

## *Patient Information Guide*

# CYBERKNIFE® ROBOTIC RADIOSURGERY SYSTEM

*The first and only robotic radiation delivery  
system for hard-to-reach tumors.*



### **WHAT IS THE CYBERKNIFE SYSTEM?**

Contrary to its name, there is no ‘knife’ in the CyberKnife® Robotic Radiosurgery System. The CyberKnife System is a non-invasive alternative to surgery using very high doses of radiation for the treatment of tumors and other medical conditions—without any incisions, anesthesia or overnight hospital stays.

The treatment consists of concentrated beams of high-dose radiation that target the tumor from unlimited directions with pinpoint, submillimeter accuracy with minimal side effects.

The CyberKnife System can be used to treat tumors anywhere in the body, including the brain, head and neck, spine, lung, liver, pancreas and prostate. It offers new hope to patients who have inoperable or complex tumors or who are looking for an effective, non-invasive alternative to surgery.



EXCEPTIONAL CARE. WITHOUT EXCEPTION.

## JOAN—LUNG CANCER SURVIVOR

After a CT scan showed cancerous spots on each of her two lungs, Joan underwent surgery to remove one of the tumors. This required the removal of the entire lower lobe of her right lung.

To help Joan maintain her lifestyle, her doctors decided to use the CyberKnife System to treat the remaining tumor. She underwent her CyberKnife System treatments over the course of three days, with each procedure taking approximately two hours.

*“I just went in, lay down, and slept,” explained Joan, who is now cancer free. “It didn’t hurt. It was just like I had rested for a few hours—almost like a spa day. The treatment was so easy and let me get right back to life as usual.”*



*“I wish the CyberKnife System could have been my option from the start.”*

## WHAT ARE THE BENEFITS OF CYBERKNIFE SYSTEM TREATMENT?

Because the CyberKnife System can deliver radiation from any direction, critical structures such as the spinal cord or optic nerve can be avoided while still delivering an effective dose of radiation. This allows the physician to accurately and safely treat tumors that would otherwise be inoperable.

The latest advances in image guidance and computer-controlled robotics are also used to track the tumor’s position and detect any movement such as breathing. This allows for immediate automatic correction to treatment delivery—targeting radiation treatment to the tumor with submillimeter accuracy. Other advantages of the CyberKnife System include:

- No incisions or invasive procedures
- Pain free, with no anesthesia required
- Outpatient procedure with no downtime—patients often return immediately to their normal activities
- No invasive head or body frame is used
- No breath-holding during treatment
- No implanted body markers needed for most procedures
- Treatment takes days instead of weeks





### WHAT SPECIFIC TUMORS AND CANCERS IS THE CYBERKNIFE SYSTEM EFFECTIVE IN TREATING?

The CyberKnife System is used to treat tumors and cancers almost anywhere in the body. It can be a more effective and less invasive alternative to both conventional radiation therapy and surgery. Some of the many conditions treated by the CyberKnife System include:

- Arteriovenous malformations (AVMs)
- Brain tumors
- Head and neck tumors
- Liver tumors
- Lung tumors
- Nasal tumors
- Orbital tumors
- Pancreatic tumors
- Prostate cancers
- Renal tumors
- Spine and spinal cord tumors
- Trigeminal neuralgia
- Other hard-to-reach and inoperable tumors

### IS THE HIGH-DOSE RADIATION USED IN THE CYBERKNIFE SYSTEM SAFE?

Yes. CyberKnife treatment is completely safe and approved by the Food and Drug Administration (FDA). Most patients experience minimal recovery time and can return to normal activities almost immediately.

### HOW MANY CYBERKNIFE TREATMENTS HAVE BEEN PERFORMED?

More than 50,000 patients worldwide have been treated using the CyberKnife System.

### HOW IS THE CYBERKNIFE SYSTEM TOLERATED BY MOST PATIENTS?

There are very few side effects associated with CyberKnife treatments. Most patients can return to normal activities following treatment. Your doctor can advise you of possible adverse side effects based on your type of cancer and specific treatment plan.

## WHAT IS THE DIFFERENCE BETWEEN CYBERKNIFE AND CONVENTIONAL RADIATION TREATMENT?

Treatment Type	Description	Treatment Time	Side Effects
<b>Conventional Radiation Therapy</b>	Conventional radiation therapy administers a broad beam of low-dose radiation from only a few directions, thus limiting how closely the tumor can be covered with radiation. In order to prevent the normal surrounding tissues from receiving too much daily radiation, many low doses of radiation must be administered over a longer period of time.	Usually 30 to 45 treatments over a period of six to eight weeks—each lasting 15 to 30 minutes in duration.	May include fatigue, malaise, mouth and throat pain, nausea, diarrhea and skin irritation, depending on the site of treatment.
<b>CyberKnife Radiosurgery</b>	CyberKnife Radiosurgery delivers radiation beams that can be targeted from virtually any direction with sub-millimeter accuracy, while limiting the damage to surrounding healthy tissue. As a result, a higher and more effective dose of radiation can be delivered to the tumor in fewer treatment sessions, which increases patient convenience.	Each treatment generally lasts between one to three hours, and the treatment course is typically completed in one to five visits.	Fewer side effects when compared to conventional radiation techniques. (Your doctor can advise you of possible side effects based on your type of tumor and specific treatment plan.) In addition, no invasive head or body frame is required, which enhances patient comfort.

## WHAT IS THE DIFFERENCE BETWEEN CYBERKNIFE AND OTHER RADIOSURGERY TECHNIQUES?

Treatment Type	Patient Comfort	Flexibility
<b>Other Radiosurgery Systems</b>	In Gamma Knife and Linac radiosurgery, a rigid metal frame must be bolted to the skull to prevent patient movement. This can cause considerable discomfort and may limit the angles from which radiation can be delivered.	The Gamma Knife can only be used for tumors and conditions of the brain or head.
<b>CyberKnife Radiosurgery</b>	CyberKnife Radiosurgery does not require a head frame.	The CyberKnife can be used on nearly every part of the body.



## WHAT CAN A PATIENT EXPECT BEFORE UNDERGOING CYBERKNIFE TREATMENT?

There are four steps to CyberKnife treatment:

- 1. Scanning** - Prior to CyberKnife treatment, the patient must complete imaging studies to determine the exact size, shape and location of the tumor. This could include a standard high-resolution CT scan and MRI, angiography or PET scan.
- 2. Treatment Planning** - After the appropriate scans, the images are digitally transferred to the CyberKnife System. Boston Medical Center's physicians and physicists create an individual treatment plan based on the patient's history, physical findings and tumor size, location and type. This ensures that an effective dose of radiation is delivered to the tumor, while
- 3. Treatment Delivery** - During CyberKnife treatment, the patient lies comfortably on the treatment table. Anesthesia is not required and the procedure is completely painless. Each treatment generally lasts between one to three hours, and the treatment course is typically completed in one to five visits.
- 4. Follow-Up** - The first follow-up images are generally taken one to three months after treatment and then periodically, depending on the patient's diagnosis. Patients are generally seen in follow-up by members of their multidisciplinary CyberKnife team one month after their treatment and every three to six months thereafter.

TO LEARN MORE ABOUT BOSTON MEDICAL CENTER'S STATE-OF-THE-ART CYBERKNIFE TREATMENT, including our team of expert CyberKnife clinicians, visit [www.bmc.org/cyberknife](http://www.bmc.org/cyberknife) or call **877.930.2288**.



### ABOUT BOSTON MEDICAL CENTER

Boston Medical Center is a private, not-for-profit, 625-licensed bed, academic medical center affiliated with Boston University School of Medicine. Committed to providing high-quality health care to all, the hospital offers a full spectrum of pediatric and adult care services including primary and family medicine and advanced specialty care with an emphasis on community-based care. Boston Medical Center offers specialized care for complex health problems and is a leading research institution. Boston Medical Center and Boston University School of Medicine are partners in the Boston HealthNet—15 community health centers focused on providing exceptional health care to residents of Boston.

The Boston Medical Center CyberKnife suite is conveniently located off Route 93 in Boston's historic South End. Our program coordinator will let you know the building location for your initial multidisciplinary evaluation. CyberKnife treatments are administered in the Department of Radiation Oncology in the Moakley Building. For more information, please visit [www.bmc.org](http://www.bmc.org).



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