

## Bleomycin Alert

The lungs are very important organs that are responsible for supplying oxygen to the body and ridding it of carbon dioxide. Sometimes, treatments given for childhood cancer can cause lung damage. Because you received bleomycin during treatment for childhood cancer, it is important for you to learn about certain lung problems that can sometimes happen after treatment with bleomycin. We also suggest that you read the “Pulmonary Health” Health Link, which contains more information about your lungs and how to keep them healthy.

### **What are the problems that can happen after treatment with bleomycin?**

People who received bleomycin during treatment for childhood cancer can sometimes develop lung problems many years after their treatment has been completed. These problems may include:

- Lung inflammation (interstitial pneumonitis)
- Lung scarring (pulmonary fibrosis)
- Breathing problems associated with high levels of oxygen and/or intravenous fluids (acute respiratory distress syndrome)

### **What is interstitial pneumonitis?**

Interstitial pneumonitis is inflammation of the thin layer of tissue between the air sacs (alveoli) in the lungs. This inflammation can worsen if a person develops lung infections, such as pneumonia. Interstitial pneumonitis that occurs as a result of therapy with bleomycin sometimes develops after exposure to toxic fumes, tobacco, or high levels of oxygen given over several hours.

### **What is pulmonary fibrosis?**

Pulmonary fibrosis is the formation of scar tissue in the small air sacs (alveoli) of the lungs. This scarring makes the lungs stiffer and affects the exchange of oxygen and carbon dioxide in the alveoli. Pulmonary fibrosis may worsen over time and can sometimes lead to early heart failure.

### **What is acute respiratory distress syndrome (ARDS)?**

ARDS is a serious condition that occurs when alveoli in the lungs are damaged and can no longer provide oxygen to the body. People who received bleomycin in the past may be at risk for developing ARDS, usually as a result of a combination of high levels of oxygen and large amounts of intravenous fluid given during surgery. However, the risk of developing ARDS is very low. If you need a medical procedure requiring oxygen or general anesthesia, be sure to tell your surgeon, anesthesiologist, and other healthcare providers that you have received bleomycin in the past for treatment of childhood cancer.

### **What are factors that increase the risk of developing lung problems after treatment with bleomycin?**

- High total doses of bleomycin (400 units/m<sup>2</sup> or more in all doses combined)
- Radiation to the chest or lungs, or total body irradiation (TBI)
- Treatment with other chemotherapy drugs that can also damage the lungs (see related Health Link: “Pulmonary Health”)
- Exposure to high oxygen levels (such as during general anesthesia or SCUBA diving)
- Smoking
- Inhaling drugs, such as smoking marijuana (“pot”)

### What monitoring is recommended for people who have received bleomycin for treatment of childhood cancer?

- A yearly medical check-up is recommended.
- Pulmonary function tests may show lung problems that are not apparent during a check-up. For this reason, it is helpful to have these tests done at least once (at least 2 years after completing cancer treatment) to find out if there are any problems. Your healthcare provider can decide if further testing is needed based on these results.
- In some cases, your healthcare provider may recommend repeating the pulmonary function tests if you are scheduled for surgery that requires general anesthesia to check for changes in the lungs that could increase the risk of breathing problems during or after anesthesia.

### Are there any special precautions I should take?

If you received therapy with bleomycin, you should:

- Avoid SCUBA diving, unless you have had a complete check-up and have been advised by a pulmonologist (lung specialist) that diving is safe. During SCUBA diving, increased underwater pressures and high oxygen levels can damage the lungs.
- Tell your surgeon, anesthesiologist, and other healthcare providers about your medical history before any scheduled procedures that may require oxygen.
- Avoid breathing high concentrations of oxygen whenever possible, especially for long periods of time (such as over several hours). If you require oxygen, monitoring of your oxygen levels can usually be done so that you can receive the lowest oxygen concentration that is necessary.
- Get the pneumococcal (pneumonia) vaccine.
- Get yearly influenza (flu) vaccines.
- Don't smoke or use inhaled drugs such as marijuana ("pot"). If you currently smoke, talk to your healthcare provider about a program to help you quit.

---

Written by Margery Schaffer, RN, MSN, CPNP, Department of Hematology/Oncology, The Children's Medical Center, Dayton, Ohio.

Reviewed by Emmett J. Broxson, Jr. MD; Edward Walz, MD; Karen Stormer, RN, CNS, CPON®; Melissa M. Hudson, MD; Debra Friedman, MD; Neyssa Marina, MD; and Smita Bhatia, MD, MPH.

**Additional health information for childhood cancer survivors is available at**  
[www.survivorshipguidelines.org](http://www.survivorshipguidelines.org)

**Note:** Throughout this *Health Links* series, the term "childhood cancer" is used to designate pediatric cancers that may occur during childhood, adolescence, or young adulthood. Health Links are designed to provide health information for survivors of pediatric cancer, regardless of whether the cancer occurred during childhood, adolescence, or young adulthood.

# Health Link

## Healthy living after treatment of childhood cancer

CHILDREN'S  
ONCOLOGY  
GROUP

The world's childhood  
cancer experts

### Disclaimer and Notice of Proprietary Rights

**Introduction to Late Effects Guidelines and Health Links:** *The Long-Term Follow-Up Guidelines for Survivors of Childhood, Adolescent, and Young Adult Cancers* and accompanying *Health Links* were developed by the Children's Oncology Group as a collaborative effort of the Late Effects Committee and Nursing Discipline and are maintained and updated by the Children's Oncology Group's Long-Term Follow-Up Guidelines Core Committee and its associated Task Forces.

**To cancer patients (if children, their parents or legal guardians):** Please seek the advice of a physician or other qualified health provider with any questions you may have regarding a medical condition and do not rely on the Informational Content. The Children's Oncology Group is a research organization and does not provide individualized medical care or treatment.

**To physicians and other healthcare providers:** The Informational Content is not intended to replace your independent clinical judgment, medical advice, or to exclude other legitimate criteria for screening, health counseling, or intervention for specific complications of childhood cancer treatment. Neither is the Informational Content intended to exclude other reasonable alternative follow-up procedures. The Informational Content is provided as a courtesy, but not intended as a sole source of guidance in the evaluation of childhood cancer survivors. The Children's Oncology Group recognizes that specific patient care decisions are the prerogative of the patient, family, and healthcare provider.

No endorsement of any specific tests, products, or procedures is made by Informational Content, the Children's Oncology Group, or affiliated party or member of the Children's Oncology Group.

**No Claim to Accuracy or Completeness:** While the Children's Oncology Group has made every attempt to assure that the Informational Content is accurate and complete as of the date of publication, no warranty or representation, express or implied, is made as to the accuracy, reliability, completeness, relevance, or timeliness of such Informational Content.

**No Liability on Part of Children's Oncology Group and Related Parties/Agreement to Indemnify and Hold Harmless the Children's Oncology Group and Related Parties:** No liability is assumed by the Children's Oncology Group or any affiliated party or member thereof for damage resulting from the use, review, or access of the Informational Content. You agree to the following terms of indemnification: (i) "Indemnified Parties" include authors and contributors to the Informational Content, all officers, directors, representatives, employees, agents, and members of the Children's Oncology Group and affiliated organizations; (ii) by using, reviewing, or accessing the Informational Content, you agree, at your own expense, to indemnify, defend and hold harmless Indemnified Parties from any and all losses, liabilities, or damages (including attorneys' fees and costs) resulting from any and all claims, causes of action, suits, proceedings, or demands related to or arising out of use, review or access of the Informational Content.

**Proprietary Rights:** The Informational Content is subject to protection under the copyright law and other intellectual property law in the United States and worldwide. The Children's Oncology Group retains exclusive copyright and other right, title, and interest to the Informational Content and claims all intellectual property rights available under law. You hereby agree to help the Children's Oncology Group secure all copyright and intellectual property rights for the benefit of the Children's Oncology Group by taking additional action at a later time, action which could include signing consents and legal documents and limiting dissemination or reproduction of Informational Content.