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.

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1 Puelles VG, Lütgehetmann M, Lindenmeyer MT, et al. Multi-organ and renal tropism of SARS-CoV-2. *N Engl J Med* 2020; published online May 13. https://doi.org.10.1056/NEJMc2011400.
2 Gross O, Moerer O, Weber M, Huber TB, Scheithauer S. COVID-19-associated nephritis: early warning for disease severity and complications? *Lancet* 2020; **395:** e87–88.
3 Selby NM, Forni LG, Horne KL, et al. Covid-19 and acute kidney injury in hospital: summary of NICE guidelines. *BMJ* 2020; **369:** m1963.
4 Batlle D, Soler MJ, Sparks MA, et al. Acute kidney injury in COVID-19: emerging evidence of a distinct pathophysiology. *JASN* 2020; **31:** 1380–83.
5 Kim D, Lee J-Y, Yang J-S, Kim JW, Kim VN, Chang H. The architecture of SARS-CoV-2 transcriptome. *Cell* 2020; **181:** 914–21.

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Back to basics: the outbreak response pillars

The Global Outbreak Alert and Response Network (GOARN), with more than 250 technical partner organisations across the world, has undertaken 150 operations in response to disease outbreaks during the past 20 years.

We read with interest the Editorial entitled, *COVID-19: the worst may be yet to come*.[1] GOARN has learned that the worst can be avoided through rapid and robust action to minimise the transmission of severe acute respiratory syndrome coronavirus 2. This prevention and control involves the core pillars of the outbreak response: surveillance and contact tracing, testing, case management, infection prevention and control, epidemiological and outbreak analytics, logistics, risk communication, and community engagement. Lockdowns and border closures are not a desirable long-term strategy; these measures should be used to gain time for building up capacities for a public health response.

To this end, the GOARN Steering Committee urges all governments and partners at a local level to (1) engage communities to build trust for evidence-based public health and encourage local ownership of outbreak control response measures; (2) discourage the politicisation of the COVID-19 response because politicisation is counterproductive and leads to poor strategic decisions; (3) leverage in-country expertise of experienced outbreak responders, including GOARN partners and emergency medical teams, because current decisions can be strengthened by expanding the advisory pool; (4) invest in the rapid expansion of the public health workforce for this response; (5) make decisions on the basis of a comprehensive strategy, the latest evidence, and the epidemiological situation (eg, supervised isolation for infectious patients and mandated mask wearing have been shown to improve outcomes), and explain these decisions clearly;[2–4] (6) ensure equitable access to diagnostic tests, therapeutics, and vaccines, which should be allocated according to sound public health criteria and needs; and (7) champion multilateral action and international solidarity. WHO is key to the international response as the organisation offers both a global direction to each nation and tailored technical assistance to responders.

We declare no competing interests.

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1 The Lancet. COVID-19: the worst may be yet to come. *Lancet* 2020; **396:** 71.
2 Koob SF. "Very disappointing": people with COVID-19 not staying home, going to work. July 20, 2020. https://www.theage.com.au/national/victoria/very-disappointing-people-with-covid-19-not-staying-home-going-to-work-20200730-p55gwf.html (accessed Aug 5, 2020).
3 Ali ST, Wang L, Lau EHY, et al. Serial interval of SARS-CoV-2 was shortened over time by nonpharmaceutical interventions. *Science* 2020; published online July 21. https://doi.org.10.1126/science.abc9004.
4 Lyu W, Wehby GL. Community use of face masks and COVID-19: evidence from a natural experiment of state mandates in the US. *Health Aff (Millwood)* 2020; **39:** 1419–25.

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SARS-CoV-2 PCR testing of skin for COVID-19 diagnostics: a case report

Understanding the disease course and prevalence of COVID-19 is important not only for medical, but also for socioeconomic reasons. So far, COVID-19 has been understood as a multisystem disease, mainly affecting the lungs, kidneys, and heart.[1] In the past few months, different cutaneous manifestations, such as chilblain-like, vasculitis-like, or urticaria-like lesions, have been described in patients with COVID-19.[2] Colmenero and colleagues[3] detected severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) in endothelial cells of cutaneous chilblain lesions via immunohistochemistry methods in seven paediatric patients with negative nasopharyngeal swabs.[3]

Here, we report the case of an 81-year-old woman who presented at the Department of Dermatology at the University Hospital of Basel, Basel, Switzerland, with a temperature of up to 39°C and a generalised macular eruption with partial vasculitis-like patterns and palmoplantar accentuation (appendix pp 1–2). Infection with SARS-CoV-2 was suspected and laboratory assessments of blood samples showed increased C-reactive protein (248 mg/L), decreased lymphocyte

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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.

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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.

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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).

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