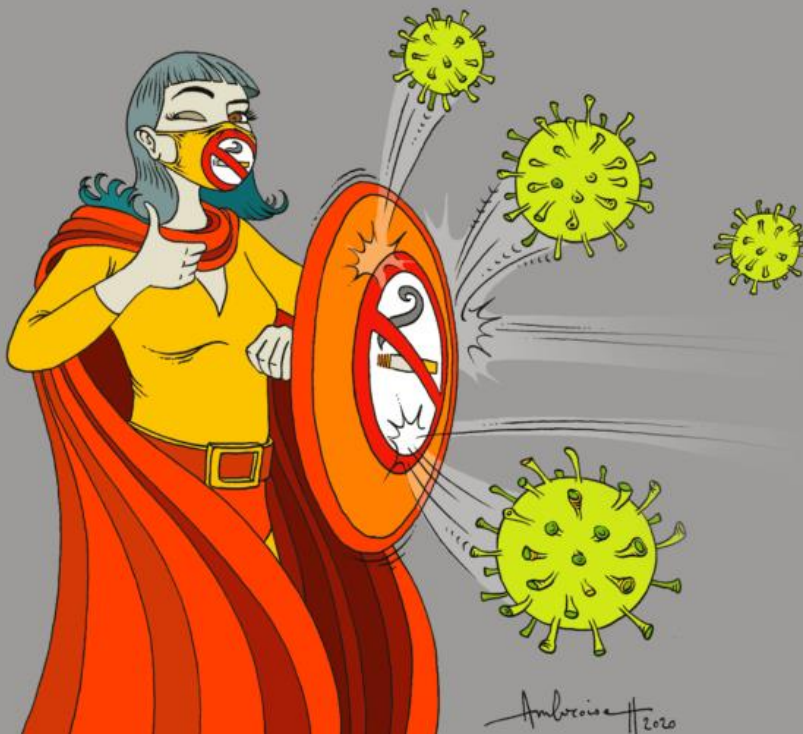




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COVID-19 and Smoking.

Brief

Any kind of smoking is harmful and seriously affects the cardiovascular and respirator systems. Recent publications have shown that smoking (including vaping) not only increase the risk of contracting the respiratory disease COVID-19, but also increase the risk of developing serious complications when infected.

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What is COVID-19?

Coronavirus disease (COVID-19) is an infectious disease caused by a newly discovered coronavirus and is predominantly a disease of the respiratory tract, with evidence emerging that cellular entry, viral replication, and virion shedding occur within the respiratory tract¹.

Most people infected with the COVID-19 virus will experience mild to moderate respiratory illness and recover without requiring special treatment. Older people, and those with underlying medical problems like cardiovascular disease, diabetes, chronic respiratory disease, and cancer are more likely to develop serious illness and suffer from post-COVID long-term consequences.

The COVID-19 virus spreads primarily through droplets of saliva or discharge from the nose when an infected person coughs or sneezes, so it's important that you also practice respiratory etiquette (for example, by coughing into a flexed elbow)².

Smoking and Vaping increase the spread of COVID-19

COVID-19 can easily spread from hand-to-mouth contact, which is common when using cigarettes or vaping devices. Social sharing of smoking and vaping products can also facilitate the spread of the virus, in particular outbreaks of COVID-19 linked to Shisha-bars are documented.

The risks of transmission linked to hookahs was immediately recognized in the early stages of the COVID-19 epidemic³. The water of the pipe could in itself be a favorable environment for the survival of the COVID-19 virus. Cleaning a water pipe should be done after each use, but this is rarely the case. Because of the airborne transmission of the virus, the social consumption of hookah in closed public places is a favorable environment for infections to occur. In May 2020, an outbreak of COVID-19 in Göttingen (Germany), in which 68 people were infected, was linked to a shisha bar: 310 people having been in contact with the infected people were identified, including children and teenagers⁴.

Moreover, the risk of COVID-19 linked to passive smoke cannot be excluded and must be considered. While there are have been no published studies looking directly at secondhand smoke and the spread of the coronavirus, the same droplets people spray when they are coughing, sneezing, or talking are exhaled when they are smoking, or vaping⁵.

Smoking, Vaping and the Risk of Contracting COVID-19

It is well established that smoking weakens the immune system and is a risk-factor for many other respiratory infections, including colds, influenza, pneumonia and tuberculosis⁶. The effects of smoking

on the respiratory system makes it more likely that smokers contract these diseases. Additionally, smoking is also associated with a higher risk of developing acute respiratory distress syndrome, a key complication for severe cases of COVID-19². A study by Ganesant et al. 2020 also pointed out the adverse effects of ENDS on the disease-naïve oral microbiome, as e-cigarettes stress the subgingival environment by increasing proinflammatory responses⁷. In consideration of the harm caused by tobacco and ENDS products, the COVID-19 virus could infiltrate the body more easily through the respiratory tract. So far, this hypothesis has not been confirmed in a well-designed study, however.

Nevertheless, several studies indicate the increased risk of respiratory infections of smokers. In one study, 391 healthy volunteers were exposed to 1 of 5 different respiratory viruses, including a coronavirus, dropped via a liquid into their noses. The volunteers who smoked were twice as likely as those who did not smoke to develop an infection⁸. In a study conducted in 2009, researchers showed that cigarette smoked causes necrosis, rather than apoptosis in viral infection, resulting in increased inflammation and enhanced viral replication⁹. Subsequent research has confirmed that cigarette smoke decreases innate responses of epithelial cells to rhinovirus infection¹⁰.

Smoking and the Increased Risk of COVID-19 Complications

Smoking increases the risk of chronic lung disease, reduces lung capacity and causes inflammation of the airways, which can increase the risk of developing pneumonia or a serious complication in COVID-19 patients^{11,12}. One of the first studies to establish a link between smoking history of the patient and the severity of COVID-19 was conducted among patients admitted to three tertiary hospitals in Wuhan between December 30, 2019, and January 15, 2020. The study was conducted with 78 patients, and history of smoking was considered as a risk factor among others¹². In another important study by Guan et al. 2020, examined the clinical characteristics of coronavirus in China. 1099 people with COVID-19 were examined and people who smoked were 2.4 times more likely to get admitted to an intensive care unit, needed mechanical ventilation, or died compared to those who did not smoke¹³.

In another study conducted in Vancouver, researchers demonstrated that active cigarette smoking increased the risk for comorbidities, such as chronic obstructive pulmonary disease (COPD), which leads to an increased severity of COVID -19 infection¹⁴. Another meta-analysis showed a significant association between smoking and the progression of COVID 19¹⁵, with recent meta analyses and a scientific brief from the WHO¹⁶ echoing results that smoking is associated with increased severity of disease and death in hospitalised COVID-19 patients.¹⁶⁻¹⁸

Vaping and Lung Health

Electronic nicotine delivery systems (ENDS) are rapidly increasing in popularity due to the perception that they may represent a safe alternative to conventional cigarettes. But there is growing evidence that aerosol from ENDS, can harm lungs at both the cellular and organ level, and reduce the body's ability to fight respiratory infections. A 2019 review of the evidence for the effects of e-cigarettes on respiratory health showed measurable adverse biological effects on organ and cellular health in humans, animals and in vitro¹⁹. Another study of smokers, e-cigarette users and total non-users examined 594 genes known to aid in immune system support and fighting off infections. Both e-cigarette and cigarette smokers showed signs of diminished gene activity, however the vaping group exhibited decreased activity in 300 more genes than regular smokers. This suggests that compounds found in the liquid used to create the inhaled aerosols has an immunosuppressive effect on the body²⁰.

Others findings reveal that chronic e-cigarette aerosols aberrantly alters the physiology of lung epithelial cells and resident immune cells and promotes a poor response to infectious challenges^{21 22}. Results of another study from 2018 revealed that e-cigarette use alters the profile of innate defense proteins in airway secretions, inducing similar and unique changes relative to cigarette smoking²³. ENDS liquid extracts are also toxic and reduce the antiviral response, which raises further concerns about the impact COVID-19 infection may have on ENDS users²⁴.

Given the limited evidence regarding ENDS impact on lung disease in general and on COVID-19, we cannot conclude that the products have no impact on the risk of COVID-19 infection or the severity of infection. The precautionary principle does not allow the exclusion of danger; however, the burden of scientific proof is on those who would like to exclude such danger.

Smoking and other COVID-19 Risk Factors

Several chronic conditions, including hypertension, diabetes, and cardiovascular disease are risk factors clearly associated with increased odds of death in COVID-19 patients.²⁵ For those chronic diseases, smoking and vaping is an established important major risk factor.²⁶⁻³⁰

One study has shown that having a history of smoking substantially increases the chance of adverse health outcomes for COVID-19 patients, including being admitted to intensive care, requiring mechanical ventilation and suffering severe health consequences.³¹ Another study has echoed relationship between smoking and COVID-19 disease severity by stating that smoking is related to a higher expression of ACE2, the cell surface receptor to which SARS-CoV-2 binds.³² Moreover, medical vulnerability was not only demonstrated in older populations with pre-existing conditions, but also in

younger populations. According to survey data, smoking appears to be the strongest risk factor for an elevated risk for severe COVID-19 amongst young adults. Researchers looked at data from more than 8,000 participants, ages 18 to 25 in the nationally representative National Health Interview Survey between 2016 and 2018, and stated that 32% of the surveyed were seen as medical vulnerable to severe COVID-19, with the highest risk amongst young, white, male adults with lower income and not fully, or partially insured.³³

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