

the needs of frontline health-care workers and the most vulnerable populations in communities who are more susceptible to infection and mortality if infected, including older adults (particularly those older than 65 years) and people with underlying health conditions.

People in some regions (eg, Thailand, China, and Japan) opted for makeshift alternatives or repeated usage of disposable surgical masks. Notably, improper use of face masks, such as not changing disposable masks, could jeopardise the protective effect and even increase the risk of infection.

Consideration should also be given to variations in societal and cultural paradigms of mask usage. The contrast between face mask use as hygienic practice (ie, in many Asian countries) or as something only people who are unwell do (ie, in European and North American countries) has induced stigmatisation and racial aggravations, for which further public education is needed. One advantage of universal use of face masks is that it prevents discrimination of individuals who wear masks when unwell because everybody is wearing a mask.

It is time for governments and public health agencies to make rational recommendations on appropriate face mask use to complement their recommendations on other preventive measures, such as hand hygiene. WHO currently recommends that people should wear face masks if they have respiratory symptoms or if they are caring for somebody with symptoms. Perhaps it would also be rational to recommend that people in quarantine wear face masks if they need to leave home for any reason, to prevent potential asymptomatic or presymptomatic transmission. In addition, vulnerable populations, such as older adults and those with underlying medical conditions, should wear face masks if available. Universal use of face masks could be considered if supplies permit. In parallel, urgent research on the duration of protection of face masks, the measures to prolong life of disposable masks, and the invention on reusable masks should be

encouraged. Taiwan had the foresight to create a large stockpile of face masks; other countries or regions might now consider this as part of future pandemic plans.

We declare no competing interests.

Editorial note: the Lancet Group takes a neutral position with respect to territorial claims in published maps and institutional affiliations.

\**Shuo Feng*†, *Chen Shen*†, *Nan Xia*†, *Wei Song*, *Mengzhen Fan*, *Benjamin J Cowling*  
[shuo.feng@paediatrics.ox.ac.uk](mailto:shuo.feng@paediatrics.ox.ac.uk)

†Contributed equally.

Oxford Vaccine Group, University of Oxford, Oxford, OX3 7LE, UK (SF); Department of Epidemiology and Biostatistics, Imperial College London, London, UK (CS); School of Public Health, Li Ka Shing Faculty of Medicine, The University of Hong Kong, Pokfulam, Hong Kong, Special Administrative Region, China (NX, BJC); Department of Chemistry, University of Oxford, Oxford, UK (MF); and Department of Economics and Related Studies, University of York, York, UK (WS)

- 1 WHO. Coronavirus disease (COVID-19) advice for the public: when and how to use masks. 2020. <https://www.who.int/emergencies/diseases/novel-coronavirus-2019/advice-for-public/when-and-how-to-use-masks> (accessed March 17, 2020).
- 2 State Council, China. Guidelines for the selection and use of different types of masks for preventing new coronavirus infection in different populations 2020 (in Chinese). Feb 5, 2020. [http://www.gov.cn/xinwen/2020-02/05/content\\_5474774.htm](http://www.gov.cn/xinwen/2020-02/05/content_5474774.htm) (accessed March 17, 2020).
- 3 The Department of Health, Hong Kong. Guidelines on prevention of coronavirus disease 2019 (COVID-19) for the general public. Mar 13, 2020. [https://www.chp.gov.hk/files/pdf/nid\\_guideline\\_general\\_public\\_en.pdf](https://www.chp.gov.hk/files/pdf/nid_guideline_general_public_en.pdf) (accessed March 17, 2020).
- 4 Ministry of Health, Singapore. Updates on COVID-19 (coronavirus disease 2019) local situation. <https://www.moh.gov.sg/covid-19> (accessed March 17, 2020).
- 5 Ministry of Health, Labour and Welfare, Japan. Q & A on coronavirus 2019 (COVID-19): when should I wear a facemask? 2020. [https://www.mhlw.go.jp/stf/seisakunitsuite/bunya/kenkou\\_iryou/dengue\\_fever\\_qa\\_00014.html](https://www.mhlw.go.jp/stf/seisakunitsuite/bunya/kenkou_iryou/dengue_fever_qa_00014.html) (accessed March 17, 2020).
- 6 CDC. Coronavirus Disease 2019 (COVID-19): steps to prevent illness. <https://www.cdc.gov/coronavirus/2019-ncov/about/prevention-treatment.html> (accessed March 17, 2020).
- 7 National Health Service. Are face masks useful for preventing coronavirus? 2020. <https://www.nhs.uk/conditions/coronavirus-covid-19/common-questions/> (accessed March 5, 2020).
- 8 Federal Ministry of Health, Germany. Daily updates on the coronavirus: is wearing a surgical mask, as protection against acute respiratory infections, useful for members of the general public? 2020. <https://www.bundesgesundheitsministerium.de/en/press/2020/coronavirus.html> (accessed March 5, 2020).
- 9 WHO. Shortage of personal protective equipment endangering health workers worldwide. March 3, 2020. <https://www.who.int/news-room/detail/03-03-2020-shortage-of-personal-protective-equipment-endangering-health-workers-worldwide> (accessed March 17, 2020).
- 10 Tsang A. EU seeks solidarity as nations restrict medical exports. March 7, 2020. <https://www.nytimes.com/2020/03/07/business/eu-exports-medical-equipment.html> (accessed March 17, 2020).



## Do chronic respiratory diseases or their treatment affect the risk of SARS-CoV-2 infection?

Published Online  
 April 3, 2020  
[https://doi.org/10.1016/S2213-2600\(20\)30167-3](https://doi.org/10.1016/S2213-2600(20)30167-3)

Coronavirus disease 2019 (COVID-19), caused by the novel severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), is an acute respiratory

disease that can lead to respiratory failure and death.<sup>1</sup> Previous epidemics of novel coronavirus diseases, such as severe acute respiratory syndrome (SARS) and Middle

	Number of patients	Health-care workers (%)	Mean or median age (years)	Prevalence (%)			
				Chronic respiratory disease	COPD	Asthma	Diabetes
<b>Patients with COVID-19</b>							
China <sup>12</sup>	44 672	3.8%	~51	2.4%	..	..	5.3%
Wuhan, China <sup>13</sup>	140	..	57*	..	1.4%	..	12.1%
<b>Patients with SARS</b>							
Toronto, Canada <sup>14</sup>	147	51%	45*	..	1.0%	..	11.0%
Taipei, Taiwan <sup>15</sup>	67	37%	51.0	6.0%	..	..	23.9%
Kaohsiung, Taiwan <sup>16</sup>	52	31%	48.1	..	10.0%	..	..
Hong Kong <sup>17</sup>	88	19%	42.1	..	0	1.0%	10.0%
Hong Kong <sup>18</sup>	112	61%	39.3	..	2.6%	..	4.5%
<b>General population†</b>							
China <sup>19</sup>	..	..	..	6.9%	4.9%	2.3%	6.6%
Canada <sup>19</sup>	..	..	..	10.4%	5.4%	5.4%	8.2%
Taiwan <sup>19</sup>	..	..	..	13.1%	10.4%	3.9%	10.6%
Hong Kong <sup>20</sup>	..	..	..	..	1.4%	1.9%	3.8%

Table references are listed in the appendix. COPD=chronic obstructive pulmonary disease. COVID-19=coronavirus disease 2019. SARS=severe acute respiratory syndrome. \*Median age. †Estimates for China, Canada, and Taiwan from the Global Burden of Disease Study; Hong Kong estimates from the Department of Health, Hong Kong Special Administrative Region Government.

See Online for appendix

**Table: Prevalence of chronic respiratory diseases and diabetes in patients with COVID-19 and SARS**

East respiratory syndrome (MERS), were associated with similar clinical features and outcomes.<sup>2</sup> One might anticipate that patients with chronic respiratory diseases, particularly chronic obstructive pulmonary disease (COPD) and asthma, would be at increased risk of SARS-CoV-2 infection and more severe presentations of COVID-19. However, it is striking that both diseases appear to be under-represented in the comorbidities reported for patients with COVID-19, compared with the global burden of disease estimates of the prevalence of these conditions in the general population (table); a similar pattern was seen with SARS. By contrast, the prevalence of diabetes in patients with COVID-19 or SARS is as high as or higher than the estimated national prevalence, as might be expected.

The lower reported prevalence of asthma and COPD in patients diagnosed with COVID-19 might be due to one or a number of factors. First, it is possible that, in contrast to the diagnosis of diabetes, there was substantial underdiagnosis or poor recognition of chronic respiratory disease in patients with COVID-19, particularly in China. However, this seems unlikely, as in very recent data (March 23, 2020) from Italy, among 355 patients dying with COVID-19 (mean age 79.5 years), diabetes was reported in 20.3% of patients but COPD was not listed as a comorbidity for any patient.<sup>3</sup> Similarly, provisional data from the USA (March 31, 2020) show that chronic

respiratory diseases and diabetes were comorbidities in 8.5% and 10.2% of patients with COVID-19, respectively, compared with Global Burden of Disease figures for the population as a whole of 11.3% for chronic respiratory diseases and 10.2% for diabetes; however these data are based on only 7162 of the 74 439 patients reported.<sup>4</sup>

A second possibility is that having a chronic respiratory disease protects against COVID-19, perhaps through a different immune response elicited by the chronic disease itself. However, this theory is not supported by the finding that among those with COVID-19 who have COPD as a comorbidity, mortality is increased, as would otherwise be expected.<sup>5</sup>

A third possibility is that therapies used by patients with chronic respiratory diseases can reduce the risk of infection or of developing symptoms leading to diagnosis. It is important to note that, at most, only around half of patients with COPD in China take treatments that are standard in Europe and North America,<sup>6</sup> but up to 75% of people in China with asthma use inhaled corticosteroids.<sup>7</sup> Furthermore, in in-vitro models, inhaled corticosteroids alone or in combination with bronchodilators have been shown to suppress coronavirus replication and cytokine production.<sup>8,9</sup> Low-quality evidence also exists from a case series in Japan, in which improvement was seen in three patients with COVID-19 requiring oxygen, but not ventilatory support,

after being given inhaled ciclesonide;<sup>10</sup> however, no control group was used and it is not known whether these patients would have improved spontaneously. Yet, the possibility that inhaled corticosteroids might prevent (at least partly) the development of symptomatic infection or severe presentations of COVID-19 cannot be ignored. By contrast, a systematic review on the use of systemic corticosteroids to treat SARS, once established, showed no benefit but possible harm.<sup>11</sup>

The potential benefits or harms of inhaled corticosteroids and other treatments for people at risk of SARS-CoV-2 infection or patients with COVID-19 are unclear at present, and no changes to the treatment or management of chronic respiratory conditions, including COPD and asthma, should be considered at this stage. However, collecting accurate data for the comorbidities and previous therapy of patients with COVID-19 will be essential to understanding risk factors for becoming infected, developing symptoms, and being diagnosed, as well as enabling answers to questions about possible benefits or harms of therapy for asthma and COPD during the COVID-19 pandemic. This could be achieved using a standard dataset as advocated by WHO, including information about the presence and severity of comorbidities and all medication that was being taken at the time of infection.

DMGH has received personal fees from AstraZeneca, Boehringer Ingelheim, Chiesi, GlaxoSmithKline, Novartis, Pfizer, and Sanofi, and non-financial support from Boehringer Ingelheim and Novartis, outside of the submitted work. RF has received grants from GlaxoSmithKline and Menarini, outside of the submitted work. AA has received grants from AstraZeneca, GlaxoSmithKline, and Menarini, and personal fees from AstraZeneca, Chiesi, GlaxoSmithKline, and Menarini, outside of the submitted work. OS and JRB declare no competing interests.

\*David M G Halpin, Rosa Faner, Oriol Sibila, Joan Ramon Badia, Alvar Agustí  
d.halpin@nhs.net

University of Exeter Medical School, College of Medicine and Health, University of Exeter, Exeter EX1 2LU, UK (DMGH); Respiratory Institute, Hospital Clinic, August Pi i Sunyer Biomedical Research Institute, University of Barcelona and National Spanish Network for Respiratory Research, Barcelona, Spain (RF, OS, JRB, AA)

- Huang C, Wang Y, Li X, et al. Clinical features of patients infected with 2019 novel coronavirus in Wuhan, China. *Lancet* 2020; **395**: 497–506.
- Yin Y, Wunderink RG. MERS, SARS and other coronaviruses as causes of pneumonia. *Respirology* 2018; **23**: 130–37.
- Onder G, Rezza G, Brusaferro S. Case-fatality rate and characteristics of patients dying in relation to COVID-19 in Italy. *JAMA* 2020; published online March 23. DOI:10.1001/jama.2020.4683.
- CDC COVID-19 Response Team. Preliminary estimates of the prevalence of selected underlying health conditions among patients with coronavirus disease 2019 — United States, February 12–March 28, 2020. 2020. <https://www.cdc.gov/mmwr/volumes/69/wr/pdfs/mm6913e2-H.pdf> (accessed April 2, 2020).
- The Novel Coronavirus Pneumonia Emergency Response Epidemiology Team. The epidemiological characteristics of an outbreak of 2019 novel coronavirus diseases (COVID-19)—China, 2020. *China CDC Weekly* 2020; **2**: 113–22.
- Liu Y, Liu G, Wu H, Jian W, Wild SH, Gasevic D. Sex differences in non-communicable disease prevalence in China: a cross-sectional analysis of the China Health and Retirement Longitudinal Study in 2011. *BMJ Open* 2017; **7**: e017450.
- Su N, Lin J, Chen P, et al. Evaluation of asthma control and patient's perception of asthma: findings and analysis of a nationwide questionnaire-based survey in China. *J Asthma* 2013; **50**: 861–70.
- Yamaya M, Nishimura H, Deng X, et al. Inhibitory effects of glycopyrronium, formoterol, and budesonide on coronavirus HCoV-229E replication and cytokine production by primary cultures of human nasal and tracheal epithelial cells. *Respir Investig* 2020; published online Feb 21. DOI:10.1016/j.resinv.2019.12.005.
- Matsuyama S, Kawase M, Nao N, et al. The inhaled corticosteroid ciclesonide blocks coronavirus RNA replication by targeting viral NSP15. *bioRxiv* 2020; published online March 12. DOI:10.1101/2020.03.11.987016 (preprint).
- Iwabuchi K, Yoshie K, Kurakami Y, Takahashi K, Kato Y, Morishima T. COVID-19. Three cases improved with inhaled ciclesonide in the early to middle stages of pneumonia. 2020. [http://www.kansensho.or.jp/uploads/files/topics/2019ncov/covid19\\_casereport\\_200310.pdf](http://www.kansensho.or.jp/uploads/files/topics/2019ncov/covid19_casereport_200310.pdf) (accessed March 27, 2020; in Japanese).
- Stockman LJ, Bellamy R, Garner P. SARS: systematic review of treatment effects. *PLoS Med* 2006; **3**: e343.



## The role of CT in case ascertainment and management of COVID-19 pneumonia in the UK: insights from high-incidence regions

Published Online  
March 25, 2020  
[https://doi.org/10.1016/S2213-2600\(20\)30132-6](https://doi.org/10.1016/S2213-2600(20)30132-6)

Severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) is the seventh pathogenic human coronavirus to be identified and the third with a predilection for causing potentially fatal pneumonia, after severe acute respiratory syndrome coronavirus and Middle East respiratory syndrome coronavirus. Coronavirus disease (COVID-19) infection is highly transmissible but has a relatively low death rate (1.0–3.5%), except in

older people (aged >70 years) with comorbidities.<sup>1,2</sup> It is estimated that 15–20% of people infected develop severe pneumonia and 5–10% require critical care.<sup>2</sup>

COVID-19 preparedness in countries with a surge in new cases have prioritised containment, rapid diagnosis, and fastidious contact tracing. With sustained community transmission, real-time RT-PCR (rtRT-PCR) of viral nucleic acid could be supported by