



Pulmonary Nodule and Mass

白冠王 醫師 Kuan-Jen Bai MD

臺北醫學大學醫學院呼吸治療學系 教授

臺北市立萬芳醫院 胸腔醫學中心 主任



Pulmonary nodule and mass

- ✓ Circumscribed intrathoracic opacity
- ✓ Mass: greater than 3cm in diameter
- ✓ Solitary vs. multiple nodules
- ✓ Benign vs. malignant lesions

Differential diagnosis of solitary pulmonary nodule and mass

✔ Neoplastic

- Malignant tumors
- Benign tumors

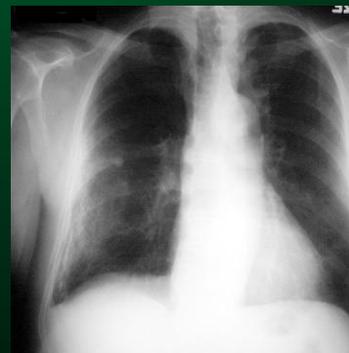
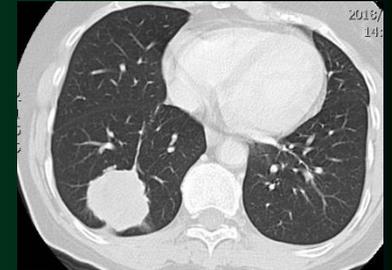
✔ Inflammatory

- Infectious disease
- Noninfectious disease

✔ Congenital

✔ Miscellaneous

✔ Mimics (pseudotumor)





Interpretation of solitary pulmonary nodule and mass

- ✓ Basic information
- ✓ Location
- ✓ Shape and Margin
- ✓ Density and calcification
- ✓ Cavitation
- ✓ Doubling time
- ✓ Accompanying signs
 - Relationship to hilum
 - Satellite lesions
 - Pleural or pericardial effusion
 - Lesions of other thoracic organs

Table 2. Distribution of etiology of solid pulmonary nodules in a cohort of 242 HIV positive patients (16).

Diagnoses	Patients with nodules, No. [87]
Bacterial pneumonia	30
Pneumocystis Carinii pneumonia (PCP)	3
Lymphoma	10
Tuberculosis	14
Kaposi's sarcoma	11
Non-tuberculous mycobacteria	4
Aspergillus pneumonia	3
Lung cancer	4
Cytomegalovirus	0
Other	8



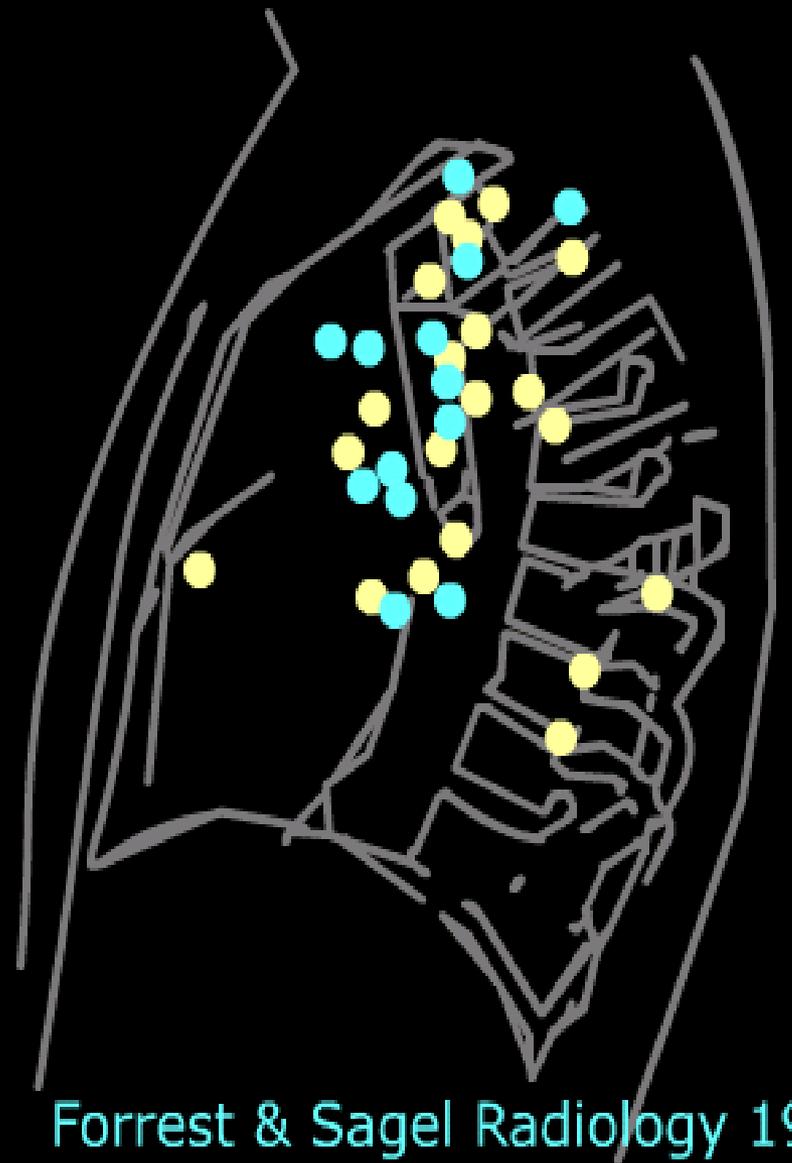
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Missed Lung Cancers



Austin et al. Radiology 1992

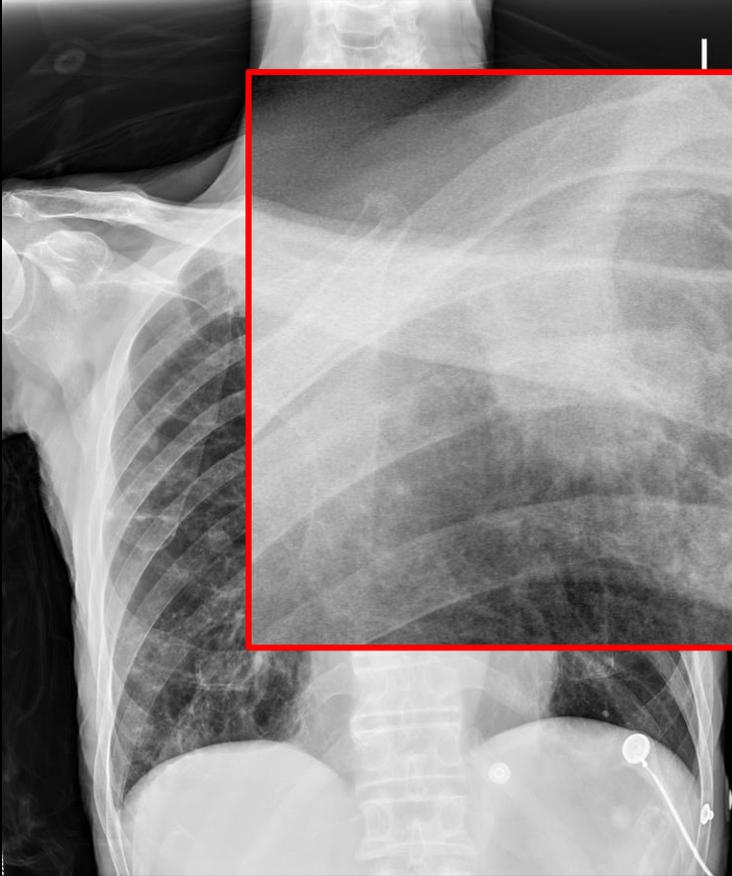


Forrest & Sagel Radiology 1979

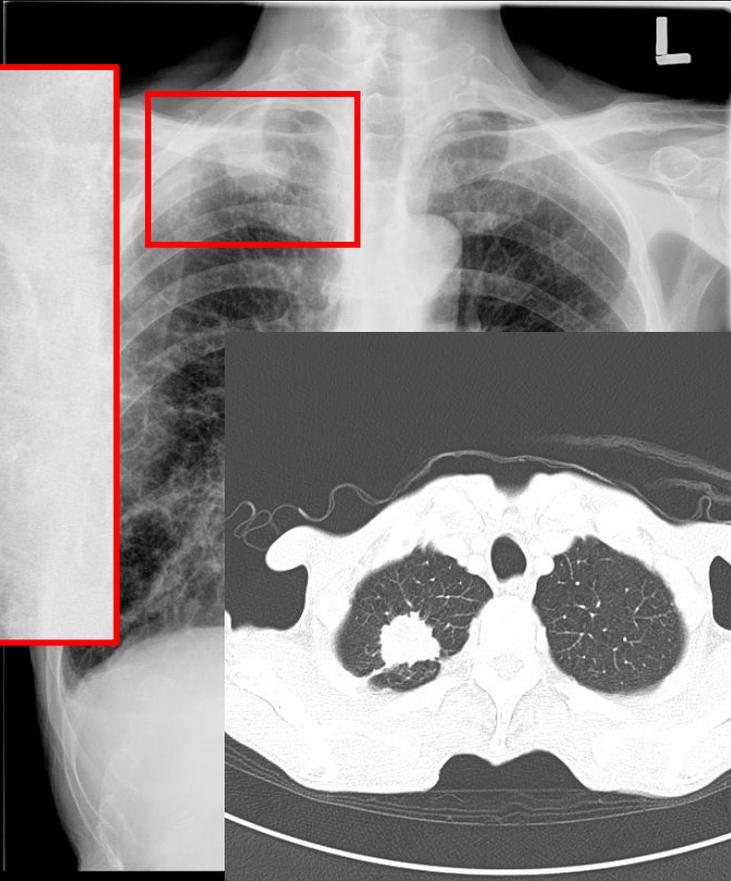
Lawyer Zone



81 y/o male patient , urosepsis with septic shock



2018/12

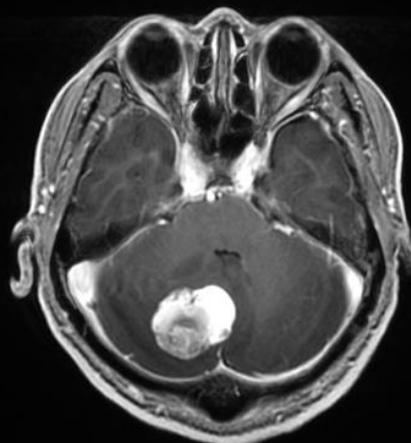
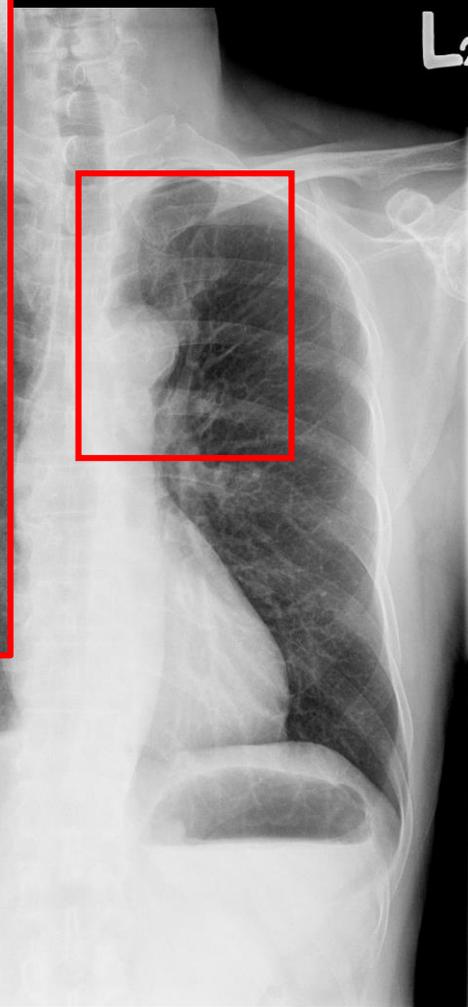
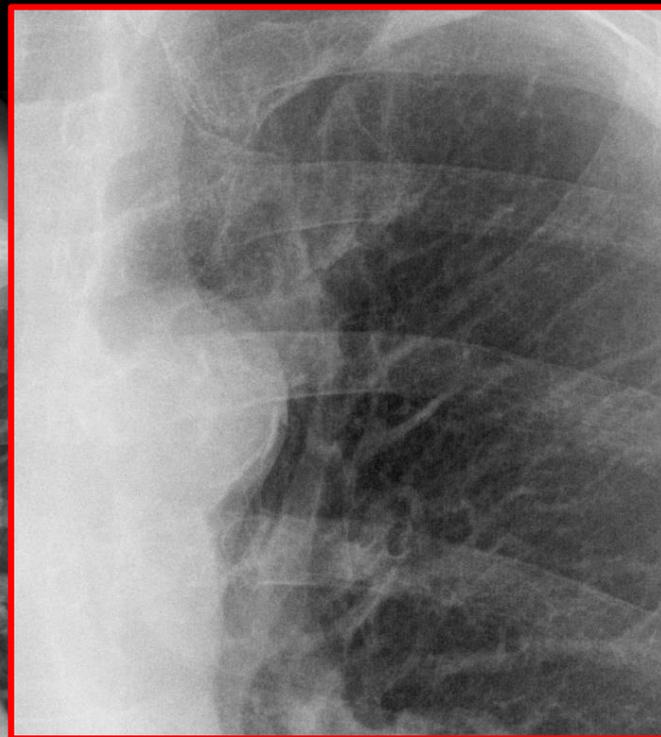


2019/1

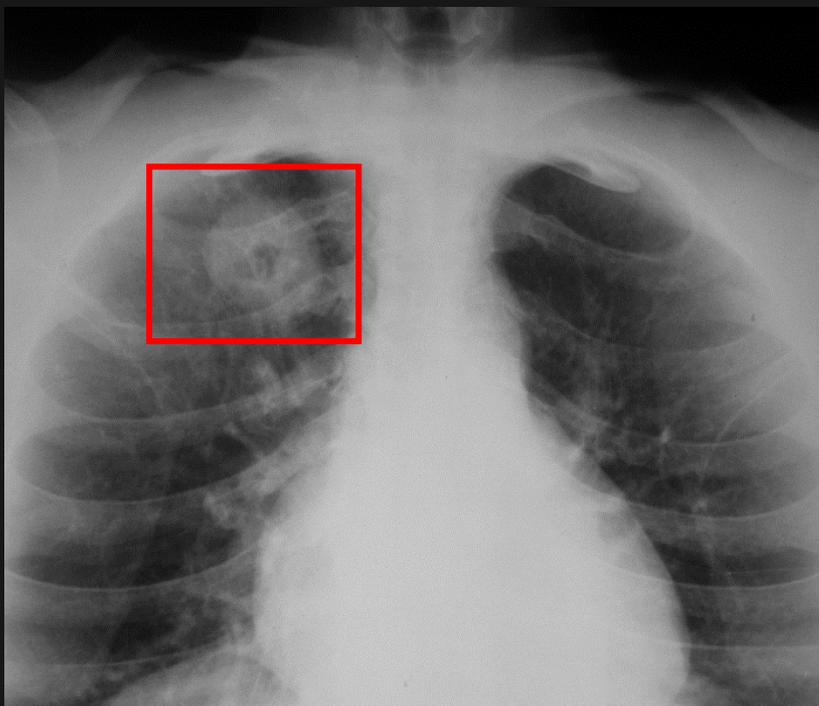
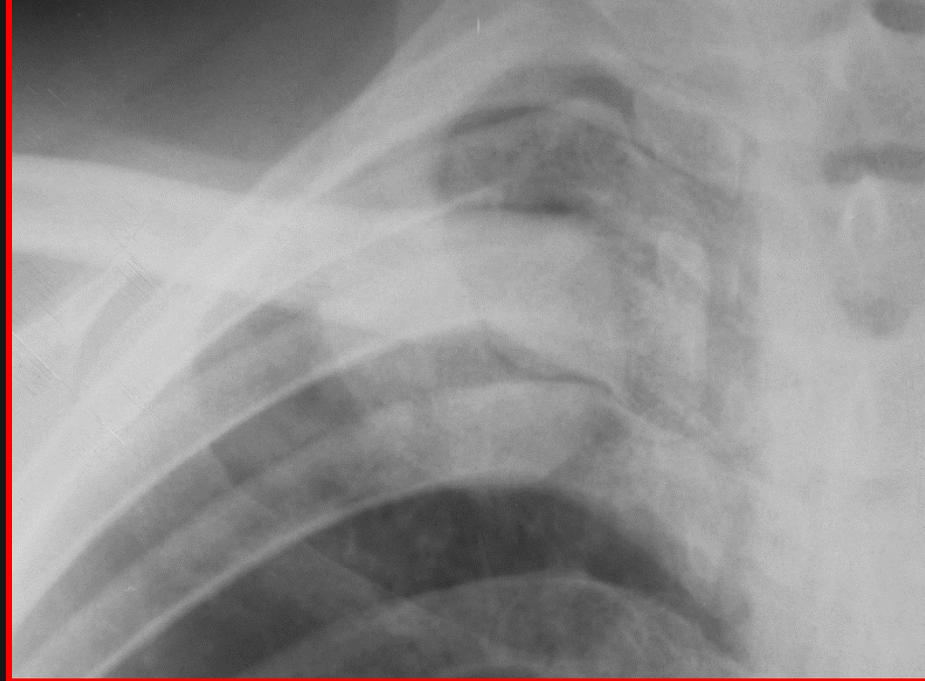
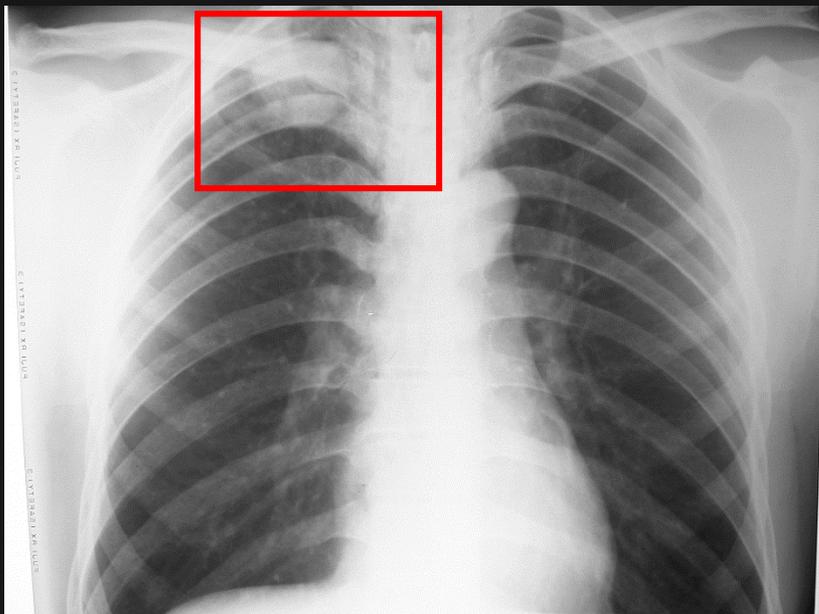
77 y/o male patient , routine examination



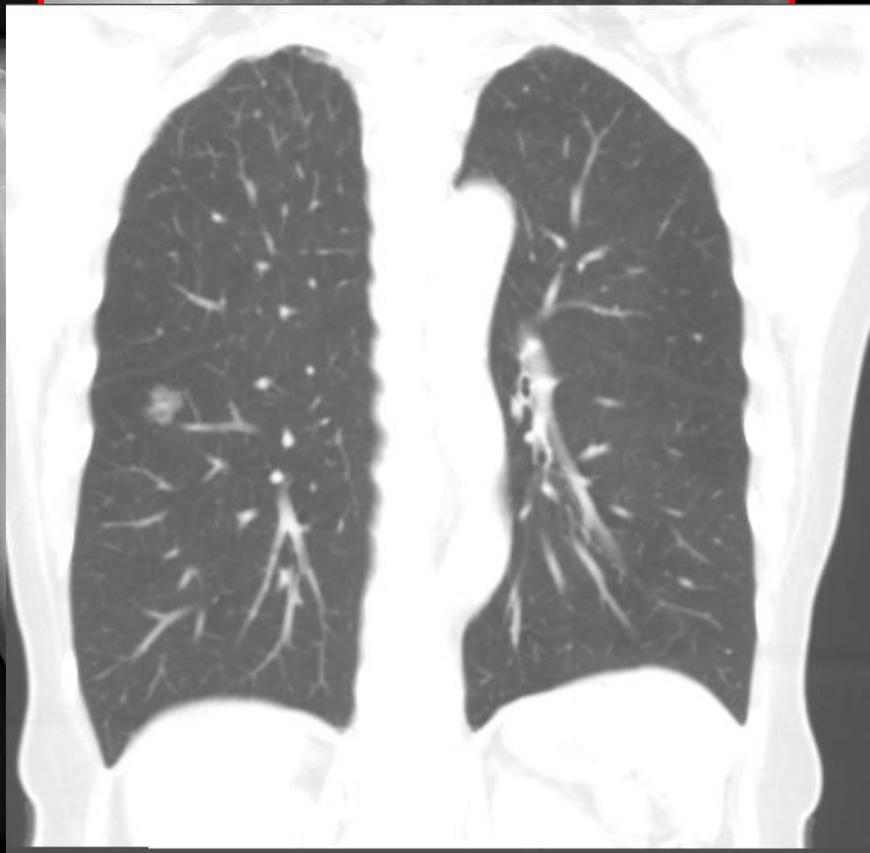
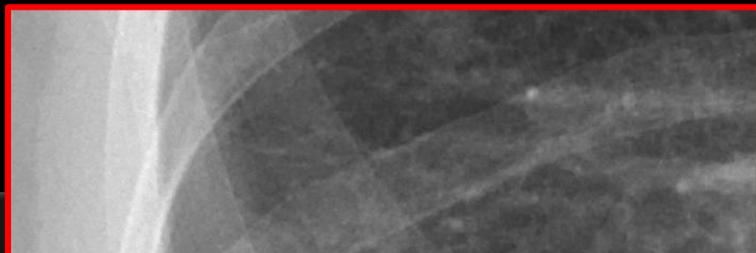
62 y/o male patient, productive cough and dizziness for 1 month



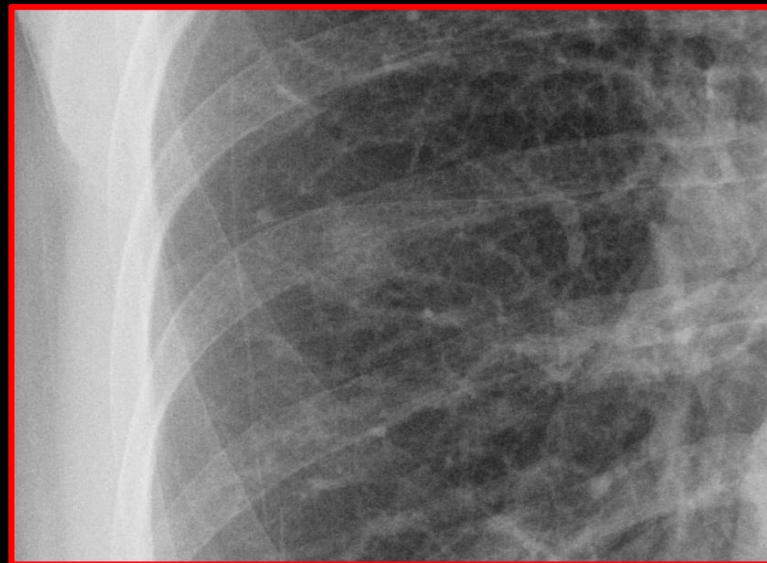
2019/9



75 y/o female patient, cough for 2 weeks

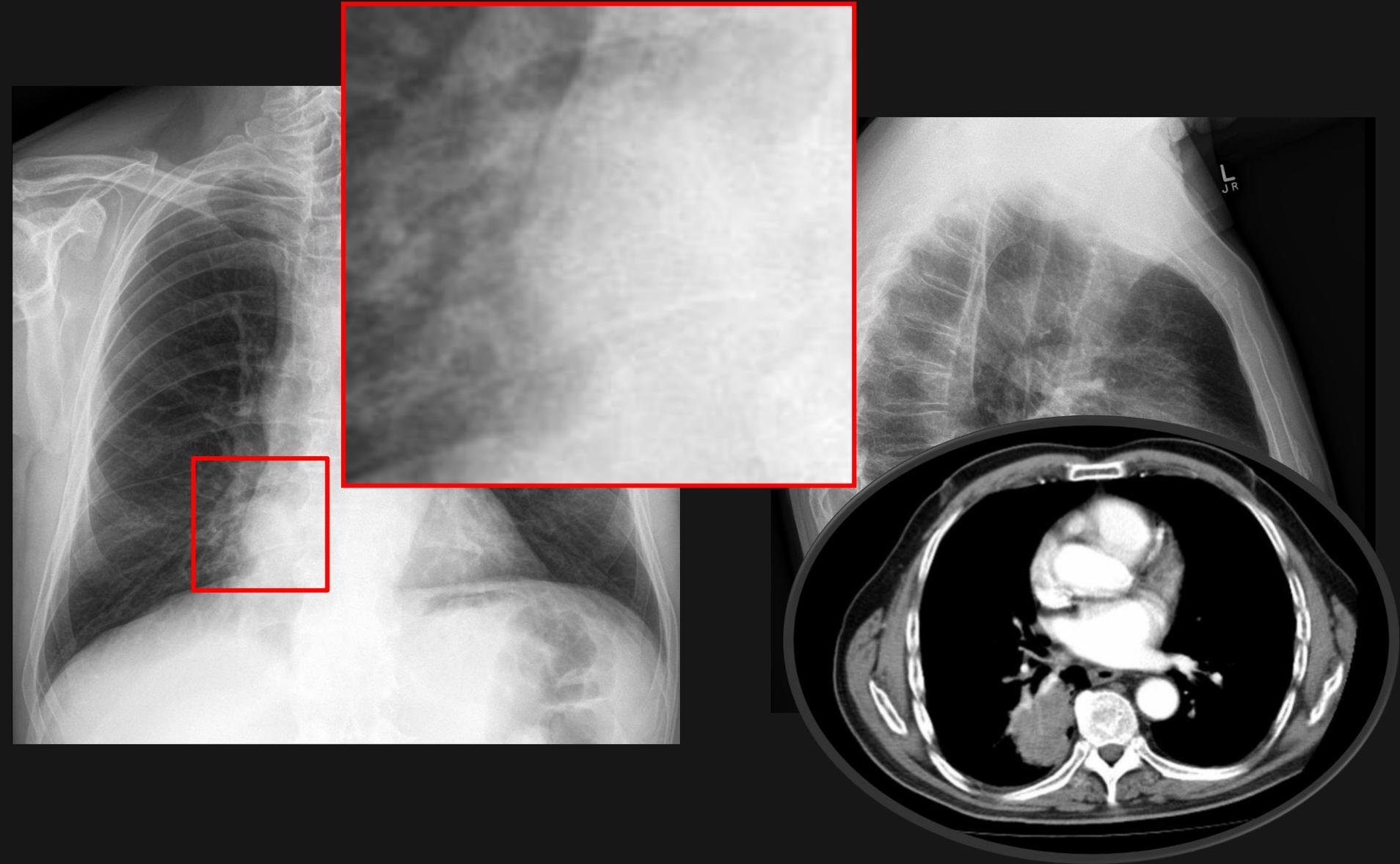


2019/11

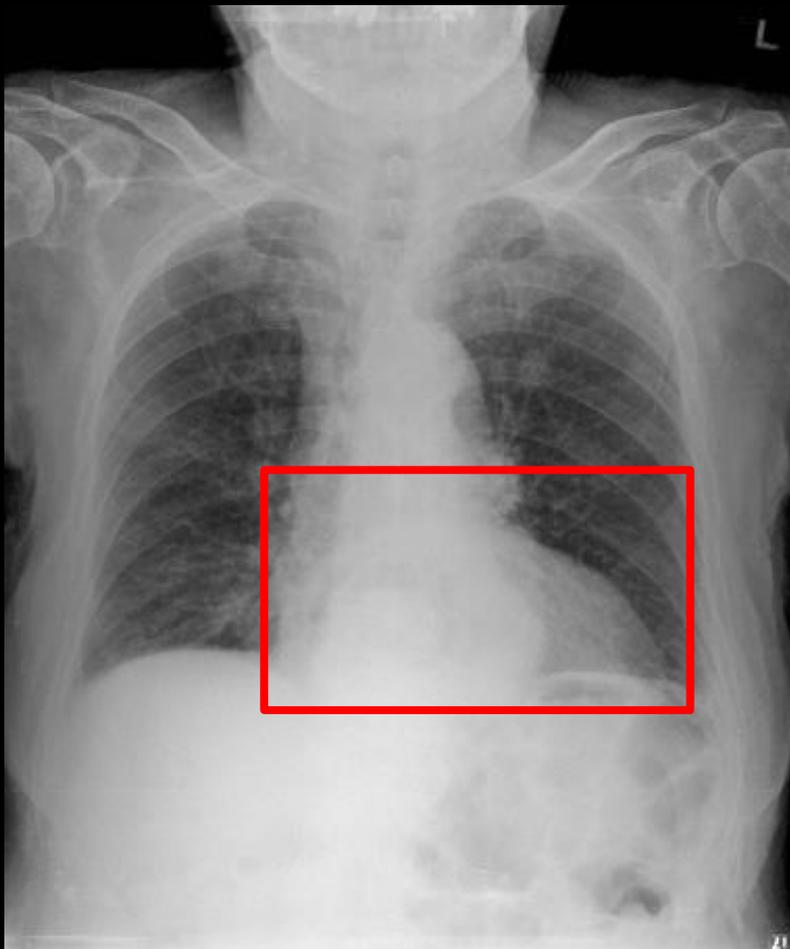


2021/3

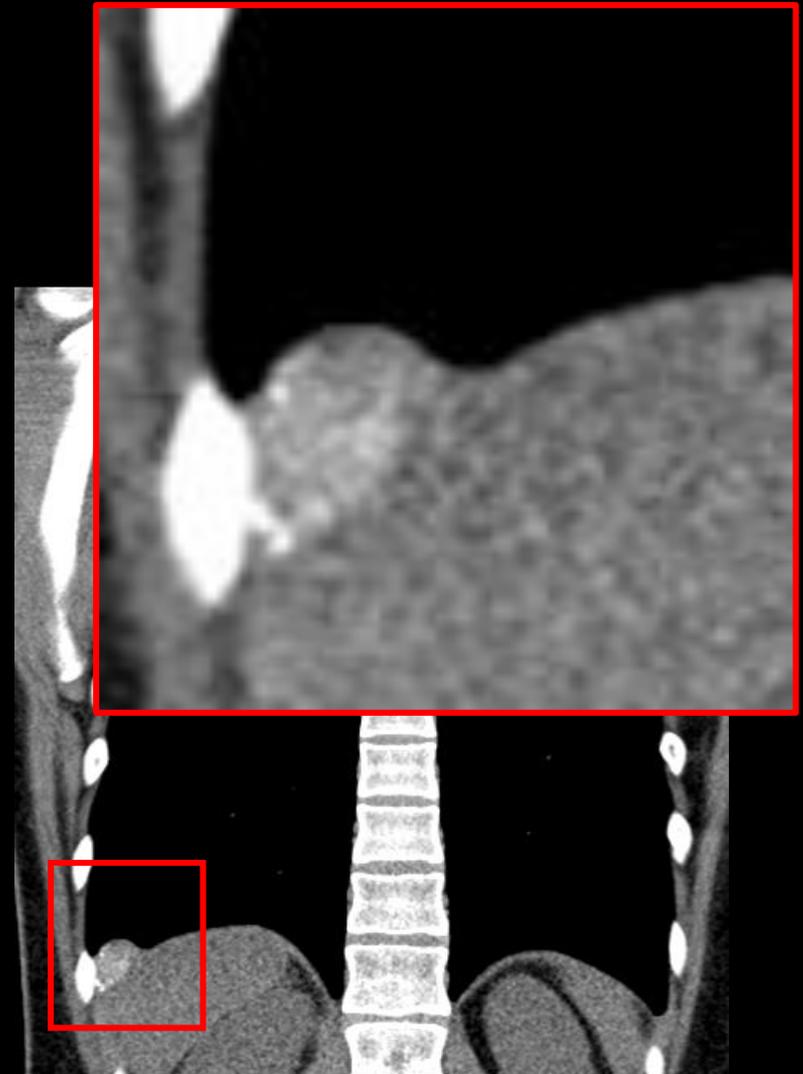
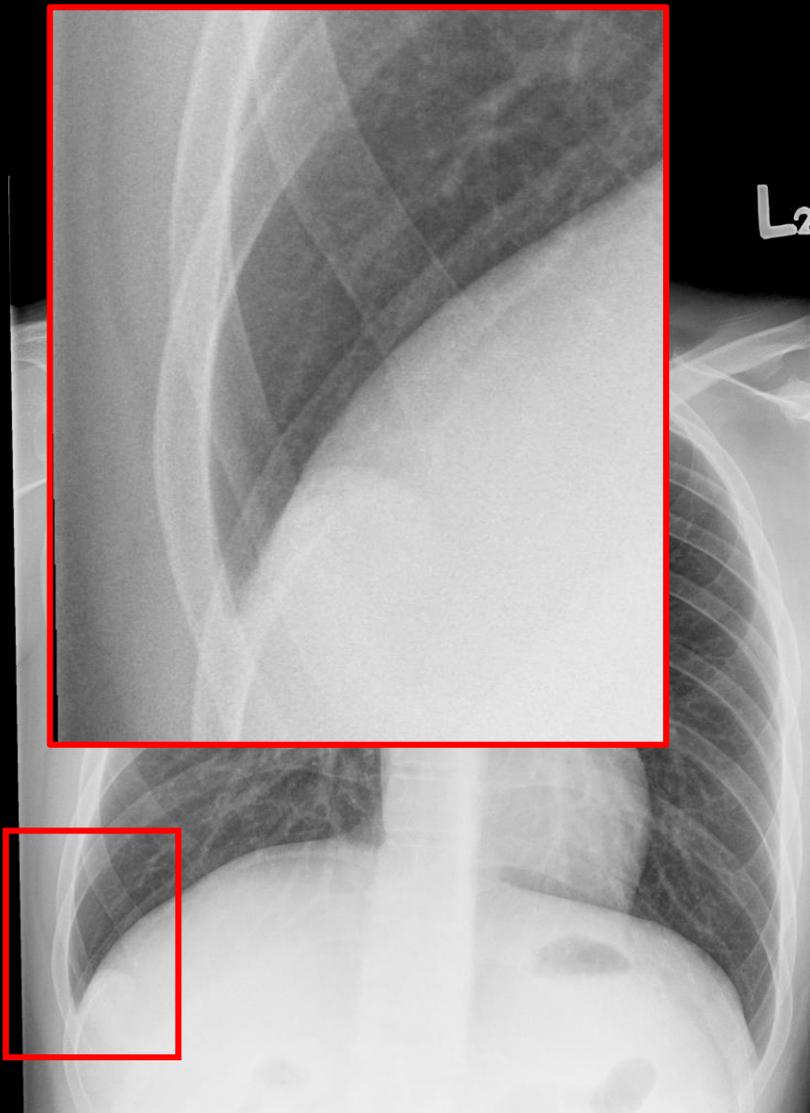
72 y/o male patient , routine examination



68 y/o male patient , routine examination



30 y/o male patient, routine examination



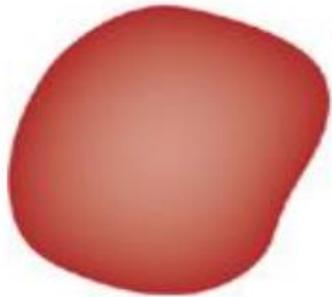


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- ✔ Basic information
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- ✔ Density and calcification
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Shape and margin

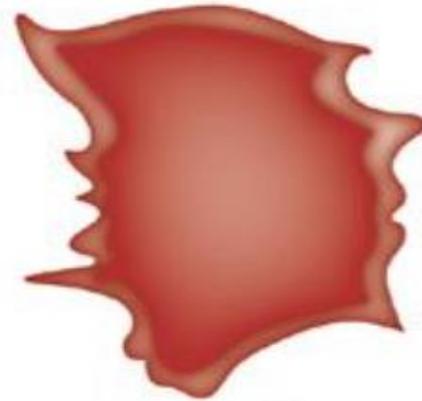
Sharp and smooth



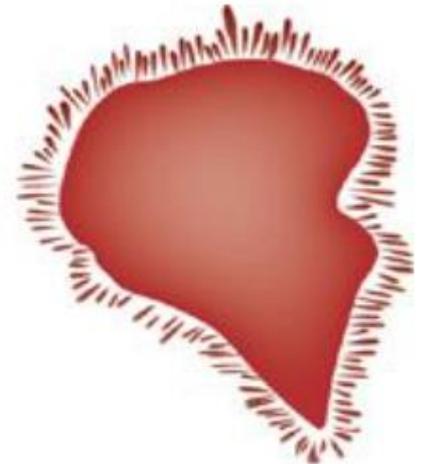
Type I



Lobulated Type II



Spiculated Type III

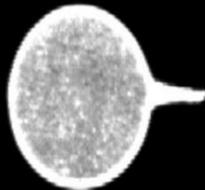


Corona radiata Type IV

grossly irregular with many spiculations. (Data from Siegelman SS, Khouri NF, Leo FP, Fishman EK, Braverman RM, Zerhouni EA. Solitary pulmonary nodules: CT assessment. *Radiology*. 1986;160(2):307-312.)



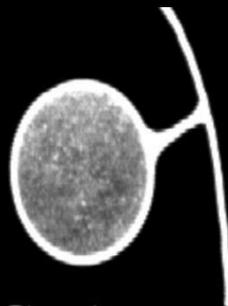
Corona radiata



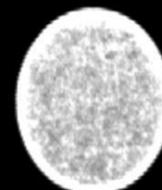
Tail sign



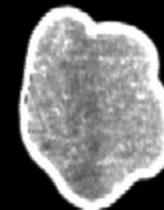
Rigler's notch



Pleural tag



Round, sharply margined



Lobulated, sharply margined



Poorly-defined

New Classification of Small Pulmonary Nodules by Margin Characteristics on Highresolution CT

Kiyomi Furuya, S. Murayama, H. Soeda, J. Murakami, Y. Ichinose, H. Ya
Y. Katsuda, M. Koga & K. Masuda



Type 1 : round



Type 2 : lobulated



Type 3 : densely spiculated



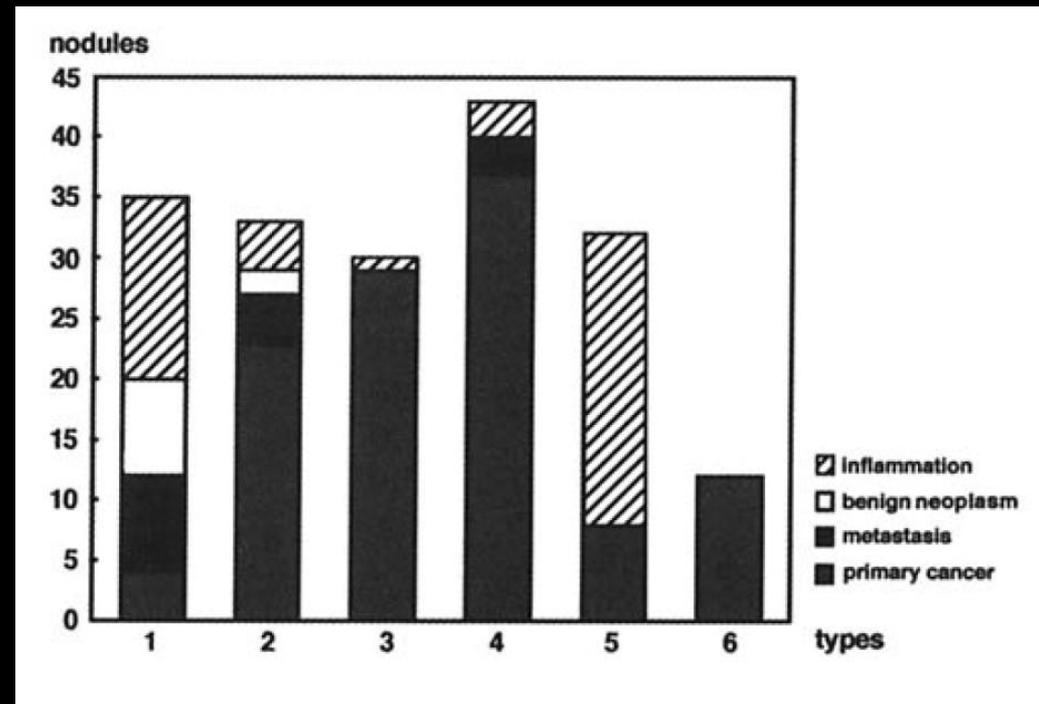
Type 4 : ragged



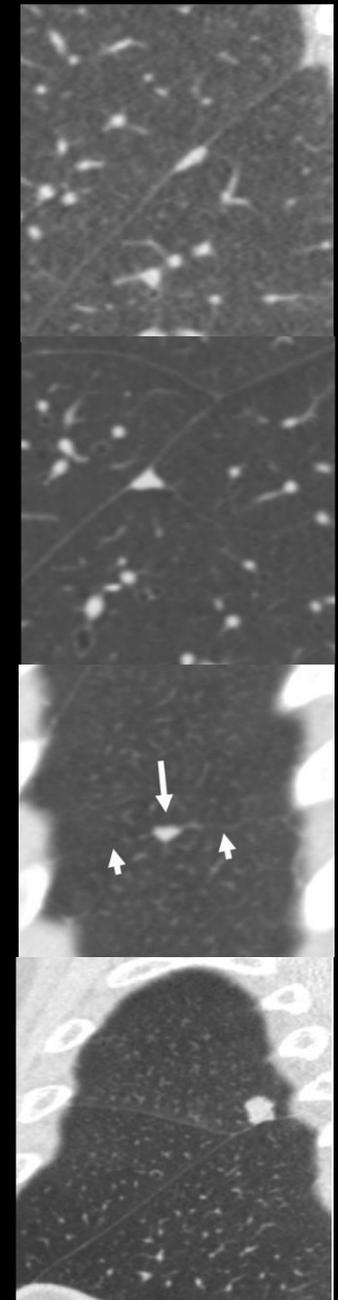
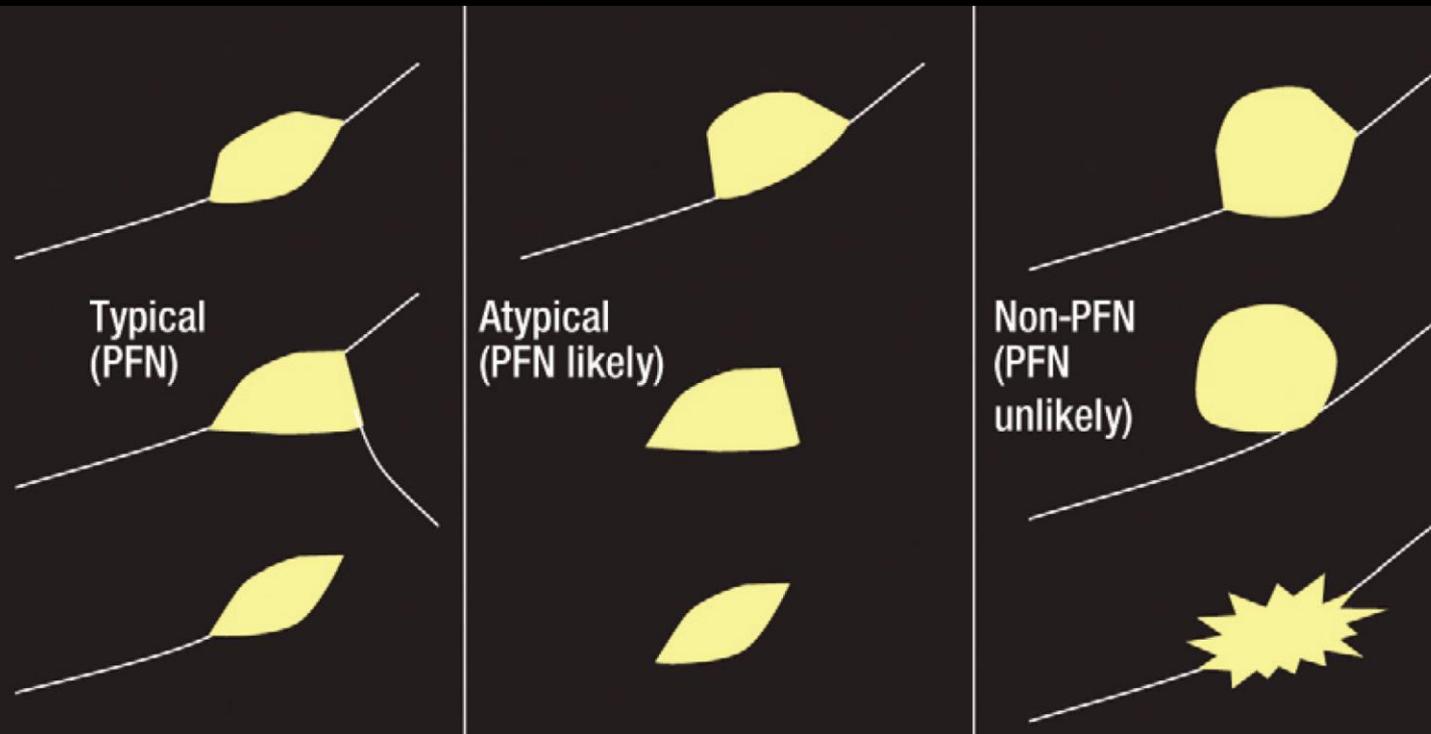
Type 5 : tentacle or polygonal



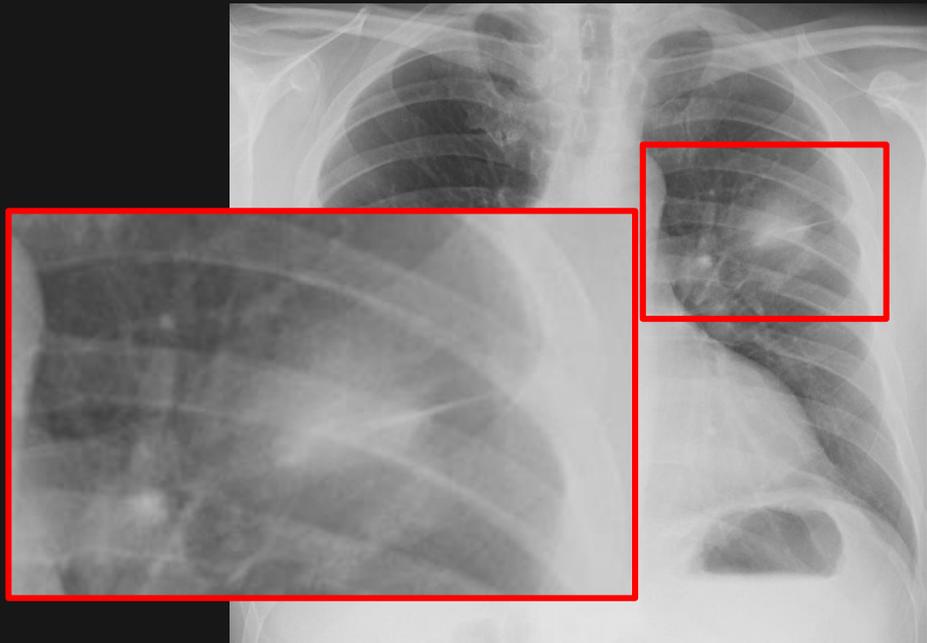
Type 6 : halo

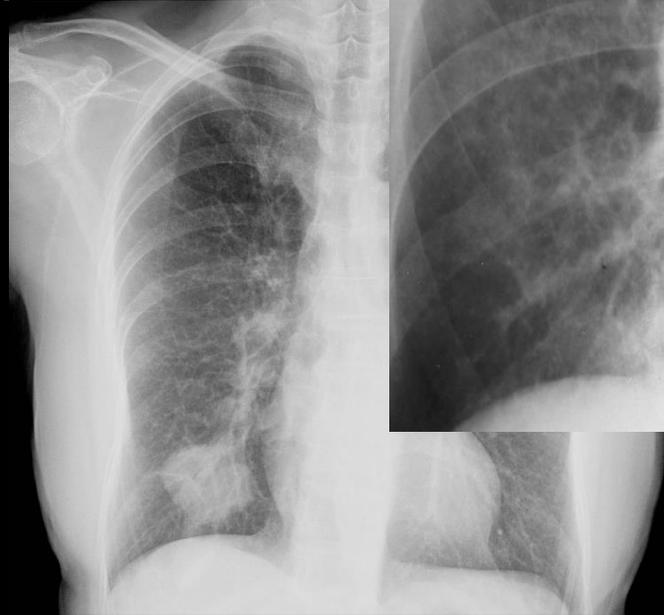
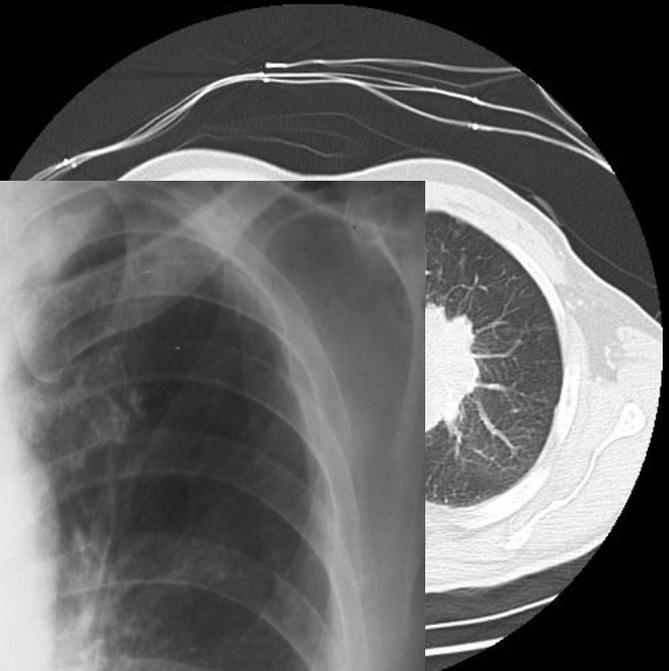
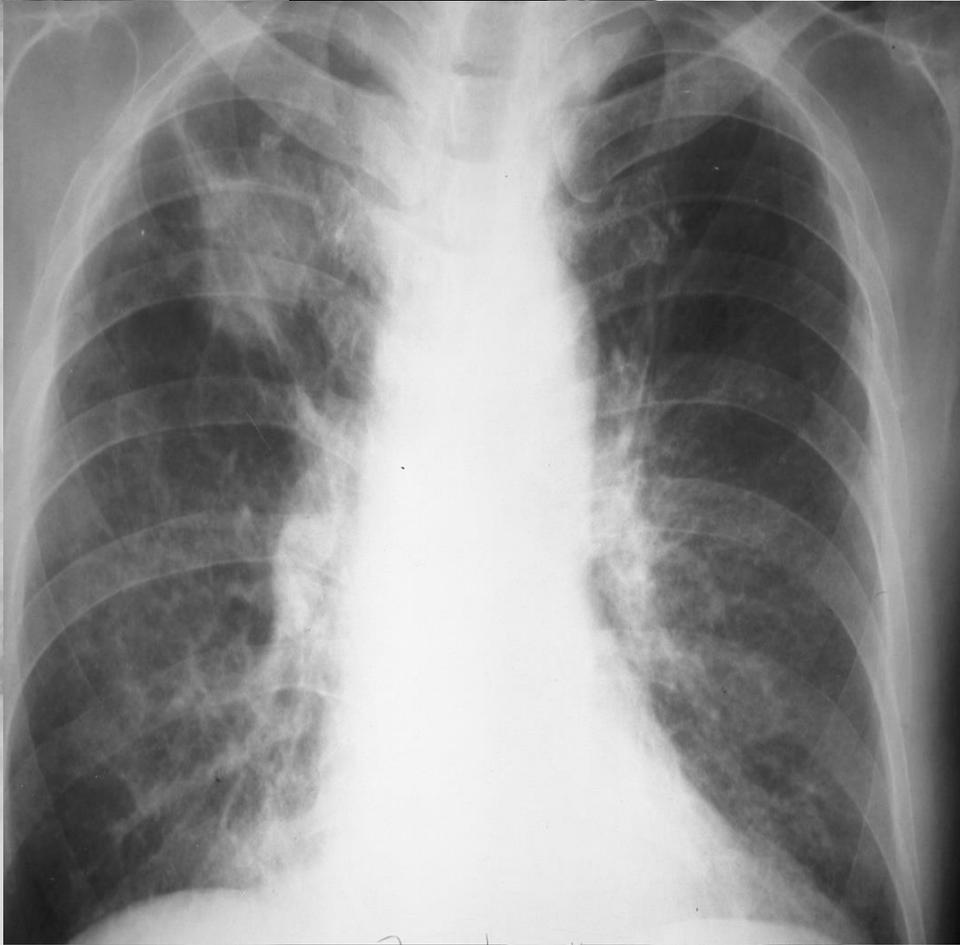
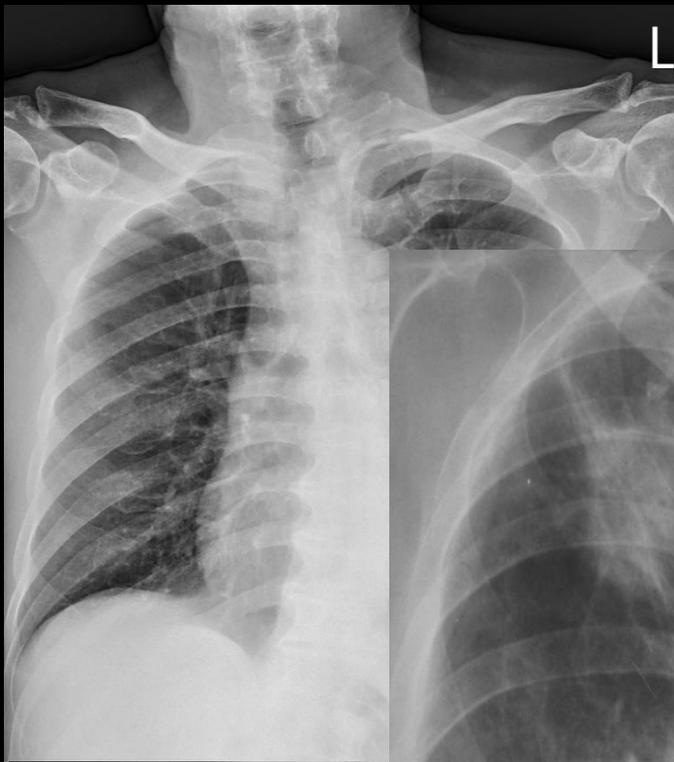


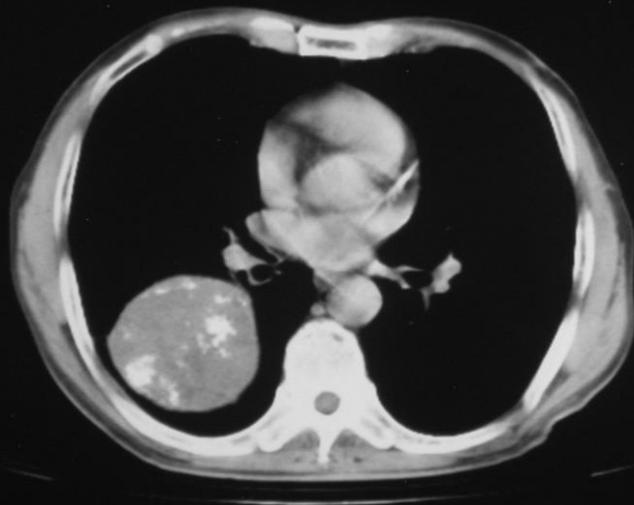
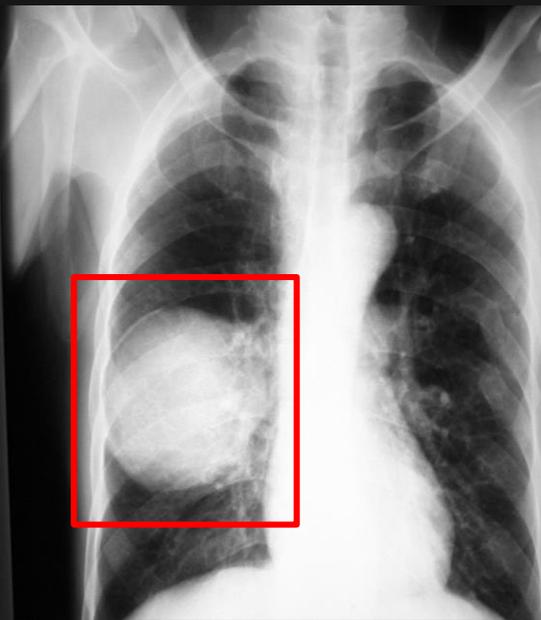
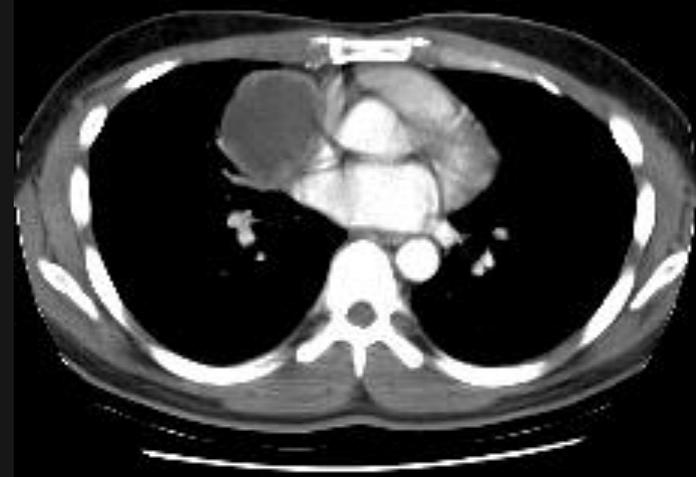
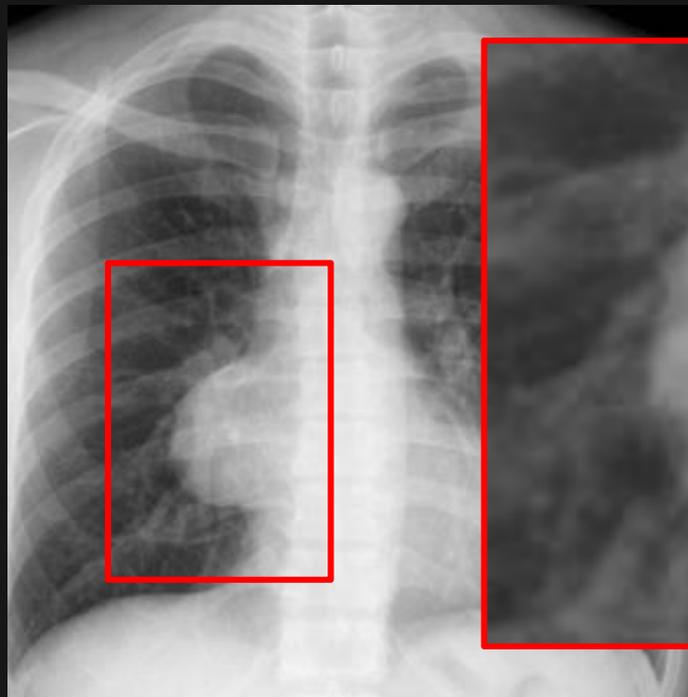
Peri-fissural Nodules (PFN)

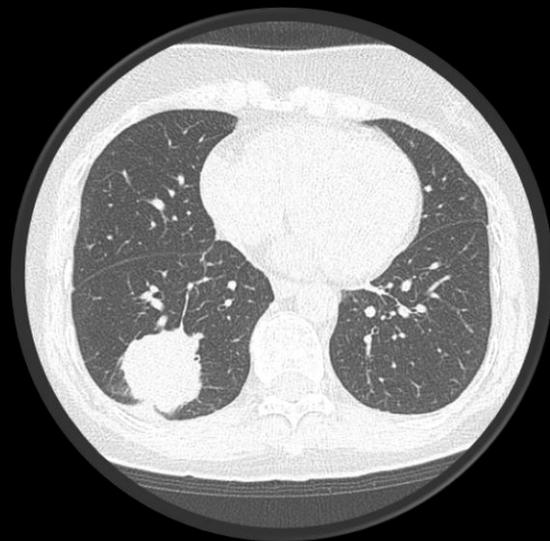
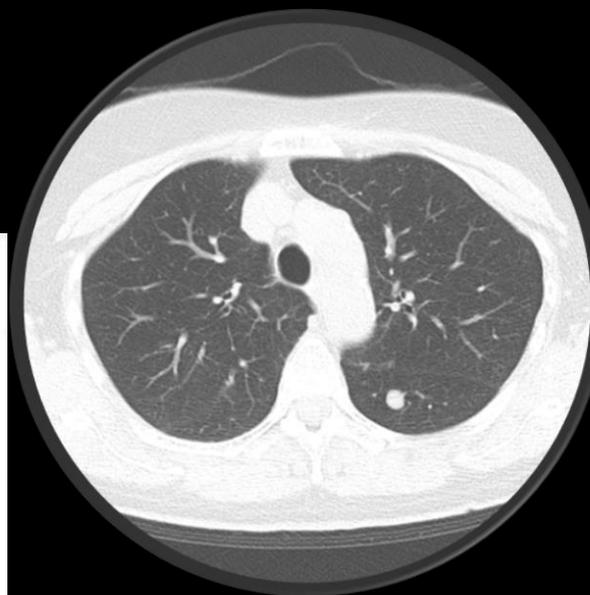
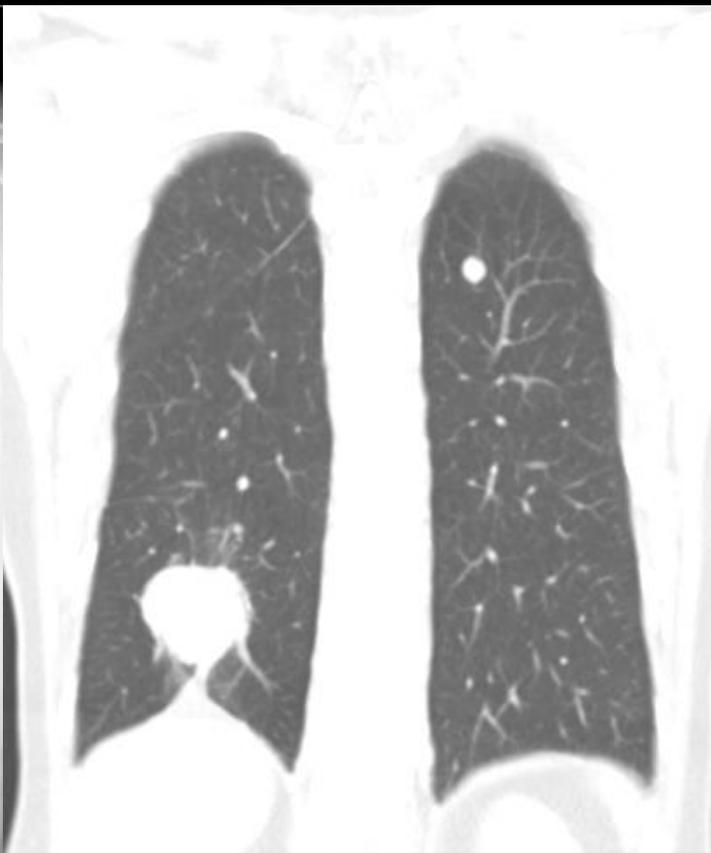


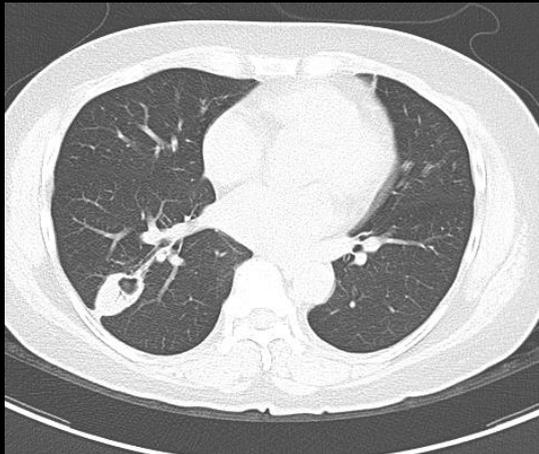
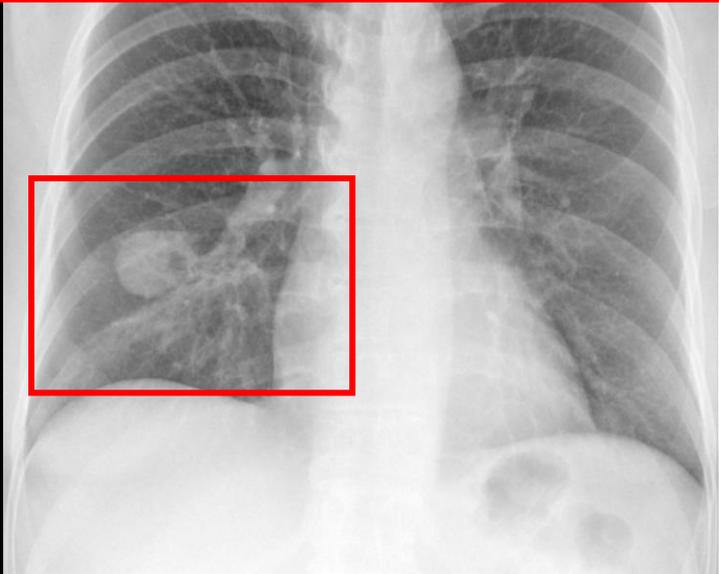
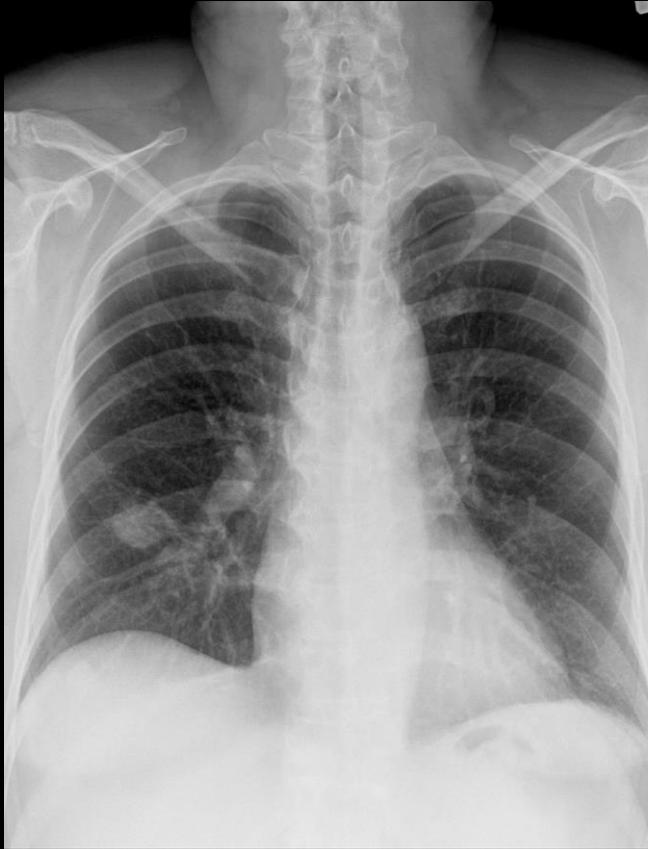
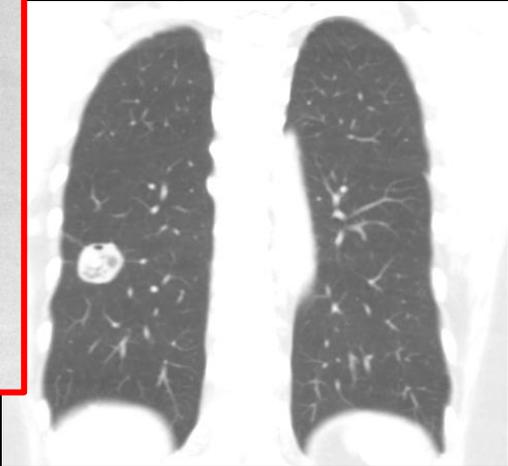
- 919 of 4026 detected nodules fulfilled the pre-defined criteria for a typical or atypical PFN
- **None** of these PFNs (typical and atypical) proved to be malignant during the 5.5-year follow-up.

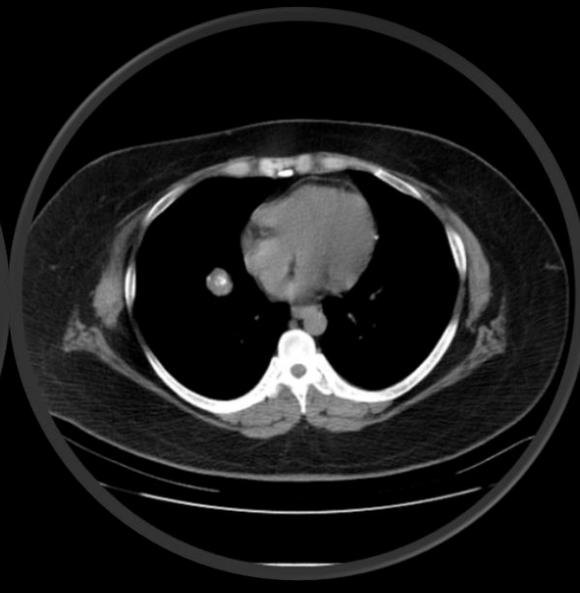
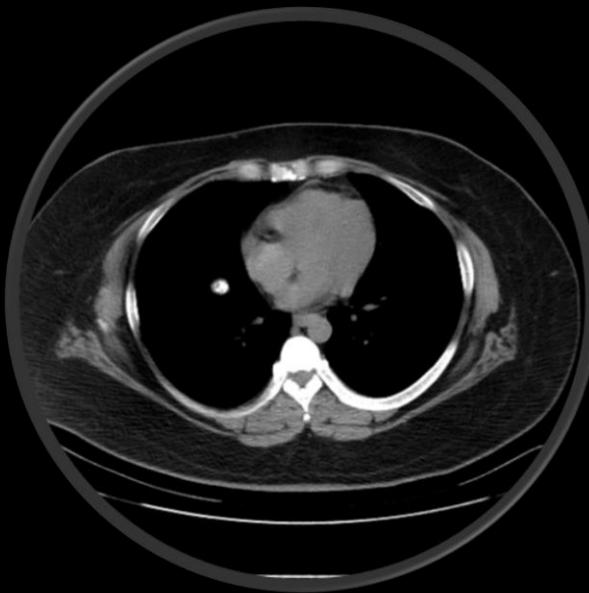
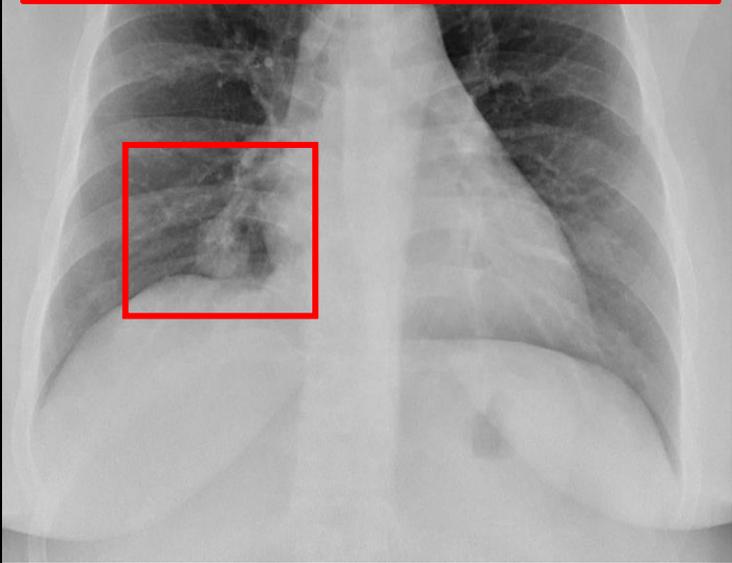
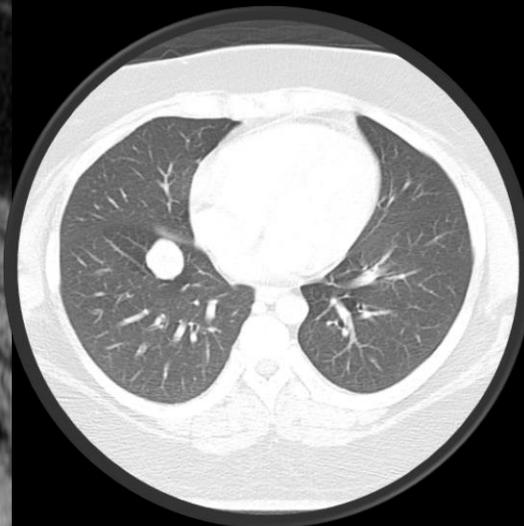














Interpretation of solitary pulmonary nodule and mass

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- ✔ Density and calcification
- ✔ Cavitation
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Calcification

central

laminated

diffuse

popcorn

stippled

eccentric

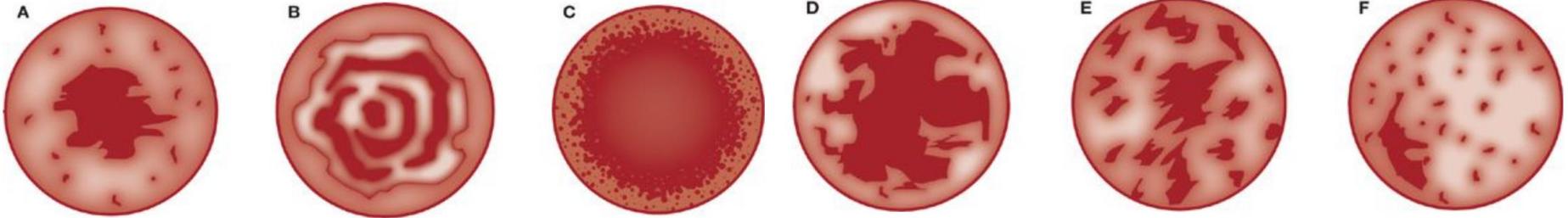
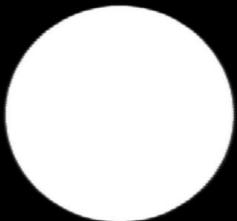
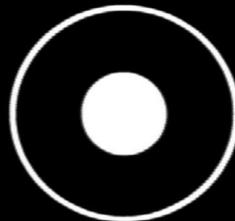


Figure 110-2 Patterns of calcification in nodules. **A.** Central. **B.** Laminated. **C.** Diffuse. **D.** Popcorn. **E.** Stippled. **F.** Eccentric. Patterns A, B, C, and D generally indicate a benign process; E and F suggest malignancy. (Data from Lillington GA. Management of solitary pulmonary nodules. *Dis Mon.* 1991;37(5):271–318.)

Benign calcification



Diffuse



Central

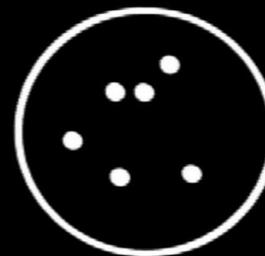


Popcorn

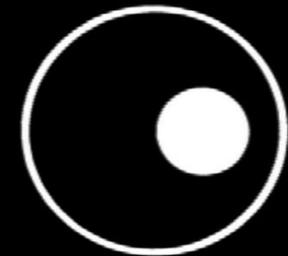


Laminar, concentric

"Malignant" calcification

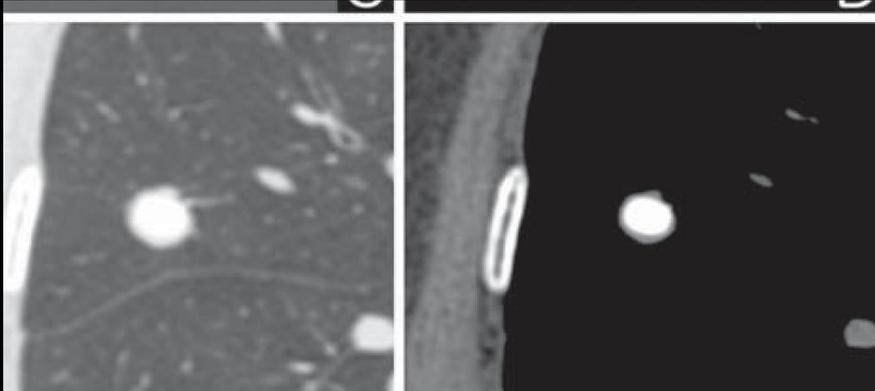


Stippled

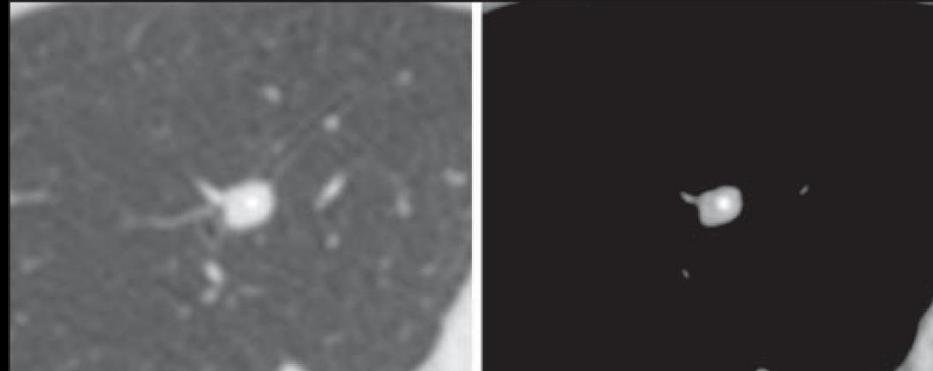


Eccentric

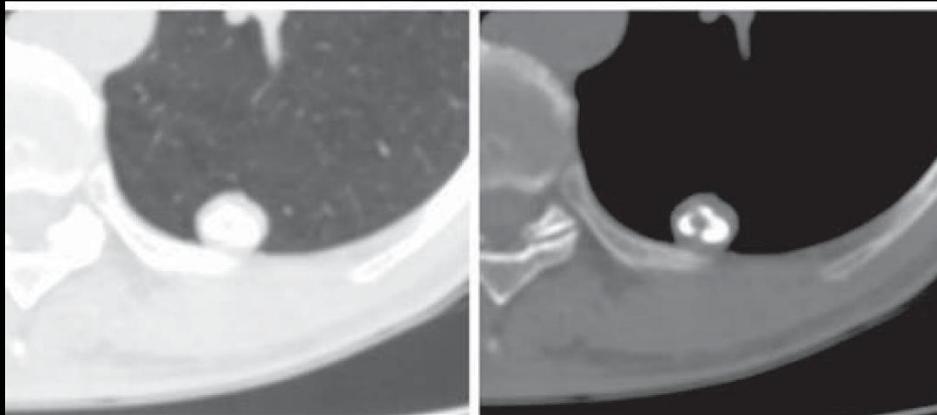
Calcification



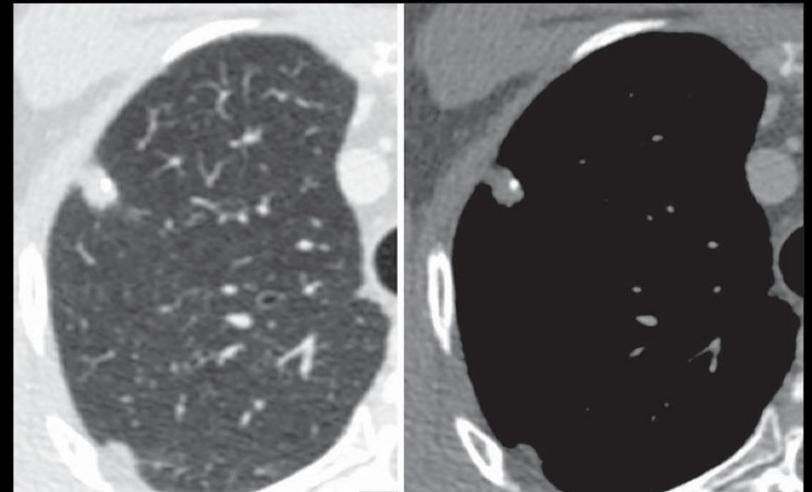
Diffuse



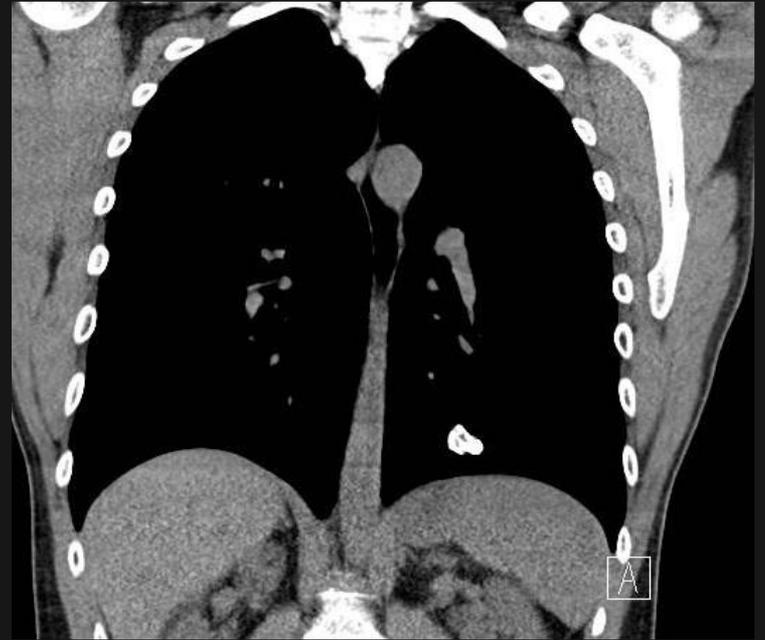
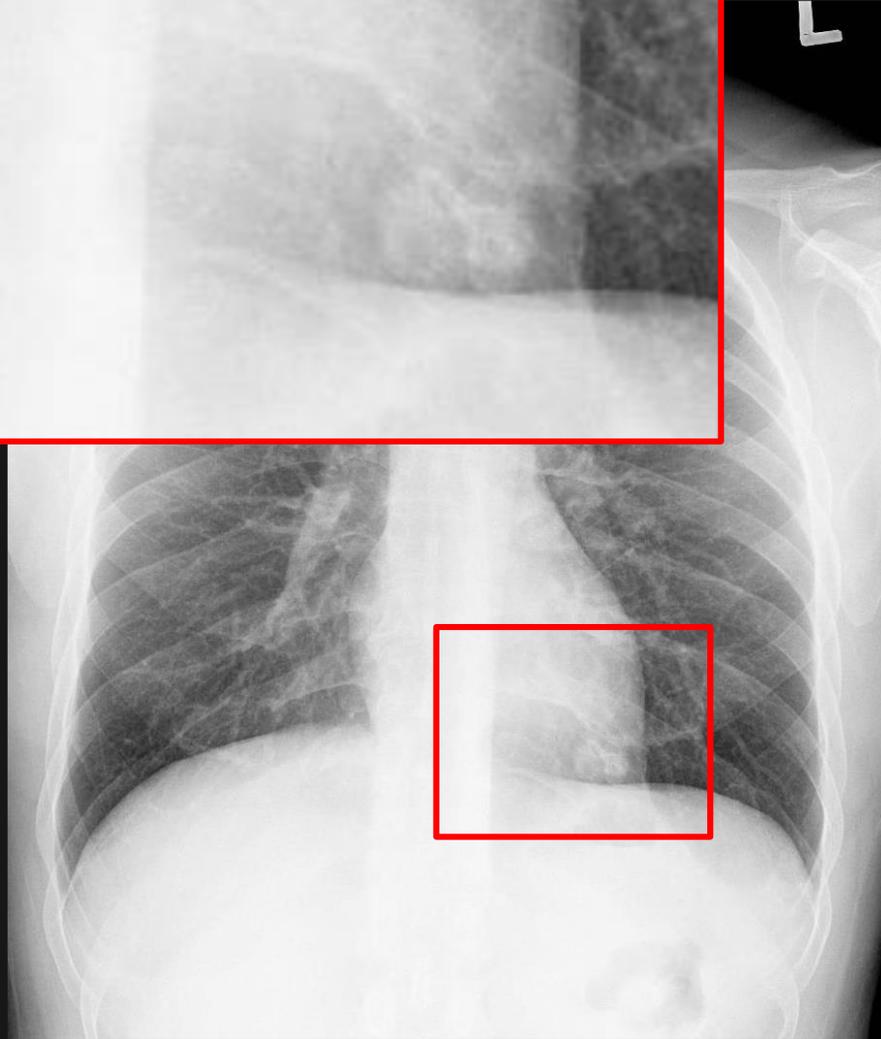
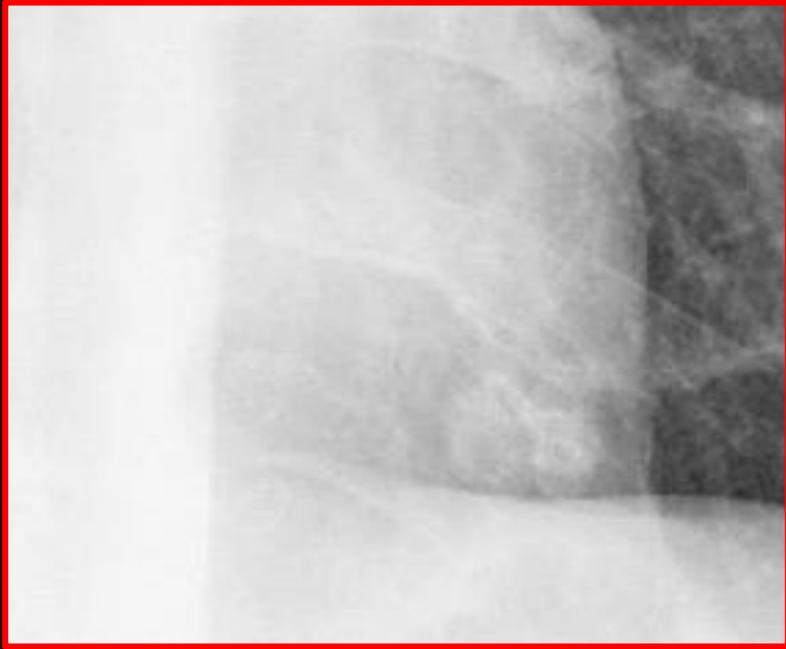
Central

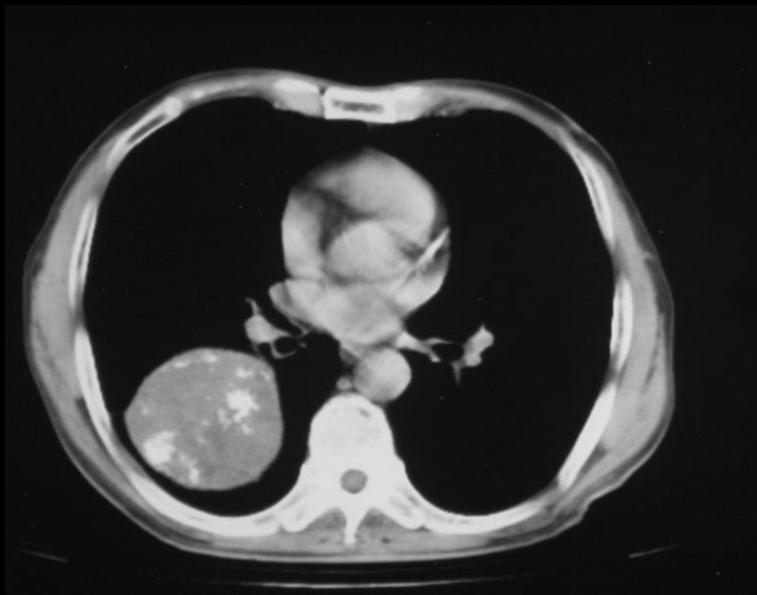
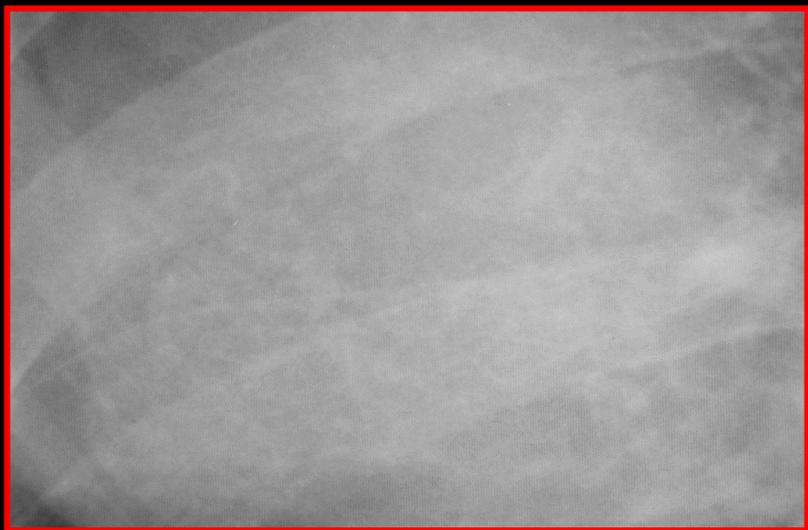
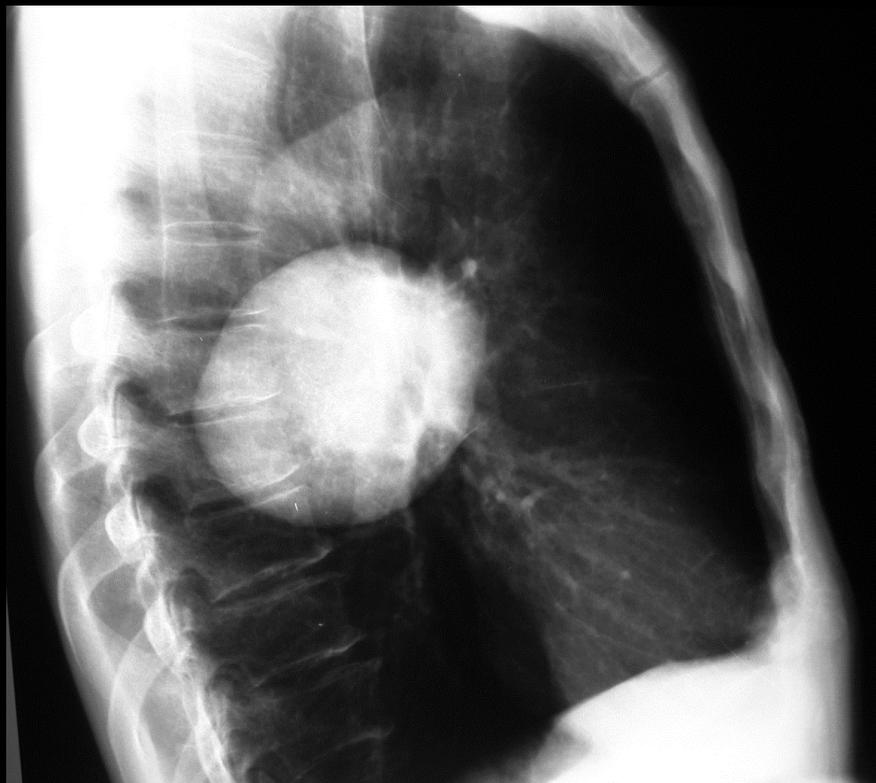
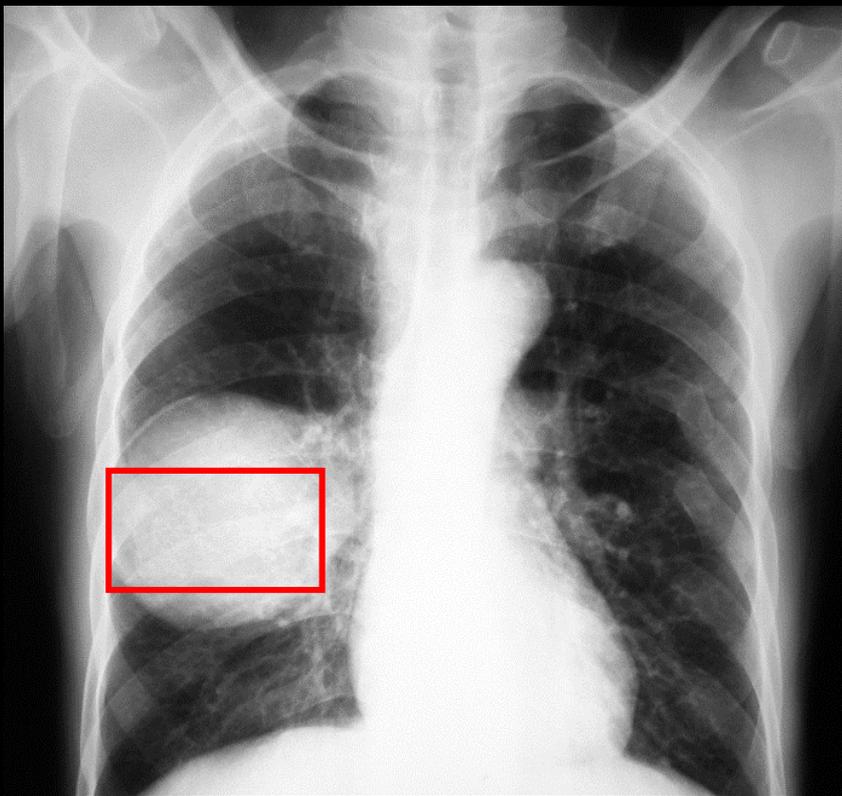


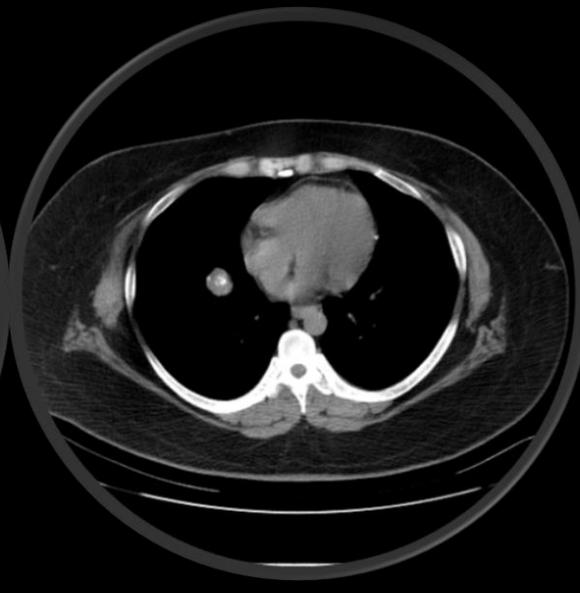
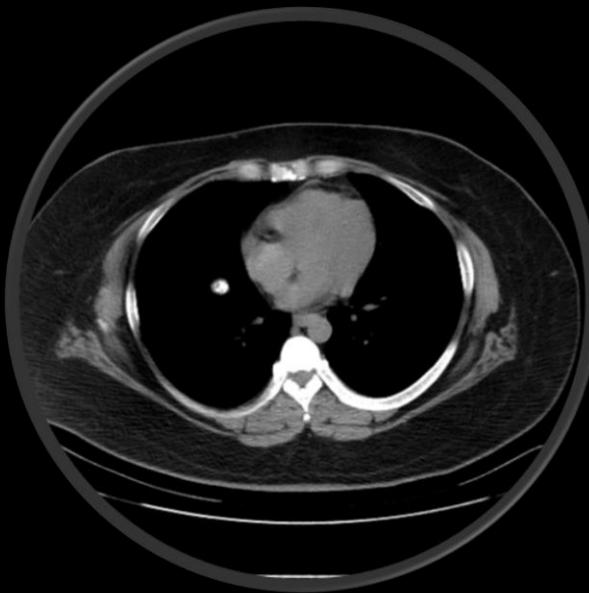
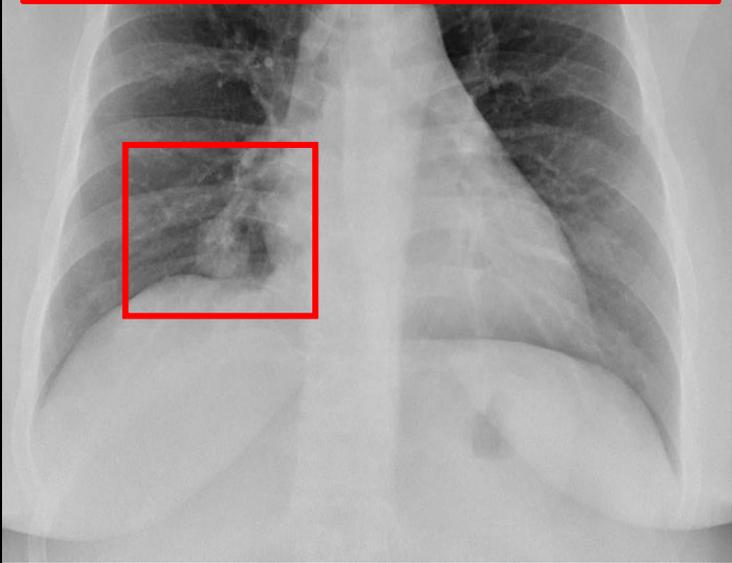
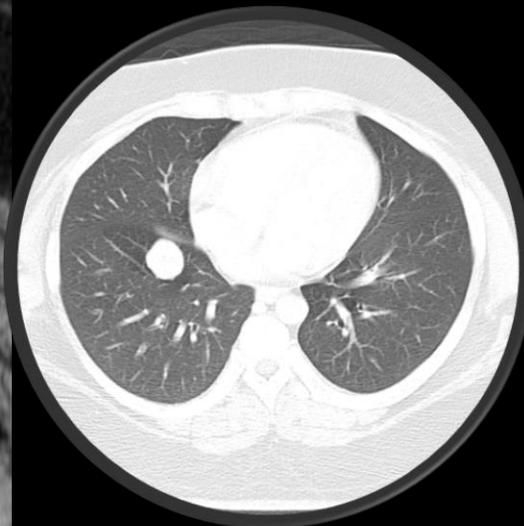
Popcorn

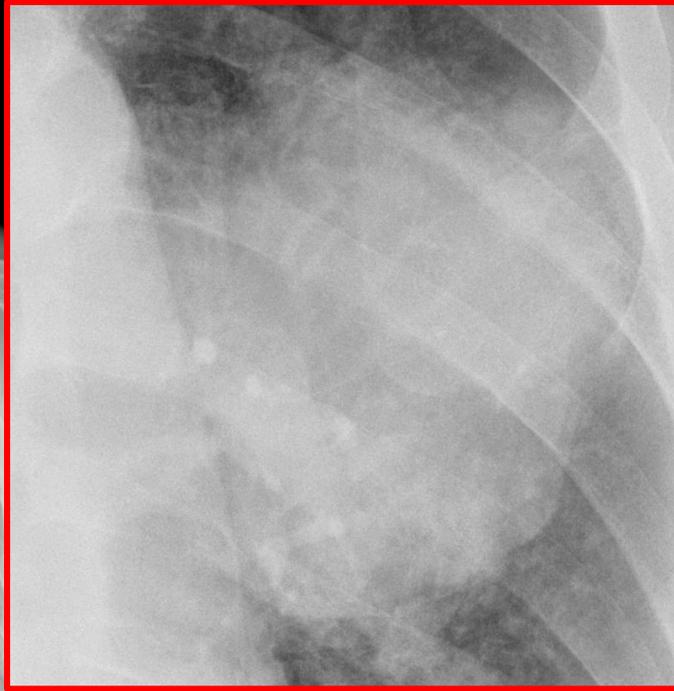
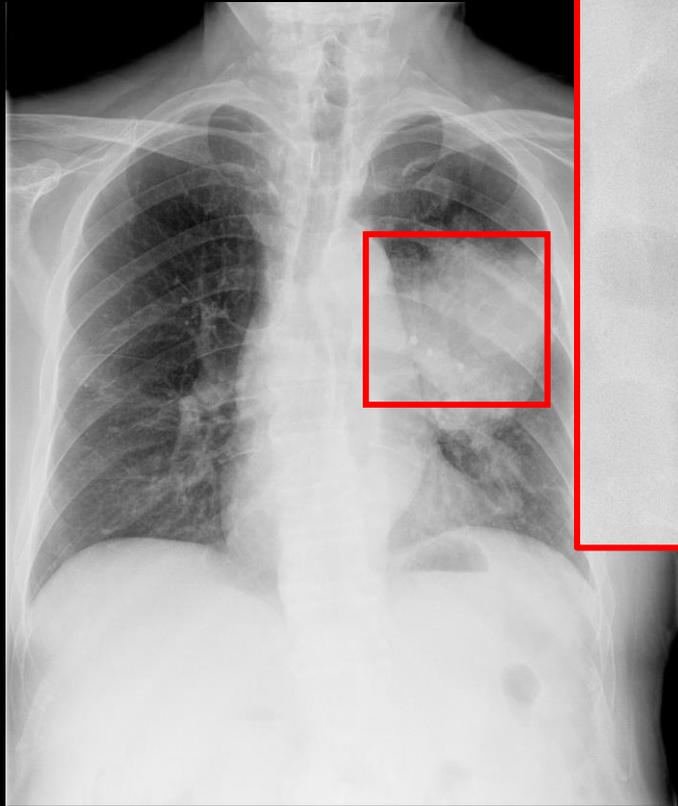


Eccentric





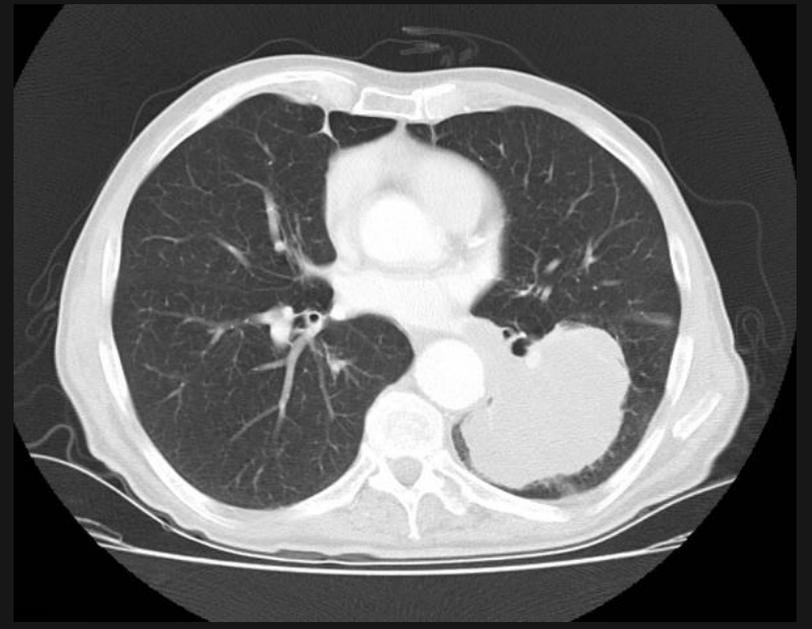


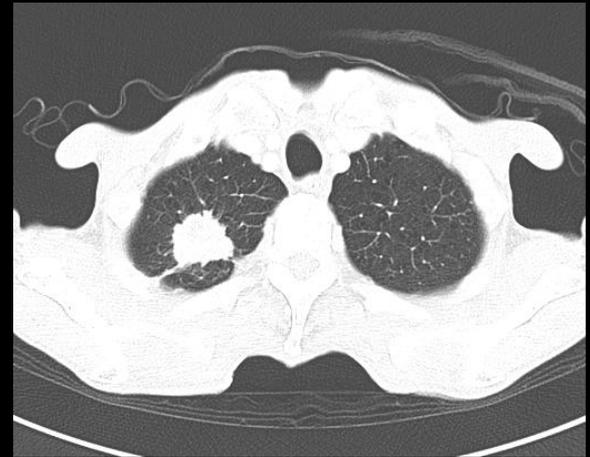
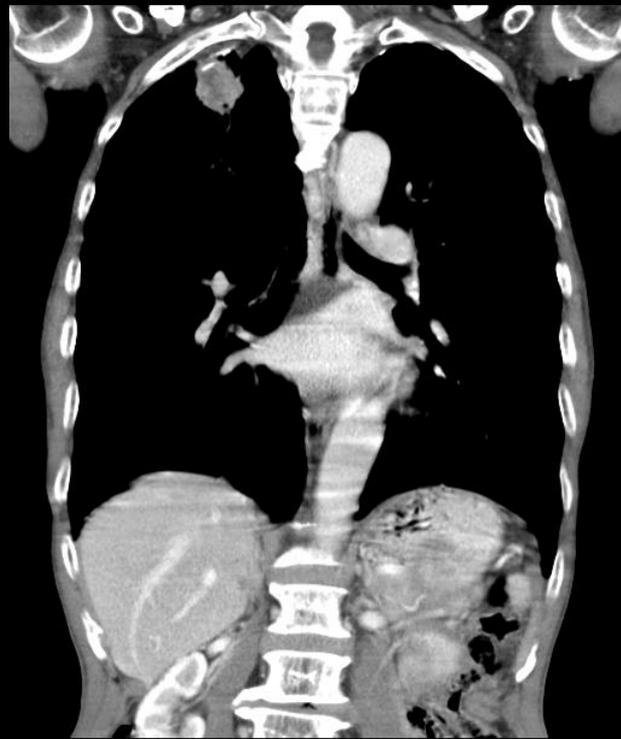
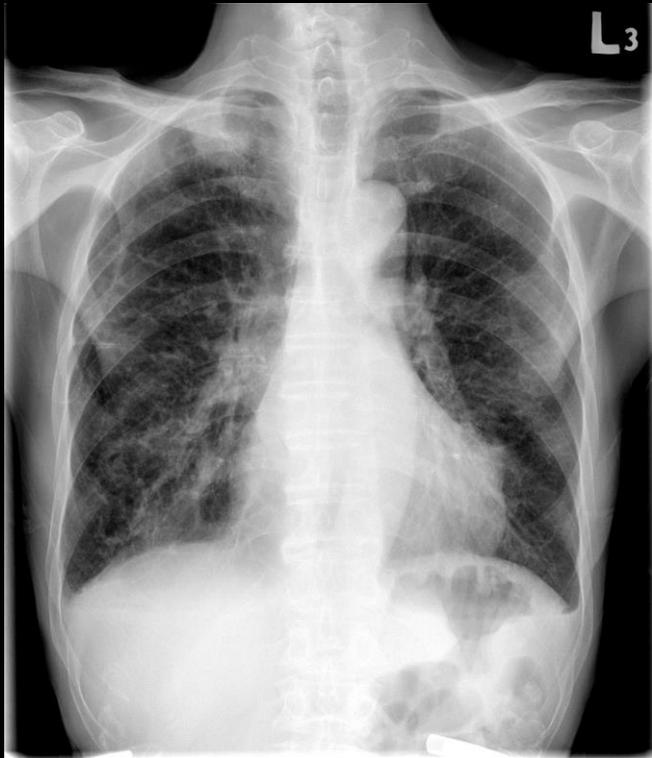


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W 2075 : L 2274







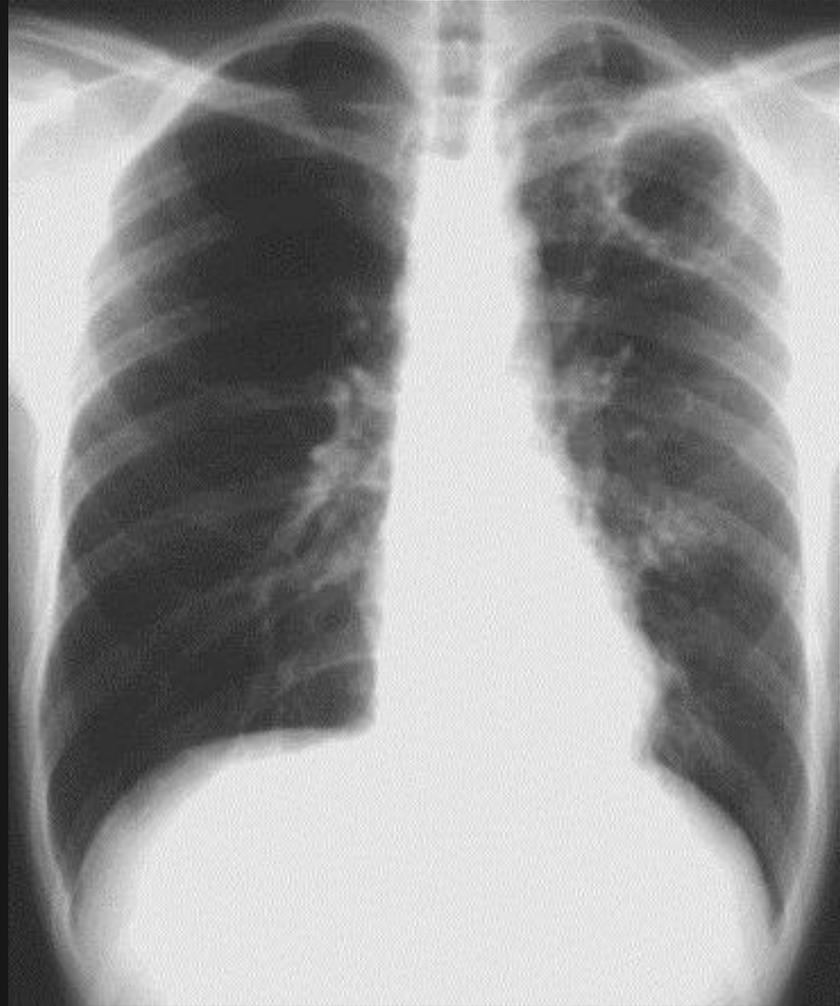
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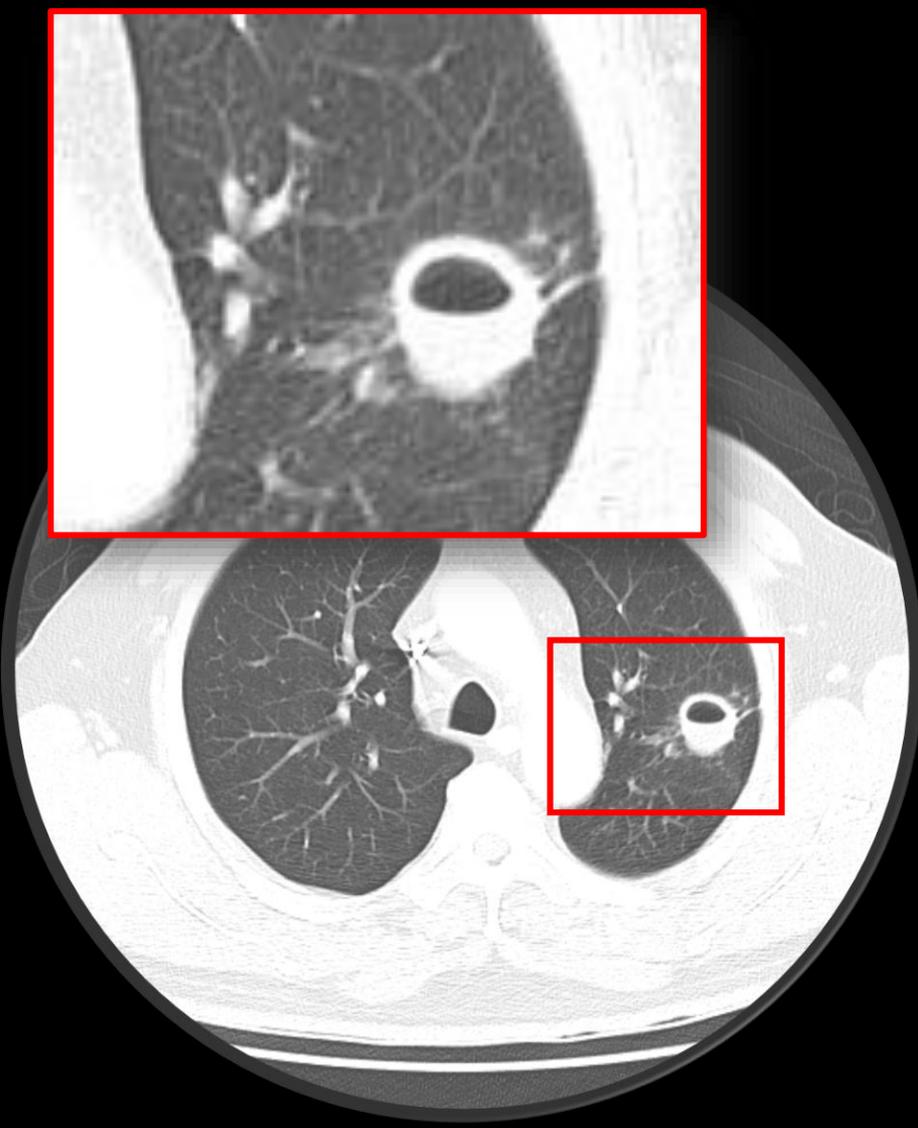
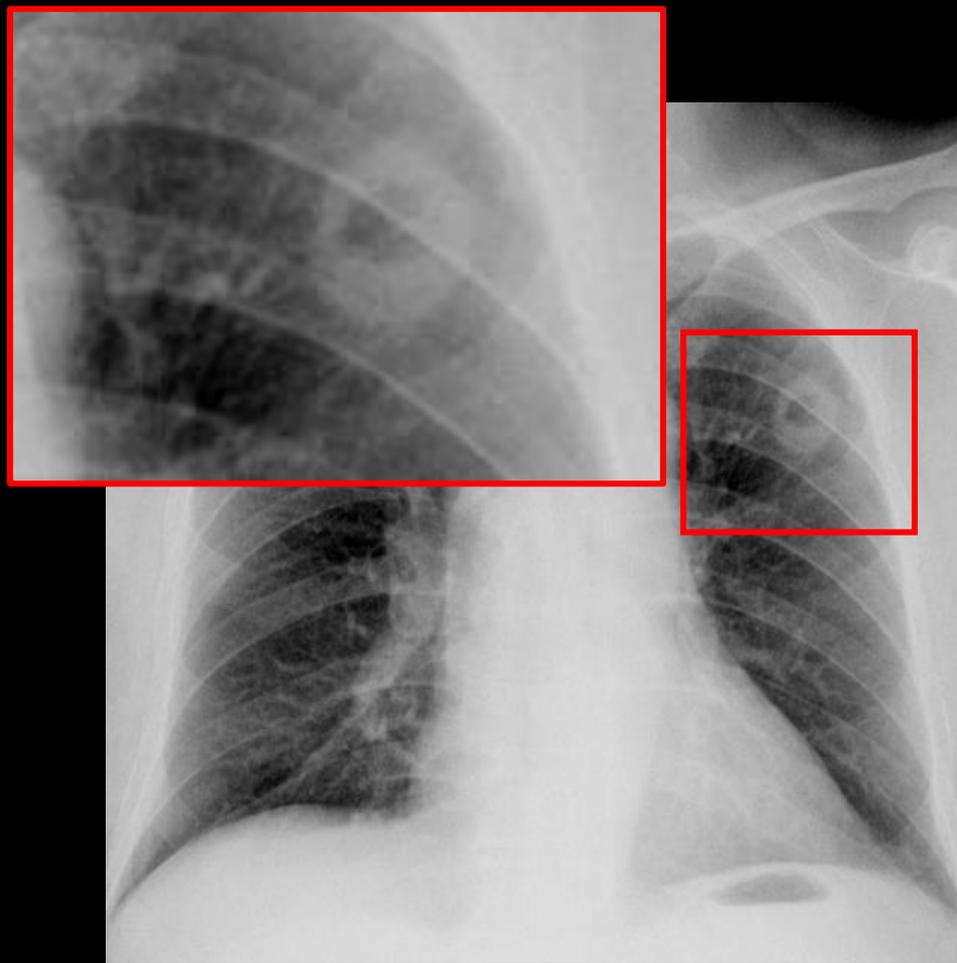


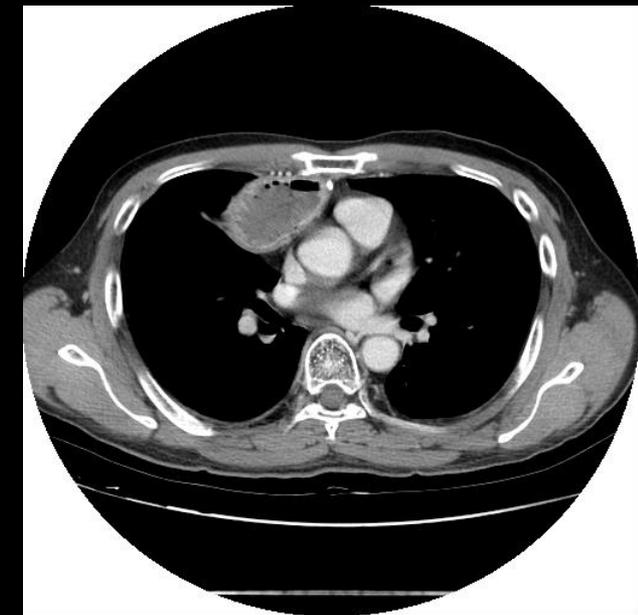
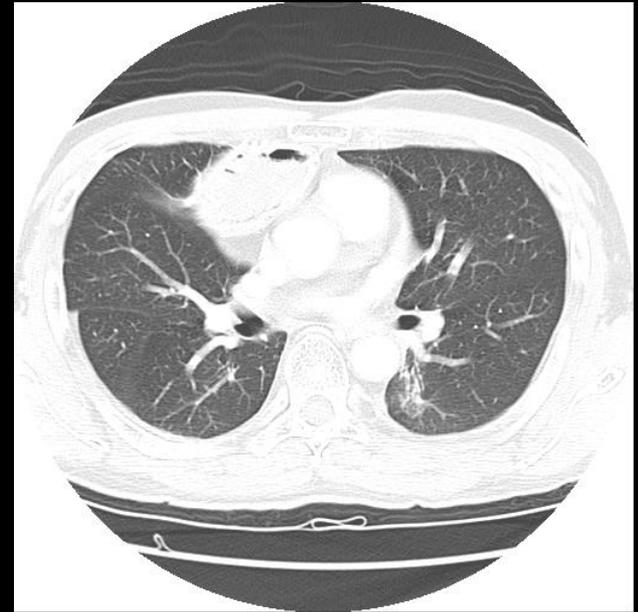
Interpretation of cavitory lesions

- ✔ Cavitory wall
- ✔ Character of inner lining
- ✔ Nature of contents
- ✔ Multiplicity of lesions





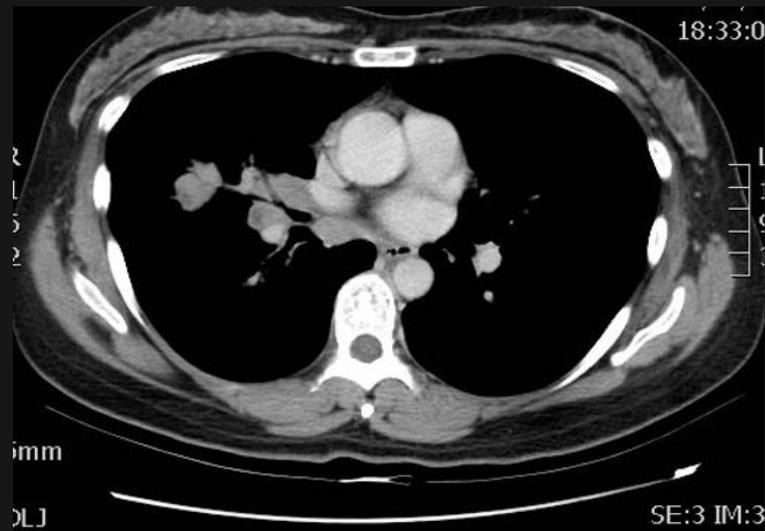


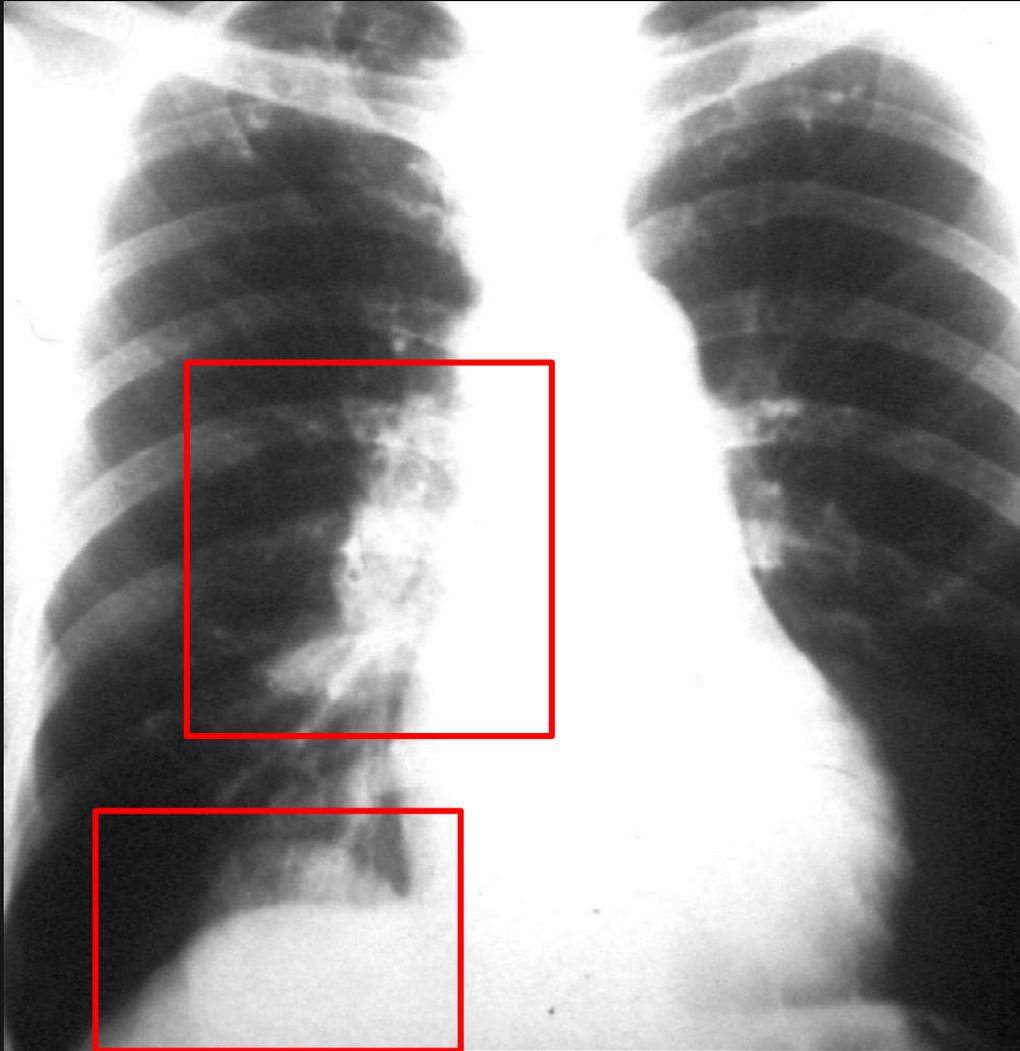


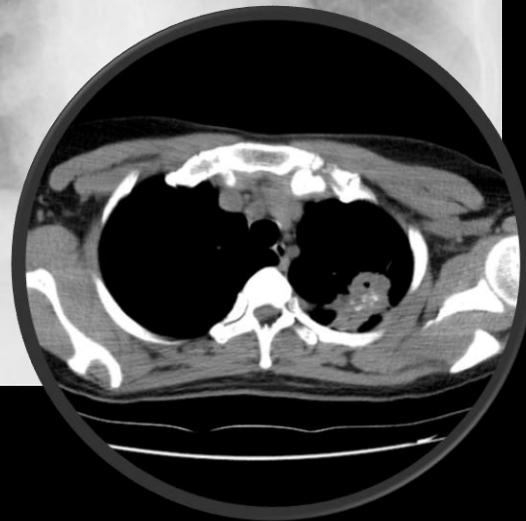


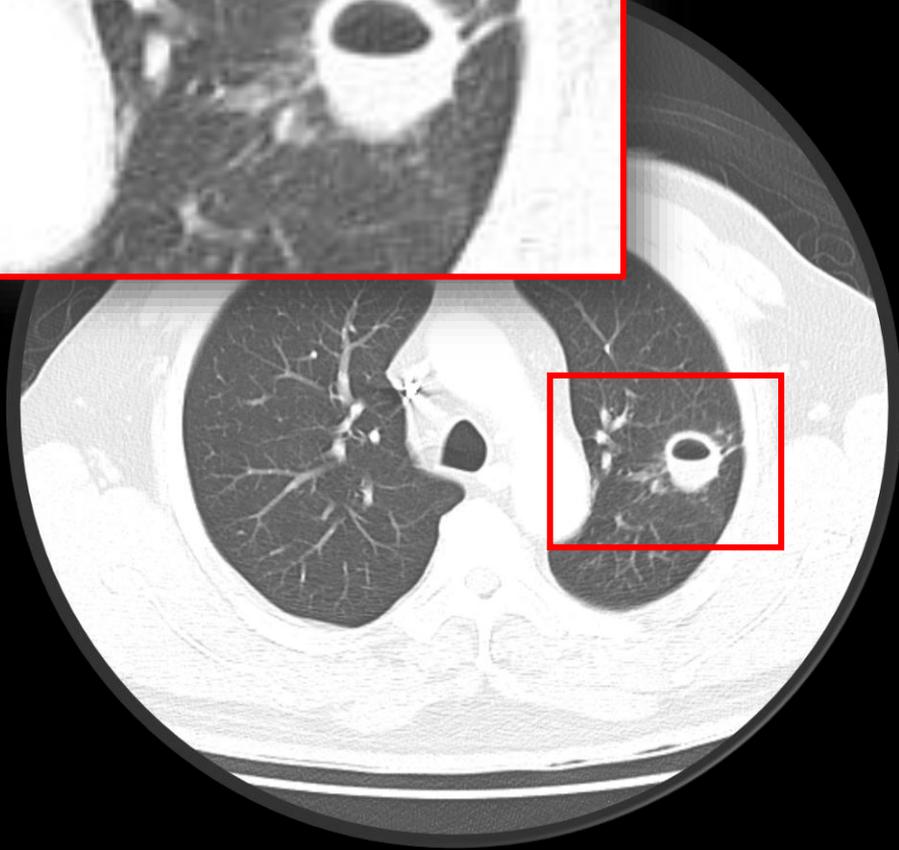
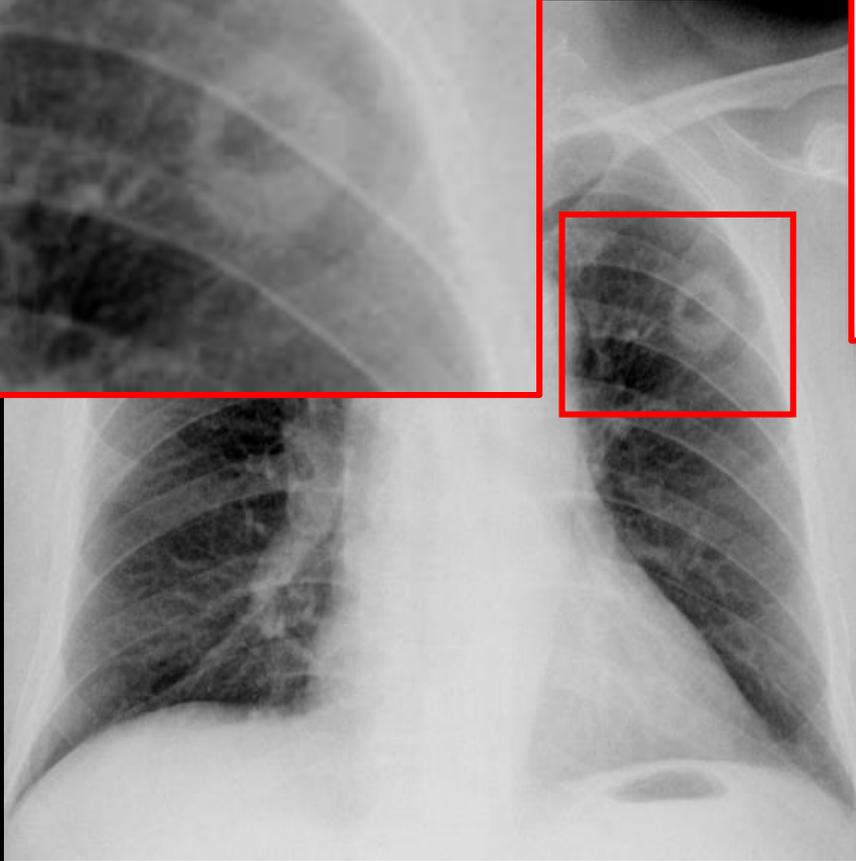
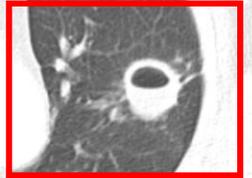
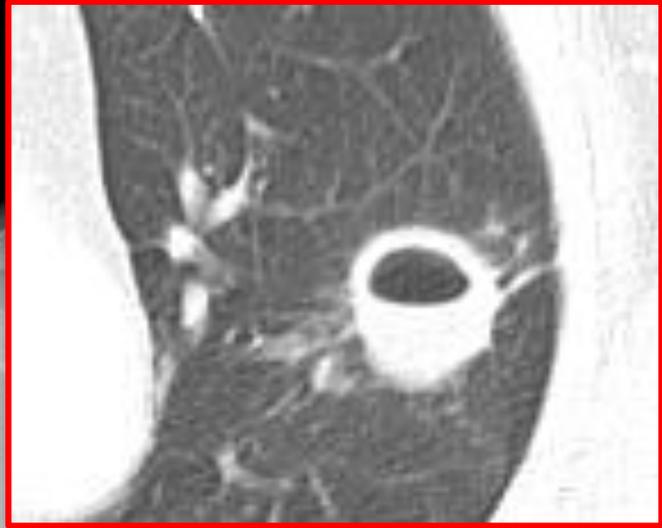
Interpretation of solitary pulmonary nodule and mass

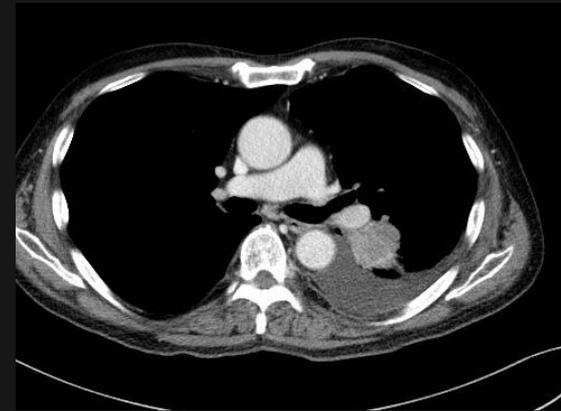
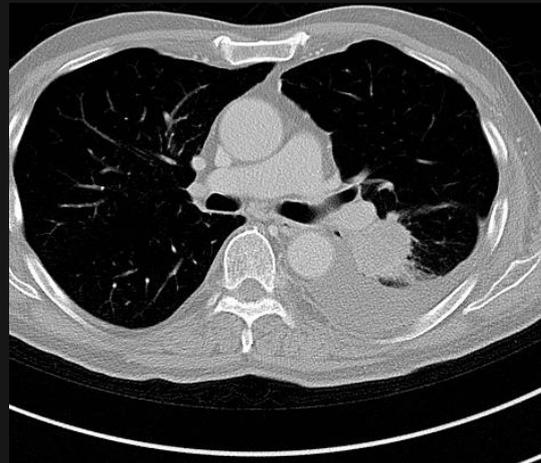
- ✔ Basic information
- ✔ Location
- ✔ Shape and Margin
- ✔ Density and calcification
- ✔ Cavitation
- ✔ Doubling time
- ✔ Accompanying signs
 - Relationship to hilum
 - Satellite lesions
 - Pleural or pericardial effusion
 - Lesions of other thoracic organs

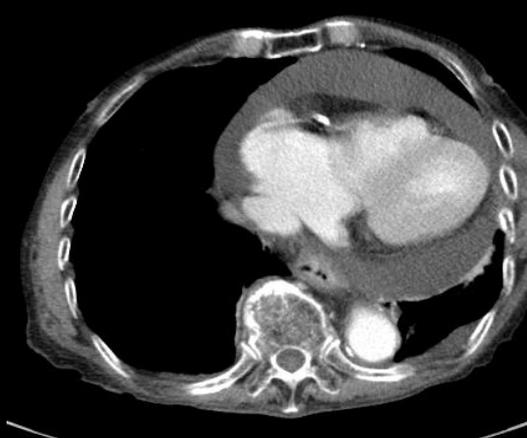
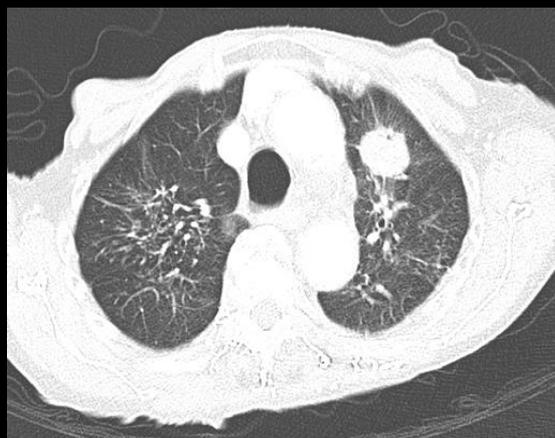


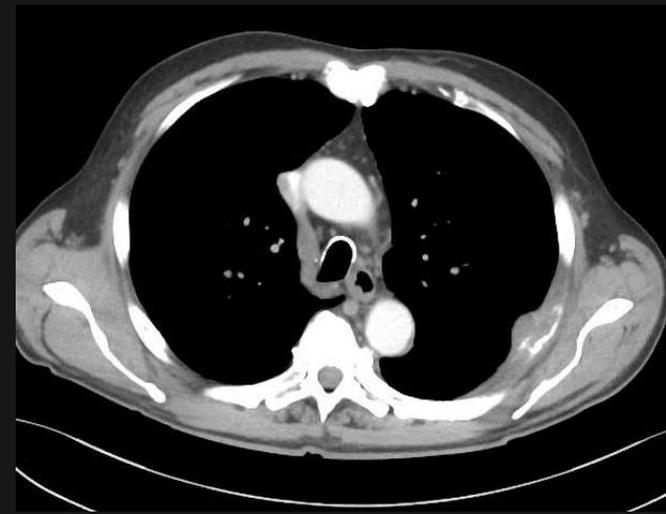
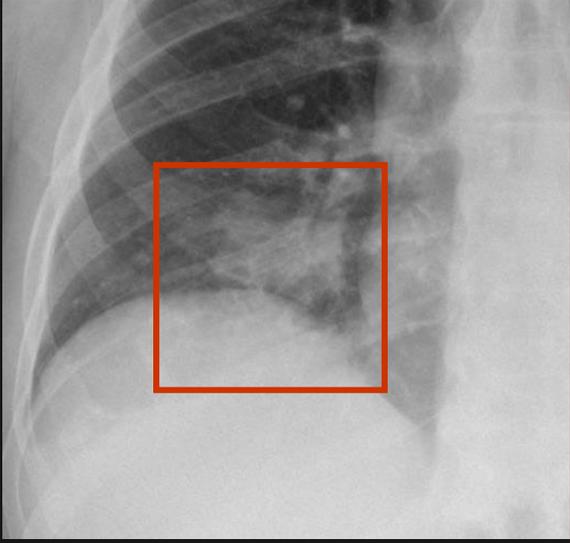
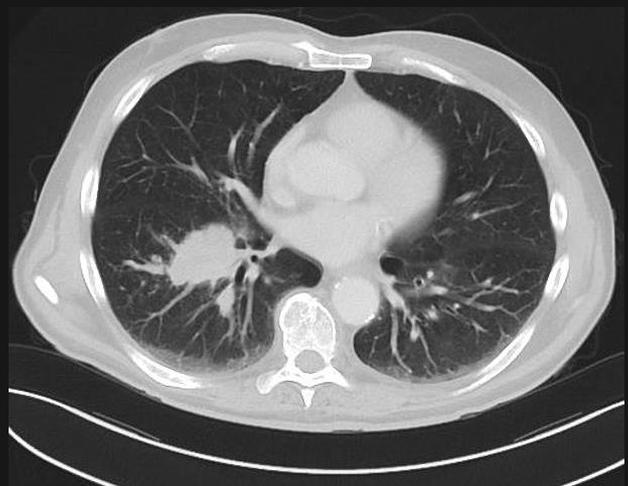


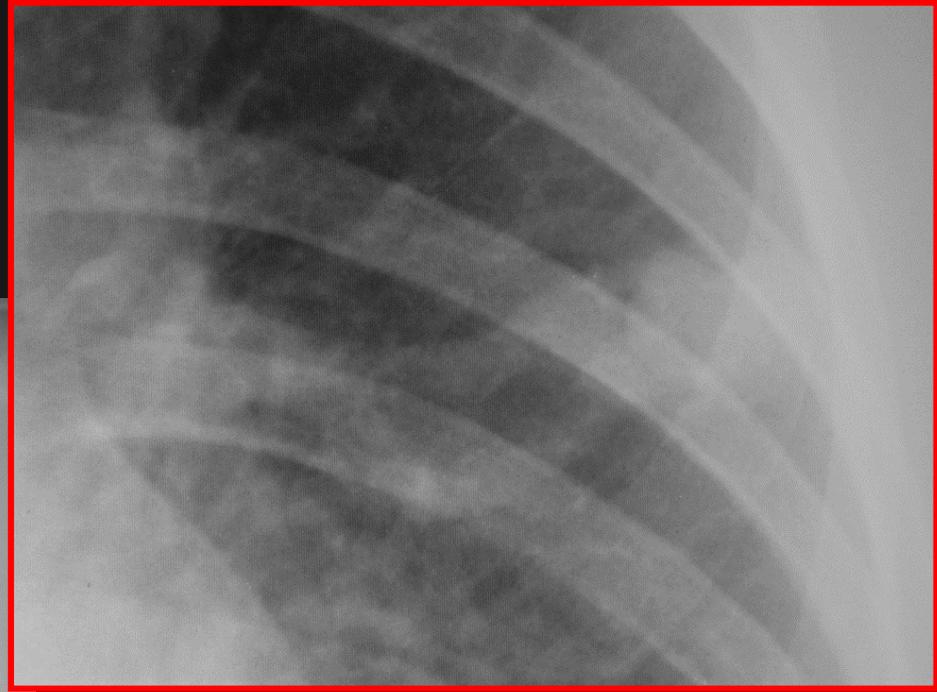
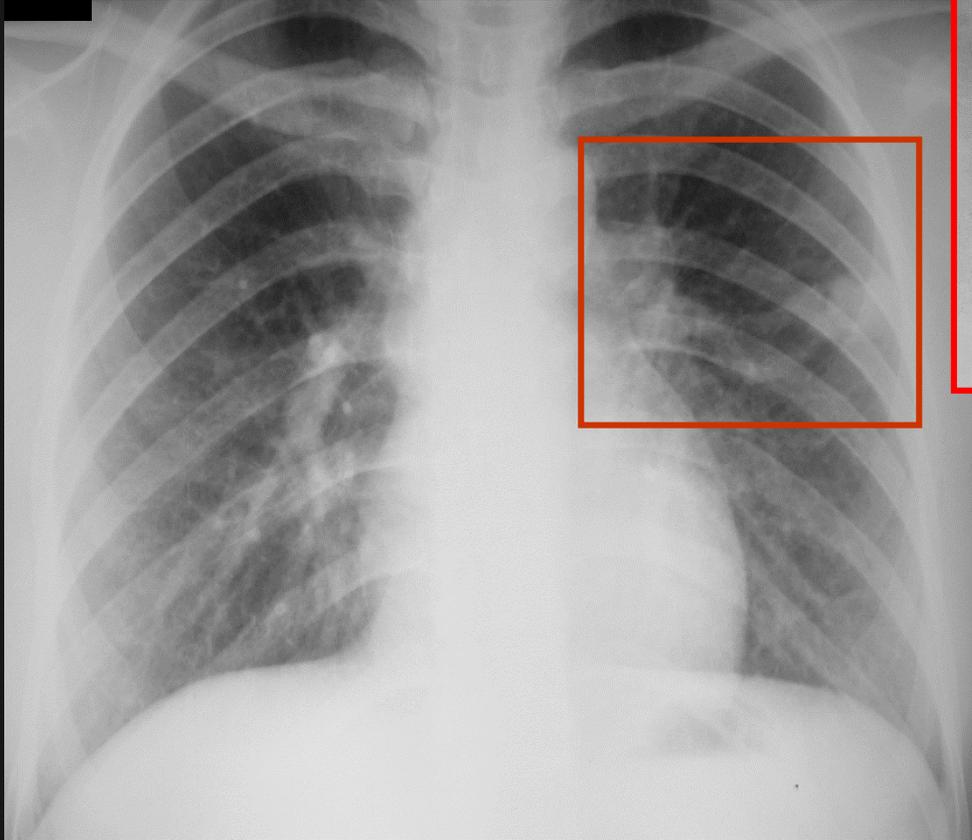














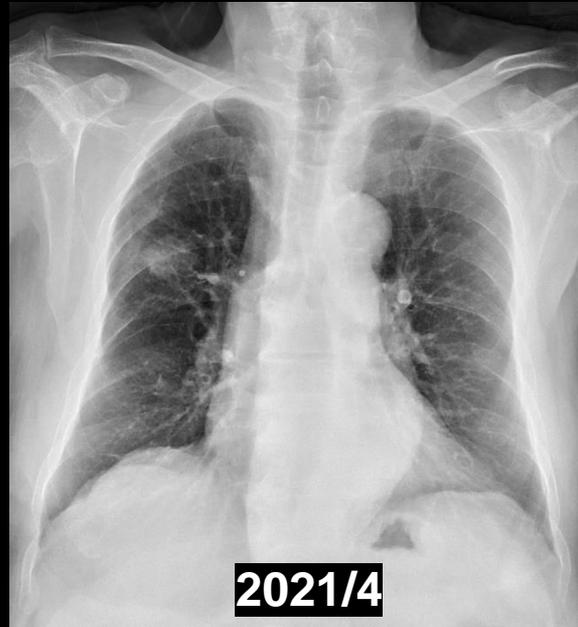
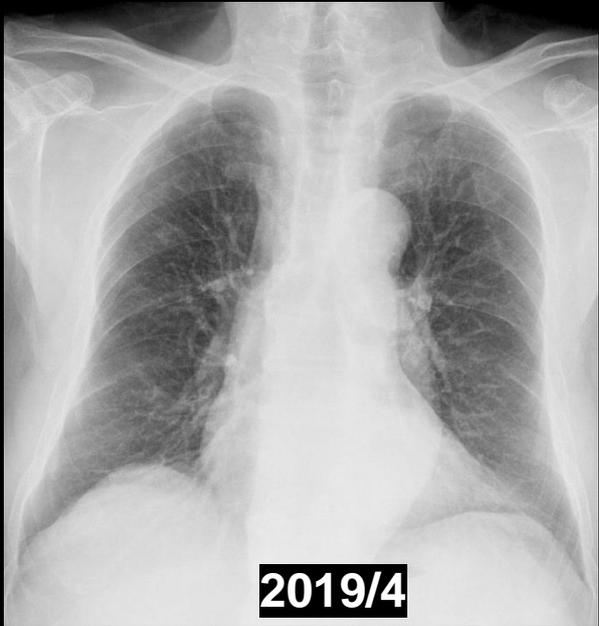
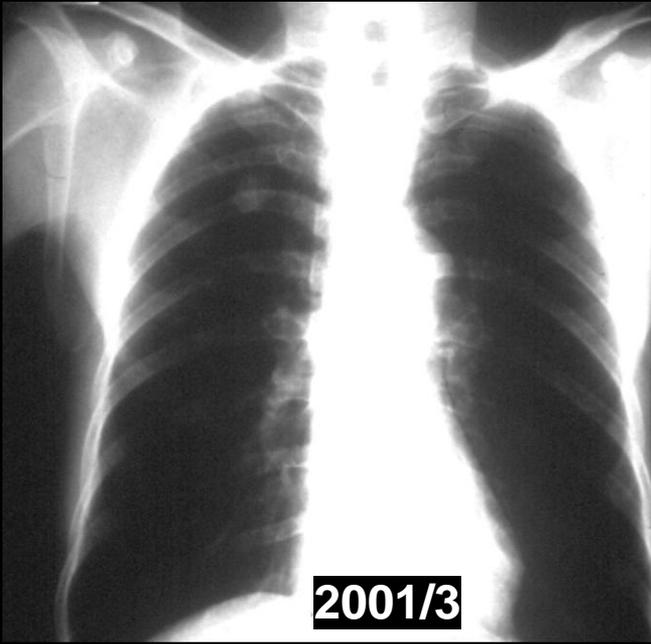
Interpretation of solitary pulmonary nodule and mass

- ✔ Basic information
- ✔ Location
- ✔ Shape and Margin
- ✔ Density and calcification
- ✔ Cavitation
- ✔ Doubling time
- ✔ Accompanying signs
 - Relationship to hilum
 - Satellite lesions
 - Pleural or pericardial effusion
 - Lesions of other thoracic organs



Average Radiographic Doubling Times

- Adenocarcinoma: 183 days
- Squamous & Large cell carcinoma: 100 days
- Small Cell carcinoma: 33 days





Multiple pulmonary nodules

✓ Neoplastic:

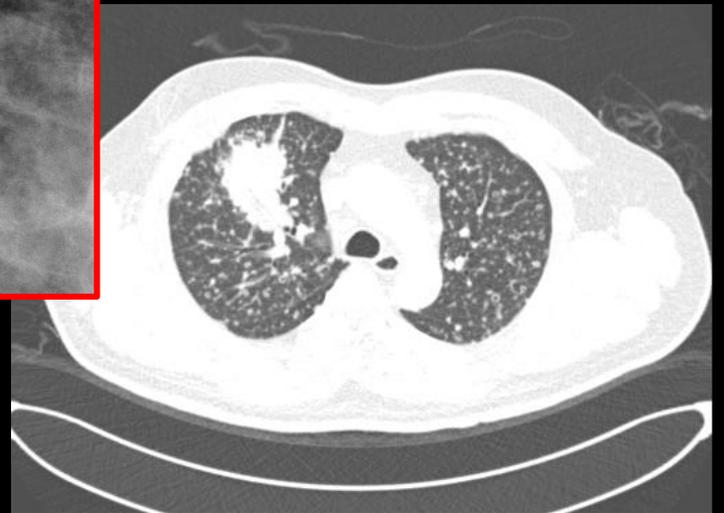
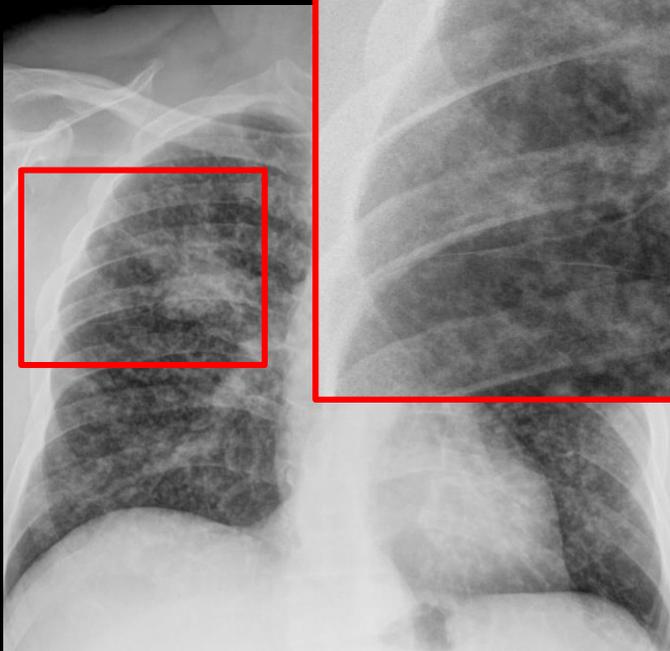
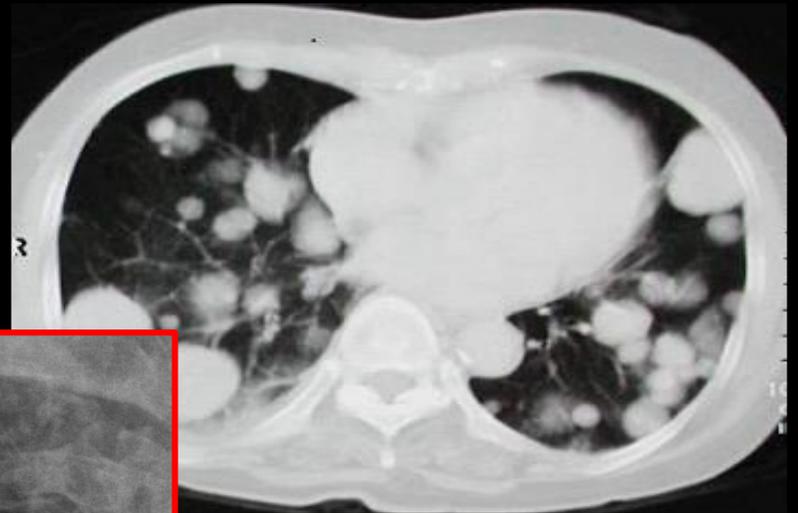
- Metastasis
- Primary

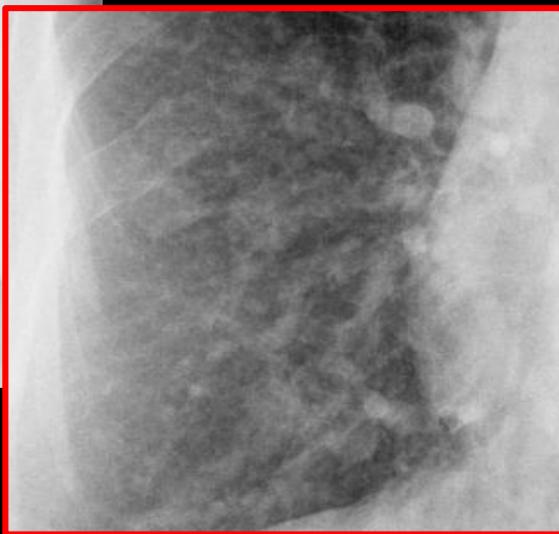
✓ Inflammatory (infectious and noninfectious):

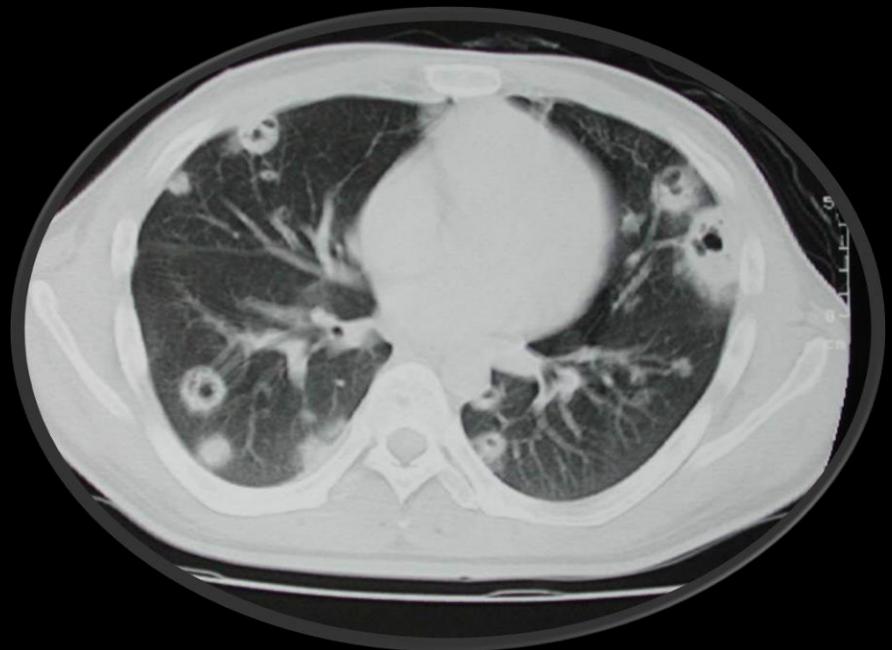
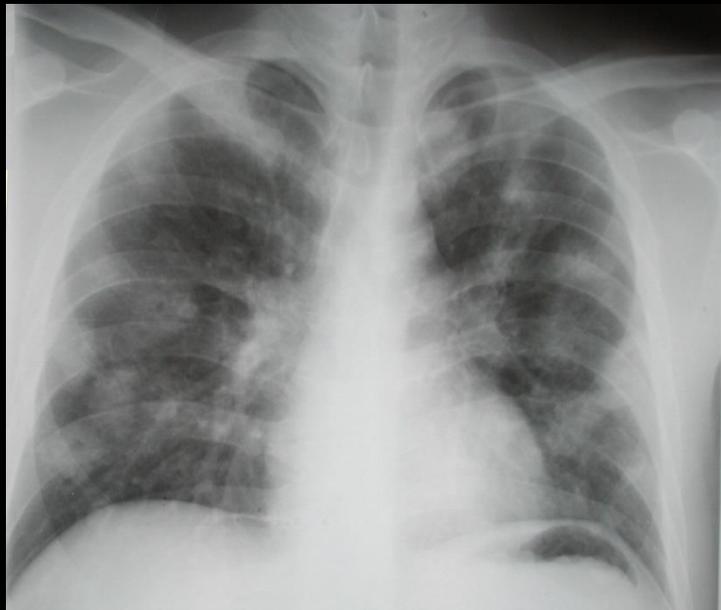
- Septic emboli
- Granulomas
- Fungal infection, viral infection
- Rheumatoid nodule, Wegener's granulomatosis,
- Sarcoidosis,
- Langerhans' cell histiocytosis

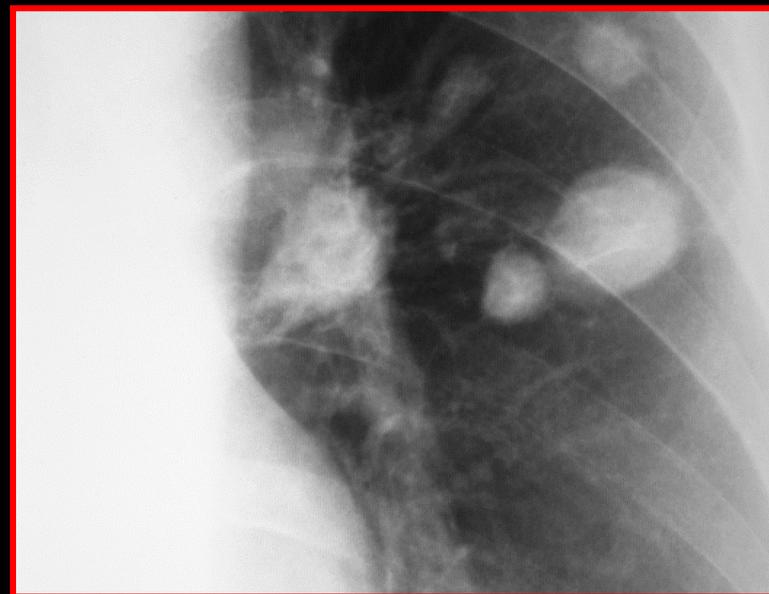
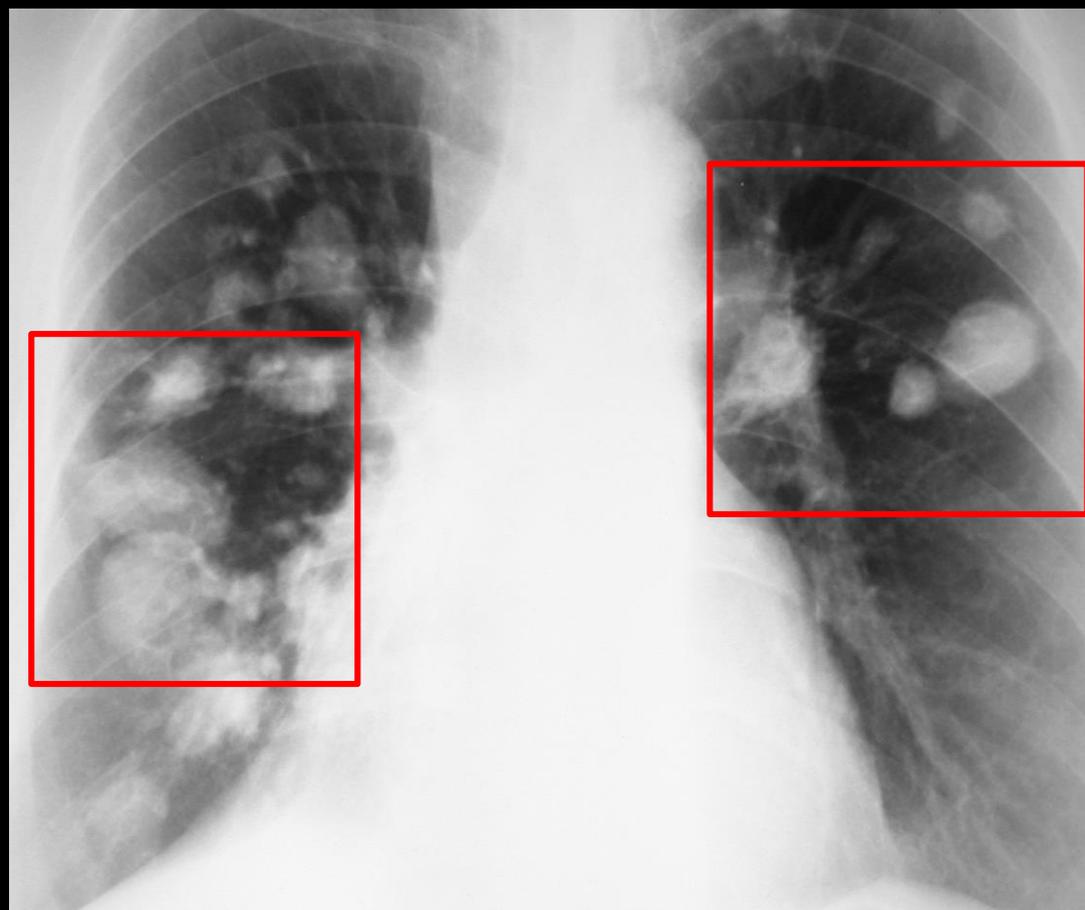
✓ Others:

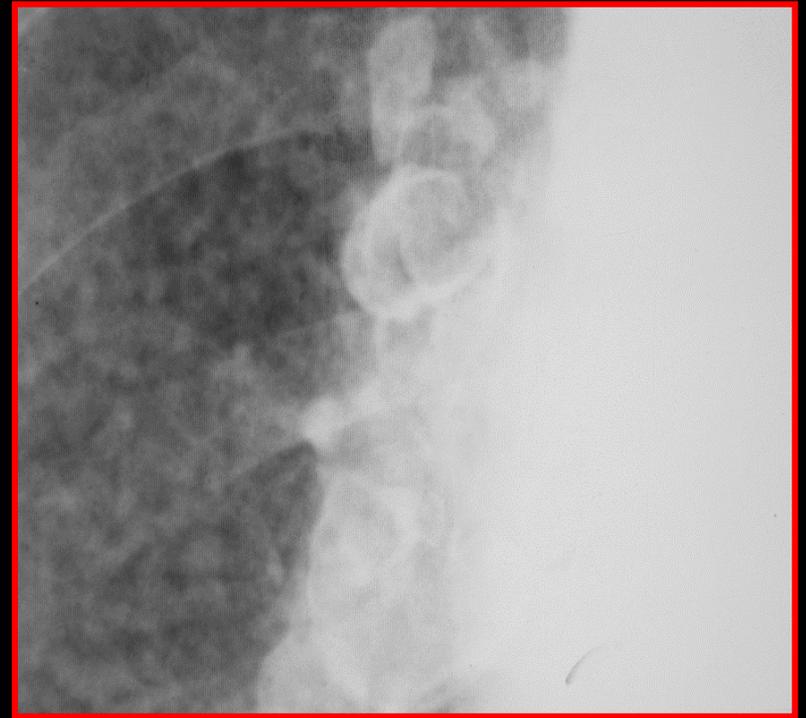
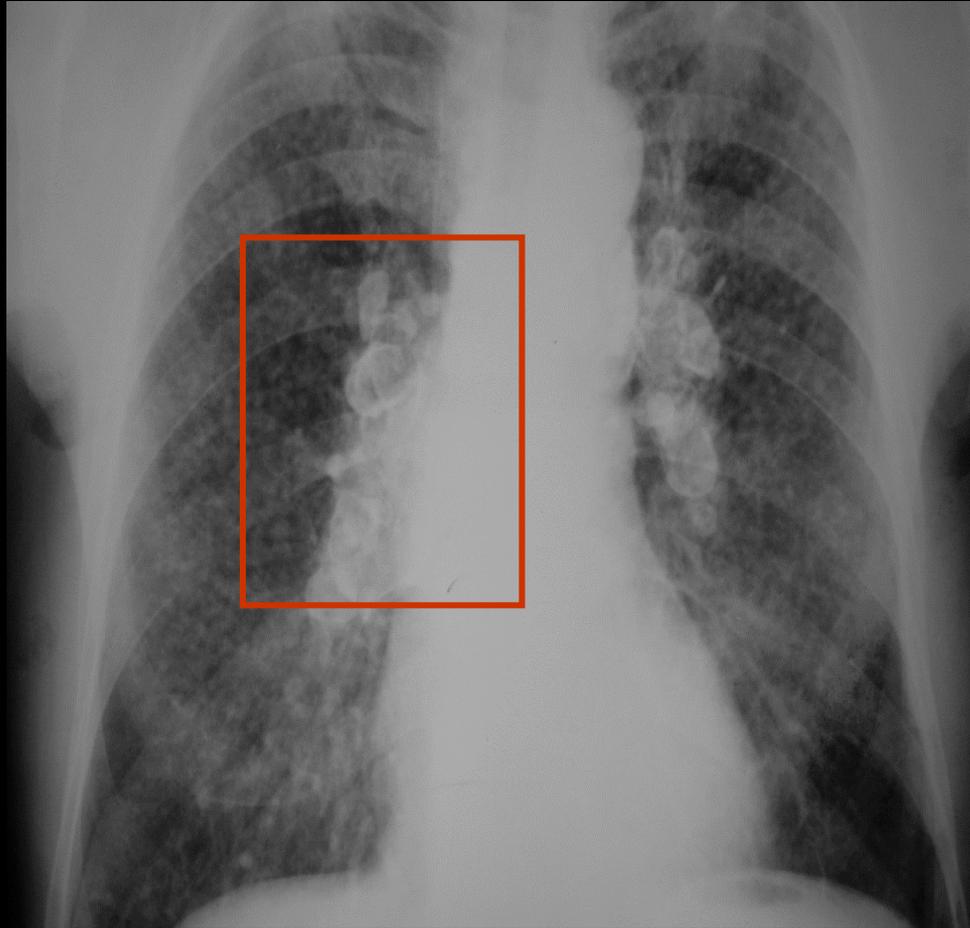
- Silicosis
- Hematoma



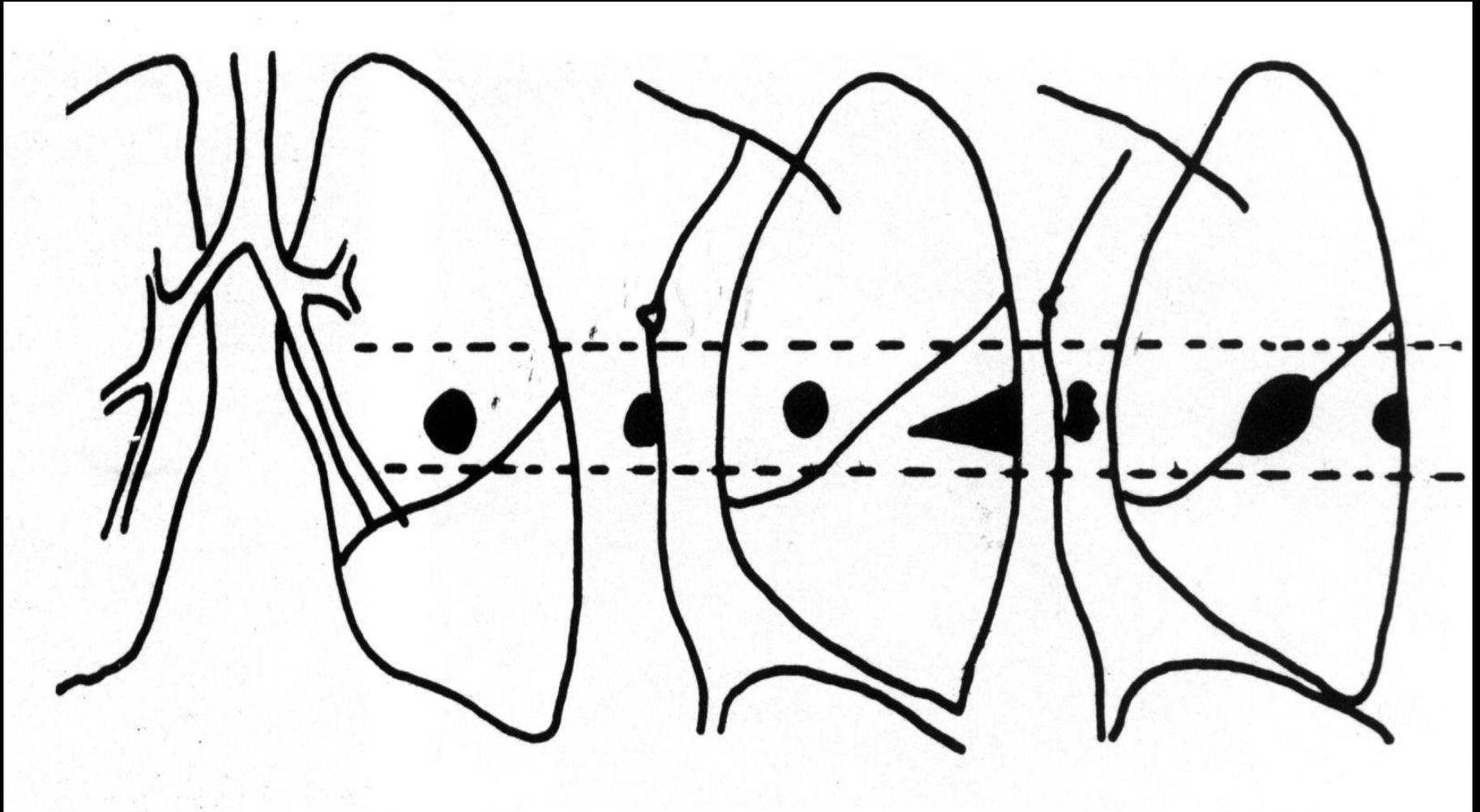




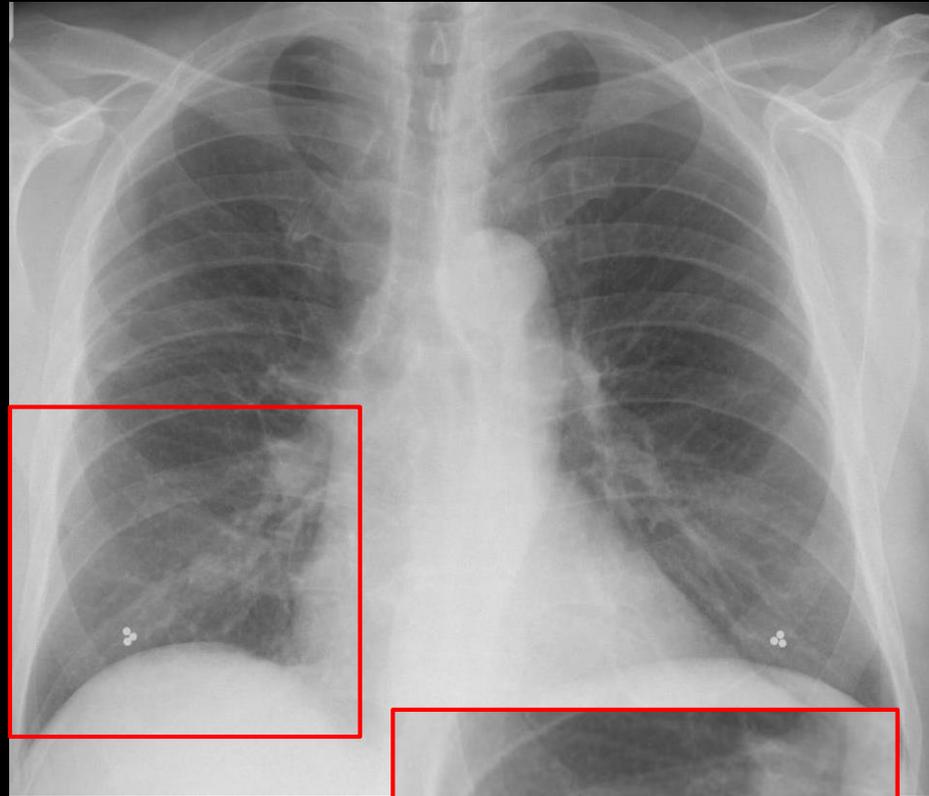
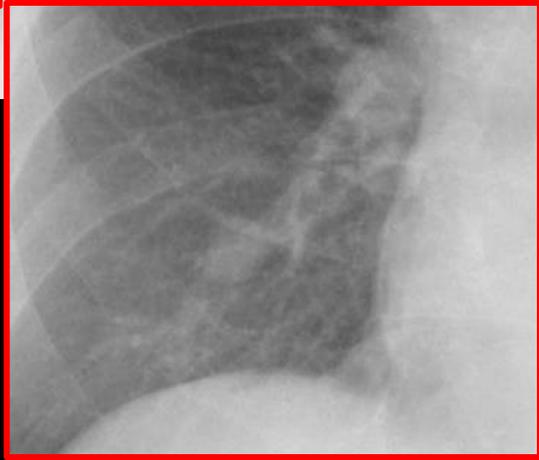
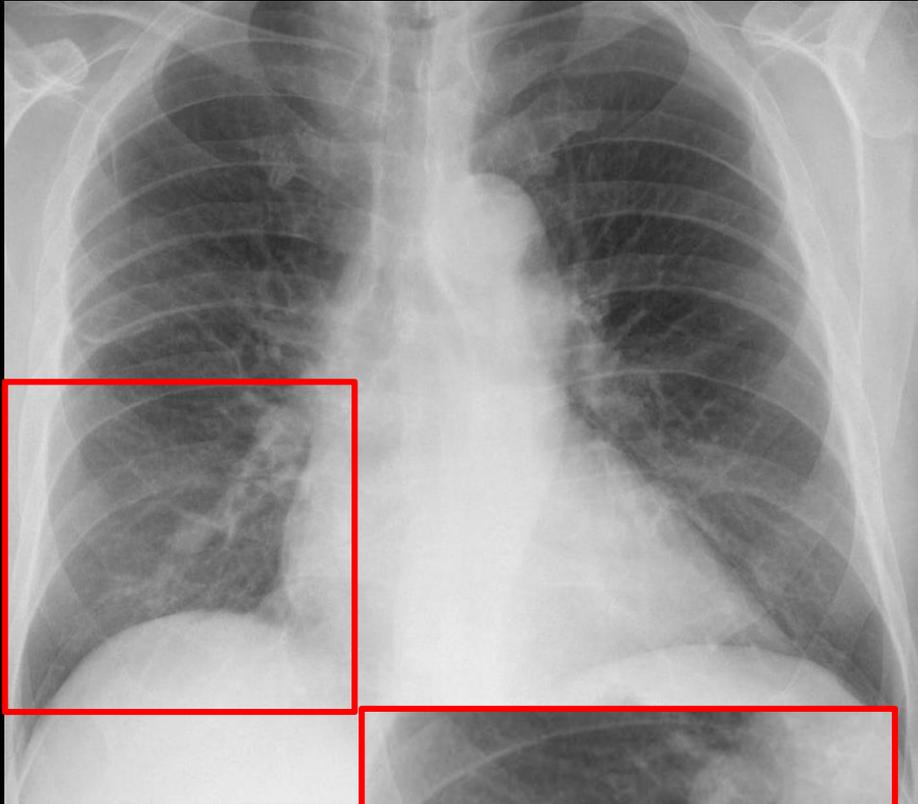


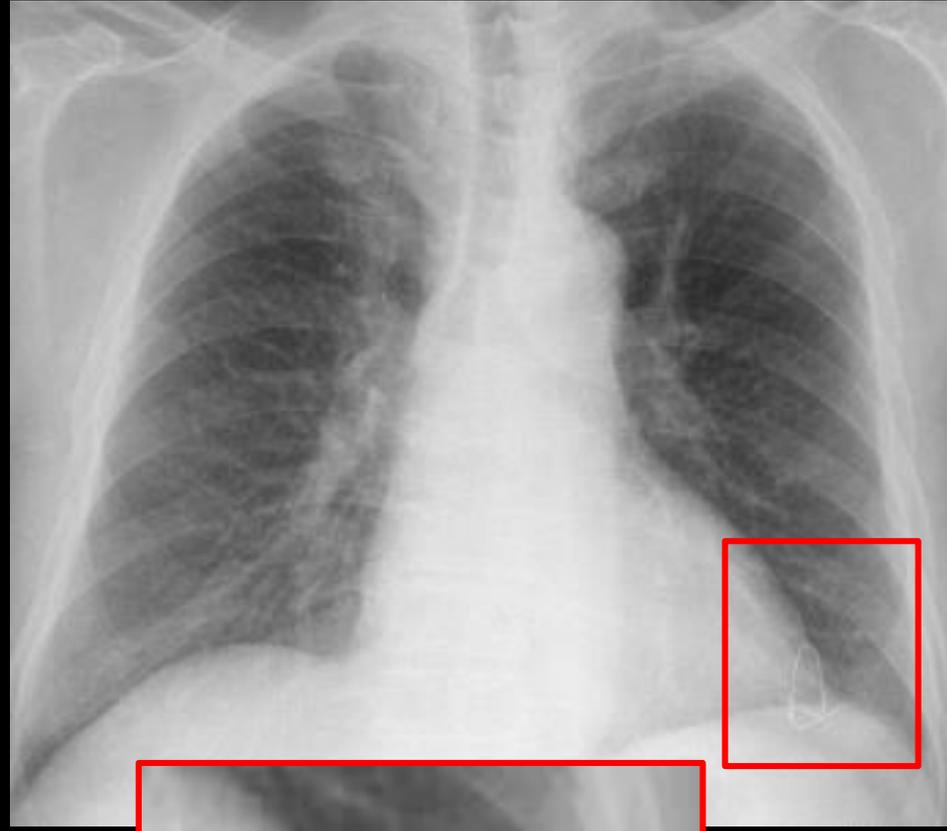
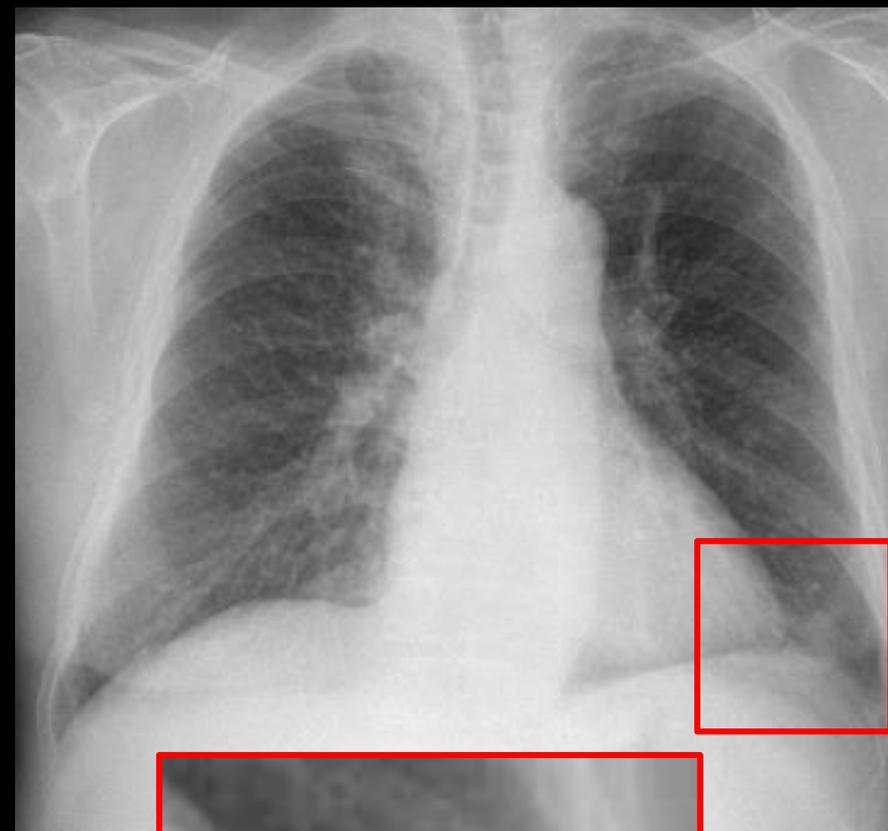


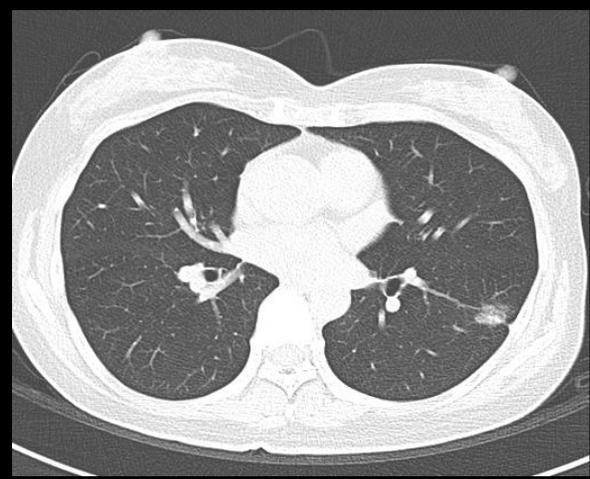
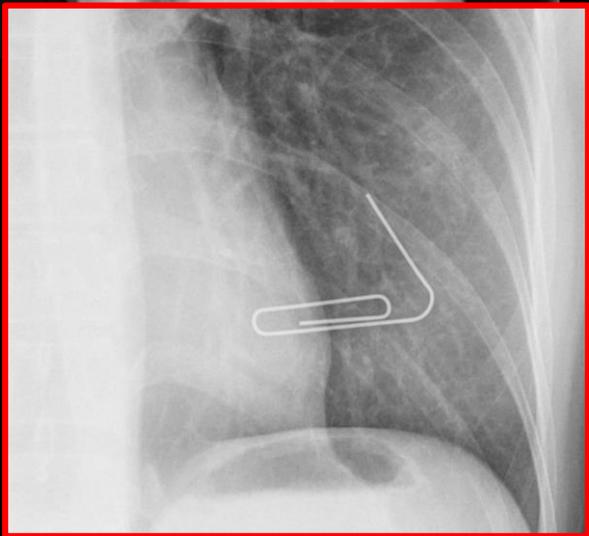
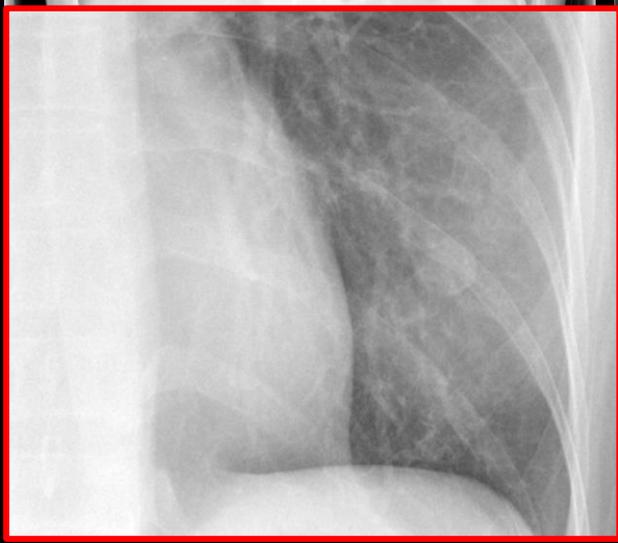
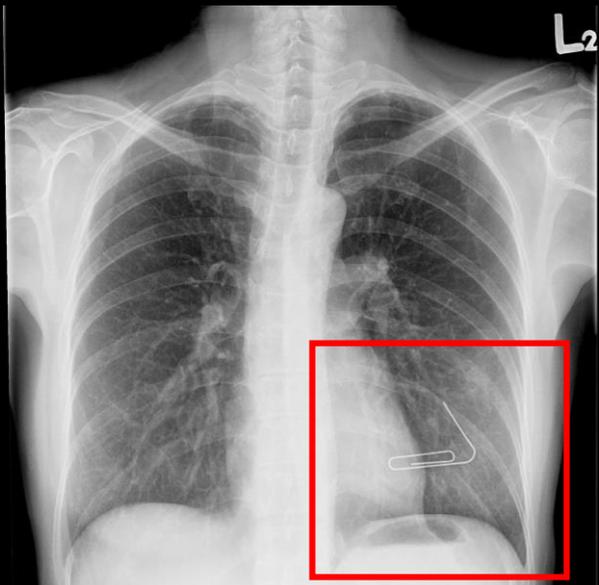
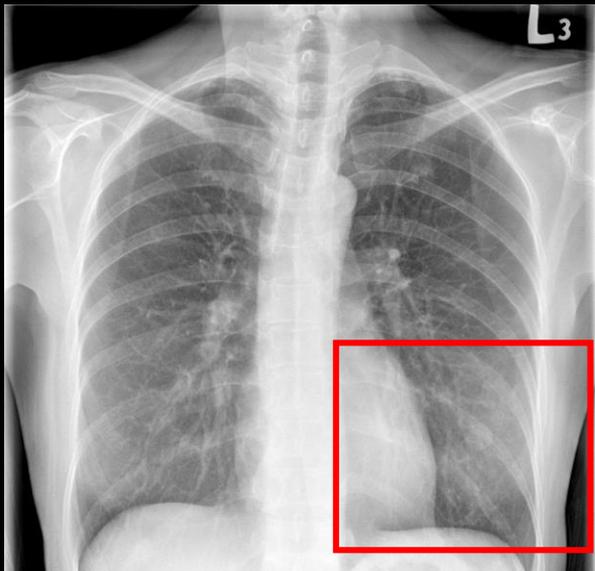
Various causes of round opacities in the P-A radiograph

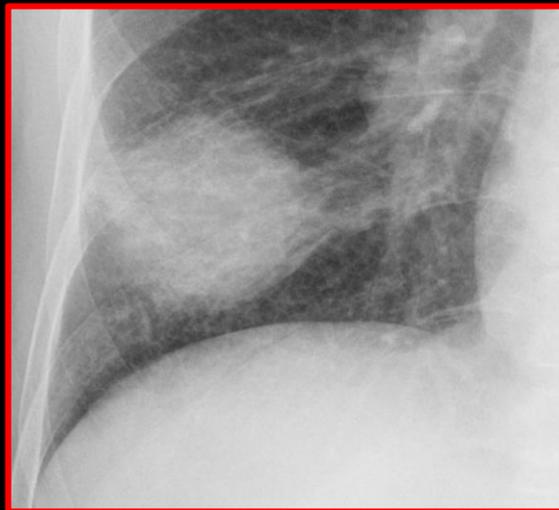
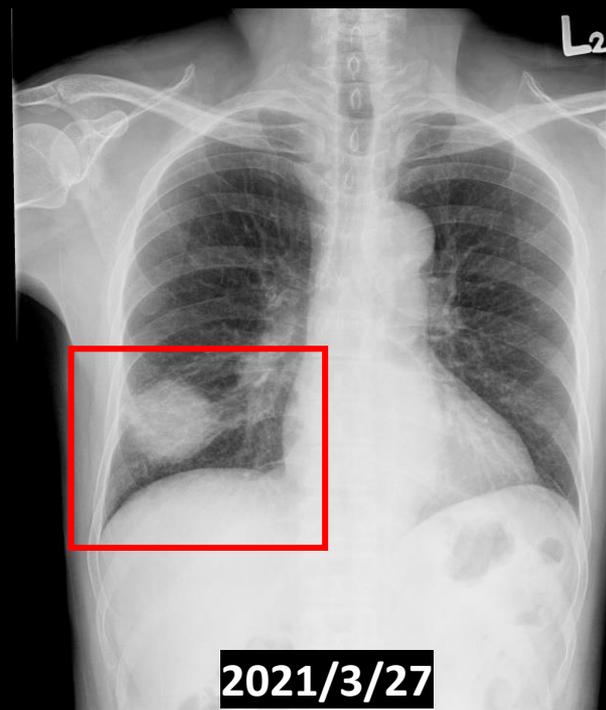
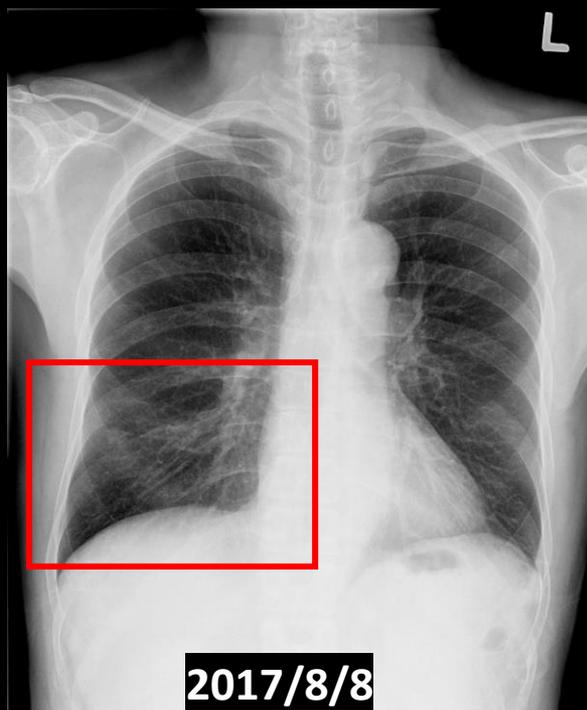
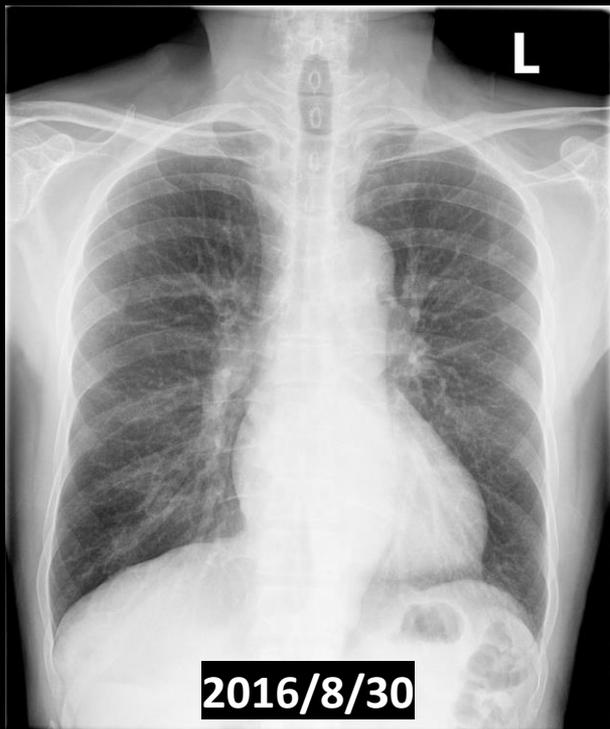


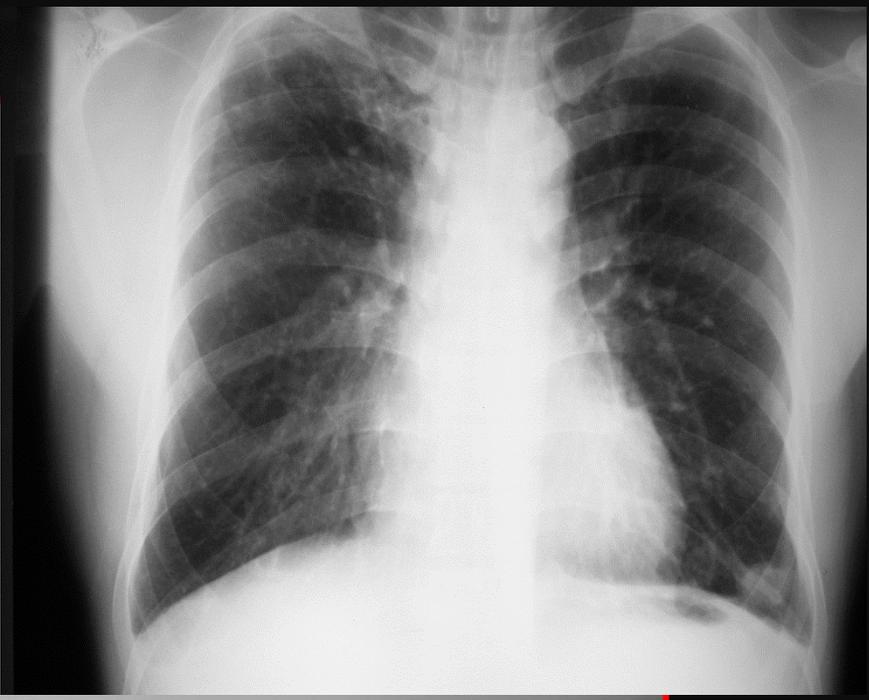
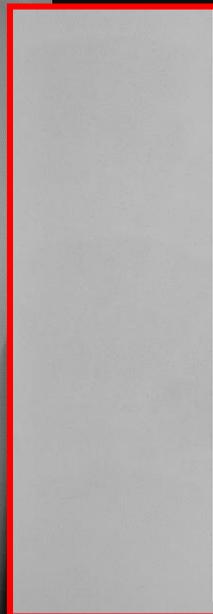
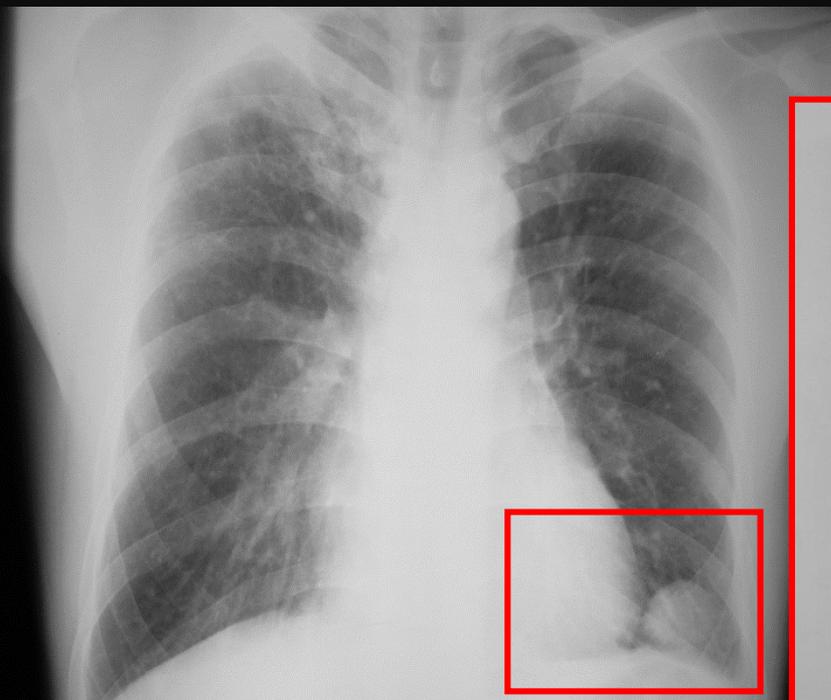
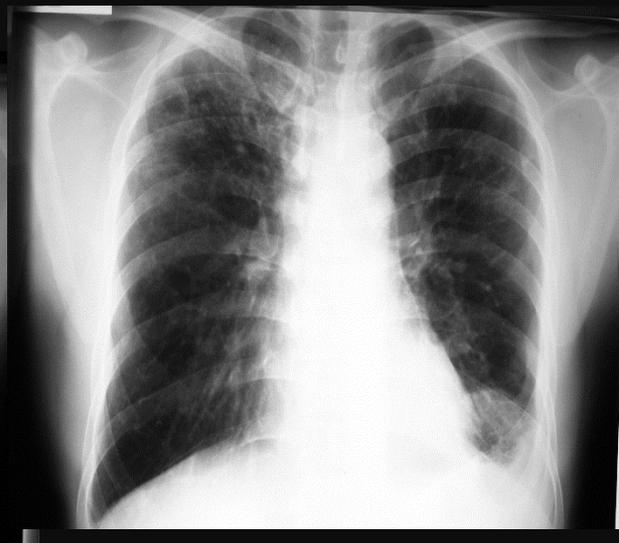
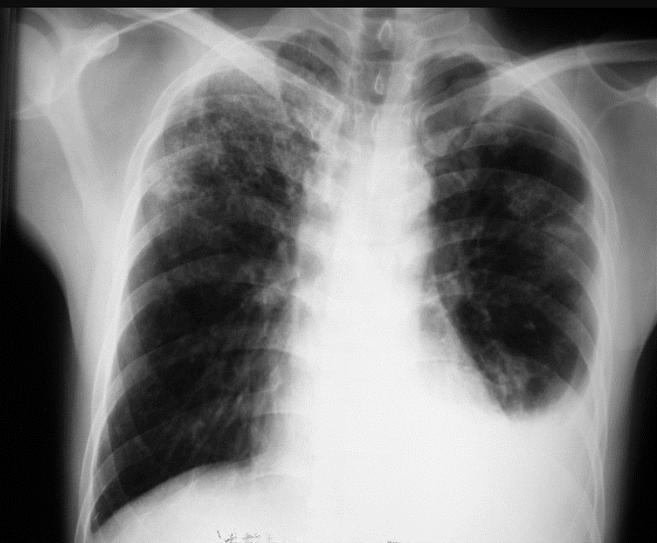
Tumor and nipple marker

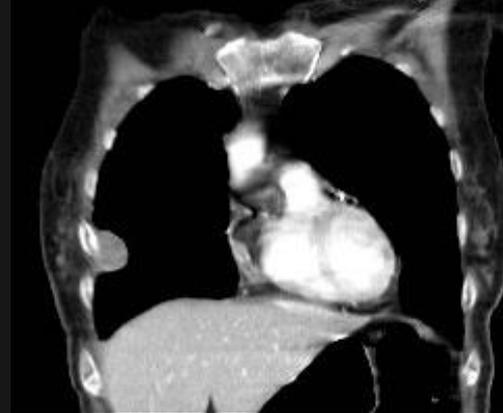
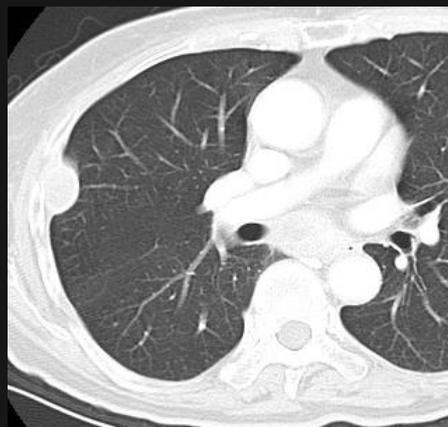
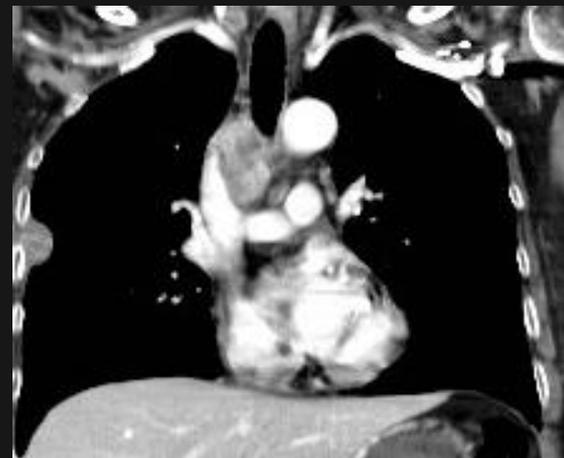
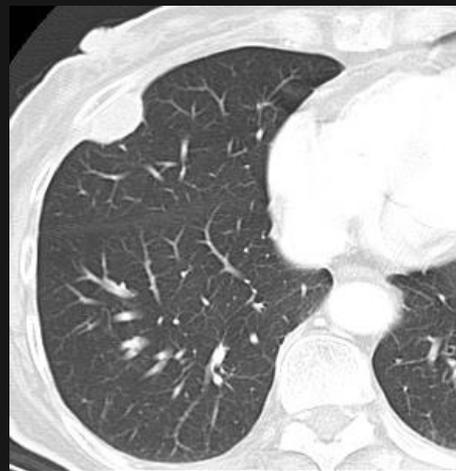
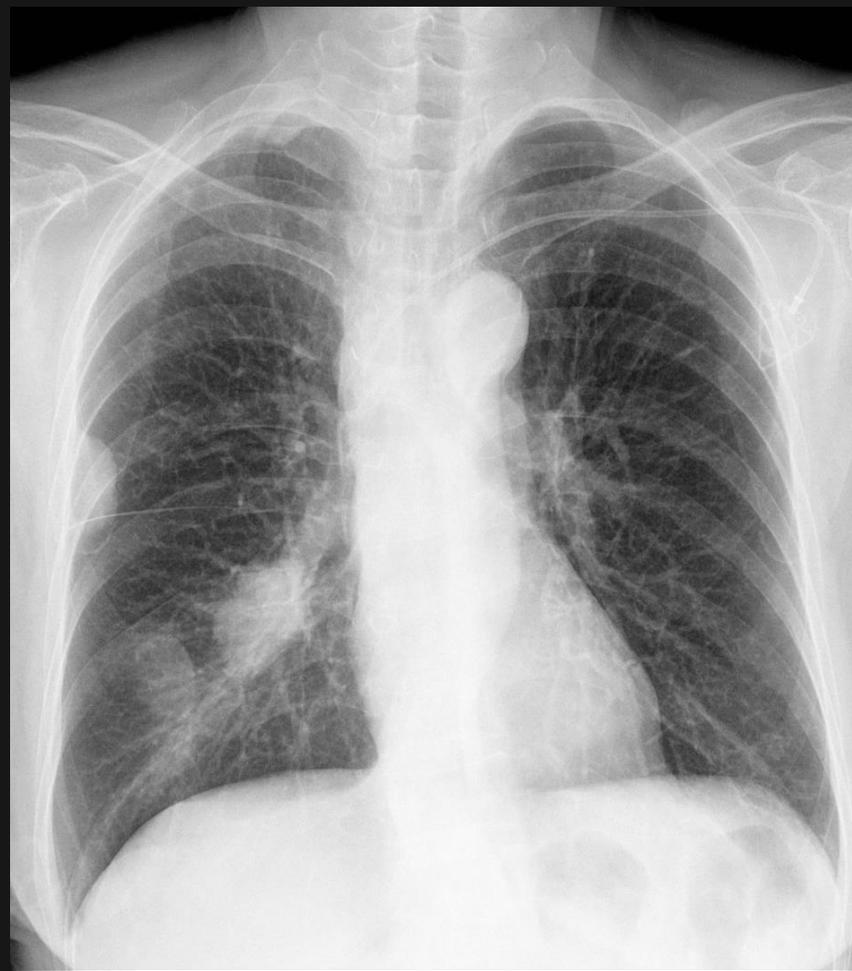




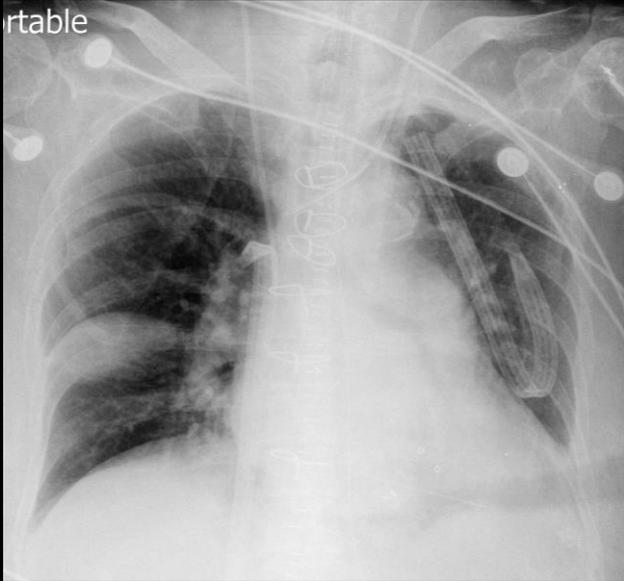




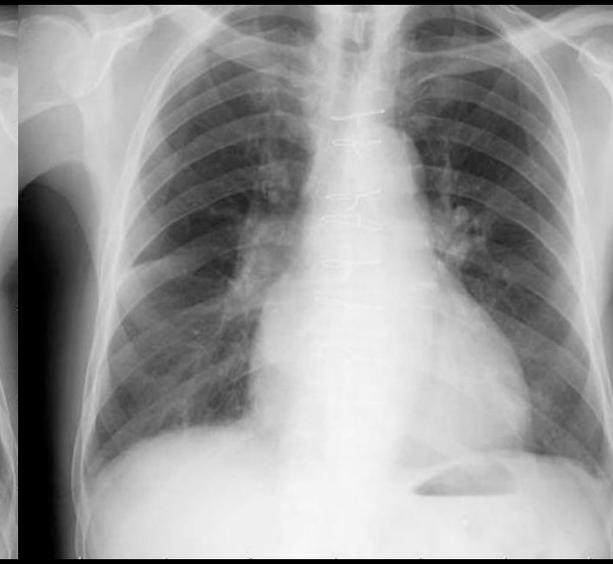
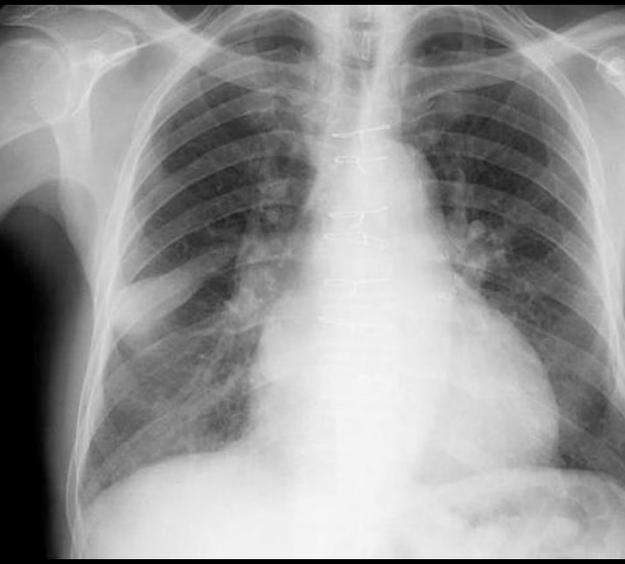


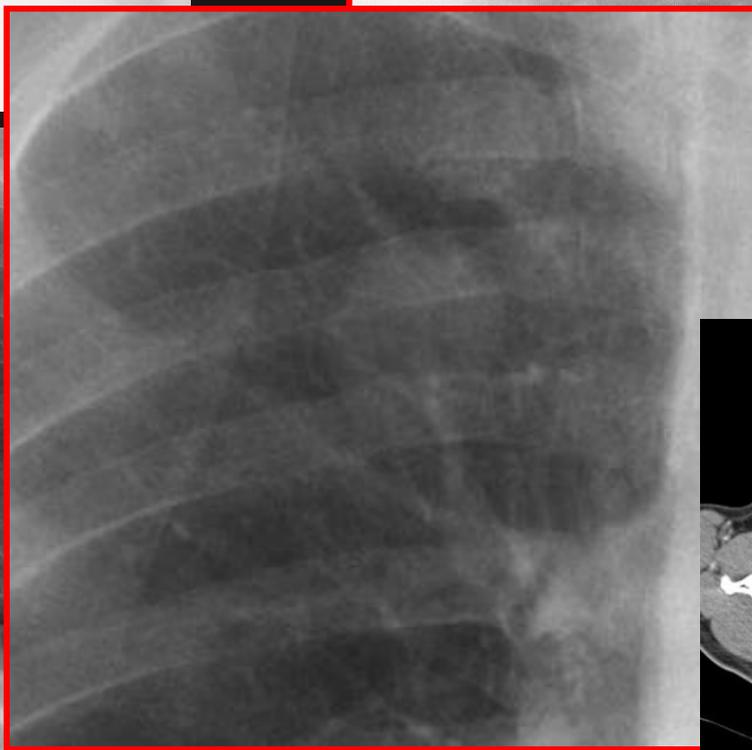
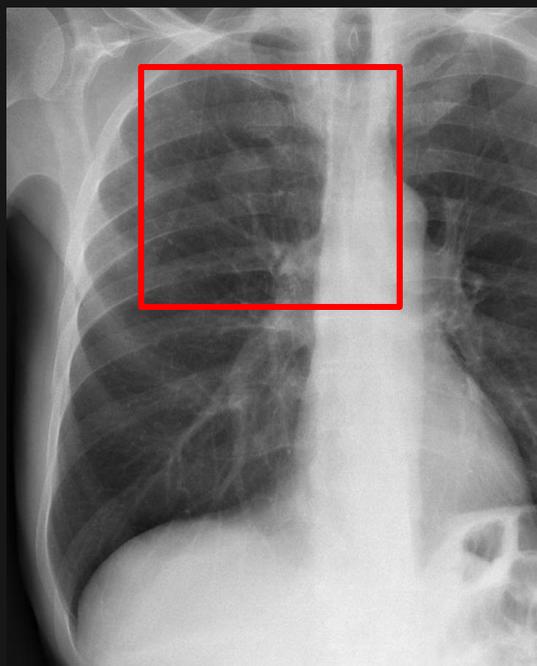
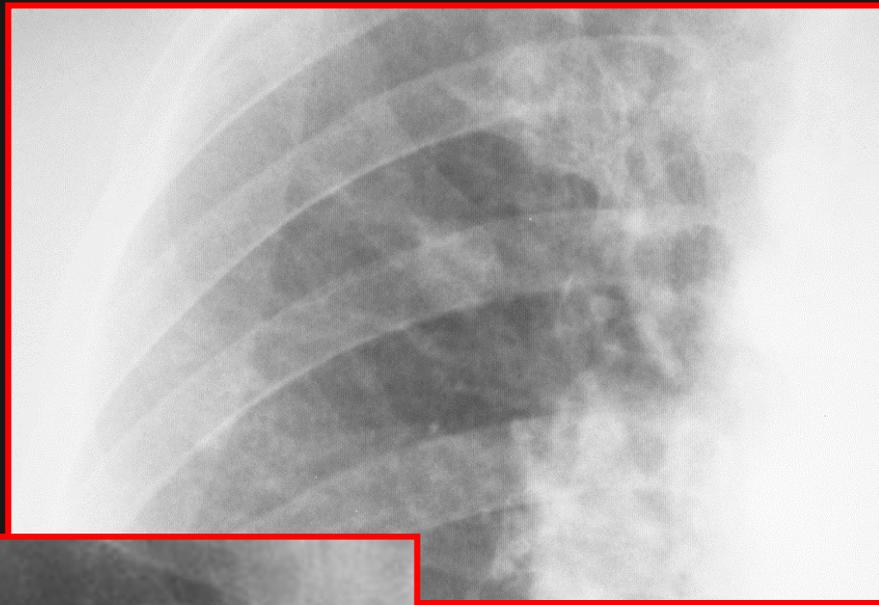
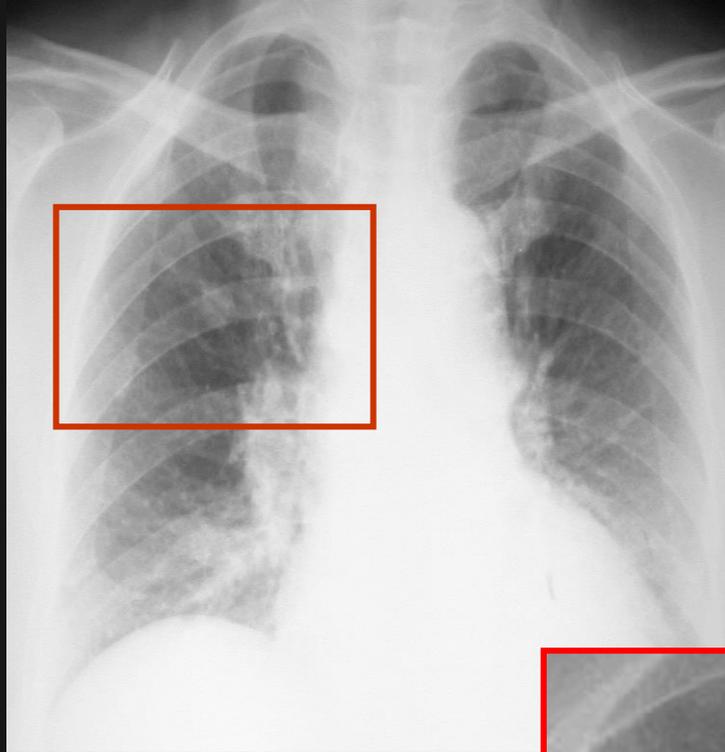


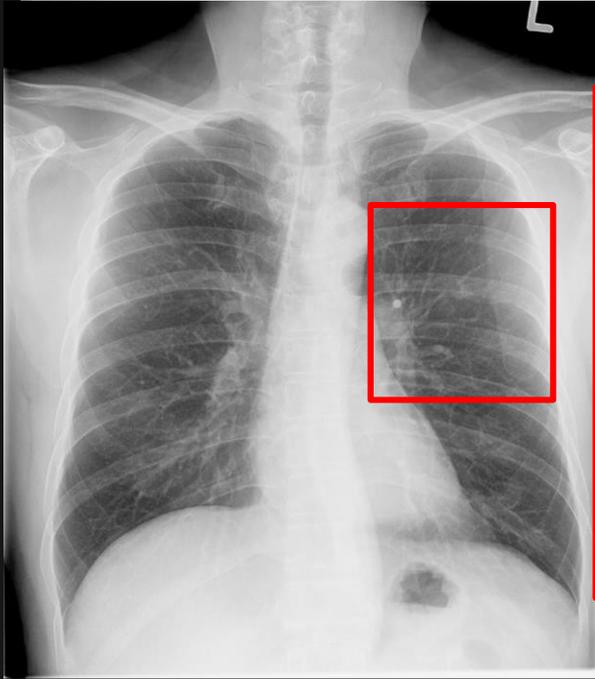
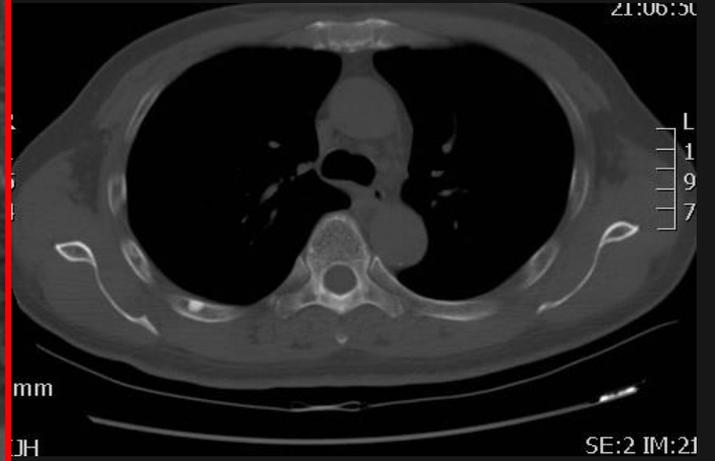
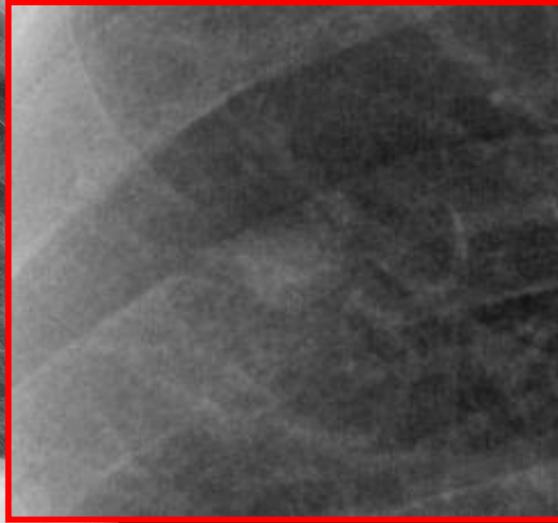
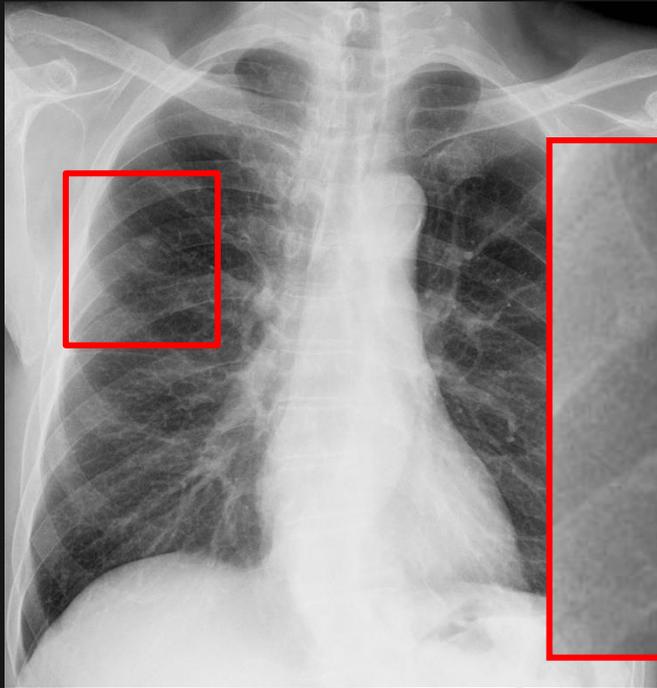
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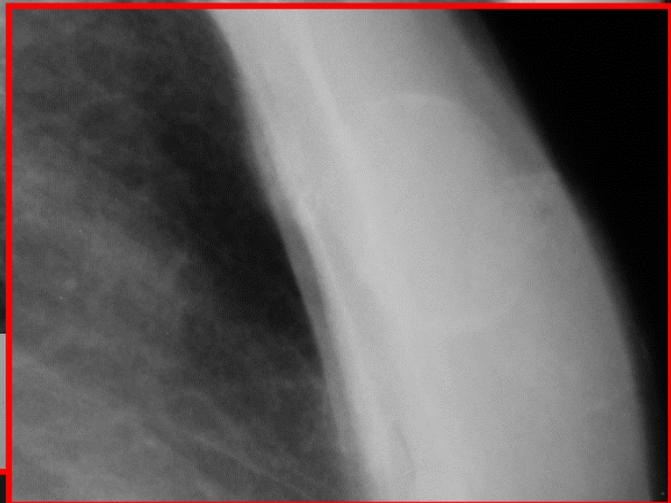
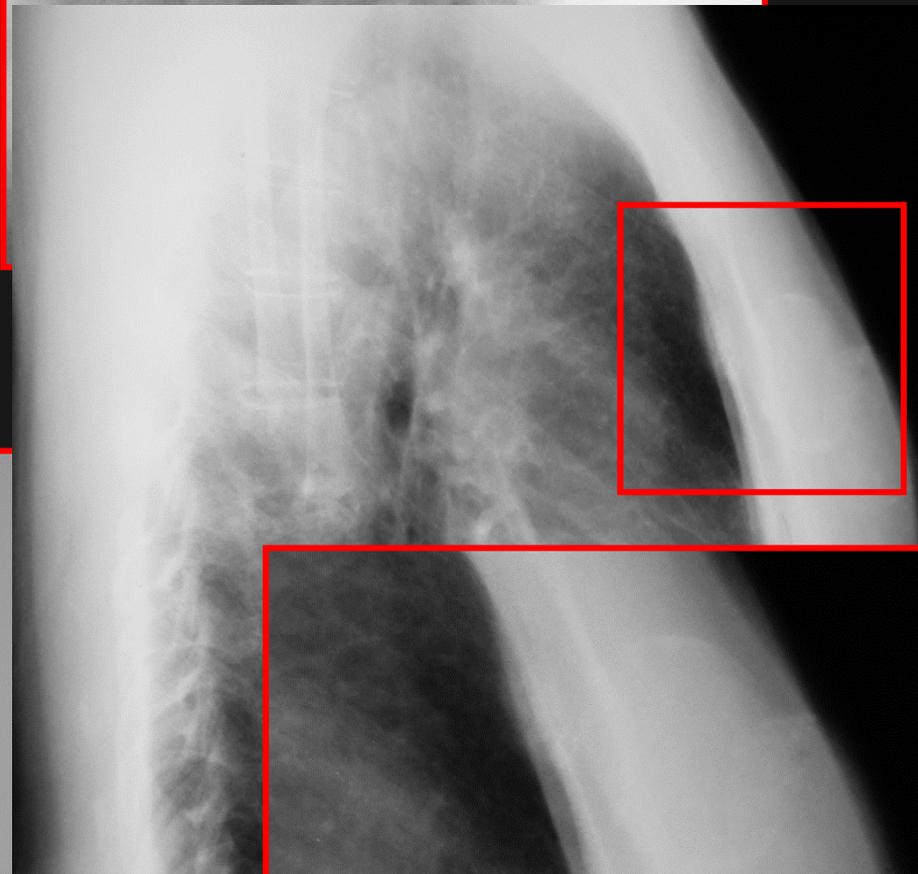
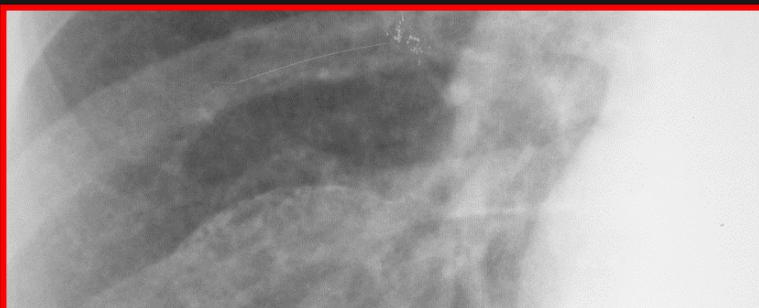
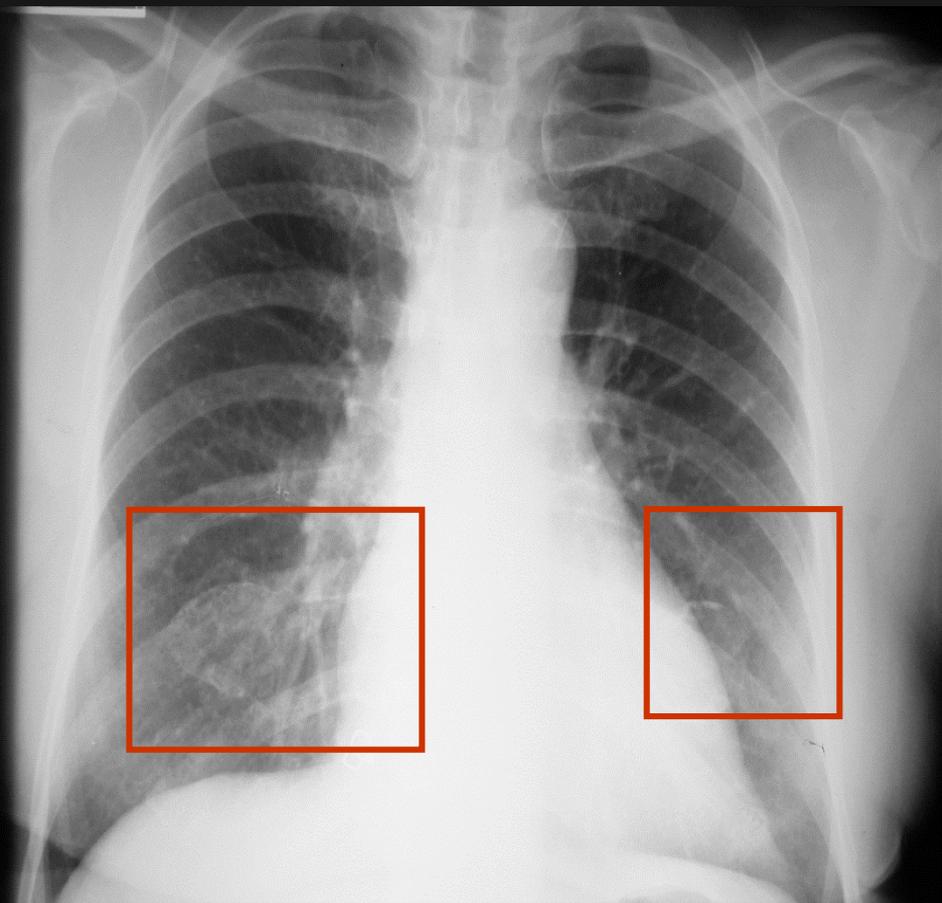


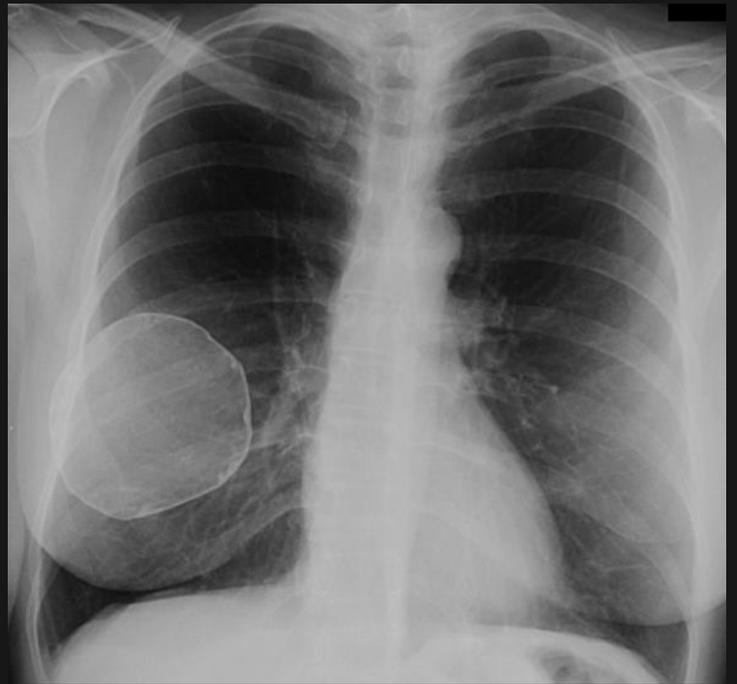
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Thank you for your attention

