Bibliographic Cite	PMID Link	Literature Type	Level of Evidence	Purpose	Population	Intervention and Outcome Measures	Results / Recommendations	Study Limitiations
Bajc M, Chen Y, Wang J, et al. Identifying the heterogeneity of COPD by V/P SPECT: A new tool for improving the diagnosis of parenchymal defects and grading the severity of small airways disease. Int J Chron Obstruct Pulmon Dis. 2017; 12:1579-1587.	28603413	Prospective, multi-center, multi-reader	Moderate	To diagnose and grade COPD severity and identify pulmonary comorbidities associated with COPD with V/P SPECT.	Ninety four patients with a clinical diagnosis of COPD, based on the 2011 revision of Global Initiative for Chronic Obstructive Lung Disease (GOLD) criteria with a postbronchodilator ratio of FEV1 over FVC < 0.70, were enrolled in 3 hospitals in Shanghai and Chongqing. Patients had a current or former smoking history (.10 pack years) or a verified biomass exposure, who were aged 40 years or older, and who had stable disease and no exacerbation or respiratory infection within 6 weeks prior to study entry. The patients had no allergic diathesis or a history of bronchial asthma, domiciliary oxygen, and no history of pulmonary resection, or concomitant major illness, or difficulties in cooperation. Pregnant or breast-feeding women were excluded.	Patients were examined with V/P SPECT and spirometry. Ventilation and perfusion defects were analyzed blindly according to the European guidelines. Penetration grade of Technegas in V SPECT measured the degree of obstructive small airways disease. Total preserved lung function and penetration grade of Technegas in V SPECT were assessed by V/P SPECT and compared to GOLD stages and spirometry.	Signs of small airway obstruction in the ventilation SPECT images were found in 92 patients. Emphysema was identified in 81 patients. Two patients had no signs of COPD, but both of them had a pulmonary embolism, and in one of them we also suspected a lung tumor. The penetration grade of Technegas in V SPECT and total preserved lung function correlated significantly to GOLD stages (r=0.63 and -0.60, respectively, P,0.0001). V/P SPECT identified pulmonary embolism in 30 patients (32%). A pattern typical for heart failure was present in 26 patients (28%). Parenchymal changes typical for pneumonia or lung tumor were present in several cases.	The limitation of this study is the dominance of men among the enrolled patients and the absence of a control group. High-resolution CT could be of added value for diagnosing nodular changes and to allow better delineation of emphysema. Further studies are required to measure the degree of obstructive small airways disease by V/P SPECT, particularly in “healthy smokers” with a normal pulmonary function on spirometry.
Chen H, Zeng QS, Zhang M, et al. Quantitative low-dose computed tomography of the lung parenchyma and airways for the differentiation between chronic obstructive pulmonary disease and asthma patients. Respiration. 2017; 94(4):366-374.	28738344	Prospective cohort	Low	To analyze quantitative measurements of the lung and bronchial parameters that are provided by low-dose computed tomography (CT) to differentiate COPD and asthma from an imaging perspective.	69 COPD patients (mean age 46.6; range 29-78 yrs; 68 males; mean BMI of 21.6), 52 asthma patients (mean age 46.6; range 18-65 yrs; 25 males; mean BMI of 23.33), and 20 healthy subjects (mean age 42.8; range 23-67 yrs; 10 males; mean BMI of 23.58) were recruited.	A 16-detector row CT scanner was used to image all the subjects. All the subjects underwent PFTs at 1 week after the CT examination. Comparative analysis was performed to identify differences between COPD and asthma in CT measurements. PFT measurements enabled validation of the differentiation between COPD and asthma patients.	There were significant differences among the COPD, asthma, and healthy control groups. The differences were more significant among inspiratory emphysema index, expiratory lung volume, expiratory mean lung density (MLD), and expiratory EI –950 (%) and EI –850 (%). The COPD group had a significantly higher EI –950 (%) than the asthma group (p = 0.008). There were significant differences among the three groups in lumen area, wall area, total area, and Pi10WA. The asthma group had significantly higher WA%/WV% than both the COPD (p = 0.002) and the control group (p = 0.012). The authors conclude that, to aid the diagnosis, CT can provide quantitative measurements to differentiate between COPD and asthma patients.	Study is primarily based on the quantification of CT images of subjects who had been diagnosed with COPD or asthma but not inflammation. In practice, CT images may not be specific in determining whether changes in airways are due to remodeling caused by asthma or inflammation.
den Harder AM, Snoek AM, Leiner G, et al. Can routine chest radiography be used to diagnose mild COPD? A nested case-control study. Eur J Radiol. 2017; 92:159-165.	28624014	Retrospective nested case control, single-center, multi-reader	Low	To determine whether mild stage COPD can be detected on chest radiography without substantial overdiagnosis	783 patients scheduled for cardiothoracic surgery - 155 mild COPD case patients (126 males; mean age 66.5; 24% never-smokers) and 155 controls (91 males; mean age 62.4; 45.8% never-smokers).	Patients underwent both spirometry and a chest radiograph preoperative. Diagnostic accuracy of chest radiography for diagnosing mild COPD was investigated using objective measurements and overall appearance specific for COPD on chest radiography. Inter-observer variability was investigated and variables with a kappa > 0.40 as well as baseline characteristics were used to make a diagnostic model which was aimed at achieving a high positive predictive value (PPV).	The PPV of overall appearance specific for COPD alone was low (37–55%). Factors in the diagnostic model were age, type of surgery, gender, distance of the right diaphragm apex to the first rib, retrosternal space, sternodiaphragmatic angle, maximum height right diaphragm (lateral view) and subjective impression of COPD (using both views). The model resulted in a PPV of 100%, negative predictive value (NPV) of 82%, sensitivity of 10% and specificity of 100% with an area under the curve of 0.811. The authors conclude that detection of mild COPD without substantial overdiagnosis was not feasible on chest radiographs in this cohort.	Only preoperative chest radiographs before cardiothoracic surgery were studied because in this patient population spirometry is routinely performed. The authors did not validate externally since the model was not clinically useful due to the limited number of COPD cases that can be detected. Also, in only 61% of patients with a chest radiograph, spirometry was performed. Also, subjective score included in the final model was based on the score of one observer.
Freund Y, Drogrey M, Miro O, et al. Association between pulmonary embolism and COVID-19 in emergency department patients undergoing computed tomography pulmonary angiogram: The PEPCOV international retrospective study. Acad Emerg Med. 2020; 27(9):811-820.	32734624	Retrospective, multi-center, single-reader	Low	To assess whether COVID-19 is associated with pulmonary embolism (PE) in emergency department (ED) patients who underwent a computed tomographic pulmonary angiogram (CTPA).	All patients who underwent a CTPA for suspected PE during the study period were included. Patients were selected from 26 centers from France, Spain, Belgium, Italy, Chile, and Canada. Patients with no COVID-19 status or inconclusive CTPA for the diagnosis of PE or in whom CTPA was performed for a reason other than “suspicion of PE” were excluded. The mean (+/-SD) age was 61 (+/-19) years and 1,695 (52%) were women.	The primary endpoint was the occurrence of a PE on CTPA. COVID-19 was diagnosed in the ED either on CT or reverse transcriptase–polymerase chain reaction. A multivariable binary logistic regression was built to adjust with other variables known to be associated with PE. A sensitivity analysis was performed in patients included during the pandemic period.	A total of 3,358 patients were included, of whom 105 were excluded because COVID-19 status was unknown, leaving 3,253 for analysis. Among them, 974 (30%) were diagnosed with COVID-19. A PE was diagnosed on CTPA in 500 patients (15%). The risk of PE was similar between COVID-19 patients and others (15% in both groups). In the multivariable binary logistic regression model, COVID-19 was not associated with higher risk of PE (adjusted odds ratio = 0.98, 95% confidence interval = 0.76 to 1.26). There was no association when limited to patients in the pandemic period. The authors conclude that, in ED patients who underwent CTPA for suspected PE, COVID-19 was not associated with an increased probability of PE diagnosis.	The authors note several limitations. First, patients were included only if a CTPA was performed in the ED. This inclusion bias limits ability to conclude whether or not these results can apply to the whole ED population with suspicion of PE and moreover to the general population. Second, defining the presence of COVID-19 in the ED may be difficult. Thirdly, it transpired that French EDs was a protective factor for PE (adjusted OR = 0.61, 95% CI = 0.48 to 0.78), which suggests different practice patterns across countries. Last, as a retrospective study, although the case record form was standardized, there was no monitoring of data collection methods in the six countries and 26 sites.

Gaia C, Chiara CM, Silvia L, et al. Chest CT for early detection and management of coronavirus disease (COVID-19): A report of 314 patients admitted to emergency department with suspected pneumonia. Radiol Med. 2020; 125(10):931-942.	32729028	Retrospective, single-center, multi-reader	Low	To assess the potential role of chest CT in the early detection of COVID-19 pneumonia and explore its role in patient management in an adult Italian population admitted to the emergency department.	314 patients (129 females, 185 males; mean age 59 ± 17 years) presenting with clinically suspected COVID-19.	Patients were evaluated with PaO2/FIO2 ratio from arterial blood gas, RT-PCR assay from nasopharyngeal swab sample and chest CT. Patients were classified as COVID-19 negative and COVID-19 positive according to RT-PCR results, considered as a reference. Images were independently evaluated by two radiologists blinded to the RT-PCR results and classified as “CT positive” or “CT negative” for COVID-19, according to CT findings.	According to RT-PCR results, 152 patients were COVID-19 negative (48%) and 162 were COVID-19 positive (52%). Authors found substantial agreement between RT-PCR results and CT findings ($p < 0.000001$), as well as an almost perfect agreement between the two readers. Mixed GGO and consolidation pattern with peripheral and bilateral distribution, multifocal or diffuse abnormalities localized in both upper lung and lower lung, in association with interlobular septal thickening, bronchial wall thickening and air bronchogram, showed higher frequency in COVID-positive patients. Results also found a significant correlation between CT findings and patient’s oxygenation status expressed by PaO2/FIO2 ratio. The authors conclude that chest CT has a useful role in the early detection and in patient management of COVID-19 pneumonia in a pandemic.	The authors note that they have not made a comparison with X-rays, which have been rarely performed according to hospital guidelines because the Unit of Emergency Radiology has a dedicated CT room for suspected COVID-19 patients; as a result, this diagnostic strategy probably cannot be adopted in all hospitals in the region.
Gross A, Heine G, Schwarz M, et al. Structured reporting of chest CT provides high sensitivity and specificity for early diagnosis of COVID-19 in a clinical routine setting. Br J Radiol. 2021; 94(1117):20200574.	33245241	Retrospective, single-center, multi-reader	Low	To report the diagnostic performance of chest CT using structured reporting in a routine clinical setting during the early phase of the epidemic.	Patients with clinical suspicion of COVID-19 and moderate-to- severe symptoms were eligible. Unstable patients requiring urgent invasive ventilation, who had chest CT later during their hospital stay, were not included. Moreover, patients with RT-PCR results available prior to CT or patients with COVID-19 pneumonia detected coincidentally on CT performed for other indications were not considered. A total of 96 patients (50 males and 46 females, age 17–98 years, mean age 64 years) were ultimately included.	CTs were performed and reported before RT-PCR results (reference standard) became available. A structured reporting system was used that concluded in a recently described five-grade score (“CO-RADS”), indicating the level of suspicion for pulmonary involvement of COVID-19 from 1 = very low to 5 = very high. Structured reporting was performed by three Radiologists in consensus.	CT features significantly more common in RT-PCR-positive patients were ground-glass opacities as dominant feature, crazy paving, hazy margins of opacities, and multifocal bilateral distribution ($p < 0.05$). Using a cut-off point between CO-RADS 3 and 4, sensitivity was 90%, specificity 91%, positive predictive value 72%, negative predictive value 97%, and accuracy 91%. ROC analysis showed an AUC of 0.938. The authors conclude that structured reporting of chest CT with a five-grade scale provided accurate diagnosis of COVID- 19. Its use was feasible and helpful in clinical routine. They note that chest CT with structured reporting may be a provisional diagnostic alternative to RT-PCR testing for early diagnosis of COVID-19, especially when RT-PCR results are delayed or test capacities are limited.	Study was retrospective in nature and had a limited number of patients, particularly in the COVID-19 group. Despite encouraging results, authors note that they regard the CO-RADS scoring system as provisional. It was introduced rapidly at the beginning of the epidemic in Germany in an attempt to cope with the expected surge of patients as adequately as possible, based on the scientific data available at the time.
Henzler C, Henzler T, Buchheidt D, et al. Diagnostic performance of contrast enhanced pulmonary computed tomography angiography for the detection of angioinvasive pulmonary aspergillosis in immunocompromised patients. Sci Rep. 2017; 7(1):4483.	28667276	Retrospective, single-center, multi-reader	Low	To evaluate the diagnostic accuracy of CTPA in a cohort including non-hematologic immunocompromised patients.	455 immunocompromised patients with proven/probable IPA based on the 2008 EORTC/MSG consensus definitions. Forty-five equally immunocompromised patients with pulmonary infiltrates but no evidence of IPA based on the EORTC/MSG criteria served as a control group (NoIPA group). Among the 78 receiving CTPA, there were 51 males, with a mean age of 60 years.	CTPA studies of 78 consecutive immunocompromised patients with proven/probable IPA were analyzed. 45 immunocompromised patients without IPA served as a control group. Diagnostic performance of CTPA-detected VOS and of radiological signs that do not require contrast-media were analyzed.	Of 12 evaluable radiological signs, five were found to be significantly associated with IPA. The VOS showed the highest diagnostic performance with a sensitivity of 0.94, specificity of 0.71 and a diagnostic odds-ratio of 36.8. Regression analysis revealed the two strongest independent radiological predictors for IPA to be the VOS and the halo sign. The VOS is highly suggestive for IPA in immunocompromised patients in general. The authors conclude their study demonstrates that VOS as observed on CTPA examinations is superior to classic CT signs observed in non-contrast enhanced studies to diagnose invasive pulmonary aspergillosis in immunocompromised patients.	Due to the retrospective monocentric design, a selection bias is possible. The prolonged timeframe of the study - with possible changes in patient mgmt and procedures - might have indirectly affected the results. Although CTPA techniques could have varied during the observation period, it appears however, difficult to conceive a direction of bias due to this variation, furthermore the decision to perform CTPA instead of non-contrast enhanced CT was left at the radiologists discretion, possibly representing a confounder.

Loubet P, Tubiana S, Claessens YE. Community-acquired pneumonia in the emergency department: An algorithm to facilitate diagnosis and guide chest CT scan indication. Clin Microbiol Infect. 2020; 26(3):382.e1-382.e7.	31284034	Post hoc analysis of a multicenter, prospective, interventional study	Low	To create and validate a community-acquired pneumonia (CAP) diagnostic algorithm to facilitate diagnosis and guide chest CT scan indication in patients with CAP suspicion in emergency departments (ED).	319 patients previously enrolled in the ESCAPED study, a multicenter, prospective, interventional study conducted in the ED of four tertiary teaching hospitals in Paris, France. 164 patients were males (51%), with median age of 68 (range 51-81). A total of 177 fans (55%) were age ≥ 65 years of age.	Analysis of CAP suspected patients enrolled in the ESCAPED study who had undergone chest CT scan and detection of respiratory pathogens through nasopharyngeal PCRs. An adjudication committee assigned the final CAP probability (reference standard). Variables associated with confirmed CAP were used to create weighted CAP diagnostic scores. Authors estimated the score values for which CT scans helped correctly identify CAP, therefore creating a CAP diagnosis algorithm. Algorithms were externally validated in an independent cohort of 200 patients consecutively admitted in a Swiss hospital for CAP suspicion.	Among the 319 patients included, 51% (163/319) were classified as confirmed CAP and 49% (156/319) as excluded CAP. Cough (weight ¼ 1), chest pain (1), fever (1), positive PCR (except for rhinovirus) (1), C-reactive protein 50 mg/L (2) and chest X-ray parenchymal infiltrate (2) were associated with CAP. Patients with a score below 3 had a low probability of CAP (17%, 14/84), whereas those above 5 had a high probability (88%, 51/58). The algorithm (score calculation þ CT scan in patients with score between 3 and 5) showed sensitivity 73% (95% CI 66-80), specificity 89% (95% CI 83-94), positive predictive value (PPV) 88% (95% CI 81-93), negative predictive value (NPV) 76% (95% CI 69-82) and area under the curve (AUC) 0.81 (95% CI 0.77-0.85). The algorithm displayed similar performance in the validation cohort (sensitivity 88% (95% CI 81-92), specificity 72% (95% CI 60-81), PPV 86% (95% CI 79-91), NPV 75% (95% CI 63-84) and AUC 0.80 (95% CI 0.73-0.87). The authors conclude that their diagnostic algorithm may help reduce CAP misdiagnosis and optimize the use of chest CT scan.	The authors acknowledge some limitations. They did not use other microbiological results in order to be in line with the data available within the few hours after ED admission. Also, it is not known if performing these additional CT scans is logically feasible in imaging departments. Third, it is unknown whether the time interval to obtain the results of multiplex respiratory panels in its crrent use will postpone the use of CT scan and thus may jeopardize the treatment initiation. Finally, although fewer than half of the patients were younger than 65 years, it has to be underlined that the authors only validated the algorithms in a cohort of patients older than 65.
Manners D, Wong P, Murray C, et al. Correlation of ultra-low dose chest CT findings with physiologic measures of asbestosis. Eur Radiol. 2017; 27(8):3485-3490.	28083692	Prospective observational, single-center, multi-reader	Moderate	To determine the relationship between ultra-low dose computed tomography (ULDCT)-detected interstitial lung disease (ILD) and measures of pulmonary function in an asbestos-exposed population.	Subjects were included in this study if they had undergone a ULDCT chest examination through the ARP and had concurrent gas transfer measurements (±1 week from imaging) in the first 12 months of the ULDCT program. From 906 participants who underwent ULDCT in the first year, 143 had concurrent DLCO measurements and were included in this analysis. Of the 143 participants, 92% were male and median age was 73.0 years.	Asbestos exposure estimates were available for former Wittenoom workers and residents derived from employment records, dust measurements and fibre count surveys conducted in and around the town and mine site. Two thoracic radiologists independently categorised prone ULDCT scans from participants for ILD appearances as absent (score 0), probable (1) or definite (2) without knowledge of asbestos exposure or lung function. Pulmonary function measures included spirometry and diffusing capacity to carbon monoxide (DLCO).	Of the 143 ULDCTs, 80 (55.9%) were reported as no ILD, 25 (17.5%) were recorded as probable ILD and 38 (26.6%) were reported as definite ILD. Inter-observer agreement between the radiologists was good (k=0.613, p<0.001). Pleural plaques were recorded in 67.8% of the cohort, emphysema in 25.1% and honeycombing in 11.1%. There was a statistically significant correlation between ILD score and both per cent predicted FEV1 and FVC (r = -0.17, p=0.04 and r = -0.20, p = 0.02), but not with cumulative asbestos exposure (r = 0.04, p = 0.69) or FEV1/FVC ratio (r = -0.01, p=0.88). There was a strong correlation between ILD score and DLCO (r = -0.34, p<0.0001). Authors conclude that In asbestos-exposed populations, ULDCT may be adequate to detect radiological changes consistent with asbestosis.	Wittenoom workers and residents in this study are arguably not representative of the general asbestos-exposed population. There was no tissue diagnosis for the ILD visualized in this study; therefore, it is not certain that asbestosis has been demonstrated. HRCT is unable to distinguish the appearances of UIP from IPF or asbestosis.
Prendki V, Scheffler M, Huttner B, et al. Low-dose computed tomography for the diagnosis of pneumonia in elderly patients: A prospective, interventional cohort study. Eur Respir J. 2018; 51(5):1702375.	29650558	Prospective, single-center, single-reader	Low	To assess whether low-dose computed tomography (LDCT) modified the probability of diagnosing pneumonia in elderly patients.	A total of 200 patients with a median age of 84 years were included. All patients had suspicion of CAP or hospital-acquired pneumonia, and were bein treated with antimicrobial therapy (AT) for that indication.	All patients had a chest radiograph and LDCT within 72 h of inclusion. The treating clinician assessed the probability of pneumonia before and after the LDCT scan using a Likert scale. An adjudication committee retrospectively rated the probability of pneumonia and was considered as the reference for diagnosis. The main outcome was the difference in the clinician's pneumonia probability estimates before and after LDCT and the proportion of modified diagnoses which matched the reference diagnosis (the net reclassification improvement (NRI)).	After LDCT, the estimated probability of pneumonia changed in 90 patients (45%), of which 60 (30%) were downgraded and 30 (15%) were upgraded. The NRI was 8% (NRI event (−6%) + NRI non-event (14%)). LDCT modified the estimated probability of pneumonia in a substantial proportion of patients. It mostly helped to exclude a diagnosis of pneumonia and hence to reduce unnecessary AT. The present results should encourage clinicians to consider performing LDCT in pneumonia diagnostic recommendations in elderly patients, especially in patients with intermediate probability. It can help to exclude a diagnosis of pneumonia, encourage the search for an alternate diagnosis and reduce unnecessary AT. These results should be confirmed in a randomised clinical trial including the discontinuation of antimicrobials in patients with negative LDCT scans.	The authors note some limitations to this work. First, the study was performed in a single center, limiting the degree to which results could be generalized. Secondly, the inclusion criteria did not allow an accurate estimate of underdiagnosis of pneumonia, as only patients with a pneumonia probability warranting an AT were included. Thirdly, a health economic assessment of the diagnostic imaging tests would have been interesting. Finally, choice of a consensus reference diagnosis could be criticized because of its low concordance.

Revel, MP, Boussouar S, de Margerie-Mellon, et al. Study of thoracic CT in COVID-19: The STOIC Project. Radiology. 2021: 210384.	8267782	Retrospective, multicenter, single reader	Low	To create a large publicly available dataset and assess the diagnostic and prognostic value of CT in COVID-19 pneumonia.	Patients presenting at the emergency departments of 20 French university hospitals. A total of 10,930 subjects were screened for eligibility, with 10,735 (median age 65 years, range 51-77 years) included.	Patients underwent both thoracic CT and RT-PCR for suspected COVID-19 pneumonia. CT images were read blinded to initial reports, RT-PCT, demographic characteristics, clinical symptoms, and outcome. Readers classified CT scans as positive or negative for COVID-19, based on criteria published by the French Sciety of Radiology. Multivariable logistic regression was used to develop a model preicting severe outcome at 1-month follow-up in subjects positive for both RT-PCR and CT, using clinical and radiological features.	A total of 6,448 patients (60%) had a positive RT-PCR results. With RT-PCR as reference, the sensitivity and specificity of CT were 80.2% (95%CI: 79.3, 81.2) and 79.7% (95%CI: 78.5, 80.9), respectively with strong agreement between junior and senior radiologists (Gwet's AC1 coefficient: 0.79). Of all variables analyzed, the extent of pneumonia on CT (OR 3.25, 95%CI: 2.71, 3.89) was the best predictor of severe outcome at one month. A score based solely on clinicl variables predicted a severe outcome with an AUC of 0.64 (95%CI: 0.62, 0.66), improving to 0.69 (95%CI: 0.6, 0.71) when it also included the extent of pneumonia and coronary calcium score on CT. The authors conclude that, using pre-defined criteria, CT reading is not influenced by reader's experience and helps predict the outcome at one month.	The authors note the following limitations. First, they did not repeat all first negative PCR tests, probably leading to an underestimation of CT specificity. Second, double readings were not systematically planned for evaluating intra and inter reader agreements. Third, BMI data was missing in too many subjects to be able to be included in the clinical model. Fourth, authors did not include biological parameters. Lastly, they defined poor outcome as the risk for intubation at one point or death at 1-month follow-up.
Salisbury ML, Xia M, Murray S, et al. Predictors of idiopathic pulmonary fibrosis in absence of radiologic honeycombing: A cross sectional analysis in ILD patients undergoing lung tissue sampling. Respir Med. 2016; 118:88-95.	27578476	Prospective cross-sectional, multi-center, multi-reader	Low	To investigate predictors of IPF and combinations allowing accurate diagnosis in individuals without honeycombing.	200 patients enrolled in the Lung Tissue Research Consortium. The mean age was 64.5 years (SD 8.5) with 52% males, 53% ever-smokers, and mean percent-predicted FVC of 69.2% (SD 15.4).Included patients had no honeycombing, no connective tissue disease, underwent diagnostic lung biopsy, and had CT pattern consistent with fibrosing ILD	HRCT Images were obtained locally and interpreted centrally by radiologists trained in semi quantitative scoring of parenchymal findings. Of interest were the presence and extent of bronchiectasis, consolidation, ground glass density, mosaic attenuation, air trapping, reticular density, micronodules, and septal thickening. The outcome of interest is a final clinical diagnosis of IPF, determined by the LTRC investigator at the referring center. Multidisciplinary diagnosis discussion (with review of pertinent clinical, laboratory, histopathologic, and radiologic data) was standard at all centers, and investigators followed current guidelines in assigning ILD diagnoses.	A multivariable model adjusted for age and gender found increasingly extensive reticular densities (OR 2.93, CI 95% 1.55-5.56, p= 0.001) predicted IPF, while increasing ground glass densities predicted a diagnosis other than IPF (OR 0.55, CI 95% 0.34-0.89, p =0.02). The model-based probability of IPF was 80% or greater in patients with age at least 60 years and extent of reticular density one-third or more of total lung volume; for patients meeting or exceeding these clinical thresholds the specificity for IPF is 96% (CI 95% 91-100%) with 21 of 134 (16%) biopsies avoided.	Frist, experts trained for LTRC radiology core participation analyzed HRCT scans, so findings may not be generalizable to a community-based population. Second, only one radiologist scored each HRCT so inter-observer variation in interpretation is unassessed. Similar semi-quantitative methods of fibrosis assessment have moderate to good inter-observer agreement. Third, centers without access to expert thoracic radiologists, pathologists, ILD physicians, or a mechanism for multidisciplinary case review should apply these results with caution and consider referral when appropriate
Seo H, Cha SI, Chin KM, et al. Community-acquired pneumonia with negative chest radiography findings: Clinical and radiological features. Respiration. 2019; 97(6):508-517.	30625485		Low	To investigate the clinical and radiological features of patients with community-acquired pneumonia (CAP) identified on chest computed tomography (CT) but not on chest radiography (CR).	1,925 CAP patients were identified. The patients were classified into the negative CR (n = 94 [4.9%]) and control (n = 1,831) groups. Patients with hospital-acquired pneumonia, healthcare-associated pneumonia, or an active thoracic malignancy, and those taking immunosuppressants or corticosteroids (> 15 mg/day of prednisone for > 14 days) were excluded. Age of patients ranged from 52-77 years old.	CR images were reviewed by two chest physicians and presence or absence of pneumonic lesions, including consolidation, infiltrate, or pleural effusion, was checked. The patients were classified into two groups: (1) CAP patients with negative CR but positive CT findings (negative CR group) and (2) those with positive CR as well as CT findings (control group). Two chest radiologists reviewed the chest CT scans of CAP patients for the presence of consolidation, ground-glass opacity (GGO), and centrilobular nodules or tree-in-bud appearance.	Negative CR findings could be attributed to the location of the lesions (e.g., those located in the dependent lung) and CT pattern with a low attenuation, such as ground-glass opacity (GGO). The negative CR group was characterized by a higher frequency of aspiration pneumonia, lower incidences of complicated parapneumonic effusion or empyema and pleural drainage, and lower blood levels of inflammatory markers than the control group. On CT, the negative CR group exhibited higher rates of GGO- and bronchiolitis-predominant patterns and a lower rate of consolidation pattern. Despite shorter length of hospital stay in the negative CR group, 30-day and in-hospital mortalities were similar between the two groups. The authors conclude that CAP patients with negative CR findings are characterized by lower blood levels of inflammatory markers, a higher incidence of aspiration pneumonia, and a lower incidence of complicated parapneumonic effusion or empyema than those with positive CR findings. Chest CT scan should be considered in suspected CAP patients with a negative CR, especially in bedridden patients.	First, because the present study was retrospectively conducted in a single institution, the possibility of selection bias should be considered. Due to the retrospective nature of this study, not all patients underwent the same tests for etiologic agents, including atypical pathogens. Furthermore, evaluation for respiratory viruses was performed in only some of the patients. Third, since this was a retrospective study, the selection of antibiotics was based on the judgment of the attending physicians. Finally, the number of patients in the negative CR group was too small to allow authors to reach definitive conclusions.

Som A, Lang M, Yeung T, et al. Implementation of the Radiological Society of North America expert consensus guidelines on reporting chest CT findings related to COVID-19: A multireader performance study. Radiol Cardiothorac Imaging. 2020; 2(5):e200276.	33778625	Retrospective, single-center, multi-reader	Low	To assess the performance of the Radiological Society of North America (RSNA) guidelines and quantify interobserver variability in application of the guidelines in patients undergoing chest CT for suspected coronavirus disease 2019 (COVID-19) pneumonia.	A total of 89 patients with CT scans meeting inclusion criteria were included in this study. The population had a mean age of 60.8 years and 41 (46%) were women. The majority had presenting symptoms of fever (57%), cough (60%), and shortness of breath (58%). The most common comorbidity was hypertension (53%). Of the patients included, 36 (40.4%) tested positive for COVID-19 by RT-PCR, and 53 (59.6%) were negative for COVID-19 infection.	A retrospective search identified 89 consecutive CT scans whose radiologic report mentioned COVID-19. One positive or two negative reverse-transcription polymerase chain reaction tests for COVID-19 were considered the reference standard for diagnosis. Each chest CT scan was evaluated using RSNA guidelines by nine readers (six fellowship-trained thoracic radiologists and three radiology resident trainees). Clinical information was obtained from the electronic medical record.On average, CT scans were performed 6.9 days (95% CI: 5.3, 8.4) from start of reported symptoms.	There was strong concordance of findings between radiology training levels with agreement ranging from 60% to 86% among attending physicians and trainees (k, 0.43 to 0.86). Sensitivity and specificity of typical CT findings for COVID-19 per the RSNA guidelines were on average 86% (range, 72%–94%) and 80.2% (range, 75%–93%), respectively. Combined typical and indeterminate findings had a sensitivity of 97.5% (range, 94%–100%) and specificity of 54.7% (range, 37%–62%). A total of 163 disagreements were seen out of 801 observations (79.6% total agreement). Uncertainty in classification primarily derived from difficulty in ascertaining peripheral distribution, multiple dominant disease processes, or minimal disease. The authors conclude that the typical appearance category for COVID-19 CT reporting has an average sensitivity of 86% and specificity rate of 80%. There is reasonable interreader agreement and good reproducibility across various levels of experience.	While all studies categorized as negative for pneumonia were found to be RT-PCR negative in the cohort, an absence of CT findings does not exclude the possibly of COVID-19 infection. Prior studies have shown that chest CT may appear normal during early stages of infection or in those that are asymptomatic. However, in these prior studies, CT was used a screening and diagnostic tool, whereas the use of CT in our study was primarily for assessment of complications or guiding management in difficult cases. Thus, there may be possible selection bias in the study as patients are all symptomatic at the time of imaging. Future studies with larger cohort size are needed to better detail the prevalence of normal CT findings in patients with COVID-19 infection.
Takahashi M, Nitta N, Kishimoto T, et al. Computed tomography findings of arc-welders' pneumoconiosis: Comparison with silicosis. Eur J Radiol. 2018; 107:98-104.	30292280	Cohort study, multi-center, multi-reader	Moderate	To assess the CT appearance of arc-welders' pneumoconiosis (AWP) using semi-quantitative methods and compare the findings with those of silicosis.	A total of 66 arc welders who were seen at 3 institutes were analyzed. The cases who visited each institute for a regular health check for workers who had histories of fume dust exposure were consecutively collected from Jul 2014 to May 2015. All were men, with a mean age of 64.3 years (range, 49–84 years), who were exposed to dust fumes for a mean duration of 35.9 years (range, 9–55 years). All these subjects have been diagnosed at each institute as AWP based on occupational history and clinical findings. For comparison, 33 cases of silicosis were recruited from 1 institute. The cases who visited an institute for a regular health check for workers who had histories of silica dust exposure were consecutively collected from Oct 2014 to Jan 2015. 30 subjects were men and 3 were women with a mean age of 74.0 years (range, 58–83 years) and who were exposed to silica dust for a mean duration of 37.8 years (range, 8–48 years). In both the AWP and silicosis groups, there were 16 and 0 current smokers (mean Brinkman Index (BI): 664.0), respectively; 41 (mean BI: 764.0) and 26 (mean BI: 882.3) ex-smokers, respectively; and 9 and 7 never-smokers, respectively.	All the subjects in both the AWP and silicosis groups underwent digital chest radiograph and CT for the purpose of regular health check, according to the Japanese workplace health management system. The CT images were interpreted according to the International Classification of HRCT for Occupational and Environmental Respiratory Diseases (ICOERD). Data on the profusion score by chest radiograph were also compared with CT score.	Ill-defined centrilobular nodules, ground-glass opacity (GGO) and centrilobular branching opacity were more frequently observed ($p=0.0031$) in AWP, whereas well-defined rounded opacity ($p < 0.0001$), progressive massive fibrosis ($p < 0.0001$), and mediastinal lymphadenopathy ($p < 0.0001$) were more frequently observed in silicosis. Regarding lung nodules, there was a high correlation between the ICOERD and CXR profusion scores in silicosis, but CXR underestimated AWP.	First, in this cohort, pathological proof was not obtained and the diagnosis of AWP was established only by clinical findings and occupational history. As described above, the possibility of disorders other than AWP, such as smoking-related diseases, could not be confidently excluded because almost all of the workers in this study were smokers. Second, the imaging protocol for the workers was not fixed because the cohort was recruited from 3 different institutes. Therefore, the different technical factors of CT scan might have influenced the incidence of each CT finding. Third, although the ICOERD was used with some modification for semi-quantitative analysis, it did not contain enough imaging references, especially for ill-defined centrilobular nodules/GGO or branching opacity. Therefore, subjective bias on the grading for each CT finding cannot be completely excluded.

Tamada T, Sugiura H, Takahashi T, et al. Coexisting COPD in elderly asthma with fixed airflow limitation: Assessment by Dlco %predicted and HRCT. J Asthma. 2017; 54(6):606-615.	27780366	Cross-sectional, multi-center, multi-reader	Low	To assess the prevalence of patients with both fixed airflow limitation (FL) and COPD components in elderly asthma.	242 asthma outpatients. All patients were over 50 years old and in a stable period at the time of enrollment. 131 (54.1%) were male and 111 (45.9%) were female. Then, 41(31.3%) of the males and 84 (75.7%) of the females were never smokers. Most asthma patients had normal levels of post-BDs FVC %predicted (98.1 ± 14.9%) and post-BDs FEV1%predicted (85.9 ± 18.5%), but had relatively decreased levels ofpost-BDs FEV1/FVC (70.3 ± 10.8%). And, 96 (39.7%) of subjects had experienced at least one severe exacerbation, and a history of allergic rhinitis existed in 127 (52.5%) cases.	Pulmonary function tests were performed in all patients after the inhalation of bronchodilators under the treatment for asthma. Each patient underwent a multi detector chest CT scanning with deep breath holding in the supine position in one of the 5 study locations.	The prevalence of patients with FEV1/FVC <70% was 31.0% of those in their SOs, 402% of those in their 60s and 61.9% of those in their 70s or older. The prevalence of those patients with lung diffusion impairment (i.e. the percent predicted values of diffusing capacity of the lung for carbon monoxide (DLco %predicted) <80%) or emphysematous findings in HRCT (i.e. the appearance of low attenuation area (LAA)) was 183% of those in their 50s, 13.8% of those in their 60s and 35.7% of those in their 70s or older.	There are several limitations in this study, because the study design is a descriptive study, not an intervention study. First, the authors did not confirm the pathological abnormalities such as destruction of the alveolarwalls, increased numbers of macrophages or CD8 T lymphocytes in the peripheral airways and peribronchial fibrosis/narrowing. However, as mentioned above, the decrease in DEco %predicted or the appearance of LAA in HRCT does not seem to be observed in senile lung, but in only COPD. Second, what this study could detect was only an emphysematous phenotype of COPD, but not a non-emphysematous COPD phenotype. Third, this study lacks data concerning the relationship between coexisting COPD in elderly asthmatics and the severity of asthma. Fourth, information about the role of comorbid conditions in elderly asthmatics is also lacking in this study.