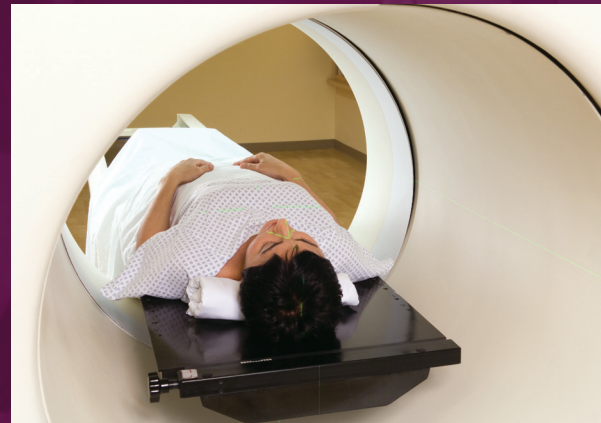


## Greater Precision More Patients Improved Profitability

How Renown Institute for Cancer  
is using the TomoTherapy® Hi•Art®  
treatment system to maintain  
leadership in a competitive market



## EXECUTIVE SUMMARY

In the face of increasing competition and growing demand in the greater Reno-Tahoe region, Renown Institute for Cancer sought to further support its reputation as the region's healthcare technology leader and premier cancer center. Renown Health developed an expansion plan and conducted an extensive study of the top linear accelerators. Initially, *TomoTherapy* was not a contender. Since *TomoTherapy* is one of the newest linacs on the market, the review team was not as familiar with it as with offerings from other manufacturers. After reviewing the capabilities of the *TomoTherapy* system, however, the Renown Health team learned it was a superior technology — which would deliver excellent patient throughput, efficiency, profitability and, most importantly, superior quality care.

### RENOWN INSTITUTE FOR CANCER



Accreditation:	A Comprehensive Community Cancer Care Center accredited by the American College of Surgeons Commission on Cancer
Number of newly diagnosed cancer patients a year:	1,250 – 1,500
Radiation vaults:	Two upgraded in January 2009; two more planned for 2011
Infusion chairs:	13
Surgical suites:	30
Clinical trials:	More than 141 trials including more than 870 patients since 1987
Traditional service area:	100,000 square miles in northern Nevada and northeast California
Service area since offering TomoTherapy:	Unlimited: Have attracted patients from Indiana, Idaho, New York and as far away as Australia

## HOW TO MEET GROWING DEMAND IN A COMPETITIVE MARKET

Soon after Dr. Linda Ferris was hired as Vice President of the Renown Institute for Cancer, she worked with facility leaders to develop a long-term strategic plan. Their projections showed the facility would be serving significantly more cancer patients within five years.

**"We knew we needed new capacity to meet growing demand," Ferris said. "At the same time, we're in a competitive market, so we needed to make sure that whatever we purchased was the best possible technology available for our patients and the community."**

While Renown Health currently is the premier provider in northern Nevada for cancer treatment and comprehensive healthcare services, another local hospital five miles away recently purchased and installed a CyberKnife®. Additionally, a group of local urologists recently built a linear accelerator vault to treat prostate cancer patients.

**"We differentiate ourselves by being a technology leader," Ferris said. "It's part of our brand. But having the best technology can be challenging, because physicians are busy and can't always take the time to learn and understand something new. We're working to overcome the assumption by some physicians that all the technologies on the market are basically the same. Once physicians learn about the key differences with *TomoTherapy*, they can't help but be excited about the possibilities for their patients."**

Renown Health's expansion plan included budget for a comprehensive education campaign targeting both healthcare providers and consumers. It included a new custom publication distributed to 80,000 residents and an "Ask the Cancer Expert" section on the web site, where patients can post questions that are answered by Dr. Eric Rost, a long-time *TomoTherapy* user who was lured out of retirement to lead Renown's Radiation Oncology program.

### COMPREHENSIVE REVIEW

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To determine which linear accelerator would be the best for Renown's growing oncology needs, Ferris pulled together a team of users — including physicists, dosimetrists, therapists and management. The team explored all linac manufacturers, including TomoTherapy.

**"Not one of us had used *TomoTherapy* before," Ferris said. "We weren't familiar with the particulars, so we went in with a bias toward other technologies we knew. But after all our due diligence, we were extremely impressed with *TomoTherapy*."**

### THE CLEAR TECHNOLOGY LEADER EMERGES

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With the three final vendors, the Renown Health team examined throughput, outcomes, quality of treatment plans and total cost, including maintenance. **"The real tipping point for us was the technology," Ferris said. "The *TomoTherapy* system's computed tomography (CT) guidance allows us to verify the shape, size and location of the tumor on the patient, and compare it to the original planning CT image, which may have been taken days before."**

**"*TomoTherapy* offers a higher quality of life for our patients," Dr. Rost said. "We are able to offer them shorter and more accurate treatments. For some patients, *TomoTherapy* only requires half the number of treatments they would need with other machines."**

Several months after Renown made its decision to go with *TomoTherapy*, an independent assessment<sup>1</sup> demonstrated that *TomoTherapy* had greater flexibility in shaping dose distributions in transverse slices than both standard intensity modulated radiation therapy (S-IMRT) and Single-Arc IMRT. **"The study from Bortfeld and Webb confirmed our decision that this is the best technology available," Ferris said.**

## MULTIPLE BENEFITS OF TOMOTHERAPY'S ADVANCED RADIATION TECHNOLOGY

The Renown review team recognized that TomoTherapy's advanced technology was the new standard of care, delivering both clinical and economic benefits:

### ACCURACY SPEEDS PATIENT SET-UP

"With *TomoTherapy*, there is no need to set up isocenters or field size; you don't have to line up to tattoos or other landmarks; you line up to real anatomy," said Dr. Rost.

The *TomoTherapy* system integrates CT technology, so with every treatment fraction, clinicians can see where the anatomy is, compared to where it's supposed to be, based on accurate, consistent 3D image pixel locations relative to the treatment beam. The system's automated image registration makes it easy to make adjustments, precisely apply a couch offset and treat.

"This is why you can treat 40 patients a day with one *TomoTherapy* vault. The set-up is so much faster," Dr. Rost said.

He admitted that even he had a hard time letting go of old habits when he first used *TomoTherapy* in 2003. "Radiation oncologists have come up with all these tricks and techniques to overcome limitations of other technologies. They think it's normal to prop a patient with pillows or draw with wax crayons on 2D film," he said. "*TomoTherapy* adapts the technology to the patient instead of making patients adapt to the technology."

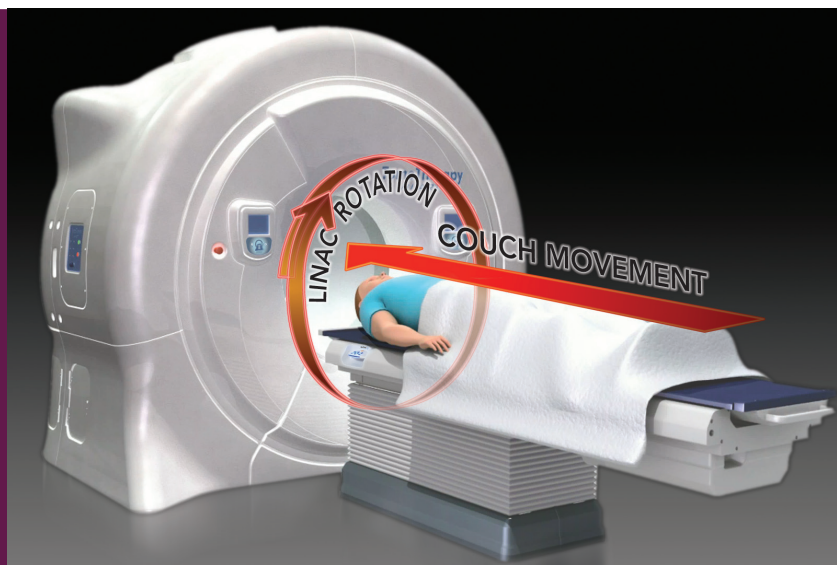
### ACCURACY EXPANDS TREATMENT OPTIONS

The *TomoTherapy* system's accuracy allows it to exclude 65 percent to 85 percent of normal tissue, so doses can be much higher for improved efficacy. The accuracy also allows clinicians to treat delicate disease sites, such as lung linings.

"And we can treat multiple sites at once for greater efficiency," said Dr. Rost. "Some people would say that's a financial loss because you can only bill insurance once, but with the time we save, we can treat more patients. So, financially it's the same, and clinically, we're able to help more people."

### THE TOMOTHERAPY TECHNOLOGY ADVANTAGE

The Renown team discovered what sets the *TomoTherapy* system apart from other linear accelerators: Helical rotation of tens of thousands of beamlets. Sixty-four thin tungsten leaves block and unblock the beamlets to rapidly change their intensity during rotation, according to the shape of the tumor.



## A BETTER PATIENT EXPERIENCE

"With *TomoTherapy*, we're able to make the experience so much better for patients," said Dr. Rost, citing the advantages over other radiation options:

- Seamless integration of image guidance into the treatment process
- Treatment time slot of approximately 15 minutes
- Fewer side effects because less normal tissue is affected
- A more comfortable environment

According to Dr. Rost, the *TomoTherapy* technology provides a much better patient experience. "We don't have to use some of the old techniques associated with other technologies, such as implanting permanent markers in the targeted treatment area. For prostate patients, there is no longer a need to insert catheters or needles in the rectum. Plus, there are fewer side effects because less healthy tissue is impacted, resulting in faster recovery times that enable patients to return to their daily activities sooner," he said.

## IMPROVED PROFITABILITY

Renown looked at the total cost of the top three linear accelerators and found the *TomoTherapy* system to be the best value, for several reasons:

**Fast installation:** "We were clinically operational three months after signing the contract with TomoTherapy. That's record time," Ferris said. She credits TomoTherapy's dedicated project manager and committed team. "The company's physicists and commissioners were in here 12- to 15-hour days and weekends to get us up and running. It was the easiest commissioning I've ever had, because *TomoTherapy* is an integrated system, so it's basically plug and play," Ferris said.

**Increased efficiency and less staff:** "*TomoTherapy* uses an integrated process and is more efficient, so it requires less staff," said Ferris. "We thought we would have to hire a third dosimetrist to handle the increased volume on our two vaults, but we didn't need to. That's a savings of about \$125,000 a year."

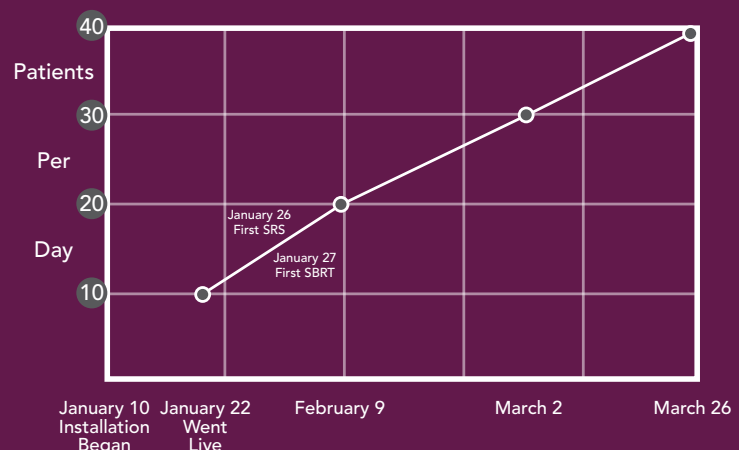
**Increased uptime:** On the revenue side, increased uptime with the *TomoTherapy* system equates to more patients and more revenue. "Our uptime with our *TomoTherapy* vault has been 98 percent, vs. a combined 94 percent with the previous Varian® and Novalis® systems," Ferris said.

**Draw from new markets:** The advanced technology also has attracted new patients to Renown that Ferris believes would not have come if not for *TomoTherapy* technology. "Most of the patients we're seeing from out of state and out of country said they specifically sought out a *TomoTherapy* clinic," she said.

**Short payback:** The financial benefits resulted in a short payback period for Renown. "The economic savings from efficiencies have surpassed our expectations," Ferris said.

## QUICK RAMP UP

Renown was treating patients 12 days after installation began, and handling complex cases like SRS and SBRT within the first week of going clinical. The center was up to full capacity within two-and-a-half months.

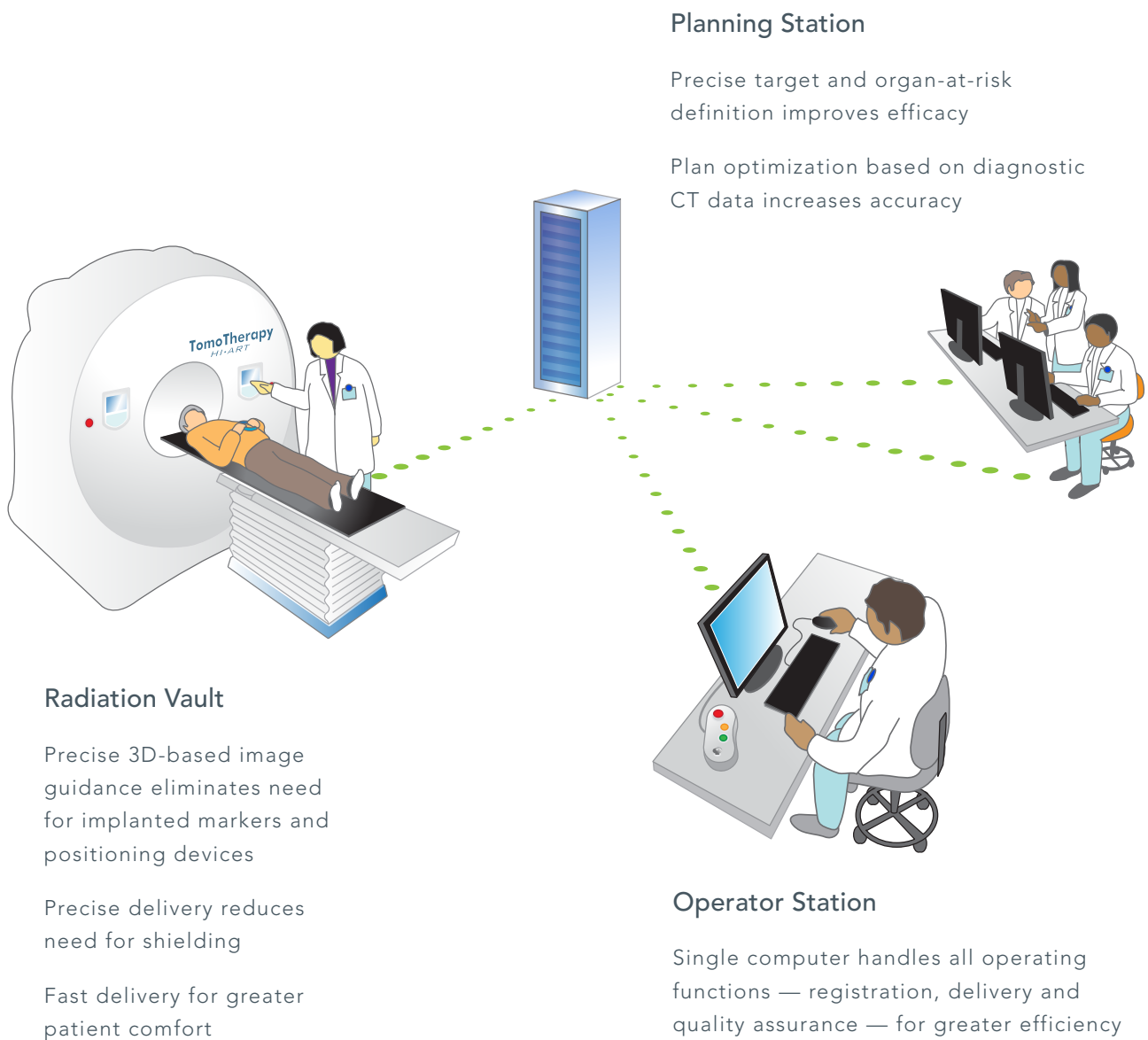




## IMPROVED WORKFLOW

"A key reason for *TomoTherapy's* efficiency is its easy, integrated workflow," said Dr. Rost.

"A single database controls all the processes — including planning, QA and treatment."



# NON-HODGKIN'S LYMPHOMA CASE STUDY: PAIN GONE WITHIN TWO TREATMENTS

Patient: Male, 63 years

## Diagnosis:

Long-standing non-Hodgkin's lymphoma that accelerated in growth with pain in the back.

## Patient History:

Diagnosed in 2004 during CT scan for kidney stones. Asymptomatic at that time. In 2008, presented to general practitioner with pain and numbness in right hip and leg. X-ray revealed decompressed lumbar vertebrae. MRI revealed enlarged tumor pressing on spinal cord.

## TomoTherapy Treatment Plan:

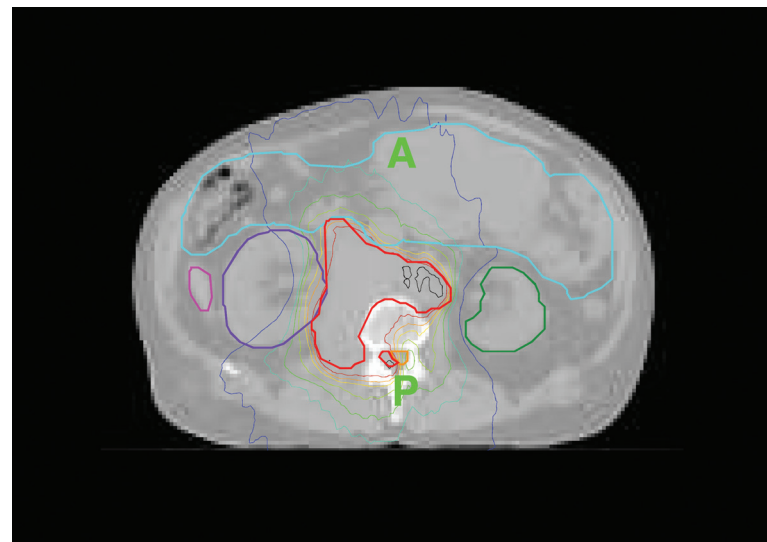
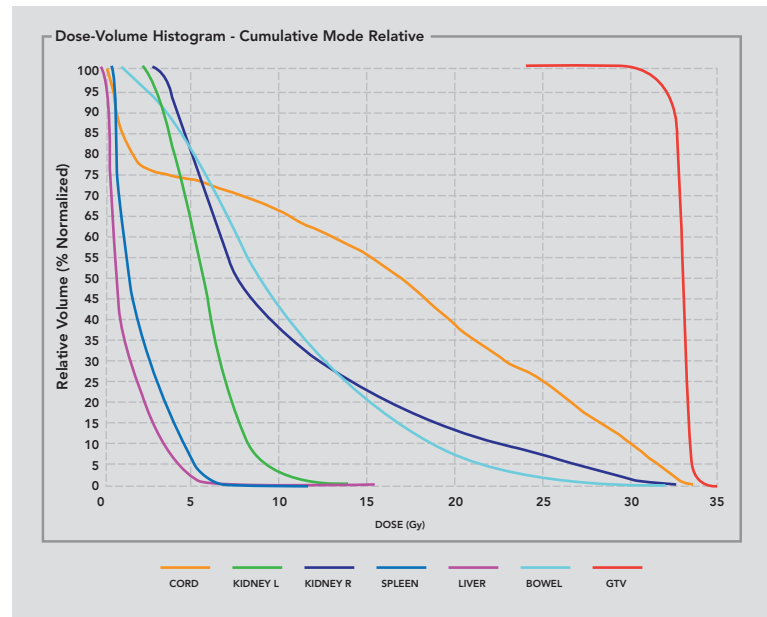
32 Gy in 16 daily fractions covering 95% of the target volume. Due to unexpectedly rapid tumor regression observed on daily MVCT scan, treatment was halted after 12 fractions and a boost dose of 8 Gy in 4 fractions was delivered to a reduced volume.

## Outcome:

Full return of muscle and nerve function.  
Tumor gone.

## Patient Perspective:

"I went in for a consultation with Dr. Rost and he said I could go home and think about it, but I was ready right then and he got me in that day. Something had to be done, because I could barely walk. The TomoTherapy<sup>SM</sup> session was easy. You lay there still and it takes about 5 minutes. Within two treatments the pain was gone. I never had any side effects. Now I'm back walking my dog five miles a day in the foothills around Reno."



TO LEARN MORE ABOUT TOMOTHERAPY, GO TO  
[WWW.ACCURAY.COM](http://WWW.ACCURAY.COM) OR CALL +1.408.716.4600.

#### References

1. Bortfeld T, Webb S. Single-Arc IMRT? *Phys. Med. Biol.* 2008; 54: N9-N20

***TomoTherapy®***

