Stories of people who have survived for many years after receiving proton therapy at Loma Linda University Medical Center (LLUMC) are common. June Jamerson, 87, of Grass Valley, California, is one of those patients.

In early 2002, Mrs. Jamerson received an advertisement regarding a low-cost blood panel and health screening at her local hospital. June feels the ad was providential. “I was feeling great and thought it might be a good idea to have a test like this.” Her doctor ordered the tests for her and added a chest X-ray. The film showed a small lesion, “the size of the fingernail on my little finger,” according to Mrs. Jamerson.

After receiving the diagnosis, Mrs. Jamerson was referred to a surgeon, who said that she should have an operation to remove the lesion. Mrs. Jamerson told her surgeon that she was, “going to call Loma Linda first, before there is any cutting.”

June had good reasons to call LLUMC first. Her husband, Paul, decided to go to LLUMC for proton therapy when he was diagnosed with prostate cancer in 1996. Paul remains in good health 17 years after treatment, and he considers himself “cured” thanks to proton therapy at Loma Linda. Most recently, in 2012, Paul’s uncle was also treated with protons for prostate cancer at LLUMC as well.

After June told her surgeon she wanted to explore other options, she called 1-800-PROTONS and talked to a proton referral nurse. Dr. David A. Bush reviewed her records. Shortly thereafter, she learned she was qualified for proton treatment.

Once June was in Loma Linda, Dr. Bush ordered a few more tests to fully evaluate the extent of the tumor. The results confirmed adenocarcinoma of the lung with metastases to lymph nodes in the mediastinum, which qualified the tumor as locally advanced. After reiterating that she did not want to be treated by surgery, Mrs. Jamerson was entered into a Phase I/II study of combined chemotherapy and high-dose, accelerated proton radiation for locally advanced non-small-cell lung carcinoma. At the time, she was the tenth patient entered into that study. The full program included induction chemotherapy followed by concomitant chemotherapy and proton therapy. June says she does not recall any side effects except for feeling tired. She completed the full treatment program and returned to Grass Valley.

Today June is as active as ever. She and Paul work together: Paul works on properties and June “keeps the books.” They enjoy living near some of their seven children and their families. June enjoys playing weekly bridge with friends, one of whom works as a cancer volunteer and invited her to the local cancer survivor events held in early June 2013. June decorated a luminary bag, which glowed along with hundreds of others surrounding

June and her husband Paul

\[\text{PTC-006-13 Proton Fulfillment Lung Flyer REV d2.indd 1} \quad 8/26/13 2:24 PM\]
the relay for life track. On it
she wrote,
“Thank God for
proton radiation
at Loma Linda. It
saved my life from
lung cancer.”

June is forever fond of Dr.
Bush and the care she received,
“He’s a really sweet doctor.
I love him. I’ve been down to
see him a few times over the
years.” June remains an advocate
of the care she and her family
have received at LLUMC: I tell
everybody about Loma Linda.”
Her long-time local doctor calls
her his “miracle patient.”

Treating Lung Cancer with
Protons at Loma Linda.

June’s story is typical for
lung-cancer patients seen by Dr.
Bush and his colleagues. The
James M. Slater, MD Proton
Treatment & Research Center
pioneered hospital-based
proton therapy when it opened
in 1990. It was the forerunner
of proton therapy facilities
in many academic medical
centers across the world.

Using protons to treat
non-small-cell lung cancer is
one of the many treatments
given to patients who are
medically inoperable or,
as in Mrs. Jamerson’s
case, refused surgery.
Protocols have been
developed to take
advantage of the
proton beam’s
ability to deliver
high radiation doses to tumor
volumes while minimizing – and
often eliminating – dose to normal
tissues. Among the protocols are
those designed to accelerate the
fractionation schedule or to use
hypofractionated proton therapy.
Hypofractionation means delivering
a course of proton treatments
in fewer fractions, or treatment
sessions. This means that each
fraction necessary is larger. Larger
fractions cause more-effective cell
destruction in targeted tissues,
but also can cause more-severe
side effects in untargeted tissues;
that is why hypofractionation is
not used often with conventional
radiation (X-ray) treatment.
Protons are ideally suited for
hypofractionation because they
conform the dose so well in
three dimensions. The physician
can deliver fewer and larger
fractions while still minimizing
side effects because the dose in
healthy tissues is low or absent.

The Department of Radiation
Medicine began hypofractionated
proton therapy in 1994 for some
cancers of the lung. Results were
encouraging, and subsequently
the technique was used for other
cancers, including those of the
liver, breast and prostate. Protocols
are underway now to use
hypofractionation for other sites,
as a way to treat some metastases
in a very few fractions. The
department long ago established
that hypofractionated protons
are as effective as conventional
proton therapy, and the use of
the technique is increasing.

In cases of lung cancer,
proton therapy performed at
LLUMC has demonstrated its
effectiveness for many years. This
has been documented in several
publications, most recently in the
article, “High-dose hypofractionated
proton beam radiotherapy is
safe and effective for central and
peripheral early-stage non-small-
cell lung cancer;”, by D. Bush, G.
Cheek, S. Zaheer, J. Wallen, H.
Mirshahidi, A. Katerelos, R. Grove
and J.D. Slater, published in the
International Journal of Radiation
Oncology Biology Physics, 2013.

Example of a proton dose distribution for lung cancer (right) compared with a plan for the same case using X-rays.
The proton plan spares the opposite lung, as well as the heart; no radiation reaches those structures.

For more information,
please call 1-800-protons or visit protons.com.