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2011 Joint AAPM/COMP Meeting Hot Topics

Embargoed for Release until Sunday, July 31, 2011

- **New Tool Can Help Doctors Determine if Radiation Treatment is Likely to be Successful**

Authors: Joe Deasy, Ph.D., Chair, Dept. of Medical Physics, Enid A. Haupt Endowed Chair in Medical Physics
Jung Hun Oh, Ph.D., Research Fellow
Memorial Sloan Kettering Cancer Center, New York City

A new tool that predicts whether a specific radiation treatment plan is likely to kill a targeted cancer tumor can help doctors individualize treatment planning, according to research supported by the National Institutes of Health conducted at Washington University, St. Louis. The Total Clonogen Survival tool was accurate when tested on 56 lung cancer patients and 80 head and neck cancer patients and then compared to actual results 1-1/2 to 2-1/2 years later. *View full abstracts one and two.*

Embargoed for Release until Monday, August 1, 2011

- **Cone-Beam CT Can Help Surgeons See and Remove Tiny Cancerous Lung Tumors**

Authors: Sebastian Schafer, Ph.D., Research Associate, Department of Biomedical Engineering
Jeff Siewerdsen, Ph.D., Associate Professor, Department of Biomedical Engineering
Johns Hopkins University, Baltimore

Video-assisted thoracoscopic surgery (VATS) allows surgeons to remove lung cancer tumors using minimally invasive techniques at an early stage, when they are potentially curable, but these tumors are often so small that they can be difficult to identify during the procedure - so small that they cannot be identified by the surgeon's fingertips. Johns Hopkins researchers are developing a mobile C-arm for cone-beam CT scanning during surgery to help surgeons accurately target these small tumors and remove them safely. Researchers say adding C-arm cone-beam CT will improve tumor targeting, spare normal, healthy tissue, and facilitate safer, more effective surgery. *View full abstract.*

Embargoed for Release until Wednesday, August 3, 2011

- **New Data Processing Technique Aimed at Shortening Scans, Decreasing Radiation Exposure in Kids**

Authors: Samuel L. Brady, Ph.D., Staff Physicist
Robert A. Kaufman, M.D., Radiologist-in-Chief
St. Jude Children's Research Hospital, Memphis

Recent data suggests that a new Computed Tomography (CT) image formation technique – a different approach to reprocessing the data gathered in the scans – could reduce radiation exposure in children by 20 to 30 percent without affecting the clarity of the images. Adaptive statistic iterative reconstruction (ASiR™) was tested in a mock patient (phantom) to simulate what would occur in an actual clinical setting. ASiR™ allows the amount of radiation to be decreased, without increasing the image noise (e.g. the grainy texture that can hide subtle abnormalities in the image). Researchers say that, although significant progress has been made in making CTs safer for children in the last decade, this study suggests more can be done to protect them without sacrificing image quality by using this newly available technique. *View full abstract.*

- **Combining PET and MRI Can Help Doctors Identify, Treat Most Aggressive Portions of Brain Tumors**

Authors: Deanna H. Pafundi, Ph.D., Medical Physics Fellow, Radiation Oncology
Debra H. Brinkmann, Ph.D., Assistant Professor of Radiologic Physics, Radiation Oncology
Mayo Clinic, Rochester, Minn.

Treatment and, ultimately, survival of patients with the most deadly types of brain tumors could be improved by combining positron emission tomography (PET) with magnetic resonance imaging (MRI), this study suggests. Researchers tested the use of PET with a radioactive tracer (^{18}F-FDOPA) and MRI in six brain cancer patients, and determined that the tracer identified the more aggressive portion of the brain tumor, which cannot be determined from MRI alone. This could help doctors identify the most aggressive portion of the tumor and guide them in more effective treatment, according to the study, the first to combine the two techniques. *View full abstract.*

- **Scientists Work to Reduce Radiation Therapy Errors**

Authors: Eric Ford, Ph.D., Assistant Professor of Radiation Oncology and Molecular Radiation Sciences
Johns Hopkins University, Baltimore
Sasa Mutic, Ph.D., Associate Professor, Washington University, St. Louis
Working Group on Prevention of Errors, AAPM

Researchers analyzed 4,407 near-miss error events at radiation therapy clinics to determine which of the 15 most common quality control checks are most effective. At the John S. Laughlin Science Council Research Symposium, they will present data showing that the most effective checks – typically not the ones most clinicians would think are the most important – include:

- physician chart review
- physics chart review
- timeout by the radiation therapist

- in vivo dosimetry using an electronic portal imaging device (EPID) or port films, and
- checklists.

View full abstract.

In a related presentation during the Joint Imaging-Therapy Symposium, the AAPM Working Group on the Prevention of Errors will report its progress in developing standards for a national incident reporting system. This system would collect accident and "near miss" data from radiation therapy clinics, using the findings to protect patients. Just as the National Transportation Safety Board investigates plane crashes, information about accidents and near misses would be analyzed, compiled and distributed to treatment centers in an attempt to prevent the same mistakes from recurring. *View full abstract.*

Embargoed for Release until Thursday, August 4, 2011

- **A New Way to Create X-Rays Could Lead to Better Treatment of Difficult Cancers**

Authors: Michael Hadsell, Ph.D. Candidate, Department of Physics and Astronomy
Otto Zhou, Ph.D., David Godschalk Distinguished Professor, Department of Physics and Astronomy
Sha Chang, Ph.D., Associate Professor, Head of Physics & Computing Division, Department of Radiation Oncology
University of North Carolina, Chapel Hill

The combination of two new technologies could help lead to widespread use of a promising experimental cancer treatment called microbeam radiotherapy (MRT). Acting like a smart bomb, MRT zaps cancerous tissues while sparing healthy tissue, and could be a huge step forward in treating currently incurable brain and pediatric cancers. Researchers at the University of North Carolina have shown it is possible to use carbon nanotube field emission technology (the first new way to create X-rays in 100 years) to produce compact MRT systems. MRT has previously only been generated using huge synchrotron facilities, which exist in just a few places in the world. The researchers have demonstrated that carbon nanotube technology could enable wider availability of MRT, which is crucial for MRT cancer research and treatment. *View full abstract.*

About Medical Physicists
If you ever had a mammogram, ultrasound, X-ray, MRI, PET scan, or known someone treated for cancer, chances are reasonable that a medical physicist was working behind the scenes to make sure the imaging procedure was as effective as possible. Medical physicists help to develop new imaging techniques, improve existing ones, and assure the safety of radiation used in medical procedures in radiology, radiation oncology and nuclear medicine. They collaborate with radiation oncologists to design cancer treatment plans. They provide routine quality assurance and quality control on radiation equipment and procedures to ensure that cancer patients receive the prescribed dose of radiation to the correct location. They also contribute to the development of physics intensive therapeutic techniques, such as stereotactic radiosurgery and prostate seed implants for cancer to name a few. The annual meeting is a great resource, providing guidance to physicists to implement the latest and greatest technology in a community hospital close to you.

About AAPM
The American Association of Physicists in Medicine (www.aapm.org) is a scientific, educational, and professional organization of more than 7,000 medical physicists. Headquarters are located at the American Center for Physics in College Park, Md.

About COMP

The Canadian Organization of Medical Physicists (COMP) (http://www.medphys.ca) is the main professional body for medical physicists practicing in Canada. The membership is composed of graduate students in medical physics programs, post-doctoral fellows, as well as professional physicists, scientists, and academics located at universities, hospitals, cancer centres, and government research facilities such as the National Research Council. Every member has an educational or professional background in physics or engineering as it applies to medicine. COMP is based in Kanata, Ont.