Lung Tumors, Lung Lobectomy	A lung tumor that originates from the lung tissue (pulmonary) is called a primary lung lobe tumor. A tumor that grows in the lung tissue as a result of cancer cells that have been carried by the blood stream and into the lung tissue is called a metastatic lung tumor. Most primary lung lobe tumors come from glandular structures, such as adenocarcinoma or bronchogenic carcinoma, but they can also come from portions of the lung tissue that provide support, such as: • fibrosarcoma from fibrous tissue • chondrosarcoma from cartilage • hemangiosarcoma from blood vessels • other structures Dogs and cats that live in a household with smokers, or in environments high in some pollutants, such as asbestos, are at an increased risk for developing primary lung lobe tumors. Brachycephalic breeds are also at a greater risk than long nosed breeds. Signs and Symptoms: Dogs and cats that present with primary lung tumors are usually middle-aged or older. About 25% of dogs and cats with a primary lung tumor will have no clinical signs. These pets may have tumors found incidentally when thoracic (X-rays) are taken for some other reason. Some dogs and cats will present with the following: • cough • weight loss • lethargy • difficulty breathing • regurgitation • lameness associated with the spread of tumor to other sites • lameness associated with hypertrophic osteopathy which is a condition causing swelling and bony reaction along the bones of the lower extremities that may be secondary to a primary lung lobe tumor. Diagnosis: Lung tumors are diagnosed by thoracic radiographs (X-rays) or computed topography (CT) scan of the thorax (chest). Lung tumors are difficult to be seen on a radiograph (X-ray) until they are at least 10 to 12.7 mm in diameter (approximately a half inch in diameter). Tumors that are large or close to the thoracic wall can be sampled with a needle and syringe and submitted for cytology to try to determine the type of tumor. Commonly performed test to evaluate the pet's health include:

- blood work
- urinalysis are evaluated for evidence of other illnesses
- screening tests such as abdominal ultrasound or abdominal CT scan to evaluate for a primary lung tumor vs metastatic disease

Radiograph of a dog with a primary lung lobe tumor.

Radiograph of a dog with hypertrophic osteopathy affecting the radius, ulna, and metacarpal bones.

	Treatment: Single lung lobe tumors are removed surgically through a thoracotomy which is an incision in the side of the thorax. Pets found with multiple lung lobe tumors most commonly have metastatic disease and alternative treatments such as chemotherapy can be considered. Cats and dogs have two lungs, the right and left, and each lung is divided into several lobes that can be removed separately. Most lung lobe tumors are removed through a thoracotomy incision that is performed between the ribs, which are spread apart and then brought back together once the lung lobe has been removed. The blood vessels and bronchus to the effected lung lobe are either tied off with suture or with a stapler. Staplers are usually used since they are usually much faster. A chest tube is placed at the time of surgery to remove any fluid or air from the thoracic cavity after surgery. Chest tubes are usually kept in for 12–24 hours after the surgery. Intravenous fluid therapy and antibiotic medication is commonly administered after surgery and multiple types of pain preventives and treatment may be used, including: • intravenous drugs • pain patches (a patch that delivers drugs through the skin) • tablets or liquid when the pet is awake Postoperative care: After the surgery, the pet will stay in the hospital until the chest tube is removed, the pet is breathing well and pain can be managed with oral medications. Exercise is restricted for 4 to 6 weeks to allow the surgery site to heal. Some pets may wear a bandage for 1–2 weeks after the surgery. An Elizabethan collar or postoperative recovery suit is worn to prevent licking or chewing at the incision. Depending on the type of tumor determined on biopsy of the removed tissue, chemotherapy may be recommended. The veterinarian may suggest monitoring the thorax with radiographs in future to check for spread or recurrence of the tumor. Anesthesia is a risk in an older pet, but the risk increases in pets whose airways are diseased. Pets may be placed on ventilators during the surgery to keep them well oxygenated. Bleeding or air leakage can be a potential problem if the blood vessels or bronchus do not seal properly. Pain medications are necessary after the surgery, as animals that are in pain will not expand their lungs well and could suffer from low oxygen. Despite these potential complications, most dogs and cats survive the surgery. Prognosis: Survival after lung lobectomy for a primary lung lobe tumor averages one year or more in many cases. Studies have shown survival is longer when the tumor is smaller or located on the periphery of the lung lobe (15 to 17.5 months), when the lymph nodes are small (20 months) and when

	the tumor can be entirely removed. Survival also depends on the tumor type and is longer in dogs with adenocarcinomas that are completely removed (19 months) than dogs with squamous cell carcinomas (8 months). The best prognosis is in pets that have small diameter, well differentiated papillary carcinomas that are diagnosed before clinical signs occur and that have no evidence of lymph node spread. Cats are much more likely to have spread of their primary lung tumors, therefore, their prognosis may not be as good as dogs.