1. A 25-year-old woman has been admitted to hospital due to severe dyspnea of sudden onset. She mentions that lately she wakes up at night due to coughing. She also noticed an occasional wheezing sound during respiration. She has allergies; she has been smoking for 5 years, 5 cigarettes/day. Physical examination: diaphragm is found low by percussion, exhalation is prolonged, a bit of wheezing sound can be heard at the end.

Pulmonary function tests: FVC: 3.02 l (80%), FEV1: 1.52 l (45%).
Reversibility test with Salbutamol: FVC: 3.52 (95%) FEV1: 1.75 l (62 %)
What is the most likely diagnosis?

2. A 67-year-old man complains of coughing. He is currently producing large amounts of yellowish-greenish sputum that is more than the amount he usually has. It is hard for him even to go to the toilet, due to his severe dyspnea. He has been treated for hypertension and hyperlipidemia for years. He weighs 100 kg. He has been smoking since the age of 14, around 30 cigarettes/day. Physical examination: his lips are markedly cyanotic; exhalation is prolonged with occasional wheezing at the end. Bronchial ronchi can be heard.

ABG: pH: 7.35; pCO2: 43 mmHg, pO2: 54 mmHg
Pulmonary function tests: FVC 2.12 l (52 %) FEV1: 0.97 l (32%), TLC: 5.24 l (105%), RV: 3.27 (176%), Raw: 0.87 kPa·s/l.
Reversibility test with Salbutamol: FVC: 2.19 l (54%) FEV1: 1.01 l (33 %)
What type of ventilation defect is present? What is the most likely diagnosis?

3. A 55-year-old woman complains of toughening of her skin and of having fissures on her hands. She has been avoiding climbing stairs for years due to breathlessness. Her dyspnea got much worse in the last few years. Auscultation of the lungs does not reveal any abnormality. Chest radiography shows increased opacification on both sides, mostly at the bases, above the diaphragm. The heart appears enlarged to the right, the pulmonary trunks are thicker on both sides.

Pulmonary function tests: FVC: 3.01 l (64 %), FEV1:2.75 l (68%), TLCO:54 %,KLCO: 45%
ABG at rest: pH: 7.38, pCO2: 38 mmHg, pO2: 81 mmHg
ABG after 6 min of exercise: pH: 7.42; pCO2:34 mmHg, pO2: 75 mmHg
ECG: signs of right ventricular strain, P pulmonale
What type of ventilation defect is present? What additional tests should be performed? What is the possible diagnosis?

4. A 72 year old man presents at the ambulance due to severe dyspnea. He has a history of longstanding hypertension, two AMIs and coronary artery disease. At his admission he complains of progressing postural dyspnea.

RR: 160/100, heart rate: 108/min, rate of respiration: 22/min.
Blood gas: pH: 7,36, pCO_2: 40 Hgmm, pO_2: 72 Hgmm, O_2 saturation (without oxygen supplementation): 88%.
ECG: signs of LVH, ST elevation and significant Q waves in the anterior and lateral leads.
What other diagnostic tests would you indicate? What type of disease(es) could this patient have?

5. A 57 year old man four days after his knee replacement surgery complains of sudden, severe dyspnea and pain on the left side of his chest.

RR: 110/70, heart rate: 120/min, respiration rate: 28/min. Physical examination finds normal heart and lung status, the right lower limb is edematous, tender, erythematic and is warm compared to the left lower limb.
Blood gas: pH: 7,36, pCO_2: 40 Hgmm, pO_2: 72 Hgmm, O_2 saturation (without oxygen supplementation): 78%.
What other diagnostic tests would you indicate? What is the possible diagnosis?