

Computer model can determine whether you'll die from COVID-19

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Artificial intelligence is able to predict who is most likely to die from the coronavirus. In doing so, it can also help decide who should be at the front of the line for the precious vaccines now being administered across Denmark.

The result is from a newly published study by researchers at the University of Copenhagen's Department of Computer Science. Since the COVID-19 pandemic's first wave, researchers have been working to develop [computer](#) models that can predict, based on disease history and [health data](#), how badly people will be affected by COVID-19.

Based on [patient data](#) from the Capital Region of Denmark and Region Zealand, the results of the study demonstrate that [artificial intelligence](#) can, with up to 90 percent certainty, determine whether an uninfected person who is not yet infected will die of COVID-19 or not if they are unfortunate enough to become infected. Once admitted to the [hospital](#) with COVID-19, the computer can predict with 80 percent accuracy whether the person will need a respirator.

"We began working on the models to assist hospitals, as during the first wave, they feared that they did not have enough respirators for intensive care patients. Our new findings could also be used to carefully identify who needs a vaccine," explains Professor Mads Nielsen of the University of Copenhagen's Department of Computer Science.

Older men with high blood pressure are highest at risk

The researchers fed a computer program with health data from 3,944 Danish COVID-19 patients. This trained the computer to recognize patterns and correlations in both patients' prior illnesses and in their bouts against COVID-19.

"Our results demonstrate, unsurprisingly, that age and BMI are the most decisive parameters for how severely a person will be affected by COVID-19. But the likelihood of dying or ending up on a respirator is also heightened if you are male, have [high blood pressure](#) or a neurological disease," explains Mads Nielsen.

The diseases and health factors that, according to the study, have the most influence on whether a patient ends up on a respirator after being infected with COVID-19 are in order of priority: BMI, age, high blood pressure, being male, neurological diseases, COPD, asthma, diabetes and heart disease.

"For those affected by one or more of these parameters, we have found that it may make sense to move them up in the vaccine queue, to avoid any risk of them becoming infected and eventually ending up on a respirator," says Nielsen.

Predicting respiratory needs is a must

Researchers are currently working with the Capital Region of Denmark to take advantage of this fresh batch of results in practice. They hope that artificial

intelligence will soon be able to help the country's hospitals by continuously predicting the need for respirators.

"We are working towards a goal that we should be able to predict the need for respirators five days ahead by giving the computer access to health data on all COVID positives in the region," says Mads Nielsen, adding:

"The computer will never be able to replace a doctor's assessment, but it can help doctors and hospitals see many COVID-19 infected patients at once and set ongoing priorities."

However, technical work is still pending to make health data from the region available for the computer and thereafter to calculate the risk to the infected patients. The research was carried out in collaboration with Rigshospitalet and Bispebjerg and Frederiksberg Hospital.

More information: Espen Jimenez-Solem et al, Developing and validating COVID-19 adverse outcome risk prediction models from a bi-national European cohort of 5594 patients, *Scientific Reports* (2021). [DOI: 10.1038/s41598-021-81844-x](https://doi.org/10.1038/s41598-021-81844-x)

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