

New model for predicting course of COVID-19 could relieve pressure on the healthcare system

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An important concern in the COVID-19 pandemic is providing optimum individual patient care, while at the same time preventing the collapse of the healthcare system. A particular feature of the disease caused by SARS-CoV-2 is that there is often a drastic deterioration in the patient's condition seven to 10 days into the illness. In order to allow for this

phase, even patients with comparatively mild symptoms are kept in hospital for an extended period before they are discharged. As well as increasing the infection risk for staff, the treatment of such COVID-19 patients takes up valuable resources that are urgently needed for other hospitalized patients. "Although our knowledge about the virus is increasing daily, we do not yet have reliable decision-making aids to support earlier discharge," points out Alice Assinger from MedUni Vienna's Institute of Vascular Biology and Thrombosis Research.

A team of MedUni Vienna scientists led by Alice Assinger at the Center for Physiology and Pharmacology has now developed a model for predicting survival of hospitalized COVID-19 patients with a high degree of accuracy. The important aspect of this model is that it is exclusively based on existing routine clinical measurements so that it does not require any additional complex laboratory analysis.

Hospital doctors are now able to input their patients' parameters into a freely available online calculator, so that they have a [tool](#) on hand to support them in their decisions regarding the potential discharge of patients. The [mathematical model](#) that underpins the tool was developed by Stefan Heber from MedUni Vienna's Institute of Physiology and is based on repeated measurements of the inflammatory marker C-reactive protein, the creatinine marker that reflects kidney function and the number of platelets (thrombocytes) in the blood.

From the derived courses of these parameters within the first four days of hospitalization, together with additional parameters such as, e.g., "age of patient" and information about body temperature on admission, it is possible to predict survival with a high degree of accuracy. Heber comments: "This works independently of the length of time symptoms were present before admission to hospital." The data from 441 patients from three different centers were used in the development of this ACCP (Age+C-reactive protein+Creatinine+Platelet) tool and the developed

model was then validated using the data from 553 patients from three other independent cohorts.

"It was important to us to make the ACCP tool available for routine clinical application as rapidly as possible. The tool will hopefully help to relieve the pressure on the Austrian healthcare system until such time as adequate vaccination coverage has been achieved within the population," says first author of the study, Stefan Heber.

More information: Stefan Heber et al. Development and external validation of a logistic regression derived formula based on repeated routine hematological measurements predicting survival of hospitalized Covid-19 patients, (2020). [DOI: 10.1101/2020.12.20.20248563](https://doi.org/10.1101/2020.12.20.20248563)

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