

PRIME:

Promoting Radiology Integration through Medical Education

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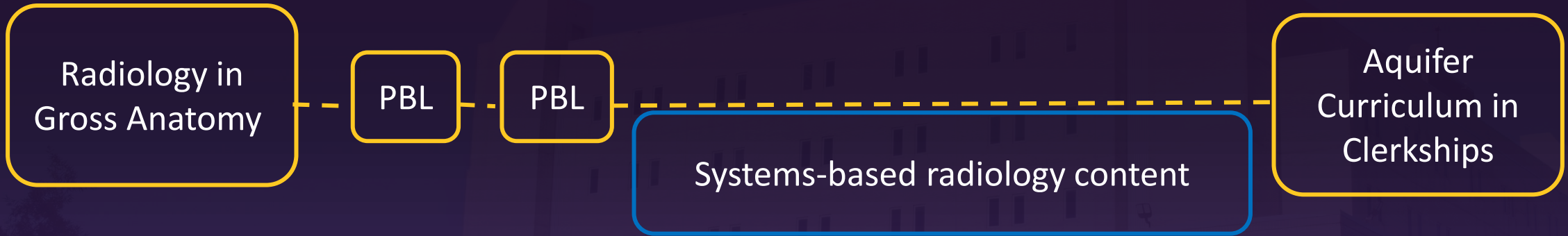
BRODY SCHOOL OF MEDICINE
9th Annual Medical Education Day

- Radiology is an increasingly important aspect of patient care across all specialties
 - Both generalists and specialists should have basic radiology understanding
 - Appropriateness criteria: ordering of imaging studies & cost
- Radiology education in medical schools is variable
 - Often limited to gross anatomy courses in M1
 - Usually taught by non-radiologists
 - M3 Clerkships not mandatory

M1

M2

M3










- Created and integrated basic radiology content, in the form of (1) videos and (2) Quick Hits, into the systems-based M2 curriculum.
- Phase 1 of Project: Selected content for each course but not comprehensive coverage.
 - Pulmonary module created and implemented.
 - Cardiovascular module NOT implemented in 2022-2023.
- Content from modules NOT tested on assessments.
- Students surveyed using SurveyMonkey.com survey.








- Course Navigation
- Course Information
- Objectives
 - Learning Objectives
 - Brody ILOs
- Important Information
 - Announcements
 - Course Calendar
 - Syllabus
- Course Content
 - Course Documents
 - Review Materials
 - Autopsy Experience Information
 - ** Radiology Topics - Pulm****
- Manage Notices
- My Grades (Student View)
 - Gradebook (Assessments)
 - My Gradebook
- Brody School of Medicine
 - Blood Exposure Procedures
 - Policies, Procedures, and Forms
 - Copyright Notice
- SYST 9200 Panopto Recordings

SYST 9200 – Cardio and Pulmonary Systems Class of 2025

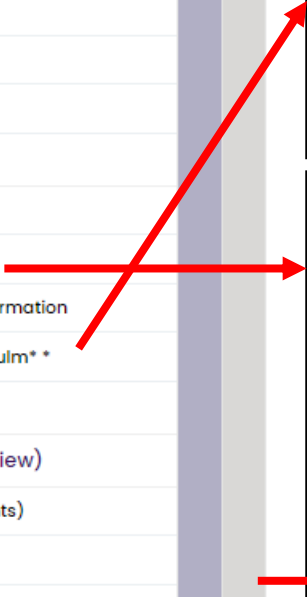
**** Radiology Topics – Pulmonary****

- ▼ **Pulmonary Radiology - Dr. Simone Montoya** (2 documents) 
 - 1) View PowerPoint in "Slide Show" or "Reading View" mode to hear the narration by Dr. Montoya - OR - 2) View MP4 file
 -  **02A - Radiology Topics - Pulmonary Imaging.pptx**  
 -  **02B - Radiology Topics - Pulmonary Imaging.mp4**  

Review Materials

- ▼ **Pathology Review Materials** (45 documents) 
 - > **01 - Cardiovascular - Review Files** (22 documents) 
 - > **02 - Pulmonary - Review Materials** (22 documents) 
 - ▼ **03 - Radiology - High-Yield Correlates** (1 documents) 
 -  **Pulm Path Quick Hits - Radiology High-Yield Co**  

Distribution in Elentra



MP4 Player Version

Pulmonary Imaging

Simone Montoya, MD
Director of Radiology Education



Patterns of Pulmonary Opacities

Opacification =
decreased
air-to-tissue ratio

Airspace: less gas in alveoli

- Atelectasis
- Consolidation
- Ground-glass

Linear: thickened interstitium

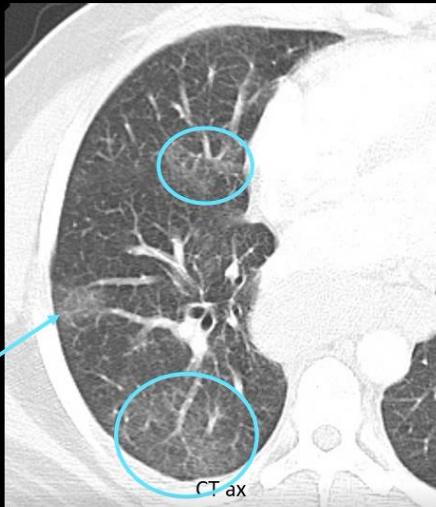
Nodular: discrete lesions

- Micronodule <3-4 mm
- Mass >3 cm

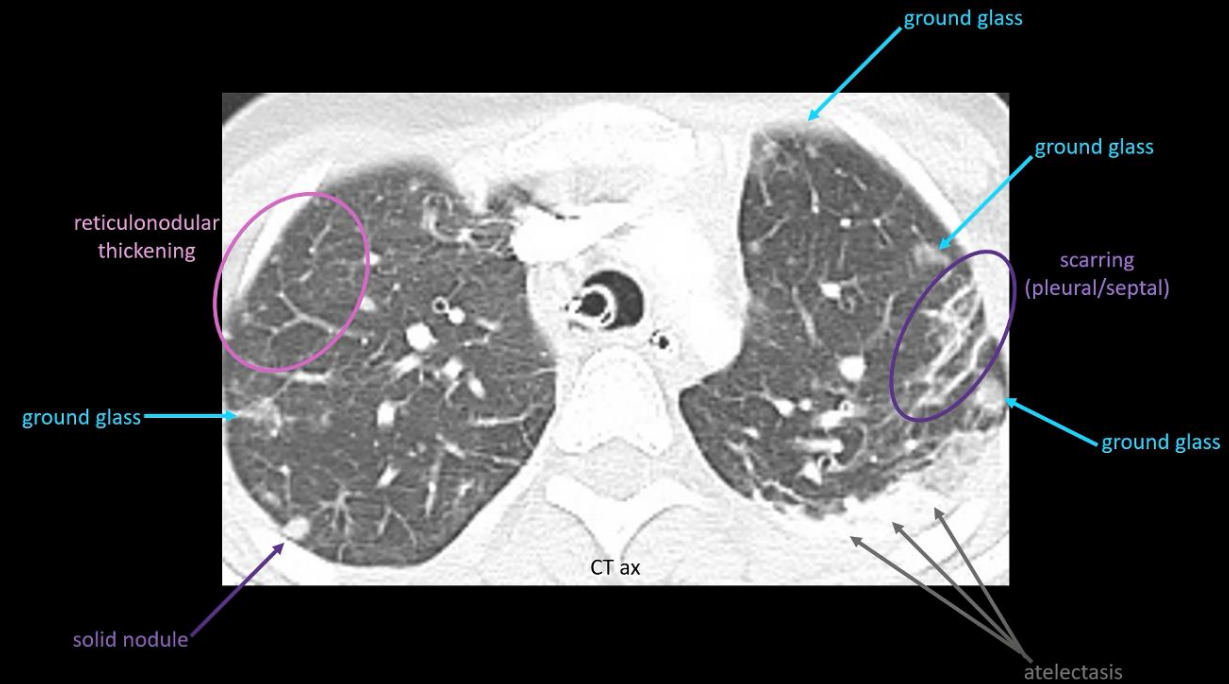
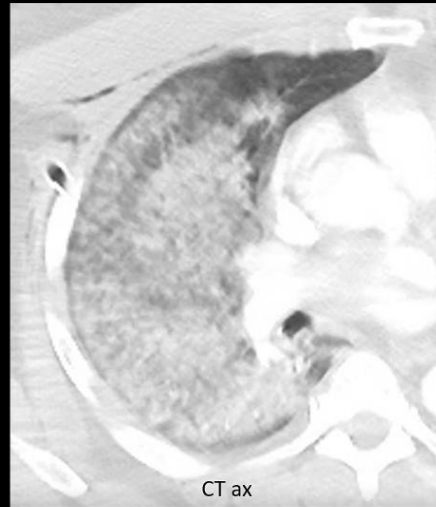
Reticulonodular

MP4 Player Version

Ground Glass



Consolidation

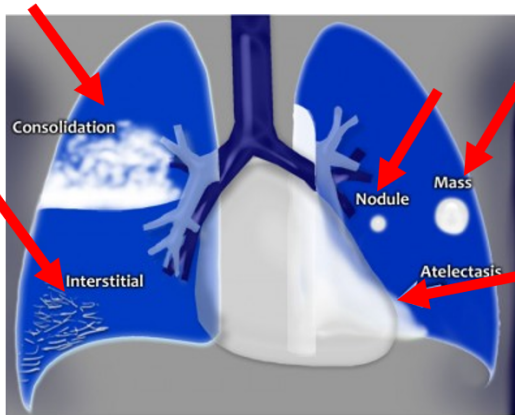


Quick Hits: Concept Reinforcement / Radiology-Pathology Correlations

Quick Hits

Rudimentary Radiology Patterns

Something's Blocking X-Rays



- **Consolidation Pattern:** Opacities, +/- Ill-Defined: Pathologic process that **fills the alveoli** with fluid, pus, blood, cells (including tumor cells) or other substances resulting in lobar, diffuse or multifocal ill-defined opacities ... **Ground Glass** to **Complete Opacification**

- **Interstitial Pattern:** Fine or coarse **reticular** opacities without or with **small nodules = reticular-nodular:** thickening of the septal, intralobular, and interlobular infrastructure.

- **Nodule or Mass Pattern:** Lesion occupying space, well-defined or not, solitary or multiple

- **Atelectasis:** Less Air in Alveoli = Ate**LESS**tasis per Mr. Z. Elliot
 → Collapse of a part of the lung
 → ↑ Density

(<http://www.radiologyassistant.nl/en/p50d95b0ab4b90/chest-x-ray-lung-disease.html>)

Quick Hits

COVID-19

Problem

Problem



- Ground Glass / Fluffy Infiltrates

- Something is in Airspace

- Here: Hyaline Membranes

- Pneumonia similar

Range:
Ground Glass → Consolidation

Possible Content

- Hyaline Membranes

- Transudate: Edema

- Exudate: Fibrinopurulent

- Blood

(Tian, S. Mod Pathol 33, 1007–1014, 2020. doi.org/10.1038/s41379-020-0536-x)

Quick Hits: Concept Reinforcement / Radiology-Pathology Correlations

Airspace Disease

Finding

Bulla: > 1 cm



Acquired Disease

Diagnosis

- Emphysema

Where?

- Upper Lobes Worst:
Likely Cigarette Smoking-Related

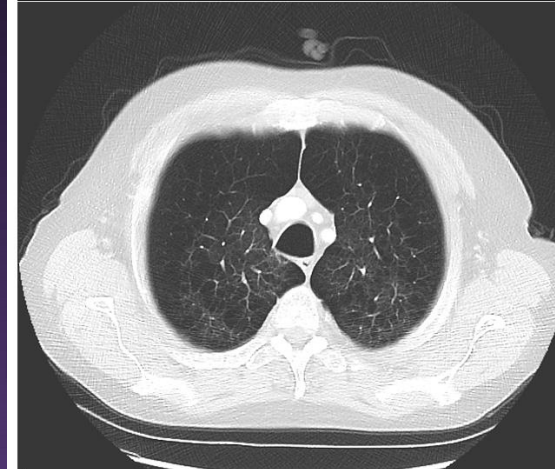
Most Likely Etiology

- Cigarette Smoking
- Coal Worker: Can be similar
 - Usually with other changes
 - Macules & Nodules

Airspace Disease

Finding

Non-Smoker



Hyperexpanded Airways

Diffuse: Lower Lobe Prominence

Diagnosis

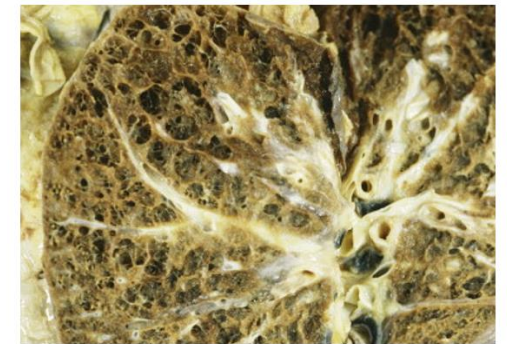
- Emphysema

Where?

- Everywhere

Most Likely Etiology

- Alpha-1 Antitrypsin Deficiency



(Husain AN. 2012)

Survey Data

- Survey Response: 78 / 81 M2 Students (96%)
- Likert scale scores of 4 (agree) and 5 (strongly agree) were combined
 - There is sufficient radiology instruction in M1 & M2 Years currently 12/78 (15%)
 - Introduction of radiology teaching modules in Block 4 welcomed 56/78 (72%)
 - Focus on high-yield topics is sufficient for version 1 of modules 61/78 (78%)
 - Quick Hits files effective educational tool to highlight key concepts 67/78 (86%)
 - Quick Hits files should be compiled for Step 1 study 64/78 (82%)

Survey Comments

- **Positives**

- I really love the radiology portion of pathology. SO thankful for Dr. Montoya for being so generous with her time and expertise.
- Helpful to have commentary about how to understand the image.
- I really enjoyed them and it added to my learning.
- Supplements our education well.
- Very nice tie-in to our pathology content we had learned in class good clinical relevance
- ... make me feel more comfortable and confident going into M3.
- Good way to practice.
- Radiology in anatomy during flipped classrooms was chaotic because the environment was not suitable for those exercises.

- **Negatives / Opportunities for Improvement**

- Should not be incorporated into formal assessments.
- I would like it to be integrated into our curriculum.
- We're already very pressed for time with everything else.
- Time. Never enough time.
- I truly can't accurately evaluate the utility of these presentations because I truly don't know what I'm expected to know about radiology in the clinic.

- Proof of concept validated.
- Only 15% of students felt that there was sufficient radiology already present in the curriculum.
- Greater than 70% of students welcomed the modules and felt that incorporation of high-yield topics within modules was an effective teaching mechanism.
- Greater than 80% of students felt that Quick Hits effectively supplemented module concepts.
- Caution was expressed regarding already very busy Block 4 Schedule.

- Recommendations for Block 4, 2023-2024 Academic Year:
 - Add modules and quick hits for areas not covered in Phase 1 of project.
 - Example: Cardiovascular imaging
 - Add 1 question per examination based on radiology module content regarding specific pathologic process as highlighted and reinforced by Quick Hits.
- Unanswered / Further Evaluation Needed:
 - Optimal integration with pathology content.
- Risk
 - Adding too much currently untested content and overwhelming and frustrating students.

