Computed Tomography Radiation Exposure: Dose Reporting Implementation and Adherence

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Introduction
The use of computed tomography (CT) in clinical medicine has dramatically increased since its inception in the 1970s and its subsequent integration into routine patient care is widely considered among the most important advances in medicine. Despite its revolutionary contributions to medical diagnosis and imaging, its contributions are not completely unfettered. With CT accounting for approximately 15% of all medical imaging tests and an estimated 62 million CT examination currently performed in the United States, it is estimated that CT contributes up to 70% of the total radiation dose to the population [1, 2]. Despite the undeniable importance of CT to the diagnosis of disease, there is rising awareness of the potential risks of radiation-induced carcinogenesis [3, 4] with numerous reports in the literature of ionizing radiation from CT imaging causing a substantial number of cancers [4, 5].

Quality Improvement and Dose Reporting
Increase awareness of radiation exposure that patients are receiving and in certain select cases, to identify those at the greatest risk of overexposure and to counsel referring physicians about other non-ionizing radiation imaging methods. In addition, in anticipation of upcoming California state regulatory mandates, we hope to implement a dose reporting system long before these are mandated and to remain at the forefront of medical education and practice with regards to minimizing patient exposure to unnecessary ionizing radiation.

Project Goal and Methods
The QI project goal for the academic year 2011-2012 is >95% of all final CT radiologic reports (from reports generated from the Neuroradiology, Chest, Abdominal Imaging, Pediatric, and Musculoskeletal imaging sections), will report the radiation for the given examination. Consecutive reports from July 1, 2011 to June 30, 2012 of all patients who underwent diagnostic computed tomography examinations done at the University of California, San Francisco Medical Center (Parnassus and Mt. Zion campuses), a 722-bed tertiary academic medical center in San Francisco, from the aforementioned imaging sections were retrospectively reviewed.

Project Plan
To ensure the timely and correct reporting of radiation dose in all finalized CT reports, we adopted a three pronged approach:
1. Dedicated Housestaff education of radiation dose reporting and CT protocols.
2. Dedicated awareness of dose reporting requirements to all Attending physicians in the Department of Radiology and Biomedical Imaging.
3. Lower all conceivable barriers to dose reporting by implementation of standardized dose reporting statements in all pertinent radiologic templates.

Discussion
Radiation doses for consecutive CT examinations done at UCSF Medical Center for the period of July 1, 2011 to April 30, 2012 were consistently reported (93%, total examinations 30,064) at a rate far above our target goal.

Factors contributing to high adherence rate:
1. Low barrier to compliance (template implementation, SmartText)
2. Resident/Fellow education
3. Unfilled fields do not allow dictation to be signed
Factors limiting greater compliance/adherence:
1. Dictations completed without template.
2. Unfamiliarity with dictation/template standards across multiple hospitals

Future Directions
In anticipation of California state law (SB 1237, effective July 1, 2012) and upcoming Federal requirements, we will continue to monitor dose reporting compliance/adherence in the upcoming academic year with new reporting goals of >95% with a focus on individualized physician compliance monitoring and education.

References
2. Martin DR, Semelka RC. Health effects of ionising radiation from diagnostic CT. Lancet 2006;367:1712-1714

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