Airway Disease in the Covid-19 Era

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Life in the time of Corona

Contents

1) Are the patients with airway disease more susceptible to SARS-CoV-2 infection?
2) Are clinical outcomes from COVID-19 worse in the patients with airway disease ?
3) Does ICS affect the risk of contracting severe COVID-19?
4) How to manage the patient with airway disease ?

Do chronic respiratory diseases or their treatment affect the risk of SARS-CoV-2 infections?

	Number of patients	Health-care workers (%)	Mean or median age (years)	Prevalence (%)			
				Chronic respiratory disease	COPD	Asthma	Diabetes
Patients with COVID-19	USA			8.5%			10.2%
China[12]	44 672	3·8%	~51	2·4%	..	..	5·3%
Wuhan, China[13]	140	..	57*	..	1·4%	..	12·1%
China[19]	..	..	..	6·9%	4·9%	2·3%	6·6%
Canada[19]	..	..	..	10·4%	5·4%	5·4%	8·2%
Taiwan[19]	..	..	..	13·1%	10·4%	3·9%	10·6%
Hong Kong[20]	..	..	..	..	1·4%	1·9%	3·8%

- Under-diagnosis of chronic respiratory disease
- Its treatment may reduce the risk of infection
- Early shielding of older and high-risk population

Global burden of Disease 11.3% 10.2% Lancet Respir Med 2020

Clinical characteristics and outcomes of COVID-19 Cohort patients in Daegu in 2020

Characteristics	Alive (n = 2,075)	Dead (n = 179)	Total (n = 2,254)	*P* value
Diabetes				< 0.001
No	1,777 (85.6)	102 (57.0)	1,879 (83.4)	
Yes	298 (14.4)	77 (43.0)	375 (16.6)	
Heart failure				< 0.001
No	2,046 (98.6)	165 (92.2)	2,211 (98.1)	
Yes	29 (1.4)	14 (7.8)	43 (1.9)	
Hypertension				< 0.001
No	1,541 (74.3)	67 (37.4)	1,608 (71.3)	
Yes	534 (25.7)	112 (62.6)	646 (28.7)	
Chronic heart disease except heart failure or hypertension				< 0.001
No	1,986 (95.7)	158 (88.3)	2,144 (95.1)	
Yes	89 (4.3)	21 (11.7)	110 (4.9)	
Asthma				0.132
No	2,018 (97.3)	170 (95.0)	2,188 (97.1)	
Yes	57 (2.7)	9 (5.0)	66 (2.9)	
COPD				0.173
No	2,049 (98.7)	174 (97.2)	2,223 (98.6)	
Yes	26 (1.3)	5 (2.8)	31 (1.4)	
Chronic renal disease				< 0.001
No	2,054 (99.0)	165 (92.2)	2,219 (98.4)	
Yes	21 (1.0)	14 (7.8)	35 (1.6)	

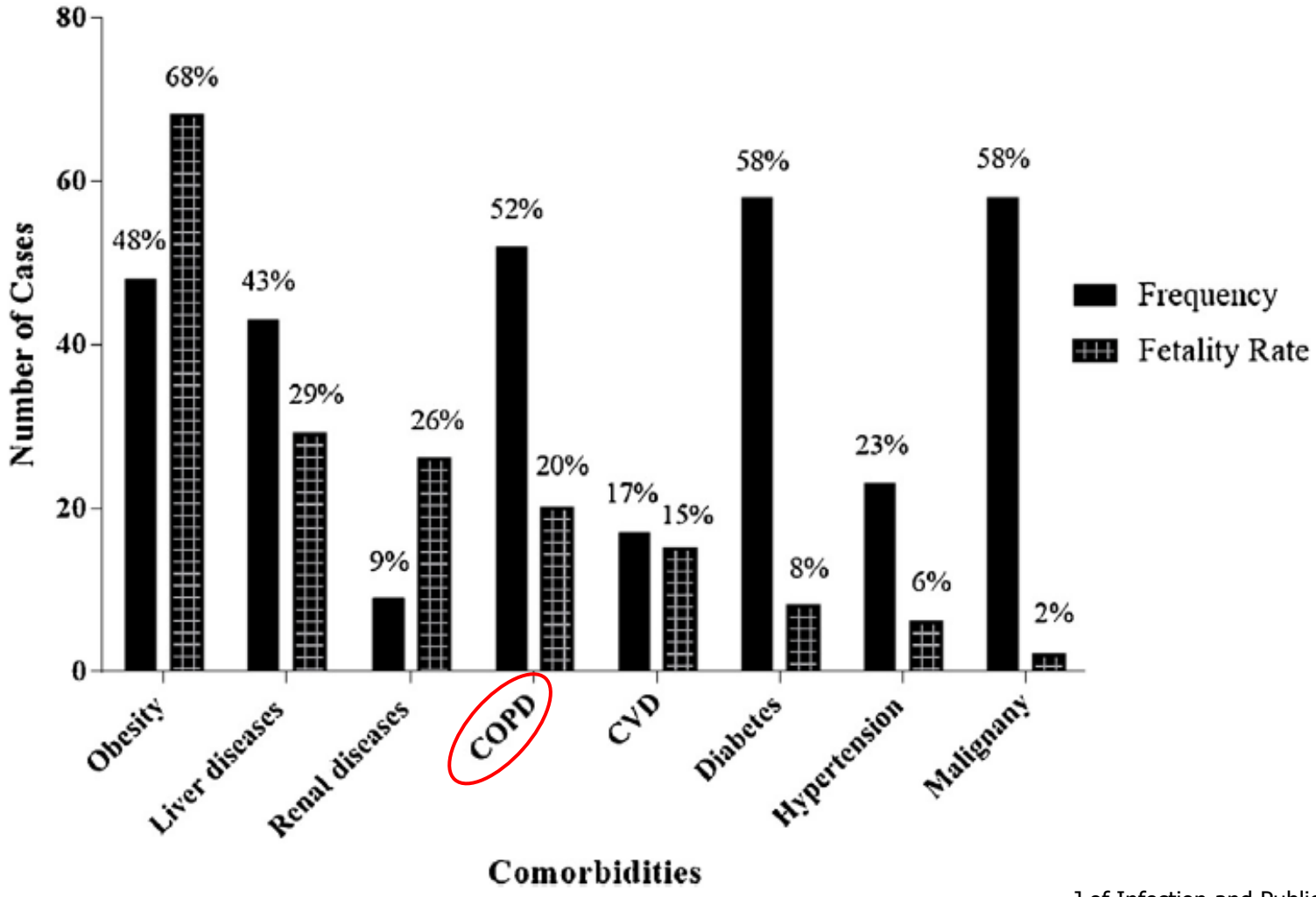
J Korean Med Sci. 2021 Jan 4;36(1):e12

COPD prevalence in COVID-19 patients

Study [ref.]	Location	Subjects n	Age#	Female	Type of patient	Smoking rate	COPD rate	COPD prevalence by outcome		p-value
Zhang [27]	China	111	38.0	65%	Hospitalised	NA	2.7%	Deterioration Discharge	5.6% 2.2%	0.415
Chu [91]	China	33	65.2	33.3%	ICU	NA	3.0%	ECMO No ECMO	14.3% 0	0.21
Wang [28]	China	107	51.0	46.7%	Hospitalised	NA	2.8%	Survivors Non-survivors	2.3% 5.3%	0.447
Lagi [46]	Italy	84	62	34.5%	Hospitalised	Current 7.1%; former 22.6%	5.6%	ICU Non-ICU hospitalisation	18.8% 2.9%	0.045
Tomlins [92]	UK	95	75	37%	Hospitalised	NA	11%	Survivors Non-survivors	8% 20%	0.2
Israelsen [93]	Denmark	175	71	51.4%	Hospitalised	Ever 55.8% Never 44.2%	6.3%	ICU Non-ICU hospitalisation	7.4% 6.1%	1.00
Auld [94]	Atlanta, GA, USA	217	64	45.2%	ICU	NA	9.7%	Survivors Non-survivors	9.5% 8.1%	0.737
Buckner [95]	Seattle, WA, USA	105	69	50%	Hospitalised	Ever 26%	10%	Severe Non-severe	14% 7%	NA
Javanian [96]	Iran	100	60.12	49%	Hospitalised	NA	12%	Survivors Non-survivors	8.64% 26.31%	0.032
Itelman [97]	Israel	162	52	35.2	Hospitalised	8.9%+	1.2%	Severe Moderate Mild	3.8% 0 1.1%	0.364

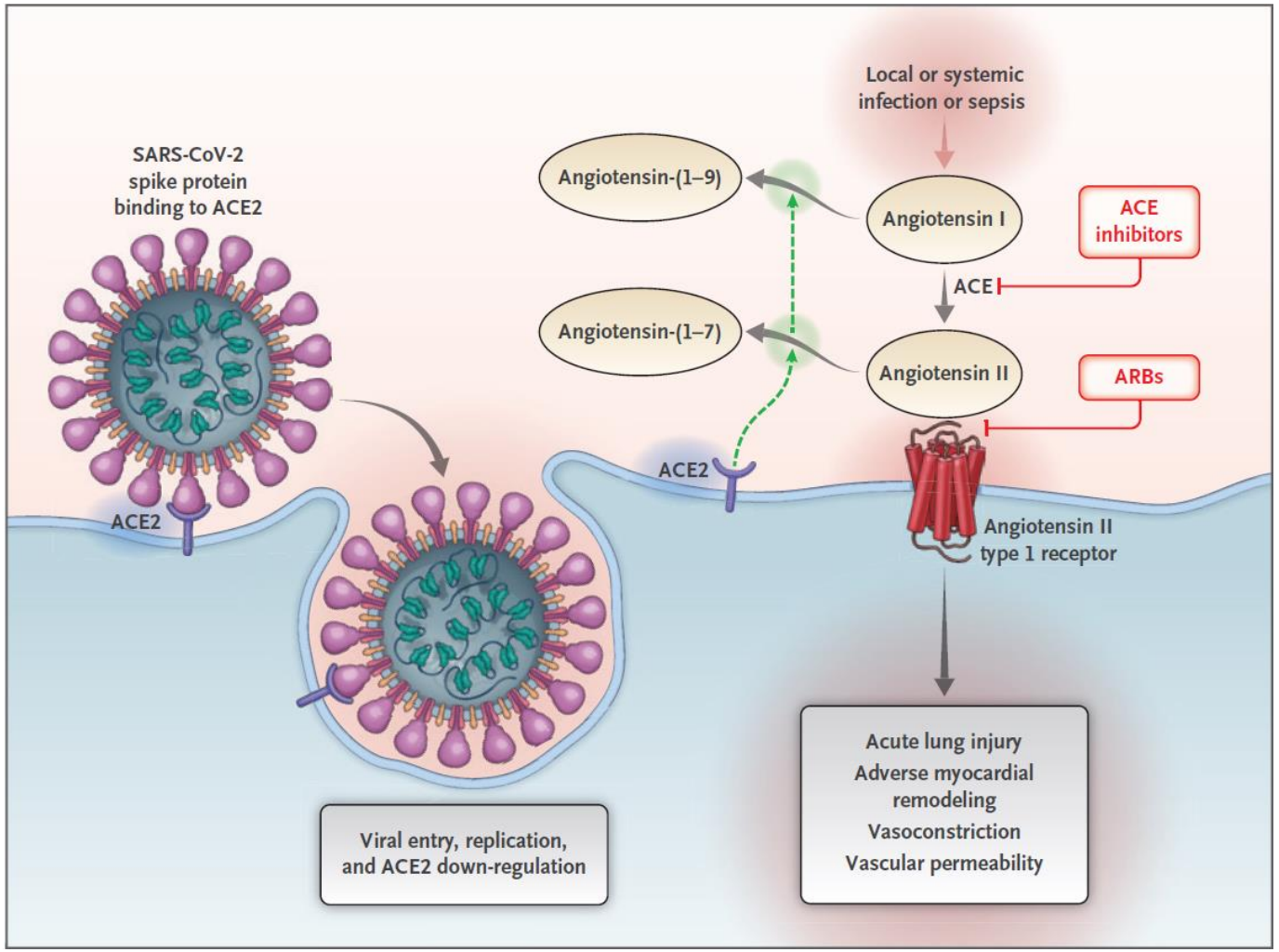
Eur Respir J 2020;56:2002108

The frequency of comorbidity and its fatality in COVID-19



J of Infection and Public Health 13 (2020) 1833-1839

Interaction between SARS-CoV-2 and the Renin-Angiotensin-Aldosterone System

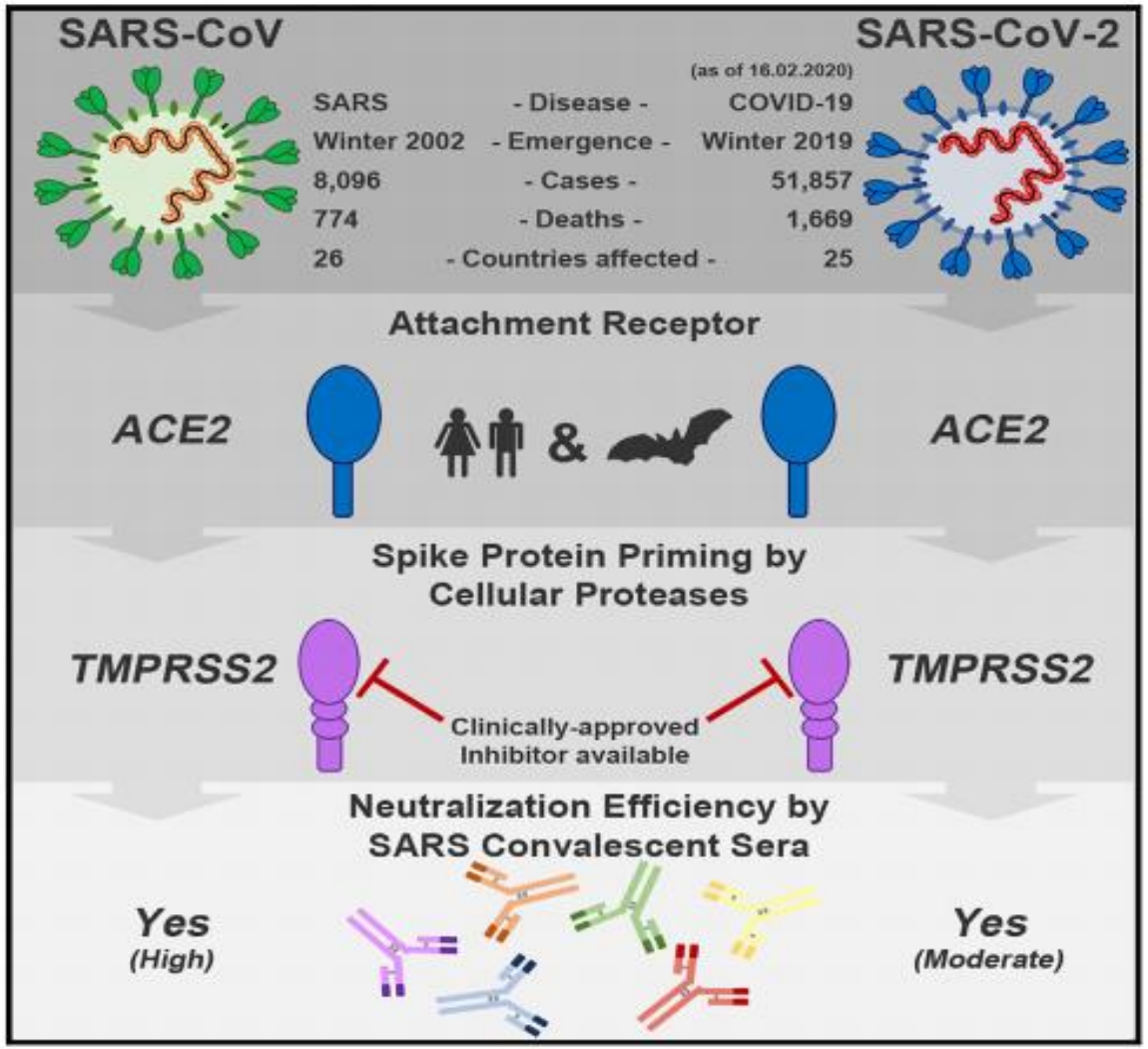


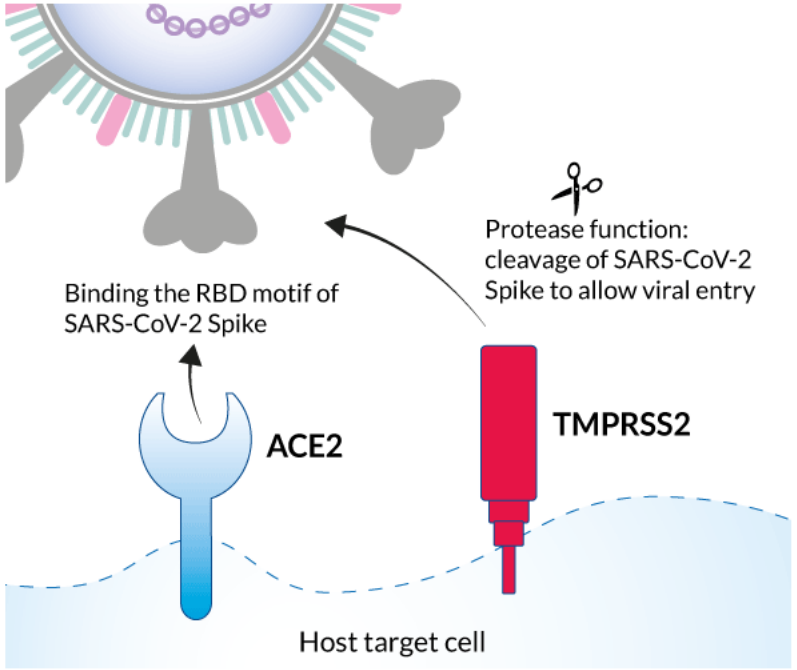
angiotensin-converting enzyme 2 (ACE2)
Angiotensin-receptor blocker (ARB)

N Eng J Med 2020;382:1653-1659

Cell

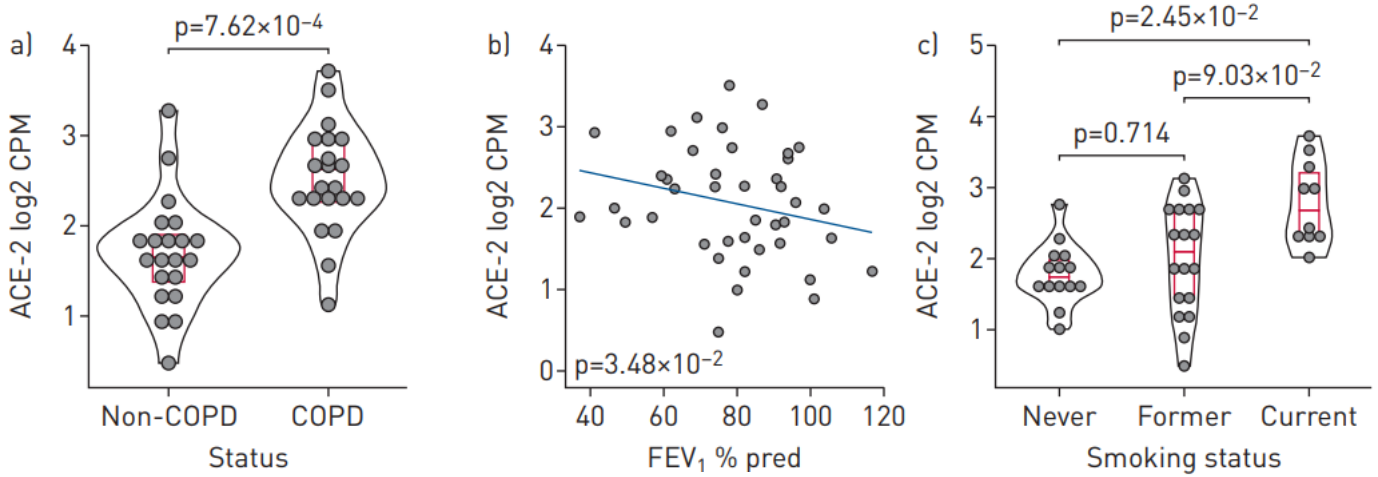
SARS-CoV-2 Cell Entry Depends on ACE2 and TMPRSS2 and Is Blocked by a Clinically Proven Protease Inhibitor

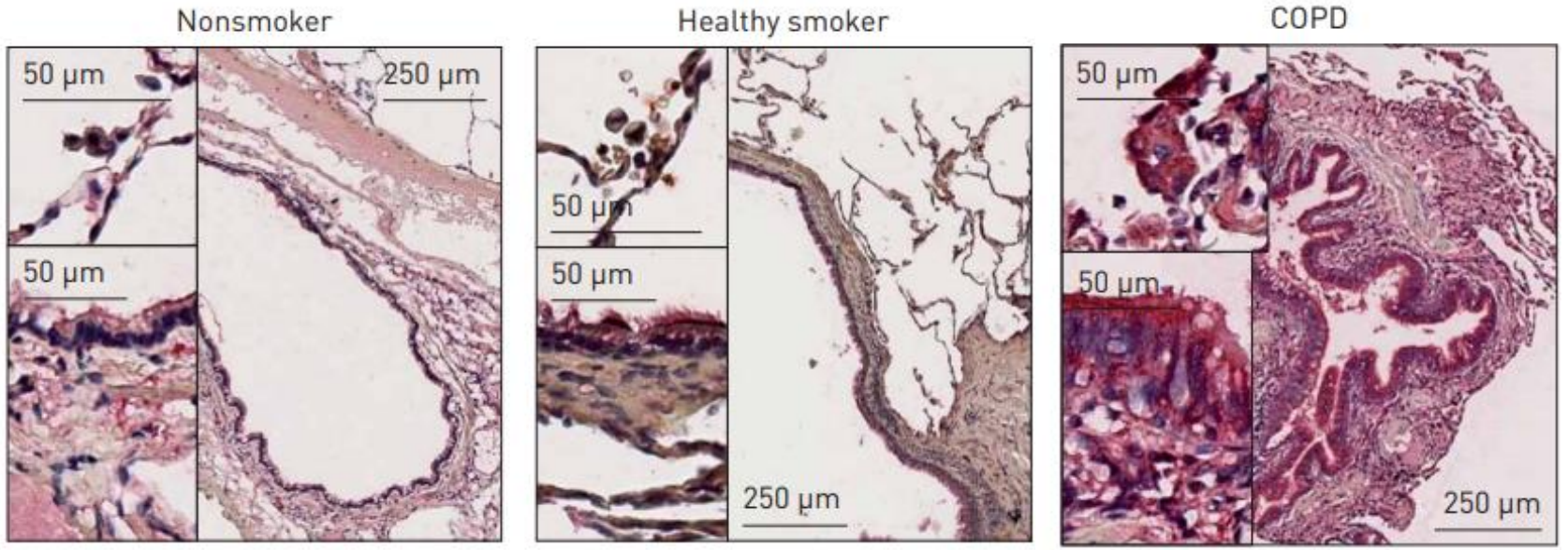


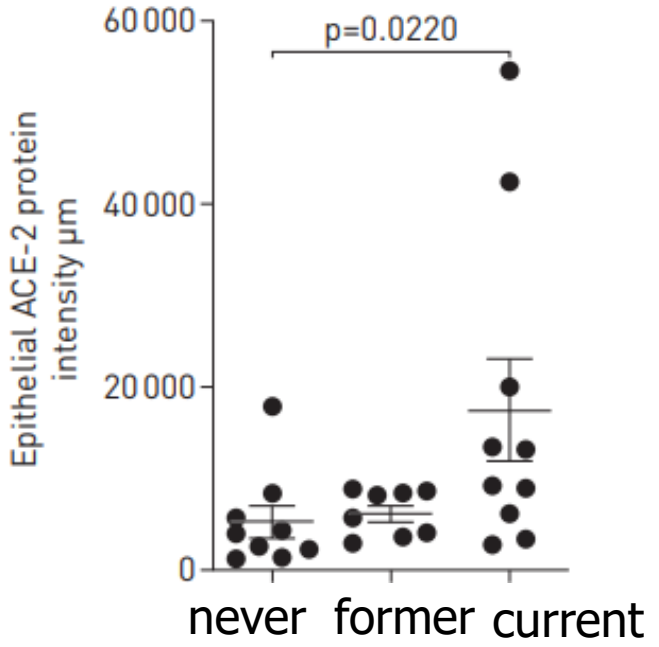


Cell 2020:181:271-280

ACE2 Expression in the small airway epithelia of smokers and COPD patients : Implications for COVID-19

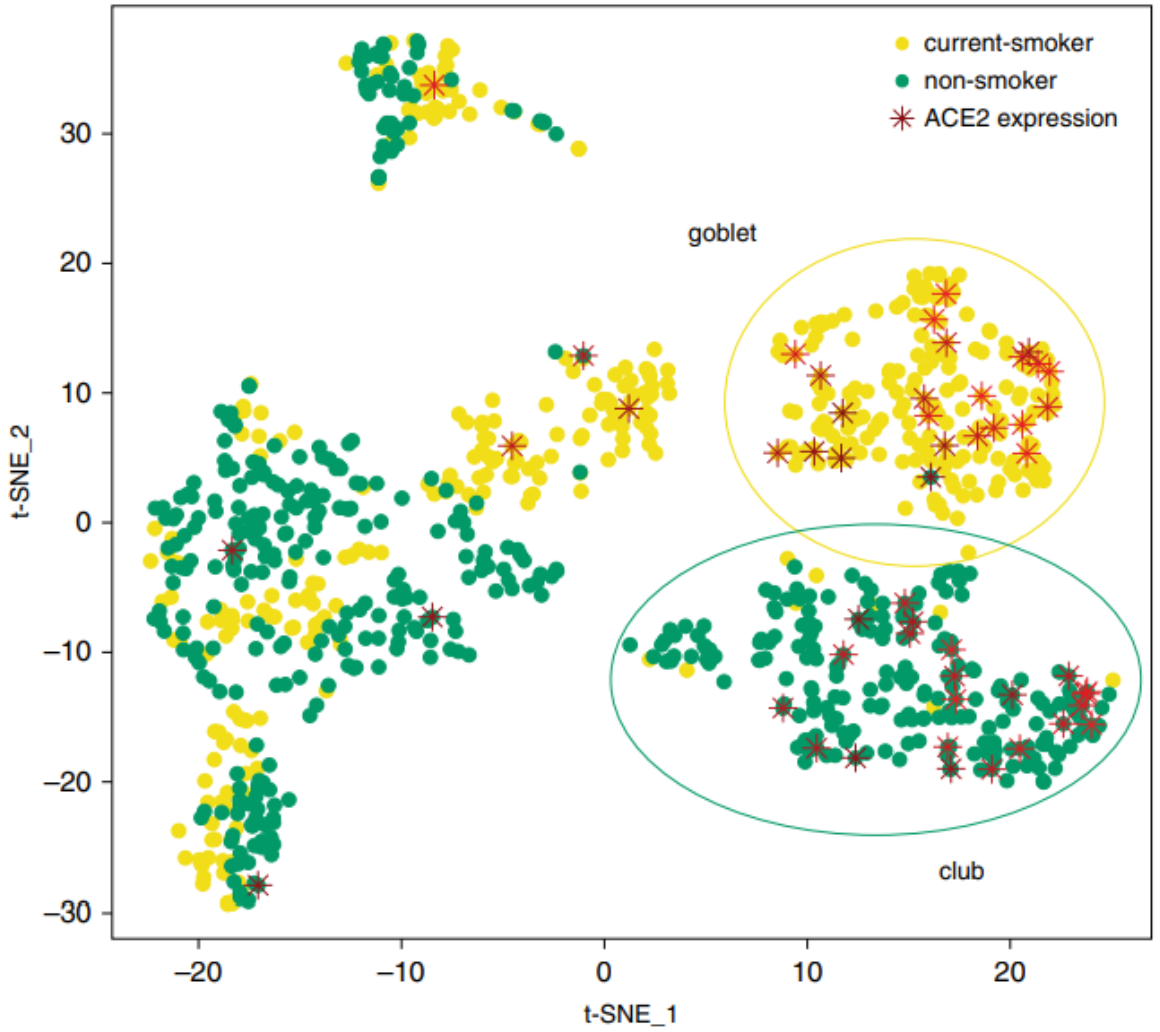






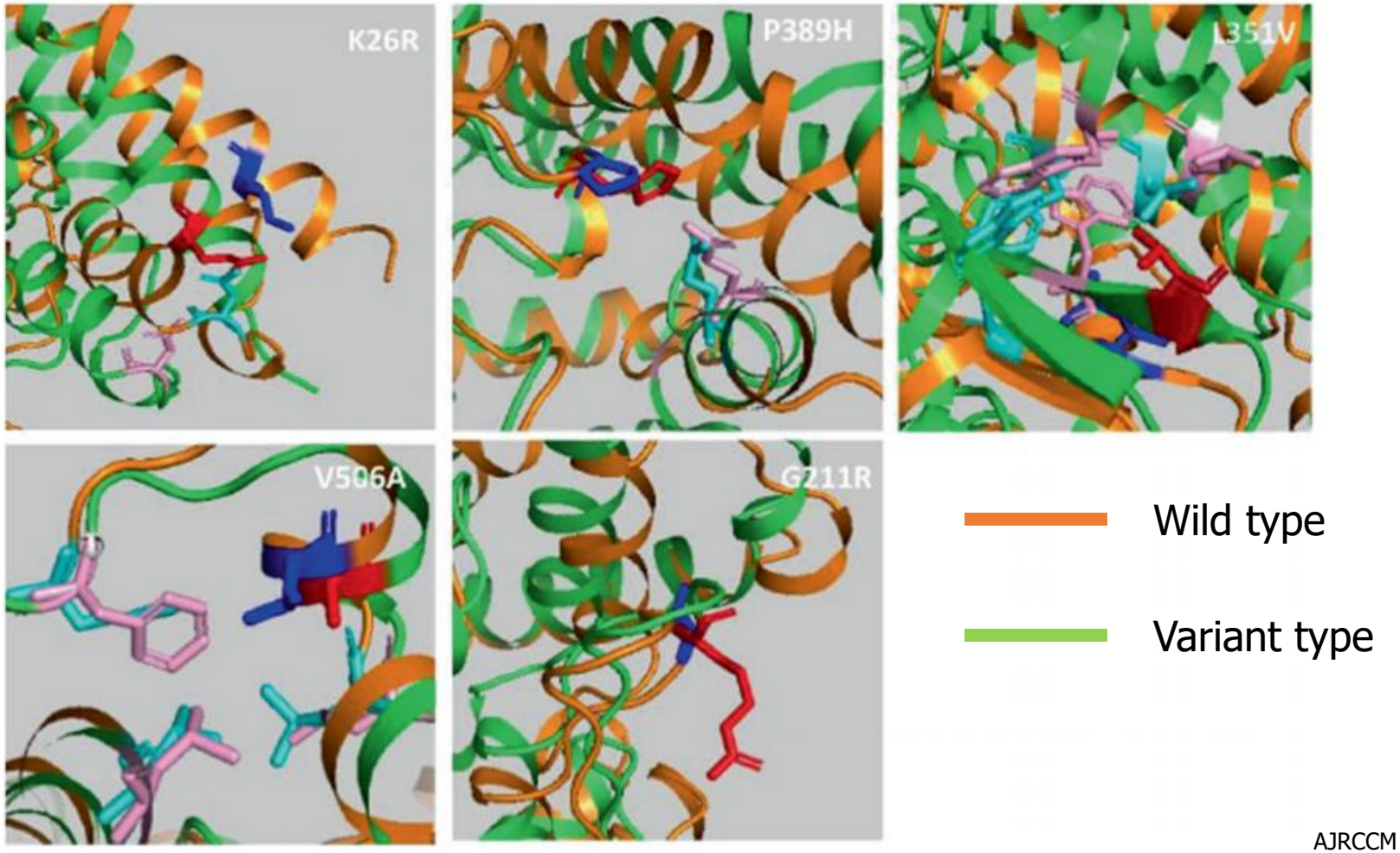
ERJ 2020

Tobacco Smoking Increases the Lung Gene Expression of ACE2, the Receptor of SARS-CoV-2



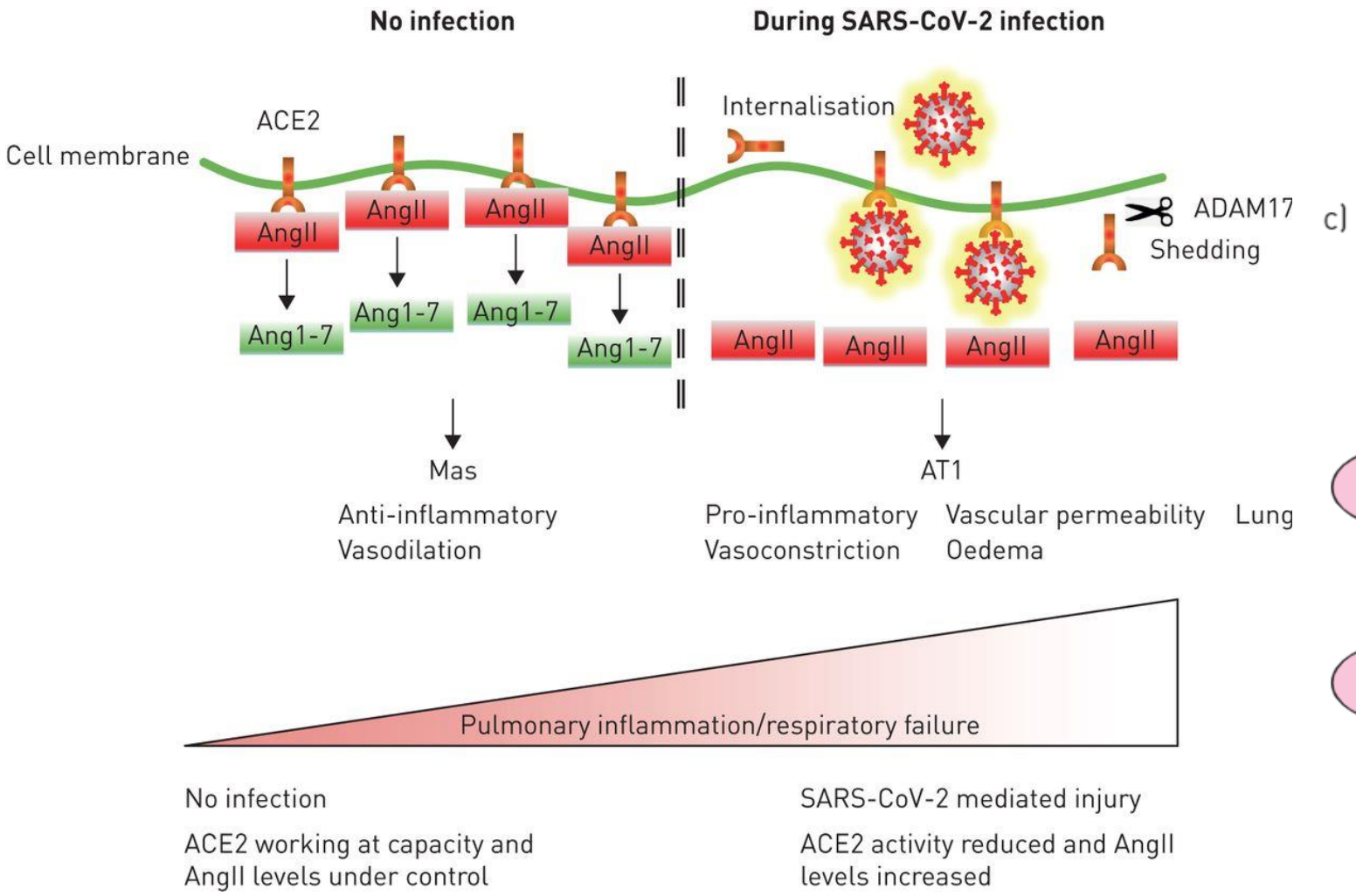
AJRCCM 202003-0693LE:2020.April.

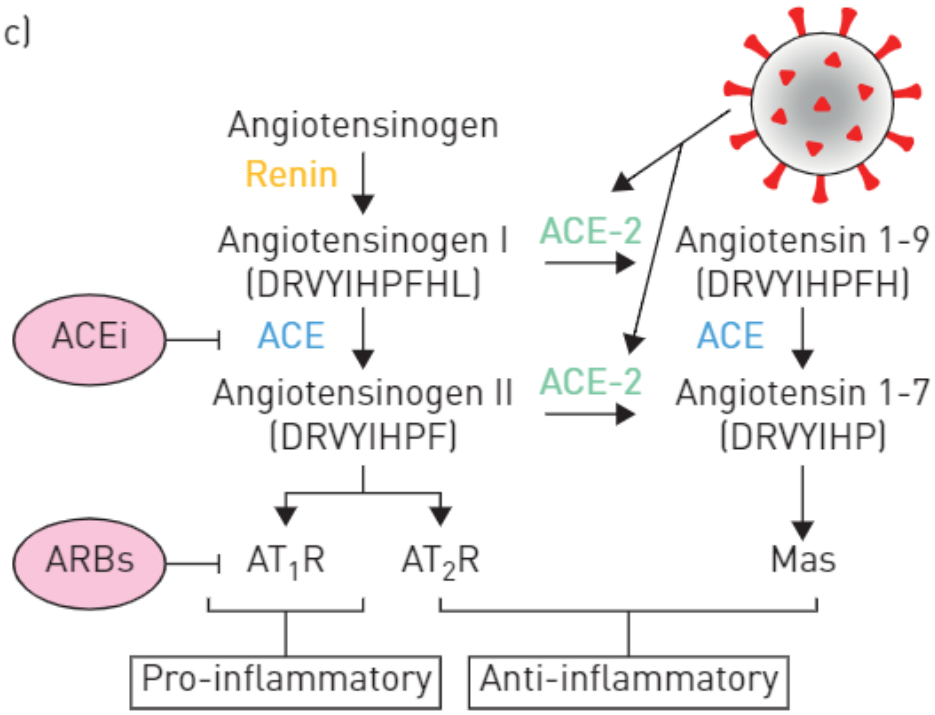
ACE2 gene variants may underlie interindividual variability and susceptibility to COVID-19



AJRCCM 202003-0693LE:2020.April.

Implications of ACE2 dysfunction during SARS-CoV2 infection

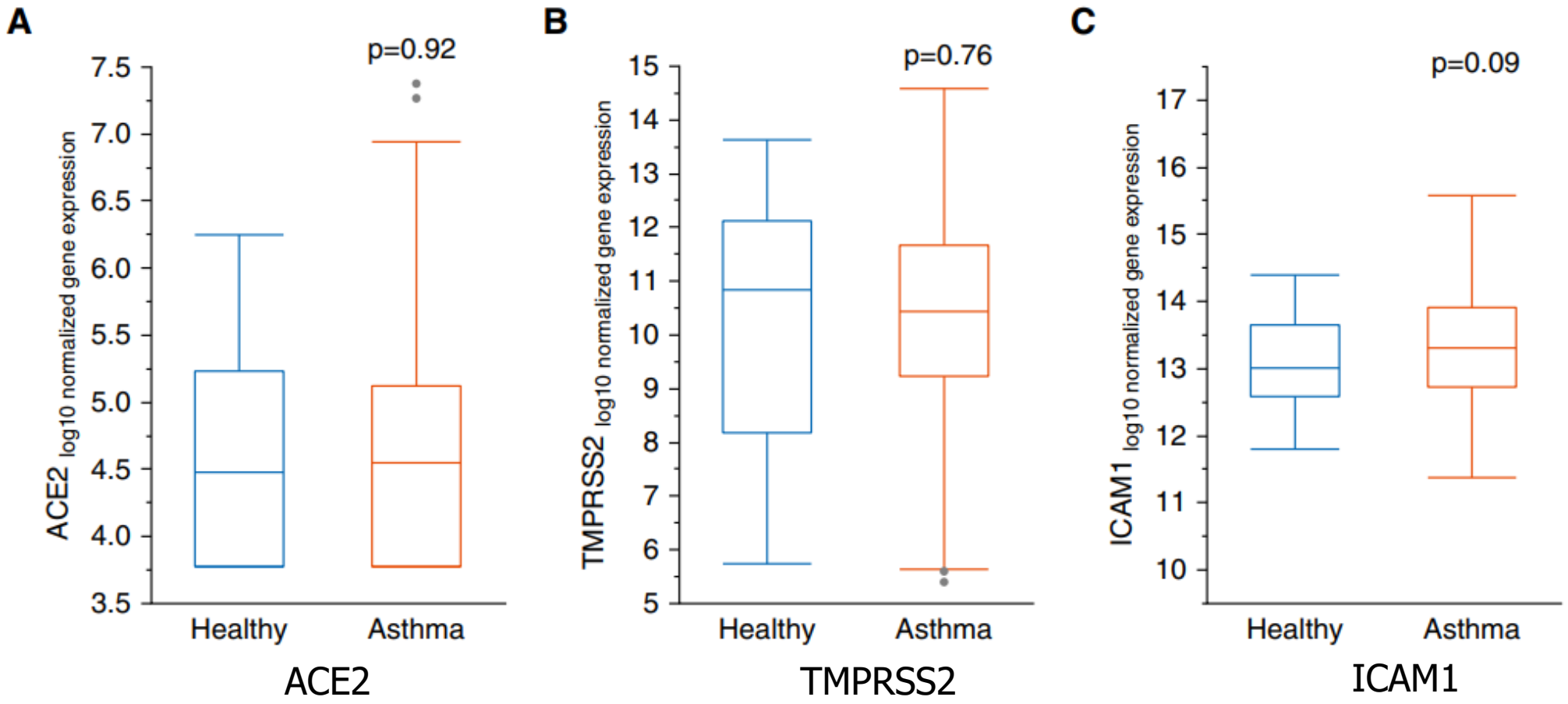




Eur Respir Rev 2020;29:200199
Eur Respir J 2020;56:2002108

COVID-19-related Genes in Sputum Cells in Asthma

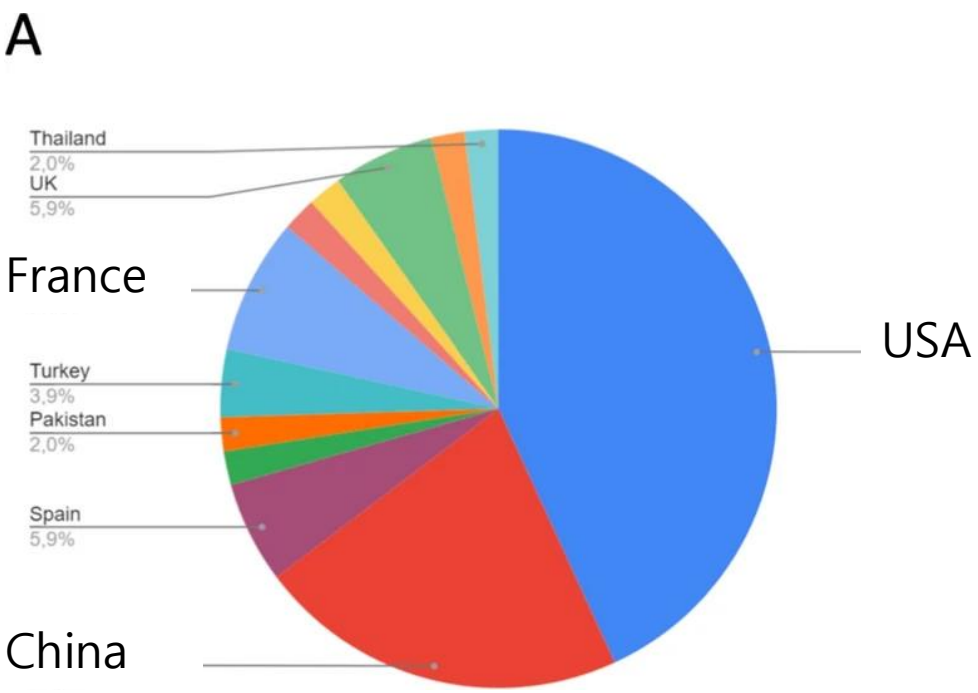
Healthy (n=79)
Asthma (n=330)

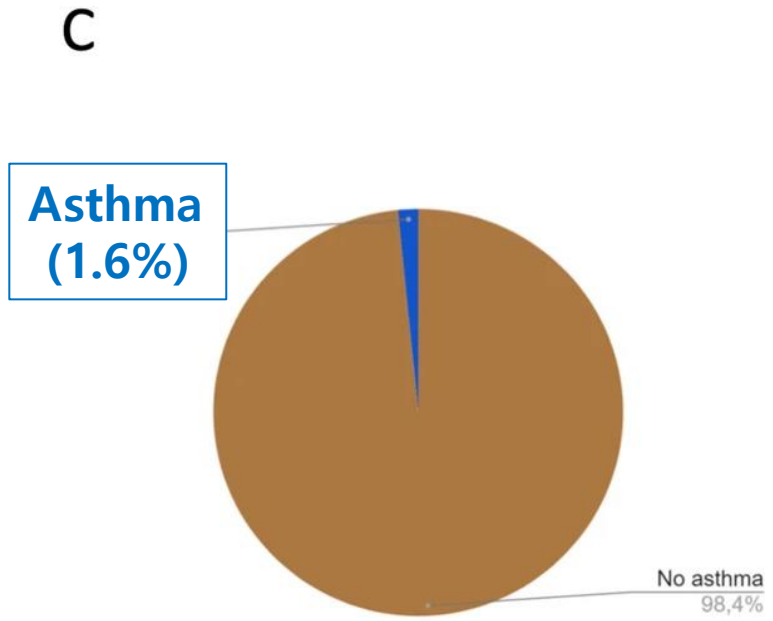


Am J Respir Crit Care Med 2020(1) 83-90

Asthma and COVID-19 : systematic review

Global prevalence of asthma ; 4.4%





Among All COVID-19 patients

Allerg, Asthma & Clinical Immunology 2021

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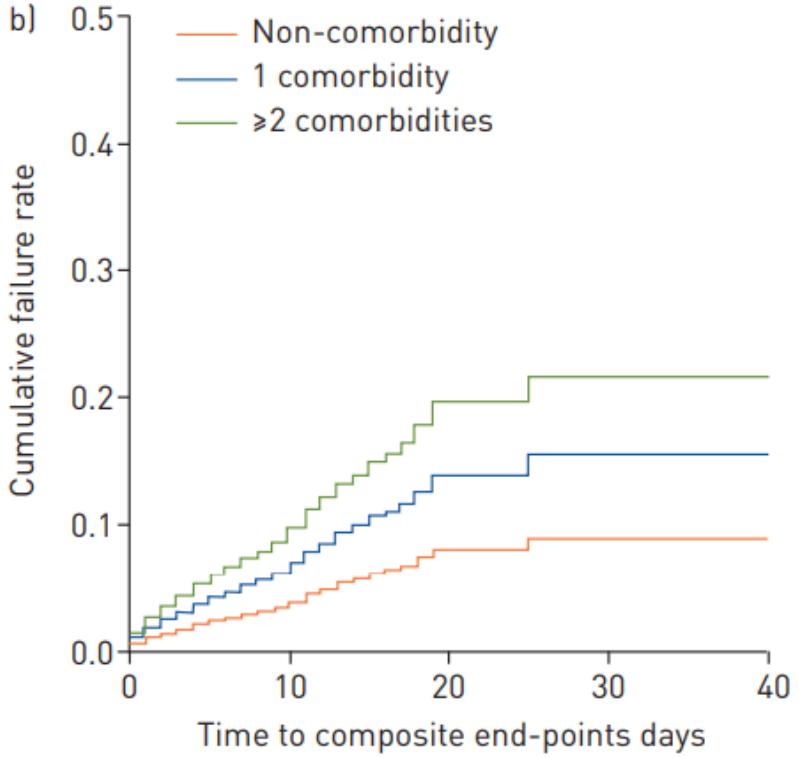
Comorbidity and its impact on 1590 patients with COVID-19 in China : a nationwide analysis

Features	HR (95% CI)	p-value
Type of comorbidities		
COPD	2.681 (1.424–5.058)	0.002
Diabetes	1.586 (1.028–2.449)	0.037
Hypertension	1.575 (1.069–2.322)	0.022
Malignant tumour	3.501 (1.604–7.643)	0.002
Comorbidities n		
1	1.789 (1.155–2.772)	0.009
≥2	2.592 (1.611–4.171)	<0.001



ICU admission, MV care, Death

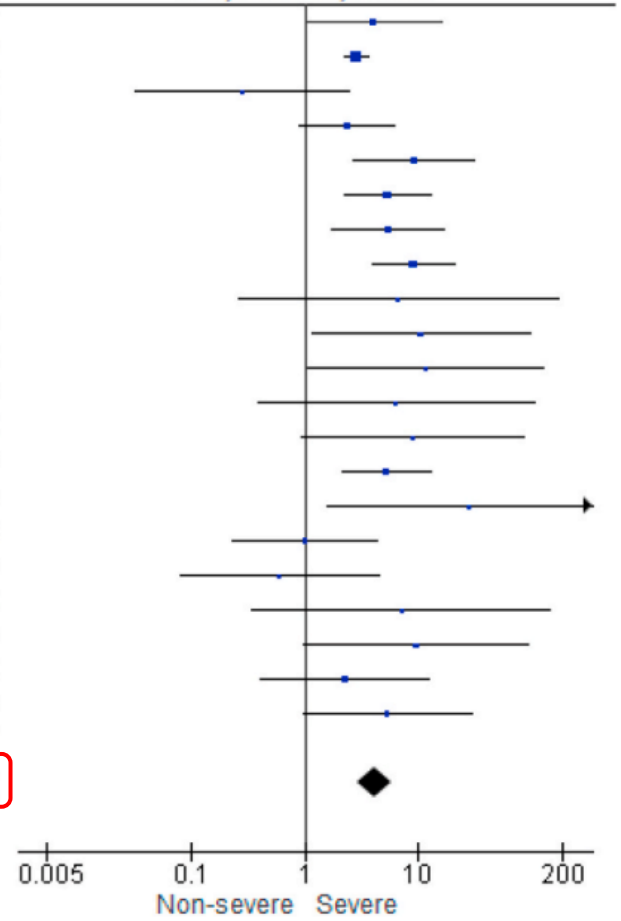
Eur Respir J 2020;55:2000547

Underlying respiratory disease, specifically COPD, and smoking are associated with severe COVID-19 outcomes :SR and MA

Study or Subgroup	RC/Severe Events	RC/Severe Total	RC/Non-Severe Events	RC/Non-Severe Total	Weight	Odds Ratio M-H, Random, 95% CI
Cao et al.	4	17	6	85	5.0%	4.05 [1.00, 16.34]
CDC USA	94	457	515	6180	17.3%	2.85 [2.23, 3.64]
Chen T el al.(b)	1	19	6	36	2.4%	0.28 [0.03, 2.50]
Chen T et al.(a)	11	113	7	161	7.9%	2.37 [0.89, 6.32]
Deng Y et al.	22	109	3	116	5.9%	9.52 [2.76, 32.86]
Feng Y et al.	14	124	8	352	8.7%	5.47 [2.24, 13.39]
Guan WJ et al.(a)	6	173	6	926	6.5%	5.51 [1.76, 17.29]
Guan WJ et al.(b)	15	254	9	1339	9.4%	9.27 [4.01, 21.44]
Huang C et al.	1	13	0	28	1.1%	6.84 [0.26, 179.78]
Li K et al.	4	25	1	58	2.3%	10.86 [1.15, 102.77]
Li YK et al.	4	9	1	16	2.0%	12.00 [1.07, 134.11]
Lui W et al.	1	11	1	67	1.5%	6.60 [0.38, 114.15]
Wang D et al.	3	36	1	102	2.2%	9.18 [0.92, 91.31]
Wang L et al.	11	65	10	274	8.6%	5.38 [2.18, 13.29]
Wang S et al.	5	40	0	95	1.4%	29.59 [1.60, 548.98]
Wang X et al.	2	100	18	912	4.6%	1.01 [0.23, 4.43]
Yang X et al.	2	32	2	20	2.7%	0.60 [0.08, 4.64]
Zhan JJ et al.	2	58	0	82	1.3%	7.30 [0.34, 154.96]
Zhang R et al.	3	30	1	90	2.2%	9.89 [0.99, 99.01]
Zhen F et al.	2	30	4	131	3.5%	2.27 [0.40, 13.00]
Zhou F et al.	4	54	2	137	3.6%	5.40 [0.96, 30.40]
Total (95% CI)		**1769**		**11207**	**100.0%**	**4.21 [2.93, 6.04]**
Total events	211		601			

Heterogeneity: $Tau^2 = 0.18$; $Chi^2 = 30.73$, $df = 20$ ($P = 0.06$); $I^2 = 35\%$

Test for overall effect: $Z = 7.79$ ($P < 0.00001$)



Prevalence of underlying respiratory conditions in severe patients to non-severe patients with COVID-19

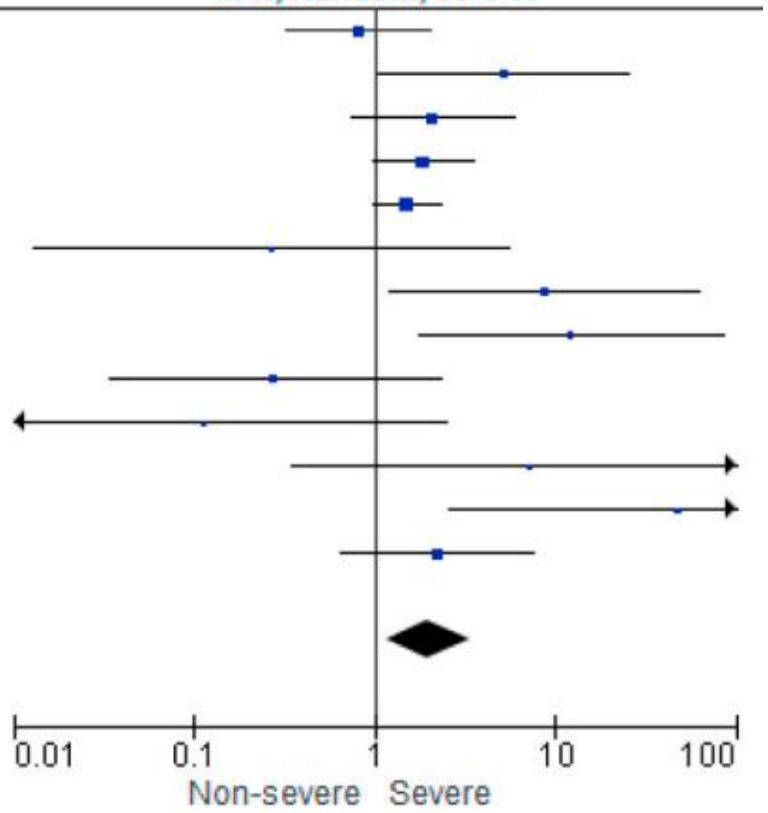
Respiratory Medicine 171(2020) 106096

Underlying respiratory disease, specifically COPD, and smoking are associated with severe COVID-19 outcomes :SR and MA

Study or Subgroup	CS/Severe Events	CS/Severe Total	CS/Non-severe Events	CS/Non-severe Total	Weight	Odds Ratio M-H, Random, 95% CI
CDC USA	5	457	83	6180	12.6%	0.81 [0.33, 2.01]
Chen T et al.(a)	7	113	2	161	7.2%	5.25 [1.07, 25.76]
Dong J et al.	6	40	13	168	11.3%	2.10 [0.75, 5.93]
Feng Y et al.	17	121	27	333	15.3%	1.85 [0.97, 3.54]
Guan WJ et al.(a)	29	172	108	913	17.4%	1.51 [0.97, 2.36]
Huang C et al.	0	13	3	28	2.7%	0.27 [0.01, 5.62]
Li YK et al.	5	9	2	16	5.3%	8.75 [1.21, 63.43]
Lui W et al.	3	11	2	67	5.5%	12.19 [1.76, 84.31]
Wang S et al.	1	40	8	95	4.8%	0.28 [0.03, 2.31]
Yang X et al.	0	32	2	20	2.6%	0.11 [0.01, 2.50]
Zhan JJ et al.	2	58	0	82	2.7%	7.30 [0.34, 154.96]
Zhang R et al.	6	30	0	90	2.9%	48.02 [2.61, 882.27]
Zhou F et al.	5	54	6	137	9.7%	2.23 [0.65, 7.63]
Total (95% CI)		**1150**		**8290**	**100.0%**	**1.98 [1.16, 3.39]**
Total events	86		256			

Heterogeneity: Tau² = 0.38; Chi² = 24.86, df = 12 (P = 0.02); I² = 52%

Test for overall effect: Z = 2.51 (P = 0.01)



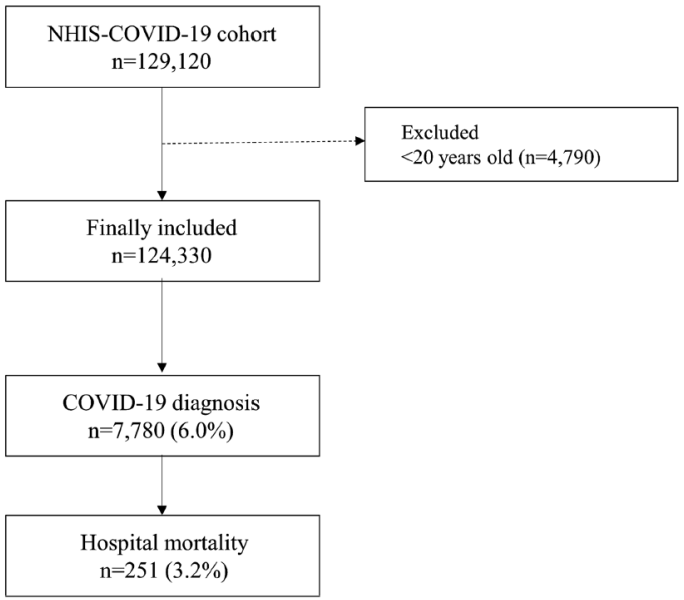
Current smoking in severe patients compared to non-severe patients with COVID-19

Respiratory Medicine 171(2020) 106096

Impact of coronavirus disease-2019 on chronic respiratory disease in south Korea : an NHIS COVID-19 database cohort study

Multivariable logistic regression model for hospital mortality in COVID-19 patients (n=7,780, death=251, 3.2%)

Variable	Multivariable model OR (95% CI)	*P*-value
Chronic respiratory diseases (model 1)	1.19 (0.86, 1.64)	0.299
Chronic respiratory diseases: sensitivity analyses (model 2)		
COPD	1.56 (1.06, 2.2)	0.024
Asthma	1.03 (0.76, 1.41)	0.834
Interstitial lung disease	1.83 (0.74, 4.55)	0.193
Lung cancer	1.82 (0.80, 4.14)	0.154
Lung disease d/t external agent	3.54 (1.70, 7.38)	<0.001
Obstructive sleep apnea	0.47 (0.06, 3.94)	0.486
Tuberculosis of lung	1.65 (0.48, 5.64)	0.423



BMC Pulm Med (202)21:12

The impact of Asthma on Mortality in Patients with COVID-19

TABLE 1] Prevalence of Self-reported Asthma and Mortality in Patients With and Without COVID-19

	COVID-19 Positive			COVID-19 Negative		
Asthma Status	Alive	Deceased	*P* Value	Alive	Deceased	*P* Value
No past history of asthma	4,890 (95.6)	1,083 (96.0)	.506	4,620 (93.2)	194 (95.6)	.187
History of asthma	227 (4.4)	45 (4.0)		337 (6.8)	9 (4.4)	

Values are No. (%) or as otherwise indicated. COVID-19 = coronavirus 2019.

TABLE 2] Predictors of Mortality Among Patients With a History of Asthma

Variable	Overall MSHS Registry (n = 11,405)	COVID-19 Positive Only (n = 6,245)
COVID-19 positive vs not detected	3.58 (2.99-4.29)	…
Asthma (yes vs no)	0.89 (0.65-1.21)	0.94 (0.66-1.34)
40-69 vs < 40 y	7.97 (4.94-12.88)	15.08 (6.69-34.01)
> 69 vs < 40 y	28.94 (17.99-46.55)	57.86 (25.72-130.17)
Female vs male	0.74 (0.64-0.86)	0.70 (0.59-0.82)
Nonwhite vs white	1.00 (0.85-1.17)	1.04 (0.87-1.25)

Values are adjusted OR (95% CI). Models were adjusted for all variables listed. MSHS = Mount Sinai Health System. See Table 1 legend for expansion of other abbreviation.

11,405 patients
Feb 29.2020-Apr. 24. 2020

54.8% COVID-19 (+)
51% women
72.2% non-white.
Age 57 years
Asthma 5.4%

Asthma history
<40 years (28.3%)
40-69 yrs (46.8%)
>69 years (23.1%)

CHEST 2020 Research Letter

Impact of comorbid asthma on severity of COVID-19

N=7,272 COVID-19 patients
686(9.4%) asthma

Variable	Respiratory failure risk		Mortality	
	Adjusted OR (95% CI)	*P*-value	Adjusted OR (95% CI)	*P*-value
Model 1				
Age	1.06 (1.05–1.07)	<0.001	1.12 (1.11–1.14)	<0.001
Sex, male	2.31 (1.58–3.37)	<0.001	2.46 (1.82–3.33)	<0.001
CCI	1.13 (1.05–1.23)	0.001	1.18 (1.11–1.25)	<0.001
Asthma	0.99 (0.58–1.70)	0.997	1.06 (0.71–1.59)	0.759
Model 2[a]				
Moderate-severe asthma	0.66 (0.15–2.82)	0.581	1.71 (0.78–3.73)	0.173

Scientific Reports (2020):10:21805

Impact of comorbid asthma on severity of COVID-19

Variable	Respiratory failure risk		Mortality	
	Adjusted OR (95% CI)	*P*-value	Adjusted OR (95% CI)	*P*-value
Age	1.05 (1.02–1.08)	<0.001	1.10 (1.07–1.14)	<0.001
Sex, male	1.00 (0.38–2.62)	0.985	2.26 (1.12–4.54)	0.021
Severity				
Mild	1 (Reference)		1 (Reference)	
Moderate-severe	0.81 (0.17–3.76)	0.795	1.33 (0.54–3.30)	0.526
Number of acute exacerbation(s)				
0	1 (Reference)		1 (Reference)	
≥1	0.42 (0.05–3.58)	0.432	2.63 (1.02–6.72)	0.043

Multivariate analyses of risk factors associated mortality in patients with asthma

Scientific Reports (2020):10:21805

Factors associated with COVID-19-related death using OpenSAFELY

Characteristic	Category	COVID-19 death HR (95% CI)	
		Adjusted for age and sex	Fully adjusted
Respiratory disease excluding asthma		1.95 (1.86-2.04)	1.63 (1.55-1.71)
Asthma (vs. None)	With no recent OCS use	1.13 (1.07-1.20)	0.99 (0.93-1.05L)
	With recent OCS use	1.55 (1.39-1.73)	1.13 (1.01-1.26)

Hazard ratios and 95% confidence intervals for COVID-19-related death

Nature 584, 430-436 (2020)

Association between pre-existing respiratory disease and its treatment, and severe COVID-19 : a population cohort study

- Highly selected populations, such as hospitalised patients with severe disease

- 2020.1.24-2020.4.30
- 8,256,161 people, in England
- 14,479(0.2%) hospitalized with COVID-19
- 1,542 (<0.1%) admitted to ICU
- 5,956 (0.1%) died

Lancer Respir Med 2021.Apr.1

Risk of severe COVID-19 outcomes for people with underlying respiratory disease

	Number of patients with outcome (n [%]/N)	Unadjusted HR (95% CI)*	HR (95% CI) adjusted for age and sex	HR (95% CI) also adjusted for other demographic factors†	HR (95% CI) also adjusted for comorbidities‡
Hospitalisation					
COPD	1555 (0·8%)/193 520	5·09 (4·83–5·36)	1·85 (1·75–1·95)	1·79 (1·70–1·90)	1·54 (1·45–1·63)
Asthma	2266 (0·2%)/1 090 028	1·22 (1·17–1·28)	1·39 (1·33–1·46)	1·32 (1·26–1·38)	1·18 (1·13–1·24)
Active asthma	1720 (0·3%)/535 126	1·95 (1·85– 2·05)	1·56 (1·48–1·64)	1·43 (1·35–1·50)	1·26 (1·20–1·33)
Severe asthma	1369 (0·4%)/385 702	2·14 (2·02–2·26)	1·65 (1·56–1·75)	1·47 (1·39–1·55)	1·29 (1·22–1·37)
ICU admission§					
COPD	59 (<0·1%)/193 520	1·68 (1·29–2·18)	0·85 (0·65–1·11)	0·92 (0·70–1·20)	0·89 (0·68–1·17)
Asthma	213 (<0·1%)/1 090 028	1·05 (0·91–1·22)	1·18 (1·02–1·36)	1·09 (0·95–1·27)	1·08 (0·93–1·25)
Active asthma	165 (<0·1%)/535 126	1·73 (1·47–2·03)	1·62 (1·37–1·90)	1·36 (1·16–1·61)	1·34 (1·14–1·58)
Severe asthma	124 (<0·1%)/385 702	1·79 (1·49–2·15)	1·64 (1·37–1·98)	1·33 (1·10–1·60)	1·30 (1·08–1·58)
Death¶					
COPD	811 (0·4%)/193 520	6·66 (6·19–7·18)	1·82 (1·69–1·96)	1·64 (1·51–1·77)	1·54 (1·42–1·67)
Asthma	762 (0·1%)/1 090 028	0·96 (0·89–1·04)	1·19 (1·1–1·28)	1·12 (1·04–1·21)	0·99 (0·91–1·07)
Active asthma	602 (0·1%)/535 126	1·62 (1·49–1·77)	1·28 (1·18–1·39)	1·18 (1·09–1·29)	1·05 (0·96–1·15)
Severe asthma	476 (0·1%)/385 702	1·78 (1·62–1·95)	1·35 (1·23–1·48)	1·21 (1·11–1·34)	1·08 (0·98–1·19)

adjusted for non-smoking-related illness (hypertension, type 1 diabetes, chronic liver disease, chronic neurological disease) and smoking-related illness (coronary heart disease, stroke, atrial fibrillation, type 2 diabetes, chronic kidney disease).

Lancer Respir Med 2021.Apr.1

The association between respiratory disease and risk of COVID-19 death excluding care home residents

	Number of patients who died (n [%]/N)	HR (95% CI) *
COPD	627 (0·3%)/189 533	1·55 (1·41–1·70)
Asthma	617 (0·1%)/1 084 522	1·05 (0·96–1·15)
Active asthma	502 (0·1%)/531 517	1·13 (1·03–1·25)
Severe asthma	400 (0·1%)/382 987	1·15 (1·04–1·28)
Bronchiectasis	112 (0·3%)/40 633	1·20 (0·99–1·45)
Sarcoidosis	25 (0·1%)/17 507	1·37 (0·92–2·03)
Extrinsic allergic alveolitis	6 (0·3%)/2309	1·40 (0·63–3·15)
Idiopathic pulmonary fibrosis	50 (0·7%)/7252	1·54 (1·14–2·08)
Other interstitial lung diseases	41 (0·7%)/5589	2·37 (1·70–3·31)
Lung cancer	53 (0·5%)/10 535	2·07 (1·57–2·72)

*Adjusted for demographic factors (age, gender, ethnicity, socioeconomic status, region of England), body-mass index (categorical variable), smoking status, non-smoking-related illness (hypertension, type 1 diabetes, chronic liver disease, and chronic neurological disease), smoking-related illness (coronary heart disease, stroke, atrial fibrillation, type 2 diabetes, and chronic kidney disease), and all other respiratory diseases.

Lancer Respir Med 2021.Apr.1

Clinical outcome of COVID-19 in airway disease

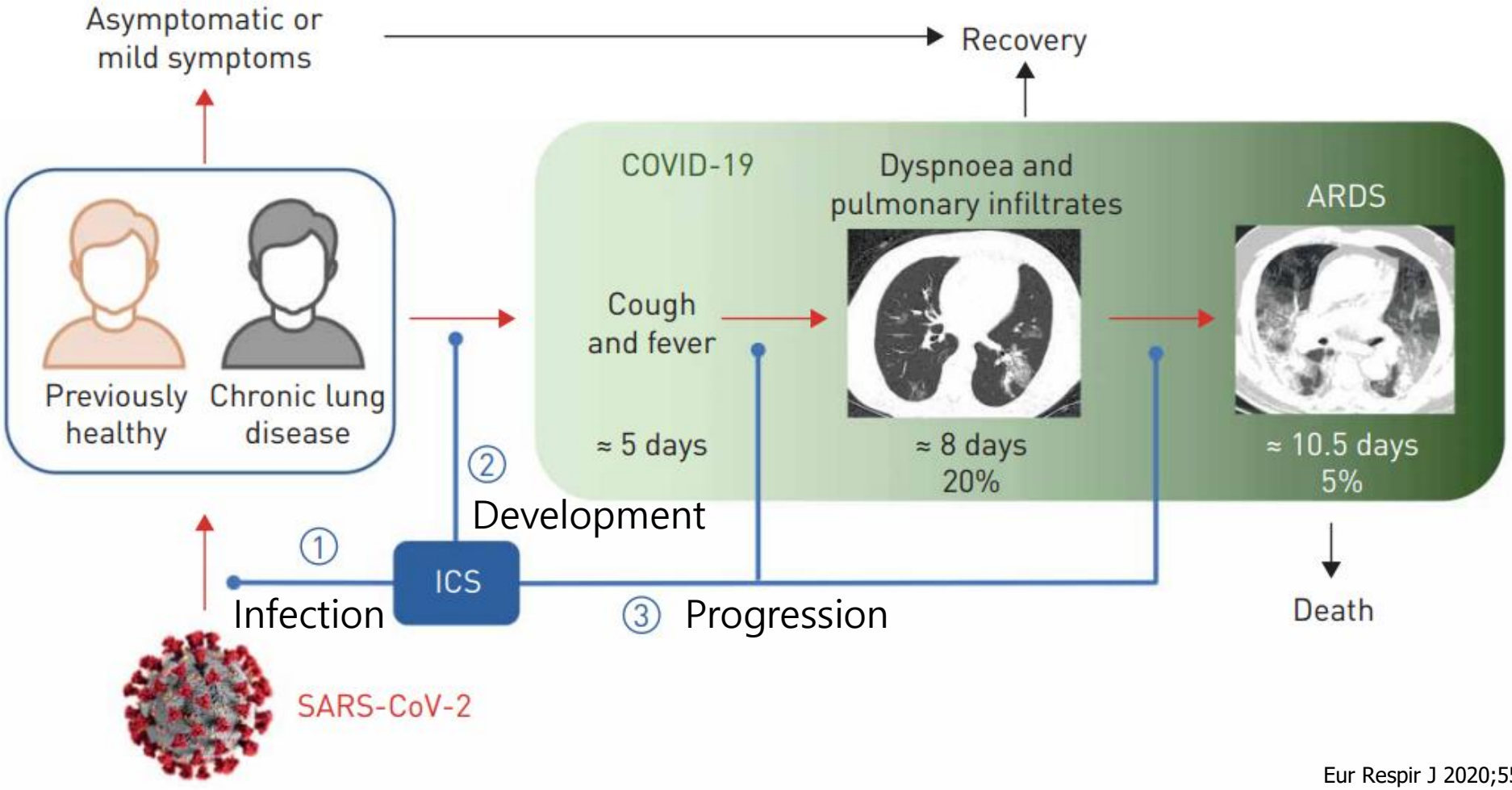
- COPD ; Poorer than the patients without COPD

- Asthma ; inconclusive,
  But, uncontrolled asthma or severe asthma

Contents

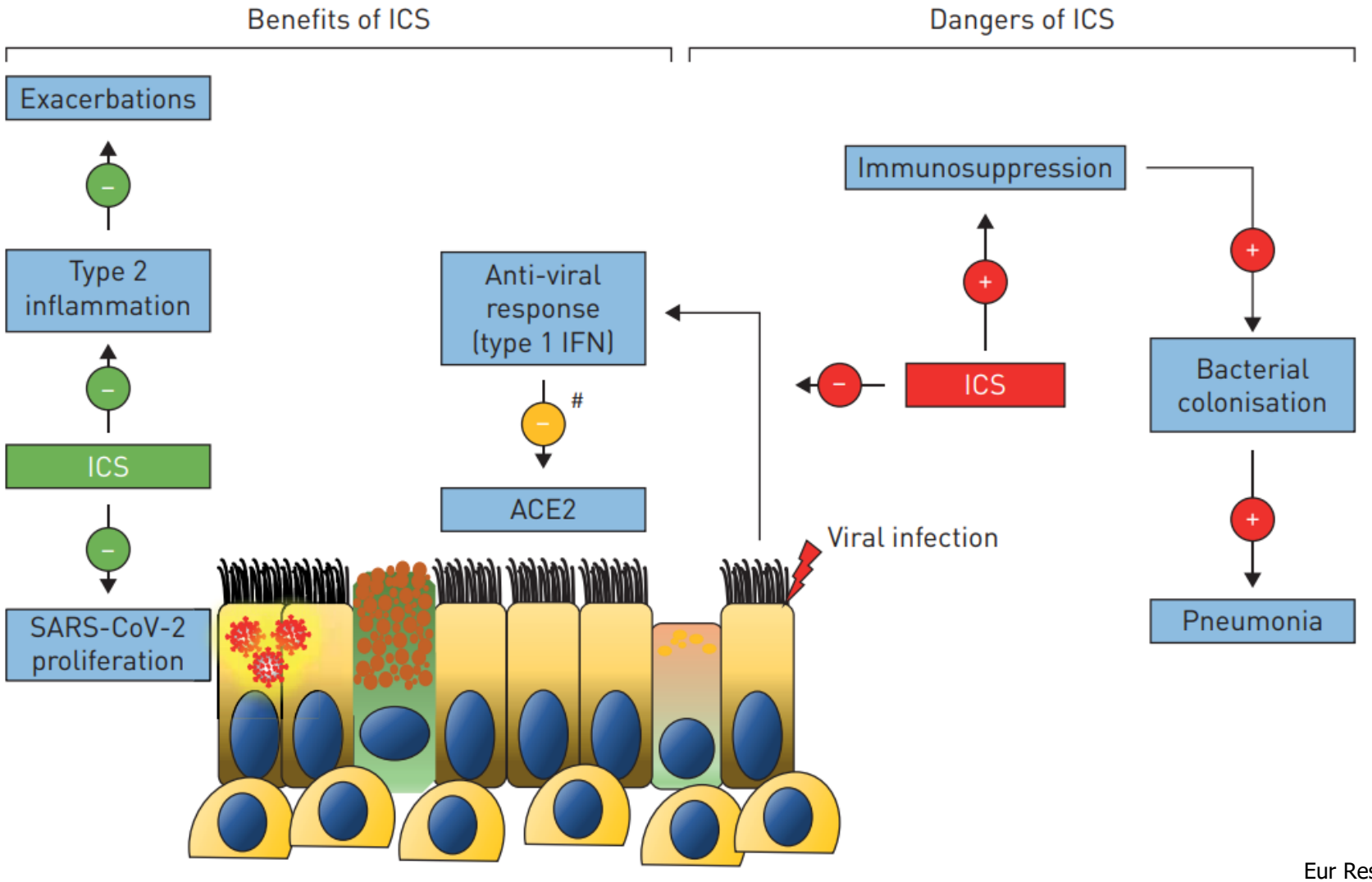
1) Are the patients with airway disease more susceptible to SARS-CoV-2 infection?
2) Are clinical outcomes from COVID-19 worse in the patients with airway disease ?
3) Does ICS affect the risk of contracting severe COVID-19?
4) How to manage the patient with airway disease ?

ICS and COVID-19



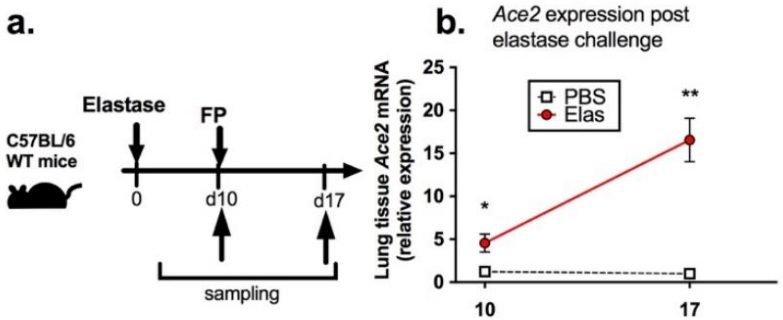
Eur Respir J 2020;55:2001009

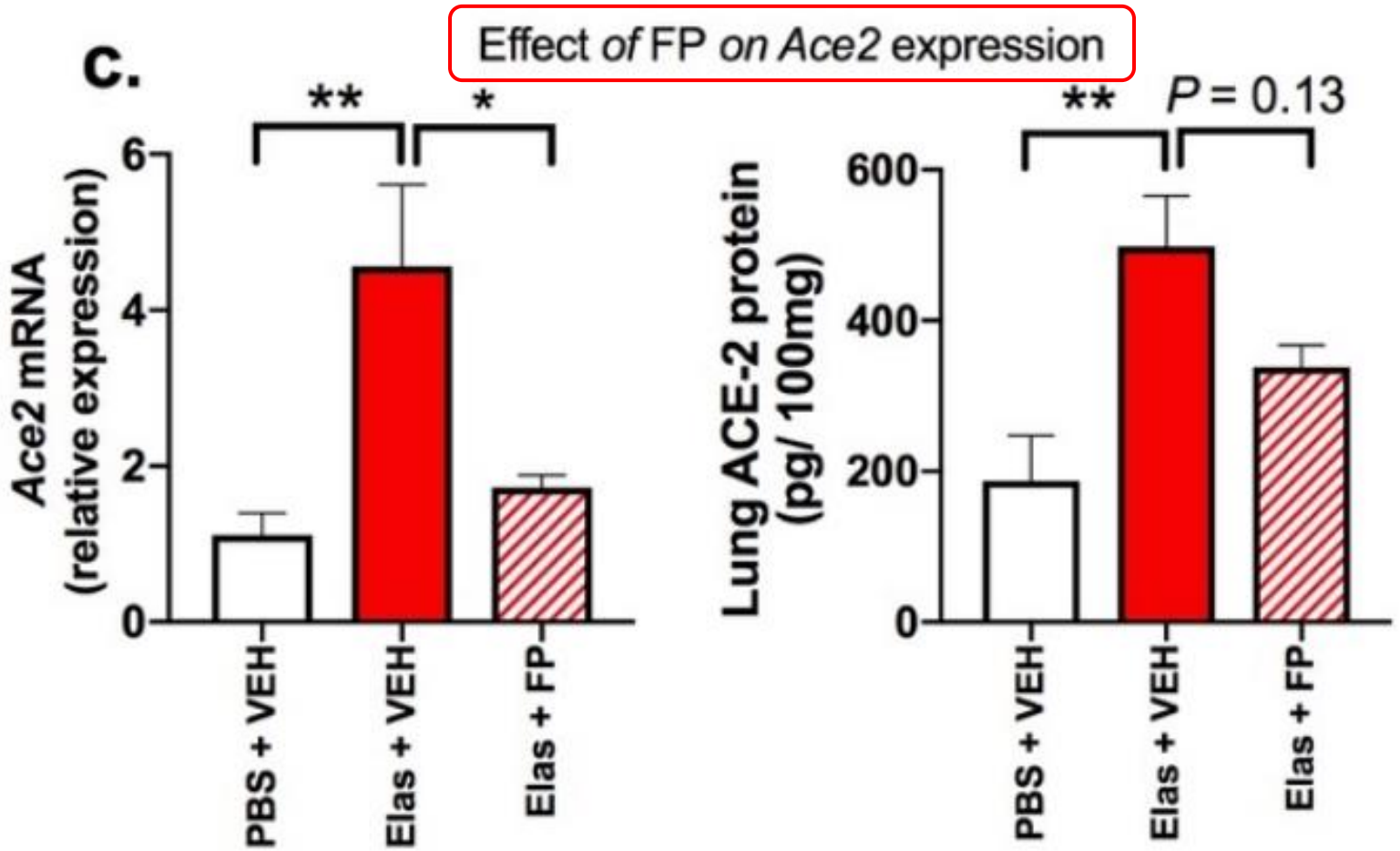
ICS use in COPD: implications for COVID-19



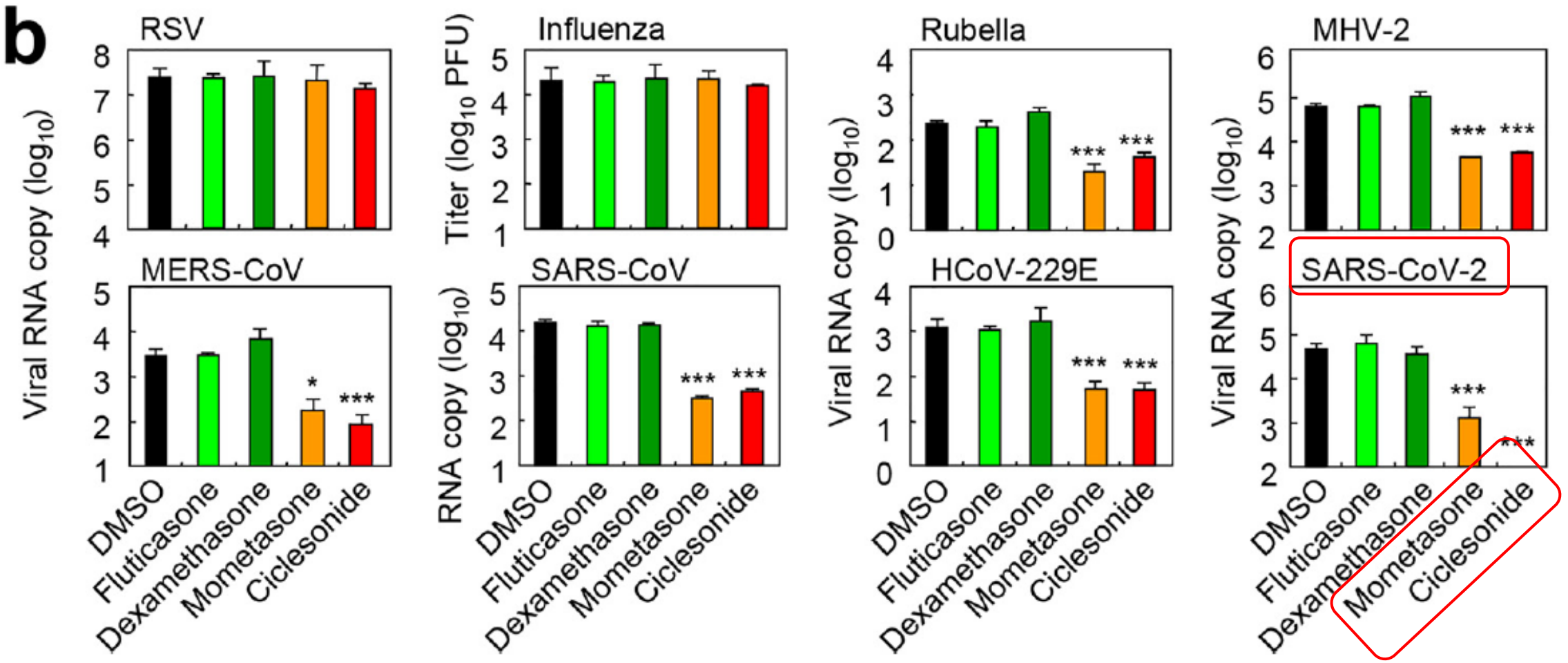
Eur Resp Rev 2020;29:200199

ICS downregulate the SARS-CoV-2 receptor ACE2 in COPD through suppression of type I interferon



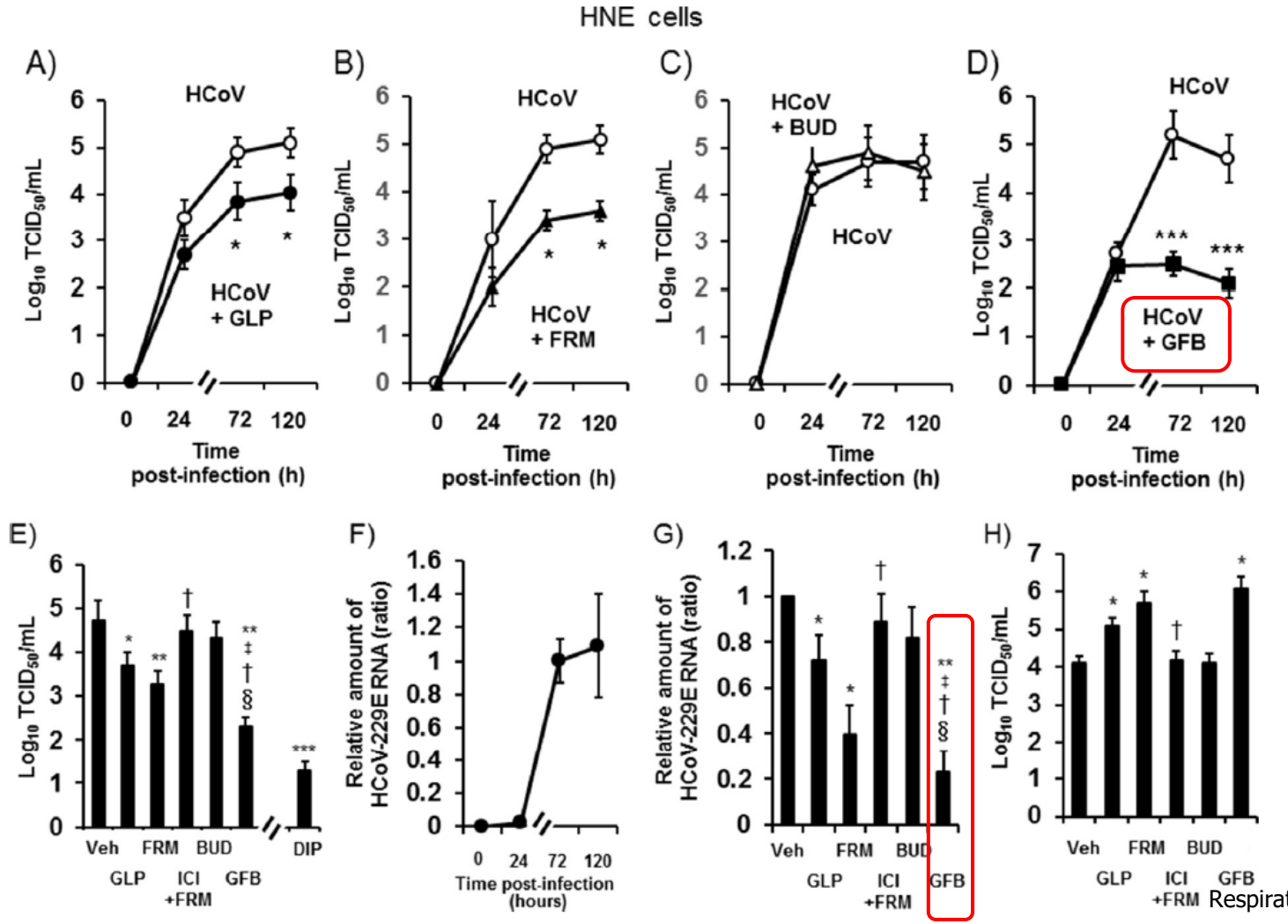


The Inhaled Steroid Ciclesonide Blocks SARS-CoV-2 RNA Replication by Targeting the Viral Replication-Transcription Complex in Cultured Cells



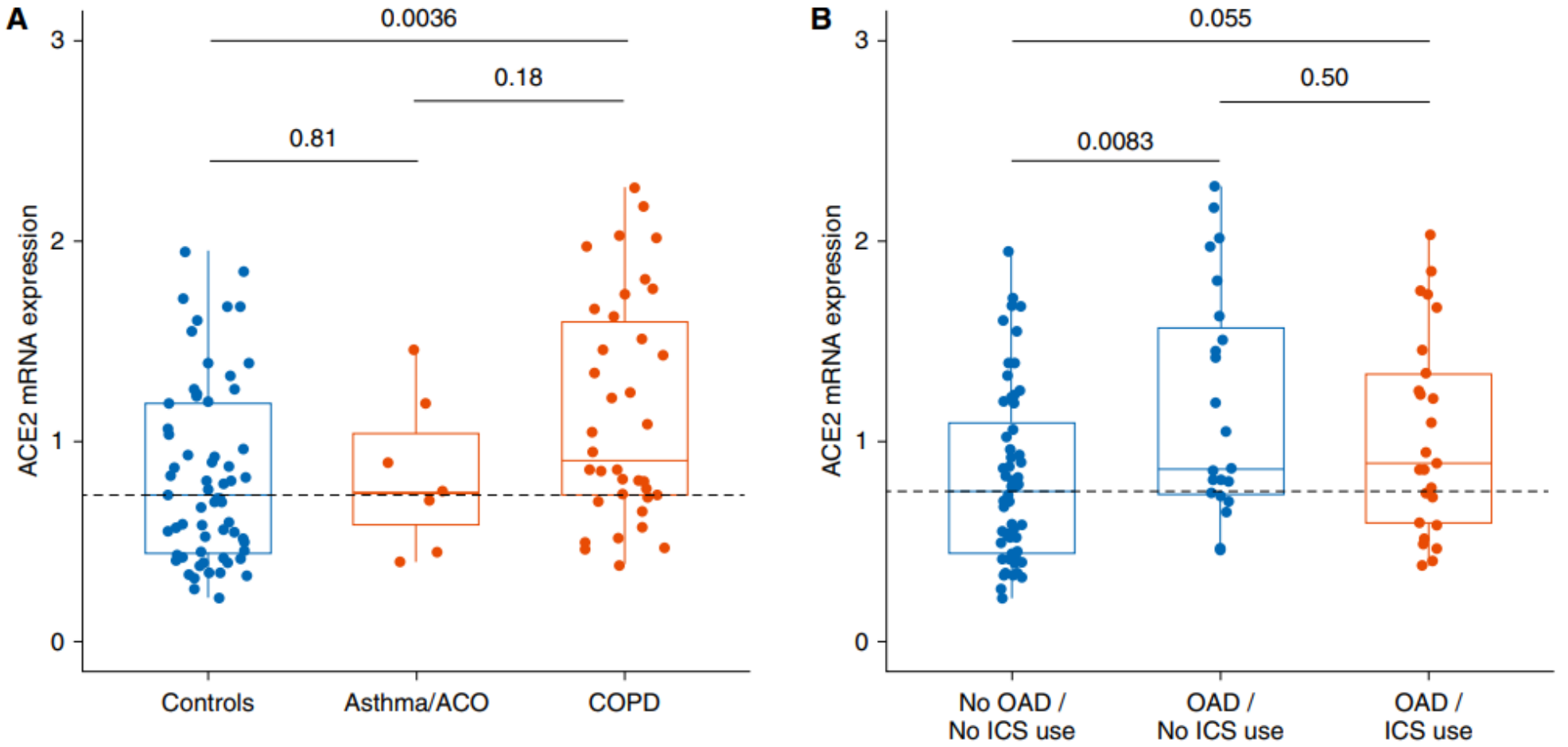
J Virol 95:e01648-20

Inhibitory effects of glycopyrronium, formoterol, and budesonide on coronavirus HCoV-229E replication and cytokine production by primary cultures of human nasal and tracheal epithelial cells



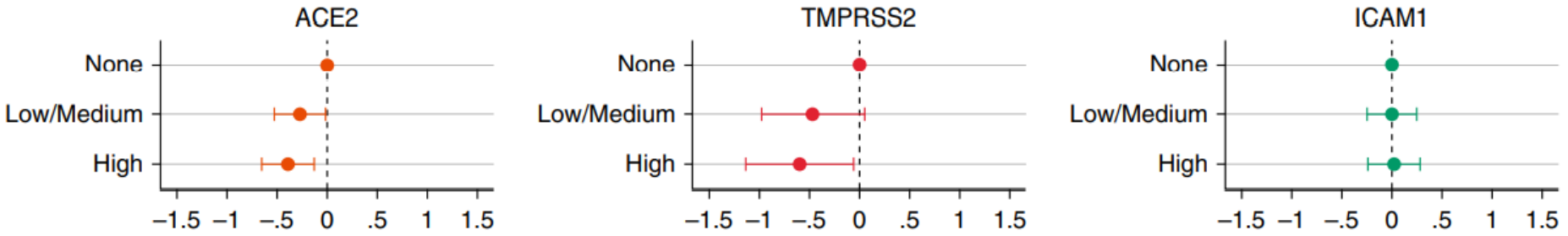
Respiratory investigation 58(2020)155-168

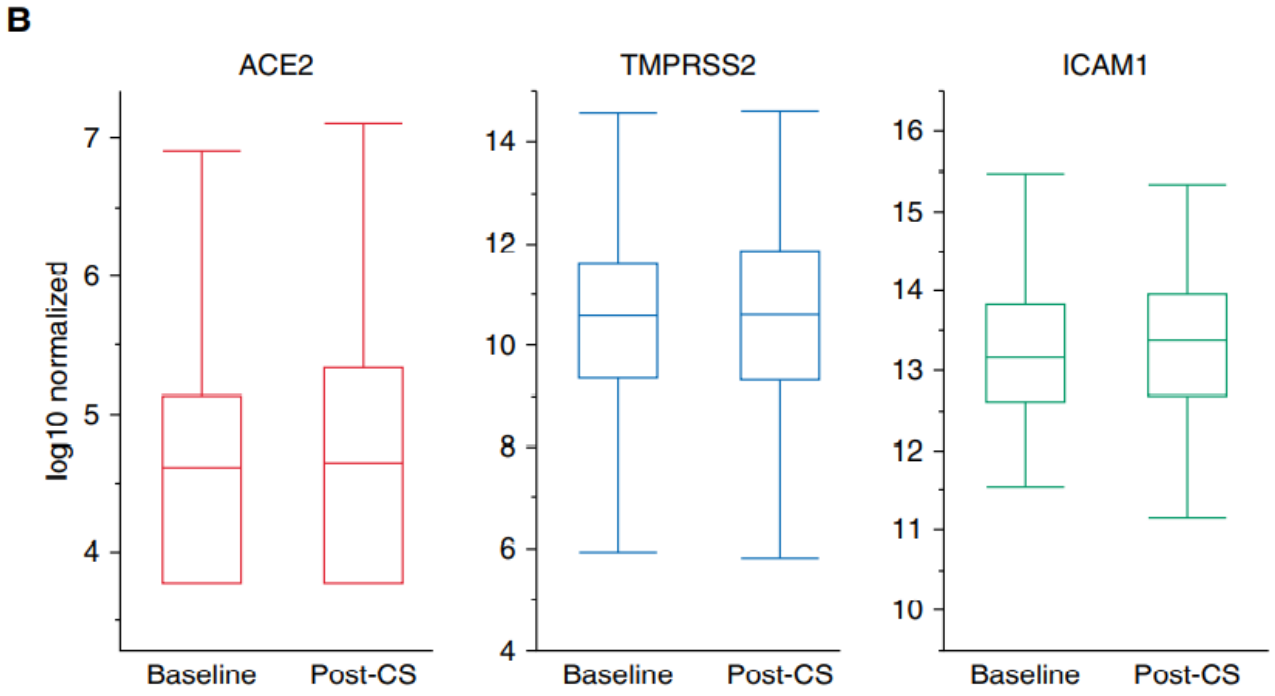
COVID-19, Asthma, and Inhaled Corticosteroids: Another Beneficial Effect of Inhaled Corticosteroids?



Am J Respir Crit Care Med202005-1651ED

COVID-19-related Genes in Sputum Cells in Asthma

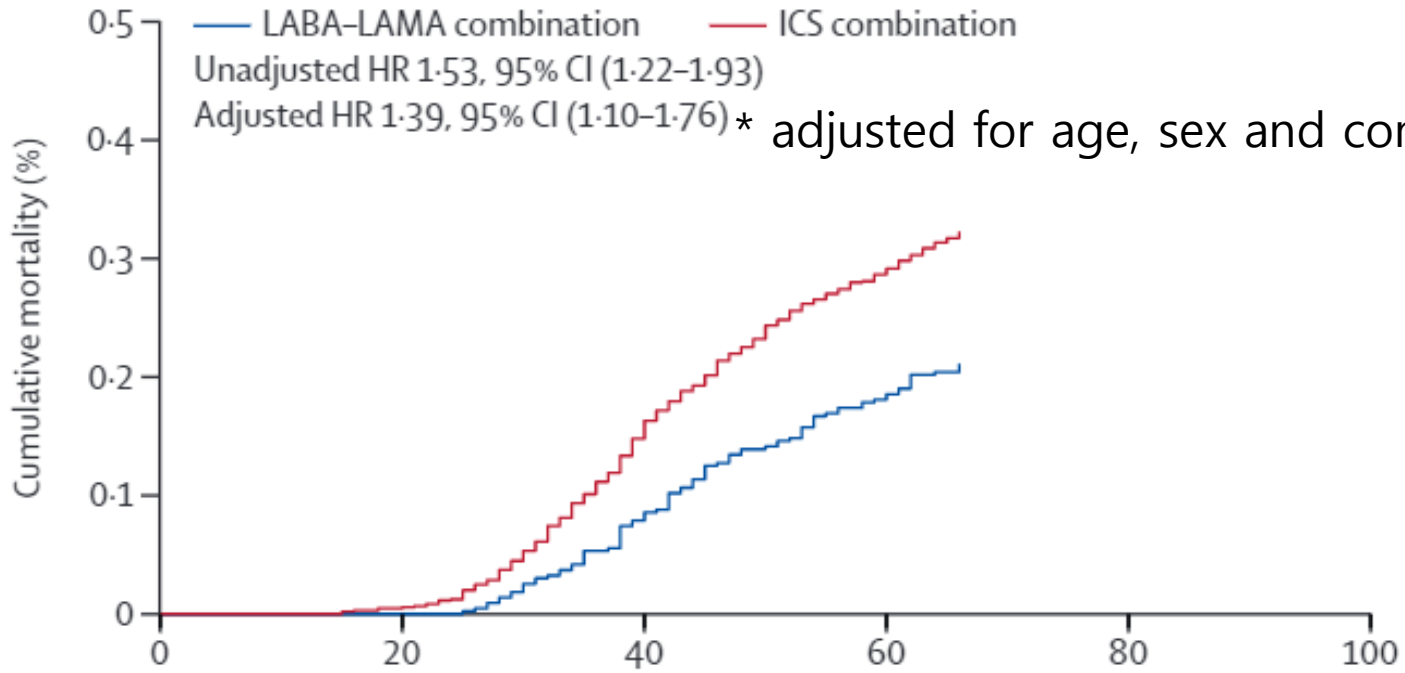




40-mg injection of triamcinolone (post-CS)

Am J Respir Crit Care Med 202(1) 83-90

Risk of COVID-19-related death among patients with COPD or asthma prescribed ICS: an observational cohort study using the OpenSAFELY platform



* adjusted for age, sex and comorbidities

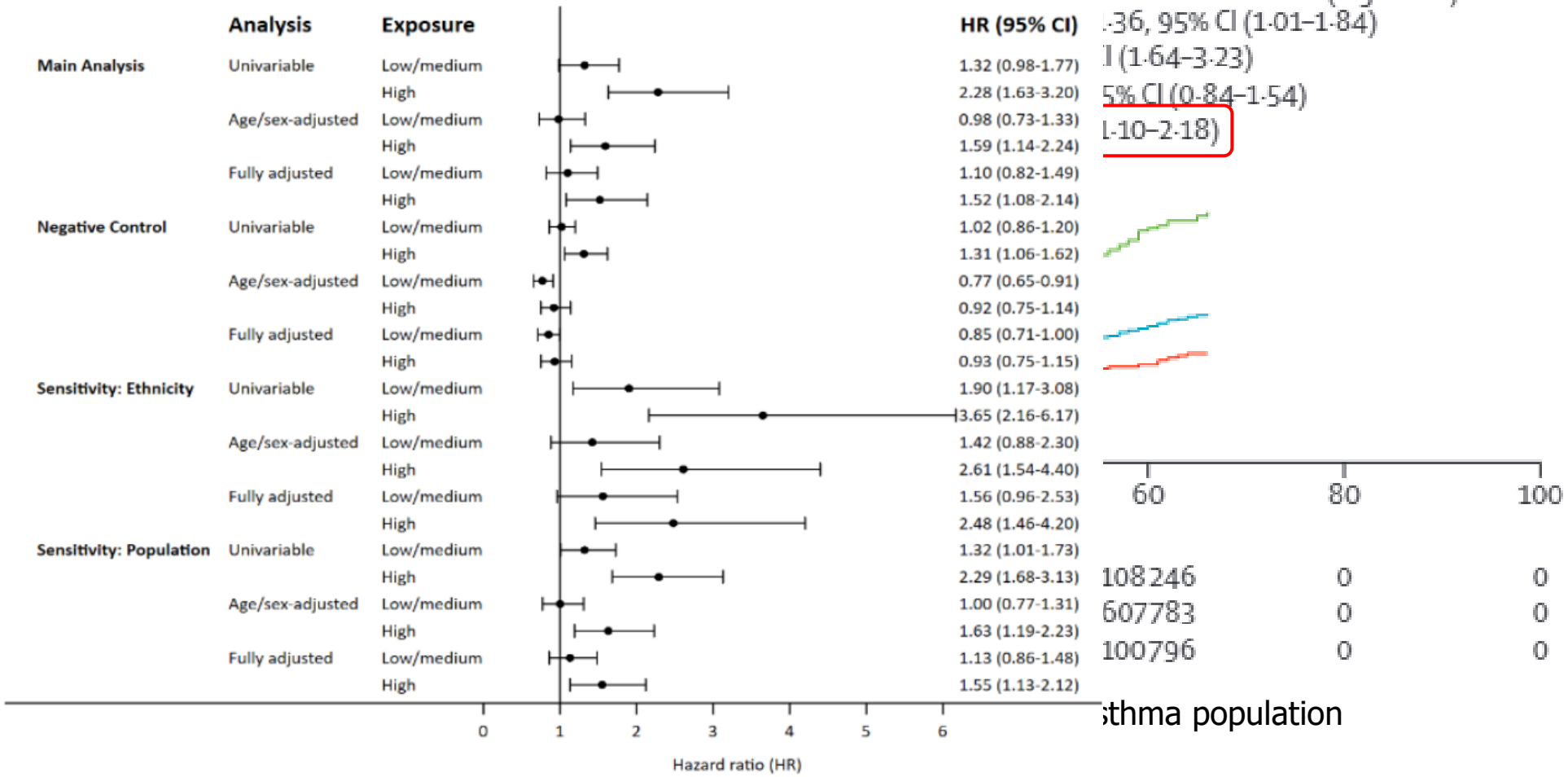
	Number at risk					
30%	LABA–LAMA combination	43308	43222	43088	42942	0	0
70%	ICS combination	105249	104963	104491	104028	0	0

Time to COVID-19-related death for the COPD population

Lancet Respir Med 2020(8):1106-20

Risk of COVID-19-related death among patients with COPD or asthma prescribed ICS: an observational cohort study using the OpenSAFELY platform

Figure 3: *Univariable and Multivariable Models, Asthma population*



sthma population

Lancet Respir Med 2020(8):1106-20

Association between pre-existing respiratory disease and its treatment, and severe COVID-19: a population cohort study

*Paul Aveyard, *Min Gao, Nicola Lindson, Jamie Hartmann-Boyce, Peter Watkinson, Duncan Young, Carol A C Coupland, Pui San Tan, Ashley K Clift, David Harrison, Doug W Gould, Ian D Pavord, Julia Hippisley-Cox

	Unadjusted HR (95% CI)	HR (95% CI) adjusted for presence of respiratory disease*	HR (95% CI) also adjusted for demographic factors†	HR (95% CI) also adjusted for smoking-related morbidity‡
Hospital admission	2·72 (2·60–2·85)	2·06 (1·94–2·19)	0·97 (0·89–1·05)	1·13 (1·03–1·23)
ICU admission	2·10 (1·78–2·46)	2·52 (2·03–3·13)	1·64 (1·20–2·23)	1·63 (1·18–2·24)
Death	2·63 (2·44–2·84)	2·04 (1·85–2·25)	0·94 (0·83–1·07)	1·15 (1·01–1·31)

Association between regular use of inhaled corticosteroids and severe COVID-19

Lancer Respir Med 2021.Apr.1

COVID-19 and ICS

- No evidence of either harm or benefit of ICS in COVID-19 patients.

Contents

1) Are the patients with airway disease more susceptible to SARS-CoV-2 infection?
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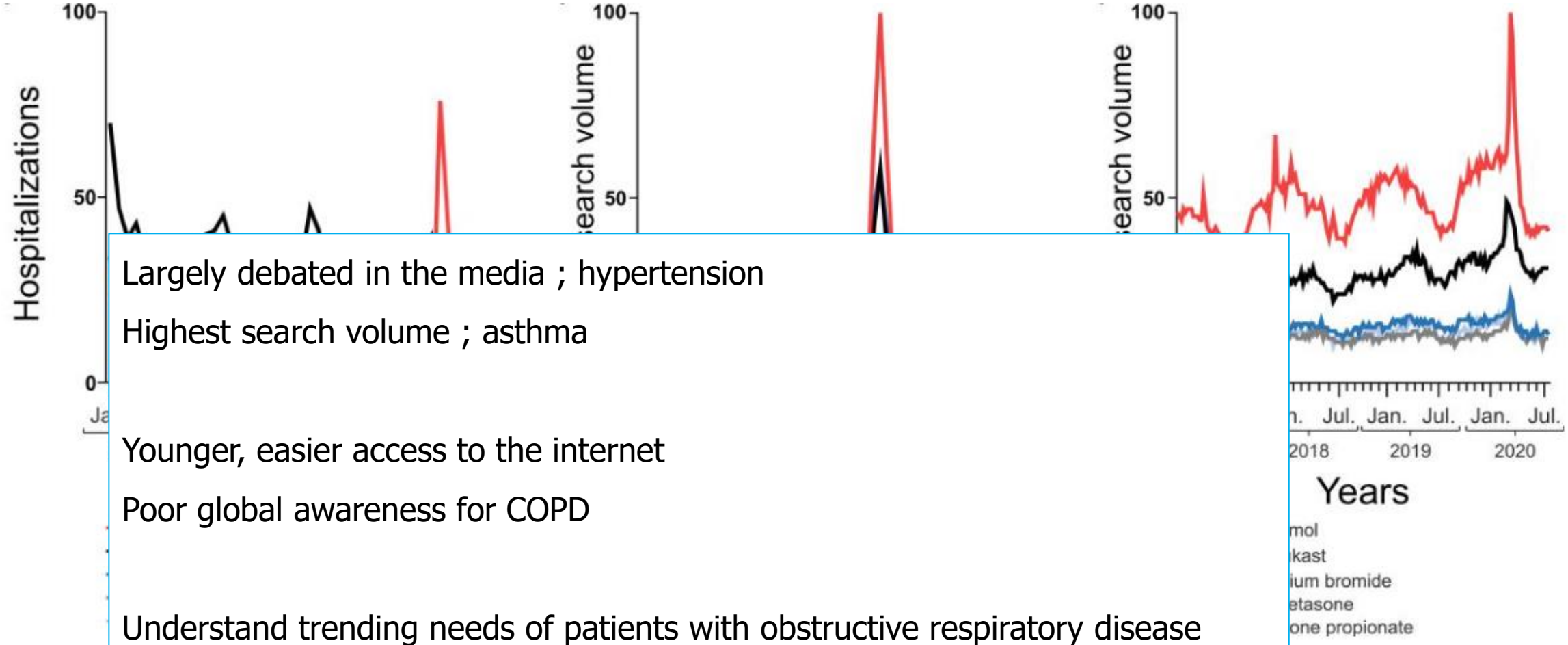
4) How to manage the patient with airway disease ?

Assessing self-medication for obstructive airway disease during COVID-19 using *Google Trends*



Largely debated in the media ; hypertension

Highest search volume ; asthma

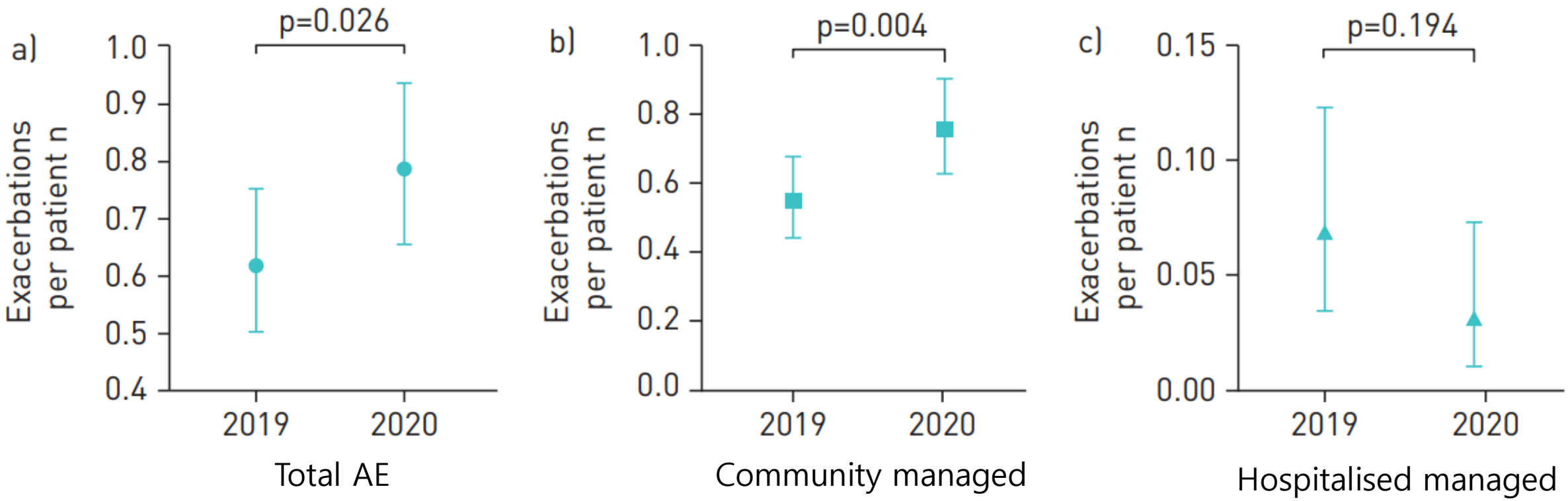
Younger, easier access to the internet

Poor global awareness for COPD

Understand trending needs of patients with obstructive respiratory disease

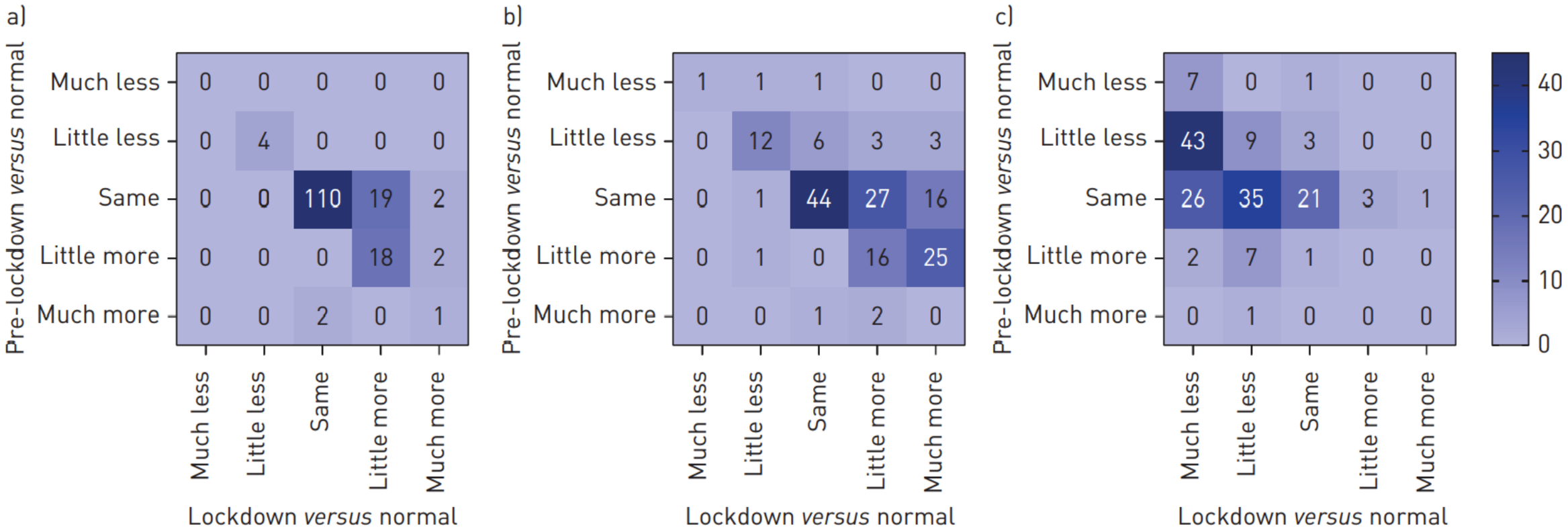
Eur Respir J 2020;doi.org/10.1183/13993003.02851

COPD in the time of COVID-19 ; acute exacerbation



ERJ Open Res 2021;7:00718-2020

COPD in the time of COVID-19 ; behavioral change



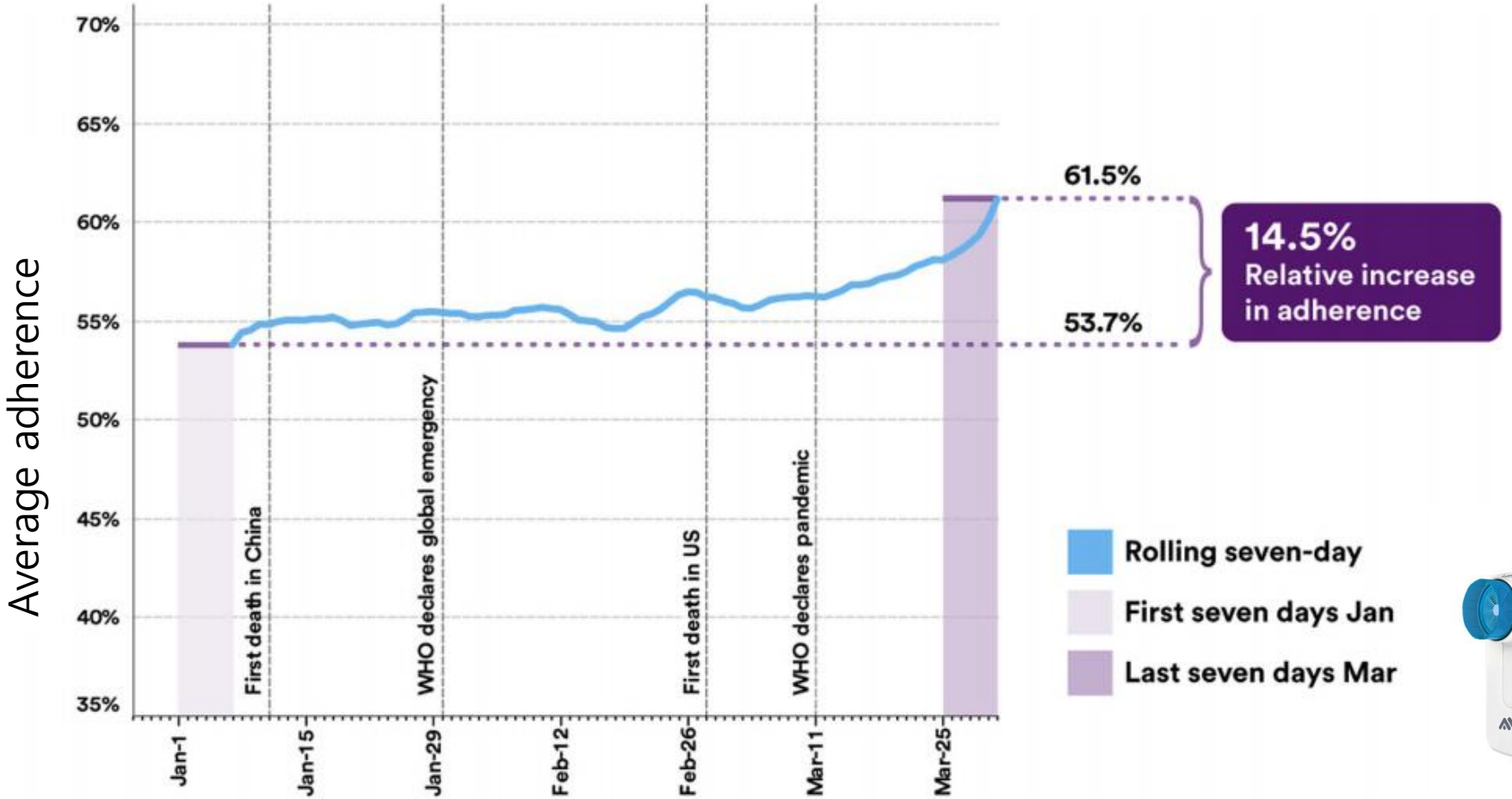
Regular inhaler use

Anxiety

Physical activity

ERJ Open Res 2021;7:00718-2020

Changes in medication adherence among patients with asthma and COPD during the COVID-19 pandemic



N=7,578
77% asthma
67% female

Mean daily controller adherence in asthma and COPD before and during COVID-19 pandemic

J Allergy Clin Immunol Pract 8(7) 2384-2385

CORONA BLUE

Communicate with patients

Support their mental health and wellbeing to help alleviate and anxiety and fear they may have about COVID-19.

Smoking cessation can decrease the risk of developing COVID-19

World Health Organization

Tobacco Free initiative

Tobacco and waterpipe use increases the risk of suffering from COVID-19

Cochrane Special Collections

Coronavirus (COVID-19): effective options for quitting smoking during the pandemic

3 April 2020

ERS | COVID-19, propelled by smoking, could destroy entire nations

Blog Author(s): Kathryn Barnsley [1] and Sukhwinder Singh Sohal [2] / 30 March, 2020

Smoking Upregulates Angiotensin-Converting Enzyme-2 Receptor: A Potential Adhesion Site for Novel Coronavirus SARS-CoV-2 (Covid-19)

by Samuel James Brake [1], Kathryn Barnsley [2], Wenying Lu [1], Kielan Darcy McAlinden [1], Mathew Suji Eapen [1] and Sukhwinder Singh Sohal [1,*]

J. Clin. Med. **2020**, *9*(3), 841; https://doi.org/10.3390/jcm9030841

NICE National Institute for Health and Care Excellence

"Strongly encourage patients with COPD who are still smoking to stop, to reduce the risk of poor outcomes from COVID-19 and their risk of acute exacerbations. This could involve telephone, video or email consultation support.
Ensure evidence-based interventions are available."

Treatment and care planning (COPD & asthma)

- Continue taking their regular inhaled and oral medicines in line with their individualized COPD self-management plan to ensure their COPD is as stable as possible.
- Be alert for new or increased issues with mental health and wellbeing, particular anxiety and depression.
- Find out if patients have advance care plans or advance decisions around ceilings of care, including 'do not attempt cardiopulmonary resuscitation" decisions.

Corticosteroids

- Explain to patients there is no evidence that treatment with inhaled corticosteroids for COPD increases the risk associated with COVID-19.
- Tell patients established on ICS to continue to use them, and delay any planned trials of withdrawal of ICS.
- Oral corticosteroids – they should continue to take them at their prescribed dose, because stopping them can be harmful.

Self-management for exacerbations

- Do not start a short course of oral corticosteroids and/or antibiotics for symptoms of COVID-19, for example fever, dry cough or myalgia.

- Do not offer patients with COPD a short course of oral corticosteroids and/or antibiotics to keep at home unless clinically indicated.

Pulmonary rehabilitation and oxygen

- Online pulmonary rehabilitation

- Not adjust their oxygen flow rate, unless advised to by their healthcare professional.
- Continue to use ambulatory oxygen as prescribed

Nebuliser

- Continue to use nebulizer. Aerosol comes from the fluid in the nebulizer chamber and will not carry virus paticles from the patient.

- Advise patients currently receiving non-invasive ventilation at home that these are potentially infectious aerosol generating procedures, and they should take appropriate precautions such as:
- using equipment in a well-ventilated room
- using equipment away from other family members if possible.


고객님과 직원들의
안전을 위하여,
마스크 미착용 시
출입 불가
쇼핑중에도 마스크를 착용해주세요.
OLIVE YOUNG


대한민국정부
11월 13일부터 적발 시 과태료 부과
마스크 착용
의무화 시행
다중이용시설 및
대중교통/집회/의료시설 등
마스크 착용 의무화
망사·밸브형 마스크,
스카프·옷가지 등
마스크 착용으로 인정 불가
코스크·턱스크 등
입과 코를 가리지 않으면
과태료 부과

Exempt from wearing a face covering

BBC NEWS | 코리아

뉴스 비디오 다운로드 TOP 뉴스

'예외 대상' 천식환자에게 마스크 착용 강제한 항공사

2020년 9월 9일

정부 홈페이지를 통해 발급 받은 예외증

Q 예외 대상도 있나.

만 14세 미만, 주변 도움 없이 스스로 마스크를 쓰거나 벗는 게 어려운 사람, 마스크를 썼을 때 호흡이 어려운 사람 등은 과태료 부과 대상에서 제외될 수 있다.

심혈관계나 호흡기계 질환 등을 앓고 있는 사람은 마스크를 착용하면 호흡이 어려운 경우가 있다. 이런 사람은 과태료 부과 대상에서 예외로 인정된다는 얘기다. 만약 단속됐다면 의견 제출 기간에 의사의 진단서나 소견서 등을 제출해 소명할 수 있다.

또 음식이나 음료를 마실 때, 물 속과 탕 안에 있을 때, 방송 출연, 신원 확인 등 마스크를 벗어야 하는 예외적 상황일 때도 과태료 부과 대상에서 제외된다. 그러나 음식점이나 카페에서 주문할 때, 음식을 기다리는 동안, 음식 섭취 후, 계산할 때, 퇴장할 때 등 음식을 먹는 경우를 제외하고는 마스크를 상시 착용해야 한다. 음식을 섭취할 때도 가급적 대화를 자제해야 한다.

Face Covering Exemption: Not Everyone Can Wear One

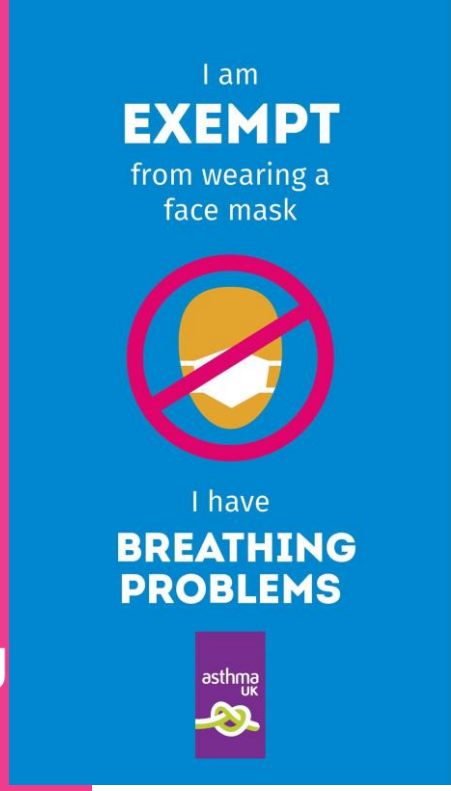
Disability Equality Scotland

People are exempt if:

- ✓ They have a disability or health condition that means they cannot wear a face covering
- ✓ A covering will cause them severe distress or anxiety
- ✓ They need to communicate with someone who relies on lip reading
- ✓ They have a reasonable need to eat, drink or take medicine

Disabled people should never face intimidation for not wearing a covering.

For more information and advice visit
disabilityequality.scot/face-covering



Not wear face masks (CDC recommendation)

- Children under age 2
- Anyone who has trouble breathing
- Anyone who is unconscious, unable to help themselves, or can’t remove the mask on their own

If you’re having trouble wearing a mask,
Try a different fabric or fit.
Weaing some kind of breathable face mask is better than nothing.
Medical masks when worn the right way do not cause you to breathe in more carbon dioxide or reduce your oxygen levels.

N95 in COPD patients

Table 1. Characteristics of the Subjects and Differences According to N95 Safety Outcome

Variable	All Subjects	Use of Mask		*P*
		Safe	Fail	
Subjects, *n*	97	90	7	
Age, mean ± SD y	68.0 ± 6.5	67.9 ± 6.4	68.6 ± 8.1	.81
Male, *n* (%)	91 (93.8)	85 (94.4)	6 (85.7)	.37
Current smoker, *n* (%)	26 (26.8)	25 (27.8)	1 (14.3)	.39
mMRC				
Score, mean ± SD	1.5 ± 0.9	1.4 ± 0.7	3.3 ± 0.5	<.001
Grade, *n* (%)				
0	6	6	0	
1	54	54	0	
2	23	23	0	
3	11	6	5 (45.5)	
4	3	1	2 (66.7)	
CAT score, mean ± SD	15.1 ± 8.2	14.3 ± 7.8	26.1 ± 3.7	<.001
Pulmonary function test				
FEV_1/FVC, mean ± SD	55.0 ± 13.1	56.3 ± 12.2	38.9 ± 13.5	.006
FVC, mean ± SD L	3.1 ± 0.7	3.2 ± 0.7	2.1 ± 0.7	.003

Respiratory care 2020

N95 in COPD patients

- **mMRC >=3** or **FEV1 < 30%** pred.

Table 2. Risk Factors for the Development of N95 Complications

Variable	Univariate Analysis			Multivariate Analysis		
	OR	95% CI	*P*	OR	95% CI	*P*
mMRC score	15.05	1.90–118.98	.01	12.58	1.49–105.95	.02
FEV_1% predicted	1.13	0.78–0.99	.03	1.09	0.83–1.00	.06

Respiratory care 2020

Have Asthma? You Can Wear a Face Mask!

Wearing a face mask is one of the few things we can all do to fight the spread of COVID-19. Expert doctors and national lung organizations agree that people with asthma and other severe lung diseases should wear masks, along with staying at least 6 feet from others and washing their hands often.

If your asthma symptoms keep you from wearing a mask, call your doctor right away for help getting your asthma under control. People with asthma over age 2 should be able to breathe through cloth or standard medical masks without trouble. There is enough airflow from gaps around the mask and through it, and you will get plenty of oxygen. Be sure the mask covers your nose and mouth, and tucks under your chin for a good fit.

N95 masks should be saved for healthcare workers, except for some people with poor immune systems. Ask your doctor if you need a special mask.

Some mask types may work better for you than others. Wearing a face shield or any kind of mask is likely better than nothing! If you have a latex allergy, look for masks made of latex-free cloth and ear loops. Used masks should be washed daily.

If the doctor does give you a pass not to wear a mask, you may not be able to go to places that require them.

Wearing a mask can also help block asthma triggers like common cold viruses, cold air, pollen and animal dander.

Call your doctor to learn more about Asthma & masks

Tips for encouraging mask use:

If patients are having trouble breathing with a mask on due to asthma symptoms, they need to make an appointment for help regaining control. During the pandemic, people who are actively having breathing problems should stay at home except to seek medical care.

- In some instances, physician reassurance regarding the safety of face coverings may be all that is needed.
- The gaps between mask fibers and around the edges of the mask allow for sufficient airflow so that there is no risk of buildup of carbon dioxide or lack of oxygen.
- Wearing a mask can also help block asthma triggers like common cold viruses, animal dander, pollen and cold air.
- Some mask types may work better than others so patients may need to try out different fabric types and styles to see what works best for them. For those with a latex allergy, encourage masks made with non-latex materials. Wearing any kind of mask is likely better than nothing!
- Face masks and face shields are not interchangeable, but face shields have been shown to reduce the amount of inhalation exposure to influenza respiratory virus.
- The use of N95 masks should be reserved for healthcare workers, except for select immunocompromised patients who should discuss this need with their physicians. Even for these patients, physical distancing should be the mainstay of self-protection.
- It may feel uncomfortable to wear a mask during vigorous physical activity for people with and without asthma. Exercising while wearing a mask should not cause an asthma flare in those with well-controlled asthma. The best option for exercising safely during the pandemic is to employ physical distancing outdoors. During extreme weather temperatures, some people with asthma will need to stay in climate-controlled areas as possible.

If an individual is given a mask exemption, they still may not be able to go places where masks are required.

Summary

- COPD ; susceptibility to infections of SARS-CoV-2
  more severe clinical course (age, comorbidities, lung function…)
- Asthma ; debates in relation to the COVID-19
- ICS ; inconclusive

- Patients with airway disease in COVID-19 time
  quitting smoking, keeping medication, keeping physical activity
  manage mental health, washing hands, wearing masks…

Thank you for your attention !!