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.

count (7·7%), and negative *Treponema pallidum* serology. A SARS-CoV-2 PCR (nasopharyngeal swab, Cobas SARS-CoV-2 Test, Roche Diagnostics, Rotkreuz, Switzerland) was negative. 2 days later, a lesional whole skin 4 mm punch biopsy sample was taken from the left flank, which showed a subacute lichenoid interface dermatitis with vacuolisation of the basal epidermal keratinocytes and scant lymphohistiocytic perivascular infiltration in the upper dermis. No leukocytoclastic vasculitis or microthrombosis was present (appendix pp 1–2). Over the next 2 weeks, the patient's rash gradually improved. 6 weeks later, serology tests against anti-SARS-CoV-2 antibodies (Elecsys Anti-SARS-CoV-2, Roche Diagnostics, Rotkreuz, Switzerland) were negative. However, PCR testing of the skin using established methods[1] detected SARS-CoV-2 at low copy numbers (37 per 1×10^6 human *RPPH1* copies).

This case is important because it highlights the shortcomings of currently available testing methods for SARS-CoV-2 infection. Although the sensitivity and specificity of currently available PCR and serology tests are high, swab samples that are taken incorrectly are known drivers of the relatively large number of false negative tests for SARS-CoV-2.[4] Our finding that the patient's serology remained negative is compatible with the hypothesis that some patients with COVID-19 might not establish humoral immunity; an observation that has also been made for other coronaviruses.[5]

In summary, this case emphasises the use of SARS-CoV-2 PCR testing of skin biopsy samples as an additional diagnostic tool, helping to shed light on the actual prevalence of COVID-19 in the general population. Additionally, further studies are needed to understand to what extent and at what point during their disease course patients with COVID-19 actually develop immunity—a question of uttermost importance, especially with regards to the currently ongoing efforts to develop a vaccine to SARS-CoV-2, and the concept of herd immunity generation.

We declare no competing interests. AT has been supported by the Botnar Research Centre for Child Health. ER thanks the Filling the Gap Grant of the University of Zurich, Zurich, Switzerland, for their support. Patient approval for publication of clinical data and pictures was acquired according to international ethics standards.

*Dagmar Jamiolkowski, Beda Mühleisen, Simon Müller, Alexander A Navarini, Alexandar Tzankov, *Elisabeth Roider*
elisabeth.roider@usb.ch

Department of Dermatology (DJ, BM, SM, AAN, ER) and Department of Pathology (AT), University Hospital of Basel, Basel 4041, Switzerland; Department of Dermatology, Venerology, and Allergology, Kantonsspital St Gallen, St Gallen, Switzerland (ER); and University of Zurich, Zurich, Switzerland (ER)

1 Menter T, Haslbauer JD, Nienhold R, et al. Postmortem examination of COVID-19 patients reveals diffuse alveolar damage with severe capillary congestion and variegated findings in lungs and other organs suggesting vascular dysfunction. *Histopathology* 2020; published online May 4. https://doi.org/10.1111/his.14134.
2 Recalcati S. Cutaneous manifestations in COVID-19: a first perspective. *J Eur Acad Dermatol Venereol* 2020; **34:** e212–13.
3 Colmenero I, Santonja C, Alonso-Riaño M, et al. SARS-CoV-2 endothelial infection causes COVID-19 chilblains: histopathological, immunohistochemical and ultrastructural study of seven paediatric cases. *Br J Dermatol* 2020; published online June 20. https://doi.org/10.1111/bjd.19327.
4 Wang W, Xu Y, Gao R, et al. Detection of SARS-CoV-2 in different types of clinical specimens. *JAMA* 2020; **323:** 1843–44.
5 Randolph HE, Barreiro LB. Herd immunity: understanding COVID-19. *Immunity* 2020; **52:** 737–41.

Health and medicine cannot solve COVID-19

Richard Horton argues that combination prevention and global health collaboration are required to address the COVID-19 pandemic.[1] We agree and suggest this should incorporate further measures. Thinking closely in terms of medical solutions could create false public expectations of a return to normal, and risks closing out non-health interventions that could lead to substantial improvements.

COVID-19 has exposed the complex and interdependent systems of everyday life. Health, politics, economics, technology, environment, education, policing, engineering, transport, food systems, communication, and more all intersect as complex expert systems.[2] Any intervention continually shapes, and is shaped by, other parts of these systems. For example, lockdown-related transport disruption is impeding routine vaccination programmes,[3] reshaping education, and improving air quality.[4] At the same time, health improvements could come from fields well outside of health. An example of this from London's recent past is the radical re-engineering of city landscapes and construction of sewer systems, which substantially reduced infectious disease burden.

Collective interventions will create the new normal that we will inhabit in the future.[5] Yet, the pandemic is framed primarily as a global health crisis, and so the public expects health interventions—a vaccine, new public health measures and hygiene behaviours, and effective treatments—to end COVID-19 and permit a return to the old normal. We caution against this framing. Medicine is well placed to change the narrative and make space for joined-up thinking about a different future with or without COVID-19.

We declare no competing interests.

**Amy K McLennan, Anne Katrine Kleberg Hansen, Stanley J Ulijaszek*
amy.mclennan@anu.edu.au

Institute of Social and Cultural Anthropology, University of Oxford, Oxford OX2 6PE, UK (AKM, AKKH, SJU); 3A Institute, Australian National University, Canberra, ACT, Australia (AKM); and School of Architecture, Design and Conservation, Royal Danish Academy of Fine Arts, Copenhagen, Denmark (AKKH)

1 Horton R. Offline: It's time to convene nations to end this pandemic. *Lancet* 2020; **396:** 14.
2 Ulijaszek S. Models of obesity: from ecology to complexity in science and policy. Cambridge: Cambridge University Press, 2017.
3 WHO. At least 80 million children under one at risk of diseases such as diphtheria, measles and polio as COVID-19 disrupts routine vaccination efforts, warn Gavi, WHO and UNICEF. 2020. https://www.who.int/news-room/detail/22-05-2020-at-least-80-million-children-under-one-at-risk-of-diseases-such-as-diphtheria-measles-and-polio-as-covid-19-disrupts-routine-vaccination-efforts-warn-gavi-who-and-unicef (accessed June 12, 2020).

Mike Kemp/Getty Images

4 Chen K, Wang M, Huang C, Kinney PL, Anastas PT. Air pollution reduction and mortality benefit during the COVID-19 outbreak in China. *Lancet Planet Health* 2020; **4:** e210–12.
5 Latour B. Where to land after the pandemic? A paper and now a platform. 2020. https://www.bruno-latour.fr/node/852.html (accessed June 7, 2020).

See **Online** for appendix

Predilatation and paravalvular leakage risk in TAVR

Jonas Lanz and colleagues[1] compared the effect of a self-expanding valve with a balloon-expandable valve for transcatheter aortic valve replacement (TAVR) in patients with symptomatic severe aortic stenosis. According to the results, the incidence of paravalvular leakage was higher in the group of patients using the self-expanding ACURATE neo device than in the group of patients using the balloon-expandable SAPIEN 3 prosthesis. However, we are concerned that this finding might be at least partly caused by differences in predilatation between the groups.

The necessity of dilatation before the TAVR procedure has been debated in recent years. In the randomised trial by Lanz and colleagues,[1] predilatation was mandatory only for the ACURATE group. However, this requirement might be unnecessary, and an important source of potential bias; for example, in the DIRECT trial,[2] no benefit was found for predilatation among patients with a self-expanding valve. There is controversial evidence regarding the effect of predilatation on paravalvular leak and other clinical outcomes.[2,3] In one prospective study, predilatation was associated with an increased risk of aortic regurgitation.[3] Because the proportion of predilatation was substantially higher in the ACURATE neo group than in the SAPIEN 3 group (88% *vs* 23%),[1] it is not certain to what extent the lower risk of moderate or severe aortic regurgitation in the ACURATE group can be explained by the net effect of ACURATE neo versus SAPIEN 3.

In conclusion, the potential effect of predilatation is an important issue that needs to be taken into consideration. Controlling for this potential confounder could help to minimise the bias of interpreting the findings in different TAVR systems.

We declare no competing interests.

*Fuxiang Liang, Xiaoqin Wang, Qi Wang, Peijing Yan, *Liang Yao*
yaol12@mcmaster.ca

Department of Cardiac Surgery, The First Hospital of Lanzhou University, Lanzhou, Gansu, China (FL); Michael G DeGroote Institute for Pain Research and Care (XW) and Department of Health Research Methods, Evidence, and Impact (QW, LY), McMaster University, Hamilton, ON L8S 4K1, Canada; and Evidence-Based Medicine Center, School of Basic Medicine Science, Lanzhou University, Lanzhou, Gansu, China (PY, LY)

1 Lanz J, Kim WK, Walther T, et al. Safety and efficacy of a self-expanding versus a balloon-expandable bioprosthesis for transcatheter aortic valve replacement in patients with symptomatic severe aortic stenosis: a randomised non-inferiority trial. *Lancet* 2019; **394:** 1619–28.
2 Toutouzas K, Benetos G, Voudris V, et al. Pre-dilatation versus no pre-dilatation for implantation of a self-expanding valve in all comers undergoing TAVR: the DIRECT trial. *JACC Cardiovasc Interv* 2019; **12:** 767–77.
3 Deharo P, Jaussaud N, Grisoli D, et al. Impact of direct transcatheter aortic valve replacement without balloon aortic valvuloplasty on procedural and clinical outcomes: insights from the FRANCE TAVI registry. *JACC Cardiovasc Interv* 2018; **11:** 1956–65.

Authors' reply

We thank Liang Yao and colleagues for their interest in our Article.[1]

They hypothesise that the higher incidence of paravalvular regurgitation in patients treated with the self-expanding ACURATE neo compared with the balloon-expandable SAPIEN 3 valve might have been related to differences in incidence of predilatation rather than to differences in device characteristics.

In the SCOPE I trial protocol, predilatation was mandatory in the ACURATE neo group but optional in patients assigned to the SAPIEN 3 group.[1] This difference is in line with the instructions for use of the two devices, the different implantation methods, and differences in device properties, such as radial strength. Accordingly, predilatation was done in 325 (88%) of 372 patients treated with ACURATE neo versus 83 (23%) of 367 patients with SAPIEN 3 (p<0·0001).[1]

We compared the frequency of moderate or severe aortic regurgitation stratified by predilatation status and valve type appendix. Although there was no significant difference in the occurrence of moderate or severe aortic regurgitation within treatment groups, the interaction between predilatation status and valve type was highly significant (p<0·0001). However, the effect of predilatation needs to be interpreted in the context of calcification of the native aortic valve complex and differences in device characteristics. Severe calcification has been associated with an increased risk of paravalvular regurgitation.[2] Predilatation is done with the objective to aid device positioning in a heavily calcified landing zone and to improve the expansion of self-expanding transcatheter heart valves. The association of predilatation and paravalvular regurgitation is therefore likely to be confounded by the degree of aortic landing zone calcification.

Although differences in predilatation requirements preclude meaningful inferences on the effect of predilatation on the risk of paravalvular aortic regurgitation in the SCOPE I trial, the effect of predilatation on clinical outcome has been investigated in dedicated studies.[3–5] In the DIRECT trial,[3] 171 patients treated with self-expanding devices were randomly allocated to predilatation versus no predilatation. No trend favoured one strategy over the other. Similarly, in the NEOPRO registry,[4] which included 1263 patients, rates of moderate to severe paravalvular regurgitation at 30 days were similar, irrespective of whether patients had predilatation before the implantation of an ACURATE neo valve (5·5% *vs* 3·4%;