Local diagnostic reference levels for lung cancer screening (LCS) in British Columbia

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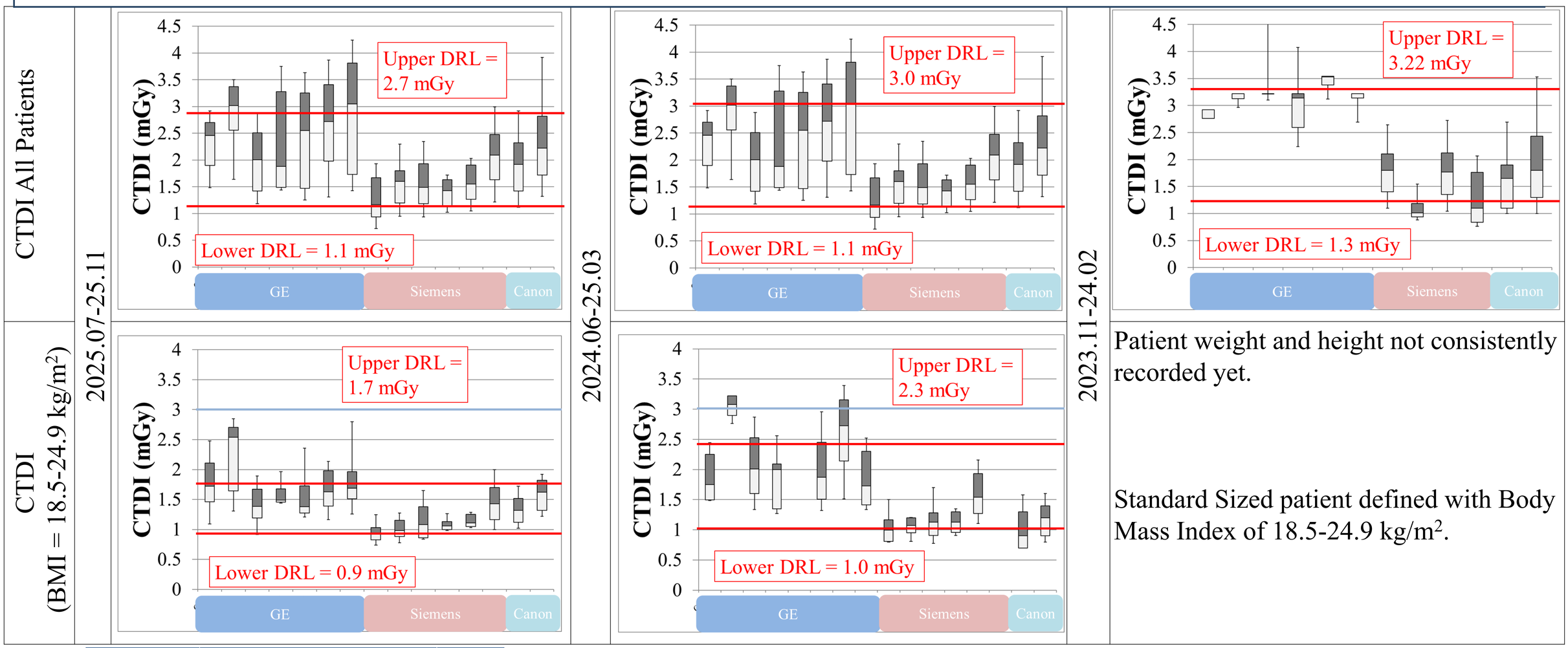
Purpose

Optimize patient dose for Lung Cancer Screening (LCS) using local diagnostic reference levels (DRLs).

Background: The provincial LCS program launched in May 2022 and required patient height and weight to be recorded and that the standard sized patient CTDI < 3.0 mGy.

Methods: Three assessments of DRLs were performed for all scanners participating in LCS in our Health Authority. Some scanners were replaced or added to the fleet over the course of the study. Over 3 time ranges shown below, data were downloaded from the ACR-DIR for scanners capable, and manually collected for the rest. For each data collection round, Upper and Lower DRLs (75th and 10th percentiles, respectively) were determined and protocol recommendations were made. After an implementation period, data collection resumed.



Patient weight and height not consistently recorded yet.

Standard Sized patient defined with Body Mass Index of 18.5-24.9 kg/m^2.

Vendor	Model	Total
Canon	Aquilion one	2
GE	VCT	3
GE	660	1
GE	750	2
GE	Revolution Maxima	0-1
Siemens	X.Ceed	1-2
Siemens	Flash	2
Siemens	Force	1-2

Results

- Upper DRL decreased from 3.2 to 2.7 mGy and the Lower DRL decreased from 1.3 to 1.1 mGy.
- For Standard Sized patients, the Upper DRL decreased from 2.3 to 1.7 mGy while the lower DRL decreased from 1.0 to 0.9 mGy.

Conclusion

- GE scanners had their Noise Indexes set too high initially.
  - Gradual reductions ongoing.
- Median CTDI values are well below accreditation standards and the DRL initiative is further reducing LCS population dose.
- Standard sized patient accreditation limits could be reduced to 1.5 mGy