

# Thoracic Radiology: Lung Disease

Robert T. O'Brien, DVM, MS, ACVR  
University of Illinois  
Urbana, IL

## Lung disease

The most important question to ask yourself is: Is the lung too opaque or too lucent? If the lung are diffusely or focally too opaque then use the pattern system (below).

### Pattern method

The pattern approach to interpreting lung lesions simplifies your life. For reasons of simplicity we will not discuss mixed patterns. Clinically when faced with a mixed pattern, identify the most severe ( i.e. alveolar or nodular).

#### Normal variants causing increased lung opacity

- Expiration: mild interstitial pattern
- Underexposure: mild interstitial pattern
- Geriatric patients: mild bronchial and interstitial patterns
- Obesity: mild interstitial pattern
- Collies: heterotopic bone mimic nodules
- Nipples, ticks, dirt, and costochondral junctions: mimic pulmonary nodules.

## Alveolar

This is the most mis- underdiagnosed pattern. The silhouette sign (=border effacement) is the hallmark radiographic sign of an alveolar disease. This manifest as the inability to see margins of heart, vessels or diaphragm. A particular form of the silhouette sign is the air bronchogram. This is the ability to see air in bronchial lumen surrounded by opaque lung. The analogy is “black tree branching in a snow storm”. The lobar sign indicates that the disease margins are limited precisely by the lung lobe margin and the disease seems to completely fill one lobe.

#### Causes: (HELP ME acronym)

- Blood (Hemorrhage)
- Water (Edema)
- Cells (neoplasia; Lymphoma in dogs, primary pulmonary neoplasia in cats)
- Pus (pneumonia; viral, bacterial or fungal)
- Atelectasis (detected by the Mediastinal shift when the alveoli are Empty)

## Bronchial

The hall mark of this pattern is thickened bronchi. This may be due to infiltration with inflammatory cells or edema.

#### Causes include

- bronchitis
- dogs: bacterial > allergic (eosinophilic)
- cats: allergic > bacterial (Mycoplasma)

## Vascular

Enlarged vessels the sole cause of increased opacity (see heart notes)

## Nodular interstitial

These are soft tissue nodules or masses in the lung

#### Causes

- Metastatic neoplasia
- mycotic pneumonia
- granuloma
- abscess
- hematoma, hematocele

## Unstructured interstitial

This pattern is the most commonly over diagnosed pattern. It is very common as a normal variant due to expiration or underexposure, and seen in geriatric or obese patients. It requires a high degree of skill to differentiate variants from true disease.

### Causes

- Lymphoma
- nonalveolarized edema (edema in transition: forming or resolving)
- Left-side heart failure (see above)
- Vasculitis (see above)
- atypical allergic/infectious pneumonitis

So a flow diagram for decision-making regarding pulmonary patterns is

Is there evidence of border effacement? No? ↓	If yes, → Alveolar
Are the bronchial walls more opaque or thickened? No? ↓	If yes, → Bronchial
Are there nodules or masses? No? ↓	If yes, → Structured interstitial
Then...	→ Unstructured interstitial

### References

O'Brien RT. Thoracic Radiology for the Small Animal Practitioner. Jackson, WY: Teton New Media; 2001;