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## APPENDIXES

### Appendix 1: Search strategies for identifying studies

#### Database: Ovid MEDLINE(R) ALL <1946 to July 30, 2020>

1	exp Coronavirus/ (22658)
2	exp Coronavirus Infections/ (22921)
3	(Coronavir* or nCov or covid or covid-19 or Middle East Respiratory Syndrome or MERS or Severe Acute Respiratory Syndrome or SARS).ti,ab,kf. (55932)
4	1 or 2 or 3 (60790)
5	(case control study or case control studies or clinical study or cohort analysis or cohort studies or correlational study or cross sectional studies or cross sectional study or epidemiologic studies or family study or follow up or followup studies or follow up studies or hospital based case control study or longitudinal studies or longitudinal study or observational study or population based case control study or prospective studies or prospective study or retrospective studies or retrospective study).sh. (2511702)
6	((case or crosssectional or cross sectional or epidemiologic\$ or observational) adj (study or studies)) or (case adj (control\$ or report\$)) or cohort\$1 or cross sectional or followup\$ or follow up\$ or followed or longitudinal\$ or prospective\$ or retrospective\$.tw. (4120613)
7	5 or 6 (4920523)
8	4 and 7 (7716)
9	8 (7716)
10	limit 9 to humans (3617)
11	limit 10 to yr="2020 -Current" (1815)
12	11 (1815)
13	limit 12 to english language (1660)

#### Database: Embase <1974 to 2020 July 30>

1	exp coronavirus/ (16784)
2	exp coronavirus infections/ (17165)
3	(Coronavir* or nCov or covid or Middle East Respiratory Syndrome or MERS or Severe Acute Respiratory Syndrome or SARS).ti,ab,tw. (58730)
4	1 or 2 or 3 (65543)
5	(case control study or case control studies or clinical study or cohort analysis or cohort studies or correlational study or cross sectional studies or cross sectional study or epidemiologic studies or family study or follow up or followup studies or follow up studies or hospital based case control study or longitudinal studies or longitudinal study or observational study or population based case control study or prospective studies or prospective study or retrospective studies or retrospective study).sh. (3757320)
6	((case or crosssectional or cross sectional or epidemiologic\$ or observational) adj (study or studies)) or (case adj (control\$ or report\$)) or cohort\$1 or cross sectional or followup\$ or follow up\$ or followed or longitudinal\$ or prospective\$ or retrospective\$.tw. (6016403)
7	5 and 6 (2977800)
8	4 and 7 (4206)
9	limit 8 to human (4027)
10	limit 9 to yr="2020 -Current" (2879)
11	limit 10 to english language (2776)

## Appendix 2: Characteristics of the included studies

Study ID	Area, Country	Setting at Enrollment	Study Design	Recruitment Dates	Covid Diagnosis	Follow-up Duration
Ponziani et al, 2020 (13)	Italy, Rome	Hospital	Retrospective cohort	06/03 – 16/04/20	Nasopharyngeal Swab/RT-PCR	Hospitalisation
Chew et al, 2021 (100)	Sweden, Multicenter	ICU	Registry based cohort	06/03 – 06/05/20	PCR	30-day
Fresan et al, 2021 (14)	Spain, Navarra	Hospital	Cohort study	03 – 05/20	PCR/Antibody Test	30-day
Dirim et al, 2021 (15)	Instabul, Turkey	Hospital	Propensity-matched cohort	01/02 & 14/05/20	PCR	Hospitalisation
Parikh et al, 2020 (95)	US, Boston	ICU	Cohort study	01/03 – 01/05/20	PCR	Hospitalisation
Pablos et al, 2020 (16)	Spain, Multicenter	Hospital	Matched cohort study	Up to 17/04/20	PCR	Hospitalisation
Diez et al, 2021 (17)	Spain, Multicenter	Hospital	Retrospective cohort	Up to 30/06/20	PCR	Hospitalisation
Pineiro et al, 2021 (96)	Spain, Barcelona	ICU	Cohort	25/03 – 21/04/20	PCR	35.5 days
Blomaard et al, 2021 (18)	Netherlands, Multicenter	Hospital	Cohort	Between 02/20 & 05/20	Clinical criteria or PCR	Hospitalisation
Biscarini et al, 2020 (19)	Italy, Milan	Hospital	Retrospective cohort	21/02 & 31/03/20	PCR	30-day
Fond et al, 2021 (20)	France, nationwide	Hospital	population-based cohort study	01/02 & 09/06/20	ICD Classification	Hospitalisation
Galiero et al, 2020 (21)	Italy, Campania Region	Hospital	Cohort	03 – 06/20	PCR	Hospitalisation
Villalba et al, 2021 (22)	Spain, Multicenter	Hospital	Retrospective cohort	15/03 – 14/04	PCR	Hospitalisation
Thomson et al, 2020 (98)	UK, London	ICU	Cohort	03/20 – 05/20	PCR	At least 28-days
Ciardullo et al, 2021 (23)	Italy, Lombardy	Hospital	Cohort	22/02 & 15/05/20	PCR	Hospitalisation
Bernard et al, 2021 (24)	France, Nationwide	Hospital	Cohort	01/03 – 30/04/20	ICD Classification	Hospitalisation
Fadini et al, 2020 (25)	Italy, Padova	Hospital	Cohort	21/02 & 20/04/20	PCR	Hospitalisation
McGurnaghan et al, 2021 (26)	Scotland, Nationwide	Hospital	Cohort	01/03 -31/07/20	PCR and/or ICD Classification	Hospitalisation
Mallet et al, 2021 (27)	France, Nationwide	Hospital	Registry based cohort	01/01 – 31/12/20	ICD Classification	30 days
San Roman et al, 2020 (28)	Spain, Valladolid	Hospital	Cohort	Between 15/03 & 11/04/20	Rt-PCR	Hospitalisation
Oetjens et al, 2020 (82)	USA, Pennsylvania	Community	Registry based cohort	Between 07/03 & 19/05/20	PCR	
Guerra Veloz et al, 2021 (29)	Spain, Sevilla	Hospital	Cohort	23/03 – 30/04/20	RT-PCR	Hospitalisation
Angeli et al, 2021 (30)	Italy, Lombardy	Hospital	Cohort	23/02 – 22/05/20	PCR	Hospitalisation
Chavarot et al, 2021 (31)	France, 3 centers	Hospital	Case control	09/03/20 & 02/05/20	PCR	30-day
Valdivielso-More et al, 2021 (32)	Spain, Barcelona	Hospital	Case control	02 – 04/20	PCR	30-day
Miarons et al, 2021 (33)	Spain, Barcelona	Hospital	Case control	11/03 - 25/04/20	PCR	28-day
Geretti et al, 2021 (34)	UK, 207	Hospital	Cohort	04/06 – 18/06/20	PCR	28-day
Sarmiento-Monroy et al, 2021 (35)	Spain, Barcelona- Hospital clinic	Hospital	Cohort study	1/03 – 29/05/20	PCR or Probable COVID	Hospitalisation
Xu et al, 2021 (36)	Sweden, Stocholm	Hospital	Cohort study	01/03 – 15/06/20	PCR or Symptoms/CT	Hospitalisation
Neumann-Podczaska et al, 2020 (37)	Poland, Poznan	Hospital	Cohort study	12/03 – 05/04/20	PCR	60-day

Maddaloni et al, 2020 (38)	Italy, Rome	Hospital	Retrospective cohort	15/05/20	PCR	Hospitalisation
Bellan et al, 2020 (39)	Italy, Eastern Piedmont (4 centers)	Hospital	Cohort	01/03 -28/04/20	PCR	Hospitalisation
Kaeuffer et al, 2020 (40)	France, Stasbourg	Hospital	Prospective cohort	03/20	PCR	7 days
Sutter et al, 2021 (41)	France, 24 centers	Hospital	Retrospective cohort	26/02 – 20/04/20	PCR	Hospitalisation
Kjeldsen et al, 2021 (42)	Denmark, National registry	Hospital	Retrospective cohort	01/03 – 30/10/20	ICD Classification	30-day
Czernichow et al, 2020 (43)	France, Paris	Hospital	Cohort	01/02 – 30/04/20	PCR	30-day
Attaoui et al, 2021 (83)	Denmark, National Registry	Community	Population based cohort	28/01 -15/09/20	PCR	Median 5.1 months
Joharatnam-Hogan et al, 2020 (44)	UK, London	Hospital	Case control from 2 cohorts	01/03 – 30/04/20	PCR	Hospitalisation
De Giorgi et al, 2020 (45)	Italy, Ferrara	Hospital	Retrospective cohort	15/03 – 15/04/20	PCR	
Strausz et al, 2021 (84)	Finland, Nationwide	Community	Retrospective cohort	Until 30/10/20	ICD Classification	
Siepmann et al, 2021 (46)	Germany, Multicenter	Hospital	Retrospective cohort	01/03 – 15/04/20	PCR	
Vena et al, 2020 (47)	Italy, Genoa	Hospital	Retrospective cohort	25/02 – 25/03/20	PCR	25 days
De Rosa et al, 2021 (48)	Italy, Piedmont	Hospital	Retrospecti registry based cohort	27/02 – 25/06/20	PCR	7 days
Telle et al, 2021 (85)	Norway, Nationwide	Community/Hospital	Registry base cohort	01/01 – 20/06/20	PCR	Hospitalisation
Khawaja et al, 2021 (49)	UK, London, Multicenter	Hospital	Retrospective cohort	03/20 – 07/04/20	PCR	Hospitalisation
Gálvez-Barrón et al, 2021 (50)	Spain, Barcelona, Multicenter	Hospital	Prospective cohort	12/03 – 02/05/20	PCR	Hospitalisation
Anastasiou et al, 2020 (51)	Germany, Essen	Hospital	Prospective cohort	03/03 – 14/05/20	PCR	Hospitalisation
Forlano et al, 2020 (52)	UK, London	Hospital	Retrospective cohort	25/02 – 05/04/20	PCR	60 days
Al-Salameh et al, 2021 (53)	France, Amiens	Hospital	Prospective cohort	Until 21/04/20	PCR	Hospitalisation or until 1st May
Varela Rodriguez et al, 2021 (54)	Spain, Madrid	Hospital	Retrospective cohort	25/02 & 04/09/20	PCR	February 25th and September 4th, 2020
Orsucci et al, 2021 (55)	Italy, Tuscany	Hospital	Retrospective cohort	03 – 05/20	PCR or Clinicoradiological	
Vanni et al, 2021 (56)	Italy, Rome	Hospital	Retrospective cohort	01/03 – 30/04/20	PCR or High Likely	
Rodriguez-Gonzalez et al, 2021 (57)	Spain, Madrid	Community/Hospital	Prospective cohort	1–24/03/20	PCR	Until 10 May
Siso-Almirall et al, 2020 (92)	Spain, Barcelona, Multicenter	Community/Hospital	Retrospective observational study	29/02 – 04/04/20	PCR	
Linares et al, 2021 (58)	Spain, Barcelona	Spain, Barcelona	Prospective cohort	06/03 – 24/05/20	PCR	68 days
Rey et al, 2020 (59)	Spain, Madrid	Spain, Madrid	Prospective cohort	01/03 -20/04/20	PCR	59 days
Vanhems et al, 2021 (60)	France, Lyon	Hospital	Prospective cohort	08/02 – 24/04/20	PCR	
De Vito et al, 2020 (61)	Italy, Sardinia	Hospital	Retrospective cohort	08/03 – 08/04/20	PCR	30 days
Cipriani et al, 2021 (62)	Italy, Padova	Hospital	Prospective cohort	26/02 – 21/03/20	PCR	
Al-Salameh et al, 2021 (63)	France, Amiens	Hospital	Retrospective cohort	Until 21/04/20	PCR	until May 1, 2020.
Gómez-Belda et al, 2021 (64)	Spain, Valencia	Hospital	Retrospective cohort	11/03 – 28/04/20	PCR or Serology	Hospitalisation
Smati et al, 2021 (65)	France, Multicenter Mationwide	Hospital	Retrospective cohort	10/03 – 10/04/20	PCR or Clinicoradiological	7 days
Fresan et al, 2021 (101)	Spain, Navarra	Community	Cohort study	03/20 – 31/04/20	PCR or Serology	Hospitalisation
Livingston et al, 2020 (66)	UK, London Multicenter	Hospital	Retrospective observational study	01/03 & 30/04/20	PCR or High Likely	Hospitalisation
Otero et al, 2021 (67)	Spain, Valladolid	Hospital	Prospective cohort	01/04 – 31/04/20	PCR	28 days
Marengoni et al, 2020 (68)	Italy, Brescia	Hospital	Retrospective cohort	08/03 – 17/04/20	PCR	Hospitalisation
Welch et al, 2021 (69)	International, Multicenter	Hospital	Prospective cohort		PCR or Clinicoradiological	Hospitalisation
Yordanov et al, 2021 (86)	France, Paris	Community	Prospective cohort	09/03 - 11/08/20	PCR or High Likely	30 days

García-Guimaraes et al, 2021 (70)	Spain, Barcelona	Hospital	Prospective cohort	27/02 – 07/04/20	PCR	28 days
Trapani et al, 2021 (93)	Italy, National	Community/Hospital	Registry based cohort	21/02 – 22/06/20	PCR	90 days
Novelli et al, 2021 (71)	Italy, Bergamo	Hospital	Retrospective cohort	23/02 & 14/03/20	PCR	28 days
Waldman et al, 2021 (94)	International, Multicenter	Community/Hospital	Registry based cohort	20/04-20/08/20	PCR or Clinicoradiological	17 days
Bloom et al, 2021 (72)	UK, Nationwide	Hospital	Registry based cohort	17/01 & 03/08/20	PCR or High Likely	Hospitalisation
Bonifazi et al, 2021 (73)	International, Multicenter	Hospital	Retrospective cohort	28/02 & 15/05/20	PCR or Clinicoradiological	Hospitalisation
Grandbastien et al, 2020 (74)	France, Stasbourg	Hospital	Retrospective cohort	04/03/20 & 06/04/20	PCR or Clinicoradiological	Hospitalisation
Kolhe et al, 2020 (75)	UK, Multicenter	Hospital	Retrospective cohort	5/03/20 & 12/05/20	PCR	up to 67 days
Maquet et al, 2020 (76)	France, Toulouse	Hospital	Prospective + retrospective cohort	11/03 – 20/04/20	PCR	14 days
Hamer et al, 2020 (120)	UK, Nationwide	Community	Registry based cohort	16/03/20 up to 26/04/20	PCR	
Spironi et al, 2021 (121)	Italy, Novara	Hospital		02/20 -05/20	PCR	30 days
Hugo et al, 2021 (122)	Germany, Multicenter	Hospital		Until 31/5/20	PCR	Hospitalisation
Göttinger et al, 2020 (88)	Europe(Austria, Belgium, Bulgaria, Croatia, Denmark, Estonia, Germany, Greece, Hungary, Ireland, Italy, Lithuania, Norway, Portugal, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the UK	82 Participating health-care institutions (The Pediatric Tuberculosis Network European Trials Group)	Cohort	1/4 - 24/4/20	PCR	Unclear
De Smet et al, 2021 (81)	Bonheiden, Belgium	Imelda Hospital, Bonheiden, Belgium	Retrospective cohort	12/3 - 30/4/21	PCR	Not reported
Rottoli et al, 2020 (79)	Bologna, Italy		Retrospective cohort	1/3 - 20/4/20	PCR	At least 7 days
Poblador-Plou et al, 2020 (89)	Aragon, Spain		Retrospective cohort	4/3 - 17/4/20	PCR	≥ 30 days
Simonnet et al, 2020 (99)	Lille, France		Cohort	27/2 - 5/4/20	PCR	>= 1 day
Deiana et al, 2020 (90)	Sardinia, Italy		Retrospective cohort	Up to 21/4/20	Unclear	Not reported
Bravi et al, 2020 (91)	Italy		Retrospective cohort	2/4 - 24/4/20	PCR	median: 24 days
García-Azorín et al, 2020 (80)	Valladolid, Spain	Clinic University Hospital, Valladolid, Spain	Retrospective cohort	8/3 – 11/4/20	PCR	>= 10 days
Lobo Valbuena et al, 2021 (97)	Spain, Madrid	ICU	Retrospective cohort	05/03 & 07/05/20	PCR	Hospitalization

### Appendix 3. Risk of Bias and Quality appraisal

The JBI critical appraisal tool for cohort studies consists of eleven questions evaluating the appropriateness of the sample used in each study, the recruitment methods, the measurements of exposures and outcomes, the identification and managing strategies for confounding factors, the follow up process and the statistical analysis. For the purposes of this study, we accepted as accurate exposures (e.g., age, sex, comorbidities) and outcome measures documented by the treated clinician or captured from health databases. We considered age, gender and recruitment setting (a surrogate measure of baseline COVID-19 severity) the most important confounding factors. All the included studies clearly grouped patients based on the recruitment setting. Therefore, we scored high risk of bias for studies that were not at least age and gender adjusted (Q5). Moreover, since the aim of our study is to assess the risk factors for adverse COVID-19 outcomes among people who may contract the disease in the future, we considered that adjustment for presenting clinical characteristics associated with COVID-19 (e.g., symptoms, oxygen saturation etc) would be a source confounding in our study. Therefore, in such cases, we scored high risk of bias in the last domain of the instrument (Q11).

Studies that provided appropriately adjusted analyses for some but not all variables were judged to be at low risk of bias for confounding. However, we noted which variables were adjusted and conducted a sensitivity analysis only including adjusted variables, the results of which are presented in the main text of the manuscript. Finally, we considered 2 weeks to be adequate follow-up to capture the outcomes of interest, as the median length of hospital stay varied between 5-13 days within the included studies, and the median length of ICU admission between 7-9 days. Therefore, 2 weeks of follow-up would suffice to capture the outcomes of significantly more than half of the participants. Studies only including patients that were discharged or deceased were also judged to be at low risk of bias.

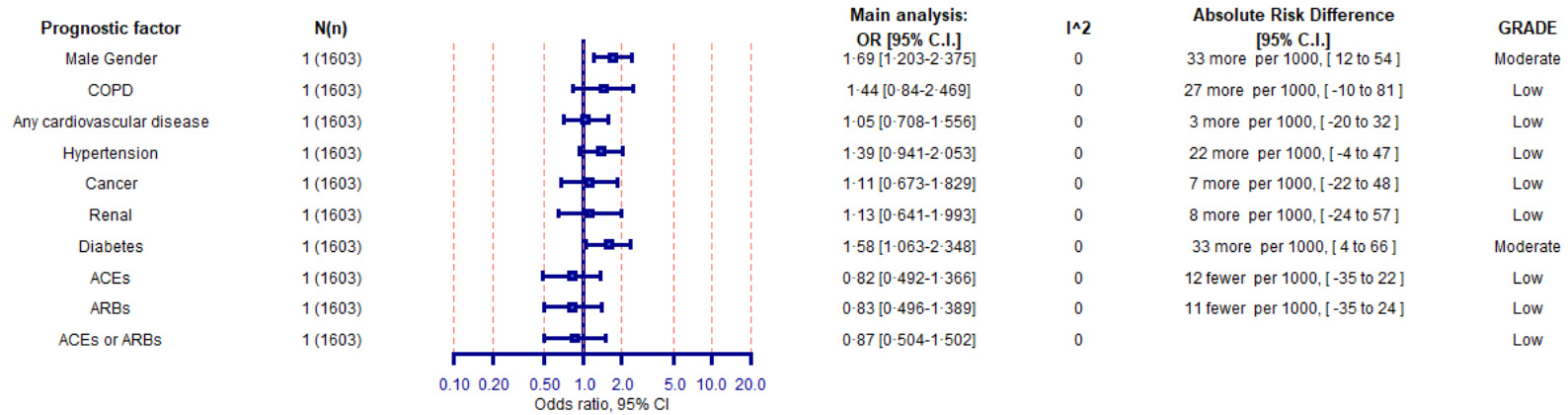
#### JBI critical appraisal tool for cohort studies

Q1	Were the two groups similar and recruited from the same population?
Q2	Were the exposures measured similarly to assign people to both exposed and unexposed groups?
Q3	Was the exposure measured in a valid and reliable way?
Q4	Were confounding factors identified?
Q5	Were strategies to deal with confounding factors stated?
Q6	Were the groups/participants free of the outcome at the start of the study (or at the moment of exposure)?
Q7	Were the outcomes measured in a valid and reliable way?
Q8	Was the follow up time reported and sufficient to be long enough for outcomes to occur?
Q9	Was follow up complete, and if not, were the reasons to loss to follow up described and explored?
Q10	Were strategies to address incomplete follow up utilized?
Q11	Was appropriate statistical analysis used?

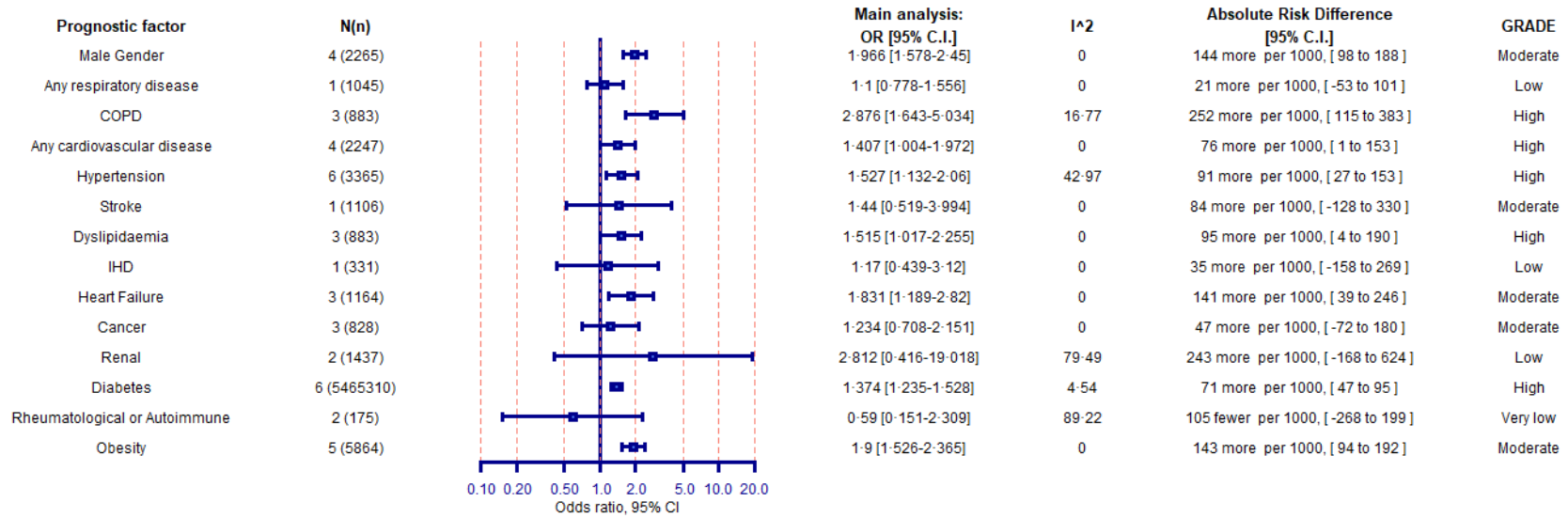
Appendix 4.

Figure 4a-b. Forest plot showing the summary of available evidence regarding the association between prognostic factors and the composite outcome death or ICU admission due to COVID-19 within the community (a), and hospital setting (b).

4.a Prognostic factors related to the composite outcome of Death or ICU admission within the community setting



#### 4.b Prognostic factors related to the composite outcome of death or ICU admission within the hospital setting

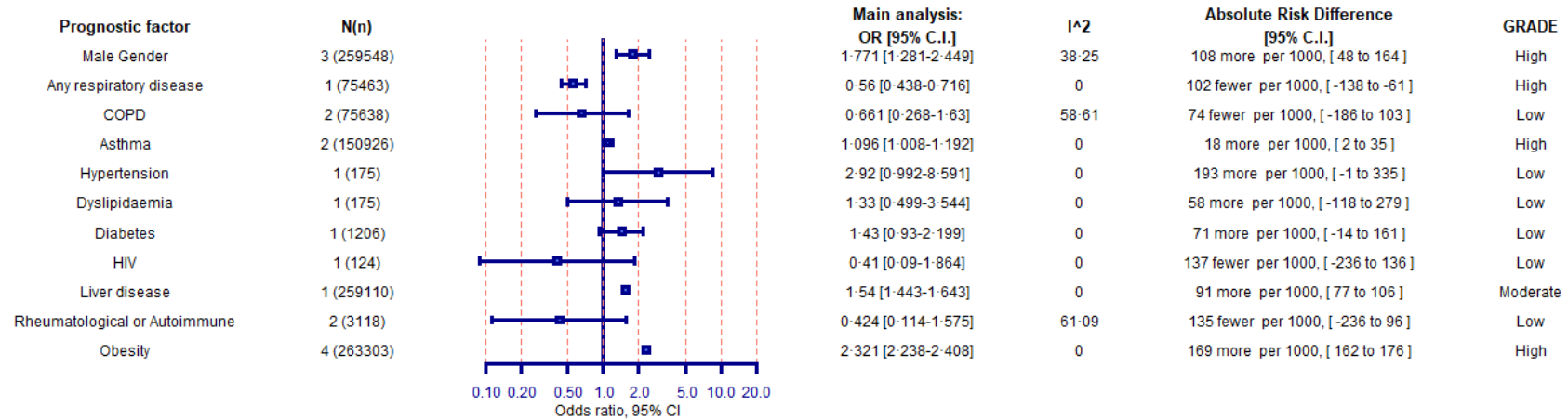




## Appendix 5.

**Figure 5a-b.** Forest plot showing the summary of available evidence regarding the association between prognostic factors for mechanical ventilation due to COVID-19 among those from within the hospital (6a) and ICU (6b) setting.

### 5a. Prognostic factors and mechanical ventilation within the hospital setting



### 5b. Prognostic factors and mechanical ventilation within the ICU setting

