

Radiologist's Perspective Medical Image Perception & Cognition

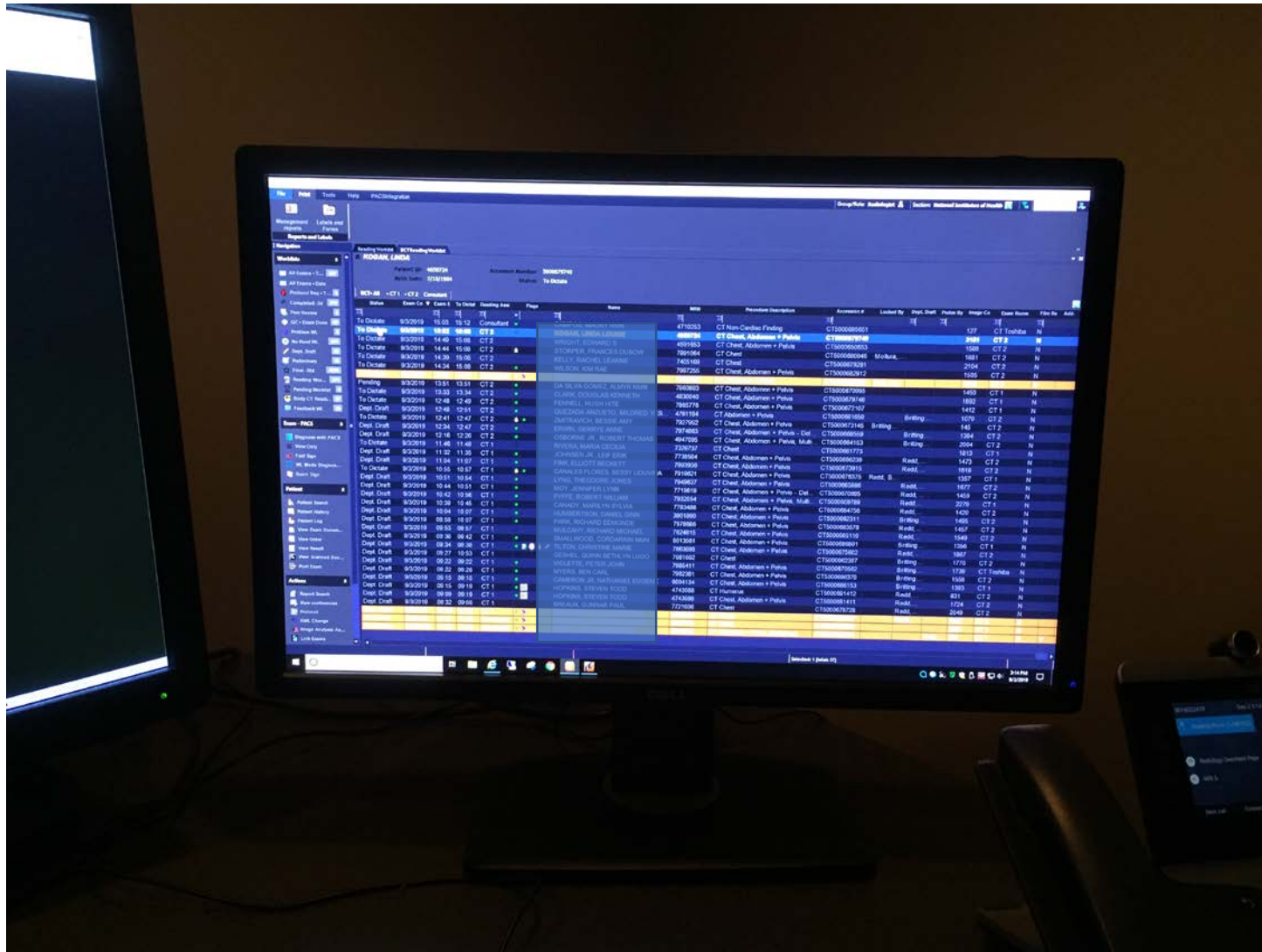
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How I read imaging studies

- Quiet, dark room
 - How behind am I?
 - What kind of day is this going to be?

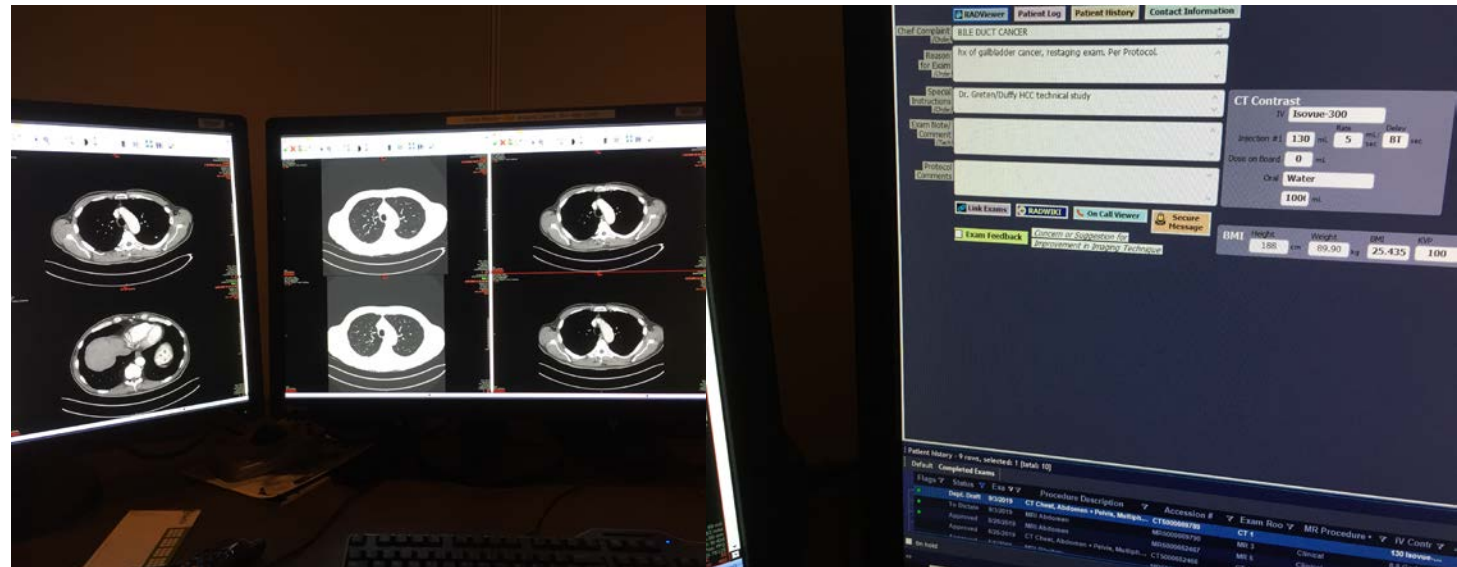


How Long Is the List?



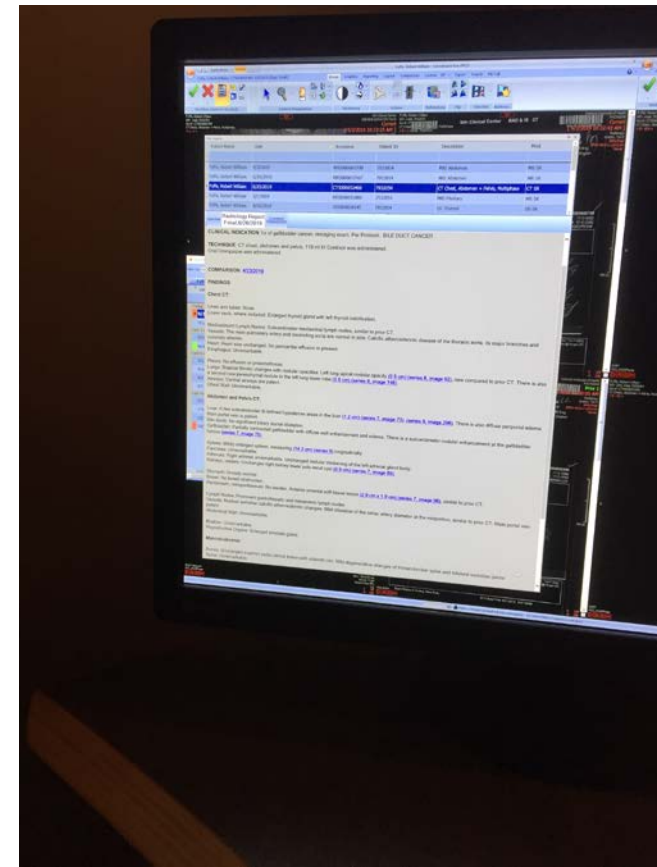
What kind of study?

- What are the referring physicians interested in:
 - Diagnostic investigation (e.g Why is this patient febrile? Tumor?)
 - Infectious/Cancer disease: better or worse?
 - Trauma/Surgery: Whats broken or out of place or not draining?
 - Cancer:
 - Diagnosis?
 - Staging?
 - Response to therapy?



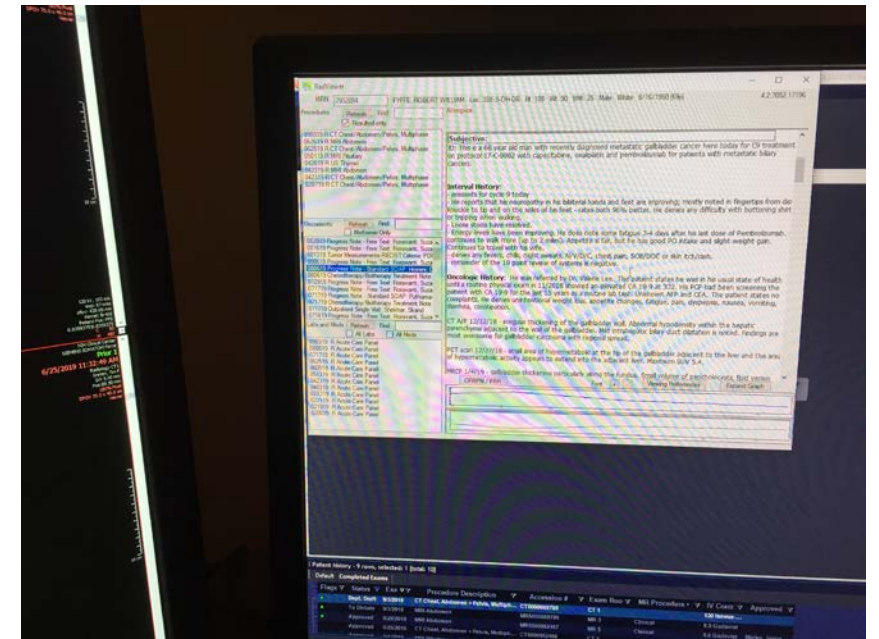
Prior report

- What were the major findings last time?
- What were incidental findings that I don't want to miss!
- What is the tempo of this disease:
 - Has it been stable?
 - Has it been getting better?
 - Has it been getting worse?
 - At what rate is this happening?



Prior Medical History

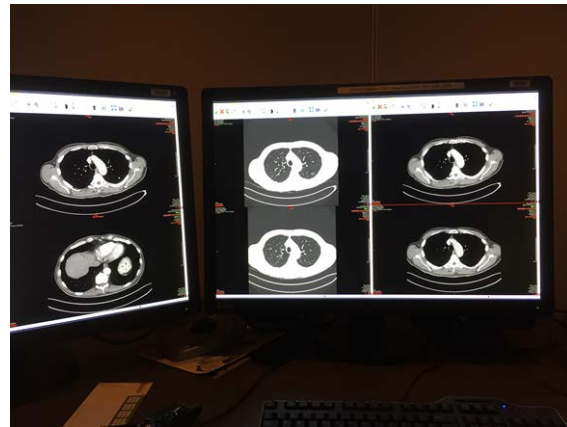
- Our PACS system has access to recent medical e-notes in chart.
- What is going on with this patient?
- What is the treatment team primarily interested in?
- Is this a routine check or a purpose-driven study?



Cognition Drives Perception
or
The educated eye sees more

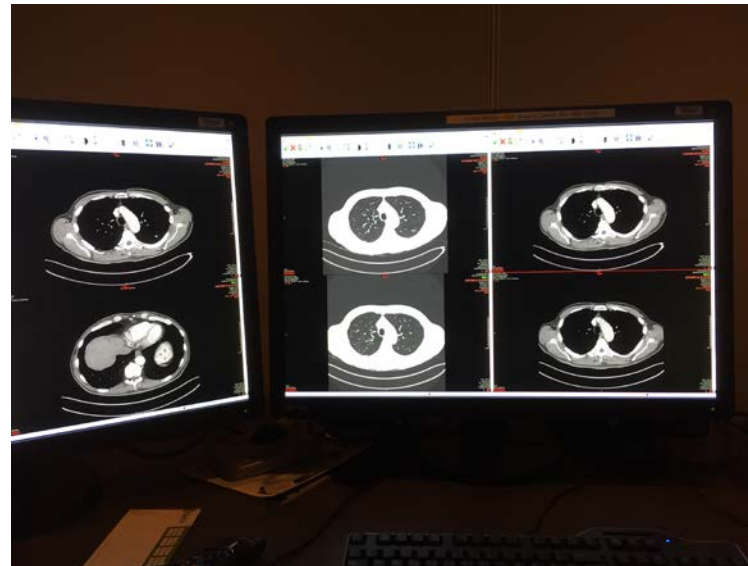
Staying organized

- Layout:
 - New over old
 - Match types of images with each other so they are close
 - Standard format aids in reducing confusion, less taxing
- Set up Report
 - Standardized format acts as checklist
 - Getting into a rhythm with a routine decreases chance of missing something

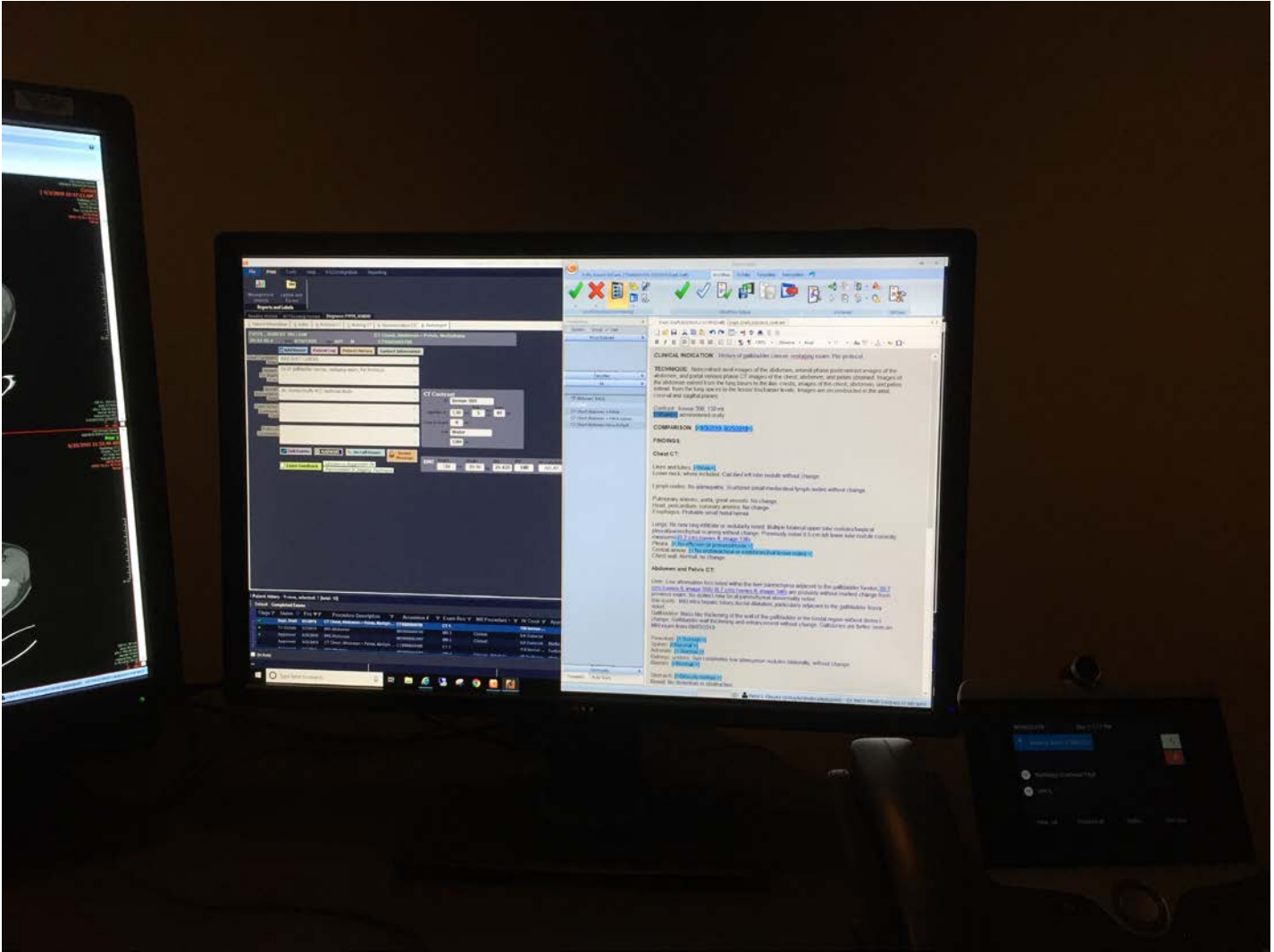


Identify normal structures

- Chest:
 - Heart, vessels, mediastinum, lungs, chest wall
 - Look for deviations from normal
 - Record and measure
 - Compare
 - Report
 - Be methodical



The Standardized Report



Problems

- Interruptions/Distractions
 - Before the interruption: “ I should mention X”
 - After the interruption: “Where was I?”
 - X gets missed



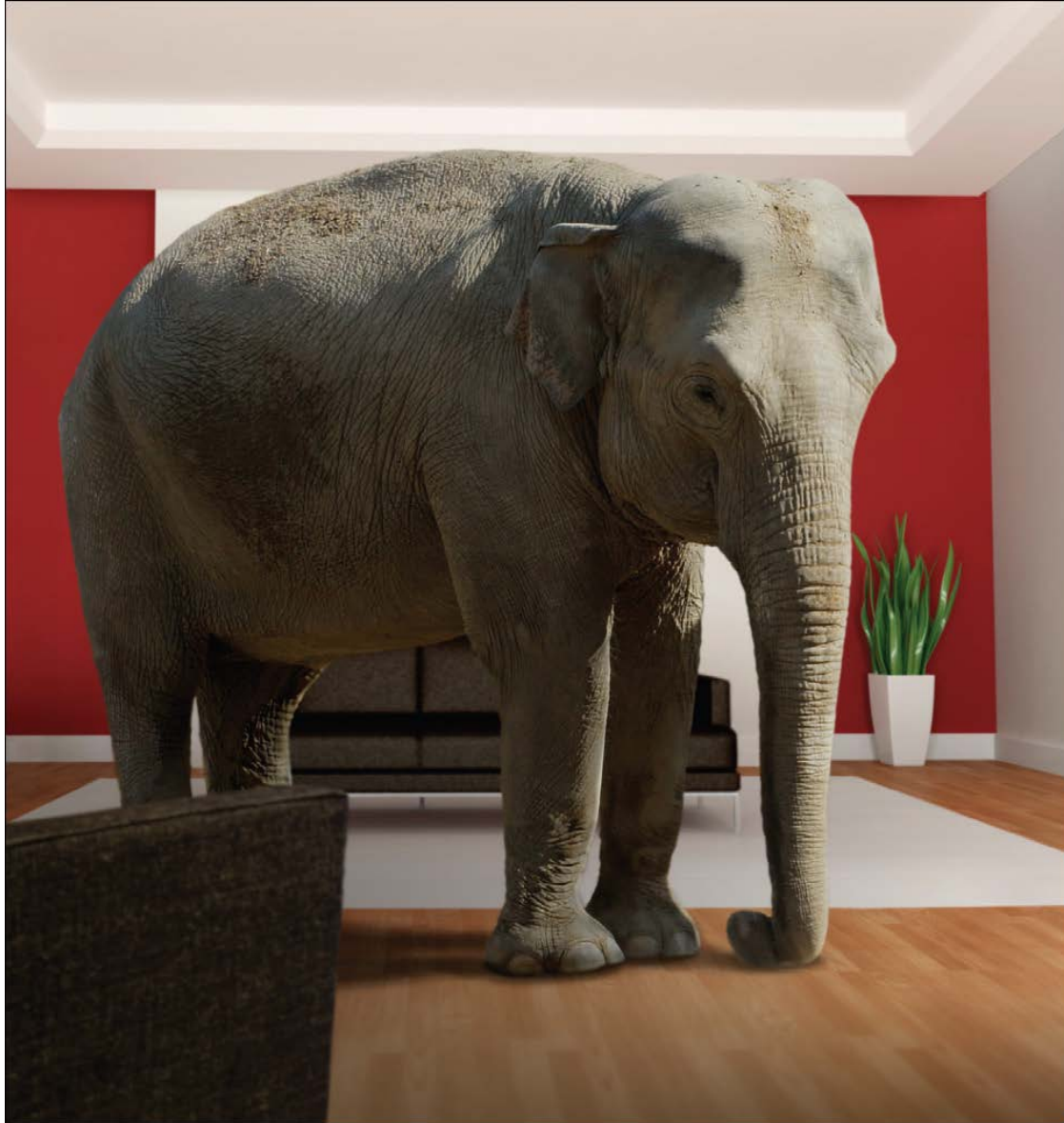
Problems

- Fatigue and Errors of Attention
 - Physical and mental
 - Scrolling too fast
 - Not comparing properly (slice alignment)
 - Not focused
 - Distracted
 - Failure to record what is perceived!

Problems

- Interpretive

- Benign to malignant: mimics tumor but on close inspection is not
- Malignant to benign: Failure to notice subtle changes or new lesions
- Don't know what it is...describe
- Failure to link findings (Adrenal nodule with a Lung mass)



Artificial Intelligence

Cognition, Perception and Artificial Intelligence

- Cognition:
 - AI can help in sorting out relevant medical information
 - AI can help understand links
 - AI can sort out what the clinician is looking for from the study
- Perception
 - AI can identify abnormalities
 - AI can identify previous abnormalities and detect changes on current exam
 - AI can double check reports (is everything mentioned?)
- Better, faster reports

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