

CORONASYS INNOVATION SHEET 12

4C MORTALITY SCORE

Background

Hospitals around the world are facing an influx of Covid-19 patients. In order to identify those with the highest risk of death or severe complications timely, there is a need for valid screening tools. Pre-existing scores developed for influenza, pneumonia or sepsis have not been sufficient¹² since Covid-19 patients often present a clinical picture that leads to different clinical courses than patients with the diseases mentioned above go through³. Researchers in the United Kingdom now developed a score that supports clinicians in assessing the severity of Covid-19 in hospital patients by using easily accessible parameters.

Features

The prospective cohort study⁴⁵ in which the score was developed included 35.000 adult patients admitted to one of 260 hospitals in England, Scotland, and Wales with Covid-19 in the derivation dataset and a further 22.000 patients in the validation dataset. The researchers identified eight variables available at initial hospital assessment to stratify patients according to their risk of mortality or severe complications: age, sex, number of comorbidities, level of consciousness, respiratory rate, peripheral oxygen saturation, level of C reactive protein, and level of urea. The maximum of the 4C score is 21 points. Patients with a high score (>15) had a 62% mortality while patients with a score of 3 or less had a mortality of 1%⁶.

Potentials

The score outperformed other risk stratification tools and showed real utility for clinical decision making⁷. The score can help clinicians to assess the severity of disease in Covid-19 patients at hospital admission. Especially in times where less experienced personnel might have to perform the initial assessment due to staff shortages a score with a high predictive value might be helpful in deciding which therapeutic options should be initiated for the individual patient⁸.

Patients with a higher score could immediately be treated more aggressively to tackle the disease before the patient's condition deteriorates while patients with a lower score could possibly be sent home for convalescence⁹.

Points to consider

The scores' applicability for other populations has to be further evaluated¹⁰.

Conclusion

The score can be a valuable contribution to the initial assessment of Covid-19 hospital patients and might help clinicians to decide on the clinical pathway.

State of information: 24/09/2020

Launch: September 2020

Country: United Kingdom

Focus area: patient assessment, Treatment

Developer: ISARIC „Coronavirus Clinical Characterisation Consortium“, involving researchers from

- University of Liverpool
- University of Edinburgh
- University of Glasgow and
- Imperial College London

Beneficiaries: clinicians

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- ¹ Chen, J.-H., S.-S. Chang, J. J. Liu, R.-C. Chan, J.-Y. Wu, W.-C. Wang, S.-H. Lee, and C.-C. Lee. "Comparison of Clinical Characteristics and Performance of Pneumonia Severity Score and CURB-65 among Younger Adults, Elderly and Very Old Subjects." *Thorax* 65, no. 11 (November 1, 2010): 971–77. <https://doi.org/10.1136/thx.2009.129627>.
- ² Gupta, Rishi K, Michael Marks, Thomas H. A. Samuels, Akish Luintel, Tommy Rampling, Humayra Chowdhury, Matteo Quartagno, et al. "Systematic Evaluation and External Validation of 22 Prognostic Models among Hospitalised Adults with COVID-19: An Observational Cohort Study." Preprint. *Infectious Diseases (except HIV/AIDS)*, July 26, 2020. <https://doi.org/10.1101/2020.07.24.20149815>.
- ³ Tolksdorf, Kristin, Silke Buda, Ekkehard Schuler, Lothar H Wieler, and Walter Haas. "Influenza-Associated Pneumonia as Reference to Assess Seriousness of Coronavirus Disease (COVID-19)." *Eurosurveillance* 25, no. 11 (March 19, 2020). <https://doi.org/10.2807/1560-7917.ES.2020.25.11.2000258>.
- ⁴ ISRCTN Registry. "ISRCTN - ISRCTN66726260: Clinical Characterisation Protocol for Severe Emerging Infection." Accessed September 25, 2020. <https://doi.org/10.1186/ISRCTN66726260>.
- ⁵ ISARIC 4C Consortium. "ISARIC 4C Consortium Trial Website." Accessed September 25, 2020. <https://isaric4c.net>.
- ⁶ Knight, Stephen R., Antonia Ho, Riinu Pius, Iain Buchan, Gail Carson, Thomas M. Drake, Jake Dunning, et al. "Risk Stratification of Patients Admitted to Hospital with Covid-19 Using the ISARIC WHO Clinical Characterisation Protocol: Development and Validation of the 4C Mortality Score." *BMJ* 370 (September 9, 2020). <https://doi.org/10.1136/bmj.m3339>.
- ⁷ American Association for the Advancement of Science (AAAS). "Discovery of Four COVID-19 Risk Groups Helps Guide Treatment." *EurekAlert!* Accessed September 25, 2020. https://www.eurekalert.org/pub_releases/2020-09/b-dof090820.php.
- ⁸ University of Liverpool News. "Discovery of Four COVID-19 Risk Groups Helps Guide Treatment - University of Liverpool News." *News (blog)*, September 10, 2020. <https://news.liverpool.ac.uk/2020/09/10/discovery-of-four-covid-19-risk-groups-helps-guide-treatment/>.
- ⁹ Deutsches Ärzteblatt. "COVID-19: Einfacher Score kann schwere Verläufe vorhersagen." *Deutsches Ärzteblatt*, September 10, 2020. <https://www.aerzteblatt.de/nachrichten/116420/COVID-19-Einfacher-Score-kann-schwere-Verlaeufe-vorhersagen>.
- ¹⁰ American Association for the Advancement of Science (AAAS). "Discovery of Four COVID-19 Risk Groups Helps Guide Treatment." *EurekAlert!* Accessed September 25, 2020. https://www.eurekalert.org/pub_releases/2020-09/b-dof090820.php.

Background on Innovation Sheet Series

As part of a real-time evaluation of the SARS CoV 2 pandemic (with focus on epidemiological, medical, economical, societal, technical, and cultural developments in Germany and Armenia) the CoronaSys research team, under the leadership of Prof. Dr. Martin Voss, is conducting a continuous monitoring of developments and medical, technical, and social innovations concerning Covid-19.

Multiple national and international media outlets, research platforms, and scientific and organizational guidelines, briefs, and updates are screened to feed into this outlet. The rationale behind this is to support the projects' network partners in Armenia and Germany with short summaries of key developments and promising innovations that are shaping the global, German, and Armenian outbreak response and recovery.

The aim of these short briefs is to give condensed and structured information on selected innovations emerging out of the conducted horizon scanning. This could be mainstream big-ticket items or fringe subjects that are easily overlooked in the global flood of information. Some innovations will be followed through their evolution in time while others may only appear once. While subjectively selected, the briefs are descriptive in nature and leave analysis and critical interpretation to the reader. Network partners in both countries are invited to provide feedback on their interest areas and suggest particularly relevant topics for the CoronaSys Workshop series.

The CoronaSys Innovation Sheet Series is published by the [Academy of the Disaster Research Unit](#), which is, as a non-profit limited liability company, a spin-off of the [Disaster Research Unit](#) at the Free University of Berlin. The series is part of the research project "[CoronaSys](#): Addressing the corona pandemic in Armenia through systemic risk management", sponsored by the German Federal Ministry of Education and Research.

If you have any questions, suggestions, or if you wish to be taken on (or off) the project mailing list for CoronaSys updates, innovation sheets, and workshop invitations, please send a message to Janina Schäfer (schaefer@a-kfs.de). For general project inquiries, you may contact the team lead Sara Merkes (merkes@a-kfs.de) or the project lead Martin Voss (voss@a-kfs.de).

Previous CoronaSys Innovation Sheets

- 1 "New" Antiviral Face Masks
- 2 "Dyphox" Surface Coating
- 3 MOVES SLC Portable ICU
- 4 Portable TRI- KLEEN 500UV
- 5 Convalescent Plasma Therapy
- 6 ASIC- App
- 7 BinaxNOW Antigen Test
- 8 Corona Traffic Light
- 9 Aproof at Home Antibody Test
- 10 IVAT Hygiene Tower
- 11 LY-CoV555 Antibody Treatment

All previous CoronaSys Innovation Sheets are available online:

<http://coronasys.a-kfs.de/category/innovation-stream/>

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