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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Smoking, nicotine, and COVID-19

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See **Personal View** page 900

Scientific journals rightly responded to the SARS-CoV-2 pandemic by more rapidly publishing their COVID-19 research. For the most part, the speeding up of time from review to publication and lowering of publication thresholds for COVID-19 research has been beneficial. But, in some cases the significant limitations of this rapidly disseminated knowledge were not sufficiently made apparent. For example, in a publication of a non-randomised, open-label study of chloroquine for COVID-19, the authors' advocated for its clinical effectiveness,[1] a stance subsequently criticised by the International Society of Antimicrobial Chemotherapy, which concluded that "publishing new data fast should not be at the cost of reducing scientific scrutiny and best practices".[2] For smoking, evidence in support of the proposal that smoking might protect against COVID-19 appeared in the literature during the early stages of the pandemic. One example was an analysis from a prospective cohort of routinely collected data, which reported a "markedly decreased risk of both COVID-19 disease and ICU admission in smokers".[3] Although the major limitations of these association data were acknowledged in the paper, the authors raised the possibility of a counterintuitive protective effect of smoking in their discussion, and speculated about its possible mechanisms.[3] But given the devastating health effects of smoking, and the deep-pocketed tobacco industry's efforts to downplay the dangers of smoking,[4] authors—especially during a global public health crisis—must exercise great caution when speculating about beneficial effects of smoking, as they should also do for non-randomised, uncontrolled efficacy studies. Indeed, an association between smoking and reduced risk of COVID-19 would be bizarre, given that cigarette smokers are five times more likely to develop laboratory-confirmed influenza[5] and four times more likely to develop invasive pneumococcal disease[6] than non-smokers, and exposure to cigarette smoke increases the risk of tuberculosis, Legionnaires disease, *Helicobacter pylori* infection, periodontitis, meningitis, otitis media, and post-surgical and nosocomial infections.[7]

The Personal View based on a literature review of tobacco use and COVID-19 by Neal Benowitz and colleagues,[8] published in *The Lancet Respiratory Medicine*, is therefore a welcome update on the current state of knowledge, albeit not a formal systematic review and based largely on searches up to August 2021. Not unexpectedly, the authors conclude that cigarette smoking adversely affects a wide range of COVID-19 outcomes such as hospitalisation and death. Policy makers should take heed of the findings of this review by including smoking cessation as part of their COVID-19 mitigation strategy. In addition, the review identifies upregulation by cigarette smoke of angiotensin-converting enzyme 2 (ACE2), the receptor co-opted by SARS-COV-2 to infect airway cells, as one possible mechanism of action. Indeed, a similar Trojan horse phenomenon underlies increased risk of invasive pneumococcal disease in smokers. In this case, cigarette smoke upregulates the platelet-activating factor

receptor, a host receptor co-opted by pneumococci to adhere to cells.[9]

Benowitz and colleagues[8] go on to consider the effects of nicotine—and other constituents of tobacco products—per se on COVID-19. For smokers, the role of nicotine in cigarette smoke is a moot point, since they must inhale a complex mix of toxic chemicals, particles, and gases. But humans can also be exposed to nicotine as inhaled nicotine salts, and as emissions from heated tobacco products and e-cigarettes (novel electronic nicotine-delivery systems or ENDS). ENDS products are not only causing a new wave of nicotine addiction, but also, as recently reported by the American Heart Association, altering immune responses that are relevant to increased susceptibility to viral and bacterial infections.[10] Thus, the possibility raised by Benowitz and colleagues[8]—on the basis of cellular and animal studies—that nicotine might reduce the risk of COVID-19 by either competing with the virus for surface binding or attenuating inflammation must, at the very least, be treated with great caution. Indeed, the limited published evidence to date on the effect of nicotine on airway cells in vitro suggests that it can induce rapid and long-lasting increases in gene and protein expression of ACE2, which in turn increases the capacity of SARS-CoV-2 to replicate in cells and cause a cytopathic effect.[11] Clearly, more cellular, animal, and epidemiological studies are urgently needed. Because a COVID-19 diagnosis was five times more likely among ever-users of e-cigarettes in the only study identified by Benowitz and colleagues[8] that included young people, and because there is a high likelihood that the COVID-19 nicotinic hypothesis[12] will be misused by those with vested interests in the sale of tobacco products, further speculation about the beneficial effects of nicotine on COVID-19 in humans would be unhelpful in the absence of conclusive evidence. Importantly, individuals must not consider using ENDS to reduce COVID-19 risk and, in line with the policy of the European Respiratory Society, should not use ENDS for smoking cessation.[13] And, certainly, young people should be discouraged from initiating ENDS, whatever the effects of ENDS use on vulnerability to airway infection turn out to be.

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The low flyers: persistent airflow limitation in young adults

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On May 18, 2022, at an American Thoracic Society research symposium held in San Francisco, CA, USA, delegates discussed how to best define and treat a new subgroup of patients who are increasingly been recognised: the so-called low flyers.

Since the landmark paper on the existence of multiple lung function pathways to chronic obstructive pulmonary disease (COPD) was published,[1] investigation into lung function trajectories across the lifespan has increased. Although at the population level there is an infinite number of lung function trajectories, studies across both lung growth and decline phases are likely to identify more nuanced lung function trajectories. Multiple early-life risk factors have been identified for