

COVID-19 and TOBACCO: THE UNION BRIEF Issue #10 (18 August 2021)

INTRODUCTION

This is The Union's tenth brief on COVID-19 and smoking. After carefully monitoring the literature over the past six months, the team has determined that because there are far fewer publications on this specific topic and because new work consistently reiterates previous findings, this will be our final brief. Eighteen months into the pandemic, there is nearly unanimous consensus that smoking results in far graver COVID-19 disease progression, including hospitalization, need for mechanical ventilation and death.

For this final brief, the team reviewed 95 studies that have been published since 1 March. We decided to summarize seven epidemiological studies, including two meta-analysis (Simons et al; Zhang et al) and a comprehensive literature review (Rodgers et al). In addition to two articles (Marques et al; Masso-Silva et al) on e-cigarettes and COVID-19, we also discuss a cross-sectional study on COVID-19's impact on three specific smoking-related outcomes as well as a retrospective study from Tattan-Birch and colleagues that examines current and former smokers self-reporting of COVID-19.

Please refer to our [main brief](#) for more thorough analysis on the critical questions regarding smoking, infection with SARS-CoV-2, hospital record limitations, biochemistry, and nicotine's alleged protective qualities. The master brief also includes definitions of the three COVID-19 disease stages.

Meta-Analyses and Literature Review

In their ongoing "Smoking and COVID Living Review: a Bayesian analysis," Simons and colleagues [1] continued to examine the association between smoking status and SARS-CoV-2 infection, hospitalization, and mortality. Using 62 studies (published and pre-prints) retrieved from MEDLINE and medRxiv prior to mid-February 2021, their 11th meta-analysis continued to find results consistent with what was previously identified. Most notable are their findings that current smokers appear to be at reduced risk of SARS-CoV-2 infection when compared to never smokers and that former smokers were at increased risk of hospitalization, greater disease severity and mortality when compared to never smokers. In addition to noting that it is "uncertain" whether associations are "causal," the authors emphasize, as they have in their previous studies, that there are several factors complicating interpretation of results. Research design issues—e.g. former smokers being inappropriately labelled "never smokers" upon hospital admission or smokers misreporting their smoking status—could result in massive underreporting of current and former smoking.

The second meta-analysis, "Association of smoking history with severe and critical outcomes in COVID-19 patients," includes 109 articles culled from eight online databases prior to 1 February 2021. In this systematic review involving over 517,000 patients, Zhang et al. [2] found a statistically significant association between smoking history and COVID-19 severity and that smoking was significantly associated with risk of admission to an intensive care unit, increased mortality, and critical disease composite endpoints. There was no association between smoking history and mechanical ventilation and the association was more significant in former smokers than current smokers.

A comprehensive literature review on smoking and COVID-19 from Rodgers et al [3] had a search criterion that was limited to published, peer reviewed cohort studies set outside China between January and August 2020. The authors' "explorative narrative synthesis" eventually focused on seven cohort studies—two from the United States, one from Turkey, and four from the United

Kingdom—and included sample sizes ranging from 200 to over 5000 participants. Despite the diverse settings and sample sizes, all seven pointed toward a “potential harmful effect of smoking on COVID-19 severity and being more susceptible to contracting SARS-CoV-2 infection.”

E-Cigarettes and COVID-19

Two studies—Marques et al [4] and Masso-Silva et al [5] explore the relationship between e-cigarettes and SARS-CoV-2. In the former, the authors review over 100 studies on e-cigarettes to answer several key questions regarding ENDS and human health. Though they conclude that e-cigarette consumption “seems” to be less toxic than tobacco smoking, they note that this does not mean e-cigarettes are “free from hazardous effects.” When they apply a specific lens to e-cigarettes and COVID-19, the authors note that “nicotine vaping may display adverse outcomes” and call for additional studies to clarify the relationship. To determine how e-cigarette aerosols affect lung inflammatory responses and resting immune state, Masso-Silva and colleagues assessed the overall gene expression changes in the lungs of two distinct mice populations. Their study—it found that chronic, daily e-cigarette aerosol inhalation fundamentally altered lung inflammatory and immune state—suggests that e-cigarette users may be at higher risk of developing lung infections and inflammatory disorders, which might affect susceptibility to SARS-CoV-2.

Smokers Quit Attempts and Self Perceptions

Finally, two studies examine if COVID-19 affects smokers’ interest in quitting tobacco and whether smokers are more likely to believe they have been infected with SARS-CoV-2. In “Smokers cognitive and behavioural reactions during the early phase of the COVID-19 pandemic,” Gravely and colleagues used a cross-sectional study design that included 6,870 adult smokers participating in the Wave 3 (2020) ITC Four Country Smoking and Vaping Survey conducted in Australia, Canada, England, and the United States. After examining the association between COVID-19 and three outcomes—thoughts about quitting smoking; changes in smoking behaviour; and factors related to a positive change—they used regression analyses on weighted data and found that nearly 47% of smokers reported thinking about quitting smoking because of COVID-19. At the same time, however, the majority of smokers studied did not actually change their behaviour. Just 1.1% of smokers made a quit attempt and only 14% reduced their smoking, demonstrating that intent did not result in action. The authors conclude that COVID-19 did not result in significant net changes in smokers’ short-term behaviour; additional efforts are needed to encourage tobacco cessation.

Using cross-sectional household surveys, Tattan-Birch et al [7] conducted research on 3,179 adults in England from April to May 2020 to determine associations between self-reported COVID-19, hand washing, smoking status, e-cigarette use, as well as the extent to which COVID-19 prompted smoking and vaping quit attempts or additional smoking at home. After being briefed on COVID-19 symptoms, 16% of the sample proclaimed that it had COVID-19. The researchers found a higher rate of self-reporting among current and former smokers and attributed this to the fact that both groups are susceptible to infections that mimic COVID-19, rather than increased disease presence.

References:

1. Simons et al. *Smoking and Covid Living Review (v 11): a Bayesian Analysis*. Qeios, 2021..

2. Zhang et al. *Association of smoking history with severe and critical outcomes in COVID-19 patients: A systemic review and meta-analysis*. European Journal of Integrative Medicine, 2021. **43**
3. Rodgers et al. *Smoking and COVID-19: A literature review of cohort studies in non-Chinese Population Settings*. 2021. Tobacco Use Insights Volume 14: 1-6.
4. Marques et al. *An updated overview of e-cigarette impact on human health*. Respiratory Research. Volume 22, Issue 1.
5. Masso-Silva et al. *Chronic e-cigarette aerosol inhalation alters the immune state of the lungs and increases ACE2 expression, raising concern for altered response and susceptibility to SARS CoV-2*. Frontiers in Physiology.
6. Gravely et al. *Smokers' cognitive and behavioral reactions during the early phase of the COVID-19 pandemic: Findings from the 2020 ITC Four Country Smoking and Vaping Survey*. PLOS One.
7. Tattan-Birch et al. *COVID-19, smoking, vaping, and quitting: A representative population survey in England*. doi:10.1111/add.15251