Association Between 10-Year ASCVD Risk Score And COVID-19 Complications and Mortality: Analysis of Data From The National COVID Cohort Collaborative (N3C)

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Background
The SARS-CoV-2 outbreak is challenging to health care systems due to wide variation in health risk with most patients experiencing few or no symptoms while a minority of patients experience high complication rates and death. Patients with prior cardiovascular events have an increased risk of COVID-19 related mortality compared to those without. Less is known about healthy patients who have not yet developed an event but may be at risk of developing the disease. The 10-year ASCVD risk score is an important clinical decision tool developed to assess risk stratification and interventions to prevent ASCVD. This score may inform patient’s future risk of developing COVID complications.

Methods
Study Design
The current study is a retrospective cohort analysis using the N3C database.

Study Population
- Adult patients with a positive COVID-19 reverse transcription polymerase chain reaction (PCR) test between Jan 2020 – Sept 2021
- Patients were eligible regardless of testing location (i.e. inpatient vs outpatient)
- Patients with history of ASCVD were excluded

10-Year ASCVD Score Definition
- Defined using the ACC calculator and included age, sex, race, SBP, DBP, total cholesterol, LDL-C, HDL-C, diabetes history, smoking, hypertension treatment, aspirin therapy, apixaban therapy

Outcomes
- Death within 90 days of COVID diagnosis
- Hospitalization within 14 days of COVID diagnosis

Results
A total of 120,335 patients from 18 institutions were diagnosed with COVID and did not have a history of ASCVD. (Figure 1)

The mean age was 59.1±16.1, 59.4% were females, 57.6% white, 15.3% black, and 13.7% Hispanic. Additional patient characteristics breakdown down by patients 10-Year ASCVD Risk Score category are presented in Table 1. Overall patients admitted within 14 days, 14.1±11 among patients hospitalized within 14 days, and 10.2±1.01 among patients alive at 90 days, 22.2±6 among patients dead at 90 days, 6.6±2.7 among patients not hospitalized within 14 days, 14.1±11.1 among patients hospitalized within 14 days, and 10.2±1.01 overall.

Hospitalization within 14 Days of Diagnosis
In unbiased analysis, patients who were older (OR 1.09, 95%CI 1.08–1.09), male (OR 1.05, 95%CI 1.05–1.06), Hispanic/Latino (OR 2.08, 95%CI 1.86–2.33) compared to White, diabetic (OR 2.14, 95%CI 1.95–2.34), smoked (OR 2.34, 95%CI 2.13–2.58), were taking BP medication (OR 2.41, 95%CI 2.19–2.68) were more likely to die within 90 days of COVID diagnosis. Patients who were female (OR 0.61, 95%CI 0.55–0.64) were less likely to die within 90 days of COVID diagnosis. (Figure 2a) In fully adjusted analysis, patients at moderate risk (OR 1.35, 95%CI 1.30–1.40) were more likely to die within 90 days of COVID diagnosis than patients at low risk. (Figure 2b)

Conclusions
Analysis from this large and diverse cohort indicates that patients free of ASCVD events but at risk of developing an event based on the 10-year ASCVD score may be at high risk of death in the majority of patients at low risk of developing ASCVD. This is concerning especially given the high prevalence of patients at risk of ASCVD in the US and worldwide, many of which remain underdiagnosed adding further challenges during this epidemic.