

## Supplementary Online Content

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**Supplementary table 1. Search strategy**

	<b>Searches</b>	<b>Results (June 11,2020)</b>
Pubmed	[(COVID-19) OR (coronavirus) OR (SARS-CoV-2)] AND [(observational) OR (characteristic) OR (comorbidity) OR (factors) OR (hypertension) OR (mortality) OR (HTN) OR (diabetes) OR (DM) OR (cardiovascular disease) OR (CVD)]	4,856
Embase	('covid 19'/exp OR 'covid 19' OR 'coronavirus'/exp OR coronavirus OR 'sars cov 2') AND (observational OR characteristic OR 'comorbidity'/exp OR comorbidity OR factors OR 'hypertension'/exp OR hypertension OR 'mortality'/exp OR mortality OR htn OR 'diabetes'/exp OR diabetes OR dm OR 'cardiovascular disease'/exp OR 'cardiovascular disease' OR (('cardiovascular'/exp OR cardiovascular) AND ('disease'/exp OR disease)) OR cvd)	5,022

**Supplementary table 2. Baseline patient characteristics**

Author	Dates, dd.mm.yy	Study design	Setting	Country	Patients group	Number	Age	Male	HTN	DM	CVD	Outcome	NOS (0~8)
Argenziano et al. <sup>1</sup>	01.03.20-05.04.20	Retrospective single-center observational	New York-Presbyterian / Columbia University Irving Medical Center, New York	USA	In-hospital based (Case series)	850	63 (50-75)	511	525	333	115	Severe COVID-19: need ICU care	7
Ashraf et al. <sup>2</sup>	22.02.20-03.05.20	Retrospective single-center observational	Tehran University of Medical Sciences, Tehran	Iran	In-hospital based (Case series)	100	58 (48-68)	64	26	26	19	Severe COVID-19: need ICU care	4
Bhargava A et al. <sup>3</sup>	08.03.20-08.04.20	Retrospective single-center observational	Ascension St John Hospital, Michigan	USA	In-hospital based (Case series)	197	60.6 ± 16.2	103	138	73	29	Severe COVID-19: respiratory distress	5
Bode B et al. <sup>4</sup>	01.03.20-04.06.20	Retrospective single-center observational	88 U.S. hospitals	USA	In-hospital based (Case series)	1122	62.6	624		451		Death	5
Chen M et al. <sup>5</sup>	01.01.20-15.02.20	Retrospective single-center observational	No. 7 Hospital, Hubei	China	In-hospital based (Case series)	123	57.8	61	41	14	15	Death	6
Chen Q et al. <sup>6</sup>	01.01.20-11.03.20	Retrospective single-center observational	Taizhou Public Health Medical Center, Zhejiang	China	In-hospital based (Case series)	145	47.5 ± 14.6	79	22	14	1	Severe COVID-19: respiratory distress	7
Chen T et al. <sup>7</sup>	13.01.20-12.02.20	Retrospective single-center observational	Tongji Hospital, Hubei	China	In-hospital based (Case series)	274	62 (44.0-70.0)	171	93	47	23	Death	6
Chen X et al. <sup>8</sup>	23.01.20-14.02.20	Retrospective multi-center observational	First Hospital of Changsha and Loudi Central Hospital, Hunan	China	In-hospital based (Case series)	291	46 (34-59)	145	39	22	12	Severe COVID-19: respiratory distress or need ICU care	7
Covino M et al. <sup>9</sup>	01.03.20-31.03.20	Retrospective single-center observational	Agostino Gemelli University Policlinic, Rome	Italy	In-hospital based (Case series)	69	84 (82-89)	37	41	9	21	Death	5
Docherty AB et al. <sup>10</sup>	06.02.20-19.04.20	Prospective multi-center observational	208 acute care hospitals in England, Scotland, and Wales	UK	In-hospital based (Cohort study)	20133	72.9 (58-82)	12068		4949	5469	Death	7
Du R et al. <sup>11</sup>	25.12.19-07.02.20	Prospective single-center observational	Wuhan Pulmonary Hospital, Hubei	China	In-hospital based (Cohort study)	179	57.6 ± 13.7	97	58	33	29	Death	6
Feng X et al. <sup>12</sup>	23.01.20-22.02.20	Prospective single-center observational	Wuhan Union Hospital, Hubei	China	In-hospital based (Cohort study)	114	63.96 ± 13.4	71	62	39	31	Severe COVID-19: respiratory distress	6
Feng Z et al. <sup>13</sup>	17.01.20-	Retrospective	Third Xiangya Hospital	China	In-hospital	141	44	72	21	8	3	Severe COVID-19:	7

	01.02.20	single-center observational	of Central South University, Hunan		based (Case series)		(34-55)					respiratory distress or need ICU care	
Fu L et al. <sup>14</sup>	01.01.20-30.01.20	Retrospective single-center observational	Union Hospital of Huazhong University, Hubei	China	In-hospital based (Case series)	200	58.2 ±12.3	99	101	137	16	Death	5
Gao C et al. <sup>15</sup>	05.02.20-15.03.20	Retrospective single-center observational	Huo Shen Shan Hospital, Hubei	China	In-hospital based (Case series)	2877	57.9	1470	850	387	221	Severe COVID-19: respiratory distress or need ICU care	7
Guan W et al. <sup>16</sup>	11.12.19-31.01.20	Retrospective multi-center observational	575 hospitals	China	In-hospital based (Case series)	1590	48.9 ±16.3	904	269	130	59	Death	7
Guan WJ et al. <sup>17</sup>	12.11.19-31.01.20	Prospective multi-center observational	552 hospitals in 30 provinces in mainland	China	In-hospital based (Cohort study)	1,099	47.0 (35-58)	637	165	81	27	Severe COVID-19: need ICU care	7
Grasselli G et al. <sup>18</sup>	20.02.20-18.03.20	Retrospective multi-center observational	Fondazione IRCCS Ca' Granda Ospedale Maggiore Policlinico, Milan	Italy	In-hospital based (Case series)	203 427 961	<50 50~60 >60	166 355 783	25 121 363	5 40 135	5 43 175	Death	7
Hou W et al. <sup>19</sup>	21.01.20-09.03.20	Retrospective single-center observational	Beijing You'an Hospital, Capital Medical University, Beijing	China	In-hospital based (Cohort study)	101	50.9 ± 20.1	44	21	6	11	Severe COVID-19: need ICU care	7
Hu L et al. <sup>20</sup>	08.01.20-20.02.20	Retrospective single-center observational	Tianyou Hospital, Shanghai	China	In-hospital based (Case series)	323	61 (23-91)	166	105	47	34	Severe COVID-19: respiratory distress or need ICU care	7
Huang J et al. <sup>21</sup>	25.01.20-24.03.20	Retrospective single-center observational	Third People's Hospital of Yichang, Hubei	China	In-hospital based (Cohort study)	344	52.9 ± 16.8	188	78	38	18	Severe COVID-19: respiratory distress	7
Huang C et al. <sup>22</sup>	16.12.19-02.01.20	Prospective single-center observational	JinYintan Hospital, Hubei	China	In-hospital based (Case series)	41	49.0 (41.0-58.0)	30	6	8	6	Severe COVID-19: need ICU care	7
Hur K et al. <sup>23</sup>	01.03.20-08.04.20	Retrospective single-center observational	Northwestern-affiliated health care centers, Chicago	USA	In-hospital based (Case series)	486	59	271	267	160	111	Severe COVID-19: need ICU care	6
Jiang et al. <sup>24</sup>	23.01.20-16.02.20	Retrospective single-center observational	Wuxi Fifth People's Hospital, Jiangsu	China	In-hospital based (Case series)	55	45 (27-60)	27	17	9	3	Severe COVID-19: respiratory distress	5
Li Q et al. <sup>25</sup>	20.01.20-29.02.20	Retrospective single-center observational	Shanghai Public Health Clinical Center, Shanghai	China	In-hospital based (Case series)	325	51 (36-64)	167	78	30	18	Severe COVID-19: respiratory distress or need ICU care	7
Liu J et al. <sup>26</sup>	13.01.20-31.01.20	Prospective single-center observational	Beijing Ditan Hospital, Beijing	China	In-hospital based (Case series)	61	40 (1-86)	31	12	5	1	Severe COVID-19: need ICU care	7

Liu W et al. <sup>27</sup>	30.12.19-01.15.20	Retrospective multi-center observational	Three tertiary hospitals, Hubei	China	In-hospital based (Case series)	78	38.0 (33-57)	39	8	5		Severe COVID-19: respiratory distress or need ICU care	5
Luo X et al. <sup>28</sup>	30.01.20-25.02.20	Retrospective single-center observational	Renmin-hospital of Wuhan university, Hubei	China	In-hospital based (Case series)	403	56 (39-68)	193	113	57	36	Death	6
Ma KL et al. <sup>29</sup>	21.01.20-02.03.20	Retrospective single-center observational	Yongchuan Hospital of Chongqing Medical University, Chongqing	China	In-hospital based (Cohort study)	84	48 (42.3-62.5)	48	12	10	5	Severe COVID-19: respiratory distress	7
Nikpouraghdam M et al. <sup>30</sup>	19.02.20-15.04.20	Retrospective single-center observational	Baqiyatallah Hospital, Tehran	Iran	In-hospital based (Case series)	2964	56 (46-65)	1955	59	113	37	Death	7
Petrilli et al. <sup>31</sup>	01.03.20-08.04.20	Prospective multi-center observational	NYU Langone Health, New York	USA	In-hospital only (Cohort study)	2729	63 (51-74)	1672	1693	950	602	Severe COVID-19: need ICU care	7
Qi D et al. <sup>32</sup>	19.01.20-16.02.20	Retrospective multi-center observational	Qianjiang central, Chongqing three gorges central and Chongqing public health medical center, Chongqing	China	In-hospital based (Case series)	267	48 (20-80)	149	20	26	13	Severe COVID-19: respiratory distress or need ICU care	6
Richardson et al. <sup>33</sup>	03.04.20-04.04.20	Retrospective multi-center observational	12 hospitals within the Northwell Health system, New York	USA	In-hospital based (Case series)	5700	63 (52-75)	3,437	3,026	1,808	595	Death	7
Rossi et al. <sup>34</sup>	27.02.20-02.04.20	Prospective multi-center observational	Province of Reggio Emilia	Italy	In-hospital only (Cohort study)	1075	70.4 ±15.1	657	280	185	115	Death	7
Russo V et al. <sup>35</sup>	01.02.20-31.04.20	Retrospective single-center observational	Five Italian Hospitals	Italy	In-hospital based (Case series)	192	67.7	115	111	42	26	Death	6
Shang W et al. <sup>36</sup>	16.01.28-28.02.20	Retrospective single-center observational	Wuhan Forth Hospital, Hubei	China	In-hospital based (Case series)	443	56 (43-66)	220	131	63	44	Severe COVID-19: respiratory distress or need ICU care	6
Shi Y et al. <sup>37</sup>	01.01.20-17.02.20	Retrospective multi-center observational	Zhejiang Province of China	China	In-hospital based (Case series)	487	46 ±18.0	259	99	29	11	Severe COVID-19: respiratory distress	7
Wan S et al. <sup>38</sup>	23.01.20-08.02.20	Retrospective single-center observational	Chongqing University Three Gorges Hospital, Chongqing	China	In-hospital based (Case series)	135	47 (36-55)	73	13	12	7	Severe COVID-19: respiratory distress or need ICU care	7
Wang K et al. <sup>39</sup>	26.01.20-05.02.20	Retrospective single-center observational	Huazhong University of Science and Technology, Hubei	China	In-hospital based (Case series)	548	60.2	279	166	83	34	Death	5
Wang L et al. <sup>40</sup>	01.01.20-	Retrospective	Renmin-hospital of	China	In-hospital	339	69	166	138	54	53	Death	5

	06.02.20	single-center observational	Wuhan university, Hubei		based (Case series)		(65-76)							
Wang X et al. <sup>41</sup>	03.02.20-21.02.20	Prospective single-center observational	Tongji Hospital, Hubei	China	In-hospital based (Cohort study)	131	49 (36-62)	59	4	2	3	Severe COVID-19: respiratory distress	7	
Wang Y et al. <sup>42</sup>	01.01.20-01.02.20	Retrospective single-center observational	Central Hospital of Wuhan, Hubei	China	In-hospital based (Case series)	110	46.9 ±17.6	48	23	15		Severe COVID-19: respiratory distress	6	
Wang D et al. <sup>43</sup>	01.01.20-28.01.20	Retrospective single-center observational	Zhongnan Hospital of Wuhan University, Hubei	China	In-hospital based (Case series)	138	56.0 (42-68)	75	43	14	20	Severe COVID-19: need ICU care	6	
Wang Z et al. <sup>44</sup>	16.01.20-29.01.20	Retrospective single-center observational	Wuhan Union Hospital, Hubei	China	In-hospital based (Case series)	69	42.0 (35-62)	32	9	7	8	Severe COVID-19: respiratory distress	6	
Xu B et al. <sup>45</sup>	26.12.19-01.03.20	Retrospective single-center observational	Hubei Provincial Hospital of traditional Chinese and Western medicine, Hubei	China	In-hospital based (Case series)	187	62 (48.5-71)	103	50		19	Death	7	
Xu PP et al. <sup>46</sup>	10.01.20-13.03.20	Retrospective multi-center observational	16 tertiary hospitals	China	In-hospital based (Case series)	703	46.1 ± 15.2	382	118	64	45	Death	7	
Yadaw AS et al. <sup>47</sup>	-06.04.20	Prospective multi-center observational	Mount Sinai Hospital, New York	USA	In-hospital based (Cohort study)	3841	56.2 ± 19.0	2125	869	608		Death	7	
Yang P et al. <sup>48</sup>	01.01.20-31.03.20	Retrospective single-center observational	Chongqing Public Health Medical Center, Chongqing	China	In-hospital based (Cohort study)	133	49.2	72	16	22	6	Severe COVID-19: respiratory distress or need ICU care	5	
Yuan B et al. <sup>49</sup>	-07.03.20	Retrospective multi-center observational	Shenzhen Municipal Health Commission, Shenzhen	China	In-hospital based (Case series)	417	45.4 ±17.7	198	63	32	28	Severe COVID-19: respiratory distress or need ICU care	7	
Zhou F et al. <sup>50</sup>	29.12.19-01.31.20	Retrospective multi-center observational	Two tertiary hospitals, Hubei	China	In-hospital based (Cohort study)	191	56 (46.0-67.0)	119	58	36	15	Death	7	
Zhu Z et al. <sup>51</sup>	23.01.20-20.02.20	Retrospective single-center observational	Hwa Mei Hospital, Zhengzhou	China	In-hospital based (Case series)	127	50.9 ± 15.3	45	31	10	6	Severe COVID-19: respiratory distress or need ICU care	6	

**Supplementary table 3. Small-study effect or publication bias**

	N studies	Pooled effect size (95% CI)	Egger's test	Begg's test	* Trim and fill analysis
<b>Hypertension</b>					
< 50 years	20	3.49 (2.49 – 4.88)	0.5192	0.1734	
50 ~ 60 years	17	2.61 (2.03 – 3.37)	0.1384	0.2165	
≥ 60 years	14	1.86 (1.55 – 2.23)	0.6491	0.2503	
Total	51	2.50 (2.15 – 2.90)	0.0303	0.5317	0.9239
<b>Diabetes</b>					
< 50 years	19	3.49 (2.24 – 5.45)	0.4915	0.7529	
50 ~ 60 years	15	2.37 (1.83 – 3.08)	0.9648	0.9605	
≥ 60 years	14	1.65 (1.34 – 2.03)	0.1669	0.4115	
Total	48	2.25 (1.89 – 2.69)	<0.001	0.9151	0.4055
<b>Cardiovascular disease</b>					
< 50 years	17	5.79 (4.32 – 7.78)	0.7419	0.9343	
50 ~ 60 years	15	2.96 (2.08 – 4.22)	0.6373	0.6222	
≥ 60 years	13	1.80 (1.51 – 2.15)	0.4866	0.2721	
Total	45	2.85 (2.37 – 3.43)	0.0001	0.7462	0.6611

\*Where publication bias was significant, trim and fill analyses were performed using the Duval and Tweedie non-parametric method.

**Supplementary table 4. Sensitivity analysis based on study size**

Subgroup	Total study number	N	OR (95% CI)	p
<b>Hypertension</b>				
Fatal outcome				
Large size ( $\geq 400$ patients)				
< 50 years	5	4,285	4.01 (2.08 – 7.72)	<0.001
50~60 years	6	11,014	2.16 (1.44 – 3.24)	<0.001
$\geq 60$ years	6	8,485	1.96 (1.57 – 2.46)	<0.001
Total	17	23,784	2.41 (1.95 – 2.98)	<0.001
Small size ( $< 400$ patients)				
< 50 years	15	1,858	3.29 (2.25 – 4.82)	<0.001
50~60 years	11	2,097	2.30 (2.35 – 3.83)	<0.001
$\geq 60$ years	8	1,695	1.66 (1.17 – 2.35)	0.0041
Total	34	5,650	2.59 (2.09 – 3.20)	<0.001
<b>Diabetes</b>				
Fatal outcome				
Large size ( $\geq 400$ patients)				
< 50 years	5	4,285	3.57 (1.76 – 7.22)	0.0004
50~60 years	5	8,137	1.98 (1.37 – 2.85)	0.0003
$\geq 60$ years	7	26,005	1.75 (1.35 – 2.27)	<0.001
Total	17	38,427	2.15 (1.71 – 2.70)	<0.001
Small size ( $< 400$ patients)				
< 50 years	14	1,740	3.49 (1.90 – 6.44)	<0.001
50~60 years	10	1,828	2.96 (2.07 – 2.24)	<0.001
$\geq 60$ years	7	1,508	1.47 (1.03 – 2.09)	0.0321
Total	31	5,077	2.39 (1.79 – 3.19)	<0.001
<b>Cardiovascular disease</b>				
Fatal outcome				
Large size ( $\geq 400$ patients)				
< 50 years	5	4,285	6.61 (4.46 – 9.80)	<0.001
50~60 years	4	4,296	2.52 (1.83 – 3.46)	<0.001
$\geq 60$ years	5	22,904	1.77 (1.39 – 2.26)	<0.001
Total	14	31,485	2.65 (2.06 – 3.39)	<0.001
Small size ( $< 400$ patients)				
< 50 years	12	1,553	4.22 (2.45 – 7.26)	<0.001
50~60 years	10	1,828	3.92 (1.98 – 7.75)	<0.001
$\geq 60$ years	8	1,695	2.83 (1.88 – 4.28)	<0.001
Total	30	5,076	3.58 (2.64 – 4.87)	<0.001

**Supplementary table 5. Sensitivity analysis performed by omitting individual studies: hypertension and clinical outcomes**

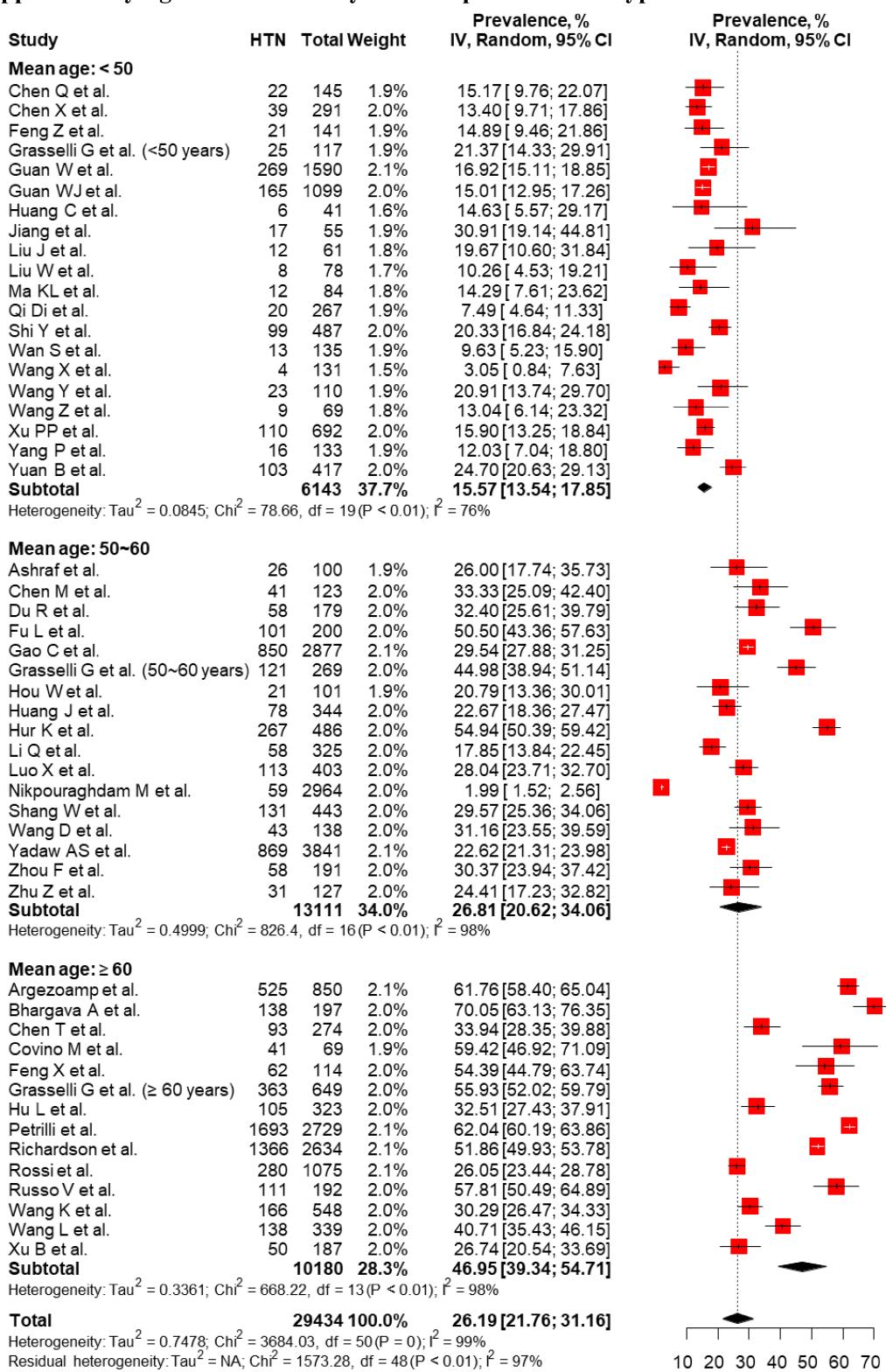
Study omitted	Total	< 50 years	50~60 years	≥ 60 years
	OR (95% CI)	OR (95% CI)	OR (95% CI)	OR (95% CI)
Argenziano et al.	2.55 (2.19 – 2.97)	3.49 (2.49 – 4.88)	2.61 (2.03 – 3.37)	1.93 (1.59 – 2.33)
Ashraf et al.	2.50 (2.14 – 2.90)	3.49 (2.49 – 4.88)	2.60 (2.01 – 3.38)	1.86 (1.55 – 2.23)
Bhargava A et al.	2.53 (2.17 – 2.94)	3.49 (2.49 – 4.88)	2.61 (2.03 – 3.37)	1.87 (1.55 – 2.27)
Chen M et al.	2.50 (2.15 – 2.91)	3.49 (2.49 – 4.88)	2.63 (2.02 – 3.43)	1.86 (1.55 – 2.23)
Chen Q et al.	2.51 (2.16 – 2.92)	3.62 (2.56 – 5.12)	2.61 (2.03 – 3.37)	1.86 (1.55 – 2.23)
Chen T et al.	2.49 (2.14 – 2.90)	3.49 (2.49 – 4.88)	2.61 (2.03 – 3.37)	1.80 (1.49 – 2.18)
Chen X et al.	2.44 (2.11 – 2.84)	3.32 (2.34 – 4.71)	2.61 (2.03 – 3.37)	1.86 (1.55 – 2.23)
Covino M et al.	2.56 (2.21 – 2.96)	3.49 (2.49 – 4.88)	2.61 (2.03 – 3.37)	1.94 (1.65 – 2.28)
Du R et al.	2.48 (2.13 – 2.88)	3.49 (2.49 – 4.88)	2.56 (1.98 – 3.33)	1.86 (1.55 – 2.23)
Feng X et al.	2.52 (2.17 – 2.93)	3.49 (2.49 – 4.88)	2.61 (2.03 – 3.37)	1.88 (1.55 – 2.26)
Feng Z et al.	2.48 (2.13 – 2.88)	3.42 (2.41 – 4.85)	2.61 (2.03 – 3.37)	1.86 (1.55 – 2.23)
Fu L et al.	2.51 (2.16 – 2.92)	3.49 (2.49 – 4.88)	2.61 (2.03 – 3.37)	1.86 (1.55 – 2.23)
Gao C et al.	2.53 (2.16 – 2.97)	3.49 (2.49 – 4.88)	2.73 (2.04 – 3.66)	1.86 (1.55 – 2.23)
Grasselli G et al.	2.55 (2.18 – 2.99)	3.51 (2.48 – 4.98)	2.71 (2.08 – 3.54)	1.84 (1.50 – 2.26)
Guan W et al.	2.43 (2.10 – 2.81)	3.30 (2.33 – 4.66)	2.61 (2.03 – 3.37)	1.86 (1.55 – 2.23)
Guan WJ et al.	2.48 (2.13 – 2.88)	3.46 (2.39 – 5.00)	2.61 (2.03 – 3.37)	1.86 (1.55 – 2.23)
Hou W et al.	2.48 (2.13 – 2.88)	3.49 (2.49 – 4.88)	2.56 (1.98 – 3.31)	1.86 (1.55 – 2.23)
Hu L et al.	2.52 (2.16 – 2.94)	3.49 (2.49 – 4.88)	2.61 (2.03 – 3.37)	1.86 (1.53 – 2.26)
Huang J et al.	2.48 (2.13 – 2.89)	3.49 (2.49 – 4.88)	2.58 (1.98 – 3.36)	1.86 (1.55 – 2.23)
Huang C et al.	2.51 (2.16 – 2.92)	3.59 (2.56 – 5.04)	2.61 (2.03 – 3.37)	1.86 (1.55 – 2.23)
Hur K et al.	2.55 (2.19 – 2.97)	3.49 (2.49 – 4.88)	2.78 (2.14 – 3.60)	1.86 (1.55 – 2.23)
Jiang et al.	2.51 (2.16 – 2.92)	3.59 (2.55 – 5.05)	2.61 (2.03 – 3.37)	1.86 (1.55 – 2.23)
Li Q et al.	2.47 (2.12 – 2.87)	3.49 (2.49 – 4.88)	2.53 (1.96 – 3.28)	1.86 (1.55 – 2.23)
Liu J et al.	2.49 (2.14 – 2.90)	3.48 (2.45 – 4.93)	2.61 (2.03 – 3.37)	1.86 (1.55 – 2.23)
Liu W et al.	2.50 (2.15 – 2.91)	3.52 (2.49 – 4.97)	2.61 (2.03 – 3.37)	1.86 (1.55 – 2.23)
Luo X et al.	2.42 (2.09 – 2.79)	3.49 (2.49 – 4.88)	2.35 (1.88 – 2.93)	1.86 (1.55 – 2.23)
Ma KL et al.	2.51 (2.16 – 2.92)	3.58 (2.54 – 5.06)	2.61 (2.03 – 3.37)	1.86 (1.55 – 2.23)
Nikpouraghdam M et al.	2.52 (2.16 – 2.93)	3.49 (2.49 – 4.88)	2.67 (2.05 – 3.49)	1.86 (1.55 – 2.23)
Petrilli et al.	2.54 (2.18 – 2.97)	3.49 (2.49 – 4.88)	2.61 (2.03 – 3.37)	1.90 (1.56 – 2.32)
Qi Di et al.	2.44 (2.11 – 2.83)	3.29 (2.35 – 4.60)	2.61 (2.03 – 3.37)	1.86 (1.55 – 2.23)
Richardson et al.	2.50 (2.14 – 2.93)	3.49 (2.49 – 4.88)	2.61 (2.03 – 3.37)	1.78 (1.49 – 2.13)
Rossi et al.	2.51 (2.15 – 2.93)	3.49 (2.49 – 4.88)	2.61 (2.03 – 3.37)	1.81 (1.48 – 2.21)
Russo V et al.	2.49 (2.14 – 2.90)	3.49 (2.49 – 4.88)	2.61 (2.03 – 3.37)	1.83 (1.51 – 2.20)
Shang W et al.	2.55 (2.19 – 2.97)	3.49 (2.49 – 4.88)	2.78 (2.15 – 3.60)	1.86 (1.55 – 2.23)
Shi Y et al.	2.45 (2.11 – 2.84)	3.34 (2.34 – 4.78)	2.61 (2.03 – 3.37)	1.86 (1.55 – 2.23)
Wan S et al.	2.52 (2.17 – 2.93)	3.68 (2.63 – 5.15)	2.61 (2.03 – 3.37)	1.86 (1.55 – 2.23)
Wang K et al.	2.50 (2.14 – 2.91)	3.49 (2.49 – 4.88)	2.61 (2.03 – 3.37)	1.81 (1.50 – 2.20)
Wang L et al.	2.53 (2.17 – 2.95)	3.49 (2.49 – 4.88)	2.61 (2.03 – 3.37)	1.88 (1.55 – 2.28)
Wang X et al.	2.50 (2.15 – 2.90)	3.49 (2.48 – 4.93)	2.61 (2.03 – 3.37)	1.86 (1.55 – 2.23)
Wang Y et al.	2.47 (2.13 – 2.87)	3.40 (2.39 – 4.83)	2.61 (2.03 – 3.37)	1.86 (1.55 – 2.23)
Wang D et al.	2.46 (2.12 – 2.87)	3.49 (2.49 – 4.88)	2.52 (1.95 – 3.26)	1.86 (1.55 – 2.23)
Wang Z et al.	2.48 (2.13 – 2.88)	3.40 (2.41 – 4.80)	2.61 (2.03 – 3.37)	1.86 (1.55 – 2.23)
Xu B et al.	2.52 (2.16 – 2.93)	3.49 (2.49 – 4.88)	2.61 (2.03 – 3.37)	1.86 (1.54 – 2.25)
Xu PP et al.	2.45 (2.11 – 2.84)	3.33 (2.35 – 4.72)	2.61 (2.03 – 3.37)	1.86 (1.55 – 2.23)
Yadaw AS et al.	2.49 (2.13 – 2.91)	3.49 (2.49 – 4.88)	2.63 (1.97 – 3.50)	1.86 (1.55 – 2.23)
Yang P et al.	2.50 (2.15 – 2.91)	3.55 (2.50 – 5.04)	2.61 (2.03 – 3.37)	1.86 (1.55 – 2.23)
Yuan B et al.	2.54 (2.19 – 2.96)	4.01 (3.03 – 5.33)	2.61 (2.03 – 3.37)	1.86 (1.55 – 2.23)
Zhou F et al.	2.49 (2.14 – 2.90)	3.49 (2.49 – 4.88)	2.59 (1.99 – 3.38)	1.86 (1.55 – 2.23)
Zhu Z et al.	2.48 (2.14 – 2.89)	3.49 (2.49 – 4.88)	2.58 (1.99 – 3.35)	1.86 (1.55 – 2.23)

**Supplementary table 6. Sensitivity analysis performed by omitting individual studies: diabetes and clinical outcomes**

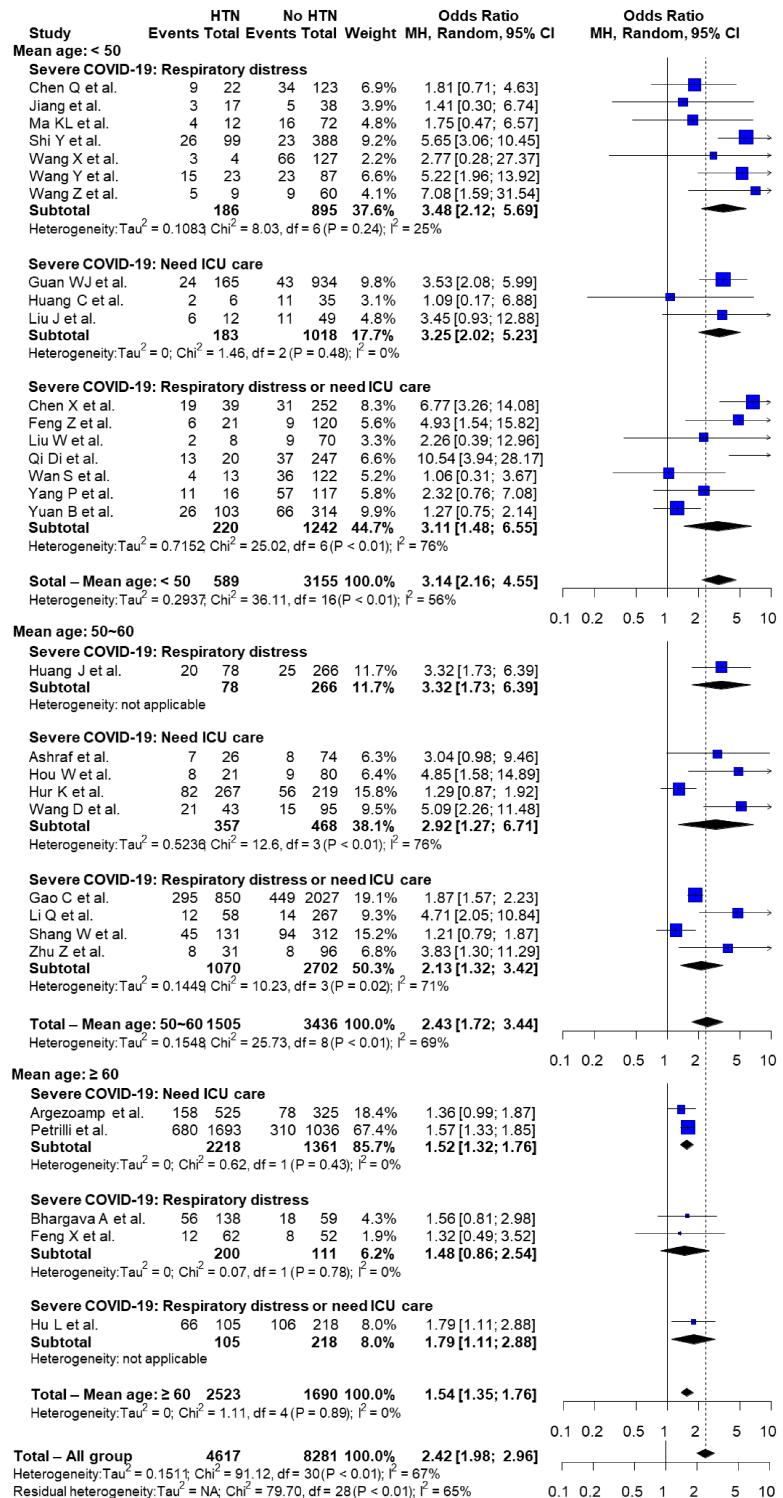
Study omitted	Total	< 50 years	50~60 years	≥ 60 years
	OR (95% CI)	OR (95% CI)	OR (95% CI)	OR (95% CI)
Argezoamp et al.	2.31 (1.92 – 2.78)	3.49 (2.24 – 5.45)	2.37 (1.83 – 3.08)	1.70 (1.35 – 2.14)
Ashraf et al.	2.26 (1.89 – 2.70)	3.49 (2.24 – 5.45)	2.38 (1.81 – 3.13)	1.65 (1.34 – 2.03)
Bhargava A et al.	2.26 (1.88 – 2.70)	3.49 (2.24 – 5.45)	2.37 (1.83 – 3.08)	1.62 (1.30 – 2.00)
Bode B et al.	2.17 (1.83 – 2.58)	3.49 (2.24 – 5.45)	2.37 (1.83 – 3.08)	1.49 (1.26 – 1.75)
Chen M et al.	2.25 (1.88 – 2.69)	3.49 (2.24 – 5.45)	2.37 (1.80 – 3.11)	1.65 (1.34 – 2.03)
Chen Q et al.	2.25 (1.88 – 2.69)	3.57 (2.23 – 5.71)	2.37 (1.83 – 3.08)	1.65 (1.34 – 2.03)
Chen T et al.	2.28 (1.90 – 2.73)	3.49 (2.24 – 5.45)	2.37 (1.83 – 3.08)	1.65 (1.33 – 2.05)
Chen X et al.	2.28 (1.91 – 2.73)	3.78 (2.43 – 5.88)	2.37 (1.83 – 3.08)	1.65 (1.34 – 2.03)
Covino M et al.	2.28 (1.91 – 2.73)	3.49 (2.24 – 5.45)	2.37 (1.83 – 3.08)	1.67 (1.36 – 2.07)
Docherty AB et al.	2.32 (1.93 – 2.78)	3.49 (2.24 – 5.45)	2.37 (1.83 – 3.08)	1.71 (1.35 – 2.18)
Du R et al.	2.26 (1.89 – 2.70)	3.49 (2.24 – 5.45)	2.40 (1.82 – 3.15)	1.65 (1.34 – 2.03)
Feng X et al.	2.30 (1.93 – 2.75)	3.49 (2.24 – 5.45)	2.37 (1.83 – 3.08)	1.70 (1.37 – 2.09)
Feng Z et al.	2.25 (1.88 – 2.69)	3.52 (2.22 – 5.58)	2.37 (1.83 – 3.08)	1.65 (1.34 – 2.03)
Fu L et al.	2.27 (1.90 – 2.72)	3.49 (2.24 – 5.45)	2.43 (1.85 – 3.20)	1.65 (1.34 – 2.03)
Guan W et al.	2.21 (1.85 – 2.64)	3.45 (2.13 – 5.61)	2.37 (1.83 – 3.08)	1.65 (1.34 – 2.03)
Guan WJ et al.	2.19 (1.83 – 2.60)	3.36 (2.09 – 5.39)	2.37 (1.83 – 3.08)	1.65 (1.34 – 2.03)
Hou W et al.	2.25 (1.89 – 2.69)	3.49 (2.24 – 5.45)	2.37 (1.81 – 3.10)	1.65 (1.34 – 2.03)
Hu L et al.	2.25 (1.88 – 2.70)	3.49 (2.24 – 5.45)	2.37 (1.83 – 3.08)	1.61 (1.30 – 2.00)
Huang J et al.	2.21 (1.85 – 2.65)	3.49 (2.24 – 5.45)	2.26 (1.74 – 2.94)	1.65 (1.34 – 2.03)
Huang C et al.	2.28 (1.91 – 2.72)	3.75 (2.43 – 5.78)	2.37 (1.83 – 3.08)	1.65 (1.34 – 2.03)
Hur K et al.	2.23 (1.87 – 2.67)	3.49 (2.24 – 5.45)	2.32 (1.73 – 3.11)	1.65 (1.34 – 2.03)
Jiang et al.	2.23 (1.86 – 2.66)	3.37 (2.13 – 5.31)	2.37 (1.83 – 3.08)	1.65 (1.34 – 2.03)
Li Q et al.	2.20 (1.84 – 2.62)	3.49 (2.24 – 5.45)	2.22 (1.75 – 2.83)	1.65 (1.34 – 2.03)
Liu J et al.	2.24 (1.88 – 2.68)	3.47 (2.19 – 5.49)	2.37 (1.83 – 3.08)	1.65 (1.34 – 2.03)
Liu W et al.	2.24 (1.88 – 2.68)	3.46 (2.19 – 5.47)	2.37 (1.83 – 3.08)	1.65 (1.34 – 2.03)
Luo X et al.	2.24 (1.87 – 2.68)	3.49 (2.24 – 5.45)	2.33 (1.75 – 3.10)	1.65 (1.34 – 2.03)
Ma KL et al.	2.21 (1.85 – 2.64)	3.30 (2.10 – 5.19)	2.37 (1.83 – 3.08)	1.65 (1.34 – 2.03)
Nikpouraghdam M et al.	2.29 (1.91 – 2.75)	3.49 (2.24 – 5.45)	2.51 (1.94 – 3.26)	1.65 (1.34 – 2.03)
Petrilli et al.	2.32 (1.91 – 2.81)	3.49 (2.24 – 5.45)	2.37 (1.83 – 3.08)	1.69 (1.31 – 2.18)
Qi Di et al.	2.29 (1.92 – 2.75)	3.82 (2.45 – 5.96)	2.37 (1.83 – 3.08)	1.65 (1.34 – 2.03)
Richardson et al.	2.28 (1.89 – 2.75)	3.49 (2.24 – 5.45)	2.37 (1.83 – 3.08)	1.60 (1.29 – 2.00)
Rossi et al.	2.28 (1.90 – 2.74)	3.49 (2.24 – 5.45)	2.37 (1.83 – 3.08)	1.65 (1.32 – 2.06)
Russo V et al.	2.28 (1.91 – 2.73)	3.49 (2.24 – 5.45)	2.37 (1.83 – 3.08)	1.66 (1.34 – 2.07)
Shang W et al.	2.31 (1.93 – 2.77)	3.49 (2.24 – 5.45)	2.57 (2.05 – 3.22)	1.65 (1.34 – 2.03)
Shi Y et al.	2.24 (1.87 – 2.68)	3.53 (2.19 – 5.69)	2.37 (1.83 – 3.08)	1.65 (1.34 – 2.03)
Wan S et al.	2.21 (1.86 – 2.64)	3.33 (2.11 – 5.25)	2.37 (1.83 – 3.08)	1.65 (1.34 – 2.03)
Wang K et al.	2.26 (1.89 – 2.71)	3.49 (2.24 – 5.45)	2.37 (1.83 – 3.08)	1.62 (1.31 – 2.02)
Wang L et al.	2.30 (1.92 – 2.75)	3.49 (2.24 – 5.45)	2.37 (1.83 – 3.08)	1.68 (1.36 – 2.09)
Wang X et al.	2.25 (1.88 – 2.69)	3.48 (2.21 – 5.48)	2.37 (1.83 – 3.08)	1.65 (1.34 – 2.03)
Wang Y et al.	2.25 (1.88 – 2.69)	3.58 (2.24 – 5.73)	2.37 (1.83 – 3.08)	1.65 (1.34 – 2.03)
Wang D et al.	2.23 (1.86 – 2.66)	3.49 (2.24 – 5.45)	2.31 (1.77 – 3.01)	1.65 (1.34 – 2.03)
Wang Z et al.	2.22 (1.86 – 2.64)	3.25 (2.10 – 5.03)	2.37 (1.83 – 3.08)	1.65 (1.34 – 2.03)
Xu PP et al.	2.19 (1.83 – 2.60)	3.30 (2.08 – 5.22)	2.37 (1.83 – 3.08)	1.65 (1.34 – 2.03)
Yadaw AS et al.	2.25 (1.88 – 2.70)	3.49 (2.24 – 5.45)	2.39 (1.74 – 3.27)	1.65 (1.34 – 2.03)
Yang P et al.	2.21 (1.85 – 2.64)	3.33 (2.11 – 5.28)	2.37 (1.83 – 3.08)	1.65 (1.34 – 2.03)
Yuan B et al.	2.30 (1.92 – 2.76)	3.85 (2.52 – 5.90)	2.37 (1.83 – 3.08)	1.65 (1.34 – 2.03)
Zhou F et al.	2.24 (1.87 – 2.68)	3.49 (2.24 – 5.45)	2.34 (1.77 – 3.09)	1.65 (1.34 – 2.03)
Zhu Z et al.	2.27 (1.90 – 2.71)	3.49 (2.24 – 5.45)	2.41 (1.86 – 3.11)	1.65 (1.34 – 2.03)

**Supplementary table 7. Sensitivity analysis performed by omitting individual studies: CVD and clinical outcomes**

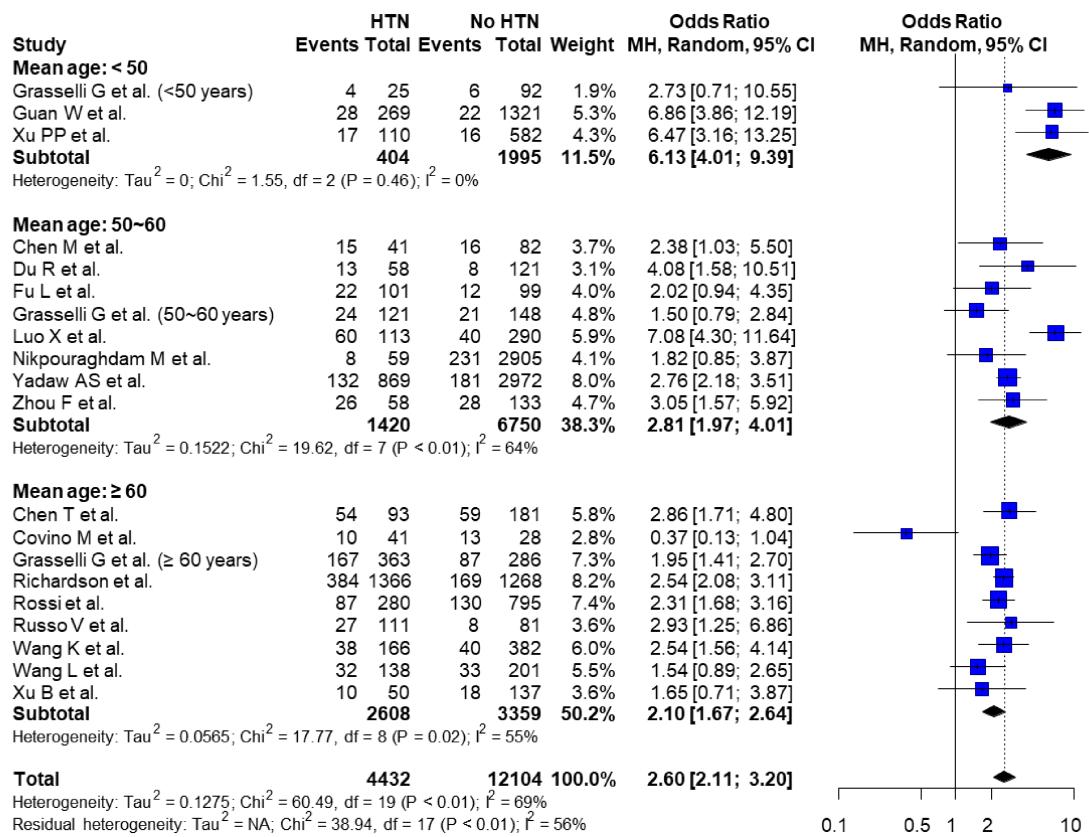
Study omitted	Total	< 50 years	50–60 years	≥ 60 years
	OR (95% CI)	OR (95% CI)	OR (95% CI)	OR (95% CI)
Argezoamp et al.	3.28 (2.69 – 3.99)	5.66 (4.12 – 7.79)	3.30 (2.16 – 5.05)	2.23 (1.85 – 2.71)
Ashraf et al.	3.14 (2.57 – 3.84)	5.66 (4.12 – 7.79)	3.30 (2.16 – 5.05)	2.10 (1.68 – 2.61)
Bhargava A et al.	3.17 (2.59 – 3.88)	5.66 (4.12 – 7.79)	3.30 (2.16 – 5.05)	2.13 (1.69 – 2.69)
Chen M et al.	3.09 (2.53 – 3.77)	5.66 (4.12 – 7.79)	3.24 (2.06 – 5.11)	2.10 (1.68 – 2.61)
Chen Q et al.	3.10 (2.54 – 3.78)	5.65 (4.10 – 7.78)	3.30 (2.16 – 5.05)	2.10 (1.68 – 2.61)
Chen T et al.	3.09 (2.53 – 3.78)	5.66 (4.12 – 7.79)	3.30 (2.16 – 5.05)	2.04 (1.63 – 2.56)
Chen X et al.	3.10 (2.53 – 3.78)	5.85 (4.20 – 8.14)	3.30 (2.16 – 5.05)	2.10 (1.68 – 2.61)
Covino M et al.	3.18 (2.61 – 3.89)	5.66 (4.12 – 7.79)	3.30 (2.16 – 5.05)	2.15 (1.72 – 2.69)
Docherty AB et al.	3.30 (2.60 – 4.20)	5.66 (4.12 – 7.79)	3.30 (2.16 – 5.05)	2.24 (1.63 – 3.09)
Du R et al.	2.99 (2.46 – 3.64)	5.66 (4.12 – 7.79)	2.99 (1.98 – 4.51)	2.10 (1.68 – 2.61)
Feng X et al.	3.16 (2.58 – 3.86)	5.66 (4.12 – 7.79)	3.30 (2.16 – 5.05)	2.13 (1.69 – 2.67)
Feng Z et al.	3.10 (2.54 – 3.78)	5.69 (4.12 – 7.84)	3.30 (2.16 – 5.05)	2.10 (1.68 – 2.61)
Fu L et al.	3.20 (2.63 – 3.89)	5.66 (4.12 – 7.79)	3.69 (2.58 – 5.27)	2.10 (1.68 – 2.61)
Guan W et al.	3.04 (2.49 – 3.71)	5.68 (4.01 – 8.04)	3.30 (2.16 – 5.05)	2.10 (1.68 – 2.61)
Guan WJ et al.	3.07 (2.51 – 3.75)	5.79 (4.13 – 8.13)	3.30 (2.16 – 5.05)	2.10 (1.68 – 2.61)
Hou W et al.	3.10 (2.54 – 3.79)	5.66 (4.12 – 7.79)	3.30 (2.10 – 5.17)	2.10 (1.68 – 2.61)
Hu L et al.	3.03 (2.49 – 3.70)	5.66 (4.12 – 7.79)	3.30 (2.16 – 5.05)	1.98 (1.61 – 2.44)
Huang J et al.	3.02 (2.48 – 3.68)	5.66 (4.12 – 7.79)	3.07 (1.99 – 4.73)	2.10 (1.68 – 2.61)
Huang C et al.	3.12 (2.55 – 3.80)	5.82 (4.21 – 8.05)	3.30 (2.16 – 5.05)	2.10 (1.68 – 2.61)
Hur K et al.	3.16 (2.57 – 3.88)	5.66 (4.12 – 7.79)	3.44 (2.11 – 5.59)	2.10 (1.68 – 2.61)
Jiang et al.	3.08 (2.52 – 3.75)	5.57 (4.04 – 7.68)	3.30 (2.16 – 5.05)	2.10 (1.68 – 2.61)
Li Q et al.	3.07 (2.51 – 3.75)	5.66 (4.12 – 7.79)	3.19 (2.04 – 5.00)	2.10 (1.68 – 2.61)
Liu J et al.	3.10 (2.54 – 3.78)	5.64 (4.10 – 7.77)	3.30 (2.16 – 5.05)	2.10 (1.68 – 2.61)
Luo X et al.	3.13 (2.55 – 3.83)	5.66 (4.12 – 7.79)	3.38 (2.10 – 5.42)	2.10 (1.68 – 2.61)
Ma KL et al.	3.12 (2.55 – 3.81)	5.82 (4.21 – 8.04)	3.30 (2.16 – 5.05)	2.10 (1.68 – 2.61)
Nikpouraghdam M et al.	3.17 (2.59 – 3.87)	5.66 (4.12 – 7.79)	3.53 (2.27 – 5.50)	2.10 (1.68 – 2.61)
Petrilli et al.	3.28 (2.62 – 4.10)	5.66 (4.12 – 7.79)	3.30 (2.16 – 5.05)	2.26 (1.69 – 3.02)
Qi Di et al.	3.13 (2.56 – 3.83)	6.11 (4.39 – 8.50)	3.30 (2.16 – 5.05)	2.10 (1.68 – 2.61)
Rossi et al.	3.16 (2.57 – 3.88)	5.66 (4.12 – 7.79)	3.30 (2.16 – 5.05)	2.07 (1.62 – 2.63)
Russo V et al.	3.10 (2.53 – 3.79)	5.66 (4.12 – 7.79)	3.30 (2.16 – 5.05)	2.04 (1.63 – 2.56)
Shang W et al.	3.10 (2.53 – 3.80)	5.66 (4.12 – 7.79)	3.31 (2.05 – 5.34)	2.10 (1.68 – 2.61)
Shi Y et al.	3.07 (2.52 – 3.75)	5.67 (4.08 – 7.89)	3.30 (2.16 – 5.05)	2.10 (1.68 – 2.61)
Wan S et al.	3.06 (2.51 – 3.73)	5.53 (4.00 – 7.63)	3.30 (2.16 – 5.05)	2.10 (1.68 – 2.61)
Wang K et al.	3.12 (2.55 – 3.82)	5.66 (4.12 – 7.79)	3.30 (2.16 – 5.05)	2.07 (1.65 – 2.60)
Wang L et al.	3.09 (2.52 – 3.78)	5.66 (4.12 – 7.79)	3.30 (2.16 – 5.05)	2.00 (1.60 – 2.50)
Wang X et al.	3.12 (2.56 – 3.81)	5.78 (4.19 – 7.97)	3.30 (2.16 – 5.05)	2.10 (1.68 – 2.61)
Wang D et al.	3.12 (2.55 – 3.82)	5.66 (4.12 – 7.79)	3.35 (2.12 – 5.31)	2.10 (1.68 – 2.61)
Wang Z et al.	3.06 (2.51 – 3.73)	5.54 (4.00 – 7.67)	3.30 (2.16 – 5.05)	2.10 (1.68 – 2.61)
Xu B et al.	3.09 (2.53 – 3.77)	5.66 (4.12 – 7.79)	3.30 (2.16 – 5.05)	2.04 (1.64 – 2.55)
Xu PP et al.	2.95 (2.43 – 3.57)	4.99 (3.52 – 7.07)	3.30 (2.16 – 5.05)	2.10 (1.68 – 2.61)
Yang P et al.	3.08 (2.53 – 3.76)	5.60 (4.06 – 7.72)	3.30 (2.16 – 5.05)	2.10 (1.68 – 2.61)
Yuan B et al.	3.02 (2.48 – 3.68)	5.52 (3.90 – 7.81)	3.30 (2.16 – 5.05)	2.10 (1.68 – 2.61)
Zhou F et al.	3.01 (2.48 – 3.66)	5.66 (4.12 – 7.79)	3.01 (2.01 – 4.52)	2.10 (1.68 – 2.61)
Zhu Z et al.	3.10 (2.54 – 3.79)	5.66 (4.12 – 7.79)	3.28 (2.11 – 5.11)	2.10 (1.68 – 2.61)

**Supplementary figure 1. Meta-analysis of the prevalence of hypertension**

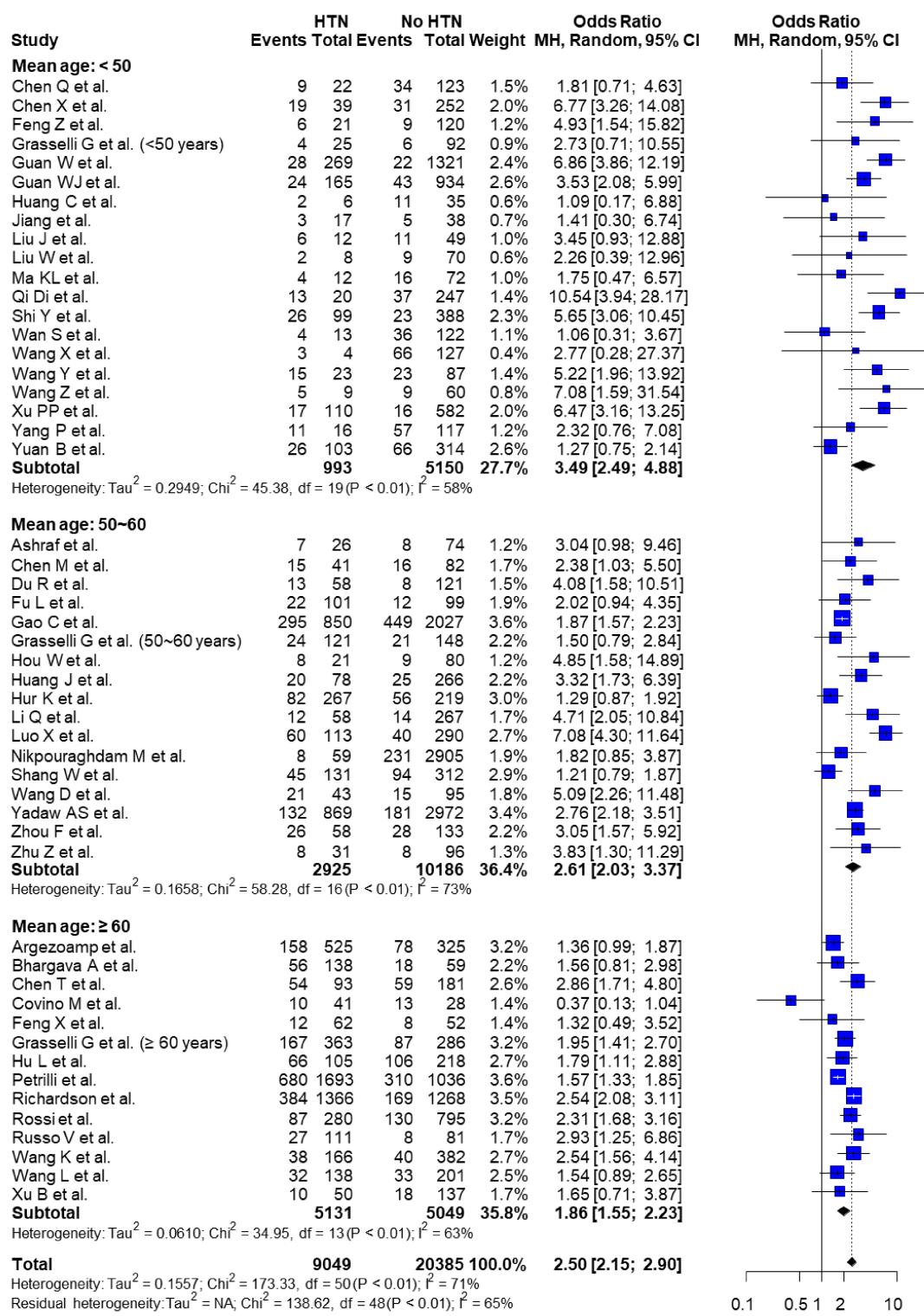
**Supplementary figure 2. Meta-analysis of the clinical outcomes of patients with hypertension: severe COVID-19**



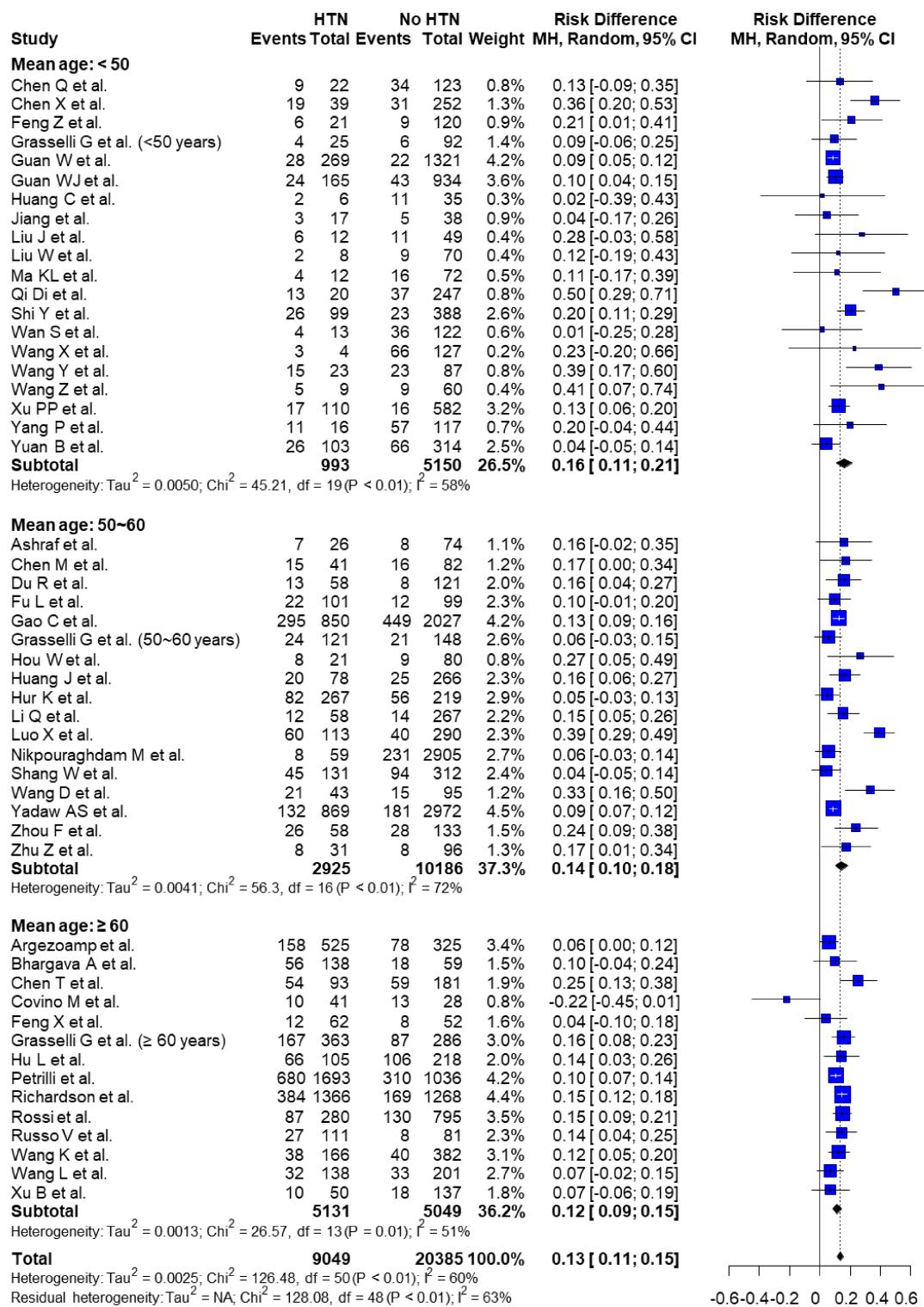
**Supplementary figure 3. Meta-analysis of the clinical outcomes of patients with hypertension: death**

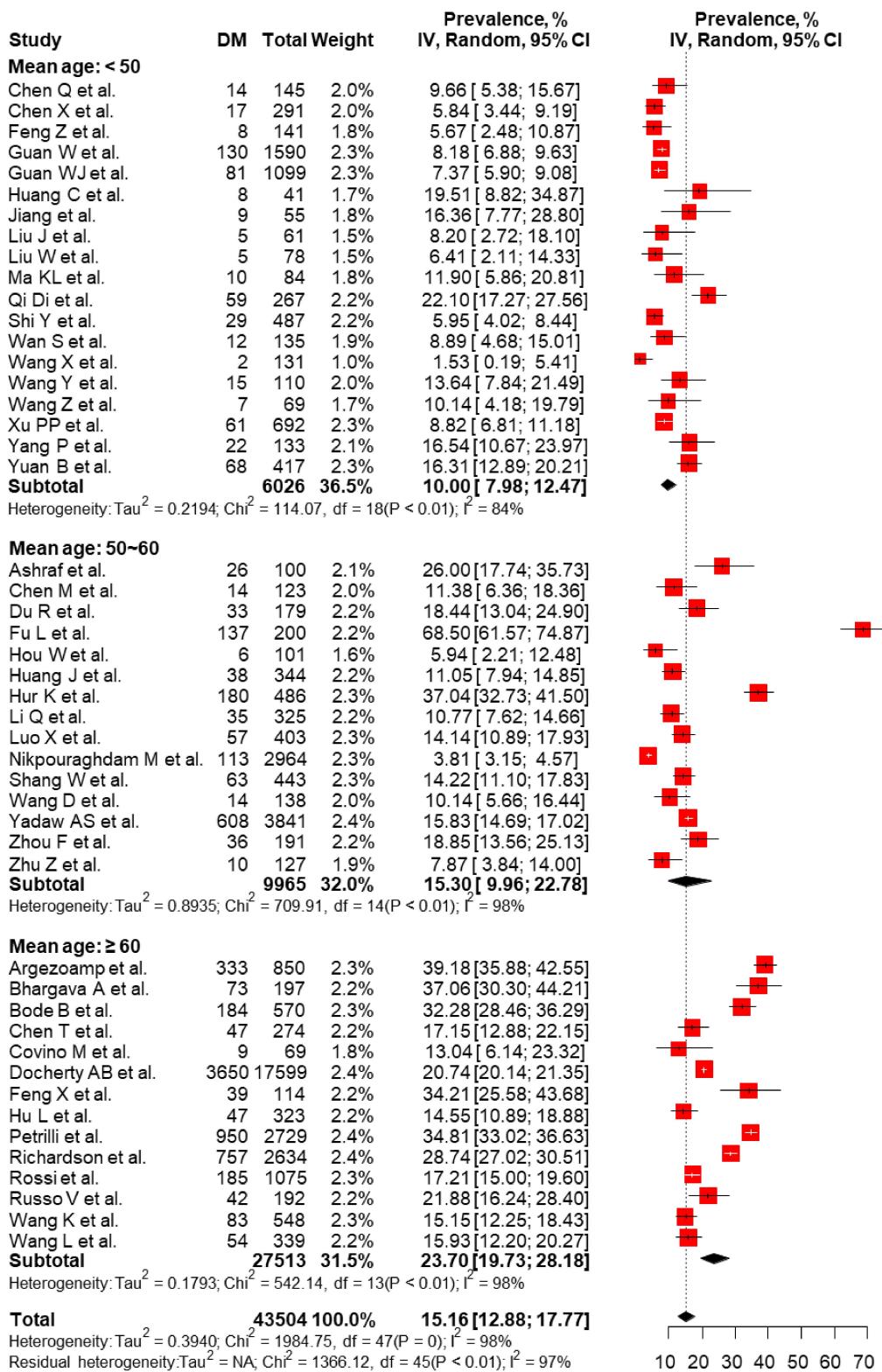


**Supplementary figure 4. Meta-analysis of the clinical outcomes of patients with hypertension: fatal outcomes**

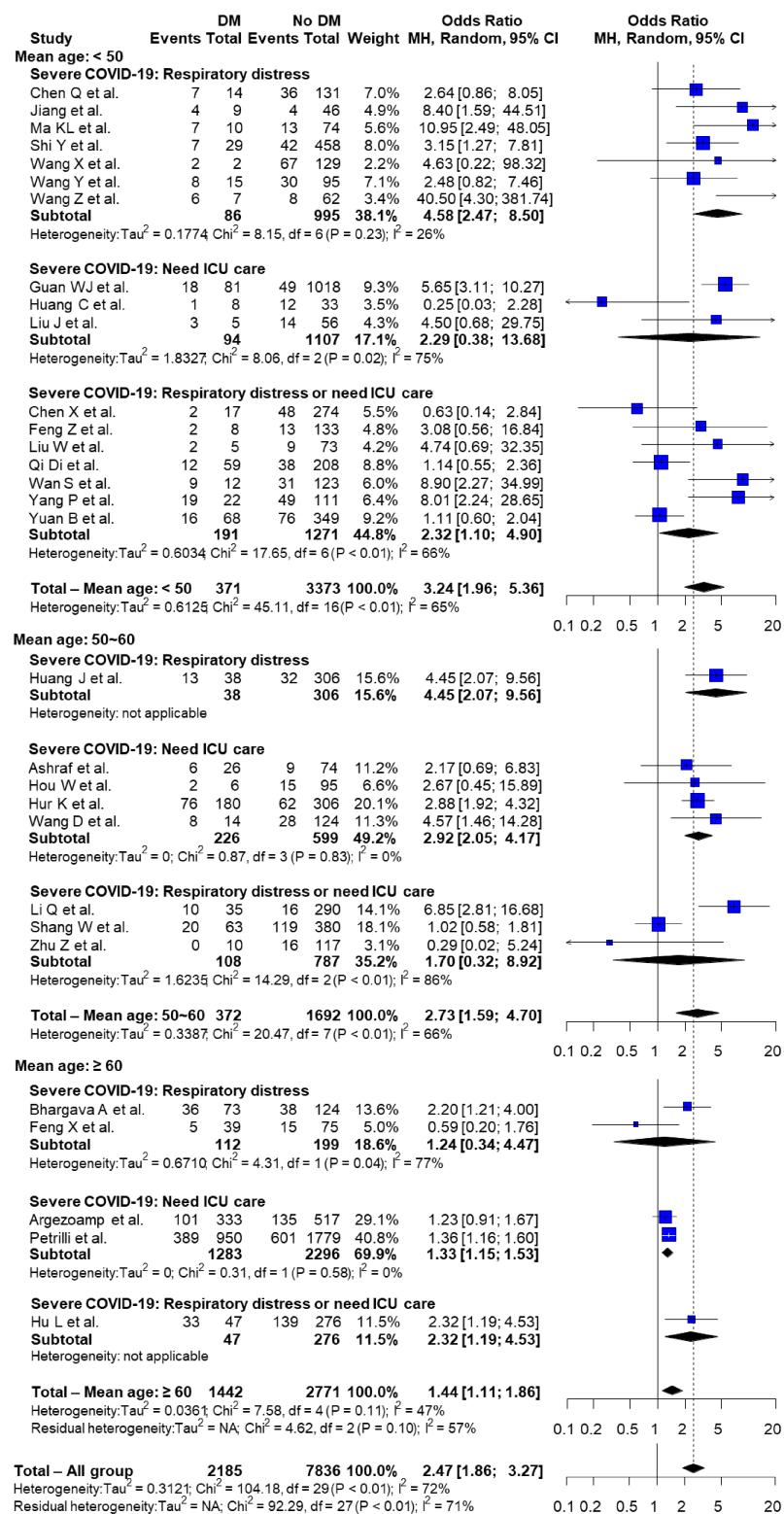


### Supplementary figure 5. Risk difference of fatal outcome in patients with hypertension

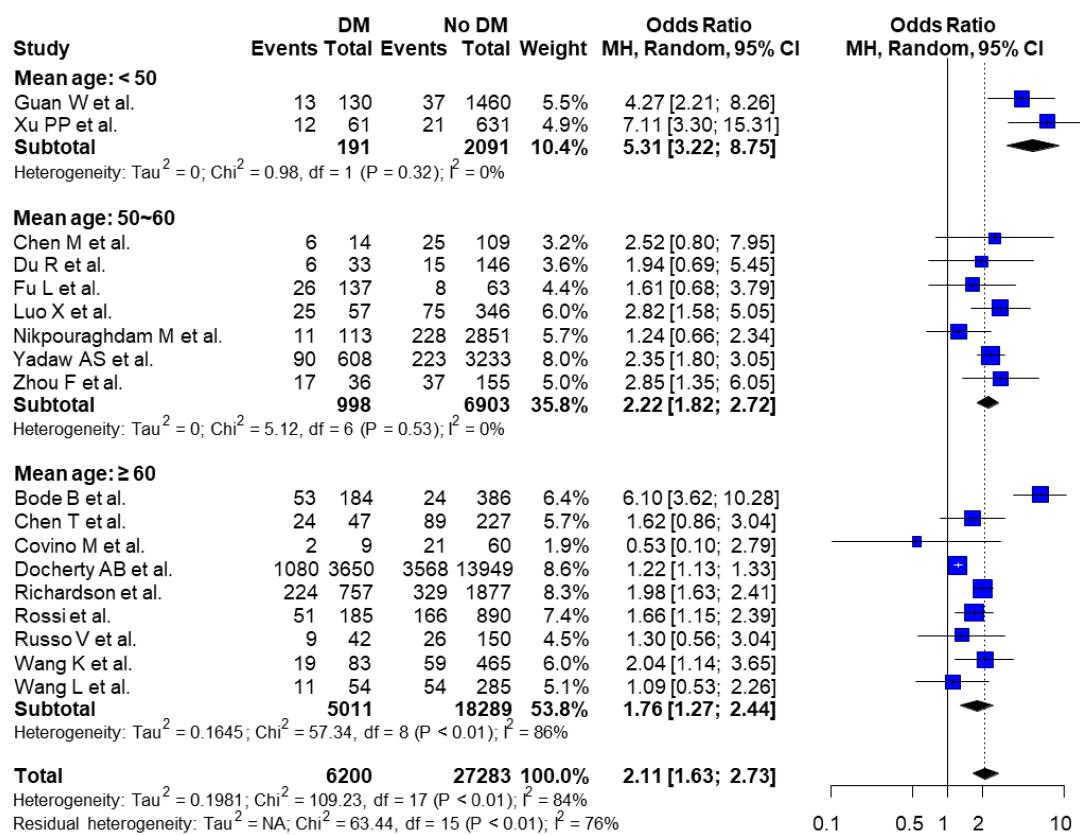


**Supplementary figure 6. Meta-analysis of the prevalence of diabetes**

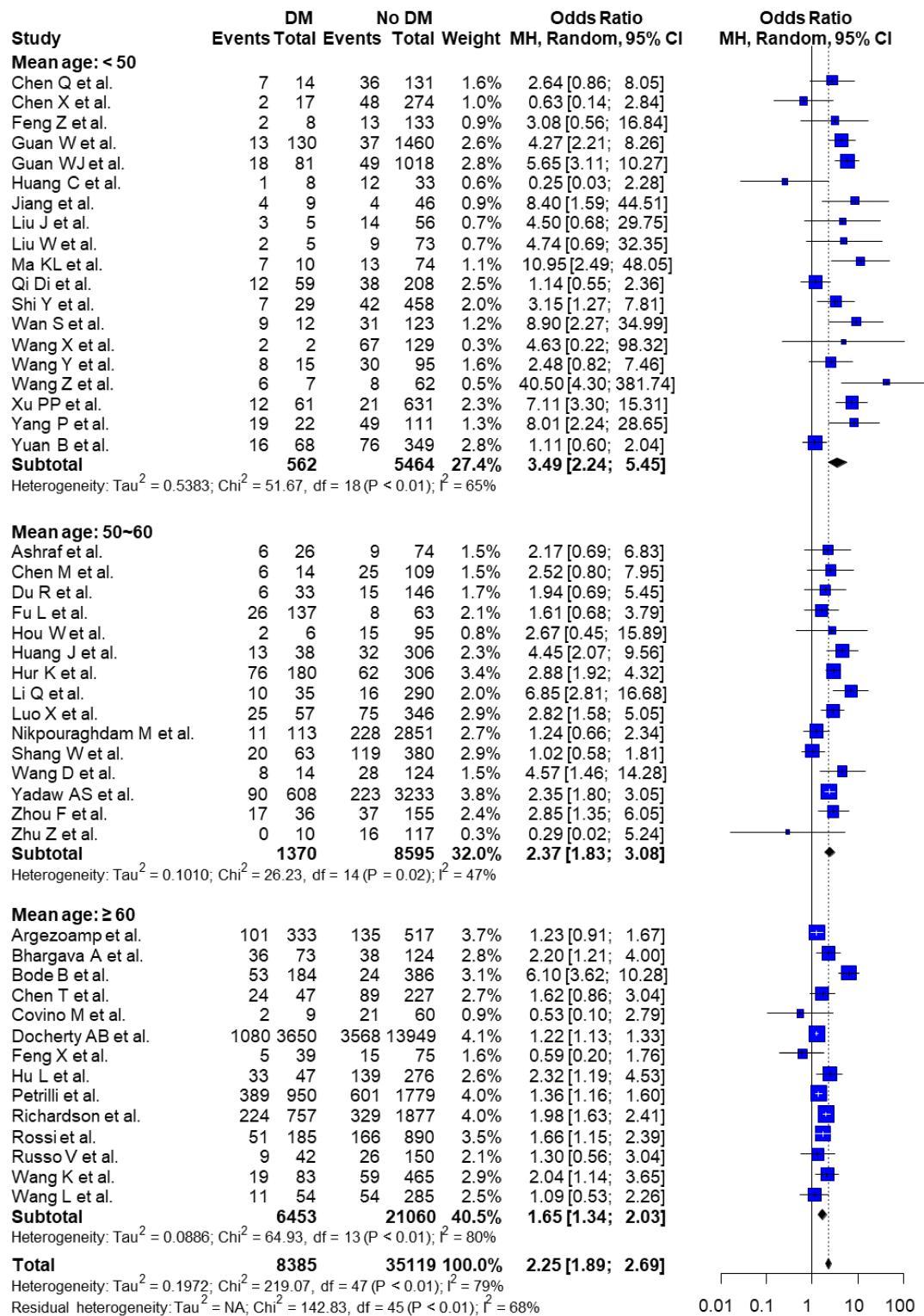
**Supplementary figure 7. Meta-analysis of the clinical outcomes of patients with diabetes: severe COVID-19**



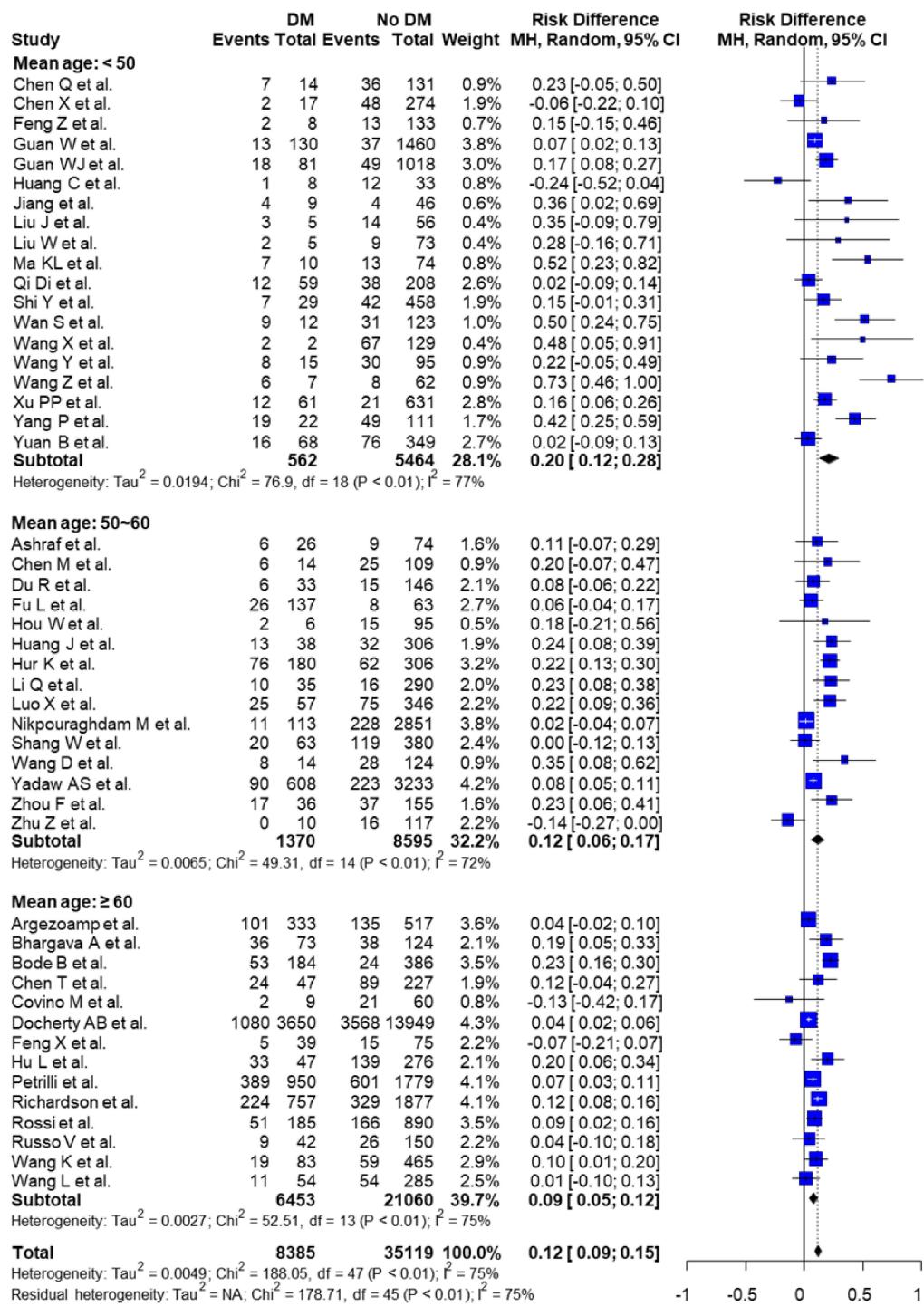
**Supplementary figure 8. Meta-analysis of the clinical outcomes of patients with diabetes: death**



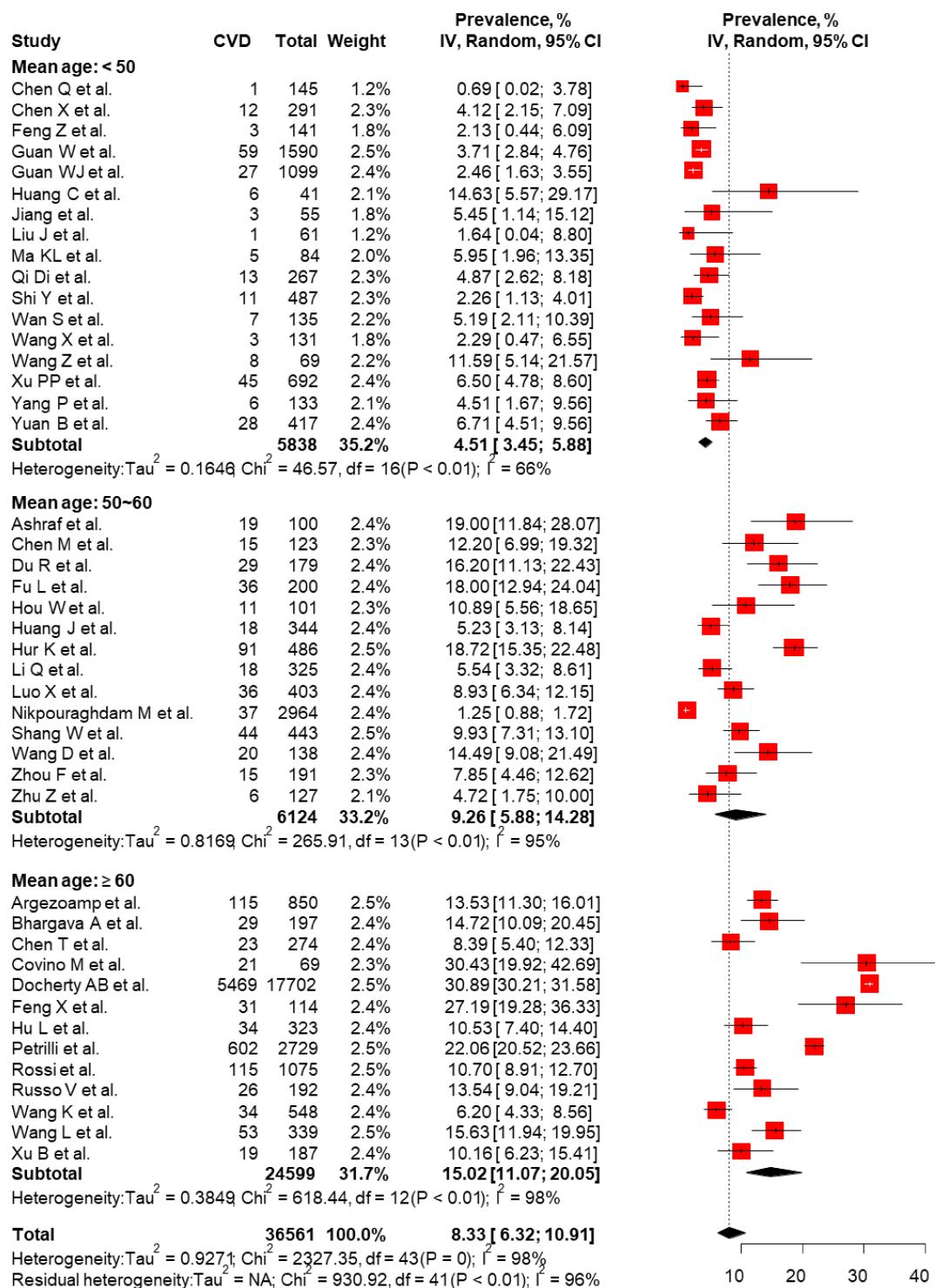
**Supplementary figure 9. Meta-analysis of the clinical outcomes of patients with diabetes: fatal outcomes**



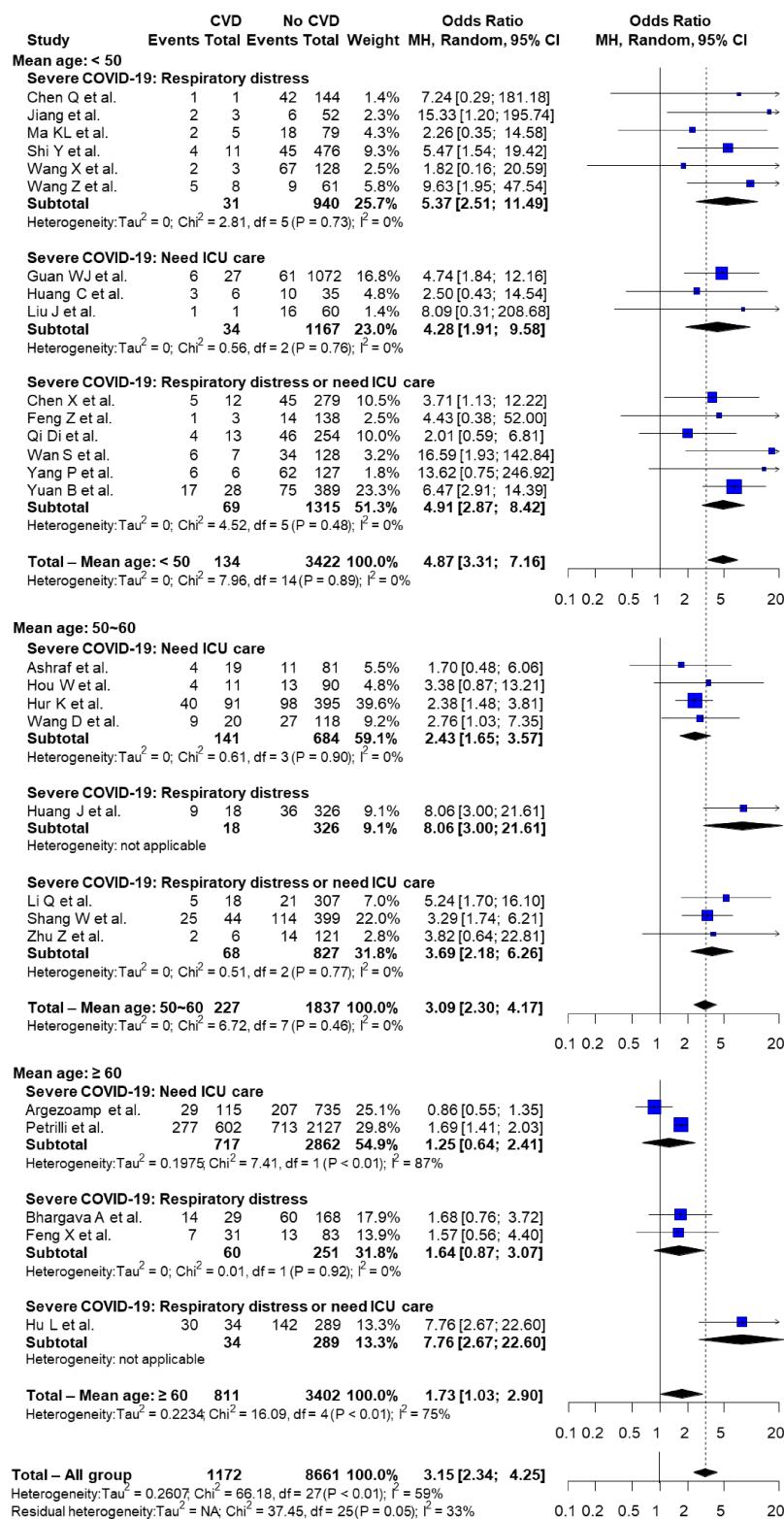
### Supplementary figure 10. Risk difference of fatal outcome in patients with diabetes



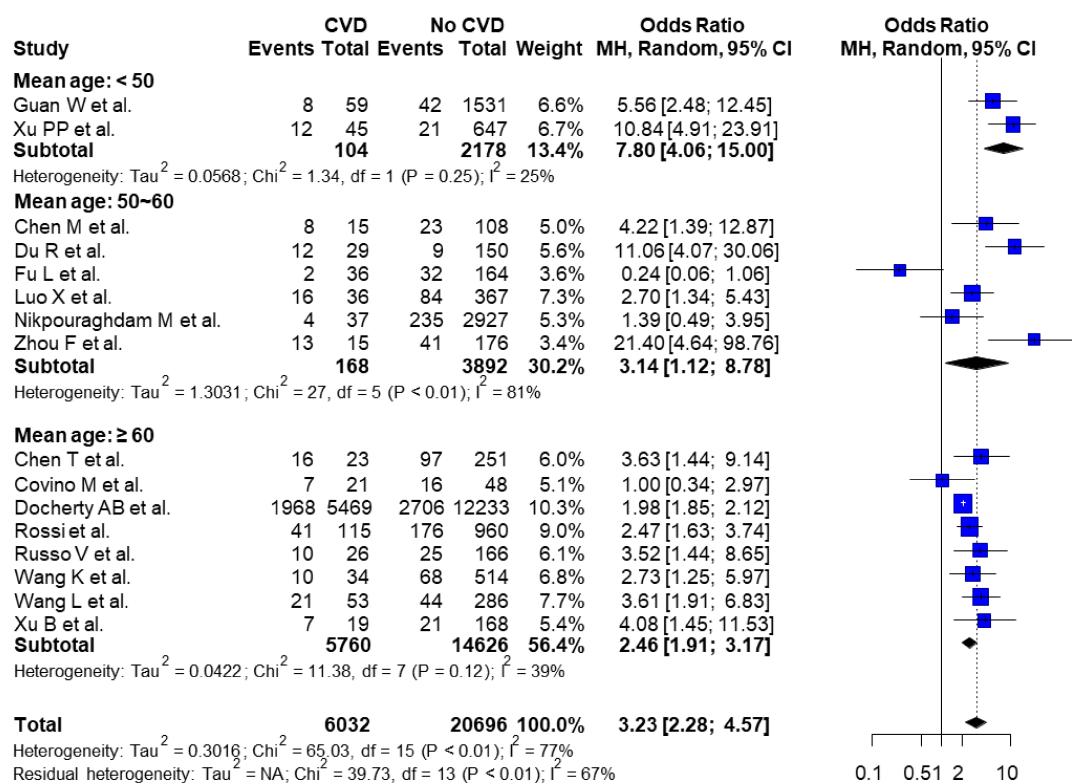
### Supplementary figure 11. Meta-analysis of the prevalence of CVD



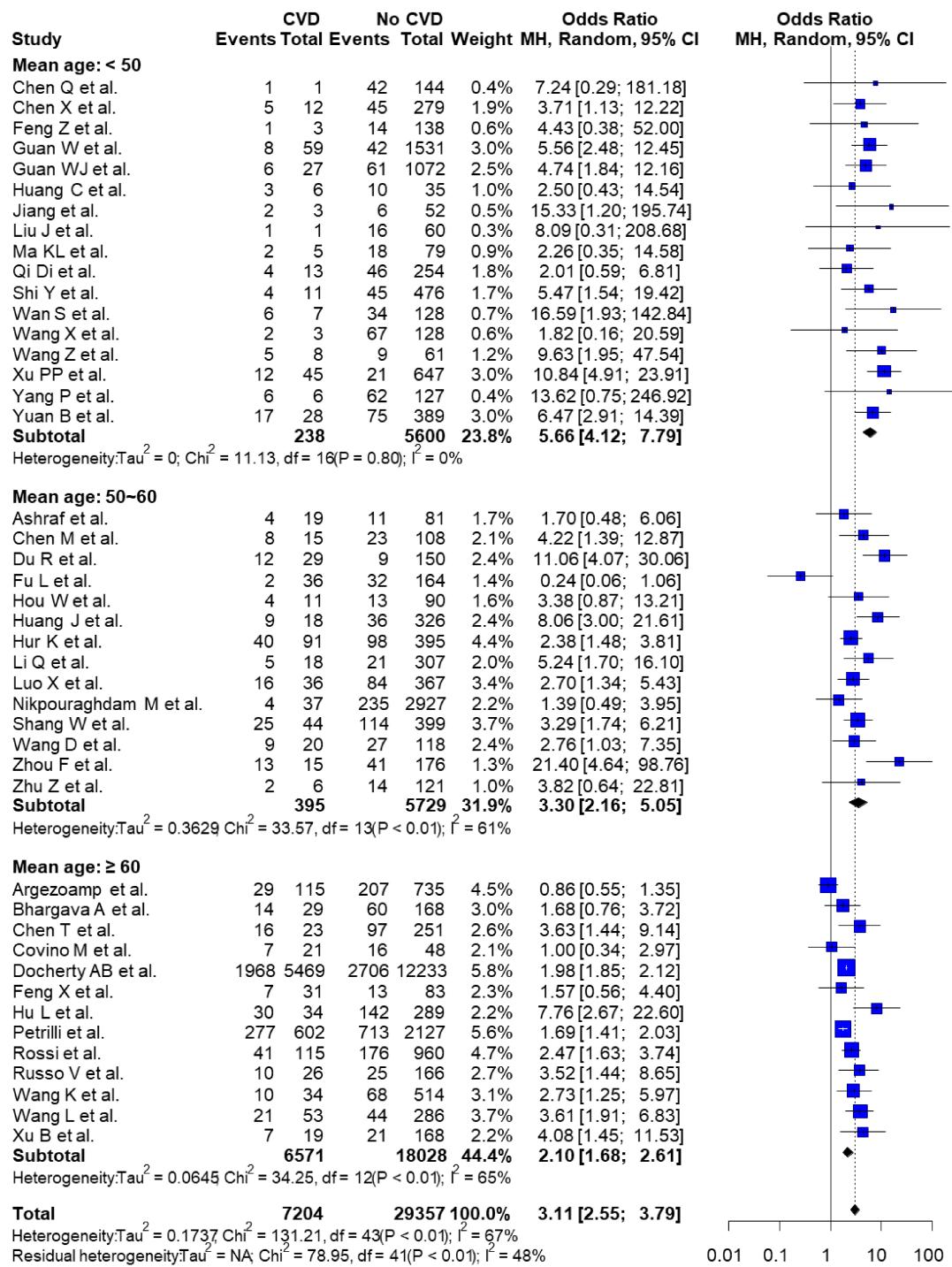
**Supplementary figure 12. Meta-analysis of the clinical outcomes of patients with CVD: severe COVID-19**



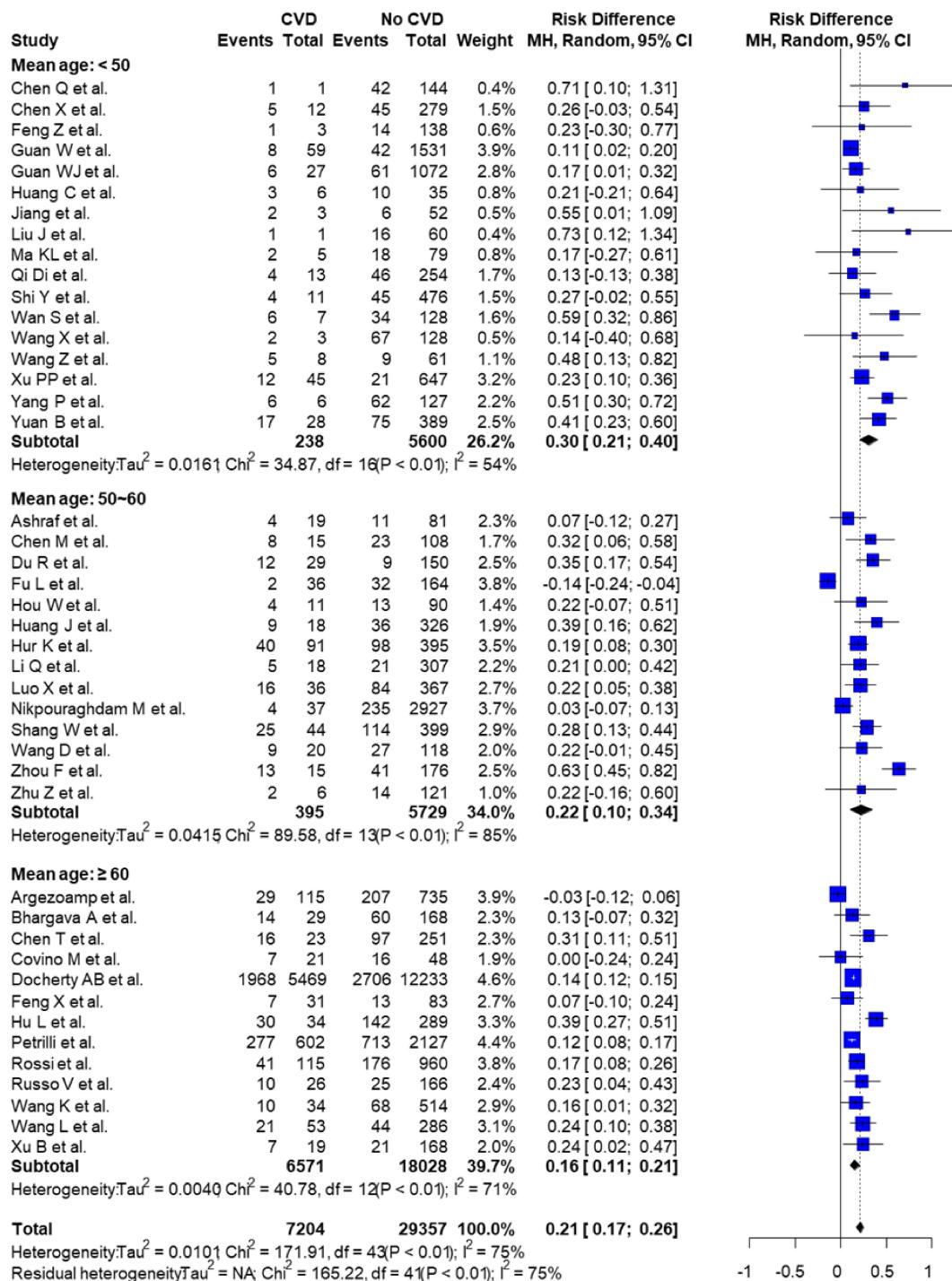
**Supplementary figure 13. Meta-analysis of the clinical outcomes of patients with CVD: death**

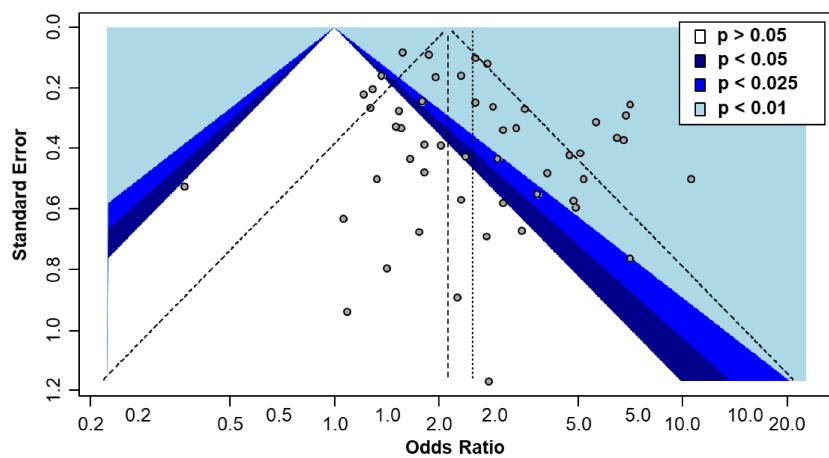
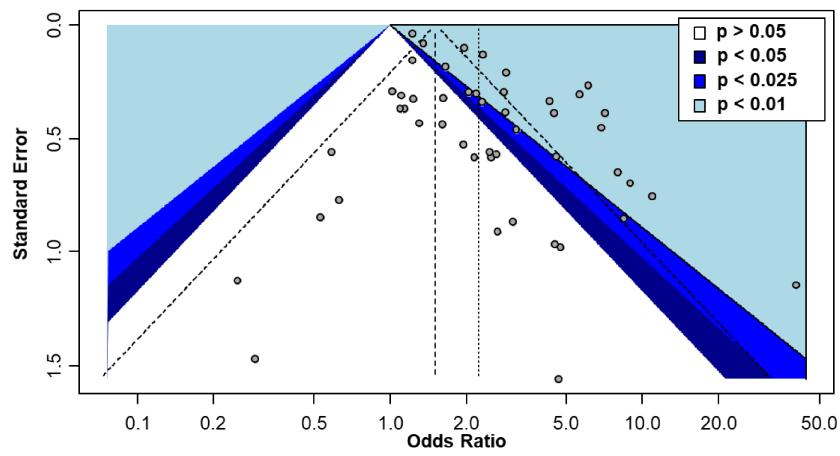
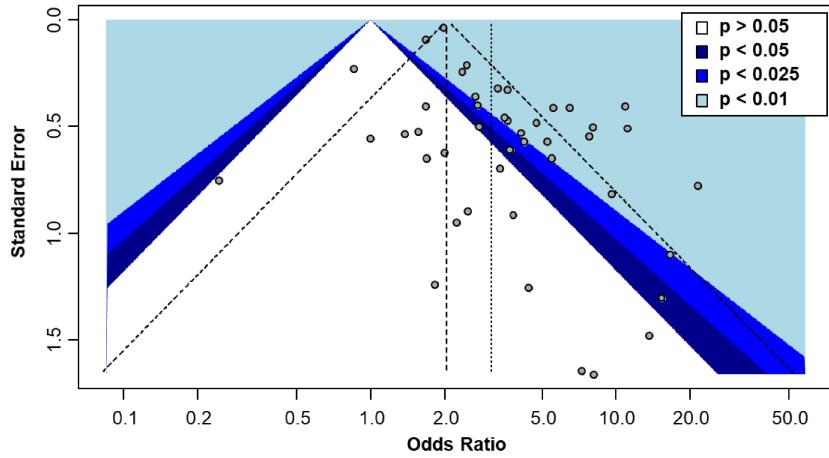


**Supplementary figure 14. Meta-analysis of the clinical outcomes of patients with CVD: fatal outcomes**



### Supplementary figure 15. Risk difference of fatal outcome in patients with CVD



**Supplementary figure 16. Contour-enhanced funnel plot****A. Hypertension****B. Diabetes****C. Cardiovascular disease**

## Reference

1. Argenziano MG, Bruce SL, Slater CL, et al. Characterization and clinical course of 1000 Patients with COVID-19 in New York: retrospective case series. *BMJ* 2020;29;369:m1996. doi: 10.1136/bmj.m1996
2. Ashraf MA, Shokouhi N, Shirali E, et al. COVID-19 in Iran, a comprehensive investigation from exposure to treatment outcomes. *medRxiv* 2020: 2020.04.20.20072421. doi: 10.1101/2020.04.20.20072421
3. Bhargava A, Fukushima EA, Levine M, et al. Predictors for Severe COVID-19 Infection. *Clin Infect Dis* 2020 doi: 10.1093/cid/ciaa674
4. Bode B, Garrett V, Messler J, et al. Glycemic Characteristics and Clinical Outcomes of COVID-19 Patients Hospitalized in the United States. *J Diabetes Sci Technol* 2020;1932296820924469. doi: 10.1177/1932296820924469
5. Chen M, Fan Y, Wu X, et al. Clinical characteristics and risk factors for fatal outcome in patients with 2019-coronavirus infected disease (COVID-19) in Wuhan, China. *Preprints with LANCET* 2020 doi: 10.2139/ssrn.3546069
6. Chen Q, Zheng Z, Zhang C, et al. Clinical characteristics of 145 patients with corona virus disease 2019 (COVID-19) in Taizhou, Zhejiang, China. *Infection* 2020;1-9. doi: 10.1007/s15010-020-01432-5
7. Chen T, Wu D, Chen H, et al. Clinical characteristics of 113 deceased patients with coronavirus disease 2019: retrospective study. *BMJ* 2020;368:m1091. doi: 10.1136/bmj.m1091
8. Chen X, Zheng F, Qing Y, et al. Epidemiological and clinical features of 291 cases with coronavirus disease 2019 in areas adjacent to Hubei, China: a double-center observational study. *medRxiv* 2020.03.03.20030353. doi: 10.1101/2020.03.03.20030353
9. Covino M, De Matteis G, Santoro M, et al. Clinical characteristics and prognostic factors in COVID-19 patients aged  $\geq$ 80 years. *Geriatr Gerontol Int* 2020 doi: 10.1111/ggi.13960
10. Docherty AB, Harrison EM, Green CA, et al. Features of 20 133 UK patients In-hospital with covid-19 using the ISARIC WHO Clinical Characterisation Protocol: prospective observational cohort study. *BMJ* 2020;369:m1985. doi: 10.1136/bmj.m1985
11. Du RH, Liang LR, Yang CQ, et al. Predictors of mortality for patients with COVID-19 pneumonia caused by SARS-CoV-2: a prospective cohort study. *Eur Respir J* 2020;55(5) doi: 10.1183/13993003.00524-2020
12. Feng X, Li P, Ma L, et al. Clinical Characteristics and Short-Term Outcomes of Severe Patients with COVID-19 in Wuhan, China. *Front Med (Lausanne)* 2020;7:491. doi: 10.3389/fmed.2020.00491
13. Feng Z, Yu Q, Yao S, et al. Early Prediction of Disease Progression in 2019 Novel Coronavirus Pneumonia Patients Outside Wuhan with CT and Clinical Characteristics. *medRxiv* 2020.02.19.20025296. doi: 10.1101/2020.02.19.20025296
14. Fu L, Fei J, Xiang H-X, et al. Influence factors of death risk among COVID-19 patients in Wuhan, China: a hospital-based case-cohort study. *medRxiv* 2020.03.13.20035329. doi: 10.1101/2020.03.13.20035329
15. Gao C, Cai Y, Zhang K, et al. Association of hypertension and antihypertensive treatment with COVID-19 mortality: a retrospective observational study. *Eur Heart J* 2020;41(22):2058-66. doi: 10.1093/euroheartj/ehaa433
16. Guan WJ, Liang WH, Zhao Y, et al. Comorbidity and its impact on 1590 patients with COVID-19 in China: a nationwide analysis. *Eur Respir J* 2020;55(5) doi: 10.1183/13993003.00547-2020
17. Guan W-j, Ni Z-y, Hu Y, et al. Clinical Characteristics of Coronavirus Disease 2019 in China. *N Engl J Med* 2020;382(18):1708-20. doi: 10.1056/NEJMoa2002032
18. Grasselli G, Zangrillo A, Zanella A, et al. Baseline Characteristics and Outcomes of 1591 Patients Infected With SARS-CoV-2 Admitted to ICUs of the Lombardy Region, Italy. *JAMA* 2020;323(16):1574-81. doi: 10.1001/jama.2020.5394
19. Hou W, Zhang W, Jin R, et al. Risk factors for disease progression In-hospital ized patients with COVID-19: a retrospective cohort study. *Infect Dis (Lond)* 2020;52(7):498-505. doi: 10.1080/23744235.2020.1759817
20. Hu L, Chen S, Fu Y, et al. Risk Factors Associated with Clinical Outcomes in 323 COVID-19 Hospitalized Patients in Wuhan, China. *Clin Infect Dis* 2020 doi: 10.1093/cid/ciaa539
21. Huang J, Cheng A, Lin S, et al. Individualized prediction nomograms for disease progression in mild COVID-19. *J Med Virol* 2020 doi: 10.1002/jmv.25969
22. Huang C, Wang Y, Li X, et al. Clinical features of patients infected with 2019 novel coronavirus in

- Wuhan, China. *Lancet* 2020;395(10223):497-506. doi: 10.1016/s0140-6736(20)30183-5
23. Hur K, Price CPE, Gray EL, et al. Factors Associated With Intubation and Prolonged Intubation In-hospitalized Patients With COVID-19. *Otolaryngol Head Neck Surg* 2020;194:599820929640. doi: 10.1177/0194599820929640
24. Jiang X, Tao J, Wu H, et al. Clinical features and management of severe COVID-19: A retrospective study in Wuxi, Jiangsu Province, China. *medRxiv* 2020.04.10.20060335. doi: 10.1101/2020.04.10.20060335
25. Qiang Li YL, Jianliang Zhang et al. Clinical Characteristics of SARS-CoV-2 Infections Involving 325 Hospitalized Patients outside Wuhan. *PREPRINT available at Research Square* 2020 doi: 10.21203/rs.3.rs-18699/v1
26. Liu J, Liu Y, Xiang P, et al. Neutrophil-to-Lymphocyte Ratio Predicts Severe Illness Patients with 2019 Novel Coronavirus in the Early Stage. *Transl Med* 2020;18(1):206. doi: 10.1186/s12967-020-02374-0
27. Liu W, Tao Z-W, Wang L, et al. Analysis of factors associated with disease outcomes In-hospitalized patients with 2019 novel coronavirus disease. *Chin Med J (Engl)* 2020;133(9):1032-38. doi: 10.1097/CM9.0000000000000775
28. Luo X, Xia H, Yang W, et al. Characteristics of patients with COVID-19 during epidemic ongoing outbreak in Wuhan, China. *medRxiv* 2020.03.19.20033175. doi: 10.1101/2020.03.19.20033175
29. Ma K-L, Liu Z-H, Cao C-f, et al. COVID-19 Myocarditis and Severity Factors : An Adult Cohort Study. *medRxiv* 2020.03.19.20034124. doi: 10.1101/2020.03.19.20034124
30. Nikpouraghdam M, Jalali Farahani A, Alishiri G, et al. Epidemiological characteristics of coronavirus disease 2019 (COVID-19) patients in IRAN: A single center study. *J Clin Virol* 2020;127:104378-78. doi: 10.1016/j.jcv.2020.104378
31. Petrilli CM, Jones SA, Yang J, et al. Factors associated with hospital admission and critical illness among 5279 people with coronavirus disease 2019 in New York City: prospective cohort study. *BMJ* 2020;369:m1966-m1966. doi: 10.1136/bmj.m1966
32. Qi D, Yan X, Tang X, et al. Epidemiological and clinical features of 2019-nCoV acute respiratory disease cases in Chongqing municipality, China: a retrospective, descriptive, multiple-center study. *medRxiv* 2020.03.01.20029397. doi: 10.1101/2020.03.01.20029397
33. Richardson S, Hirsch JS, Narasimhan M, et al. Presenting Characteristics, Comorbidities, and Outcomes Among 5700 Patients Hospitalized With COVID-19 in the New York City Area. *JAMA* 2020;323(20):2052-9. doi: 10.1001/jama.2020.6775
34. Giorgi Rossi P, Marino M, Formisano D, et al. Characteristics and outcomes of a cohort of SARS-CoV-2 patients in the Province of Reggio Emilia, Italy. *PLoS One* 2020; 27;15(8):e0238281. doi: 10.1371/journal.pone.0238281
35. Russo V, Di Maio M, Attena E, et al. Clinical impact of pre-admission antithrombotic therapy In-hospitalized patients with COVID-19: A multicenter observational study. *Pharmacol Res* 2020;159:104965. doi: 10.1016/j.phrs.2020.104965
36. Shang W, Dong J, Ren Y, et al. The value of clinical parameters in predicting the severity of COVID-19. *J Med Virol* 2020 doi: 10.1002/jmv.26031
37. Shi Y, Yu X, Zhao H, et al. Host susceptibility to severe COVID-19 and establishment of a host risk score: findings of 487 cases outside Wuhan. *Crit Care* 2020;24(1):108. doi: 10.1186/s13054-020-2833-7
38. Wan S, Xiang Y, Fang W, et al. Clinical features and treatment of COVID-19 patients in northeast Chongqing. *J Med Virol* 2020;92(7):797-806. doi: 10.1002/jmv.25783
39. Wang K, Zhang Z, Yu M, et al. 15-day mortality and associated risk factors for hospitalized patients with COVID-19 in Wuhan, China: an ambispective observational cohort study. *Intensive Care Med* 2020;1-3. doi: 10.1007/s00134-020-06047-w
40. Wang L, He W, Yu X, et al. Coronavirus disease 2019 in elderly patients: Characteristics and prognostic factors based on 4-week follow-up. *J Infect* 2020;80(6):639-45. doi: 10.1016/j.jinf.2020.03.019
41. Wang X, Xu H, Jiang H, et al. The Clinical Features and Outcomes of Discharged Coronavirus Disease 2019 Patients : A Prospective Cohort Study. *QJM* 2020 doi: 10.1093/qjmed/hcaa178
42. Wang Y, Zhou Y, Yang Z, et al. Clinical Characteristics of Patients with Severe Pneumonia Caused by the 2019 Novel Coronavirus in Wuhan, China. *medRxiv* 2020.03.02.20029306. doi: 10.1101/2020.03.02.20029306
43. Wang D, Hu B, Hu C, et al. Clinical Characteristics of 138 Hospitalized Patients With 2019 Novel

- Coronavirus-Infected Pneumonia in Wuhan, China. *JAMA* 2020;323(11):1061-9. doi: 10.1001/jama.2020.1585
44. Wang Z, Yang B, Li Q, et al. Clinical Features of 69 Cases with Coronavirus Disease 2019 in Wuhan, China. *Clin Infect Dis* 2020 doi: 10.1093/cid/ciaa272
45. Xu B, Fan CY, Wang AL, et al. Suppressed T cell-mediated immunity in patients with COVID-19: A clinical retrospective study in Wuhan, China. *J Infect* 2020;81(1):e51-e60. doi: 10.1016/j.jinf.2020.04.012
46. Xu PP, Tian RH, Luo S, et al. Risk factors for adverse clinical outcomes with COVID-19 in China: a multicenter, retrospective, observational study. *Theranostics* 2020;10(14):6372-83. doi: 10.7150/thno.46833
47. Yadaw AS, Li YC, Bose S, et al. Clinical predictors of COVID-19 mortality. *medRxiv* 2020 doi: 10.1101/2020.05.19.20103036
48. Yang P, Wang P, Song Y, et al. A retrospective study on the epidemiological characteristics and establishment of an early warning system of severe COVID-19 patients. *J Med Virol* 2020 doi: 10.1002/jmv.26022
49. Bo Yuan Y-WA, Yong-Xin Chen et al. Epidemiological Characteristics of 417 patients infected with COVID-19 and 368 discharged cases among them in Shenzhen City, China. *PREPRINT available at Research Square* 2020 doi: 10.21203/rs.3.rs-19554/v1
50. Zhou F, Yu T, Du R, et al. Clinical course and risk factors for mortality of adult inpatients with COVID-19 in Wuhan, China: a retrospective cohort study. *Lancet* 2020;395(10229):1054-62. doi: 10.1016/s0140-6736(20)30566-3
51. Zhu Z, Cai T, Fan L, et al. Clinical value of immune-inflammatory parameters to assess the severity of coronavirus disease 2019. *Int J Infect Dis* 2020;95:332-39. doi: 10.1016/j.ijid.2020.04.04