

March 22, 2023

To: New Users of University of Wisconsin-Madison CT Protocols

This letter specifically addresses the dose given by the GE bolus tracking feature, “smartprep”. We have found many sites elect not to use bolus tracking for routine exams. At the UW, we use bolus tracking for the majority of our with contrast body exams and many neuro and cardiovascular exams. For users new to using smartprep, the extra dose delivered by this feature may seem too high to warrant its use. Our opinion, however, is that since the dose is negligible relative to the total exam dose, the increase in robustness in capturing optimal contrast dynamics is worth the slight dose increase.

The following figures were computed using patient data from 4,676 medium-sized (anterior + lateral dimensions between 55 and 75 cm) abdominal/pelvis scans.

The mean/median CTDIvol from the smartprep series at UW is 17/17 mGy.

The mean/median DLP from the smartprep series at UW is 8/9 mGy*cm.

The mean/median CTDIvol from the helical abd/pelvis at UW is 10/9 mGy.

The mean/median DLP from the helical abd/pelvis at UW is 521/445 mGy*cm.

Making sense of these numbers:

The smartprep contributes only 1.9% of the total exam DLP. In terms of deterministic effects coming from the slightly higher CTDIvol of the smartprep relative to the helical scan, 17 mGy is far below any deterministic threshold. For reference, the AAPM recommends a threshold of 1,000 mGy to alert users to possible damaging dose levels. The accepted threshold for deterministic effects (hair loss, skin reddening) is 2,000-5,000 mGy peak skin dose. CTDIvol actually overestimates the peak skin dose meaning that even if the CTDIvol was 2,000, the PSD would likely be below the deterministic threshold limit. Consultation with your medical physicist should be scheduled if you need further explanation on this topic. Bolus tracking techniques are standard options on all modern CT scanners and are used routinely in medical centers across the globe. While it is not a good idea to disregard the dose from this feature, it is important to understand the magnitude of this dose with respect to the rest of the exam and known deterministic dose thresholds.

If you have any more questions, or would like to have any of the above clarified, please contact your GE applications specialist.

Sincerely,

The CT Protocol Optimization Team