

Building an LCS program with AI-driven efficiency

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LDCT Scan Acquisition

- Protocol optimization based on participant characteristics. Dose adjustment as required using automatic exposure control systems
- Automated quality control to detect motion artifacts, patient centering or suboptimal scans (eg. expiratory)
- Dose management
 - Use of iterative reconstruction techniques to optimize image quality, reduce noise and artifacts whilst using the lowest dose reasonably achievable

Scan Interpretation

- CAD (computer aided detection) and volumetry software
 - Nodule segmentation
 - Nodule morphology (solid, part solid, subsolid)
 - Vessel suppression
 - Volume and mean nodule diameter measurements, VDT, growth assessment
 - Additional findings
 - Report generation
- Advantages:
 - reduces interobserver variability, reproducible, fast processing times, act as 2nd read, reduces reader "fatigue"
- Disadvantages
 - Cost, sensitivity threshold set high thereby increasing false positive rate, unable to segment/recognise certain nodules eg. juxtapleural nodules, atypical pulmonary cysts, endobronchial nodules. Software must be trained on diverse datasets to reduce bias. Current data not trained on the Australian population.

Actionable additional findings

- AI software can quantify emphysema, coronary artery calcification and osteoporosis.
- These conditions contribute significantly to patient morbidity and mortality. Ischaemic heart disease, for instance, is the leading cause of death in the lung cancer screening cohort. This provides an opportunity to practice preventative medicine.

Workflow Optimisation

- AI can orchestrate a reporting dashboard
 - High risk scans can be flagged and triaged to the top of the reporting list.
 - High risk scans can be colour coded for ease of visualization
- Schedule optimization
 - Appointment scheduling for both the LDCT scan plus nodule clinic review.
 - Create MDT lists
 - Post reminders to participants with date of next scan
 - Flag if participant fails to attend either the CT or nodule clinic appointment
 - Flag once the participants “ages out” of the program.