

# Managing Long-term Effects of Pediatric Cancer Survivors

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## Introduction

Pediatric cancer survival rates have significantly improved over the past few decades, thanks to advancements in early diagnosis, treatment regimens, and supportive care. As a result, more children diagnosed with cancer now live into adulthood. However, despite these improvements, survivors of pediatric cancer face numerous long-term effects that can affect their physical, emotional, and social well-being. Managing these long-term effects requires a multifaceted approach, including continued medical surveillance, psychological support, and educational interventions. The challenge lies not only in addressing the immediate consequences of cancer treatment but also in recognizing and mitigating the lasting impacts that can surface many years later.

One of the primary long-term effects that pediatric cancer survivors experience is the risk of developing chronic health conditions related to the treatments they received. The aggressive treatments, including chemotherapy, radiation therapy, and surgeries, can cause lasting damage to various organs and systems in the body. For example, survivors who underwent certain chemotherapy regimens may be at higher risk for developing heart problems, such as cardiomyopathy or heart failure, as a result of the toxic effects of some chemotherapeutic agents. Additionally, radiation therapy, especially when directed at the chest or brain, can increase the risk of developing secondary cancers later in life, such as breast cancer, thyroid cancer, or lung cancer. This risk necessitates ongoing surveillance through regular screenings and diagnostic tests to catch any potential issues early.

## Description

In addition to cancer-related organ damage, many pediatric cancer survivors experience growth and developmental problems. Children treated for cancer may face delays in physical growth due to the impact of treatment on bone development and hormone production. For instance, radiation to the brain or spinal cord can interfere with the pituitary gland's ability to produce growth hormones, leading to short stature or other growth abnormalities. Similarly, chemotherapy can affect fertility, particularly in males, who may experience reduced sperm count or infertility as a result of damage to the testes. For females, treatments that cause early menopause can impact reproductive health, affecting their ability to conceive. These issues often require interventions, including hormone replacement therapy, fertility preservation strategies, and specialized care to help manage these challenges.

Cognitive and neurological challenges are also common among pediatric cancer survivors, especially for those who received cranial radiation or chemotherapy that crosses the blood-brain barrier. These children may experience long-term effects on cognitive functioning, including difficulties with attention, memory, and learning. These challenges can manifest as learning disabilities, poor academic performance, and difficulties with problem-solving and executive functioning. Neurocognitive deficits may not always be immediately apparent after treatment but can emerge over time, making

it essential for survivors to have access to neuropsychological evaluations and educational support throughout their lives. Specialized educational plans, accommodations, and tutoring can help mitigate the effects of cognitive impairments and support academic success [1].

Furthermore, psychological and emotional issues are prevalent among pediatric cancer survivors. The trauma of a cancer diagnosis, coupled with the invasive and often painful treatments, can have lasting effects on a child's mental health. Survivors may struggle with anxiety, depression, post-traumatic stress disorder (PTSD), and other psychological disorders. The long-term nature of the cancer experience, with frequent hospital visits, the potential for recurrence, and the constant reminder of their past illness, can contribute to chronic psychological distress. In addition to these emotional difficulties, survivors may experience a sense of social isolation or struggle with identity development, as they are often separated from their peers during their treatment and recovery period. They may also face difficulties reintegrating into normal life after treatment, navigating the transition from being a patient to a healthy individual. Mental health support, including therapy, counselling, and peer support groups, plays a crucial role in helping survivors manage these emotional challenges [2,3].

Physical issues related to the late effects of cancer treatment are also significant. Survivors may experience long-term musculoskeletal problems, such as joint pain, stiffness, and limited range of motion, particularly if they have received radiation in areas such as the pelvis or limbs. These physical limitations can impact mobility and quality of life, requiring rehabilitation services such as physical therapy and occupational therapy to help maintain function and manage discomfort. Survivors may also face challenges with hearing and vision, as treatments like chemotherapy and radiation can damage sensory organs, leading to partial or complete hearing loss or visual impairments. Social and interpersonal relationships may also be affected in pediatric cancer survivors. Although many survivors grow up to lead fulfilling lives, they may face challenges in their social interactions, including difficulties forming and maintaining relationships due to the emotional and physical effects of their treatment. They may also encounter challenges in the workplace, where their history of cancer can sometimes lead to discrimination or misunderstandings.

Some survivors may have to deal with feelings of guilt or resentment, particularly when it comes to comparing themselves with peers who have not had to go through such traumatic experiences. This social isolation or difficulty in developing relationships can be exacerbated if the individual feels that others do not understand what they have been through. In these cases, programs designed to encourage survivor communities, social networking, and mentorship can be invaluable in promoting positive relationships and social integration. The healthcare system plays a critical role in addressing the long-term needs of pediatric cancer survivors. While the immediate care of children with cancer is often concentrated within specialized pediatric oncology centers, long-term survivorship care requires a broader approach. After completion of cancer treatment, survivors should transition to adult care providers who are knowledgeable about the late effects of childhood cancer [4,5].

## Conclusion

While the survival rates of pediatric cancer patients have improved dramatically, the long-term effects of treatment remain a significant concern. Managing these effects requires a comprehensive, individualized approach that addresses the physical, cognitive, emotional, and social challenges faced by survivors. It requires collaboration between healthcare providers, psychologists, educators, and survivors themselves to ensure the best possible outcomes. Given the complexity of these long-term effects, it is essential for survivors to have access to lifelong care that includes regular

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monitoring, therapeutic interventions, and emotional support. Only through such a comprehensive approach can we help pediatric cancer survivor's lead healthy, fulfilling lives long after their battle with cancer is over.

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None.

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## Conflict of Interest

No potential conflict of interest was reported by the authors.

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