

# THE LANCET

## Rheumatology

### Supplementary appendix

This appendix formed part of the original submission. We post it as supplied by the authors.

Supplement to: Hsu TY-T, D'Silva K M, Patel N J, et al. Title. *Lancet Rheumatol* 2021; published online April 6. [https://doi.org/10.1016/S2665-9913\(21\)00106-5](https://doi.org/10.1016/S2665-9913(21)00106-5).

## **Incident systemic rheumatic disease following COVID-19**

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### **Supplemental material**

**Supplemental Table 1.** Rheumatic disease terms used to screen for patients with systemic rheumatic disease and their associated ICD-9 and ICD-10 codes.

**Supplemental Table 2.** Demographics of cases and comparators at time of PCR testing (index date).

**Supplemental Figure 1.** Flow diagram illustrating identification of cases of incident systemic rheumatic disease after positive or negative PCR testing for SARS-CoV-2.

**Supplemental Table 3.** Incident rheumatic diseases in patients with PCR-confirmed COVID-19.

**Supplemental Table 4.** Incident rheumatic diseases in comparators with negative PCR testing for SARS-CoV-2.

**Supplemental Table 1.** Rheumatic disease terms used to screen for patients with systemic rheumatic disease and their associated ICD-9 and ICD-10 codes.

<b>Category</b>	<b>Rheumatic Disease (ICD-9 and ICD-10 codes)</b>
Inflammatory arthritis	<ul style="list-style-type: none"> <li>● Rheumatoid arthritis (M05%, M06%, 714%)</li> <li>● Inflammatory arthritis or inflammatory polyarthropathy (M06.4, 714.89, 714.9)</li> <li>● Juvenile idiopathic arthritis (M08.20, 714.3)</li> <li>● Psoriatic arthritis or arthropathic psoriasis (L40.50, 696.0)</li> <li>● Ankylosing spondylitis (M45.9, 720.0)</li> </ul>
Vasculitis	<ul style="list-style-type: none"> <li>● ANCA-associated vasculitis: granulomatosis with polyangiitis, eosinophilic granulomatosis with polyangiitis, microscopic polyangiitis (M31.3, M31.7, M30.0, 446.0, 446.4, 446.7, 447.6)</li> <li>● Kawasaki disease (M30.3, 446.1)</li> <li>● Takayasu arteritis (M31.4, 446.7)</li> <li>● Polyarteritis nodosa (M30.0, 446.0)</li> <li>● Giant cell arteritis/polymyalgia rheumatica (M31.6, 446.5, M35.3, 725%)</li> <li>● Behçet disease (M35.2, 136.1)</li> <li>● Unspecified arteritis (I77.6, 447.6)</li> </ul>
Other Systemic Autoimmune Diseases	<ul style="list-style-type: none"> <li>● Systemic lupus erythematosus (M32%, 710.0)</li> <li>● Sjögren syndrome (M35.0, 710.2)</li> <li>● Idiopathic inflammatory myositis: dermatomyositis, polymyositis, statin-associated autoimmune myositis, unspecified myositis (G72.49, G72.41, M33, 710.3, 710.4)</li> <li>● Systemic sclerosis (M34.0, M34.1, M34.8%, M34.9, 710.1)</li> <li>● Mixed connective tissue disease (M35.1, 710.9)</li> <li>● Antiphospholipid syndrome (D68.61, 239.81)</li> <li>● Sarcoidosis (D86.0, D86.9, 135%)</li> <li>● IgG4-related disease (M35)</li> </ul>

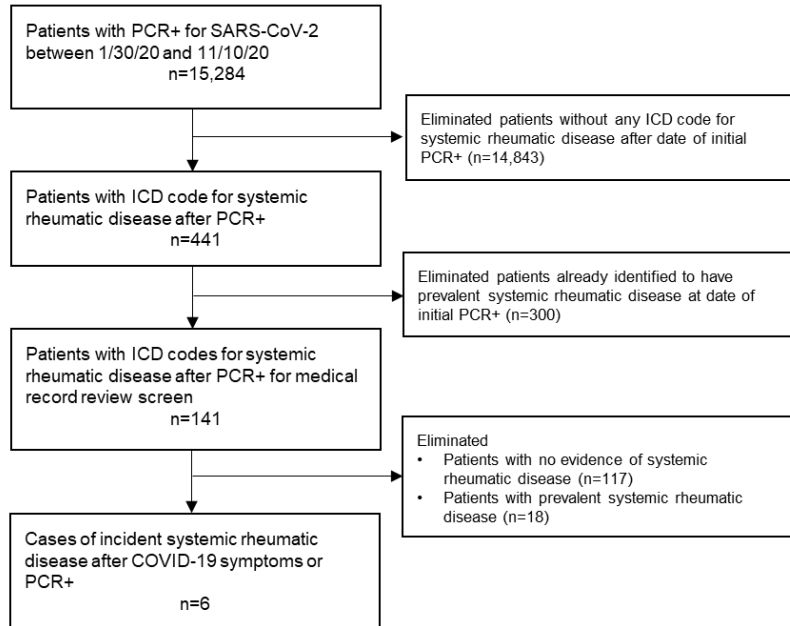
ICD = international classification of disease 9th or 10th revision codes

**Supplemental Table 2.** Demographics of cases and comparators at time of PCR testing (index date). Comparators were matched to cases by age (+/- 5 years) and sex.

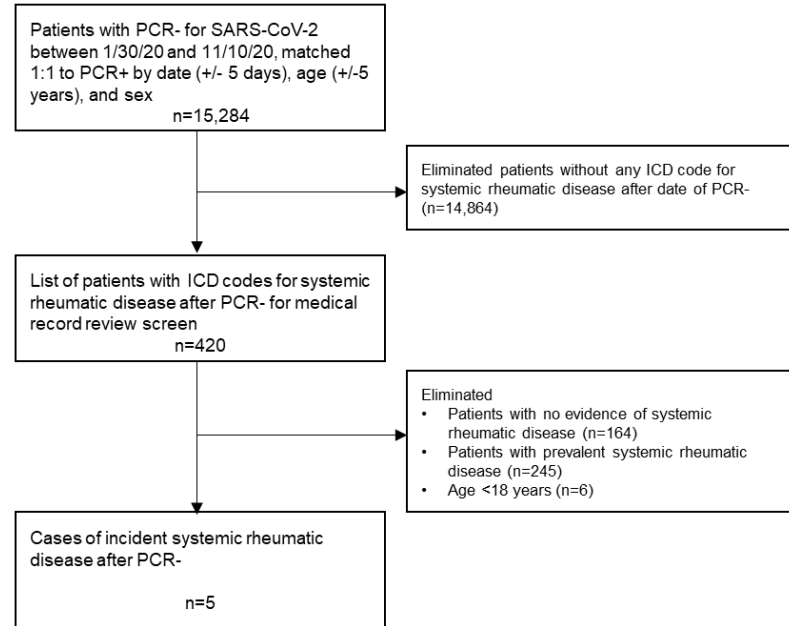
	<b>PCR+ cases (n=15,284)</b>	<b>PCR- comparators (n=15,284)</b>
Female sex, n (%)	8244 (54)	8244 (54)
Mean age, years (SD)	47 (20)	46 (20)
Median age, years [IQR]	46 [31, 61]	45 [30, 60]
Categorical age by decade of years, n (%)		
<20	804 (5)	804 (5)
20 to <30	2527 (17)	2527 (17)
30 to <40	2704 (18)	2704 (18)
40 to <50	2502 (16)	2502 (16)
50 to <60	2624 (17)	2624 (17)
60 to <70	1893 (12)	1893 (12)
70 to <80	1120 (7)	1120 (7)
80+	1110 (7)	1110 (7)

**Supplemental Figure 1.** Flow diagram illustrating identification of cases of incident systemic rheumatic disease after positive or negative PCR testing for SARS-CoV-2.

Incident rheumatic disease after PCR+ for SARS-CoV-2



Incident rheumatic disease after PCR- for SARS-CoV-2



**Supplemental Table 3.** Incident rheumatic diseases in patients with PCR-confirmed COVID-19.

Age, years	Sex	Clinical or autoimmune features before COVID-19	COVID-19 complications	COVID-19 pharmacologic treatment	Lingering COVID-19 symptoms	Days from positive SARS-CoV-2 PCR test to rheumatic disease diagnosis	Rheumatic diagnosis	Meets classification criteria?	Rheumatic disease treatment
37	Female	None	Hospitalization	None	None	3	Seronegative inflammatory arthritis	No*	None
70	Male	None	Hospitalization, death due to cardiac arrest	None	None	4	Giant cell arteritis	Yes†	Methylprednisolone pulse, then high-dose prednisone
38	Male	None	Hospitalization	Remdesivir x 5 days (200 mg IV on day 1, 100 mg IV daily on days 2-5)	Proximal muscle weakness	7	Dermatomyositis (myopathy from type I interferonopathy) <sup>5</sup>	Yes‡	Methylprednisolone pulse, then high-dose prednisone, IVIG
67	Female	DVT/PE	None	None	None	74	Antiphospholipid syndrome	Yes§	Warfarin
47	Female	Arthralgias without synovitis	None	None	None	89	Seronegative rheumatoid arthritis	Yes	Low-dose prednisone taper, hydroxychloroquine, methotrexate, infliximab
35	Female	Arthralgias without synovitis, positive ANA	None	None	Cough	104	Primary Sjögren's syndrome	Yes¶	Hydroxychloroquine

ANA, antinuclear antibody; COVID-19, Coronavirus Disease 2019; DVT, deep vein thrombosis; IVIG, intravenous immunoglobulin; N/A, not applicable; PE, pulmonary embolism; PCR, polymerase chain reaction; SARS-CoV-2, Severe Acute Respiratory Syndrome Coronavirus 2.

\*Per 2010 ACR/EULAR classification criteria for rheumatoid arthritis

†Per 1990 American College of Rheumatology classification criteria for giant cell arteritis

‡Per 2017 ACR/EULAR classification criteria for idiopathic inflammatory myopathies

§Per revised Sapporo classification criteria for antiphospholipid syndrome

||Per 1987 ACR classification criteria for rheumatoid arthritis

¶Per 2016 ACR/EULAR classification criteria for primary Sjögren's syndrome

**Supplemental Table 4.** Incident rheumatic diseases in comparators with negative PCR testing for SARS-CoV-2.

Age, years	Sex	Clinical or autoimmune features before COVID-19	Days from negative SARS-CoV-2 PCR test to rheumatic disease diagnosis	Rheumatic diagnosis	Meets classification criteria?	Rheumatic disease treatment
76	Female	None	45	Polymyalgia rheumatica	Yes*	Prednisone
83	Male	None	129	Polymyalgia rheumatica	Yes*	Prednisone
85	Female	None	30	Polymyalgia rheumatica	Yes*	Prednisone
51	Female	None	100	Seronegative rheumatoid arthritis	Yes†	Prednisone, sulfasalazine, methotrexate
66	Female	None	102	Polymyalgia rheumatica	Yes*	Prednisone, methotrexate

PCR, polymerase chain reaction; SARS-CoV-2, Severe Acute Respiratory Syndrome Coronavirus 2.

\*Per 2012 EULAR/ACR provisional classification criteria for polymyalgia rheumatica

†Per 2010 ACR/EULAR classification criteria for rheumatoid arthritis