Supplement File

Supplement 1. Search strategy

Ovid MEDLINE(R) All 1946 to June 15, 2020

1	(Risk factor* or relative risk or odds ratio or between group* or Regression or multi-variate or multivaria* or covariate or univariate or co-variate or matching or ANOVA or Analysis of variance or ANCOVA or Correlation or Covariance or Principal Component Analysis or cohort* or follow-up or prognos* or predict*).mp.
2	exp cohort studies/ or cohort*.mp.
3	("Associated with" or "Association of" or "impact of" or "Correlated with" or "Impact* on" or characteristics or characterise or features or clinical findings or clinical outcomes or clinical manifestations or clinical course).ti.
4	(clinical data or (clinical adj5 (characteristics or features or manifestations))).tw,kf.
5	1 or 2 or 3 or 4
6	(Mortal* or fatal* or death* or died or discharged alive or poor prognos* or good prognos* or clinical outcome* or adverse outcome* or disease course or clinical course or ((severe* or serious* or critical*) adj4 (ill* or outcome* or course or case or cases or patient* or condition)) or Severity or ((ICU or hospital or intensive care) adj7 (admission* or admit*)) or Ventilator* or ventilation or Hospitaliz* or hospitalis* or (Length adj3 stay)).mp.
7	((pregnan* or maternal or perinatal or birth or neonat* or infant*) adj7 outcome*).mp.
8	6 or 7
9	5 and 8
10	(Coronavirus* or corona-virus* or betacoronavirus* or nCOV* or 2019nCoV or 2019-ncov or covid or covid19 or SARS-CoV*or SARSCov*).mp.
11	limit 10 to yr="2020 -Current"
12	limit 11 to abstracts
13	(11 not 12) and (1 or 2 or 3 or 4 or 6 or 7)
14	9 and 11
15	13 or 14
16	(exp China/ or Iran/ or exp Russia/) not (canada/ or exp united states/ or europe/ or austria/ or belgium/ or exp france/ or exp germany/ or exp united kingdom/ or exp italy/ or spain/ or netherlands/ or exp "scandinavian and nordic countries"/ or australia/ or new zealand/ or mexico/ or chile/ or colombia/ or exp japan/ or korea/ or exp "republic of korea"/ or baltimore/ or berlin/ or boston/ or chicago/ or "district of columbia"/ or london/ or los angeles/ or new orleans/ or new york city/ or paris/ or philadelphia/ or rome/ or san francisco/ or estonia/ or latvia/ or lithuania/ or czech republic/ or hungary/ or poland/ or slovakia/ or slovenia/ or greece/ or luxembourg/ or portugal/ or switzerland/ or israel/ or turkey/)
17	((China or wuhan or hubei or beijing).tw,kf. and china.in.) not (canada or italy or italian or spain or spanish or france or french or united kingdom or UK or england or english or NHS or ireland or irish or wales or welsh or scotland or scottish or german* or austria* or sweden or swedish or netherlands or norwegian or norway or finland or finnish or denmark or danish or european or belgium or belgian or Czech or Estonia* or Greece or Greek or Hungar* or Latvia* or Lithuania* or Luxembourg or Iceland* or Poland or Portugal or Slovak Republic or Slovenia* or Switzerland or Japan* or Tokyo or Korea* or Seoul or Chile* or Colombia* or Mexico or Mexican or Israel* or Turkey or Turkish or australia* or new zealand* or united states or USA or american or "U.S." or new york or california* or washington or seattle).tw,kf.

18	((russia* or iran* or tehran or brazil*) not (canada or italy or italian or spain or spanish or france or french or united kingdom or UK or england or english or NHS or ireland or irish or wales or welsh or scotland or scottish or german* or austria* or sweden or swedish or netherlands or norwegian or norway or finland or finnish or denmark or danish or european or belgium or belgian or Czech or Estonia* or Greece or Greek or Hungar* or Latvia* or Lithuania* or Luxembourg or Iceland* or Poland or Portugal or Slovak Republic or Slovenia* or Switzerland or Japan* or Tokyo or Korea* or Seoul or Chile* or Colombia* or Mexico or Mexican or Israel* or Turkey or Turkish or australia* or new zealand* or united states or USA or american or "U.S." or new york or california* or washington or seattle)).tw,kf.
19	((china or russia or iran or tehran or Brazil) not (canada or italy or italian or spain or spanish or france or french or united kingdom or UK or england or english or NHS or ireland or irish or wales or welsh or scotland or scottish or german* or austria* or sweden or swedish or netherlands or norwegian or norway or finland or finnish or denmark or danish or european or belgium or belgian or Czech or Estonia* or Greece or Greek or Hungar* or Latvia* or Lithuania* or Luxembourg or Iceland* or Poland or Portugal or Slovak Republic or Slovenia* or Switzerland or Japan* or Tokyo or Korea* or Seoul or Chile* or Colombia* or Mexico or Mexican or Israel* or Turkey or Turkish or australia* or new zealand* or united states or USA or american or "U.S." or new york or california* or washington or seattle)).in.
20	15 not (16 or 17 or 18 or 19)
21	limit 20 to (english or french)
22	limit 21 to editorial
23	21 not 22
24	Remove duplicates from 23

Online databases, hand-searched up to June 12, 2020:

Epistimonikos COVID-19 in L*VE Platform (epidemiology, etiology and prognosis questions) at:
https://app.iloveevidence.com/loves/5e6fdb9669c00e4ac072701d?utm=epdb_en

McMaster COVID-19 Evidence Alerts (prognosis or etiology studies) at:
https://plus.mcmaster.ca/COVID-19/

Supplement 2. Eligibility criteria

Criterion	Include	Exclude
Population/ Exposure	P[2]ROGRESS risk factors[1], with or without infection with COVID-19[2] [1]Risk factors include: - Pre-existing disease/condition, disability (e.g., chronic disease, immunocompromised, pregnancy) - Place/state of residence (e.g., remote, overcrowding, homeless, institutionalization) - Race/ethnicity/culture/language/immigrant/refugee status - Occupation - Gender identity/sex - Religion/belief system - Education/literacy level - Socio-economic status - Social capital (e.g., social support/networks/trust) - Age - Other (risk behaviours e.g., drug and alcohol use disorders, smoking) [2]COVID-19 infection may include lab-confirmed, or epidemiologically-linked cases (e.g., transmission/cases within households). Cases with co-infections (e.g., influenza such as H1N1) will be accepted, but may be analyzed separately from COVID-19-only infections.	Studies including populations with pandemic-related infections (e.g., SARS, MERS) without data isolated for COVID-19
Comparator	Staged, in the following order: i) The same P[2]ROGRESS factor experienced differently or to a different degree (e.g., higher or lower socioeconomic status, higher or lower literacy level) or the absence of a P[2]ROGRESS factor (e.g., non-refugee; no pre-existing disease). ii) None (in some circumstances such as pregnancy and immunocompromised)	Not applicable
Outcomes	Primary outcomes[3] - Hospitalization rate (including readmissions) - Hospital length of stay (binary or continuous) - Admission to ICU - ICU length of stay (binary or continuous) - Need for mechanical ventilation - Case fatality - All-cause fatality - Severe or critical infection (composite; as defined by authors) [3]Data may be extracted for outcomes listed above for the following population denominators, in order of priority: i) General population ii) Population positive for COVID-19 iii) Population hospitalized for COVID-19 iv) Population with a risk factor	COVID-19 infection requiring outpatient treatment (e.g., treatment at primary care office, attendance at ED) Hospitalization for an illness other than COVID-19 infection Outcomes post-hospital discharge (e.g., readmissions unrelated to index COVID-19 infection)
Timing	Any follow-up duration	Not applicable

Criterion	Include	Exclude
Setting	OECD countries (https://www.oecd.org/about/document/list-oecd-member-countries.htm)	Non-OECD countries
Study design	Prospective and retrospective cohort studies	Studies of interventions/treatments
Language	Full text in English or French; pre-prints if accepted for publication in a peer-reviewer journal.	Language other than English or French

COVID-19: novel coronavirus 2019; ED: emergency department; ICU: intensive care unit; MERS: Middle East Respiratory Syndrome; MV: mechanical ventilation; OECD: Organisation for Economic Co-operation and Development; SARS: severe acute respiratory syndrome

Supplement 3. Excluded studies

Excluded – case series (n=87)

1. Akdur A, Karakaya E, Ayvazoglu Soy EH, Alshalabi O, Kirnap M, Arslan H, et al. Coronavirus Disease (COVID-19) in Kidney and Liver Transplant Patients: A Single-Center Experience. Exp Clin Transplant. 2020;18(3):270-4.

2. Albalate M, Arribas P, Torres E, Cintra M, Alcazar R, Puerta M, et al. High prevalence of asymptomatic COVID-19 in haemodialysis: learning day by day in the first month of the COVID-19 pandemic. Alta prevalencia de COVID-19 asintomatico en hemodialisis Aprendiendo dia a dia el primer mes de pandemia de COVID-19. 2020.

3. Alberici F, Delbarba E, Manenti C, Econimo L, Valerio F, Pola A, et al. A report from the Brescia Renal COVID Task Force on the clinical characteristics and short-term outcome of hemodialysis patients with SARS-CoV-2 infection. Kidney international. 2020.

4. Alberici F, Delbarba E, Manenti C, Econimo L, Valerio F, Pola A, et al. A single center observational study of the clinical characteristics and short-term outcome of 20 kidney transplant patients admitted for SARS-CoV2 pneumonia. Kidney international. 2020;97(6):1083-8.

5. Aries JA, Davies JK, Auer RL, Hallam SL, Montoto S, Smith M, et al. Clinical outcome of coronavirus disease 2019 in haemato-oncology patients. British journal of haematology. 2020.

6. Arslan H, Musabak U, Ayvazoglu Soy EH, Kurt Azap O, Sayin B, Akcay S, et al. Incidence and Immunologic Analysis of Coronavirus Disease (COVID-19) in Hemodialysis Patients:A Single-Center Experience. Experimental and clinical transplantation : official journal of the Middle East Society for Organ Transplantation. 2020;18(3):275-83.

7. Bezzio C, Saibeni S, Variola A, Allocca M, Massari A, Gerardi V, et al. Outcomes of COVID-19 in 79 patients with IBD in Italy: an IG-IBD study. Gut. 2020;69(7):1213-7.

8. Biagi A, Rossi L, Malagoli A, Zanni A, Sticozzi C, Comastri G, et al. Clinical and epidemiological characteristics of 320 deceased patients with COVID-19 in an Italian Province: A retrospective observational study. J Med Virol. 2020.

9. Bode B, Garrett V, Messler J, McFarland R, Crowe J, Booth R, et al. Glycemic Characteristics and Clinical Outcomes of COVID-19 Patients Hospitalized in the United States. Journal of diabetes science and technology. 2020:1932296820924469.

10. Breazzano MP, Shen J, Abdelhakim AH, Dagi Glass L, Horowitz J, Xie SX, et al. New York City COVID-19 resident physician exposure during exponential phase of pandemic. The Journal of clinical investigation. 2020.

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12. Brenner EJ, Ungaro RC, Gearry RB, Kaplan GG, Kissous-Hunt M, Lewis JD, et al. Corticosteroids, but not TNF Antagonists, are Associated with Adverse COVID-19 Outcomes in Patients With Inflammatory Bowel Diseases: Results from an International Registry. Gastroenterology. 2020.

13. Cariou B, Hadjadj S, Wargny M, Pichelin M, Al-Salameh A, Allix I, et al. Phenotypic characteristics and prognosis of inpatients with COVID-19 and diabetes: the CORONADO study. Diabetologia. 2020.

14. Caron B, Arondel Y, Reimund J-M. Covid-19 and inflammatory bowel disease: questions on incidence, severity, and impact of treatment? Clinical gastroenterology and hepatology : the official clinical practice journal of the American Gastroenterological Association. 2020.

15. Chao JY, Derespina KR, Herold BC, Goldman DL, Aldrich M, Weingarten J, et al. Clinical Characteristics and Outcomes of Hospitalized and Critically Ill Children and Adolescents with Coronavirus Disease 2019 (COVID-19) at a Tertiary Care Medical Center in New York City. The Journal of pediatrics. 2020.

16. Columbia University Kidney Transplant P. Early Description of Coronavirus 2019 Disease in Kidney Transplant Recipients in New York. Journal of the American Society of Nephrology : JASN. 2020;31(6):1150-6.

17. Cook G, John Ashcroft A, Pratt G, Popat R, Ramasamy K, Kaiser M, et al. Real-world assessment of the clinical impact of symptomatic infection with severe acute respiratory syndrome coronavirus (COVID-19 disease) in patients with multiple myeloma receiving systemic anti-cancer therapy. British journal of haematology. 2020.

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28. Gervasoni C, Meraviglia P, Riva A, Giacomelli A, Oreni L, Minisci D, et al. Clinical features and outcomes of HIV patients with coronavirus disease 2019. Clinical infectious diseases : an official publication of the Infectious Diseases Society of America. 2020.

29. Gianfrancesco M, Hyrich KL, Al-Adely S, Carmona L, Danila MI, Gossec L, et al. Characteristics associated with hospitalisation for COVID-19 in people with rheumatic disease: data from the COVID-19 Global Rheumatology Alliance physician-reported registry. Annals of the rheumatic diseases. 2020.

30. Gisondi P, Facheris P, Dapavo P, Piaserico S, Conti A, Naldi L, et al. The impact of the COVID-19 pandemic on patients with chronic plaque psoriasis being treated with biological therapy: the Northern Italy experience. The British journal of dermatology. 2020.

31. Goicoechea M, Sánchez Cámara LA, Macías N, Muñoz de Morales A, Rojas Á G, Bascuñana A, et al. COVID-19: clinical course and outcomes of 36 hemodialysis patients in Spain. Kidney Int. 2020;98(1):27-34.

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33. Gubatan J, Levitte S, Patel A, Balabanis T, Sharma A, Jones E, et al. Prevalence, risk factors and clinical outcomes of COVID-19 in patients with a history of pancreatitis in Northern California. Gut. 2020.

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35. Husain SA, Dube G, Morris H, Fernandez H, Chang J-H, Paget K, et al. Early Outcomes of Outpatient Management of Kidney Transplant Recipients with Coronavirus Disease 2019. Clinical journal of the American Society of Nephrology : CJASN. 2020.

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37. Jung HY, Lim JH, Kang SH, Kim SG, Lee YH, Lee J, et al. Outcomes of COVID-19 among Patients on In-Center Hemodialysis: An Experience from the Epicenter in South Korea. J Clin Med. 2020;9(6).

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44. Lescure FX, Bouadma L, Nguyen D, Parisey M, Wicky PH, Behillil S, et al. Clinical and virological data of the first cases of COVID-19 in Europe: a case series. The Lancet Infectious diseases. 2020;20(6):697-706.

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49. Martinez-Perez O, Vouga M, Cruz Melguizo S, Forcen Acebal L, Panchaud A, Munoz-Chapuli M, et al. Association Between Mode of Delivery Among Pregnant Women With COVID-19 and Maternal and Neonatal Outcomes in Spain. JAMA. 2020.

50. Mathian A, Amoura Z. Response to: Correspondence regarding research letter to the editor by Mathian et al, 'Clinical course of coronavirus disease 2019 (COVID-19) in a series of 17 patients with systemic lupus under long-term treatment with hydroxychloroquine" by Nikpour et al. Annals of the rheumatic diseases. 2020.

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Supplement 4. Characteristics of included studies

Author, year; Publication date; Country; Study design; Study period & follow-up	**Enrolled cohort; Study sample; Mean age (SD), years[1] Male, proportion**	**COVID-19 diagnosis**	**P[2]ROGRESS risk factors, adjusted for in multivariate regression analysis[2]**	**Outcomes**	**Quality rating & concerns (if any)**
Azar K, 2020 May 21 (published) USA Retrospective cohort Jan 1-Apr 8	Patients ≥18 years old who had at least one encounter at a Sutter facility (integrated health system) during the study period for suspected or confirmed COVID-19 infection N=1,052 53 (95% CI 52-54) 49%	ICD codes or evidence in lab records (reports suspected cases but confirmed cases analyzed separately)	Pre-existing condition (asthma, cardiovascular disease, cancer, chronic pulmonary disease, congestive heart failure, type II diabetes, hypertension, depression); Place of residence (homeless); Race/ethnicity; Sex; SES (household income); Age; Other factors (smoking status)	Rate of hospitalization	Good; No major concerns
Bhargava A, 2020 May 30 (published) USA Retrospective cohort Mar 8-Apr 8	Adults admitted to a tertiary care urban academic medical center with COVID-19 N=197 61 (16) 52%	RT-PCR	Pre-existing condition (renal disease); Sex; Age	Severe disease	Good; No major concerns
Bianchetti A, 2020 May 11 (accepted) Italy Retrospective cohort Study period not reported	Adults admitted to acute medical wards with COVID-19 pneumonia in Brescia N=627 71 (13) 47%	RT-PCR	Pre-existing condition (dementia); Sex; Age	Mortality	Fair; Did not report follow-up duration or censorship for outcomes

Borobia A, 2020 June 4 (published) Spain Retrospective cohort Feb 25-Apr 19; Follow-up to Apr 19	Adults >=18 years old hospitalized in wards or the ED at a university hospital with COVID-19 N=2,226 Median 61 (IQR 46-78) 48%	Lab-confirmed	Pre-existing condition (not clearly specified for multivariate analysis); Sex; Age	Mortality	Fair; No follow-up and censored to patients who died or were discharged by April 19
Busetto L, 2020 May 28 (accepted) Italy Retrospective cohort Mar 14-Apr 11	Adults hospitalized in a medical COVID-19 ward with SARS-CoV-2 related pneumonia N=92 71 (13) 62%	RT-PCR	Pre-existing condition (BMI/obesity, chronic respiratory disease, dementia, type II diabetes); Sex; Age	ICU admission; Noninvasive ventilation or MV (composite); Mortality (in-hospital)	Fair; Did not report follow-up duration or censorship for outcomes
Cecconi M, 2020 May 20 (published) Italy Retrospective cohort Feb 22-Mar 22	Adults ≥18 years old admitted to a hospital with COVID-19 N=239 64 (14) 71%	Positive assay	Pre-existing condition (coronary heart disease); Age	ICU admission or mortality (composite)	Fair; No adjustment for sex and patients were censored as of March 25 (inadequate for patients enrolled on March 22)
Colaneri M, 2020 Apr 23 (published) Italy Retrospective cohort Feb 21-28; Follow-up to Mar 4	Patients admitted to a hospital with COVID-19 N=44 Median 68 (IQR 29) 64%	RT-PCR	Pre-existing condition (tumor); Sex	Severe disease	Good; No major concerns

Covino M, 2020 May 18 (accepted) Italy retrospective cohort Mar 1-31; Follow-up at 30 days from ED admission	Adults ≥80 years old admitted to ED of urban teaching hospital for suspected COVID-19 N=69 Median 84 (IQR 82-89) 54%	RT-PCR	Pre-existing condition (severe dementia)	Mortality	Fair; No adjustment for age or sex, or other pre-existing conditions
Cummings MJ, 2020 May 19 (published) USA Prospective cohort Mar 2-Apr 1; Follow-up to Apr 28	Adults admitted to high-dependency unit (O2) or ICU (MV) of two hospitals in New York with COVID-19 and were critically ill with acute hypoxaemic respiratory failure N=257 Median 62 (IQR 51-72) 67%	Lab-confirmed	Pre-existing condition (chronic cardiac disease [coronary artery disease or congestive heart failure], chronic pulmonary disease [chronic obstructive pulmonary disease/interstitial lung disease], diabetes, hypertension); Sex; Age	Mortality (in-hospital)	Good; No major concerns
Docherty AB, 2020 May 15 (accepted) UK Prospective cohort Feb 6-Apr 19; Follow-up at least 2 weeks to May 3	Children and adults admitted to 208 acute care hospitals with COVID-19 in England, Wales, and Scotland N=20,133 Median 73 (IQR 58-82) 60%	RT-PCR	Pre-existing condition (chronic cardiac disease, chronic pulmonary disease, asthma, CKD, DM, obesity, chronic neurological disorder, dementia, malignancy, moderate/severe liver disease, mild liver disease, chronic hematologic disease, rheumatologic disorder, HIV/AIDS, malnutrition); Sex; Age; Other factors (smoking status)	Mortality (in-hospital)	Good; No major concerns
D'Silva K, 2020 May 18 (accepted) USA Retrospective cohort	Patients seen at PHS who were ≥18 years of age and had a positive test result for SARS-CoV-2 by PCR clinical assay. *PHS is a large healthcare system that includes tertiary care hospitals (Massachusetts General Hospital	PCR	Pre-existing condition (rheumatic disease)	Rate of hospitalization; ICU admission/ or MV (all with MV); Mortality	Fair; No adjustment for sex, and mortality only adjusted for age and BMI

Mar 1-Apr 8; Follow-up averaged 29 days	and Brigham and Women's Hospital), community hospitals and primary and specialty outpatient centres in the greater Boston N=156 63 (15) 31%				
El-Boghdadly K, 2020 June 9 (accepted) Multi-country Prospective cohort Mar 23-Jun 2	Healthcare workers from 503 hospitals in 17 countries who performed tracheal intubations, with data for new COVID-19 infection or new COVID-19 symptoms requiring self-isolation or hospitalization. N=1,718 42 (9) 60%	Lab-confirmed or symptoms	Occupation (intubator/laryngologist vs. assistant); Sex	Self-isolation/ hospitalization (composite)	Good; No major concerns
Giacomelli A, 2020 May 22 (published) Italy Prospective cohort Feb 21-Mar 19; Follow-up to Apr 20	Adults hospitalized at one hospital with COVID-19 N=233 Median 61 (IQR 50-72) 62%	RT-PCR	Pre-existing condition (age unadjusted Charlson Comorbidity Index, obesity, anemia); Sex; Age	Mortality	Good; No major concerns
Gold J, 2020 May 8 (published, MMWR weekly report) USA Prospective cohort Mar 1-30; Follow-up to Apr 28	Adults ≥18 years old hospitalized at eight hospitals with COVID-19 N=305 Median 60 (IQR 46-69) 49%	Lab-confirmed	Pre-existing condition (obesity, diabetes, cardiovascular disease, coronary artery disease, congenital heart disease, arrhythmia, chronic lung disease, asthma, chronic obstructive pulmonary disease, immunocompromising conditions/therapies, end-stage renal disease on dialysis, liver disease, hypertension,	MV or mortality (composite)	Good; No major concerns

			neurologic disorder, chronic liver disease without dialysis, cancer, rheumatologic or autoimmune condition); Race/ethnicity; Sex; Age		
Hajifathalian K, 2020 (#163) May 29 (accepted) USA Retrospective cohort Mar 4-Apr 9; Follow-up to Apr 16	Adults ≥18 years old with and without obesity hospitalized in ED or inpatient wards with COVID-19 N=770 64 (17) 61%	RT-PCR	Pre-existing condition (obesity)	ICU admission; MV; Mortality (in-hospital)	Fair; No adjustment for sex, and 7-day follow-up inadequate for mortality
Hajifathalian K, 2020 (#1154) May 1 (accepted) USA Retrospective cohort Mar 4-Apr 9	Adults with SARS-CoV-2 N=1,059 61 (18) 58%	RT-PCR	Pre-existing condition (number of comorbidities); Age	ICU admission or mortality (composite)	Fair; Unclear if adjustment for sex, and did not report follow-up duration or censorship for outcomes
Hamer M, 2020 May 23 (published) UK Prospective cohort Mar 16-Apr 26	Adults in the community N=387,109 56 (8) 45%	RT-PCR	Pre-existing condition (overweight, obesity); Other factors (smoking status, level of alcohol consumption, level of physical activity)	Rate of hospitalization	Fair; One of three publications reporting on same or similar population, significant amount of missing data and data on risk factors are from 2006-2010
Hur K, 2020 May 20 (accepted)	Patients hospitalized with laboratory-confirmed COVID-19 infection admitted to any of the 10	RT-PCR	Pre-existing condition (obesity, diabetes, hypertension);	MV	Good; No major concerns

USA Retrospective cohort Mar 1-Apr 8; Follow-up to Apr 18	hospitals in the Northwestern Memorial HealthCare system spread across the Chicago metropolitan area N=486 Median 59 (IQR 19-101) 56%		Place of residence (suburban vs. urban hospital); Race/ethnicity; Sex; Age; Other factors (smoking status)		
Imam Z, 2020 June 4 (published) USA Retrospective cohort Mar 1-Apr 17; outcome analysis ended Apr 17	Individuals that were hospitalized at a hospital within Beaumont Health with SARS-CoV-2 infection demonstrated by a positive RT-PCR on nasopharyngeal swab per world health organization (WHO)guidance N=1,305 61 (16) 54%	RT-PCR	Pre-existing condition (Charlson Comorbidity Index >3); Age	Mortality (in-hospital)	Fair; Adjustment for Charlson Comorbidity Index score (>3) despite individual comorbidities being significant at univariate analysis, and some missing data for ethnicity (n=5) and smoking status (n=240)
Kalligeros M, 2020 June 12 (published) USA Retrospective cohort Feb 17-Apr 5	All consecutive adult (≥18 years old) patients who had a laboratory confirmed (using a reverse transcriptase–polymerase chain reaction assay) SARS-CoV-2 infection and who were hospitalized at the Rhode Island Hospital, The Miriam Hospital, or Newport Hospital in Rhode Island N=103 Median 60 (IQR 50-72) 61%	RT-PCR	Pre-existing condition (obesity, diabetes, hypertension, heart disease, lung disease);	ICU admission; MV	Good; No major concerns
Klang E, 2020 May 23 (accepted)	Adults hospitalized at five academic hospitals with COVID-19 with BMI information	PCR	Pre-existing condition (obesity, diabetes, heart disease, hypertension, lung disease); Race/ethnicity;	Mortality (in-hospital)	Fair; Did not report follow-up duration or censorship for outcomes, and a

USA Retrospective cohort Mar 1-May 17	N=3,406 Range 34 to 84 y 58%		Sex; Age		large number of patients who were still hospitalized at time of analysis were excluded (n=1,047)
Lassale C, 2020 May 28 (accepted) UK Prospective cohort Mar 16-Apr 26	Adults in the community N=340,966 56 (8) 45%	RT-PCR	Pre-existing condition (obesity, cardiovascular disease, chronic bronchitis, ever seen a psychiatrist); Place of residence (number in household); Race/ethnicity; Sex; Education/literacy level (university degree vs. lower education); SES (Townsend index); Age; Other factors (smoking status, level of alcohol consumption, level of physical activity)	Rate of hospitalization	Fair; One of three publications reporting on same or similar population, significant amount of missing data and data on risk factors are from 2006-2010
Okoh A, 2020 June 10 (published) USA Retrospective cohort Mar 10-Apr 10; Follow-up to Apr 20	Adults ≥18 years old of Black/African American or Latino/Hispanic ethnicity hospitalised at a quaternary care teaching hospital in New Jersey with COVID-19 N=251 Median 62 (IQR 49-74) 51%	RT-PCR	Pre-existing condition (coronary artery disease, chronic kidney disease, hypertension, HIV); Race/ethnicity; Sex; Age	Mortality (in-hospital)	Good; No major concerns
Palaiodimos L, 2020 May 14 (accepted) USA Retrospective cohort	Adults (first 200) admitted to the inpatient medicine service or the ICU of a tertiary academic institution with COVID-19 N=200	Lab-confirmed	Pre-existing condition (overweight, obesity, coronary artery disease, chronic kidney disease or end-stage renal disease, chronic obstructive pulmonary disease, diabetes,	MV; Mortality (in-hospital)	Good; No major concerns

Mar 9-Mar 22; Follow-up 3 weeks to Apr 12	Median 64 (IQR 50-74) 49%		heart failure, hyperlipidemia, obstructive sleep apnea); Sex; Age; Other factors (smoking status)		
Patel AP, 2020 July 6 (published, letter) UK Prospective cohort Mar 16-Apr 14	Adults who were enrolled in a national health database N=418,794 66 (SD not reported) 45%	PCR	Pre-existing condition (obesity, chronic obstructive pulmonary disease, coronary artery disease, diabetes, chronic kidney disease, heart failure, hypertension, ischemic stroke, previous pneumonia, Alzheimer's or dementia); Race/ethnicity; Sex; SES (Townsend index, average income); Age; Other factors (smoking status)	Rate of hospitalization	Fair; One of three publications reporting on same or similar population, significant amount of missing data and data on risk factors are from 2006-2010
Perez-Guzman PN, 2020 April 29 (published, report) UK retrospective cohort Feb 25-Apr 5; Follow-up to Apr 19	Adults hospitalized at three hospitals (with a multi-ethnic catchment) with COVID-19 N=520 Median 67 (IQR 26) 62%	RT-PCR	Pre-existing condition (Elixhauser score, obesity, diabetes, ischaemic heart, hypertension, hyperlipidemia, chronic heart failure, stroke, asthma, chronic obstructive pulmonary disease, dementia, chronic kidney disease, dementia, solid tumor, liver non-cirrhotic, liver cirrhotic, atrial fibrillation, deep vein thrombosis/pulmonary embolism); Race/ethnicity; Sex; Age	Mortality (in-hospital)	Good; No major concerns
Petrilli CM, 2020 May 14 (accepted) USA Prospective cohort	Adults tested for SARS-CoV-2 from 260 outpatient office sites and 4 acute care hospitals N=5,279 Median 54 (IQR 38-66)	RT-PCR	Pre-existing condition (obesity, asthma or chronic obstructive pulmonary disease, chronic lung disease, coronary artery disease, diabetes, heart failure, hyperlipidemia, hypertension, cancer); Race/ethnicity;	Rate of hospitalization; Severe disease; Mortality (in-hospital)	Good; No major concerns

Mar 1-Apr 8; Follow-up to May 5	50%		Sex; Age; Other factors (smoking status)		
Piano S, 2020 June 11 (published) Italy Retrospective cohort Feb 22-Apr 8	Non-critically ill patients hospitalized with COVID-19 in five internal medicine COVID unit in two regions of Northern Italy N=565 66 (15) 63%	RT-PCR	Pre-existing condition (liver function, Charlson Comorbidity Index); Gender; Age	Transfer to ICU or mortality (composite)	Good; No major concerns
Price-Haywood EG, 2020 May 27 (published) USA Retrospective cohort Mar 1-Apr 11; Follow-up to May 7 for mortality	Adults attending integrated-delivery health system who tested positive for SARS-CoV-2 N=3,481 54 (17) 40%	PCR	Pre-existing condition (Charlson Comorbidity Index score, obesity); Place of residence (residence in low-income area); Race/ethnicity; Sex; Age	Rate of hospitalization; Mortality (in-hospital)	Good; No major concerns
Public Health England June (published) UK Retrospective cohort Mar 20-May 13	Patients admitted to hospital (ward or critical care) with COVID-19 N=130,091 No aggregate data for age (range 2% at <20 y to 29% at ≥80 y) 47%	Lab-confirmed	Race/ethnicity; SES (deprivation); Sex; Age	Mortality	Fair; No adjustment for pre-existing condition(s), and data for risk factors are derived from a 2011 census with some missing data for sex (n=10), age (n=38), and ethnicity (2,024)
Shah V, 2020 June 11 (accepted) UK	Haemato-oncology patients and patients without underlying haematological malignancies (first 80) admitted to the hospital with COVID-19	RT-PCR	Sex; Age	Mortality	Fair; Adjusted for age and sex only, and no explanation of discrepancy in cohort

Retrospective cohort Until April 15; Follow-up of 30 days	N=1,183 Median 71 (IQR 57-82) 58%				sample size change during study (80 and 68)
Singh S, 2020 (#121) June 2 (accepted) USA Retrospective cohort Jan 20-May 26	Inflammatory bowel disease (IBD) patients diagnosed with COVID-19 and patients diagnosed with COVID-19 and who had no history of or documentation of a diagnosis of IBD ever were included in the non-IBD control group. N=464 No aggregate data for age (IBD vs. non-IBD: mean 51 y [18] vs. 50 y [19]) No aggregate data for sex (IBD vs. non-IBD: 37% vs. 45%)	Lab-confirmed or ICD code for COVID-19	Pre-existing condition (obesity, essential hypertension, chronic lower respiratory diseases [asthma and chronic obstructive pulmonary disease], diabetes, ischemic heart disease, chronic kidney disease, heart failure, cerebrovascular disease); Race/ethnicity; Sex; Age; Other factors (nicotine dependency)	Rate of hospitalization; Mortality	Good; No major concerns
Singh S, 2020 (#1201) Apr 28 (accepted) USA Retrospective cohort Apr 12 (search for patient records)	Patients ≥10 years old with COVID-19, with and without pre-existing liver disease, who presented to a health care organization N=2,780 No aggregate data for age (liver disease vs. non-liver disease: mean 55 y [15] vs. 52 y [18]) 38%	ICD codes per CDC guidelines	Pre-existing condition (obesity, diabetes, hypertension, liver disease with cirrhosis, liver disease without cirrhosis); Race/ethnicity; Age; Other factors (nicotine use)	Rate of hospitalisation; Mortality	Good; No major concerns
Violi F, 2020 June 22 (published) Italy	Consecutively hospitalized adult (≥18 years) patients with laboratory-confirmed COVID-19 and severe acute respiratory syndrome coronavirus-2 (SARS-CoV2)-related	RT-PCR	Pre-existing condition (heart failure); Age	Mortality (in-hospital)	Good; No major concerns

Retrospective cohort Mar-Apr; Follow-up of 19 days (median, IQR: 12–27 days)	pneumonia, requiring or not mechanical ventilation. N=319 No aggregate data for age (survivors vs. non-survivors: mean 66 y vs. 77 y) No aggregate data for sex (survivors vs. non-survivors: 58% vs. 70%)				

[1] values for age are mean (SD), unless otherwise denoted

[2] risk factors adjusted for in multivariate analysis may differ for outcome(s) reported within a study

CDC: Centers for Disease Control and Prevention; COVID-19: novel coronavirus; ICD: International Classification of Diseases; IQR: interquartile range; MV: mechanical ventilation; RT-PCR/PCR: reverse transcriptase polymerase chain reaction/polymerase chain reaction; SD: standard deviation; SES: socio-economic status; UK: United Kingdom; USA: United States of America; vs.: versus; y: year(s)

Supplement 5. All results data from the included studies

Contents

Table 1. Body mass index (BMI) and weight

Risk factor; Outcome among population	Study	Total number of patients	Adjusted odds ratio*	95% CI lower bound	95% CI upper bound	p-value	Quality rating
BMI unspecified							
Hospitalization							
community sample	Lassale C (UK; pc)	340,966	**1.03**	**1.02**	**1.05**	**<0.001**	Fair
community sample	Patel AP (UK; pc)	418,794	**1.04**	**1.03**	**1.06**	**<0.001**	Fair
Underweight (BMI <18.5) vs. normal weight (BMI <25)							
ICU admission							
hospitalized with COVID-19	Hajifathalian (USA; rc) #163	770	aRR 0.68	0.21	2.17	0.519	Fair
Mechanical ventilation							
hospitalized with COVID-19	Hajifathalian (USA; rc) #163	770	aRR 0.48	0.11	2.12	0.333	Fair
hospitalized with COVID-19	Palaiodimos L (USA; rc)	200	0.76	0.26	2.22	0.613	Good
Mortality							
hospitalized with COVID-19	Hajifathalian (USA; rc) #163	770	aRR 1.64	0.84	3.19	0.145	Fair
hospitalized with COVID-19	Palaiodimos L (USA; rc)	200	1.37	0.52	3.64	0.527	Good
Overweight (BMI 25-29.9) vs. normal weight (BMI <25)**							
Hospitalization							
community sample positive for COVID-19	Hamer (UK; pc)	387,109	**aRR 1.32**	**1.09**	**1.6**	**NR**	Fair
positive for COVID-19	Petrilli CM (USA; pc)	5,279	**1.3**	**1.07**	**1.57**	**0.007**	Good
Severe disease							
hospitalized with COVID-19	Petrilli CM (USA; pc)	2,725	0.94	0.73	1.2	0.65	Good
ICU admission							
hospitalized with COVID-19	Busetto L (Italy; rc)	92	**11.65**	**3.88**	**34.96**	**<0.001**	Fair
hospitalized with COVID-19	Kalligeros M (USA; rc)	103	2.27	0.59	8.83	0.235	Good
Mechanical ventilation							
ventilation (non-invasive + mechanical) among hospitalized with COVID-19	Busetto L (Italy; rc)	92	**4.19**	**1.36**	**12.89**	**0.012**	Fair
hospitalized with COVID-19	Kalligeros M (USA; rc)	103	3.7	0.6	22.87	0.159	Good
Mortality							
hospitalized with COVID-19	Busetto L (Italy; rc)	92	0.27	0.03	2.05	0.204	Fair
hospitalized with COVID-19	Petrilli CM (USA; pc)	2,725	1.01	0.82	1.25	0.94	Good
Obese class I or greater (BMI ≥30) vs. normal weight (BMI <30)**							
Hospitalization							
community sample positive for COVID-19	Hamer (UK; pc)	387,109	**aRR 1.97**	**1.61**	**2.42**	**NR**	Fair
positive for COVID-19	Price-Haywood EG (USA; rc)	3,481	**1.43**	**1.2**	**1.71**	**NR**	Fair
positive for COVID-19	Petrilli CM (USA; pc)	5,279	**1.8**	**1.47**	**2.2**	**<0.001**	Good
Severe disease							
hospitalized with COVID-19	Petrilli CM (USA; pc)	2,725	1.11	0.85	1.5	0.44	Good

Risk factor; Outcome among population	Study	Total number of patients	Adjusted odds ratio*	95% CI lower bound	95% CI upper bound	p-value	Quality rating
ICU admission							
hospitalized with COVID-19	Hajifathalian (USA; rc) #163	770	**aRR 1.76**	**1.24**	**2.48**	**0.001**	Fair
hospitalized with COVID-19 (BMI 30-34.9)	Kalligeros M (USA; rc)	103	2.65	0.64	10.95	0.178	Good
hospitalized with COVID-19 (BMI ≥35)	Kalligeros M (USA; rc)	103	**5.39**	**1.13**	**25.64**	**0.034**	Good
Mechanical ventilation							
hospitalized with COVID-19	Hajifathalian (USA; rc) #163	770	**aRR 1.72**	**1.22**	**2.44**	**0.002**	Fair
hospitalized with COVID-19	Kalligeros M (USA; rc)	103	**6.85**	**1.05**	**44.82**	**0.045**	Good
hospitalized with COVID-19	Hur K (USA; rc)	486	1.46	0.87	2.46	0.151	Good
hospitalized with COVID-19	Kalligeros M (USA; rc)	103	**9.99**	**1.39**	**71.69**	**0.022**	Good
hospitalized with COVID-19	Palaiodimos L (USA; rc)	200	**3.87**	**1.47**	**10.18**	**0.006**	Good
Mortality							
hospitalized with COVID-19	Hajifathalian (USA; rc) #163	770	aRR 1.15	0.62	2.14	0.663	Fair
hospitalized with COVID-19	Giacomelli A (Italy; pc)	233	**aHR 3.04**	**1.42**	**6.49**	**0.004**	Good
hospitalized with COVID-19	Price-Haywood EG (USA; rc)	1,382	aHR 0.99	0.77	1.27	NR	Fair
hospitalized with COVID-19, ≤50 y	Klang E (USA; rc)	572	1.1	0.5	2.3	0.755	Fair
hospitalized with COVID-19, >50 y	Klang E (USA; rc)	2,834	1.1	0.9	1.3	0.421	Fair
hospitalized with COVID-19	Petrilli CM (USA; pc)	2,725	1.08	0.87	1.36	0.48	Good
hospitalized with COVID-19	Palaiodimos L (USA; rc)	200	**3.78**	**1.45**	**9.83**	**0.006**	Good
Mortality							
hospitalized with COVID-19	Petrilli CM (USA; pc)	2,725	1.45	0.99	2.13	0.05	Good
Obese class III (BMI ≥40) vs. normal weight (BMI <25)**							
Hospitalization							
positive for COVID-19	Petrilli CM (USA; pc)	5,279	**2.45**	**1.78**	**3.36**	**<0.001**	Good
Severe disease							
hospitalized with COVID-19	Petrilli CM (USA; pc)	2,725	**1.71**	**1.1**	**2.7**	**0.02**	Good
Mechanical ventilation							
hospitalized with COVID-19	Hur K (USA; rc)	486	1.92	0.92	4	0.08	Good
Mortality							
hospitalized with COVID-19	Petrilli CM (USA; pc)	2,725	**1.45**	**0.99**	**2.13**	**0.05**	Good
hospitalized with COVID-19, ≤50 y	Klang E (USA; rc)	572	**5.1**	**2.3**	**11.1**	**<0.001**	Fair
hospitalized with COVID-19, >50 y	Klang E (USA; rc)	2,834	**1.6**	**1.2**	**2.3**	**0.004**	Fair

* values are adjusted odds ratio, unless otherwise denoted

** the reference category differs slightly across studies

aHR: adjusted hazards ratio; aRR: adjusted risk ratio; BMI: body mass index; CI: confidence interval; COVID-19: novel coronavirus disease 2019; ICU: intensive care unit; NR: not reported; pc: prospective cohort; rc: retrospective cohort; UK: United Kingdom; USA: United States of America; y: year(s)

Table 2. Pre-existing disease, unspecified

Risk factor; Outcome among population	Study	Total number of patients	Adjusted odds ratio*	95% CI lower bound	95% CI upper bound	p-value	Quality rating
CCI score							
Hospitalization							
positive for COVID-19	Price-Haywood EG (USA; rc)	3,481	**aHR 1.05**	**1**	**1.1**	**NR**	Good
Severe disease							
ICU transfer or death (composite) among hospitalized for COVID-19	Piano S (Italy)	565	**1.21**	**1.03**	**1.42**	**0.021**	Good
Mortality							
hospitalized with COVID-19	Price-Haywood EG (USA; rc)	1,382	aHR 0.99	0.95	1.04	NR	Good
hospitalized with COVID-19	Imam (USA; rc)	1,305	**2.71**	**1.85**	**3.97**	**<0.001**	Fair
Number of comorbidities							
Severe disease							
ICU or death (composite) among positive for COVID-19	Hajifathalian K (USA; rc) #1154	1,059	**1.19**	**NR**	**NR**	**0.021**	Fair

* values are adjusted odds ratio, unless otherwise denoted

aHR: adjusted hazards ratio; CCI: Charlson Comorbidity Index; CI: confidence interval; COVID-19: novel coronavirus disease 2019; ICU: intensive care unit; NR: not reported; rc: retrospective cohort; USA: United States of America; y: year(s)

Table 3. Respiratory disease

Risk factor; Outcome among population	Study	Total number of patients	Adjusted odds ratio*	95% CI lower bound	95% CI upper bound	p-value	Quality rating
Asthma							
Hospitalization							
positive for COVID-19	Azar K (USA; rc)	1,052	1.52	0.89	2.58	>0.05	Good
Asthma or COPD							
Hospitalization							
positive for COVID-19	Petrilli CM (USA; pc)	5,279	1.08	0.88	1.33	0.47	Good
Severe disease							
hospitalized with COVID-19	Petrilli CM (USA; pc)	2,725	0.99	0.76	1.3	0.93	Good
Mortality							
hospitalized with COVID-19	Petrilli CM (USA; pc)	2,725	1.03	0.83	1.29	0.76	Good
Chronic pulmonary disease or COPD							
Hospitalization							
positive for COVID-19	Azar K (USA; rc)	1,052	1.8	0.75	4.34	>0.05	Good
community sample	Patel AP (UK; pc)	418,794	**1.51**	**1**	**2.28**	**0.05**	Fair
Mortality							
hospitalized with COVID-19	Docherty AB (UK; pc)	20,133	**aHR 1.17**	**1.09**	**1.27**	**<0.001**	Good
hospitalized with COVID-19	Palaiodimos L (USA; rc)	200	2.05	0.76	5.51	0.156	Good
Chronic bronchitis							
Hospitalization							
community sample	Lassale C (UK; pc)	340,966	1.34	0.81	2.21	0.259	Fair
Obstructive sleep apnea							
Mechanical ventilation							
hospitalized with COVID-19	Palaiodimos L (USA; rc)	200	1.15	0.4	3.35	0.791	Good
Pneumonia, previous							
Hospitalization							
community sample	Patel AP (UK; pc)	418,794	1.31	0.83	2.05	0.25	Fair
Other respiratory disease (includes one or more of: asthma, COPD, lung disease, interstitial lung disease, and/or pulmonary hypertension)							
ICU admission							
hospitalized with COVID-19 (includes heart failure, coronary artery disease and cardiomyopathy)	Kalligeros M (USA; rc)	103	1.5	0.47	4.82	0.495	Good
Mechanical ventilation							
hospitalized with COVID-19 (includes heart failure, coronary artery disease and cardiomyopathy)	Kalligeros M (USA; rc)	103	0.76	0.2	2.86	0.687	Good
Mortality							
hospitalized with COVID-19 (chronic cardiac disease or congestive heart failure)	Cummings MJ (USA; pc)	257	**aHR 2.94**	**1.48**	**5.84**	**NR**	Good

* values are adjusted odds ratio, unless otherwise denoted
aHR: adjusted hazards ratio; CI: confidence interval; COPD=Chronic obstructive pulmonary disease; COVID-19: novel coronavirus disease 2019; ICU: intensive care unit; NR: not reported; pc: prospective cohort; rc: retrospective cohort; UK: United Kingdom; USA: United States of America

Table 4. Cardiovascular disease

Risk factor; Outcome among population	Study	Total number of patients	Adjusted odds ratio*	95% CI lower bound	95% CI upper bound	p-value	Quality rating
Cardiovascular disease							
Hospitalization							
community sample	Lassale C (UK; pc)	340,966	**1.06**	**0.79**	**1.42**	**0.001**	Fair
positive for COVID-19	Azar K (USA; rc)	1,052	1.32	0.75	2.32	>0.05	Good
Heart failure							
Hospitalization							
positive for COVID-19	Azar K (USA; rc)	1,052	**3.34**	**1.49**	**7.52**	**<0.001**	Good
community sample	Patel AP (UK; pc)	418,794	1.09	0.56	2.14	0.79	Fair
positive for COVID-19	Petrilli CM (USA; pc)	5,279	**4.43**	**2.59**	**8.04**	**<0.001**	Good
Severe disease							
hospitalized with COVID-19	Petrilli CM (USA; pc)	2,725	**1.93**	**1.4**	**2.6**	**<0.001**	Good
Mortality							
hospitalized with COVID-19	Palaiodimos L (USA; rc)	200	1.43	0.5	4.06	0.501	Good
hospitalized with COVID-19	Petrilli CM (USA; pc)	2,725	**1.54**	**1.23**	**1.93**	**<0.001**	Good
Coronary artery disease (includes coronary heart disease)							
Hospitalization							
community sample	Patel AP (UK; pc)	418,794	0.95	0.67	1.36	0.79	Fair
positive for COVID-19	Petrilli CM (USA; pc)	5,279	1.08	0.81	1.44	0.6	Good
Severe disease							
hospitalized with COVID-19	Petrilli CM (USA; pc)	2,725	0.92	0.71	1.2	0.56	Good
ICU transfer or death (composite) among hospitalized with COVID-19	Cecconi M (Italy; rc)	239	**aHR 2.02**	**1.13**	**3.64**	**0.018**	Fair
Mortality							
hospitalized with COVID-19	Palaiodimos L (USA; rc)	200	1.53	0.54	4.34	0.421	Good
hospitalized with COVID-19	Petrilli CM (USA; pc)	2,725	1.1	0.9	1.35	0.36	Good
Hyperlipidemia							
Hospitalization							
positive for COVID-19	Petrilli CM (USA; pc)	5,279	**0.62**	**0.52**	**0.74**	**<0.001**	Good
Severe disease							
hospitalized with COVID-19	Petrilli CM (USA; pc)	2,725	0.93	0.75	1.2	0.51	Good
Mechanical ventilation							
hospitalized with COVID-19	Palaiodimos L (USA; rc)	200	1.66	0.78	3.55	0.188	Good
Mortality							
hospitalized with COVID-19	Petrilli CM (USA; pc)	2,725	0.98	0.82	1.17	0.79	Good
Hypertension							
Hospitalization							
community sample	Lassale C (UK; pc)	340,966	0.98	0.82	1.17	0.84	Fair

Risk factor; Outcome among population	Study	Total number of patients	Adjusted odds ratio*	95% CI lower bound	95% CI upper bound	p-value	Quality rating
community sample	Patel AP (UK; pc)	418,794	1.12	0.9	1.39	0.32	Fair
positive for COVID-19	Azar K (USA; rc)	1,052	1.4	0.93	2.1	>0.05	Good
positive for COVID-19	Petrilli CM (USA; pc)	5,279	**1.78**	**1.49**	**2.12**	**<0.001**	Good
Severe disease							
hospitalized with COVID-19	Petrilli CM (USA; pc)	2,725	0.96	0.75	1.2	0.76	Good
ICU admission							
hospitalized with COVID-19	Kalligeros M (USA; rc)	103	0.79	0.27	2.28	0.663	Good
Mechanical ventilation							
hospitalized with COVID-19	Kalligeros M (USA; rc)	103	0.47	0.13	1.66	0.242	Good
Mortality							
hospitalized with COVID-19	Cummings MJ (USA; pc)	257	aHR 1.58	0.89	2.81	NR	Good
hospitalized with COVID-19	Petrilli CM (USA; pc)	2,725	0.98	0.78	1.23	0.86	Good
Other cardiovascular disease (includes one or more of: chronic cardiac disease, heart disease, heart failure, coronary artery disease and cardiomyopathy)							
ICU admission							
hospitalized with COVID-19	Kalligeros M (USA; rc)	103	1.52	0.51	4.51	0.448	Good
Mechanical ventilation							
hospitalized with COVID-19	Kalligeros M (USA; rc)	103	**3.41**	**1.05**	**11.06**	**0.041**	Good
Mortality							
hospitalized with COVID-19	Cummings MJ (USA; pc)	257	**aHR 1.76**	**1.08**	**2.86**	**NR**	Good
hospitalized with COVID-19	Docherty AB (UK; pc)	20,133	**aHR 1.16**	**1.08**	**1.24**	**<0.001**	Good
Ischemic stroke							
Hospitalization							
community sample	Patel AP (UK; pc)	418,794	0.94	0.39	2.3	0.90	Fair

* values are adjusted odds ratio, unless otherwise denoted

aHR: adjusted hazards ratio; CI: confidence interval; COVID-19: novel coronavirus disease 2019; ICU: intensive care unit; NR: not reported; pc: prospective cohort; rc: retrospective cohort; UK: United Kingdom; USA: United States of America

Table 5. Endocrine disease

Risk factor; Outcome among population	Study	Total number of patients	Adjusted odds ratio*	95% CI lower bound	95% CI upper bound	p-value	Quality rating
Diabetes							
Hospitalization							
community sample	Patel AP (UK; pc)	418,794	**1.52**	**1.14**	**2.03**	**0.01**	Fair
positive for COVID-19	Petrilli CM (USA; pc)	5,279	**2.24**	**1.84**	**2.73**	**<0.001**	Good
positive for COVID-19	Azar K (USA; rc)	1,052	**2.17**	**1.33**	**3.53**	**<0.01**	Fair
Severe disease							
hospitalized with COVID-19	Petrilli CM (USA; pc)	2,725	1.23	0.99	1.5	0.06	Good
ICU admission							
hospitalized with COVID-19	Kalligeros M (USA; rc)	103	1.91	0.71	5.19	0.202	Good
Mechanical ventilation							
hospitalized with COVID-19	Hur K (USA; rc)	486	**1.64**	**1.02**	**2.66**	**0.046**	Good
hospitalized with COVID-19	Kalligeros M (USA; rc)	103	2.13	0.73	6.22	0.168	Good
hospitalized with COVID-19	Palaiodimos L (USA; rc)	200	1.26	0.58	2.73	0.557	Good
Mortality							
hospitalized with COVID-19	Cummings MJ (USA; pc)	257	aHR 1.31	0.81	2.1	NR	Good
hospitalized with COVID-19	Docherty AB (UK; pc)	20,133	aHR 1.06	0.99	1.14	0.087	Good
hospitalized with COVID-19	Palaiodimos L (USA; rc)	200	1.16	0.55	2.44	0.698	Good
hospitalized with COVID-19	Petrilli CM (USA; pc)	2,725	1.01	0.85	1.21	0.87	Good

* values are adjusted odds ratio, unless otherwise denoted

aHR: adjusted hazards ratio; CI: confidence interval; COVID-19: novel coronavirus disease 2019; ICU: intensive care unit; NR: not reported; pc: prospective cohort; rc: retrospective cohort; UK: United Kingdom; USA: United States of America

Table 6. Hepatic disease

Risk factor; Outcome among population	Study	Total number of patients	Adjusted odds ratio*	95% CI lower bound	95% CI upper bound	p-value	Quality rating
Liver disease							
Hospitalization							
positive for COVID-19	Singh S (USA; rc) #1201	464	**aRR 1.3**	**1.1**	**1.6**	**0.006**	Good
Mortality							
hospitalized with COVID-19	Docherty AB (UK; pc)	20,133	**aHR 1.51**	**1.21**	**1.88**	**<0.001**	Good
positive for COVID-19	Singh S (USA; rc) #1201	464	**aRR 3.0**	**1.5**	**6.0**	**0.001**	Good
positive for COVID-19 (liver disease with cirrhosis)	Singh S (USA; rc) #1201	464	**aRR 4.6**	**2.6**	**8.3**	**<0.001**	Good

* values are adjusted odds ratio, unless otherwise denoted

aHR: adjusted hazards ratio; aRR: adjusted risk ratio; CI: confidence interval; COVID-19: novel coronavirus disease 2019; pc: prospective cohort; rc: retrospective cohort; UK: United Kingdom; USA: United States of America

Table 7. Renal disease

Risk factor; Outcome among population	Study	Total number of patients	Adjusted odds ratio*	95% CI lower bound	95% CI upper bound	p-value	Quality rating
Chronic kidney disease							
Hospitalization							
community sample	Patel AP (UK; pc)	418,794	**2.01**	**1.19**	**3.41**	**0.01**	Fair
positive for COVID-19	Petrilli CM (USA; pc)	5,279	**2.6**	**1.89**	**3.61**	**<0.001**	Good
Severe disease							
hospitalized with COVID-19	Petrilli CM (USA; pc)	2,725	**0.73**	**0.55**	**1**	**0.04**	Good
hospitalized with COVID-19	Bhargava A (USA; rc)	197	**7.4**	**2.5**	**22**	**<0.001**	Good
Mortality							
hospitalized with COVID-19	Docherty AB (UK; pc)	20,133	**aHR 1.28**	**1.18**	**1.39**	**<0.001**	Good
hospitalized with COVID-19	Petrilli CM (USA; pc)	2,725	0.92	0.73	1.16	0.49	Good
hospitalized with COVID-19	Palaiodimos L (USA; rc)	200	1.15	0.49	2.68	0.746	Good

* values are adjusted odds ratio, unless otherwise denoted

aHR: adjusted hazards ratio; CI: confidence interval; COVID-19: novel coronavirus disease 2019; pc: prospective cohort; rc: retrospective cohort; UK: United Kingdom; USA: United States of America

Table 8. Gastrointestinal disease

Risk factor; Outcome among population	Study	Total number of patients	Adjusted odds ratio*	95% CI lower bound	95% CI upper bound	p-value	Quality rating
Irritable bowel disease							
Hospitalization							
positive for COVID-19	Singh S (USA; rc) #121	464	aRR 1.10	0.74	1.4	0.91	Good
Severe disease							
positive for COVID-19	Singh S (USA; rc) #121	464	aRR 0.93	0.68	1.27	0.66	Good

* values are adjusted odds ratio, unless otherwise denoted

aRR: adjusted risk ratio; CI: confidence interval; COVID-19: novel coronavirus disease 2019; rc: retrospective cohort; USA: United States of America

Table 9. Neurological disease

Risk factor; Outcome among population	Study	Total number of patients	Adjusted odds ratio*	95% CI lower bound	95% CI upper bound	p-value	Quality rating
Alzheimer's disease or dementia							
Hospitalization							
community sample	Patel AP (UK; pc)	418,794	5.08	0.7	36.68	0.11	Fair
Dementia							
Mortality							
hospitalized with COVID-19	Bianchetti A (Italy; rc)	627	**1.84**	**1.08**	**3.13**	**0.024**	Fair
hospitalized with COVID-19 (dementia)	Docherty AB (UK; pc)	20,133	**aHR 1.40**	**1.28**	**1.52**	**<0.001**	Good
hospitalized with COVID-19	Covino M (Italy; rc)	69	**aHR 3.87**	**1.23**	**12.17**	**0.021**	Fair
hospitalized with COVID-19 (chronic neurological disorder)	Docherty AB (UK; pc)	20,133	**aHR 1.17**	**1.06**	**1.29**	**0.001**	Good

* values are adjusted odds ratio, unless otherwise denoted

** the reference category differs slightly across studies

aHR: adjusted hazards ratio; CI: confidence interval; COVID-19: novel coronavirus disease 2019; pc: prospective cohort; rc: retrospective cohort; UK: United Kingdom

Table 10. Malignancy

Risk factor; Outcome among population	Study	Total number of patients	Adjusted odds ratio*	95% CI lower bound	95% CI upper bound	p-value	Quality rating
Cancer or tumor							
Hospitalization							
positive for COVID-19	Azar K (USA; rc)	1,052	0.96	0.45	2.03	>0.05	Good
positive for COVID-19	Petrilli CM (USA; pc)	5,279	0.88	0.65	1.19	0.41	Good
Severe disease							
hospitalized with COVID-19	Petrilli CM (USA; pc)	2,725	1.3	0.95	1.8	0.1	Good
hospitalized with COVID-19	Colaneri M (Italy; rc)	44	22.199	0.826	596.152	0.0648	Good
Mortality							
hospitalized with COVID-19	Petrilli CM (USA; pc)	2,725	**1.29**	**1.03**	**1.62**	**0.03**	Good
hospitalized with COVID-19	Docherty AB (UK; pc)	20,133	**aHR 1.13**	**1.02**	**1.24**	**0.017**	Good
positive for COVID-19	Shah V (UK; rc)	1,183	**aHR 1.74**	**1.12**	**2.71**	**0.014**	Fair
Hematological cancer - lymphoid							
Mortality							
positive for COVID-19	Shah V (UK; rc)	1,183	**aHR 1.75**	**1.07**	**2.87**	**0.026**	Fair
Hematological cancer - myeloid							
Mortality							
positive for COVID-19	Shah V (UK; rc)	1,183	aHR 1.70	0.7	4.13	0.244	Fair

* values are adjusted odds ratio, unless otherwise denoted

aHR: adjusted hazards ratio; CI: confidence interval; COVID-19: novel coronavirus disease 2019; pc: prospective cohort; rc: retrospective cohort; UK: United Kingdom; USA: United States of America

Table 11. Immunocompromised

Risk factor; Outcome among population	Study	Total number of patients	Adjusted odds ratio*	95% CI lower bound	95% CI upper bound	p-value	Quality rating
Rheumatic disease							
Hospitalization							
positive for COVID-19	D'Silva K (USA; pc)	156	1.1	0.51	2.38	0.81	Fair
ICU admission							
ICU or mechanical ventilation among hospitalized with COVID-19	D'Silva K (USA; pc)	65	**2.92**	**1.002**	**8.49**	**0.049**	Fair
Mortality							
positive for COVID-19	D'Silva K (USA; pc)	156	1.58	0.31	8.03	0.58	Fair
HIV							
Mortality							
hospitalized with COVID-19	Okoh A (USA; rc)	251	**0.07**	**0.03**	**0.52**	**0.006**	Good

* values are adjusted odds ratio, unless otherwise denoted

CI: confidence interval; COVID-19: novel coronavirus disease 2019; HIV: human immunodeficiency virus; ICU: intensive care unit; pc: prospective cohort; rc: retrospective cohort; USA: United States of America

Table 12. Mental health

Risk factor; Outcome among population	Study	Total number of patients	Adjusted odds ratio*	95% CI lower bound	95% CI upper bound	p-value	Quality rating
Depression							
Hospitalization							
positive for COVID-19	Azar K (USA; rc)	1,052	1.18	0.57	2.41	>0.05	Good
Ever seen a psychiatrist							
Hospitalization							
community sample	Lassale C (UK; pc)	340,966	1.24	0.99	1.55	0.057	Fair

* values are adjusted odds ratio, unless otherwise denoted

** the reference category differs slightly across studies

CI: confidence interval; COVID-19: novel coronavirus disease 2019; pc: prospective cohort; rc: retrospective cohort; UK: United Kingdom; USA: United States of America

Table 13. Place/state of residence

Risk factor; Outcome among population	Study	Total number of patients	Adjusted odds ratio*	95% CI lower bound	95% CI upper bound	p-value	Quality rating
Low-income geographic area							
Hospitalization							
positive for COVID-19	Price-Haywood EG (USA; rc)	3,481	**1.22**	**1.04**	**1.43**	**NR**	Good
Homeless							
Hospitalization							
positive for COVID-19	Azar K (USA; rc)	1,052	3.25	0.38	28.02	>0.05	Good
Number of people in household (1 vs. 2)							
Hospitalization							
community sample	Lassale C (UK; pc)	340,966	1.15	0.93	1.43	0.195	Fair
Number of people in household (3 vs. 2)							
Hospitalization							
community sample	Lassale C (UK; pc)	340,966	1.22	0.97	1.55	0.093	Fair
Number of people in household (4 vs. 2)							
Hospitalization							
community sample	Lassale C (UK; pc)	340,966	**1.59**	**1.26**	**2.01**	**<0.001**	Fair
Suburban vs. urban hospital							
Mechanical ventilation							
hospitalized with COVID-19	Hur K (USA; rc)	486	1.35	0.82	2.23	0.241	Good

* values are adjusted odds ratio, unless otherwise denoted

CI: confidence interval; COVID-19: novel coronavirus disease 2019; pc: prospective cohort; rc: retrospective cohort; UK: United Kingdom; USA: United States of America; vs.: versus

Table 14. Race/ethnicity

Risk factor; Outcome among population	Study	Total number of patients	Adjusted odds ratio*	95% CI lower bound	95% CI upper bound	p-value	Quality rating
Black vs. non-Hispanic White							
Hospitalization							
community sample	Lassale C (UK; pc)	340,966	**2.66**	**1.82**	**3.91**	**<0.001**	Fair
community sample	Patel AP (UK; pc)	418,794	**2.38**	**1.52**	**3.74**	**<0.001**	Fair
positive for COVID-19	Azar K (USA; rc)	1,052	**2.67**	**1.3**	**5.47**	**<0.01**	Good
positive for COVID-19	Petrilli CM (USA; pc)	5,279	0.81	0.65	1.01	0.06	Good
positive for COVID-19	Price-Haywood EG (USA; rc)	3,481	**1.96**	**1.62**	**2.37**	**NR**	Good
Severe disease							
hospitalized with COVID-19	Gold JAW (USA; pc)	305	aHR 0.63	0.35	1.13	>0.05	Good
hospitalized with COVID-19	Petrilli CM (USA; pc)	2,725	**0.57**	**0.41**	**0.8**	**0.001**	Good
ICU admission							
hospitalized with COVID-19	Hajifathalian (USA; rc) #163	770	aRR 1.16	0.7	1.94	0.558	Fair
hospitalized with COVID-19	Kalligeros M (USA; rc)	103	0.8	0.26	2.45	0.701	Good
Mechanical Ventilation							
hospitalized with COVID-19	Kalligeros M (USA; rc)	103	1.83	0.55	6.11	0.327	Good
hospitalized with COVID-19	Hajifathalian (USA; rc) #163	770	aRR 1.23	0.74	2.06	0.42	Fair
hospitalized with COVID-19	Hur K (USA; rc)	486	0.56	0.3	1.01	0.058	Good
Mortality							
hospitalized with COVID-19	Hajifathalian (USA; rc) #163	770	aRR 1.49	0.67	3.29	0.328	Fair
hospitalized with COVID-19	Perez-Guzman PN (UK; rc)	520	**1.86**	**1.03**	**3.35**	**NR**	Good
hospitalized with COVID-19	Petrilli CM (USA; pc)	2,725	**0.71**	**0.53**	**0.94**	**0.02**	Good
hospitalized with COVID-19	Price-Haywood EG (USA; rc)	1,382	aHR 0.89	0.68	1.17	NR	Good
hospitalized with COVID-19 (Black-African)**	Public Health England (UK; rc)	130,091	aHR 1.06	0.96	1.18	0.24	Fair
hospitalized with COVID-19 (Black-Caribbean)**	Public Health England (UK; rc)	130,091	**aHR 1.10**	**1.02**	**1.19**	**0.01**	Fair
hospitalized with COVID-19 (Black-Other)**	Public Health England (UK; rc)	130,091	**aHR 1.35**	**1.18**	**1.55**	**<0.001**	Fair
Hispanic vs. Non-Hispanic White							
Hospitalization							
positive for COVID-19	Azar K (USA; rc)	1,052	1.24	0.78	1.98	>0.05	Good
positive for COVID-19	Petrilli CM (USA; pc)	5,279	**1.63**	**1.35**	**1.97**	**<0.001**	Good
Severe disease							
hospitalized with COVID-19	Petrilli CM (USA; pc)	2,725	0.89	0.69	1.2	0.38	Good
ICU admission							
hospitalized with COVID-19	Kalligeros M (USA; rc)	103	0.56	0.19	1.58	0.271	Good
Mechanical ventilation							
hospitalized with COVID-19	Hur K (USA; rc)	486	0.83	0.44	1.55	0.565	Good

Risk factor; Outcome among population	Study	Total number of patients	Adjusted odds ratio*	95% CI lower bound	95% CI upper bound	p-value	Quality rating
hospitalized with COVID-19	Kalligeros M (USA; rc)	103	1.17	0.36	3.82	0.796	Good
Asian vs. non-Hispanic White							
Hospitalization							
community sample	Lassale C (UK; pc)	340,966	1.43	0.91	2.26	0.125	Fair
community sample	Patel AP (UK; pc)	418,794	**1.75**	**1.08**	**2.85**	**0.02**	Fair
positive for COVID-19	Petrilli CM (USA; pc)	5,279	1.29	0.97	1.72	0.08	Good
Severe disease							
hospitalized with COVID-19	Petrilli CM (USA; pc)	2,725	1.24	0.82	1.9	0.3	Good
ICU admission							
hospitalized with COVID-19	Hajifathalian (USA; rc) #163	770	**aRR 1.65**	**1.05**	**2.6**	**0.031**	Fair
Mechanical ventilation							
hospitalized with COVID-19	Hajifathalian (USA; rc) #163	770	**aRR 1.68**	**1.06**	**2.66**	**0.027**	Fair
Mortality							
hospitalized with COVID-19	Hajifathalian (USA; rc) #163	770	aRR 1.47	0.85	2.55	0.168	Fair
hospitalized with COVID-19	Perez-Guzman PN (UK; rc)	520	1.74	0.9	3.36	NR	Good
hospitalized with COVID-19	Petrilli CM (USA; pc)	2,725	1.26	0.91	1.75	0.16	Good
hospitalized with COVID-19 (Asian-Bangladeshi)**	Public Health England (UK; rc)	130,091	**aHR 2.02**	**1.74**	**2.35**	**<0.001**	Fair
hospitalized with COVID-19 (Asian-Chinese)**	Public Health England (UK; rc)	130,091	**aHR 1.23**	**1.04**	**1.58**	**0.02**	Fair
hospitalized with COVID-19 (Asian-Indian)**	Public Health England (UK; rc)	130,091	**aHR 1.22**	**1.13**	**1.32**	**<0.001**	Fair
hospitalized with COVID-19 (Asian-Other)**	Public Health England (UK; rc)	130,091	**aHR 1.13**	**1.02**	**1.25**	**0.02**	Fair
hospitalized with COVID-19 (Asian-Pakistani)**	Public Health England (UK; rc)	130,091	**aHR 1.44**	**1.31**	**1.58**	**<0.001**	Fair

* values are adjusted odds ratio, unless otherwise denoted

**Findings were similar for ethnicity analyses stratified by age category, thus only results for the full sample are shown

aHR: adjusted hazards ratio; aRR: adjusted risk ratio; CI: confidence interval; COVID-19: novel coronavirus disease 2019; ICU: intensive care unit; NR: not reported; pc: prospective cohort; rc: retrospective cohort; UK: United Kingdom; USA: United States of America; vs.: versus

Table 15. Occupation

Risk factor; Outcome among population	Study	Total number of patients	Adjusted odds ratio*	95% CI lower bound	95% CI upper bound	p-value	Quality rating
Healthcare workers: laryngologist/intubator vs. assistant							
Hospitalization							
healthcare workers performing tracheal intubations on patients with COVID-19	El-Boghdadly (Multi-country; pc)	1,718	aHR 0.76	0.56	1.04	0.08	Good

* values are adjusted odds ratio, unless otherwise denoted

aHR: adjusted hazards ratio; CI: confidence interval; COVID-19: novel coronavirus disease 2019; pc: prospective cohort; vs.: versus

Table 16. Gender identity/sex

Risk factor; Outcome among population	Study	Total number of patients	Adjusted odds ratio*	95% CI lower bound	95% CI upper bound	p-value	Quality rating
Male vs. female							
Hospitalization							
community sample	Patel AP (UK; pc)	418,794	**1.37**	**1.12**	**1.66**	**0.00**	Fair
community sample	Lassale C (UK; pc)	340,966	1.15	0.92	1.44	0.219	Fair
positive for COVID-19	Azar K (USA; rc)	1052	**1.94**	**1.33**	**2.81**	**<0.01**	Good
positive for COVID-19	Petrilli CM (USA; pc)	5,279	**2.67**	**2.39**	**3.2**	**<0.001**	Good
positive for COVID-19	Price-Haywood EG (USA; rc)	3,481	**1.79**	**1.54**	**2.08**	NR	Good
healthcare workers performing tracheal intubations on patients with COVID-19	El-Boghdadly (Multi-country; pc)	1,718	**aHR 0.74**	**0.55**	**0.99**	**0.04**	Good
Severe disease							
hospitalized with COVID-19	Colaneri M (Italy; rc)	44	17.24	0.50	1000.00	0.1148	Good
hospitalized with COVID-19	Petrilli CM (USA; pc)	2,725	1.06	0.85	1.3	0.6	Good
death or transfer to the ICU (composite) among hospitalized for COVID-19	Piano S (Italy; rc)	565	1.42	0.8	2.52	0.236	Good
ICU admission							
hospitalized with COVID-19	Busetto L (Italy; rc)	92	0.54	0.19	1.52	0.24	Fair
hospitalized with COVID-19	Kalligeros M (USA; rc)	103	2.4	0.87	6.64	0.09	Good
Mechanical ventilation							
hospitalized with COVID-19	Busetto L (Italy; rc)	92	1.22	0.47	3.17	0.682	Fair
hospitalized with COVID-19	Hur K (USA; rc)	486	**1.69**	**1.04**	**2.77**	**0.034**	Good
hospitalized with COVID-19	Kalligeros M (USA; rc)	103	1.13	0.32	3.4	0.825	Good
hospitalized with COVID-19	Palaiodimos L (USA; rc)	200	**3.35**	**1.51**	**7.46**	**0.003**	Good
Mortality							
hospitalized with COVID-19	Bianchetti A (Italy; rc)	627	1.15	0.79	1.67	>0.05	Fair
hospitalized with COVID-19	Borobia A (Spain; rc)	2,226	**1.82**	**1.27**	**2.63**	**0.002**	Fair
hospitalized with COVID-19	Busetto L (Italy; rc)	92	2.51	0.37	16.94	0.346	Fair
hospitalized with COVID-19	Cummings MJ (USA; pc)	257	aHR 1.13	0.71	1.81	NR	Good
hospitalized with COVID-19	Giacomelli A (Italy; pc)	233	aHR 1.42	0.62	3.28	0.409	Good
hospitalized with COVID-19	Palaiodimos L (USA; rc)	200	**2.74**	**1.25**	**5.98**	**0.011**	Good
hospitalized with COVID-19	Petrilli CM (USA; pc)	2,725	0.92	0.77	1.11	0.39	Good
hospitalized with COVID-19	Docherty AB (UK; pc)	20,133	**aHR 1.23**	**1.16**	**1.33**	**<0.001**	Good
hospitalized with COVID-19	Price-Haywood EG (USA; rc)	1,382	aHR 1.14	0.88	1.47	NR	Good
hospitalized with COVID-19 (20-64 years)	Public Health England (UK; rc)	64,961	aHR 1.99	1.85	2.14	<0.001	Fair
hospitalized with COVID-19 (>64 years)	Public Health England (UK; rc)	63,094	aHR 1.47	1.44	1.51	<0.001	Fair

* values are adjusted odds ratio, unless otherwise denoted

** the reference category differs slightly across studies
aHR: adjusted hazards ratio; CI: confidence interval; COVID-19: novel coronavirus disease 2019; ICU: intensive care unit; NR: not reported; pc: prospective cohort; rc: retrospective cohort; UK: United Kingdom; USA: United States of America; vs.: versus

Table 17. Education/literacy level

Risk factor; Outcome among population	Study	Total number of patients	Adjusted odds ratio*	95% CI lower bound	95% CI upper bound	p-value	Quality rating
Lower education vs. university degree							
Hospitalization							
community sample	Lassale C (UK; pc)	340,966	1.15	0.96	1.37	0.131	Fair

* values are adjusted odds ratio, unless otherwise denoted

CI: confidence interval; pc: prospective cohort; UK: United Kingdom

Table 18. Socioeconomic status

Risk factor; Outcome among population	Study	Total number of patients	Adjusted odds ratio*	95% CI lower bound	95% CI upper bound	p-value	Quality rating
Material deprivation (Q2 vs. Q1 least deprived)							
Hospitalization (Townsend Index)**							
community sample	Lassale C (UK; pc)	340,966	1	0.76	1.33	0.989	Fair
Mortality (Index of Multiple Deprivation*)**							
Hospitalized	Public Health England (UK; rc)	130,091	**aHR 1.93**	**1.70**	**2.19**	**<0.001**	Fair
Town Material deprivation (Q3 vs. Q1)							
Hospitalization (Townsend Index)							
community sample	Lassale C (UK; pc)	340,966	0.99	0.75	1.31	0.937	Fair
Mortality (Index of Multiple Deprivation)							
Hospitalized	Public Health England (UK; rc)	130,091	**aHR 1.65**	**1.46**	**1.88**	**<0.001**	Fair
Material deprivation (Q4 vs. Q1)							
Hospitalization (Townsend Index)							
community sample	Lassale C (UK; pc)	340,966	1.24	0.95	1.62	0.116	Fair
Mortality (Index of Multiple Deprivation)							
Hospitalized	Public Health England (UK; rc)	130,091	**aHR 1.38**	**1.21**	**1.57**	**<0.001**	Fair
Material deprivation (Q5 vs. Q1)							
Hospitalization (Townsend Index)							
community sample	Lassale C (UK; pc)	340,966	**1.67**	**1.3**	**2.16**	**<0.001**	Fair
Mortality (Index of Multiple Deprivation)							
Hospitalized	Public Health England (UK; rc)	130,091	**aHR 1.32**	**1.15**	**1.52**	**<0.001**	Fair
Townsend index (continuous)							
Hospitalization							
community sample	Patel AP (UK; pc)	418,794	**1.09**	**1.05**	**1.12**	**<0.001**	Fair
Average income (continuous)							
Hospitalization							
community sample	Patel AP (UK; pc)	418,794	1.01	0.92	1.11	0.76	Fair
Income percentile (26th to 50th vs. 25th and below)							
Hospitalization							
positive for COVID-19	Azar K (USA; rc)	1,052	1.2	0.76	1.9	>0.05	Good
Income percentile (51st to 75th vs. 25th and below)							
Hospitalization							
positive for COVID-19	Azar K (USA; rc)	1,052	**0.24**	**0.12**	**0.46**	**<0.001**	Good
Income percentile (>=75th vs. 25th and below)							
Hospitalization							
positive for COVID-19	Azar K (USA; rc)	1,052	**0.55**	**0.33**	**0.91**	**<0.05**	Good

* values are adjusted odds ratio, unless otherwise denoted

** Townsend index incorporates unemployment, car & home (non-)ownership & household crowding
*** Index of Multiple Deprivation is used within the UK and incorporates income, employment, education, health, crime, barriers to housing and services, and living environment
aHR: adjusted hazards ratio; CI: confidence interval; COVID-19: novel coronavirus disease 2019; pc: prospective cohort; Q1-5: quartile (first to fifth); rc: retrospective cohort; UK: United Kingdom; USA: United States of America; vs.: versus

Table 19. Age

Risk factor; Outcome among population	Study	Total number of patients	Adjusted odds ratio*	95% CI lower bound	95% CI upper bound	p-value	Quality rating
Age (continuous or incremental)							
Hospitalization							
community sample	Lassale C (UK; pc)	340,966	**1.02**	**1.01**	**1.03**	**0.003**	Fair
community sample	Patel AP (UK; pc)	418,794	**1.02**	**1**	**1.03**	**0.02**	Fair
positive for COVID-19	Price-Haywood EG (USA; rc)	3,481	**1.29**	**1.25**	**1.33**	**NR**	Good
ICU admission							
hospitalized with COVID-19	Busetto L (Italy; rc)	92	0.97	0.93	1.01	0.18	Fair
hospitalized with COVID-19	Hajifathalian K (USA; rc)	770	aRR 1.01	1.01	1.02	0.123	Fair
hospitalized with COVID-19	Kalligeros M (USA; rc)	103	1.03	1	1.07	0.059	Good
Mechanical ventilation							
hospitalized with COVID-19	Busetto L (Italy; rc)	92	0.97	0.93	1	0.091	Fair
hospitalized with COVID-19	Hajifathalian K (USA; rc)	770	aRR 1.01	0.99	1.01	0.43	Fair
hospitalized with COVID -19	Kalligeros M (USA; rc)	103	1.02	0.98	1.06	0.271	Good
hospitalized with COVID-19 (quartiles of age)	Palaiodimos L (USA; rc)	200	**1.5**	**1.05**	**2.12**	**0.025**	Good
Severe disease							
positive for COVID-19	Hajifathalian K (USA; rc)	1,059	**1.03**	**NR**	**NR**	**<0.001**	Fair
death or transfer to the ICU (composite) among hospitalized with COVID-19	Piano S (Italy)	565	**1.03**	**1.01**	**1.05**	**0.012**	Good
Mortality							
hospitalized with COVID-19	Busetto L (Italy; rc)	92	**1.21**	**1.05**	**1.39**	**0.007**	Fair
hospitalized with COVID-19	Perez-Guzman PN (UK; rc)	520	**2.16**	**1.5**	**3.12**	**<0.01**	Good
hospitalized with COVID-19	Violi F (Italy; rc)	319	**aHR 1.03**	**1.01**	**1.06**	**0.001**	Good
hospitalized with COVID-19	Hajifathalian K (USA; rc)	770	**aRR 1.06**	**1.04**	**1.08**	**<0.001**	Fair
hospitalized with COVID-19	Borobia A (Spain; rc)	2,226	**1.11**	**1.09**	**1.12**	**<0.001**	Fair
hospitalized with COVID-19	Bianchetti A (Italy; rc)	627	**1.09**	**1.07**	**1.12**	**<0.001**	Fair
hospitalized with COVID-19	Okoh A (USA; rc)	251	**1.04**	**1.01**	**1.06**	**0.003**	Good
hospitalized with COVID-19	Palaiodimos L (USA; rc)	200	**1.73**	**1.13**	**5.98**	**0.011**	Good
hospitalized with COVID-19 (5-year increase)	Price-Haywood EG (USA; rc)	1,382	**aHR 1.18**	**1.13**	**1.24**	**NR**	Good
hospitalized with COVID-19 (10-year increase)	Cummings MJ (USA; pc)	257	**aHR 1.31**	**1.09**	**1.57**	**NR**	Good
hospitalized with COVID-19 (10-year increase)	Giacomelli A (Italy; pc)	233	**aHR 2.08**	**1.48**	**2.9**	**<0.0001**	Good
45-54 vs. ≤45 years old**							
Hospitalization							
positive for COVID-19	Azar K (USA; rc)	1,052	**2.24**	**1.13**	**4.43**	**<0.05**	Good
positive for COVID-19	Petrilli CM (USA; pc)	5,279	**2.14**	**1.76**	**2.59**	**<0.001**	Good
Severe Disease							

Risk factor; Outcome among population	Study	Total number of patients	Adjusted odds ratio*	95% CI lower bound	95% CI upper bound	p-value	Quality rating
hospitalized with COVID-19	Petrilli CM (USA; pc)	2,725	0.78	0.54	1.1	0.21	Good
Mortality							
hospitalized with COVID-19	Petrilli CM (USA; pc)	2,725	**1.95**	**1.16**	**3.31**	**0.01**	Good
hospitalized with COVID-19	Public Health England (UK; rc)	64,961	**aHR 3.33**	**2.79**	**3.99**	**<0.001**	Fair
50-64 vs. ≤45 years old**							
Hospitalization							
positive for COVID-19	Azar K (USA; rc)	1,052	**2.62**	**1.37**	**4.99**	**<0.01**	Good
positive for COVID-19	Petrilli CM (USA; pc)	5,279	**3.67**	**3.01**	**4.48**	**<0.001**	Good
Severe disease							
hospitalized with COVID-19	Petrilli CM (USA; pc)	2,725	1.32	0.93	1.9	0.12	Good
Mortality							
hospitalized with COVID-19	Docherty AB (UK; pc)	20,133	**aHR 2.63**	**2.06**	**3.35**	**<0.001**	Good
hospitalized with COVID-19	Petrilli CM (USA; pc)	2,725	**3.18**	**1.93**	**5.21**	**<0.001**	Good
hospitalized with COVID-19	Public Health England (UK; rc)	64,961	**aHR 8.94**	**7.61**	**10.5**	**<0.001**	Fair
>60 vs. ≤45 years old							
Hospitalization							
positive for COVID-19	Azar K (USA; rc)	1,052	**4.62**	**2.39**	**9.95**	**<0.001**	Good
positive for COVID-19	Petrilli CM (USA; pc)	5,279	**8.7**	**6.77**	**11.22**	**<0.001**	Good
Severe disease							
hospitalized with COVID-19	Petrilli CM (USA; pc)	2,725	**1.73**	**1.19**	**2.5**	**0.004**	Good
Mechanical ventilation							
hospitalized with COVID-19	Hur K (USA; rc)	486	**3.9**	**2.3**	**6.76**	**<0.001**	Good
Mortality							
hospitalized with COVID-19	Imam (USA; rc)	1,305	**1.93**	**1.26**	**2.94**	**0.002**	Fair
hospitalized with COVID-19	Docherty AB (UK; pc)	20,133	**aHR 4.99**	**3.99**	**6.25**	**<0.001**	Good
hospitalized with COVID-19	Petrilli CM (USA; pc)	2,725	**4.83**	**2.93**	**7.96**	**<0.001**	Good
hospitalized with COVID-19	Public Health England (UK; rc)	64,961	**aHR**	**19.01**	**16.18**	**22.35**	<0.001
>70 vs. ≤45 years old							
Hospitalization							
positive for COVID-19	Azar K (USA; rc)	1,052	**5.68**	**2.6**	**12.38**	**<0.001**	Good
positive for COVID-19	Petrilli CM (USA; pc)	5,279	**37.87**	**26.1**	**56.03**	**<0.001**	Good
Severe disease							
hospitalized with COVID-19	Petrilli CM (USA; pc)	2,725	**2.32**	**1.57**	**3.4**	**<0.001**	Good
Mortality							
hospitalized with COVID-19	Petrilli CM (USA; pc)	2,725	**7.69**	**4.6**	**12.84**	**<0.001**	Good
hospitalized with COVID-19	Docherty AB (UK; pc)	20,133	**aHR 8.51**	**6.85**	**10.57**	**<0.001**	Good
>80 vs. ≤45 years old							

Risk factor; Outcome among population	Study	Total number of patients	Adjusted odds ratio*	95% CI lower bound	95% CI upper bound	p-value	Quality rating
Hospitalization							
positive for COVID-19	Azar K (USA; rc)	1,052	**19.08**	**7.86**	**46.32**	**<0.001**	Good
Mortality							
hospitalized with COVID-19	Docherty AB (UK; pc)	20,133	**aHR 11.09**	**8.93**	**13.77**	**<0.001**	Good
70-79 vs. 65-69 years old							
Mortality							
hospitalized with COVID-19	Public Health England (UK; rc)	63,094	**aHR 1.55**	**1.47**	**1.64**	**<0.001**	Fair
80-89 vs. 65-69 years old							
Mortality							
hospitalized with COVID-19	Public Health England (UK; rc)	63,094	**aHR 2.15**	**2.05**	**2.26**	**<0.001**	Fair

* values are adjusted odds ratio, unless otherwise denoted

** the reference category differs slightly across studies

aHR: adjusted hazards ratio; CI: confidence interval; COVID-19: novel coronavirus disease 2019; ICU: intensive care unit; NR: not reported; pc: prospective cohort; rc: retrospective cohort; UK: United Kingdom; USA: United States of America; vs.: versus

Table 20. Other factors

Risk factor; Outcome among population	Study	Total number of patients	Adjusted odds ratio*	95% CI lower bound	95% CI upper bound	p-value	Quality rating
Smoking (current vs. never)							
Hospitalization							
positive for COVID-19	Azar K (USA; rc)	1,052	0.92	0.31	2.70	>0.05	Good
community sample	Hamer (UK; pc)	387,109	**aRR 1.36**	**1.08**	**1.71**	**NR**	Fair
community sample	Lassale C (UK; pc)	340,966	1.25	0.96	1.62	0.095	Fair
community sample	Patel AP (UK; pc)	418,794	0.91	0.66	1.25	0.55	Fair
positive for COVID-19	Petrilli CM (USA; pc)	5,279	**0.59**	**0.43**	**0.81**	**0.001**	Good
Severe disease							
hospitalized with COVID-19	Petrilli CM (USA; pc)	2,725	0.82	0.53	1.3	0.39	Good
Mortality							
hospitalized with COVID-19	Petrilli CM (USA; pc)	2,725	0.92	0.62	1.38	0.69	Good
Smoking (former vs. never)							
Hospitalization							
community sample	Hamer (UK; pc)	387,109	**aRR 1.36**	**1.15**	**1.59**	**NR**	Fair
community sample	Lassale C (UK; pc)	340,966	**1.3**	**1.1**	**1.55**	**0.003**	Fair
positive for COVID-19	Petrilli CM (USA; pc)	5,279	**0.69**	**0.56**	**0.85**	**<0.001**	Good
Severe disease							
hospitalized with COVID-19	Petrilli CM (USA; pc)	2,725	1.05	0.82	1.3	0.72	Good
Mechanical ventilation							
hospitalized with COVID-19	Petrilli CM (USA; pc)	2,725	1.05	0.82	1.3	0.72	Good
Mortality							
hospitalized with COVID-19	Petrilli CM (USA; pc)	2,725	1.07	0.88	1.31	0.49	Good
hospitalized with COVID-19	Palaiodimos L (USA; rc)	200	0.83	0.37	1.87	0.647	Good
Smoking (former vs. current)							
Hospitalization							
positive for COVID-19	Azar K (USA; rc)	1,052	0.77	0.25	2.35	>0.05	Good
Alcohol consumption (continuous)							
Hospitalization							
community sample	Patel AP (UK; pc)	418,794	1.04	0.98	1.11	0.21	Fair
Alcohol consumption (never/rarely vs. within guideline)							
Hospitalization							
community sample	Hamer (UK; pc)	387,109	**aRR 1.57**	**1.31**	**1.88**	**NR**	Fair
community sample	Lassale C (UK; pc)	340,966	**1.3**	**1.07**	**1.59**	**0.01**	Fair
Alcohol consumption (above vs. within guideline)							
Hospitalization							
community sample	Hamer (UK; pc)	387,109	**aRR 1.24**	**1.03**	**1.5**	**NR**	Fair
community sample	Lassale C (UK; pc)	340,966	1.1	0.9	1.34	0.368	Fair
Rarely/never active vs. below guideline							

Hospitalization							
community sample	Hamer (UK; pc)	387,109	aRR 0.99	0.84	1.18	NR	Fair
Rarely/never active vs. meeting guideline							
Hospitalization							
community sample	Lassale C (UK; pc)	340,966	**1.22**	**1**	**1.48**	**0.049**	Fair
Some activity (>10 minutes but below guideline) vs. meeting guideline							
Hospitalization							
community sample	Lassale C (UK; pc)	340,966	0.93	0.77	1.13	0.466	Fair
Exceeding vs. meeting guideline							
Hospitalization							
community sample	Hamer (UK; pc)	387,109	**aRR 1.24**	**1.03**	**1.5**	**NR**	Fair

* values are adjusted odds ratio, unless otherwise denoted

** the reference category differs slightly across studies

aHR: adjusted hazards ratio; aRR: adjusted risk ratio; CI: confidence interval; COVID-19: novel coronavirus disease 2019; ICU: intensive care unit; NR: not reported; pc: prospective cohort; rc: retrospective cohort; UK: United Kingdom; USA: United States of America; vs.: versus