# Evidence-based consensus statements for the identification and management of interstitial lung disease in systemic sclerosis

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# MODIFIED DELPHI PROCESS<sup>1</sup> TO DEVELOP EVIDENCE-BASED **CONSENSUS STATEMENTS**

**Additional consensus** 

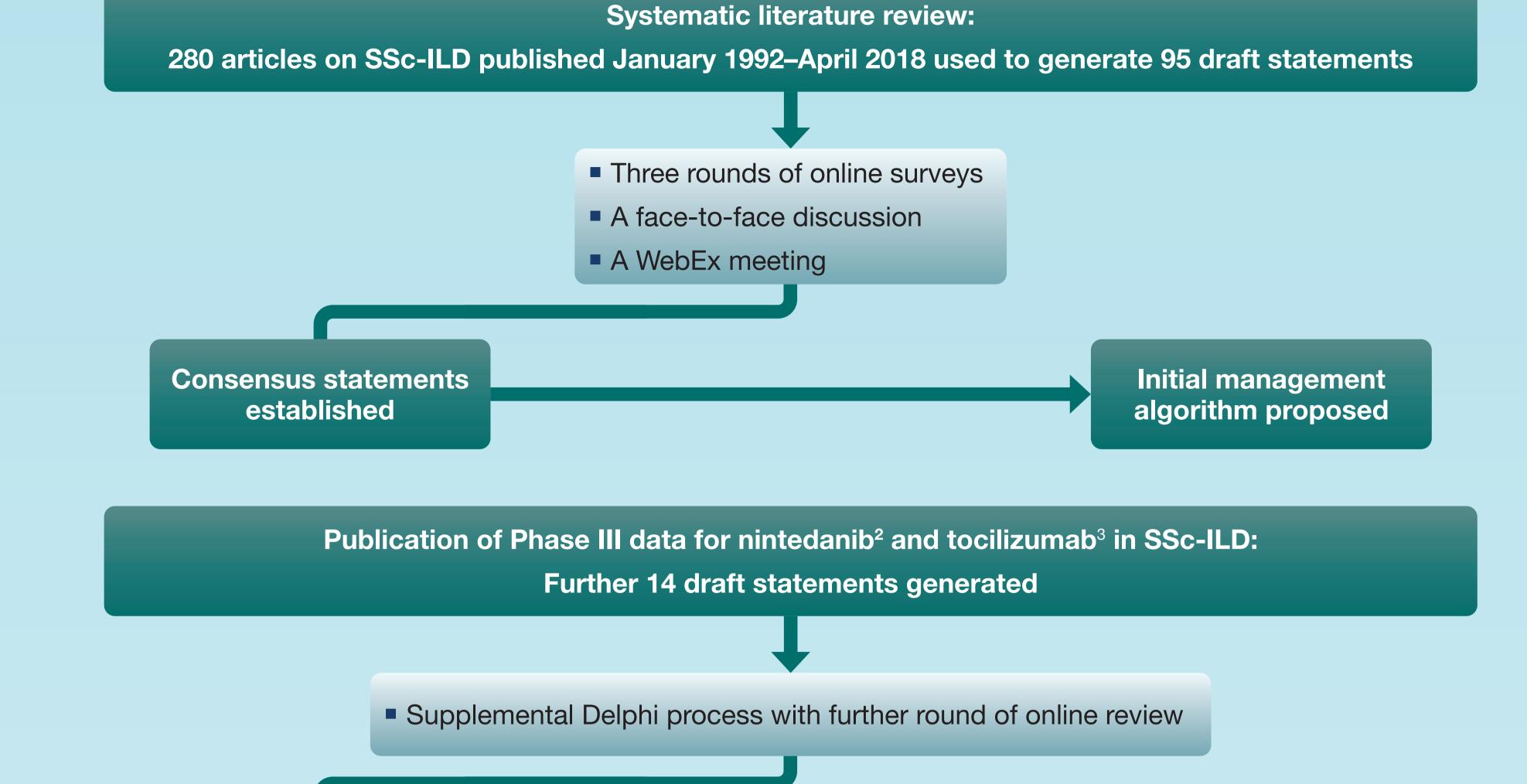
statements established

#### **AIM**

- To establish the first European evidence-based expert consensus statement for SSc-ILD management in six key domains, applying well-established methodologies
- Develop a management algorithm providing a framework for future decision-making in SSc-ILD







#### **EXPERT PANEL**

- 27/31 participants completed all study rounds
  - 16 rheumatologists
  - 7 pulmonologists 4 internists



# STATEMENTS IN SIX KEY DOMAINS

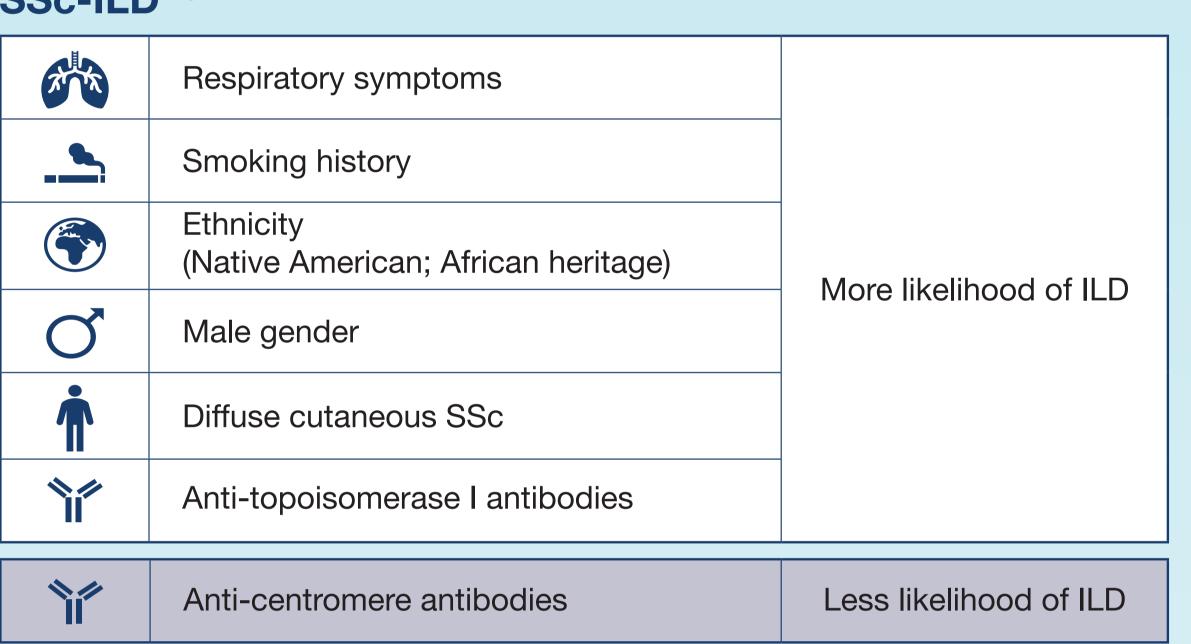
# MANAGEMENT ALGORITHM

Screen all patients with SSc for ILD using HRCT

FVC and DL<sub>co</sub> at baseline and at regular intervals:

every patient should receive an ILD-related physical examination





2. Screening for SSc-ILD<sup>10-14</sup>

All patients should be screened at baseline using HRCT

Pulmonary function testing provides baseline parameters FVC

Auscultation

3. SSc diagnosis<sup>15,16</sup> and severity assessment<sup>17,18</sup>



The primary tool for diagnosing ILD in patients with SSc is HRCT



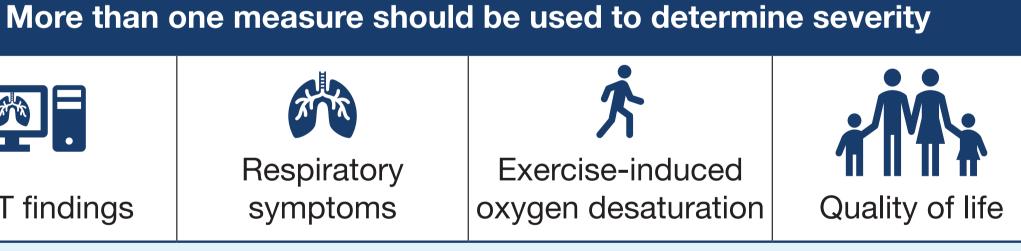
Supporting diagnostic tools Pulmonary function tests and clinical assessment of respiratory symptoms<sup>18</sup>



HRCT findings



Exercise-induced oxygen desaturation



**\** 

# **Diagnose ILD using HRCT** Continue monitoring for ILD Assess ILD severity using multiple methods Guided by risk of ILD, lung function, symptoms HRCT, FVC, DL<sub>CO</sub>, exercise-induced blood O<sub>2</sub> desaturation, clinical symptoms, QoL Decide whether pharmacological therapy is required Factors to consider include disease severity, QoL, available clinical guidelines Pharmacological therapy No pharmacological therapy Mycophenolate mofetil, cyclophosphamide, nintedanib Follow up closely No consensus with regard to tocilizumab Assess ILD progression using multiple methods Inadequate treatment response or disease progression **Escalate therapy** Modify dose or choice of pharmacological treatment: Mycophenolate mofetil, cyclophosphamide, nintedanib Consider rituximab

- Evaluate for lung transplant
- Consider autologous haemopoietic stem-cell transplantation for selected patients

# 4. SSc-ILD treatment initiation<sup>19</sup> and options<sup>2,20–22</sup>

#### **Drivers of treatment** initiation

- QoL Clinical guidelines/ experience
- Patient's
- symptoms Efficacy
- Safety/tolerability

#### Pharmacological treatment options

"No pharmacological treatment" is an option for some

- Patients should be followed up regularly and treatment initiated in case of progression All cases of severe ILD should be
- offered treatment
- Mycophenolate mofetil, cyclophosphamide and nintedanib are effective

# 5. SSc-ILD disease progression assessment<sup>18,23</sup>

More than one measure should be used to assess progression Changes in extent of fibrosis or pattern on HRCT

Pulmonary function tests (FVC and DL<sub>CO</sub> ATT. absolute value, or FVC decline)

Exercise-induced oxygen desaturation Worsening of clinical symptoms

6. SSc-ILD treatment escalation and options<sup>2, 24–29</sup> **Drivers of Available treatment options** 

escalation

progression

Pace of

Disease

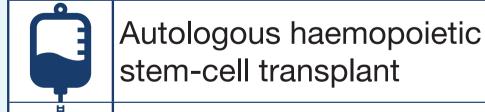
severity

All patients with severe or progressive SSc-ILD should be offered pharmacological treatment Available options include: mycophenolate

mofetil, cyclophosphamide, nintedanib, combination nintedanib and mycophenolate mofetil, rituximab

Management

algorithm defined



Lung transplant (evaluate suitability early)

# CONCLUSIONS

- This multidisciplinary modified Delphi study provides evidence-based expert consensus statements for SSc-ILD management across six key domains
- An SSc-ILD management algorithm for use in clinical practice is also provided
- These consensus statements and the clinical management algorithm provide important clinical guidance for the early identification and medical management of SSc-ILD, and offer a framework for future treatment decision-making

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# References

- Hohmann E, et al. Arthroscopy 2018; 34:3278-3282; Distler O, et al. N Engl J Med 2019; 380:2518–2528;
- Khanna D, et al. ACR 2018 abstract 898; Wangkaew S, et al. Mod Rheumatol 2016; 26:588-593;
- Liaskos C, et al. Autoimmunity 2017;50:414–21; Ashmore P. et al. Rheumatol Int 2018: 38:657-662:
- Steen V. et al. Arthritis Rheum 2012: 64:2986-2994:
- Nihtyanova S, et al. Arthritis Rheumatol 2014; 66:1625–1635; Sanchez-Cano D, et al. Rheumatol Int 2018; 38:363-374;
- 10. Hoffmann-Vold AM, et al. Am J Respir Crit Care Med 2019; 200:1258-1266;
- 11. Wangkaew S, et al. Quant Imaging Med Surg 2016; 6:381–390; Showalter K, et al. J Rheumatol 2018; 45:1572–1576; 13. Le Gouellec N, et al. PLoS One 2017; 12:e0181692;

14. Tashkin DP, et al. Ann Rheum Dis 2016; 75:374–381;

- 15. Chowaniec M, et al. Reumatologia 2018; 56:249–254; Caron M, et al. Eur Respir Rev 2018; 27:170102; Salaffi F, et al. PLoS One 2016; 11:e0149240;
- Hoffmann-Vold AM, et al. RMD Open 2019; 5:e000826; Tashkin DP, et al. N Engl J Med 2006; 354:2655-2666; Tashkin DP, et al. Lancet Respir Med 2016; 4:708-719; Volkmann ER. et al. Arthritis Rheumatol 2017: 69:1451-1460:

Wu W. et al. Ann Rheum Dis 2018: 77:1326–1332:

- Goh NS. et al. Arthritis Rheumatol 2017: 69:1670–1678: Daoussis D, et al. Semin Arthritis Rheum 2017; 46:625–631; Jordan S, et al. Ann Rheum Dis 2015; 74:1188–1194; Burt RK, et al. Lancet 2011: 378:498-506:
- van Laar JM, et al. JAMA 2014; 311:2490-2498; Sullivan KM, et al. N Engl J Med 2018; 378:1066–1067;
- Jablonski R, et al. Curr Opin Rheumatol 2018; 30:562–569

# **Abbreviations**

DL<sub>co</sub>, diffusing capacity of the lungs for carbon monoxide; FVC, forced vital capacity; HRCT, high-resolution computed tomography; ILD, interstitial lung disease; QoL, quality of life; SSc, systemic sclerosis.

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