F I S C A L I M P A C T R E P O R T

SPONSOR McSorley **ORIGINAL DATE** 03/03/07 **LAST UPDATED** **HB**

SHORT TITLE Support Advanced Particle Beam Cancer Therapy **SB** SJM 60

ANALYST Hanika Ortiz

APPROPRIATION (dollars in thousands)

Appropriation		Recurring or Non-Rec	Fund Affected
FY07	**FY08**		
	NFI		

(Parenthesis ( ) Indicate Expenditure Decreases)

SOURCES OF INFORMATION
LFC Files

SUMMARY

Synopsis of Bill

Senate Joint Memorial 60 urges New Mexico to support research on the promising clinical application of advanced particle beam cancer therapy in the care of cancer patients.

The memorial provides the following comments:

- Cancer is a devastating disease that has enormous consequences for those affected and their families.
- In the last six decades, proton beam therapy has been perfected for clinical use and used with high success to treat many types of tumors.
- Continuing research has shown that heavier particles, such as carbon ions, when used in cancer therapy, can have a higher biological effectiveness than proton beam therapy.
- Antiproton particle beams are anticipated to have an even better efficiency in destroying tumors without harming surrounding tissue.
- Research using antiproton particle beams has just begun in Europe with promising results.
- New Mexico is an ideal location for advanced particle beam cancer therapy research because it is the home of Los Alamos national laboratory, Sandia national laboratories and the university of New Mexico medical school.
- Michael Holzscheiter, a renowned physicist and one of the world's foremost experts on advanced particle beam cancer therapy, is now living in New Mexico while conducting

his ongoing research locally and at CERN, a large particle physics laboratory near Geneva, Switzerland.

FISCAL IMPLICATIONS

Promoting an interest in the types of scientific research proposed in the memorial will not only provide for more effective cancer treatment in the future for New Mexicans; but, will also assist in creating high-paying jobs and new economic opportunities which will lead to a more diversified economy.

SIGNIFICANT ISSUES

The memorial proposes New Mexico investigate new research on the effect of antiprotons on cell irradiation.

On October 31, 2006 in Geneva, a pioneering experiment at CERN with potential future application in cancer therapy produced its first results. Started in 2003, ACE (Antiproton Cell Experiment), the first investigation of the biological effects of antiprotons, showed that antiprotons are four times more effective than protons at terminating live cells.

Current particle beam therapy commonly uses protons to destroy tumor cells inside a patient. The ACE experiment directly compared the effectiveness of cell irradiation using protons and antiprotons. To simulate a cross-section of tissue inside a body, tubes were filled with hamster cells suspended in gelatine. Researchers sent a beam of protons or antiprotons with a range of 2 cm depth into one end of the tube, and evaluated the fraction of surviving cells after irradiation along the path of the beam.

The results showed that antiprotons were four times more effective than protons. When comparing a beam of antiprotons with a beam of protons that cause identical damage at the entrance to the target, the experiment found the damage to cells inflicted at the end of the beam path to be four times higher for antiprotons than for protons. Michael Holzscheiter, spokesperson of the ACE experiment, summarizes: *"To achieve the same level of damage to cells at the target area one needs four times fewer antiprotons than protons. This significantly reduces the damage to the cells along the entrance channel of the beam for antiprotons compared to protons. Due to the antiproton's unsurpassed ability to preserve healthy tissue while causing damage to a specific area, this type of beam could be highly valuable in treating cases of recurring cancer, where this property is vital."*

Researchers are currently conducting more tests to irradiate cells at a greater depth (about 15cm below the surface). Experiments to compare the effectiveness of antiprotons with another form of treatment using carbon ions will begin next month at GSI (Gesellschaft für Schwerionenforschung) in Germany. Further tests are planned to fully assess the effectiveness and suitability of antiprotons for cancer therapy, and to assure that less damage is caused to healthy tissues compared to other methods.

If all goes well, the first clinical application will still be a decade or more into the future.

PERFORMANCE IMPLICATIONS

The memorial further provides that the New Mexico State Legislature request the interim legislative health and human services committee and the legislative finance committee to

schedule a presentation and report by physicist Michael Holzscheiter by September 2007 to learn more about the medical application of advanced particle beam cancer therapy and to identify new sources of funding to support ongoing research in New Mexico.

ADMINISTRATIVE IMPLICATIONS

The memorial further requests that copies of this memorial be transmitted to the Department of Health.

WHAT WILL BE THE CONSEQUENCES OF NOT ENACTING THIS BILL

NM research institutions may miss out on an opportunity to work toward and participate in the successful application of antiproton particle beams for treating aggressive cancers in the future.

AHO/csd