Computed tomography (CT) imaging aids doctors in the diagnosis, management, treatment, and prevention of common diseases; however, concerns exist regarding the carcinogenic potential of the ionizing radiation emitted during the scans.

Trends in the Radiation Used for Adult CT At the University of California San Francisco, 2010-2012

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UCSF will conduct a Virtual Symposium on Radiation Safety in CT during our study period, we include data for five General Electric (GE) VCT machines, one GE LightSpeed Ultra 16-slice machine, one GE LightSpeed QX/I 4-slice machine installed in 2010 only), a Neurology C-arm (limited to portable CNS exams on ICU patients). Four of the VCT machines performed in trend. Among adults, the effective average dose from 2010 to 2012 at UCSF Medical Center. Using this data, we attempt to

UCSF Dose Reduction Strategies:

CTDmean can be most easily thought of as the average dose per slice. For the purposes of our analysis, we looked at patients scanned within the Head, Chest, Abdomen/Pelvis, and Chest/Abdomen/Pelvis groups. Research and interventional CT studies were not included.

Results:

CTDvol and CTDmean can be most easily thought of as the average dose per slice. For the purposes of our analysis, we looked at patients scanned within the Head, Chest, Abdomen/Pelvis, and Chest/Abdomen/Pelvis groups. Research and interventional CT studies were not included.

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Published dose estimation using xRayspec ™ (Radiometrics, Ontario, Canada) dose analytic software. The software extracts the CTDvol and CTDmean from the Digital Imaging and Communications in Medicine (DICOM) headers in the PACS data, and converts these values with images and patient demographic information, to calculate site-specific dose estimates (SDD). organ doses and effective dose using ICRP 2001 dose calculation algorithms for each patient.

Dose Analytic Software:

The patient population for this study includes UCSF Medical Center patients (>17 years of age) undergoing a CT examination from February 1 to April 30 in 2010 and 2012.

In California, Senator Alex Padilla authored Senate Bill 1237 requiring facilities to record CT radiation doses in patient medical records. When made available, a medical physicist reviews the dose for each exam.

Discussion:

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UCSF Dose Reduction Strategies:

There have been increased efforts at UCSF Medical Center to reduce diagnostic CT radiation levels in recent years. Some of the strategies include:

• Increased technological training
• Specified instructions to avoid over scanning
• Reduction of the kVp from 120 to 100 for patients under 100 lbs. in weight
• Reduction of the mA for chest and abdomen/pelvis exams by an average of 9% by adjusting the Noise Index used by automatic tube current modulation protocols
• Reduction in use and elimination of certain higher dose and multiphase protocols
• Increased use of shielding where appropriate
• The installation of ASIR software

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We used the conversion factors outlined by AAPM Task Group #204 to estimate SSDE. Radiation Dose Metrics:

Results (continued):


doses declined 7% for abdomen/pelvis protocols, 32% for chest exams, and 46% for head exams.

Trends By Anatomic Region:

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