

# Preventative medicine and surveillance in sarcoma survivorship

Surviving sarcoma is hard in and of itself, but survivors often experience long-term effects in the years after their treatment has finished. These can include difficulty with pain and mobility, mental health conditions such as anxiety and depression, and coronary artery disease. However, sarcoma survivors often do not receive adequate surveillance and follow-up care. Professor Laurence Baker of the University of Michigan focuses on sarcoma survivorship, setting up the Sarcoma Survivorship Program to care for and examine the long term health of sarcoma survivors.

Sarcoma is a rare type of cancer that occurs in the connective tissues of the body. Sarcomas can be classed as either soft tissue sarcomas or bone sarcomas. Factors leading to the development of sarcoma are thought to include exposure to ionising radiation and random genetic mutations.

It is estimated that in 2021, 13,460 new soft tissue sarcomas will be diagnosed and 5,350 people will die of soft tissue sarcomas in the USA. There are more than 50 different types of soft tissue sarcoma that collectively have a survival rate just above 50%. Primary bone sarcomas are rarer, making up less than 0.2% of all cancers. It is estimated that 3,610 Americans will be diagnosed with bone sarcomas in 2021, with 2,060 people dying from this type of cancer. There are different types of bone sarcomas, with 5-year

survival rates ranging between 60% and 82%.

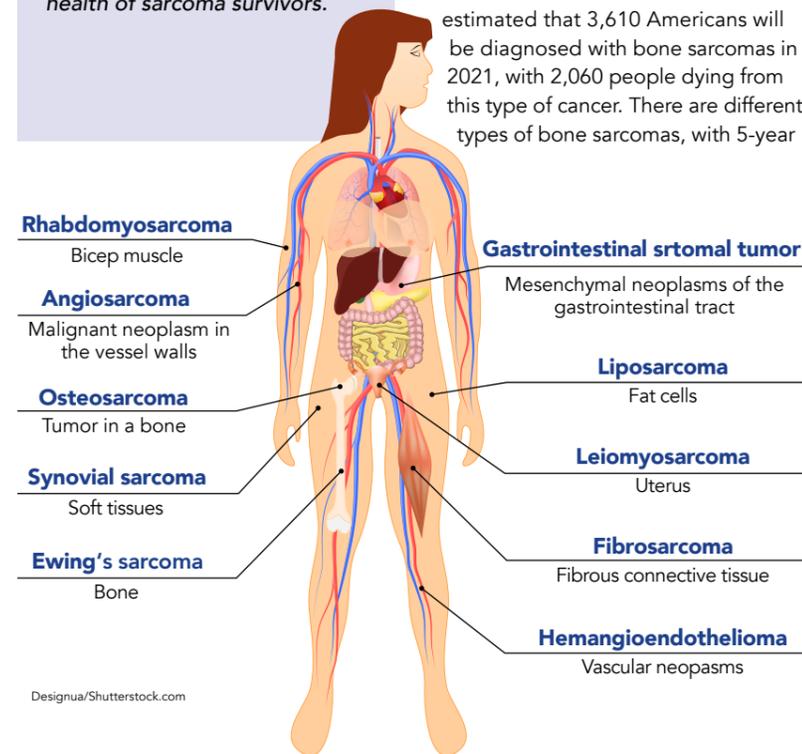
## HOW ARE SARCOMAS TREATED?

There are three main approaches for treating sarcoma: chemotherapy, surgery, and radiation therapy. However, these life-saving treatments can also come with lasting effects on the body of the patient. Following up with the patient after treatment, known as surveillance, is therefore essential to their recovery.

Chemotherapy involves the use of drugs that kill cancer cells. One popular drug is doxorubicin, a member of a family of drugs called anthracyclines. Unfortunately, a common adverse effect of anthracyclines is cardiotoxicity, with the potential to damage the heart cumulatively with each dose.

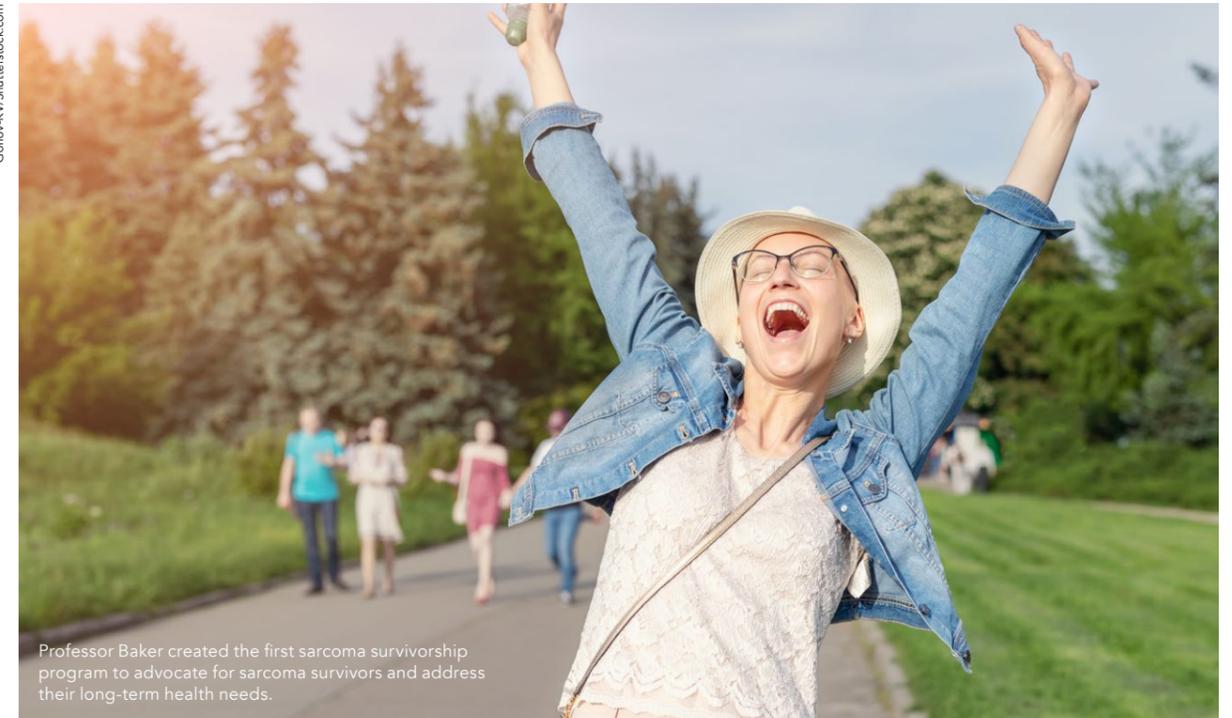
Surgery is done to remove the cancer and areas around the tumour that may harbour cancerous cells. One type of surgery for people with sarcomas in their limbs is called limb-salvage surgery, an alternative to amputation aiming to remove the tumour while keeping the limb as intact as possible. Advances in limb salvage surgery alongside chemotherapy have improved bone sarcoma survival rates from 0-20% to 70%. However, for some, amputation is still the best option.

Radiation therapy is often used in combination with surgery for sarcoma patients. Radiation treatment can sometimes induce a second cancer. It can shrink tumours before surgery, and help kill cancer cells that linger around the site of the surgery to help prevent



Designua/Shutterstock.com

gorlov-KV/Shutterstock.com



Professor Baker created the first sarcoma survivorship program to advocate for sarcoma survivors and address their long-term health needs.

the sarcoma from returning. Radiation therapy can negatively affect the lungs and heart if given in the chest area.

Due to the long-term effects of sarcoma survivorship, good post-treatment care is key to ensuring good health and quality of life. This is the specialty of Professor Laurence Baker, an oncologist at the University of Michigan who created the first sarcoma survivorship program to advocate for sarcoma survivors and address their long-term health needs.

## CHRONIC CONDITIONS AND HEALTHCARE FOR SARCOMA SURVIVORS

Being a survivor of sarcoma is a risk factor for many different chronic conditions - survivors of the bone sarcomas osteosarcoma and Ewing sarcoma are 39 times more likely to develop severe, life-threatening chronic diseases than their siblings at age 12. For example, decreased mobility and pain in the extremities can increase the risk of diabetes, hypertension, lipid disorders, morbid obesity, anxiety, and depression. For this reason, surveillance

of these patients for risk factors of chronic conditions is important, as well as practising preventative medicine and encouraging a healthy lifestyle to reduce the risk of them occurring.

## Due to the long-term effects of sarcoma survivorship, good post-treatment care is key to ensuring good health and quality of life.

In a 2014 survey assessing the comfort level of doctors caring for childhood cancer survivors, a minority of general internists responded that they were "comfortable" or "somewhat comfortable" caring for survivors of certain childhood cancers. Only 27% gave this response for acute lymphoblastic leukemia, and 25% for osteosarcoma.

In a 2020 viewpoint article in *JAMA Oncology*, Professor Baker explains that the lack of attention and holistic care given to cancer survivors is a systematic failing of the healthcare system. Whilst prevention of conditions such as coronary artery disease (CAD) in patients is a better outcome for both patients

and institutions - coming from both a quality of life and financial perspective - the profit-driven nature of the healthcare system leads to fragmented care that leaves physicians less able to centre on patient welfare. The needs of cancer survivors are diverse and varied, so a "one size fits all" approach will not adequately serve them. Unfortunately, short appointment time slots and less access to sub-specialty physicians means that the needs of many survivors remain unmet.

## THE UNIVERSITY OF MICHIGAN SARCOMA SURVIVORSHIP PROGRAM

The goal of the University of Michigan Sarcoma Survivorship Program is to increase survivorship follow-up care among young adult sarcoma survivors, improving quality of life and reducing treatment-related morbidity. To enrol in the survivorship clinic, patients must be 18 or older, at least two years past active chemotherapy, and willing to return for an annual visit. As well as receiving healthcare and guidance, patients at the clinic also provide data that helps to

## Activation of the innate inflammatory pathway and vascular risk

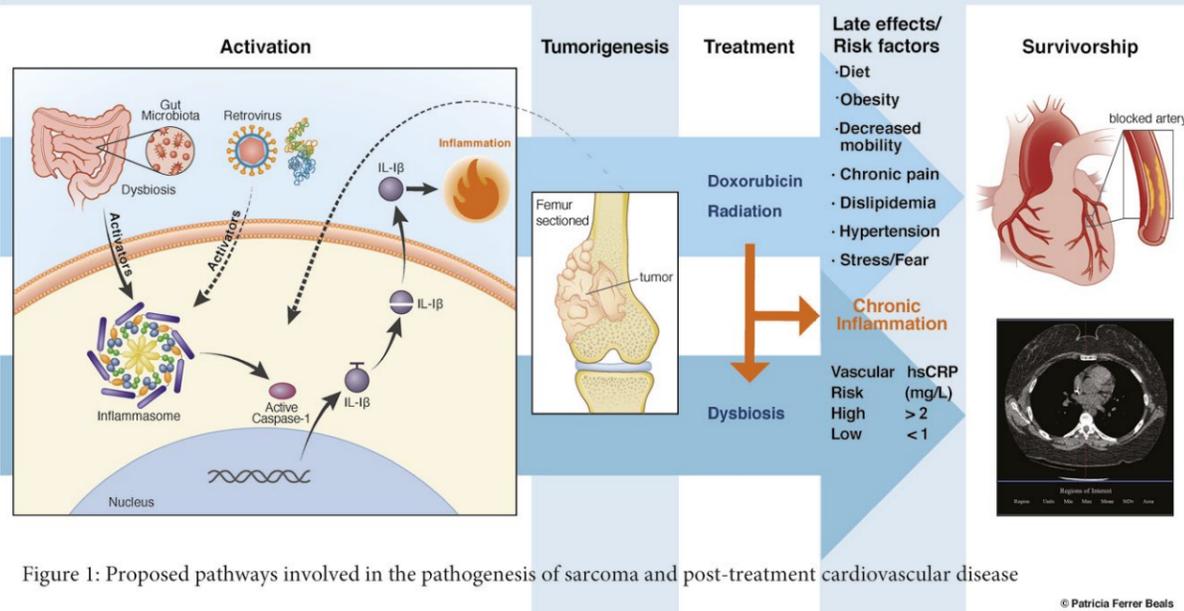


Figure 1: Proposed pathways involved in the pathogenesis of sarcoma and post-treatment cardiovascular disease

© Patricia Ferrer Boals

characterise risk factors for chronic disease in sarcoma survivors.

In a recent paper, data from the clinic was used in a pilot study to assess risk factors for CAD in sarcoma survivors treated with doxorubicin. Of the patients participating in the study, 89% of whom had also had cancer surgery, and 49% had received chest radiation therapy.

Of these patients, 51% had a high-sensitivity C-reactive protein (hsCRP) measurement of 2.0 mg/L or greater at their enrolment visit. This is a biomarker that indicates inflammation, and is a recognised risk factor for CAD. Creatinine clearance is a

measure of kidney function, and 45% patients had a measurement of 88 mL/minute. As well as hsCRP levels, the patients were assessed for other risk factors for CAD. 26% of patients were found to have at least three risk factors, and 49% had at least two. Also, as part of their surveillance, three patients between the ages of 18 and 24 were found to have visible coronary artery calcifications, which is a factor strongly linked to coronary artery disease. This

study suggested that the risk factors for CAD in sarcoma survivors greatly exceed those in the general population, demonstrating a need for active preventative measures.

At the Sarcoma Survivorship Clinic, Professor Baker and colleagues have provided comprehensive, holistic care to help manage late effects of cancer treatment and prevent the onset of conditions such as CAD. Patients receive a comprehensive health exam at their visits, assessing for metabolic syndrome, diabetes, musculoskeletal

### The risk factors for coronary artery disease in sarcoma survivors greatly exceed those in the general population.

dysfunction, hypertension, lipid disorders, cardiac diseases, anxiety, depression, obesity, and renal insufficiency. A risk assessment with a nurse practitioner is then carried out, with education on risks and counselling on what lifestyle changes could reduce the patient's risk of chronic illness. This includes encouraging a healthy lifestyle, including exercise, nutrition, and mindfulness. Disorders known to increase the risk of coronary artery disease are managed, including:

hypertension, lipid disorders, obesity. Patients have access to a sarcoma trained medical oncologist expert in screening for cancer recurrence, as well as evaluation for risk of other cancers. Anxiety disorders and depression are managed, and if needed mental health providers are identified if necessary, helping to alleviate fear and increase quality of life.

The COVID-19 global pandemic has propelled telehealth to the forefront of clinical care. Professor Baker was directed to make visits virtual

eliminating physical examination. Rather than accept poor medicine he reluctantly closed his clinic and referred each patient to a

sarcoma oncology expert to continue care. Hopefully in the future, more attention will be given to survivors of sarcoma throughout their lives for the sake of their quality of life and long-term health.

Baker and his team now propose to use virtual meetings to teach sarcoma physicians and nurses the lessons they have learned and encourage sarcoma oncologists to render survivorship care.



# Behind the Research

## Professor Laurence Baker

E: [bakerl@med.umich.edu](mailto:bakerl@med.umich.edu) T: +1 734-998-7130 W: <https://jamanetwork.altmetric.com/details/76755987/twitter>

### Research Objectives

Professor Laurence Baker is an oncologist at the University of Michigan who created the first sarcoma survivorship program to advocate for sarcoma survivors and address their long-term health needs.

### Detail

**Address**  
3A17 NIB, 300 North Ingalls St.  
Ann Arbor MI, 48109-5419, USA

**Bio**  
Following Laurence Baker's service in Vietnam, he pursued a career in oncology where he and others

developed neoadjuvant chemotherapy strategies for rare cancers. Professor Baker created the first sarcoma survivorship program to address survivors long-term health needs, advocating for holistic care of this population of rare cancer survivors.

**Funding**

- Heather and Robert Ulrich Sarcoma Fund
- The Hope Foundation

**Collaborators**

- Erin Peregrine-Antalis Ph.D.
- Denise K. Reinke BSN, MA, MBA

### References

- Baker, L. (2020). Cancer Survivorship—A Call to Action. *JAMA Oncology*, [online] 6(5), 632. <https://doi.org/10.1001/jamaoncol.2019.5969>
- Baker, L., Boonstra, P., Reinke, D., Antalis, E., Zebrack, B., & Weinberg, R. (2020). Burden of chronic diseases among sarcoma survivors treated with anthracycline chemotherapy: results from an observational study. *Journal Of Cancer Metastasis And Treatment*, [online]. <https://doi.org/10.20517/2394-4722.2020.36>

### Personal Response

**For healthcare providers, what would be the best steps to take in order to give improved long-term care to sarcoma survivors?**

“ I have repeatedly advised that it is not possible to examine patients for muscle strength or neurologic deficit over a telephone line. While virtual visits are preferred by some patients and some physicians and medical institutions profit from this care, there are clear circumstances where physical exam is required to best serve patient needs. Finally, being a sarcoma survivor is hard work and patients benefit from the physician placing a hand on a patient's shoulder, offering words of encouragement, and recognition of the challenges the patient has faced. The physician's role is to promote healing. ”



Tama2u/Shutterstock.com

**M**  
DEPARTMENT OF INTERNAL MEDICINE  
DIVISION OF HEMATOLOGY/ONCOLOGY  
UNIVERSITY OF MICHIGAN