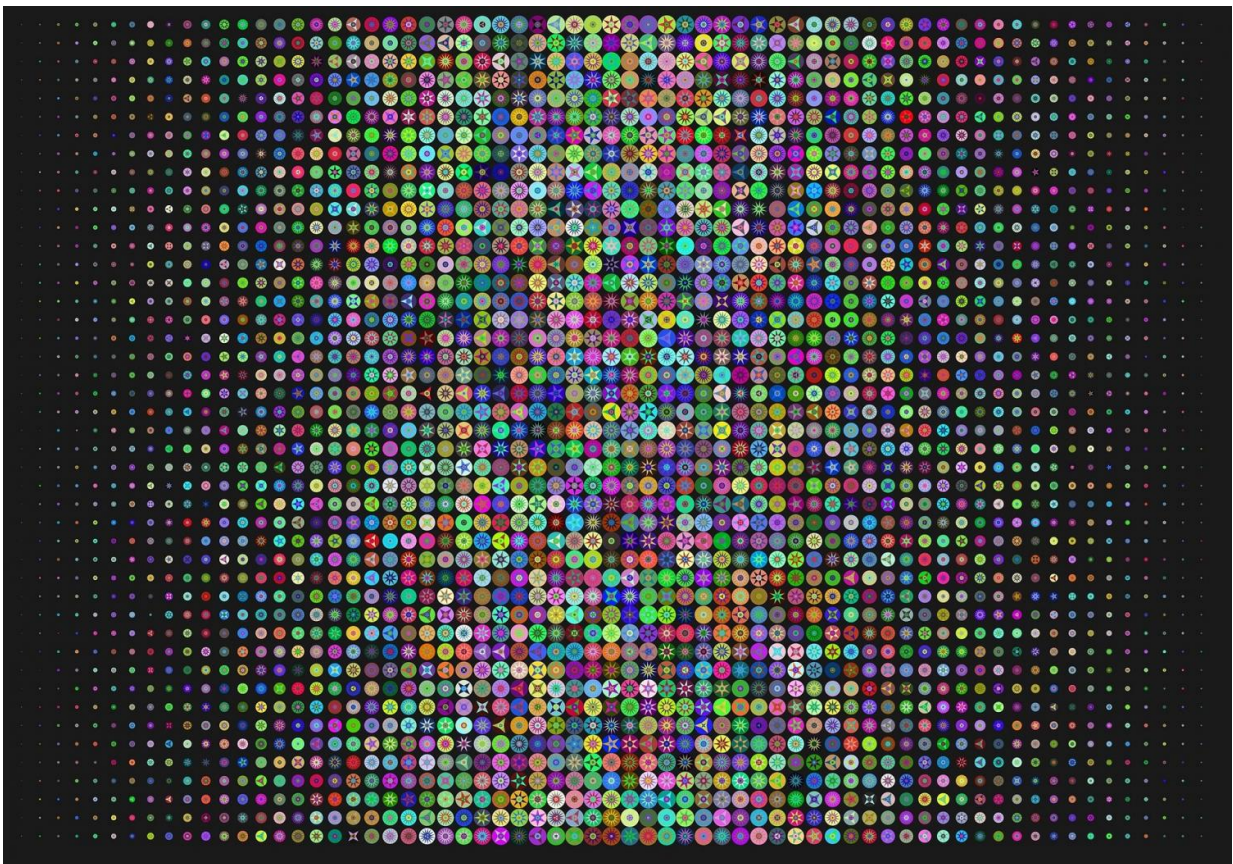# New algorithm could save lives: Predicts COVID-related intensive care unit resource use

November 24 2021

Credit: CC0 Public Domain

The COVID-19 pandemic is on the rise in many European countries, and

hospitals world wide are under maximum pressure.

Now, an innovative algorithm will help alleviate pressure whenever hospitals are confronted by new waves of COVID. Researchers from the University of Copenhagen, among others, have developed the algorithm, which can predict the course of COVID patients' illnesses in relation to how many of them will be highly likely or unlikely to require [intensive care](link) or ventilation.

This is important for the allocation of staff across the hospitals in for example Denmark, explains one of the study's authors.

"If we can see that we'll have capacity issues five days out because too many beds are taken at Rigshospitalet, for example, we can plan better and divert patients to hospitals with more space and staffing. As such, our algorithm has the potential save lives," explains Stephan Lorenzen, a postdoc at the University of Copenhagen's Department of Computer Science.

The algorithm uses individual patient data from Sundhedsplatform (the National Health Platform) including information about a patient's gender, age, medications, BMI, whether they smoke or not, blood pressure and more.

This allows the algorithm to predict how many patients, within a one-to-fifteen day time frame, will need intensive care in the form of, for example, ventilators and constant monitoring by nurses and doctors.

Along with colleagues at the University of Copenhagen, as well as researchers at Rigshospitalet and Bispebjerg Hospital, Lorenzen developed the [new algorithm](link) based on [health data](link) from 42,526 Danish patients who tested positive for the coronavirus between March 2020 and May 2021.

Predicts the number of intensive care patients with 90 percent accuracy

Traditionally, researchers have used regression models to predict COVID-related [hospital](link) admissions. However, these models haven't taken individual disease histories, age, gender and other factors into account.

"Our algorithm is based on more detailed data than other models. This means that we can predict the number of patients who will be admitted to intensive care units or who need a ventilator within five days with over 90 percent accuracy," states Stephan Lorenzen.

In fact, the algorithm provides extremely accurate predictions for the likely number of intensive care patients for up to ten days.

"We make better predictions than comparable models because we are able to more accurately map the potential need for ventilators and 24-hour intensive care for up to ten days. Precision decreases slightly beyond that, similar to that of the existing algorithmic models used to predict the course of illness in COVID cases," he elaborates.

In principle, the algorithm is ready to be deployed in Danish hospitals. As such, the researchers are about to begin discussions with relevant health professionals.

"We have shown that data can be used for so incredibly much. And, that we in Denmark, are lucky to have so much health information to draw from. Hopefully, our new algorithm can help our hospitals avoid COVID overload when a new wave of the illness hits," concludes Stephan Lorenzen.

What distinguishes the new algorithm from others

Most existing algorithms in the field do not take the gender, age and medical history of individuals into account. They look at the number of hospitalized COVID patients in need of intensive care on any given day. Based on this, along with mortality and new infection data, existing models try to predict how many people will be hospitalized tomorrow.

"For example, typical models cannot distinguish between younger or [older people](#). Whether there are five people who are 80-years-old or more hospitalized, or five 25-year-old patients, has a major impact on the prediction in relation to what the probability of hospitalization is. Our new algorithm accounts for this," says Stephan Lorenzen.

Ethical considerations

- The new [algorithm](#) uses health data approved for use under section 42 d of the Danish Health Act.
- Data is processed on Computerome 2, a secure supercomputer for personal data, and under the permission of the Danish Patient Safety Authority, data owners and other relevant authorities.
- The Danish Council on Ethics has approved the study and the regional executive boards have approved the use of data.

The research was published in *Scientific Reports*.

Provided by University of Copenhagen

Citation: New algorithm could save lives: Predicts COVID-related intensive care unit resource use (2021, November 24) retrieved 8 May 2024 from https://medicalxpress.com/news/2021-11-algorithm-covid-related-intensive-resource.html