

# Smoking found to significantly increase the risk of depression

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Although smoking can provide an immediate feeling of calm and relaxation, the habit has serious long-term consequences - also in the brain. New figures from Aarhus University suggest that smoking significantly increases the risk of severe mental disorders. Credit: Mateo Avila Chinchilla

Most of us know that smoking is unhealthy.

Cigarette packets display shocking picture warnings of diseased lungs and rotting teeth. And we often hear in the media about how smoking can cause all sorts of cancer.

But most of us probably do not know that smoking actually increases the risk of [mental illness](#) as well.

In recent years, ever more research has indicated a strong correlation between smoking and mental illness. However, researchers have not been able to agree on whether smoking causes depression or other [mental disorders](#), or whether we smoke because we need to lessen the symptoms of a latent mental disorder.

But now we know.

Together with two colleagues from Canada, Doug Speed from the Center for Quantitative Genetics and Genomics at Aarhus University has shown that smoking can lead to depression and bipolar disorder.

"The numbers speak for themselves. Smoking does cause mental illness. Although it's not the only cause, smoking increases the risk of being hospitalized with a mental illness by 250 percent," he says.

"Smoking typically comes before the mental illness. In fact, a long time before. On average, people from the data set began smoking at the age of 17, while they were typically not admitted to hospital with a mental disorder until after the age of 30."

## **Based on health data from 350,000 people**

Before Doug Speed and his colleagues could answer whether smoking can cause mental disorders, they needed very large volumes of data. There can be many different reasons why we develop a mental disorder.

It was therefore important that they had enough data to clean their figures from other possible effects.

They gained access to the UK Biobank, one of the largest databases in the world of human health information. The database contains genetic data on more than half a million people. The [genetic data](#) was paired with a lot of other health information and answers provided by the participants regarding their lifestyle.

They fed the data into a computer and began looking for patterns. Doug Speed and his colleagues are far from the first researchers to investigate this correlation, but they found a new way to do it, as he explains.

"Previous research hasn't really considered that there may be a temporal dimension at play. People typically start to smoke before the age of 20, but aren't admitted to hospital with a mental disorder until they're between 30 and 60 on average."

## **Your genes affect whether you become a smoker**

As many as 90 percent of the people in the data set who were still smokers or former smokers started before the age of 20. The likelihood that you will start smoking later in life is therefore quite small. In fact, your [genes](#) help determine whether or not you will become a smoker, explains Doug Speed.

"When we looked at the many smokers in the database, we found a number of recurring genetic variants. By looking at [twin studies](#), in which the twins had the same genes but grew up in separate homes, we could see that their genes could explain 43 percent of the risk of becoming a smoker."

In the homes where the [adoptive parents](#) also smoked, the risk of the

child starting to smoke increased. However, if the parents didn't smoke, the risk was lower, but still greater when the children's 'real' parents had been smokers and passed on certain genes.

"There are a number of genetic variants that we can refer to as 'smoking-related genes'. The people in the data set who carried the smoking-related genes but did not smoke were less likely to develop mental disorders compared to those who carried the genes and smoked," he says and continues:

"Because the genetic variants also seem to be linked with the [risk of mental illness](#), this used to be a bit blurry. But in this study, we demonstrate that it's probable that the risk of starting to smoke causes the risk of developing mental disorders to increase due to the 'smoking-related genes'."

## **Nicotine may damage the brain**

Statistically, smoking seems to cause mental disorders such as depression, [bipolar disorder](#) and schizophrenia. However, Doug Speed and his colleagues have no explanation as to why. Only a number of theories.

"We still need to find the biological mechanism that causes smoking to induce mental disorders. One theory is that nicotine inhibits absorption of the neurotransmitter serotonin in the brain, and we know that people with depression don't produce enough serotonin," he says.

When you smoke a single cigarette, nicotine activates the production of serotonin in the brain. Among other things, this is what makes you feel relaxed after smoking. But if you continue to smoke, nicotine will have the opposite effect. Instead, it will inhibit the serotonin—which can make you anxious, upset and unstable.

"Another explanation could be that smoking causes inflammation in the brain, which in the long term can damage parts of the brain and lead to various mental disorders. But as I said, We don't know for sure as yet," he says.

## Should we raise the age limit for buying cigarettes?

One of the things the new figures show is that we rarely start smoking after the age of 20. Therefore, it might be a good idea to look into whether we should raise the age limit for buying cigarettes.

"This could be a good way to prevent people from starting smoking. Again, we don't know why people don't start [smoking](#) after the age of 20, but perhaps it's because we become less and less willing to take risks with age," says Doug Speed, and continues:

"Changing the law and raising the age limit may therefore have an effect. At least there are indications for this."

The figures on which the study is based are from the UK. So they are not based on Danes. However, Speed believes that the differences, if any, are very small.

"Denmark and the UK are very similar, and I would say that they are quite comparable. Having said that, our next step is actually to conduct the same study with figures from Denmark and Finland. However, getting access to this data is more expensive, which is why we did a [pilot study](#) with the British data to see if there was a correlation," he concludes.

The research is published in the journal *Acta Psychiatrica Scandinavica*.

**More information:** Lloyd Balbuena et al, Using polygenic risk scores

to investigate the evolution of smoking and mental health outcomes in UK biobank participants, *Acta Psychiatrica Scandinavica* (2023). [DOI: 10.1111/acps.13601](https://doi.org/10.1111/acps.13601)

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