



Rheumatoid Arthritis

Rheumatoid arthritis-associated lung disease is an important and often under recognized source of morbidity in veterans with rheumatoid arthritis. Emerging VA data from large connective tissue disease cohorts show that rheumatoid arthritis constitutes the bulk of connective tissue disease cases, and rheumatoid arthritis-associated lung disease frequently develops years after the initial rheumatologic diagnosis, emphasizing the value of long-term respiratory vigilance in this population.¹

VA researchers developed an experimental three-marker blood test that modestly improves prediction of rheumatoid arthritis-associated interstitial lung disease and may help flag veterans who need earlier lung screening and closer monitoring.² Longitudinal forced vital capacity analyses in veterans with rheumatoid arthritis-associated interstitial lung disease show that both slow and rapid forced vital capacity decline are associated with higher mortality and respiratory hospitalizations than stable lung function.³ Together, these data show the value of earlier, phenotype informed, and risk stratified screening strategies, along with timely intervention for veterans with rheumatoid arthritis-associated interstitial lung disease before irreversible decline occurs.

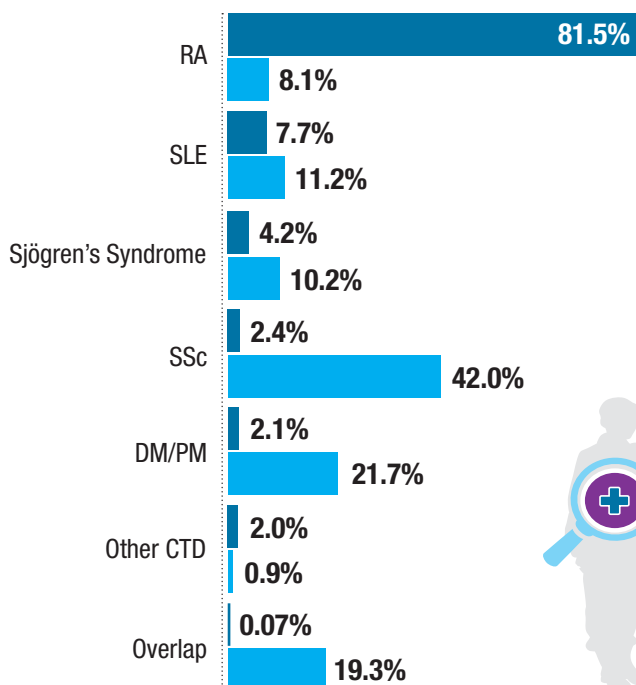
Mapping Connective Tissue Disease-Associated Interstitial Lung Disease¹



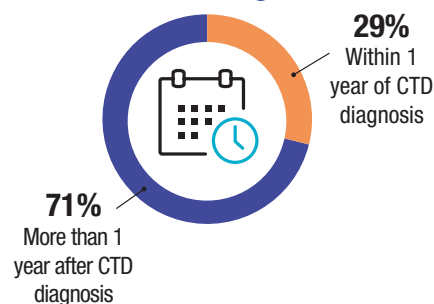
A nationwide VA cohort included > 88,000 veterans with connective tissue disease (CTD), followed for an average of 8.8 years; most were male, White, and had a mean age of 60.4 at CTD diagnosis.

CTD Types and ILD Burden in Veterans

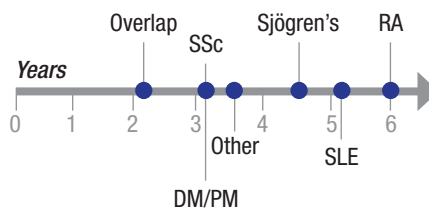
- Share of all veterans with CTD
- Prevalence of ILD in veterans with this CTD



Mean Years From CTD Diagnosis Until ILD is Diagnosed



Mean Time to ILD Diagnosis by CTD Subtype



CTD, connective tissue disease; DM/PM, dermatomyositis/polymyositis; ILD, interstitial lung disease; RA, rheumatoid arthritis; SLE, systemic lupus erythematosus; SSc, systemic sclerosis



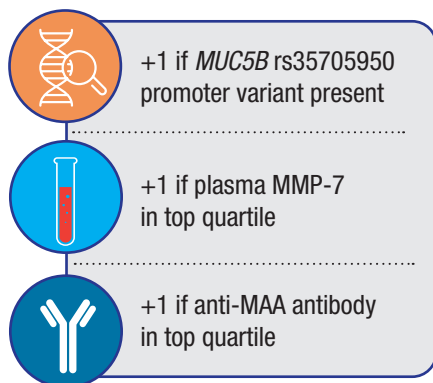
This longitudinal VA cohort highlights wide variation in CTD-ILD burden and time to ILD diagnosis across CTD subtypes in veterans, as shown by differences in both prevalence and mean years to ILD.

3-Point Blood Score for Identifying RA-ILD Risk in Veterans²



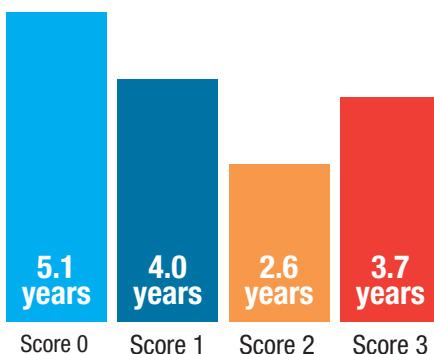
In a **multicenter cohort** of veterans with RA, researchers evaluated whether three blood biomarkers could help identify patients at higher risk for RA-ILD. They used the mucin 5B (*MUC5B*) promoter variant, plasma matrix metalloproteinase 7 (MMP-7), and anti-malondialdehyde acetaldehyde–albumin (MAA) antibodies, and tested against both existing and future RA-ILD. The score summarizes the three biomarkers into one simple risk measure.

Three Biomarker Score (0-3 points)



Future (Incident) RA-ILD

Median time to diagnosis among patients with the 3-point blood score who later developed RA-ILD



These times apply only to veterans who eventually developed ILD; they illustrate timing, not absolute risk.

In this veteran cohort, higher biomarker scores were associated with higher odds of existing RA-ILD.

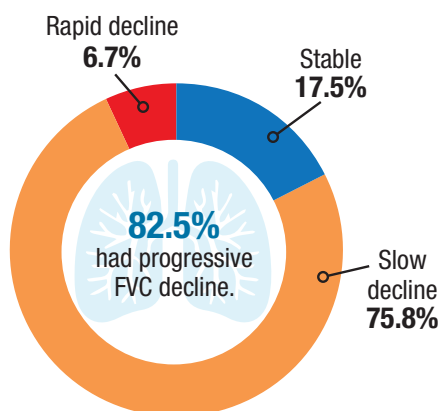
Higher scores were associated with increased risk of developing RA-ILD and shorter time to diagnosis among those who developed ILD.

Hidden Risk in RA-ILD: FVC Trajectories and Outcomes³



Patterns of forced vital capacity (FVC) decline over time are powerful predictors of mortality and respiratory hospitalization in RA-ILD. A retrospective VA cohort of more than 5000 veterans (1999–2021) used longitudinal clustering of FVC change to inform prognosis independent of baseline lung function.

Patterns of FVC Change in RA-ILD

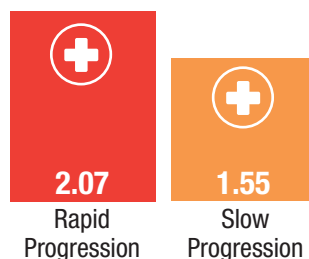


Average Annual FVC Change Patterns

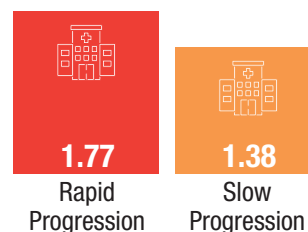


✓ Slower FVC decline still confers risk

Mortality, aHR (vs stable)



Respiratory Hospitalization, aHR



aHR, adjusted hazard ratio