Supplementary Material*

Kansagara D, Mackey K, Vela K. Update Alert: Risks and Impact of Angiotensin-Converting Enzyme Inhibitors or Angiotensin-Receptor Blockers on SARS-CoV-2 Infection in Adults. Ann Intern Med. 25 June 2020. [Epub ahead of print]. doi:10.7326/L20-0887

Supplement. **Supplementary Materials**

* This supplementary material was provided by the authors to give readers further details on their article. The material was reviewed but not copyedited.

Supplement Table 1. **Use of ACEIs or ARBs and Odds of Receiving a Positive COVID-19 Test Result, update June 8, 2020**

Study (Reference)*	**Period; Population; Setting**	**Patient Characteristics**	**Patients with Positive COVID-19 Test Result/ Patients Tested, *n/N (%)***	**Patients with Positive COVID-19 Test Result Receiving ACEI or ARB, *n/N (%)*; Not Receiving ACEI or ARB, *n/N (%)***	**aOR for Positive COVID-19 Test Result with ACEI or ARB Use (95% CI)**
Mehta(2)	3/8/20-4/12/20; all patients with SARS-CoV2 test in 1 health system in 2 states; United States	N = 18,472 (Demographics reported below are for those taking v not taking ACEI) Mean age: 62 v 48 Male: 53 v 39% Black: 22 v 20% HTN: 94 v 36% DM: 48 v 17% CAD: 29 v 11 % CHF: 25 v 9%	1735/18,472 (9.4)	Case patients receiving ACEI: 116/1735 Case patients receiving ARB: 98/1735	0.97 (0.81-1.15) (propensity score adjusted for age, sex, comorbid conditions)

ACEI = angiotensin-converting enzyme inhibitor; aOR = adjusted odds ratio; ARB = angiotensin-receptor blocker; CAD = coronary artery disease; CHF = congestive heart failure; DM = diabetes mellitus; HTN = hypertension; SARS-CoV-2 = severe acute respiratory syndrome coronavirus 2.

* All studies from 2020.

Supplement Table 2. **Use of ACEIs or ARBs and Odds of Severe COVID-19 Illness, Update June 8, 2020**

Study (Reference)*	Period; Population; Setting	Patient Characteristics	Disease Severity Definition	Patients Receiving ACEI or ARB with Severe Illness, *n/n (%)*; With Nonsevere Illness, *n/n (%)*	Unadjusted OR for Severe Illness with ACEI or ARB (95% CI)	aOR for Severe Illness with ACEI or ARB (95% CI)	Other Outcomes
Mehta(2)	3/8/20-4/12/20; all patients with SARS-CoV2 test in 1 health system in 2 states; United States	N = 18,472 (Demographics reported below are for those taking v not taking ACEI) Mean age: 62 v 48 Male: 53 v 39% Black: 22 v 20% HTN: 94 v 36% DM: 48 v 17% CAD: 29 v 11 % CHF: 25 v 9%	Hospitalization; ICU admission; mechanical ventilation			Hospitalization: 1.93 (1.38-2.71) ICU admission: 1.64 (1.07-2.51) Mechanical ventilation: 1.32 (0.80-2.18) (propensity score adjusted for age, sex, comorbid conditions)	
Chen(3)	1/1/20-3/17/20; Adults with COVID-19, HTN, and DM admitted to 1 hospital; China	N = 71 Mean age: 67 y HTN: 100% DM: 100%	In-hospital death	4/14 (28.6); 28/57 (49.1)	0.41 (0.12-1.48)		
Huang(4)	2/7/20-3/3/20; Adults with COVID-19 and HTN admitted to 1 hospital; China	N = 50 ACEI/ARB group v non-ACEI/ARB group: Mean age: 53 v 68 y Male: 50 v 57% DM: 0 v 13% HTN: 100%	Per National Health Commission of China†	13/37 (35.1); 7/13 (53.9)	0.46 (0.13-1.67)		
Jung(5)	Through 4/8/20; Adults with COVID-19; Korea (nationwide study)	N = 5179 Mean age: 45 Male: 44% DM: 17%	Death	33/84 (39.3); 762/5095 (15.0)	3.88 (2.48-6.05)	0.88 (0.53-1.44) (adjusted for age, sex, comorbidities,	

	HTN: 22% CVD: 6%	immunosuppression, hospital type)

ACEI = angiotensin-converting enzyme inhibitor; aOR = adjusted odds ratio; ARB = angiotensin-receptor blocker; CAD = coronary artery disease; CHF = congestive heart failure; HTN = hypertension; ICU = intensive care unit; OR = odds ratio.

* All studies from 2020.

† National Health Commission of China severity definition: mild—mild symptoms but no imaging evidence of pneumonia; moderate—fever and other respiratory tract symptoms with imaging findings of pneumonia; severe—respiratory distress, tachypnea (≥30 breaths per minute), O_2 saturation ≤93%, PaO_2/FIO_2 ≤300 mm Hg; critical—need for mechanical ventilation, shock, organ failure requiring intensive care.

***Supplement Table 3*. Quality Assessment of Cohort Studies using the Newcastle-Ottawa Quality Assessment Scale, June 8, 2020 update**

	Selection				**Comparability**	**Outcome**		
Author (all year 2020**)**	**Representativeness of the exposed cohort***	**Selection of the non-exposed cohort***	**Ascertainment of exposure***	**Demonstration that outcome of interest was not present at start of study, OR baseline assessment***	**Comparability of cohorts on the basis of the design or analysis***	**Assessment of outcome***	**Was follow-up long enough for outcomes to occur?***	**Adequacy of follow up of cohorts***
Mehta (2)	1	1	1	1	1	0	0	1
Chen (3)	0	1	0	1	0	1	1	1
Huang (4)	0	1	0	1	0	1	0	1
Jung (5)	1	1	1	1	1	1	0	1

*Key: Newcastle-Ottawa QA scale for Cohort studies

Representativeness of the exposed cohort
Enter 0 or 1:
1 = truly representative of the average __ in the community
1 = somewhat representative of the average __ in the community
0 = selected group of users, e.g., nurses, volunteers
0 = no description of the derivation of the cohort

Selection of the non-exposed cohort
Enter 0 or 1:
1 = drawn from the same community as the exposed cohort
0 = drawn from a different source
0 = no description of the derivation of the non-exposed cohort

Ascertainment of exposure
Enter 0 or 1:

1 = secure record
1 = structured interview
0 = written self-report
0 = no description

Demonstration that outcome of interest was not present at start of study, OR baseline assessment
Enter 0 or 1:
1= yes
0 = no

Comparability of cohorts on the basis of the design or analysis
Enter 0 or 1:
1 = study accounts/controls for most important factors(s), e.g., age
0 = no adjustment for potential confounders

Assessment of outcome
Enter 0 or 1:
1 = independent blind assessment
1 = record linkage
0 = self-report
0 = no description

Was follow-up long enough for outcomes to occur?
Enter 0 or 1:
1 = yes
0 = no or unclear

Adequacy of follow up of cohorts
Enter 0 or 1:
1 = complete follow up; all subjects accounted for.
1 = subjects lost to follow up unlikely to introduce bias; small number (less than 20%) lost, or description was provided of those lost
0 = follow up rate < 80% and no description of those lost
0 = no description