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Background. We aimed to explore a novel risk score to predict mortality in hospitalised patients with COVID-19 pneumonia. In additoon, we compared the accuracy of the novel risk score with CURB-65, qSOFA and NEWS2 scores.

Methods. The study was conducted in hospitalised patients with laboratory and radiologically confirmed COVID-19 pneumonia between November 1, 2020 and November 30, 2020. In this retrospective multicenter study. independent predictors were identified using multivariate logistic regression analysis. A receiver operating characteristics (ROC) analysis with area under the curve (AUC) was used to evaluate the performance of the novel score. The optimal cut-off points of the candidate variables were calculated by the Youden's index of ROC curve. Mortality was defined as all cause in-hospital death.

Results. A total of 1013 patients with COVID-19 were included. The mean age was 60,5 ±14,4 years, and 581 (57,4%) patients were male. In-hospital death was occured in 124 (12,2%) patients. Multivariate analysis revealed that peripheral capillary oxygen saturation (SpO2), albumin, D-dimer, and age were independent predictors for mortality (Table). A novel scoring model was named as SAD-60 (**S**pO2, **A**lbumin, **D**-dimer, **≥60** years old). SAD-60 score (0,776) had the highest AUC compared to CURB-65 (0,753), NEWS2 (0,686), and qSOFA (0,628) scores (Figure).

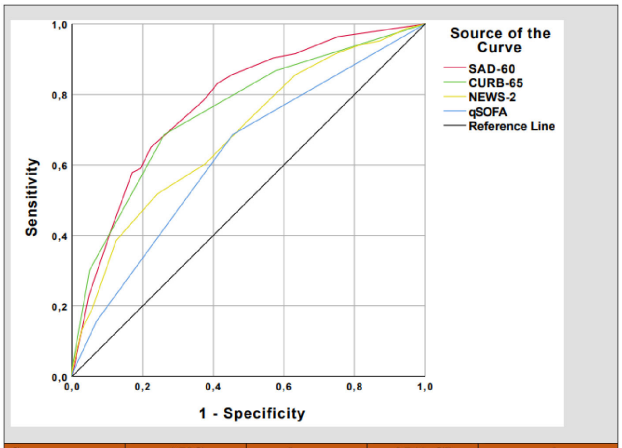
Conclusion. We demonstrated that SAD-60 score had a promising predictive capacity for mortality in hospitalised patients with COVID-19.

Univariate and multivariate analysis of factors predicting mortality

Logistic Regresion	Univariate			Multivariate		
	OR	CI	p value	OR	CI	p value
Age ≥60 years	4,63	2,93-7,32	**<0,001**	3,62	1,97-6,66	**<0,001**
Dyspnea	1,55	1,02-2,35	**0,040**	1,00	0,56-1,79	0,992
Confusion	6,18	1,89-20,57	**0,003**	8,05	0,72-89,84	0,090
Respiratory rate/min. ≥28/min	4,06	2,42-6,84	**<0,001**	1,74	0,82-3,73	0,151
SpO2 ≤90%	3,50	2,38-5,15	**<0,001**	2,52	1,52-4,18	**<0,001**
Any comorbidity	2,39	1,56-3,66	**<0,001**	1,31	0,72-2,37	0,373
PLR ≥190	1,54	1,06-2,24	**0,025**	1,07	0,63-1,80	0,801
Albumin <3,5 g/dL	3,63	2,32-5,69	**<0,001**	2,15	1,29-3,59	**0,003**
D-dimer ≥0,9 µg/mL	2,66	1,73-4,09	**<0,001**	1,86	1,11-3,12	**0,019**

Abbreviations: SpO2=peripheral capillary oxygen saturation; PLR=platelet lymphocyte ratio

Comparison of CURB-65, qSOFA, NEWS-2 and SAD-60 for predicting pneumonia mortality in hospitalised patients with COVID-19 by ROC analysis



Scores	AUC	std. error	95% CI	p value
SAD-60	0,776	0,027	0,724-0,829	<0,001
CURB-65	0,753	0,030	0,623-0,748	<0,001
NEWS-2	0,686	0,032	0,623-0,748	<0,001
qSOFA	0,628	0,033	0,563-0,693	<0,001

Disclosures. **All Authors**: No reported disclosures

32. Host Immune-Protein Signature Combining TRAIL, IP-10 and CRP for Early and Accurate Prediction of Severe COVID-19 Outcome

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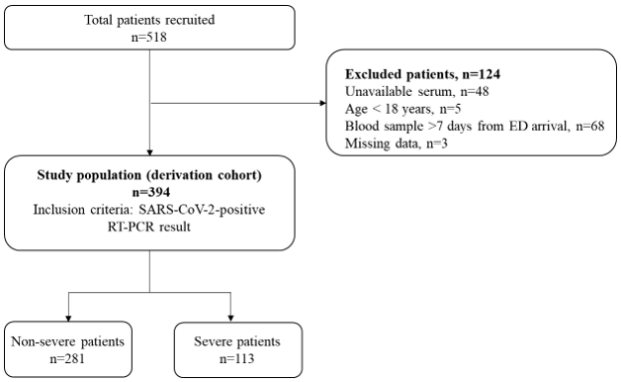
Background. Accurately identifying COVID-19 patients at-risk to deteriorate remains challenging. Dysregulated immune responses impact disease progression and development of life-threatening complications. Tools integrating host immune-protein expression have proven useful in determining infection etiology and hold potential for prognosticating disease severity.

Methods. Adults with COVID-19 were enrolled at medical centers in Israel, Germany, and the United States (Figure 1). Severe outcome was defined as intensive care unit admission, non-invasive or invasive ventilation, or death. Tumor necrosis factor related apoptosis inducing ligand (TRAIL), interferon gamma inducible protein-10 (IP-10) and C-reactive protein (CRP) were measured using an analyzer providing values within 15 minutes (MeMed Key®). A signature indicating the likelihood of severe outcome was derived generating a score (0-100).

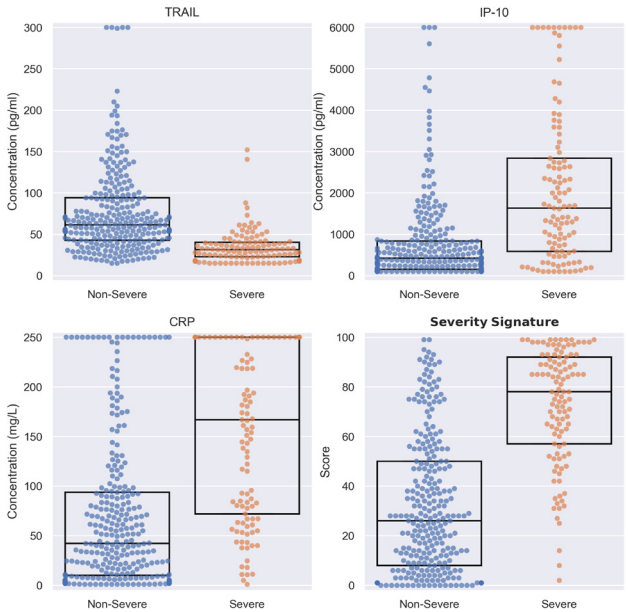
Description of derivation cohort



RT-PCR, reverse transcription polymerase chain reaction.

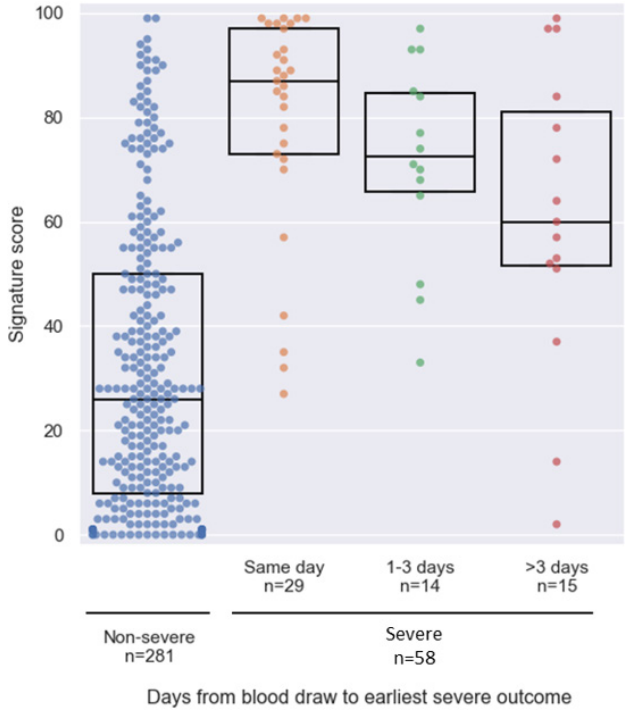
Results. Between March and November 2020, 518 COVID-19 patients were enrolled, of whom 394 were eligible, 29% meeting a severe outcome. Age ranged between 19-98 (median 61.5), with 59.1% male. Patients meeting severe outcomes exhibited higher levels of CRP and IP-10 and lower levels of TRAIL (Figure 2; $p < 0.001$). Likelihood of severe outcome increased significantly ($p < 0.001$) with higher scores. The signature's area under the receiver operating characteristic curve (AUC) was 0.86 (95% confidence interval: 0.81-0.91). Performance was not confounded by age, sex, or comorbidities and was superior to IL-6 (AUC 0.77; $p = 0.033$) and CRP (AUC 0.78; $p < 0.001$). Clinical deterioration proximal to blood draw was associated with higher signature score. Scores of patients meeting a first outcome over 3 days after blood draw were significantly ($p < 0.001$) higher than scores of non-severe patients (Figure 3). Moreover, the signature differentiated patients who further deteriorated after meeting a severe outcome from those who improved ($p = 0.004$) and projected 14-day survival probabilities ($p < 0.001$; Figure 4).

TRAIL, IP-10, CRP and the severity signature score are differentially expressed in severe and non-severe COVID-19 infection



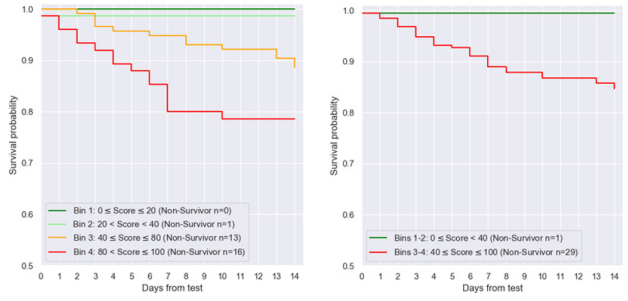
Dots represent patients and boxes denote median and interquartile range (IQR)

The signature score of patients meeting a severe outcome on or after the day of blood draw is significantly ($p < 0.001$) higher than the signature score of non-severe patients.



Dots represents patients and boxes denote median and IQR

Kaplan-Meier survival estimates for signature score bins



Conclusion. The derived signature combined with a rapid measurement platform has potential to serve as an accurate predictive tool for early detection of COVID-19 patients at risk for severe outcome, facilitating timely care escalation and de-escalation and appropriate resource allocation.

Disclosures. **Alon Angel, n/a, MeMed** (Employee, Shareholder) **Niv Samuel Mastboim, BSc, MeMed** (Employee, Shareholder) **Oded Shaham, PhD, MeMed** (Employee, Shareholder) **Tahel Ilan Ber, MD, MeMed** (Employee, Shareholder) **Roy Navon, MSc, MeMed** (Employee, Shareholder) **Einav Simon, PhD, MeMed** (Employee, Shareholder) **Michal Rosenberg, PhD, MeMed** (Employee) **Yael Israeli, PhD, MeMed** (Employee) **Mary Hainrichson, PhD, MeMed** (Employee, Shareholder) **Noa Avni, PhD, MeMed** (Employee) **Eran Reiner, MD, MeMed** (Employee) **Kfir Oved, MD, PhD, MeMed** (Board Member, Employee, Shareholder) **Ilya Kagan, MD, MeMed** (Scientific Research Study Investigator) **Shaul Lev, M.D, MeMed** (Scientific Research Study Investigator) **Dror Diker, MD, MeMed** (Scientific Research Study Investigator) **Amir Jarjou'i, MD, MeMed** (Scientific Research Study Investigator) **Ramzi Kurd, MD, MeMed** (Scientific Research Study Investigator) **Guy Danziger, MD, MeMed** (Scientific Research Study Investigator) **Cihan Papan, MD, MeMed** (Scientific Research Study Investigator) **Sergey Motov, MD, MeMed** (Scientific Research Study Investigator) **Maanit Shapira, Ph.D, MeMed** (Scientific Research Study Investigator) **Tanya Gottlieb, PhD, MeMed** (Employee, Shareholder) **Eran Eden, PhD, MeMed** (Board Member, Employee, Shareholder)

33. Evaluation of Rural-Urban Differences in Hospitalization and Mortality Rates for US COVID-19 Patients in the United States

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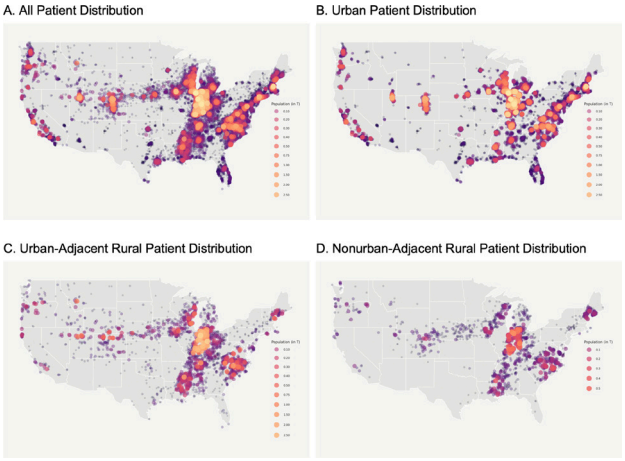
Background. Rural communities are among the most vulnerable and resource-scarce populations in the United States. Rural data is rarely centralized, precluding comparability across regions, and no significant studies have studied this population at scale. The purpose of this study is to present findings from the National COVID Cohort Collaborative (N3C) to provide insight into future research and highlight the urgent need to address health disparities in rural populations.

N3C Patient Distribution

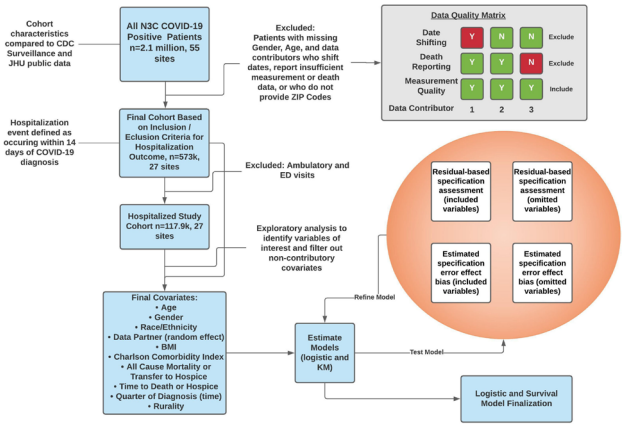


This figure shows the geospatial distribution of the N3C COVID-19 positive population. N3C contains data from 55 data contributors from across the United States, 40 of whom include sufficient location information to map by ZIP Code centroid spatially. Of those sites, we selected 27 whose data met our minimum robustness qualifications for inclusion in our study. This bubble map is to scale with larger bubbles representing more patients. A. shows all N3C patients. B. shows only urban N3C distribution. C. shows the urban-adjacent rural patient distribution. D. shows the nonurban-adjacent rural patient distribution, representing the most isolated patients in N3C.

Methods. This retrospective cohort of 573,018 patients from 27 hospital systems presenting with COVID-19 between January 2020 and March 2021, of whom 117,897 were admitted (see Data Analysis Plan diagram for inclusion/exclusion criteria), analyzes outcomes and 30-day survival for the hospitalized population by the degree of rurality.

Multivariate Cox regression analysis and mixed-effects models were used to estimate the association between rurality, hospitalization, and all-cause mortality, controlling for major risk factors associated with rural-urban health discrepancies and differences in health system outcomes. The difference in distribution by rurality is described as well as supplemented by population-level statistics to confirm representativeness.

Data Analysis Plan



This data analysis plan includes an overview of study inclusion and exclusion criteria, the matrix for data robustness to determine potential sites to include, and our covariate selection, model building, and residual testing strategy.

Results. This study demonstrates a significant difference between hospital admissions and outcomes in urban versus urban-adjacent rural (UAR) and