



[Home](#) > Reduce your risk of serious lung disease caused by corona virus by quitting smoking and vaping

March 6, 2020

Stanton A. Glantz, PhD

Reduce your risk of serious lung disease caused by corona virus by quitting smoking and vaping



Updated March 31, 2020

When someone's lungs are exposed to flu or other infections the adverse effects of smoking or vaping are much more serious than among people who do not smoke or vape.

Smoking is associated with increased development of acute respiratory distress syndrome (ARDS) in people with a risk factor like severe infection, non-pulmonary sepsis (blood infection), or blunt trauma. People who have any cotinine (a metabolite of nicotine) in their bodies – even at the low

levels associated with secondhand smoke – have substantially increased risk of acute respiratory failure from ARDS ([paper 1](#), [paper 2](#), [paper 3](#)).

The recent [excellent summary](#) of the evidence on the pulmonary effects of e-cigarettes reported multiple ways that e-cigarettes impair lungs' ability to fight off infections:

Effects on immunity

Reporting of respiratory symptoms by e-cigarette users suggests increased susceptibility to and/or delayed recovery from respiratory infections. A study of 30 healthy non-smokers exposed to e-cigarette aerosol found decreased cough sensitivity.⁸² If human ciliary dysfunction is also negatively affected, as suggested by animal and cellular studies,⁸³ the combination of reduced coughing and impaired mucociliary clearance may predispose users to increased rates of pneumonia. Exposure to e-cigarettes may also broadly suppress important capacities of the innate immune system. Nasal scrape biopsies from non-smokers, smokers, and vapers showed extensive immunosuppression at the gene level with e-cigarette use.⁸⁴ Healthy non-smokers were exposed to e-cigarette aerosol, and bronchoalveolar lavage was obtained to study alveolar macrophages.⁴⁶ The expression of more than 60 genes was altered in e-cigarette users' alveolar macrophages two hours after just 20 puffs, including genes involved in inflammation. Neutrophil extracellular trap (NET) formation, or NETosis, is a mode of innate defense whereby neutrophils lyse DNA and release it into the extracellular environment to help to immobilize bacteria, a process that can also injure the lung.⁸⁵ Neutrophils from chronic vapers have been found to have a greater propensity for NET formation than those from cigarette smokers or non-smokers.⁵⁷ Given that e-cigarettes may also impair neutrophil phagocytosis,⁸⁶ these data suggest that neutrophil function may be impaired in e-cigarette users. [emphasis added]

Studies in animals reinforce and help explain these human effects:

Two weeks of exposure to e-cigarette aerosol in mice decreased survival and increased pathogen load following inoculation with either *Streptococcus pneumoniae* or influenza A, two leading causes of pneumonia in humans.⁹⁷ Furthermore, the aerosol exposure may lead to enhanced upper airway colonization with pathogens and to virulent changes in pathogen phenotype, as shown with *Staphylococcus aureus*.^{98 99} Thus, although more studies are needed, **the animal data suggesting that vaping leads to an increased susceptibility to infection would seem to correlate with the population level data in young adult humans, whereby vapers have increased rates of symptoms of chronic bronchitis.**²³ [emphasis added]

A meta-analysis of the relationship between [smoking and influenza](#) found that smokers were more likely to be hospitalized and admitted to the ICU.

Consistent with this science, [analysis of deaths from corona virus in China](#) shows that men are more likely to die than women, something that may be related to the fact that many more Chinese men smoke than women. However, [one study](#) from China that evaluated predictors of death among all people hospitalized with COVID-19 did not find an association with smoking. Another study from China of patients diagnosed with COVID-19 associated pneumonia who had been in the

hospital for two weeks reported that [the odds of disease progression \(including to death\) were 14 times higher among people with a history of smoking](#) compared to those who did not smoke. This was the strongest risk factor among those examined.

A [review of the available literature done in mid-March 2020](#) found 5 relevant papers, all from China. Three of the five papers did not find statistically significant differences between smokers and nonsmokers in terms of disease progression, but the studies were generally small, which means they had low power to detect an effect if it was there. One did not report a p value and the other (noted earlier in this paragraph) found worse outcomes for smokers. The general pattern in the non-significant studies was for worse outcomes among the smokers. The authors concluded, "with the limited available data, and although the above results are unadjusted for other factors that may impact disease progression, smoking is most likely associated with the negative progression and adverse outcomes of COVID-19." A meta-analysis of these five papers concluded that there was [no significant association](#) between smoking and COVID outcomes. The authors used a nonstandard way to compute the overall risk; when I put their numbers into the widely-used statistical analysis program Stata, it found a significant increase in risk using a fixed effects model (one that just applies to the 5 particular studies) and came close to significance using the more conservative random effects model (which treats the 5 studies as a random sample of all studies). Research on the association between smoking and COVID outcomes is appearing quickly; I expect that we will have a better estimate of the actual risk soon.

Dr. Nora Volkow, director of the National Institute on Drug Abuse, posted an article on her blog ["COVID-19: Potential Implications for Individuals with Substance Use Disorders,"](#) that started off by saying

As people across the U.S. and the rest of the world contend with coronavirus disease 2019 (COVID-19), the research community should be alert to the possibility that it could hit some populations with substance use disorders (SUDs) particularly hard. Because it attacks the lungs, the coronavirus that causes COVID-19 could be an especially serious threat to those who smoke tobacco or marijuana or who vape.

She goes on to address other drug use and how COVID-19 could interact with them, including noting that

Vaping, like smoking, may also harm lung health. Whether it can lead to COPD is still unknown, but emerging evidence suggests that exposure to aerosols from e-cigarettes harms the cells of the lung and diminishes the ability to respond to infection. In [one NIH-supported study](#), for instance, influenza virus-infected mice exposed to these aerosols had enhanced tissue damage and inflammation.

The whole blog post is worth reading.

In addition, an article in *Scientific American*, ["Smoking or Vaping May Increase the Risk of a Severe Coronavirus Infection,"](#) summarizes how smoking and vaping affect the lungs and the immune system that is consistent with the view that using these products increases the risk of infection and

worse outcomes. [CNN](#) also has a good story, "[How smoking, vaping and drug use might increase risks from Covid-19.](#)"

CDC, FDA, the Surgeon General, state health departments and everyone (including [comedians](#), such as [John Oliver](#) who spent his whole show on the issue last weekend) working to educate the public on how to lower risk of serious complications from covid-19 should **add stopping smoking, vaping, and avoiding secondhand exposure to their list of important preventive measures.**

This would also be a good time for cities, states private employers and even individual families to **strengthen their smokefree laws and policies** – including e-cigarettes -- to protect nonsmokers from the effects of secondhand smoke and aerosol on their lungs and to create an environment that will help smokers quit.

The California Department of Public Health has information on smoking, vapi and COVID [here](#), as does the [California Smokers' Helpline](#). [Trinity Health](#) is also urging people to stop smoking to protect against COVID-19. [FDA](#) has said that vaping and smoking could increased COVID risks. [CDC](#) lists smoking as one of the risk factors for COVID-19.

The Ontario Tobacco Research Unit has prepared a good two-page summary of the evidence and recommendations from various sources and authorities; it is available [here](#).

Not surprisingly, the pro-vaping lobbying organization CASAA does not agree with me or the other cited authorities; you can read their perspective [here](#).

[Add new comment](#)

Comments

There is probably a strong

[Permalink](#) Submitted by Mark Gottlieb on Mar 7, 2020

Comment:

There is probably a strong policy argument to be made for providing free NRT distribution through chain pharmacies and a boost in Quitline funding as part of the federal response to COVID-19. That would actually be a form of harm reduction we could all agree on.

[reply](#)

I agree, but it is important

[Permalink](#) Submitted by Stanton Glantz on Mar 7, 2020

Comment:

I agree, but it is important that the NRT only be made available to those who are also part of a formal smoking cessation program including counselling. (State quitlines can provide the counselling.)

The [tobacco companies](#) figured out a long time ago that NRT used properly works, but used improperly -- without conselling -- actually keeps people smoking. That's why they got into the NRT business a few years ago. Sell it by the cash register like candy.

[reply](#)

"Among Chinese patients

[Permalink](#) Submitted by Jay Fink on Mar 8, 2020

Comment:

"Among Chinese patients diagnosed with COVID-19 associated pneumonia, the odds of disease progression (including to death) were 14 times higher among people with a history of smoking compared to those who did not smoke. This was the strongest risk factor among those examined".

14 times higher, what a statistic! This information needs to get out to the public. Few people know about this.

[reply](#)

What are the implications for

[Permalink](#) Submitted by Marie B. on Mar 9, 2020

Comment:

What are the implications for someone who quit smoking over seven years ago? Any idea?

[reply](#)

The immune and inflammatory

[Permalink](#) Submitted by Stanton Glantz on Mar 9, 2020

Comment:

The immune and inflammatory responses are generated by current exposure to the smoke/aerosol, so you are essentially a nonsmoker now.

[reply](#)

I quit smoking three weeks

[Permalink](#) Submitted by Tia on Mar 9, 2020

Comment:

I quit smoking three weeks ago? How will this affect me?

[reply](#)

You are no longer bathing

[Permalink](#) Submitted by Stanton Glantz on Mar 9, 2020

Comment:

You are no longer bathing your lungs in toxic chemicals, so you are better off. The cilia (little hairs that move foreign particles out of your lungs so you can cough them out) are recovering. CDC has a good summary of what happens after you quit, which is available [here](#).

reply

Thank you! That's quite the

[Permalink](#) Submitted by Marie B. on Mar 10, 2020

Comment:

Thank you! That's quite the relief.

reply

If I quit now will it help

[Permalink](#) Submitted by Mary Tsiouris on Mar 10, 2020

Comment:

If I quit now will it help

reply

Yes. As I said in the blog

[Permalink](#) Submitted by Stanton Glantz on Mar 10, 2020

Comment:

Yes. As I said in the blog post, this is new territory, but everything we know about how smoking and vaping affects lungs suggests that it will. It certainly won't hurt!

reply

QUESTION ON CANNABIS

[Permalink](#) Submitted by Faith Washburn on Mar 10, 2020

Comment:

QUESTION ON CANNABIS CONSUMPTION: Hi Dr. Glantz, thank you for this article! I summarized your post in one of my COVID-19 daily updates (<https://faithwashtub.livejournal.com/279.html>) and I got a question regarding whether smoking or vaping cannabis would have a similar effect. Would you be able to describe what smoking or vaping cannabis would do in terms of raising your risk for severe illness from COVID-19, assuming it would? Thank you so much for your time and expertise, take care!

reply

That is a a very good

[Permalink](#) Submitted by Stanton Glantz on Mar 10, 2020

Comment:

That is a a very good question. As far as I know, no one has addressed it directly. But we do know that cannabis smoke is very similar to tobacco smoke (other than a different psychoactive agent, THC vs nicotine). And vaped cannabis delivers an aerosol of ultrafine particles and chemicals deep into the lungs. too.

It would be sensible to stop using these cannabis products, too.

By the way, the federal government makes it almost impossible to study the cannabis products people are actually using. If I went down the street to a local cannabis dispensary and bought some products off the shelf and brought them back to UCSF to study, even in a chemistry lab, the federal government could pull *all* federal funding to all 10 UC campuses. This is a huge problem for scientists who are trying to get the answers to these reasonable questions that people are asking.

[reply](#)

can contaminated cigarette

[Permalink](#) Submitted by sherry mc on Mar 11, 2020

Comment:

can contaminated cigarette smoke be linked to spreading covid19

[reply](#)

I checked with some pulmonary

[Permalink](#) Submitted by Stanton Glantz on Mar 13, 2020

Comment:

I checked with some pulmonary specialists. This is not something that has received much study. The [one study](#) that looked at flu didn't find that smokers shed more virus. No one seems to have studied vaping.

[reply](#)

Any idea on the risk of

[Permalink](#) Submitted by Marcus on Mar 11, 2020

Comment:

Any idea on the risk of juuling? I have been juuling a little under a year now and am trying to quit. I know a lot of long term effects of juuling (vaping) are still unknown, and the practical answer is to stop (consistently breathing in anything other than air is bad) but I was wondering if you know any further details? Is lung health status before contracting the virus the biggest determining factor in regards to mortality rate? If so, how can I check how heathy my lungs are? Should I be worried?

[reply](#)

As far as I know, no one has

[Permalink](#) Submitted by Stanton Glantz on Mar 12, 2020

Comment:

As far as I know, no one has yet studied Juul particularly in terms of effects on pulmonary immunity and inflammation (although I have not done a comprehensive search). There is evidence that for [vascular](#) (blood vessel) effects, showing that Juul has the same adverse effects as an earlier generation e-cig or a Marlboro Red. Because, like all e-cigarettes and cigarettes, Juul delivers an aerosol of ultrafine particles and chemicals to your lungs, the safest thing would be to stop.

Because it uses nicotine salts, Juul and similar e-cigs appear to be more addictive than older e-cigs (and maybe even conventional cigarettes). I would seek help from your doctor or call your state quitline, which you can reach through 1-800-QUIT NOW. Many also provide medications to help when appropriate. [Truth Initiative](#) has a texting service targeted at Juul.

Health officials have said that people with existing conditions, including lung disease, are at increased risk, but have not, as far as I know, made any quantitative statements based on how severe the lung disease is.

[reply](#)

Dear Dr. Glantz, I quit

[Permalink](#) Submitted by Dermot on Mar 12, 2020

Comment:

Dear Dr. Glantz, I quit smoking 2 months ago and am currently using 2mg nicotine lozenges. Should I now also stop those because of your finding on Cotinine/Nicotine?

Really appreciate that you are answering these comments as reliable info is hard to find

[reply](#)

The effects of concern are

[Permalink](#) Submitted by Stanton Glantz on Mar 12, 2020

Comment:

The effects of concern are due to the inhaled aerosol, not nicotine in your blood (which is what the NRT does). You should eventually wean yourself off the NRT (because it has other effects), but I would stay on the NRT until you are sure that you are past smoking.

[reply](#)

I am a current smoker and

[Permalink](#) Submitted by Kristin on Mar 12, 2020

Comment:

I am a current smoker and terrified of getting this virus. If I quit smoking today how long will it take for cotinine/nicotine to get out of my body? I'm shocked that the media isn't publicizing this heightened risk about smoking and the Coronavirus. I also have asthma too so I know that is dangerous and that smoking is harmful but didn't realize that it greatly increases your risks due to the cotinine in cigarettes. The public needs to know about this ASAP because the people who I know that smoke or vape etc had no idea about the deadly links between the two. I've been trying to quit for a while but this is it, I'm done.

reply

Congradulations on quitting.

[Permalink](#) Submitted by Stanton Glantz on Mar 12, 2020

Comment:

Congradulations on quitting.

As I said in response to another comment, it is the inhaled aerosol not the nicotine in your blood that is causing most of the problems. The effects of smoking start resolving as soon as you stop. The CDC link I posted earlier includes information of how quickly different things start changing.

reply

“ People who have any

[Permalink](#) Submitted by Jase on Mar 16, 2020

Comment:

“ People who have any cotinine (a metabolite of nicotine) in their bodies – even at the low levels associated with secondhand smoke”

“Bodies” is vague. I assume should read “respiratory system” since NRT gum would not increase chances of severe infection, correct?

reply

I recently quit juuling and

[Permalink](#) Submitted by Doug Jones on Mar 17, 2020

Comment:

I recently quit juuling and now am scared since I am using Nicotine replacement therapy, patches or gum. Is the nicotine in them just as dangerous as the juul?

reply

You are much better off

[Permalink](#) Submitted by Stanton Glantz on Mar 17, 2020

Comment:

You are much better off quitting. You are not inhaling the ultrafine aerosol that Juul and other e-cigs -- and cigarettes -- deliver to your lungs.

Once you are sure you are de-addicted, you should get off the NRT, but stay on it as long as you need to avoid Juul. Counselling helps. State quitlines are available for free.

[reply](#)

Thanks for the clarification.

[Permalink](#) Submitted by Winston Smith on Mar 19, 2020

Comment:

Thanks for the clarification.

If I got this right, it's all about aerosol and/or chemicals which result from combustion. You wrote earlier that "vaped cannabis delivers an aerosole of ultrafine particles and chemicals deep into the lungs, too". Is that also valid for vaporizers which work with heat only (no liquids, no combustion)?

Thank you for your work.

[reply](#)

I haven't seen any direct

[Permalink](#) Submitted by Stanton Glantz on Mar 19, 2020

Comment:

I haven't seen any direct evidence one way or the other in terms of pulmonary effects (although I didn't do an exhaustive search). There is [evidence](#) that for vascular (blood vessel) effects, vaporizers have similar adverse effects as combusted marijuana smoke. All these different delivery modes -- smoking, vaping, vaporizers -- all work by delivering an aerosol of ultrafine particles to your lungs to deliver the active ingredient (THC or nicotine). Those particles are not a good thing for your lungs (or your vascular system).

My advice: Don't put anything but air into your lungs.

[reply](#)

Cleveland Clinic weighs in:

[Permalink](#) Submitted by Stanton Glantz on Mar 21, 2020

Comment:

Cleveland Clinic weighs in: <https://health.clevelandclinic.org/teens-vaping-and-coronavirus-is-there-a-connection/>

[reply](#)

BMJ blog: "Covid-19: The role

[Permalink](#) Submitted by Stanton Glantz on Mar 22, 2020

Comment:

BMJ blog: "[Covid-19: The role of smoking cessation during respiratory virus epidemics](#)"

[reply](#)

What about using a cannibus

[Permalink](#) Submitted by Mee on Mar 22, 2020

Comment:

What about using a cannibus bubbler to filter the flower?

[reply](#)

It doesn't matter. Studies

[Permalink](#) Submitted by Stanton Glantz on Mar 22, 2020

Comment:

It doesn't matter. Studies of tobacco hookah shows that the [particles and gases are carried through the water in the bubbles.](#)

[reply](#)

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Director, Center for Tobacco Research Control & Education

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