SUPPLEMENTARY FILE S1.

Methods:

Structure of the research network and data source:

TriNetX (Cambridge, MA, USA) is a multiinstitutional cloud-based research network. It allows real-time access to de-identified data from participating institutions to researchers.

De-identified data is collected and aggregated from participating healthcare organizations in real time, which can then be analyzed using statistical and analytical tools available on the network. TriNetX platform pulls data from EHRs, that includes demographic variables, clinical diagnoses, medical procedures, laboratory investigations, medications, and other clinical variables including vital signs etc. This platform can also extract facts from clinical documents available in the EHRs through its Natural Language Processing system that is then transformed into standard clinical terminologies.

The healthcare organizations (HCOs) that are included in the TriNetX platform are generally large academic heathcare centers that comprise more than one facility and include both tertiary care centers and satellite healthcare clinics. HIPAA compliance is ensured by the platform by including either de-identified data or a Limited Data Set depending on the participating HCO. TriNetX obfuscates dates for de-identified data and hides patienst ages more than 90. The platform also obfuscates patient counts less than 10 to ensure anonymity.

Western IRB has granted a waiver to TriNetX as a federated network. West Virginia University Clinical and Translational Science Institute (WVU CTSI) manages the TriNetX platform at West Virginia University.

Patient selection:

COVID-19 patienst were identified using CDC COVID-19 coding guidance. Patients were identidfied by using International Classification of Diseases, Ninth Revision and tenth Revision, Clinical Modification (ICD-10-CM) codes as well as LOINC codes for positive laboratory tests discussed below.

1. ICD-10-CM codes U07.1 (COVID-19, virus identified), OR B34.2 (Coronavirus infection, unspecified), OR B97.29 (Other coronavirus as the cause of diseases classified elsewhere) OR J12.81 (Pneumonia due to SARS-associated coronavirus).
   Patients were excluded if they had diagnosis code 079.89 (Other specified viral infection). This code is mapped to ICD-10 code B34.2 and B97.2, and it was exclude to prevent false positives because it is used as a catch all code sometimes for many viral infections.
2. The following LOINC codes were also used to identify COVID-19 patients with positive COVID-19 test results.
   94533-7: SARS coronavirus 2 N gene [Presence] in Respiratory specimen by NAA with probe detection
   94534-5: SARS coronavirus 2 RdRp gene [Presence] in Respiratory specimen by NAA with probe detection
   41458-1 SARS coronavirus RNA [Presence] in Unspecified specimen by NAA with probe detection
   94309-2 SARS coronavirus 2 RNA [Presence] in Unspecified specimen by NAA with probe detection
   94531-1 SARS Coronavirus 2 RNA panel - Respiratory specimen by NAA with probe detection
   94506-3 SARS coronavirus 2 IgM Ab [Units/volume] in Serum or Plasma by Immunoassay
   94500-6 SARS coronavirus 2 RNA [Presence] in Respiratory specimen by NAA with probe detection
   94315-9 SARS coronavirus 2 E gene [Presence] in Unspecified specimen by NAA with probe detection.
   94316-7 SARS-CoV-2 (COVID19) N gene [Presence] in Unspecified specimen by NAA with probe detection

94502-2 SARS-related coronavirus RNA [Presence] in Respiratory specimen by NAA with probe detection

3. Patient identification period was limited from January 20, 2020 to September 30, 2020. January 20 was chosen as it was the date of of diagnosis of the first case of COVD-19 in the USA. September 30 was chosen so that all patienst had 1 month follow up available, as the primary study endpoint was a composite outcome at 30 days from diagnosis. Study search was updated on January 6, 2021.
4. Patients with ages 16 years or more at index event were included.

Solid organ transplant recipients were identified using the International Classification of Diseases, Ninth Revision and tenth Revision, Clinical Modification (ICD-10-CM) codes given below

1. Z94.4: Liver transplant status
   OR Z94.0: Kidney transplant status
   OR Z94.2: Lung transplant status
   OR Z94.1: Heart transplant status

Study definitions for data aggregation:

Index event:

Diagnosis of COVID 19 per criteria defined above was considered the index event for the purposes of our study.

Time windows:

All study outcomes were assessed 30 days and 60 days post index event, which included the day of index event. Laboratory values were assessed within 7 days from COVID-19 diagnosis. Baseline characetristics were considered uptil the day of diagnosis with COVID-19.