Table 1.
Studies of pulmonary function testing in HIV-infected individuals in the cART era

Location	Study period	Author	Study type	Population and demographics	Key findings
Los Angeles, United States	2003-04	George et al. (2009)	Cross sectional Spirometry	234 HIV clinic outpatients 60% current smokers	31.5% respiratory symptoms, airflow obstruction: **Increasing age, smoking pack-year history, previous bacterial pneumonia and use of cART**
Copenhagen, Denmark	2000-07	Kristoffersen et al. (2012)	Prospective cohort study median follow up 4.4 years of spirometry and TLCO	63 patients with previous lung function testing followed up 48% current smokers	FEV1:FVC <0.7 10% at baseline, 19% at follow up. Reduced TLCO in smoking HIV-infected patients, decline during follow-up also in non-smokers
Pittsburgh, United States	2007-09	Gingo et al. (2010)	Cross sectional Spirometry pre and post bronchodilator and TLCO	167 HIV clinic outpatients 53% current smokers	64% respiratory symptoms (dyspnoea>cough) TLCO <80% predicted in 64% airflow obstruction: s**moking pack-year history, intravenous drug use and use of cART**
Baltimore, United States	2007-09	Drummond et al. (2012)	Retrospective cross sectional review of spirometry	1,077 people in inner city area with history of IVDU (303 HIV) 86% current smokers	16% FEV1:FVC<0.7, airflow obstruction: **Higher HIV viral load** (>200,000 copies/ml)
Philadelphia, United States	2008-09	Hirani et al. (2011)	Cross sectional Spirometry	98 HIV clinic outpatients 55% current smokers	16% FEV1:FVC <0.7 and 14% airflow obstruction in never smokers. Association with: **increasing age, intravenous drug use, smoking pack-year history and previous PCP**
Hamilton, Canada	<2010	Cui et al. (2010)	Cross sectional Spirometry	119 HIV clinic outpatients 44% current smokers	20% abnormal spirometry 12% airway obstruction (FEV1:FVC<70%)
Baltimore, United States	2007-10	Drummond et al. (2013)	Longitudinal analysis of spirometry in AIDS Linked to the Intravenous Experience study (Median follow up 2.75 years)	1064 (316 HIV infected) 85% current smokers	No significant decline in HIV compared to non-HIV group. HIV-patients with CD4 >200 cells/ml had no difference to HIV uninfected. Decline in FEV1 and FVC associated with **HIV viral load >75,000 copies/ml and CD4 <100ml/l**

Table 2.
Differential diagnosis for chronic cough and dyspnoea in HIV infected individuals

Condition	Usual CD4 count cell/mm³	Dyspnoea	Additional features	Chest radiograph
Obstructive spirometry				
Chronic obstructive pulmonary disease	Any	On exertion	Wheeze History of cigarette smoking Obstructive spirometry reduced TLCO	Hyperinflated lung fields Flattening of diaphragm Increased bronchial wall thickening Hyperlucency (if bullous change)
Asthma	Any	On exertion or identifiable trigger	Wheeze, history of atopy Reversible obstructive spirometry	May be normal or show features of bronchial wall thickening and hyperinflation
Bronchiectasis	Any	If airway obstruction	Previous respiratory infections	Increase in bronchovascular markings Ring shadows of bronchi seen 'end-on' Tram-track opacities or air fluid levels
Restrictive spirometry				
Sarcoidosis	>200 May be due to IRIS*	On exertion	Fever, arthralgia, lymphadenopathy, hepatosplenomegaly, skin nodules, uveitis, neurological or cardiac disease	Hilar lymphadenopathy +/- reticulonodular opacities
Nonspecific interstitial pneumonitis (NSIP)	<200 May be normal	Often remains stable over years	Fever (often prolonged)	Interstitial or alveolar infiltrates, normal in up to 50%
Lymphocytic interstitial pneumonia (LIP)	>350	Progressive exertional dyspnoea	Fever, weight loss, fatigue If occurs as part of DILS⁺ xerophthalmia and xerostomia	Reticular or nodular shadowing
Cryptogenic organizing pneumonia (COP)	Any	Exertional dyspnoea	Fevers, weight loss Restrictive defect on spirometry with reduced TLCO	Consolidation
Hypersensitivity pneumonitis (HP)	Usually >350	Acute or subacute dyspnoea depending on allergen exposure	Fever, rash, weight loss	Normal or diffuse nodules
Infectious causes				
***Pneumocystis Jirovecii* pneumonia (PCP)**	<200 Not on cART	Progressive dyspnoea on exertion	Fever Oxygen desaturation with exercise	Normal or bilateral infiltrates
Bacterial pneumonia	Any Incidence increased with lower CD4	Short history of dyspnoea	Fever Chest pain	Focal consolidation May be diffuse Pleural effusion
Tuberculosis	Any Incidence increased with lower CD4	Not a prominent feature	Weight loss, fevers Superficial lymphadenopathy Hepatosplenomegaly	Parenchymal infiltrates +/- cavitation Hilar/mediastinal lymphadenopathy Pleural effusion
Other causes				
Lung cancer	Any	Not a prominent feature	Weight loss, anaemia History of cigarette smoking	Mass lesion Hilar/mediastinal lymphadenopathy Pleural effusion
Gastro-oesophageal reflux	Any	Not a feature	Dyspepsia/acid reflux	Often normal May show features of hiatus hernia or aspiration
Chronic allergic rhinitis	Any	Not a feature	Rhinorrhoea Nasal congestion, sneezing	Normal

*IRIS = Immune reconstitution inflammatory syndrome

⁺DILS = Diffuse infiltrative lymphocytosis syndrome