Since January 2020 Elsevier has created a COVID-19 resource centre with free information in English and Mandarin on the novel coronavirus COVID-19. The COVID-19 resource centre is hosted on Elsevier Connect, the company's public news and information website.

Similar lessons can be applied across disciplines to other inflammatory conditions. One example is in inflammatory bowel disease. Like juvenile-onset SLE, the inflammatory cascade in patients with inflammatory bowel disease is intricate, with multiple inputs including genetic susceptibility, environmental exposures, and faecal microbiota composition, interacting to influence a complex pro-inflammatory cytokine milieu.[4] However, inflammatory bowel disease has been historically categorised using clinical descriptors such as disease location, extent, and behaviour, and without incorporating assessment of specific immunological aberrancies.[5] Consequently, treatment decisions are based on clinician and patient preference rather than disease biology. Clinicians simply do not have the requisite tools to distinguish which patients are likely to be responsive to different therapeutic classes, and conventional statistical methods applied in clinical trial development programmes and real-world cohorts have failed to produce a reliable, accurate companion diagnostic biomarker for treatment response. Therefore, adoption of machine-learning methods on PBMCs might offer additional insights into disease classification that will permit the future implementation of a more refined therapeutic algorithm.

As more studies are using machine-learning methods, the European League Against Rheumatism (EULAR) has published recommendations on the optimal use of these applications.[6] Importantly, the implementation of machine learning requires an interdisciplinary approach because health-care providers might not be familiar with these statistical methods, whereas data scientists might lack the clinical context to interpret the findings. However, it is clear that machine learning has the versatility and potential to unlock tremendous opportunities for health research in inflammatory conditions, even when using small datasets.

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1 Robinson GA, Peng J, Dönnes P, et al. Disease-associated and patient-specific immune cell signatures in juvenile-onset systemic lupus erythematosus: patient stratification using a machine-learning approach. *Lancet Rheumatol* 2020; **2:** e485–96.
2 Brunner HI, Gladman DD, Ibañez D, Urowitz MD, Silverman ED. Difference in disease features between childhood-onset and adult-onset systemic lupus erythematosus. *Arthritis Rheum* 2008; **58:** 556–62.
3 Petri M, Orbai AM, Alarcón GS, et al. Derivation and validation of the Systemic Lupus International Collaborating Clinics classification criteria for systemic lupus erythematosus. *Arthritis Rheum* 2012; **64:** 2677–86.
4 Lee SH, eun Kwon J, Cho M-L. Immunological pathogenesis of inflammatory bowel disease. *Intest Res* 2018; **16:** 26–42.
5 Satsangi J, Silverberg MS, Vermeire S, Colombel JF. The Montreal classification of inflammatory bowel disease: controversies, consensus, and implications. *Gut* 2006; **55:** 749–53.
6 Gossec L, Kedra J, Servy H, et al. EULAR points to consider for the use of big data in rheumatic and musculoskeletal diseases. *Ann Rheum Dis* 2020; **79:** 69–76.

COVID-19 and systemic lupus erythematosus: a case series

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The COVID-19 pandemic has spread across New York City, NY, USA, affecting more than 150 000 of its 8·5 million inhabitants as of April 26, 2020.[1] Severe illness resulting in hypoxemic respiratory failure, believed to be the result of uncontrolled inflammation coupled with a reduced and dysfunctional lymphocyte response, occurs in 5% of cases.[2] Systemic lupus erythematosus (SLE) is an autoimmune disease characterised by autoantibodies, inflammation, and lymphopenia. The condition is frequently treated with hydroxychloroquine or chloroquine, both of which are being tested in the treatment of COVID-19.[3] It remains unclear whether patients with SLE are at increased risk of COVID-19 or if there is a paradoxical protective effect due to, in part, hydroxychloroquine use. Patients with SLE comprise 17% of the COVID-19 Global Rheumatology Alliance registry as of April 1, 2020.[4] Although two series[5,6] reported that patients with chronic arthritis receiving immunosuppressants had low rates of severe disease from COVID-19 (0–2%), another series by Mathian and colleagues[7] described 17 patients with SLE, of whom 7 (35%) required mechanical methods of ventilation or extracorporeal membrane oxygenation.

To our knowledge, this is the first case series to report the characteristics and clinical course of COVID-19 in patients with SLE in the USA. 18 patients diagnosed with SLE on the basis of the revised classification criteria by the American College of Rheumatology[8] had confirmed or clinically suspected COVID-19 infection. 16 of these patients were identified from the Columbia Lupus

Cohort consisting of 450 patients and the remaining two patients were from the New York Presbyterian–Columbia database of 835 patients who tested positive for COVID-19 up to April 1, 2020. All patients with SLE admitted for COVID-19 have a consultation with a rheumatologist and are cared for by our team (per hospital policy); therefore, the patients reported here are the total patient population reporting to our hospital with SLE until April 26, 2020. Additionally, we included patients with SLE from our cohort with clinically suspected COVID-19 infection, as assessed by the Lupus Center treating clinician. The clinical characteristics of the 18 patients are described in the appendix. Ten patients had COVID-19 infection confirmed by nasopharyngeal swab COVID-19 RT-PCR. The other eight patients had clinical symptoms highly suggestive of COVID-19 but were not tested. By contrast with most of the patients with COVID-19, but as expected for individuals with SLE, 16 (89%) of patients were young women (mean age 41 years [SD 11]). There was an over-representation of Hispanic patients (nine [50%]) and black patients (seven [39%]). Most patients (15 [83%]) were taking immunosuppressants, seven (39%) were taking steroids, 13 (72%) were taking hydroxychloroquine or chloroquine, and 11 (61%) had lupus nephritis (one patient had end-stage renal disease on haemodialysis and two patients were kidney transplant recipients). Six patients were essential health-care workers.

Of the seven hospitalised patients, three had severe hypoxemic respiratory failure. C-reactive protein concentration (median 200 mg/L [IQR 93–300]), erythrocyte sedimentation rate (68 mm/h [42–113]), ferritin concentration (572 ng/mL [173–2351]), or a combination of all three, were elevated in six (86%) of the hospitalised patients. The patients' mean absolute lymphocyte count appeared lower at the time of COVID-19 diagnosis than at baseline ($0{\cdot}79 \times 10^3$ cells per µL [SD 0·46] *vs* $1{\cdot}58 \times 10^3$ [0·73] cells per µL). In three patients who had double-stranded DNA titres available both before and at the time of COVID-19 diagnosis, titres did not change; however, complement concentrations increased. Patients with severe hypoxaemia had higher serum interleukin (IL)-6 concentrations than did patients who did not require any supplemental oxygen (258 pg/mL [99] *vs* 39 pg/mL [44]), and chest x-rays showed multifocal opacities (three patients), compared with no opacities (one patient) or focal opacities (four patients) in the remaining patients with available chest x-ray results.

Intake of immunosuppressants when admitted to hospital (eg, methotrexate, azathioprine, cellcept, tacrolimus, and rituximab) were not different in patients with mild versus severe disease. Four (43%) of the seven patients that required hospitalisation were taking hydroxychloroquine or chloroquine at baseline; ten (91%) of the 11 patients who were not hospitalised were taking these drugs. Three patients not on antimalarials when diagnosed with COVID-19 were treated with a 5–7 day course of 400–600 mg/day hydroxychloroquine. All hospitalised patients received empiric antibiotics. Three patients with severe hypoxaemia (two patients required non-invasive ventilation and one patient required invasive mechanical intubation) also received high-dose intravenous methylprednisolone (two patients received 1 mg/kg for 5 days and one patient received 1000 mg for 3 days), and tocilizumab (1–2 doses of 6–8 mg/kg). One patient improved and two remain critically ill, despite decreasing inflammatory markers. The remaining patients who were hospitalised improved without any requirement for supplemental oxygen.

See Online for appendix

Our findings suggest that 16 (4%) of the 450 patients in the Colombia Lupus Cohort developed symptomatic COVID-19 infection, compared with the suggested 2% community risk in New York City,[1] as estimated by the number of symptomatic patients tested by RT-PCR nasopharyngeal swabs up to April 26, 2020. By contrast with the low incidence suggested by RT-PCR testing, antibody testing has suggested that up to 25% of the general population of New York City could be positive for COVID-19 antibodies;[9,10] however, whether these COVID-19 seropositivity rates are accurate or hold true for patients with SLE is unknown. More severe COVID-19 manifestations, which affected 2 (0·4%) of the 450 patients in the Columbia Lupus Cohort, were associated with high IL-6 concentrations and multifocal opacities on chest x-ray. Previous intake of immunosuppressants before admission to hospital did not seem to influence the severity of infection.

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1 The Official Website of the City of New York. COVID-19: data. https://www1.nyc.gov/site/doh/covid/covid-19-data.page (accessed April 26, 2020).
2 Li H, Liu L, Zhang D, et al. SARS-CoV-2 and viral sepsis: observations and hypotheses. *Lancet* 2020; **395:** 1517–20.
3 Askanase A, Khalili L, Buyon J. Thoughts on COVID-19 and autoimmune diseases. *Lupus Sci Med* 2020; **7:** e000396.
4 Gianfrancesco MA, Hyrich KL, Gossec L, et al. Rheumatic disease and COVID-19: initial data from the COVID-19 Global Rheumatology Alliance provider registries. *Lancet Rheumatol* 2020; **2:** e250–53.
5 Monti S, Balduzzi S, Delvino P, et al. Clinical course of COVID-19 in a series of patients with chronic arthritis treated with immunosuppressive targeted therapies. *Ann Rheum Dis* 2020; **79:** 667–68.
6 Haberman R, Axelrad J, Chen A, et al. Covid-19 in immune-mediated inflammatory diseases–case series from New York. *N Engl J Med* 2020; published online April 29. DOI:10·1056/NEJMc2009567.
7 Mathian A, Mahevas M, Rohmer J, et al. Clinical course of coronavirus disease 2019 (COVID-19) in a series of 17 patients with systemic lupus erythematosus under long-term treatment with hydroxychloroquine. *Ann Rheum Dis* 2020; published online April 24. DOI:10·1136/annrheumdis-2020–217566.
8 Hochberg MC. Updating the American College of Rheumatology revised criteria for the classification of systemic lupus erythematosus. *Arthritis Rheum* 1997; **40:** 1725.
9 Cuomo GA. Governor Cuomo's Daily Presentation. https://newyork.cbslocal.com/wp-content/uploads/sites/14578484/2020/04/04·27·20-COVID19-Briefing-Deck.pdf (accessed April 27, 2020).
10 The New York Times. 1 in 5 New Yorkers may have had Covid-19, antibody tests suggest. https://www.nytimes.com/2020/04/23/nyregion/coronavirus-antibodies-test-ny.html (accessed April 24, 2020).

Are treat-to-target and dose tapering strategies for rheumatoid arthritis possible during the COVID-19 pandemic?

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For more on the **COVID-19 rapid guidelines** see https://www.nice.org.uk/guidance/ng167/resources/covid19-rapid-guideline-rheumatological-autoimmune-inflammatory-and-metabolic-bone-disorders-pdf-66141905788357

The global pandemic of COVID-19 has dramatically altered the delivery of rheumatology outpatient services because of the redeployment of staff and efforts to minimise infection risk to patients and clinicians in line with physical distancing guidance. Departments have converted most face-to-face appointments to telephone clinics or, less frequently, to video clinics. The National Institute for Health and Care Excellence (NICE) COVID-19 rapid guidelines for rheumatology suggest that face-to-face consultations are only required for patients who have a disease flare. Implicit is the presumption that those with so-called stable disease will be managed remotely. Departments are now planning the restoration of services as we move towards a recovery phase in the UK. The advantages of telemedicine remain because physical distancing is mandated as part of the effort to reduce the likelihood of a second wave of infections, and hospital outpatient settings have limited physical space. It is therefore pertinent to reflect on the meaning of stable disease, as applied to rheumatoid arthritis, and whether remote clinics are compatible with the therapeutic framework of treat-to-target.

Treat-to-target has been a cornerstone in the management of rheumatoid arthritis over the past decade and has the ultimate aim of achieving disease remission.[1] This strategy was first tested through randomised clinical trials, and was then assessed in clinical practice, initially in patients with early rheumatoid arthritis and subsequently in those with established disease.[2,3] Studies report that treat-to-target strategies can attain higher remission rates compared with other, less structured therapeutic approaches.[2,3] Up to 50% of patients can achieve remission, depending on its definition, through the application of treat-to-target, the optimal use of conventional, targeted synthetic, and biological disease-modifying antirheumatic drugs (DMARDs), and the implementation of well defined metrics of remission. So, where does the concept of stable disease fit within treat-to-target? Stable disease could encompass patients with low or moderate disease activity whose disease trajectories have not worsened (ie, patients not having a disease flare). Both disease states are associated with worse outcomes compared with remission, leading to pain, stiffness, and disability.[4]

Treat-to-target requires frequent monitoring with clinical examinations and blood tests, followed by appropriate modifications to treatment, particularly in the early phase of disease. A comprehensive assessment of the number of tender and swollen joints, a key component of the metrics used to measure disease activity and distinguish between remission and low or moderate disease activity, can only be adequately done through a face-to-face encounter. A face-to-face visit would include a physical examination, blood tests, and the recording of patient-reported outcomes. Although adding joint ultrasound examinations to treat-to-target methods does not appear to confer additional benefits compared with conventional treat-to-target strategies in a clinical trial setting,[5] the inclusion of ultrasound imaging in the