEALTH APPROACH TO COLLECT PATIENT-GENERATED HEALTH DATA FOR PREDICTING ADVERSE HEALTH OUTCOMES AMONG ADULT SURVIVORS OF CHILDHOOD CANCER

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INTRODUCTION

Cancer therapies predispose childhood cancer survivors to various treatment-related late effects, which contribute to a higher symptom burden, chronic health conditions (CHCs), and premature mortality. Regular monitoring of symptoms between clinic visits is useful for timely medical consultation and interventions that can improve quality of life (QOL). The Health Share Study aims to utilize mHealth to collect patient-generated health data (PGHD; daily symptoms, momentary physical health status) and develop survivor-specific risk prediction scores for mitigating adverse health outcomes including poor QOL and emergency room admissions. These personalized risk scores will be integrated into the hospital-based electronic health record (EHR) system to facilitate clinician communications with survivors for timely management of late effects.

METHODS

This prospective study will recruit 600 adult survivors of childhood cancer from the St. Jude Lifetime Cohort study. Data collection include 20 daily symptoms via a smartphone, objective physical health data (physical activity intensity, sleep performance, and biometric data including resting heart rate, heart rate variability, oxygen saturation, and physical stress) via a wearable activity monitor, patient-reported outcomes (poor QOL, unplanned healthcare utilization) via a smartphone, and clinically ascertained outcomes (physical performance deficits, onset of/worsening CHCs) assessed in the survivorship clinic. Participants will complete health surveys and physical/functional assessments in the clinic at baseline, 2) report daily symptoms, wear an activity monitor, measure blood pressure at home over 4 months, and 3) complete health surveys and physical/functional assessments in the clinic 1 and 2 years from the baseline. Socio-demographic and clinical data abstracted from the EHR will be included in the analysis. We will invite 20 cancer survivors to investigate suitable formats to display predicted risk information on a dashboard and 10 clinicians to suggest evidence-based risk management strategies for adverse health outcomes.

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ANALYSIS
Machine and statistical learning will be used in prediction modeling. Both approaches can handle a large number of predictors, including longitudinal patterns of daily symptoms/other PGHD, along with cancer treatments and socio-demographics.

CONCLUSION
The individualized risk prediction scores and added communications between providers and survivors have the potential to improve survivorship care and outcomes by identifying early clinical presentations of adverse events.

GENETIC RISK OF SECOND MALIGNANT NEOPLASM AFTER CHILDHOOD CANCER TREATMENT: A SYSTEMATIC REVIEW

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Cancer Epidemiol Biomarkers Prev; doi: 10.1158/1055-9965.EPI-24-0010

ABSTRACT

Second malignant neoplasm (SMN) is one of the most severe long-term risks for childhood cancer survivors (CCS), significantly impacting long-term patient survival. While radiotherapy and chemotherapy are known risk factors, the observed inter-individual variability suggests a genetic component contributing to the risk of SMN. This article aims to conduct a systematic review of genetic factors implicated in the SMN risk among CCS. Searches were performed in PubMed, Scopus, and Web of Sciences. Eighteen studies were included (eleven candidate gene studies, three genome-wide association studies, and four whole exome/genome sequencing studies). The included studies were based on different types of first cancers, investigated any or specific types of SMN, and focused mainly on genes involved in drug metabolism and DNA repair pathways. These differences in study design and methods used to characterize genetic variants limit the scope of the results and highlight the need for further extensive and standardized investigations. However, this review provides a valuable compilation of SMN risk-associated variants and genes, facilitating efficient replication and advancing our understanding of the genetic basis for this major risk for CCS.

SEXUAL HEALTH IN ADULT SURVIVORS OF CHILDHOOD CANCER: A PROJECT REACH STUDY

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Cancer; doi: 10.1002/cncr.35363

BACKGROUND
Sexual dysfunction is a significant complication of treatment for many adult-onset cancers. However, comparatively less is known about sexual dysfunction in adult childhood cancer survivors (CCSs). Research has been limited by the exclusion of specific cancers (e.g., central nervous system [CNS] tumors) and the lack of validated measures, which makes it difficult to understand the nature and prevalence of sexual dysfunction in CCSs.

METHODS
A total of 249 adult CCSs (aged 18-65 years) enrolled in Project REACH, a prospective cohort study, and completed measures of physical and mental health, including sexual dysfunction. Participants scoring ≤19 on the Female Sexual Function Index 6 or ≤21 on the International Index of Erectile Function 5 were classified as experiencing sexual dysfunction. Analyses examined the relationships between sexual dysfunction and demographic, disease, treatment, and health variables.

RESULTS
A total of 78 participants (32%) experienced clinically significant sexual dysfunction. In univariate analysis, sexual dysfunction was significantly associated with CNS tumor diagnosis (odds ratio [OR], 2.56) and surgery (OR, 1.96) as well as with health variables such as fatigue (OR, 3.00), poor sleep (OR, 2.84), pain (OR, 2.04), depression (OR, 2.64), poor physical health (OR, 2.45), and poor mental health (OR, 2.21). Adjusted analyses found that CNS tumor diagnosis ($p = .001$) and health variables ($p = .025$) contribute significantly to sexual dysfunction in CCSs.

CONCLUSIONS
Approximately one third of adult CCSs report clinically significant sexual dysfunction, which underscores a significant screening and treatment need. However, because available measures were developed for survivors of adult cancers, research to create a sexual health measure specifically for adult CCSs is necessary to better identify the sexual health concerns of this vulnerable population.

EXPLORING HEIGHT OUTCOMES WITH ADJUVANT AROMATASE INHIBITION IN GROWTH HORMONE-DEFICIENT MALE SURVIVORS OF CHILDHOOD CANCER

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Pediatr Blood Cancer; doi: 10.1002/pbc.31117

BACKGROUND
Aromatase inhibitors (AI) may improve height in short stature conditions; however, the effect in childhood cancer survivors (CCS) is unknown. We assessed final adult height (FAH) in CCS treated with AI and GH compared with those treated with GH alone.

METHODS
Retrospective cohort study of GH-deficient male CCS treated between 2007 and 2023. FAH was noted as the height at the fusion of growth plates or 18 years of age. Multivariable linear regression was used to examine treatment association with FAH, adjusting for other risk factors.

RESULTS
Ninety-two patients were included; 70 were treated with GH and 22 with combination AI/GH. The mean age at GH initiation did not differ between groups. The mean age at AI initiation was 13.7 ± 1.9 years. A greater proportion of patients in the AI/GH group were treated with stem cell transplantation, abdominal radiation, total body irradiation, and cis-retinoic acid ($p < .01$). Multivariable linear regression demonstrated no significant treatment association with FAH Z-score ($\beta = 0.04$, 95% CI: -0.9 to 0.9). History of spinal radiation ($\beta = -0.93$, 95% CI: -1.7 to -0.2), lower starting height Z-score ($\beta = -0.8$, 95% CI: -1.2 to -0.4), and greater difference between bone age and chronological age ($\beta = -0.3$, 95% CI: -0.5 to -0.07) were associated with lower FAH Z-score.

CONCLUSIONS
Adjuvant AI was not associated with increased FAH in male CCS compared with GH monotherapy. Future work is needed to determine the optimal adjunctive treatment to maximize FAH for this population.

MAPPING THE SUPPORTIVE CARE NEEDS AND QUALITY OF LIFE OF ADULT SURVIVORS OF CHILDHOOD CANCER AT A COMPREHENSIVE CANCER CENTER IN THE MIDDLE EAST

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Sci Rep; doi: 10.1038/s41598-024-60567-9

ABSTRACT

Assessing unmet needs is crucial to achieving quality care and patient satisfaction. Between September and December 2021, we assessed unmet supportive care needs in a consecutive sample of adult survivors of childhood cancer at KHCC (King Hussien Cancer Center). Two hundred and ninety-seven adult survivors of childhood cancer completed the study questionnaire. The average needs score across all domains was 24.80 (SD = 19.65), with the financial domain scoring the highest 30.39 (SD = 31.95) and sexuality scoring the lowest 7.67 (SD = 19.67). Using a multivariate linear regression model, female gender was independently associated with significantly high scores in all need domains ($p < 0.001$), except for sexuality. Monthly income, comorbidities, socioeconomic challenges, time since diagnosis, and age at diagnosis have emerged as predictors of needs in many domains. Mean quality of life (QoL) was significantly and inversely associated with the mean score in multiple domains: psychological ($p < 0.001$), sexuality ($p = 0.038$), financial ($p < 0.001$), and overall needs ($p = 0.004$). Following a content analysis of qualitative data, educational difficulties, and work-related challenges were identified as other unmet needs. Cancer experiences during childhood significantly influence supportive care needs in adulthood. There is a need for more tailored studies assessing different populations of cancer survivors and avoiding the one-size-fits-all survivorship care.

LONG-TERM SEQUELAE OF CANCER TREATMENT ON THE CENTRAL NERVOUS SYSTEM IN CHILDHOOD

R J Packer, A T Meadows, L B Rorke, J L Goldwein, G D'Angio

Med Pediatr Oncol 1987; 10.1002/mpo.2950150505

ABSTRACT

Increasing numbers of children with cancer, including those with acute lymphocytic leukemia and medulloblastoma, are experiencing long-term disease control. As survival increases, so does the recognition that the treatment used to prolong survival may have significant detrimental effects on the central nervous system (CNS). Because of the slow replication rate of most constituents of the CNS, these effects tend to be delayed. Radiotherapy, and to a lesser extent, chemotherapy (primarily methotrexate) have been implicated in the causation of such sequelae. The pathogenesis of CNS damage is only partially understood and evidence suggests that direct effects on intracranial endothelial cells and brain white matter and immunologic mechanism play a role. A spectrum of clinical syndromes may occur, including radionecrosis, necrotizing leukoencephalopathy, mineralizing microangiopathy with dystrophic calcification, cerebellar sclerosis and spinal cord dysfunction. The two most common forms of sequelae are neuropsychological and neuroendocrinologic damage. The frequency, degree of and etiology of neurocognitive dysfunction is less than completely elucidated. Radiotherapy has been implicated as the major cause of damage, but the relationship between radiotherapy and the type of damage caused and the volume and dose of radiotherapy and degree of cognitive damage is unclear. Cognitive deficits are progressive in nature. Younger children are more likely to suffer the severest damage; but no patient of any age is free of risk of damage. Growth hormone impairment is the most common form of neuroendocrinologic dysfunction. There is increasing evidence that children with cancer who are long-term survivors are at increased risk for the development of secondary CNS tumors; possibly due, in part, to previous treatment. Much work needs to be done to characterize the sequelae which may occur, develop means of earlier detection, investigate ways to ameliorate sequelae and devise less toxic treatment.

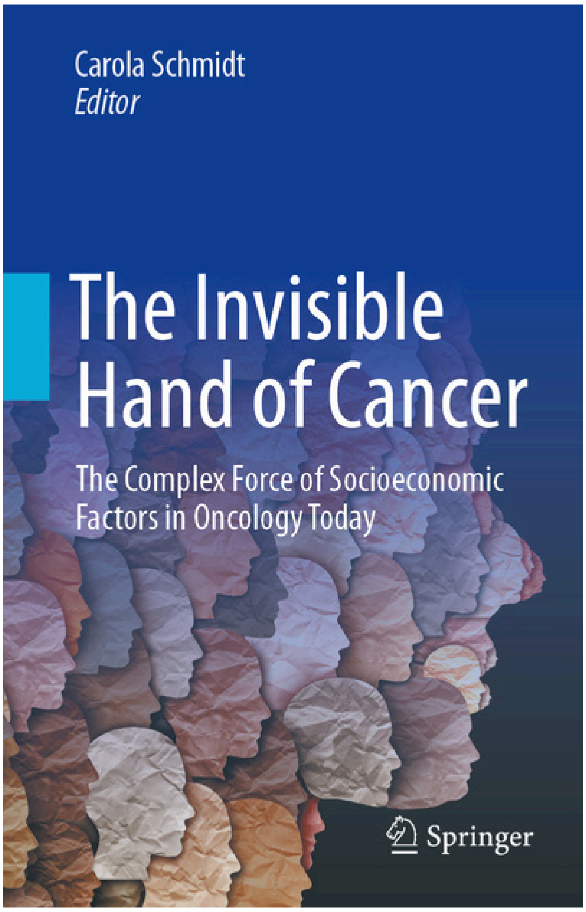
HAVE YOU READ?

Oncology is a field characterized as "medicine of high complexity" and cancer is generally regarded as a complex system. Therefore, it cannot be classified and treated according only to its biology. Even though research on the biology of cancer has increased and more studies have been published, the related sociological, political and economic dimensions, as well as mathematical models that predict whether this condition will take one course or another, have often been neglected. The Invisible Hand of Cancer-The Complex Force of Socioeconomic Factors in Oncology Today unfolds the variables behind the biological disease, exploring the social aspects and presenting cancer as a model inside of the Complexity Theory.

Carola Schmidt: "The Invisible Hand of Cancer"; Springer 2024

More information:

https://link.springer.com/book/10.1007/978-3-031-45774-6



Everyone knows someone whohas or had cancer, so more and more popular science books on this topic are becoming bestsellers. This book is directed to a general audience and follows scientific standards, encompassing high-quality data, but in an easy-to-read format. Furthermore, it will raise awareness and show how simple actions such as not judging patients and not spreading false popular beliefs can contribute to achieve a new milestone in the cancer journey.

IMPRINT

STUDY SCAN is a free, quarterly online magazine for everyone who is involved in care of childhood cancer survivors or who is interested in childhood cancer survivorship. It is published by the German childhood cancer late effects study group LESS – Late Effects Surveillance System (Arbeitsgruppe Spätfolgen)
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