Long COVID: impatto epidemiologico e clinico

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- Definizione
- Epidemiologia
- Caratteristiche cliniche

Post-COVID conditions are heterogenous

- Several patterns have been identified
  - Persistent symptoms
  - New-onset late sequelae
  - Evolution of symptoms/conditions
- Attributable to different underlying pathophysiologic processes
- Presentation could be complicated by a number of factors
- May share similarities with other post-viral conditions

Polmonite
Ondata
Variante
Comorbidità

Post-intensive Care Syndrome (PICS)

According to the Centers for Disease Control and Prevention (CDC), long COVID has been defined as new, returning, or ongoing symptoms that develop during or after a SARS-CoV-2 infection that continue for four or more weeks [4].

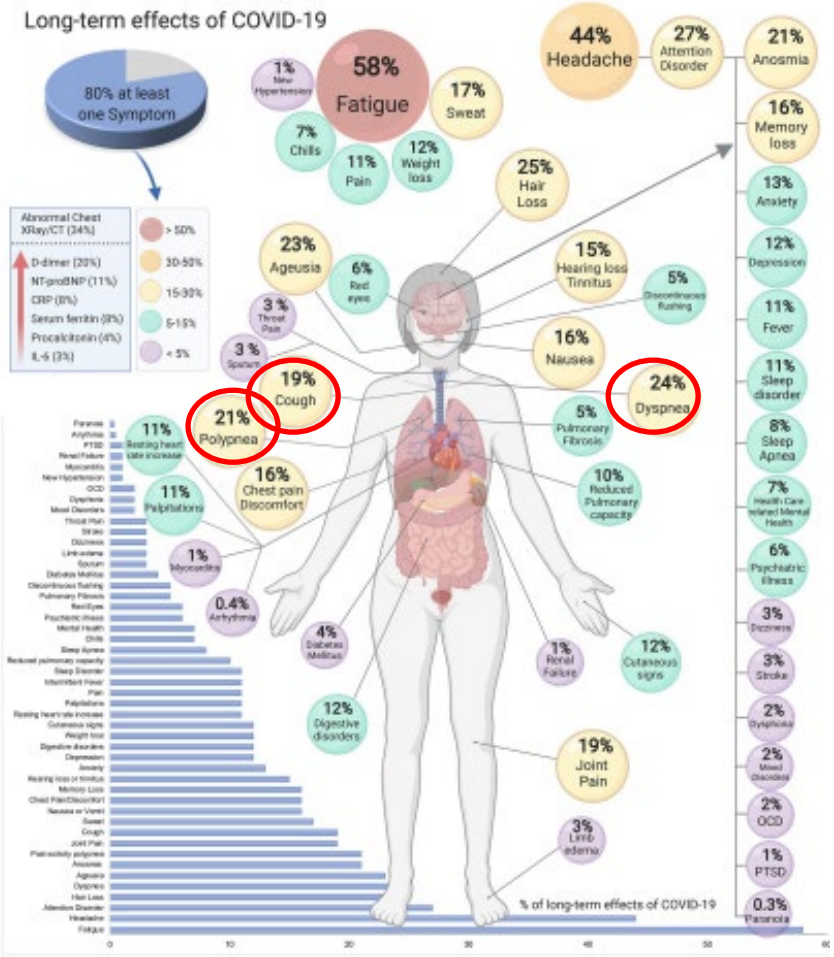
www.nature.com/scientificreports

scientific reports

Nature 2021

OPEN

More than 50 long-term effects of COVID-19: a systematic review and meta-analysis



18,251 publications were identifed

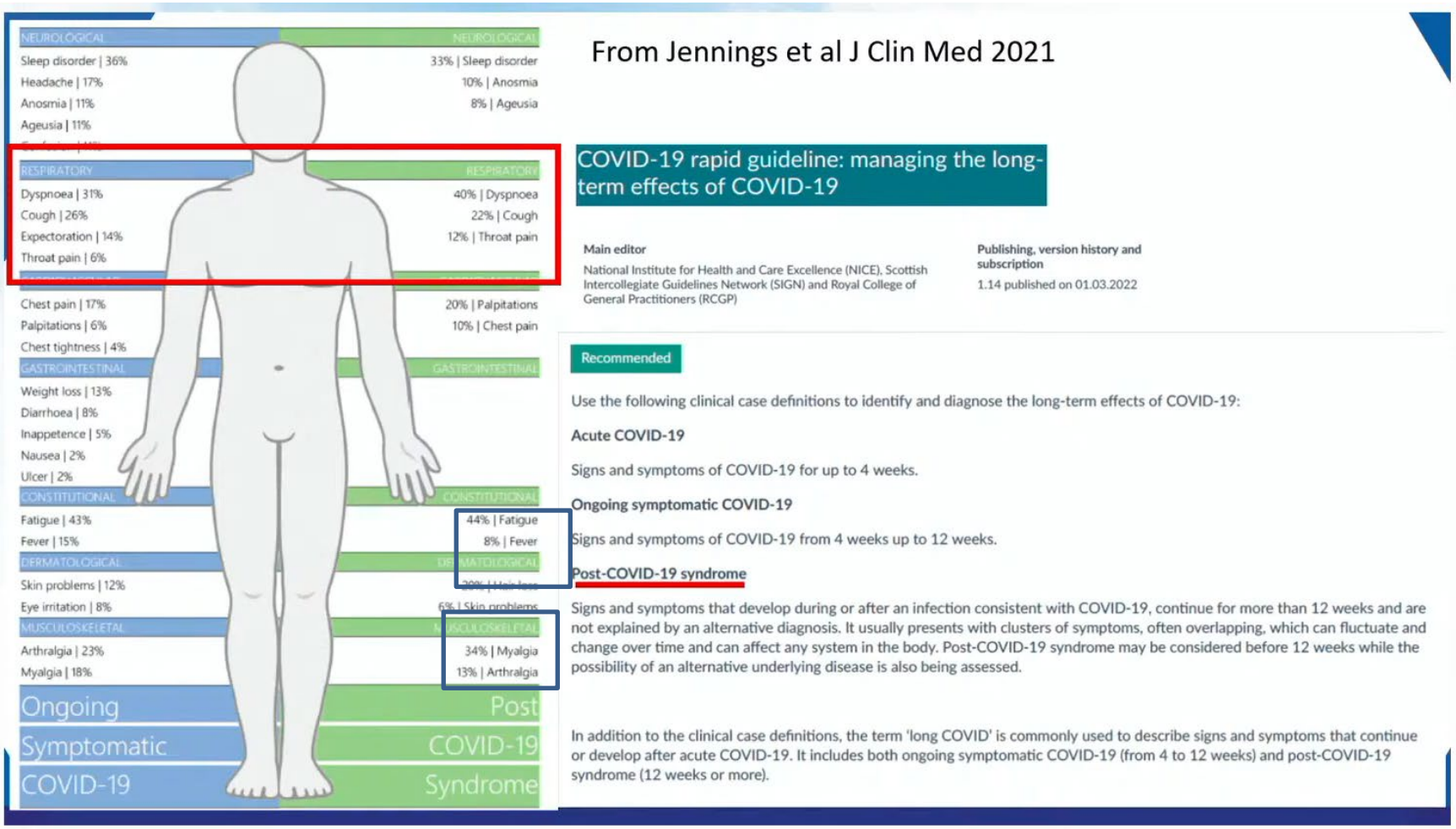
47,910 patients were included

The included studies defined long-COVID as ranging from 14 to 110 days post-viral infection

The five most common symptoms were:

- fatigue
- headache
- attention disorder
- hair loss
- dyspnea

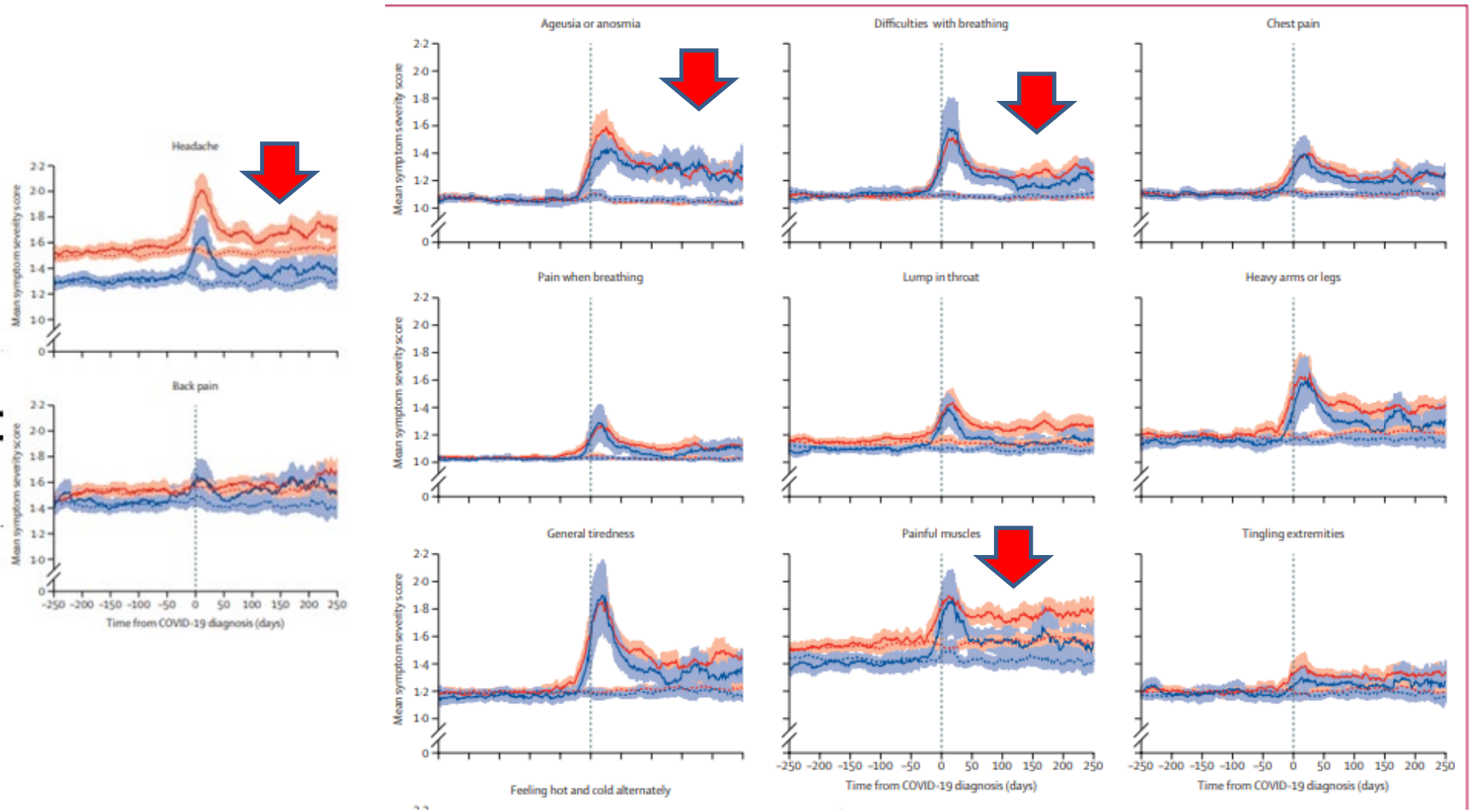
Post-COVID-19 SyndromeA Systematic Review of Persistent Symptoms and Residual Abnormal Functioning following Acute COVID-19: Ongoing Symptomatic Phase vs. Post-COVID-19 Syndrome



Persistence of somatic symptoms after COVID-19 in the Netherlands: an observational cohort study

Lancet 2022; 400: 452–61

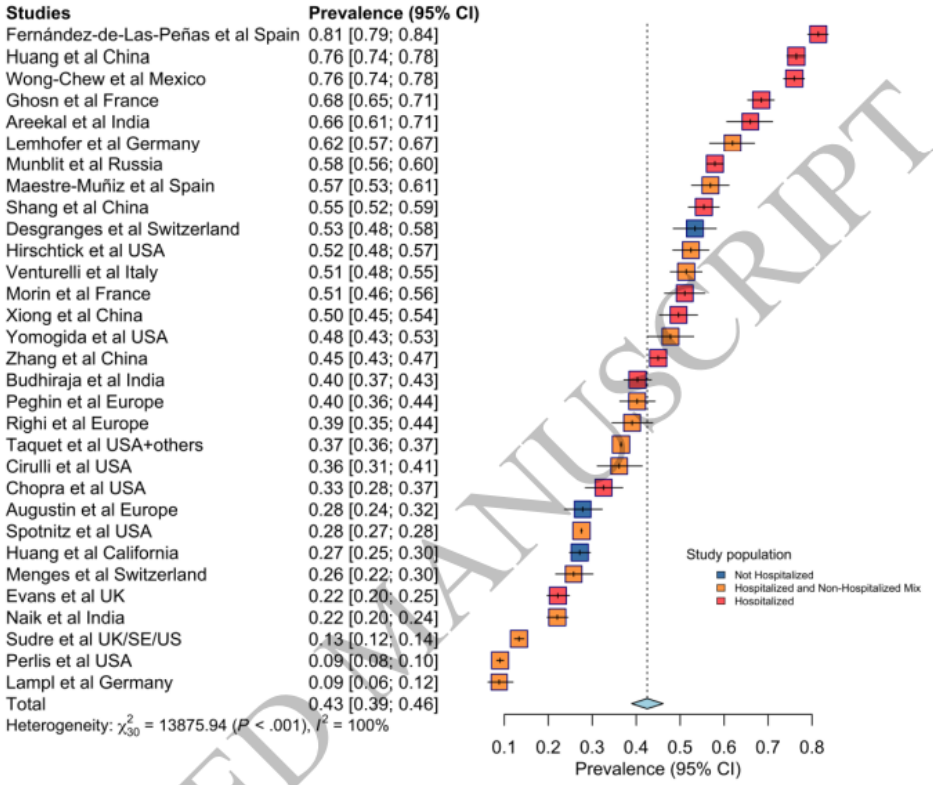
*Aranka V Ballering, Sander K R van Zon, Tim C olde Hartman, Judith G M Rosmalen, for the Lifelines Corona Research Initiative**



Meta-Analysis > J Infect Dis. 2022 Nov 1;226(9):1593-1607. doi: 10.1093/infdis/jiac136.

Global Prevalence of Post-Coronavirus Disease 2019 (COVID-19) Condition or Long COVID: A Meta-Analysis and Systematic Review

Chen Chen [1], Spencer R Haupert [1], Lauren Zimmermann [1 2], Xu Shi [1], Lars G Fritsche [1 3 4], Bhramar Mukherjee [1 2 3 4 5]



Female sex affects respiratory function and exercise ability in patients recovered from COVID-19 pneumonia

Spicuzza et al. JWH 2022

	Males (n=91)	Females (=66)	P value
Pulmonary function tests			
FEV_1 (% pred)	101.9±17	105.1±20	0.9
FEV_1<80%, n (%)	14 (15.3)	11(16.6)	0.5
FVC (% pred)	95.0±16.7	98.2±23	0.5
FVC<80%, n (%)	15 (16.4)	14 (21.2)	0.5
DLCO (% pred)	85.8±19	78.4±18	<0.05
DLCO<80%, n (%)	29 (31.8)	35 (53.0)	<0.01
6MWT			
Meters	418±112	483±93	<0.001
Abnormal 6MWT, n (%)	45 (49.4)	44 (66.6)	<0.05
Severe reduction in 6MWT, n (%)	19 (20.8)	31 (46.9)	<0.001
SaO_2,% baseline	96.6±1.7	97.0±1.3	0.1
Lower SaO_2% during 6MWT	94.2±1.7	94.9±2.6	0.1
Borg scale Dyspnea	2.8±0.8	4.5±2.7	<0.05
Borg Perceived Exertion	2.4±1.9	3.7±2.8	<0.05

	Males (n=91)	Females (N=66)
Current symptomatic, n (%)	53(58.7)	43(65.1)
Exertional Dyspnea, n (%)	38(41.7)	31(46.9)
Fatigue, n (%)	27(29.6)	16(24.2)
Osteo-muscular pain, n (%)	5(5.3)	11 (16.6)
Cough, n (%)	2(2.1)	2(3.0)
Abnormal CT, n (%)	68(74.7)	45 (68.1)

6 month consequences of COVID-19 in patients discharged from hospital

Huang et al. Lancet 2021

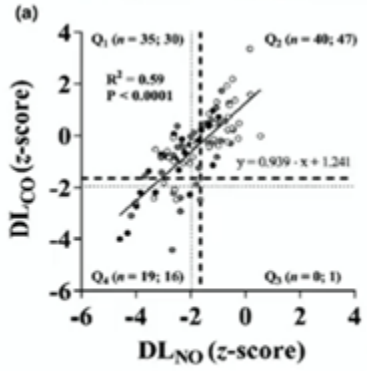
	Seven-category scale			OR or β (95% CI)	
	Scale 3: not requiring supplemental oxygen	Scale 4: requiring supplemental oxygen	Scale 5–6: requiring HFNC, NIV, or IMV	Scale 4 vs 3	Scale 5–6 vs 3
Lung function					
Number of patients	89	172	88		
FEV_1 <80%, % of predicted	7 (8%)	4 (2%)	11 (13%)	OR 0·14 (0·03 to 0·68)*	OR 0·50 (0·09 to 2·93)
FVC <80%, % of predicted	3 (3%)	1 (1%)	10 (11%)	OR 0·11 (0·01 to 1·59)	OR 2·09 (0·19 to 23·02)
FEV_1/FVC <70%	7 (8%)	13 (8%)	2 (2%)	OR 0·91 (0·29 to 2·80)	OR 0·26 (0·03 to 1·93)
TLC <80%, % of predicted	9/83 (11%)	17/165 (10%)	30/86 (35%)	OR 0·89 (0·33 to 2·42)	OR 3·00 (0·93 to 9·67)
FRC <80%, % of predicted	5/83 (6%)	6/165 (4%)	16/84 (19%)	OR 0·61 (0·17 to 2·16)	OR 3·93 (0·97 to 15·82)
RV <80%, % of predicted	16/83 (19%)	28/164 (17%)	43/86 (50%)	OR 0·76 (0·33 to 1·75)	OR 2·75 (1·03 to 7·37)*
DLCO <80%, % of predicted†	18/83 (22%)	48/165 (29%)	48/86 (56%)	OR 1·61 (0·80 to 3·25)	OR 4·60 (1·85 to 11·48)*

	Absolute	% predicted	*z*-score
DL_{CO} (mL·min^{-1}·mmHg^{-1})	17.4	78	-1.37
DL_{NO} (mL·min^{-1}·mmHg^{-1})	60.3	46	-3.54
DL_{CO}/V_A (mL·min^{-1}·mmHg^{-1}·L^{-1})	4.21	95	-0.32
DL_{NO}/V_A (mL·min^{-1}·mmHg^{-1}·L^{-1})	16.0	78	-1.58
TLC (L)	3.80	66	-2.83

Lung diffusion capacity for nitric oxide and carbon monoxide following mild-to-severe COVID-19

Barisione and Brusasco Physiological Reports 2021

Over 8 months of recovery a significant percentage of subjects had DL_{NO} but not DL_{CO} below LLN_S

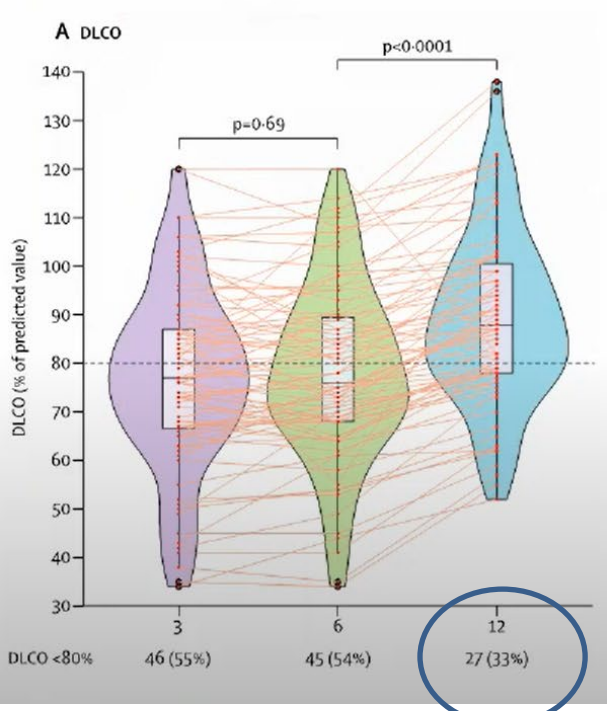


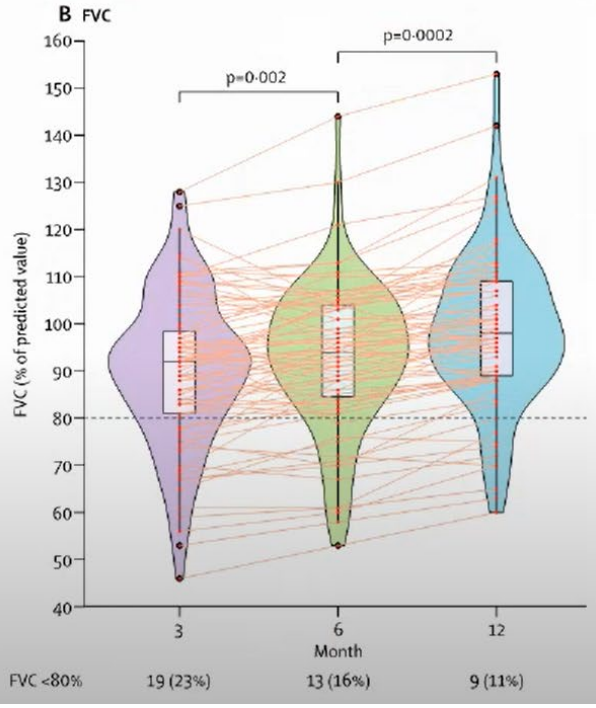
Symbols indicate subjects recovering from *mild* (white), *moderate* (gray), and *severe* (black) COVID-19 pneumonia.

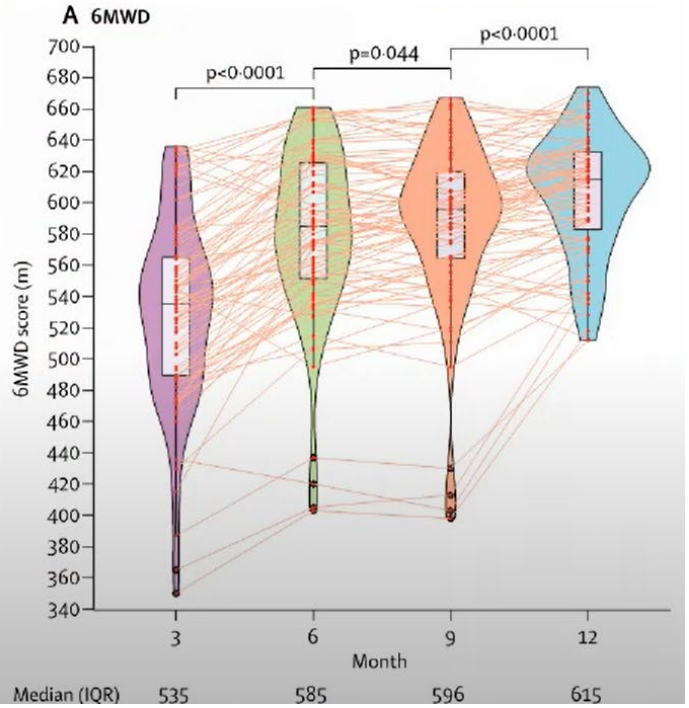
- Long-COVID: how long ?

3-month, 6-month, 9-month, and 12-month respiratory outcomes in patients following COVID-19-related hospitalisation: a prospective study

Xiaojun Wu, Xiaofan Liu*, Yilu Zhou*, Hongying Yu*, Ruiyun Li*, Qingyuan Zhan*, Fang Ni, Si Fang, Yang Lu, Xuhong Ding, Hailing Liu, Rob M Ewing, Mark G Jones†, Yi Hu†, Hanxiang Nie†, Yihua Wang†*







Lancet Respir Med 2021; 9: 747–54

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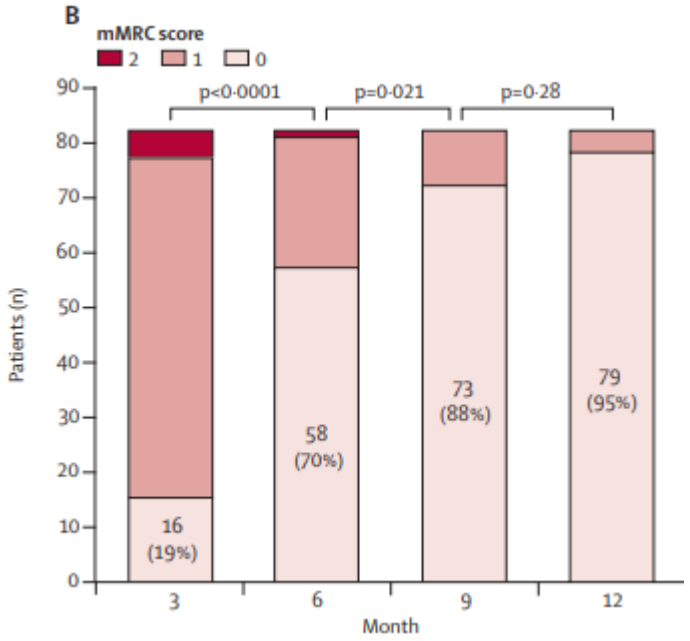
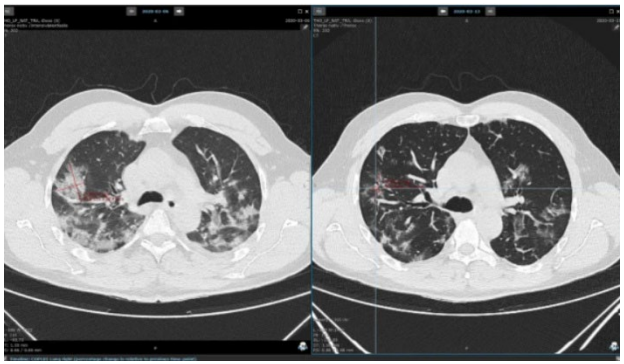


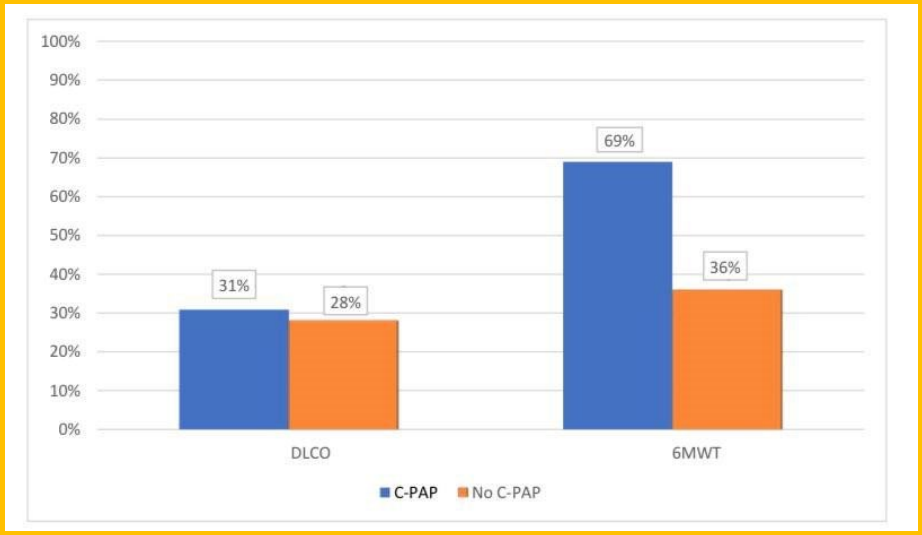
At 9 months the radiological changes did not fully resolve in 22 (27%) patients, confirmed at 12 months

Patients with abnormal radiographic changes at 12 months had increased length of hospital stay and increased peak HRCT pneumonia scores

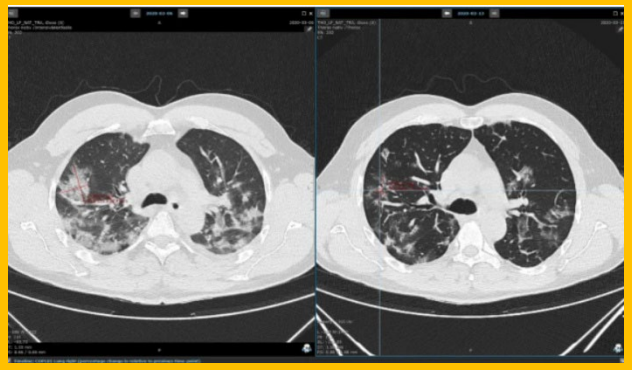


Lancet Respir Med 2021; 9: 747–54

Funzione polmonare 1 anno dopo ricovero per COVID -19 (60 pts)



34% pazienti sintomatici
40% GGO HRCT

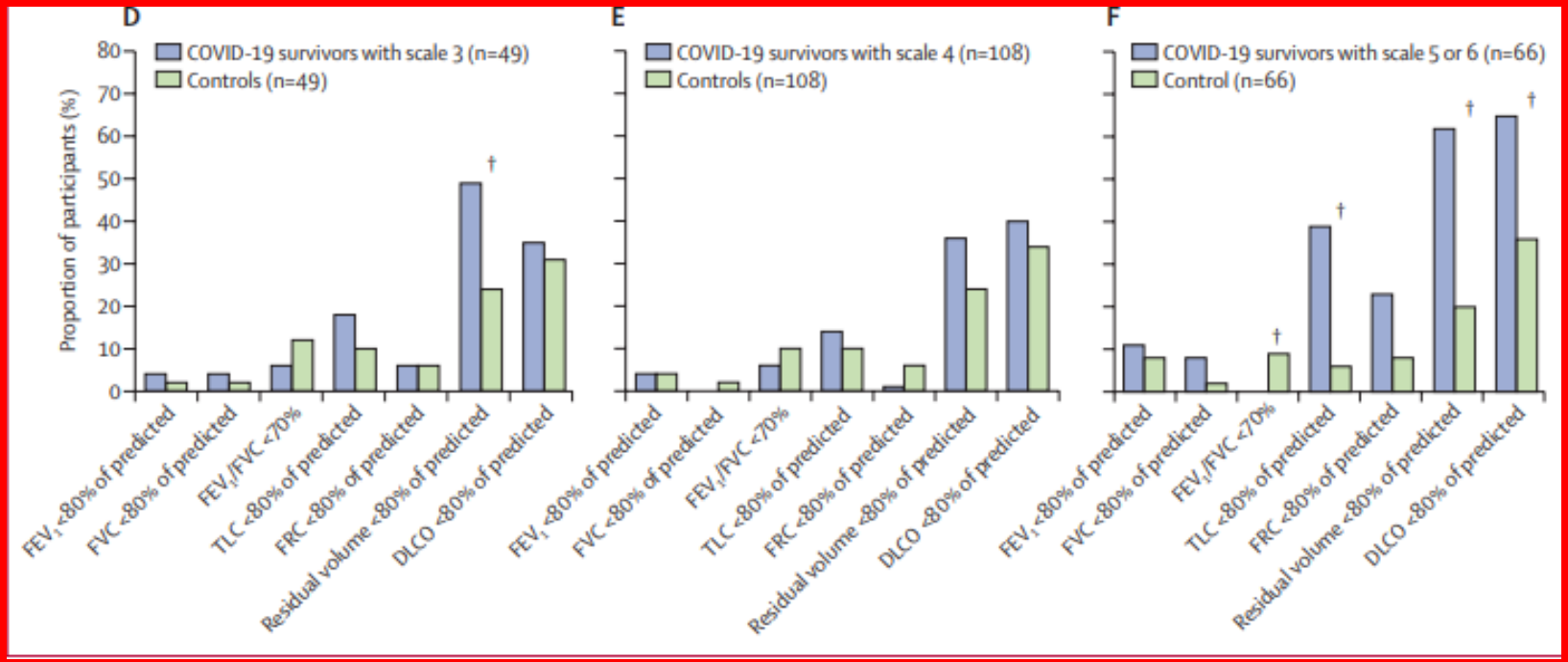


Health outcomes in people 2 years after surviving hospitalisation with COVID-19: a longitudinal cohort study

Lixue Huang*, Xia Li*, Xiaoying Gu*, Hui Zhang*, LiLi Ren*, Li Guo*, Min Liu*, Yimin Wang*, Dan Cui, Yeming Wang, Xueyang Zhang,

Lancet Respir Med 2022

2469 patients with COVID-19 were discharged from Jin Yin-tan Hospital Whan between Jan 7 and May 29, 2020

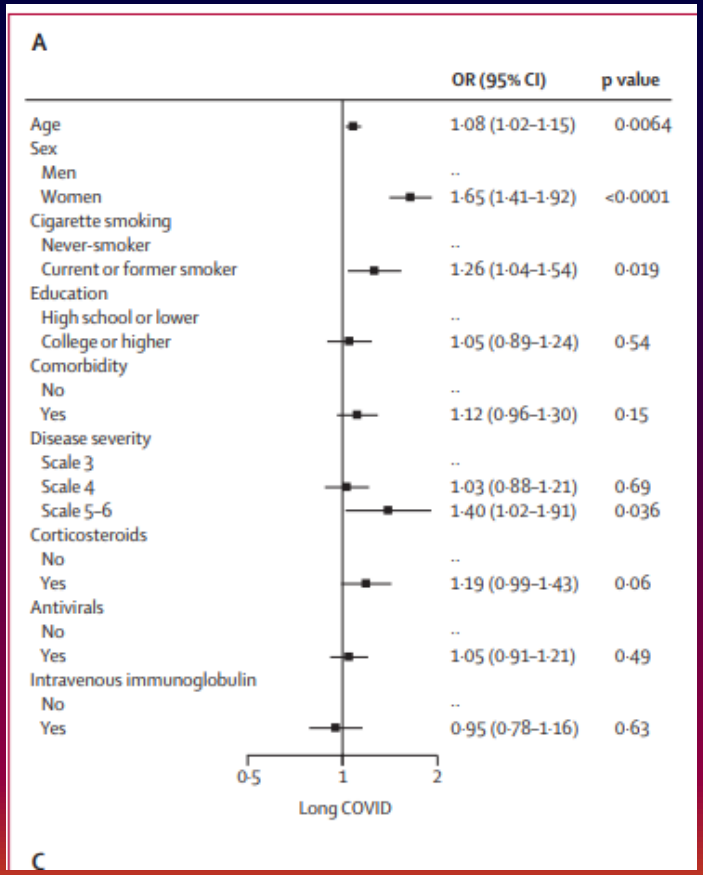


Interpretation Regardless of initial disease severity, COVID-19 survivors had longitudinal improvements in physical and mental health, with most returning to their original work within 2 years; however, the burden of symptomatic sequelae remained fairly high. COVID-19 survivors had a remarkably lower health status than the general population at 2 years. The study findings indicate that there is an urgent need to explore the pathogenesis of long COVID and develop effective interventions to reduce the risk of long COVID.

Who gets Long Covid?

Complex and challenging …..

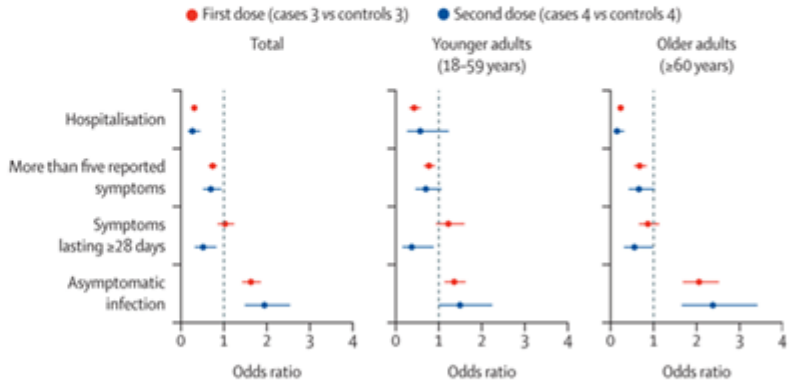
-people with pre-existing health conditions (e.g. diabetes hypertension)
- older people)
- overweight individuals
- women
- patients with 5 or more symptoms in first week of Covid19 infection



Huang Lancet 22

How Does Vaccination Affect the Risk of Long COVID?

- An active area of research
- One study in the UK of over 1 million people identified a lower odds of symptoms lasting >28 days among vaccinated people
- Other studies have suggested that vaccination may improve the severity of symptoms



Antonelli M. Lancet Infectious Diseases 2021.
Arnold DT. medRxiv 2021.

Research

Trajectory of long covid symptoms after covid-19 vaccination: community based cohort study

BMJ 2022 ; 377 doi: https://doi.org/10.1136/bmj-2021-069676 (Published 18 May 2022)
Cite this as: *BMJ* 2022;377:e069676

Risk of long COVID associated with delta versus omicron variants of SARS-CoV-2

Antonelli M. Lancet 2022

Among omicron cases, 2501 (4·5%) of 56 003 people experienced long COVID and, among delta cases, 4469 (10·8%) of 41 361 people experienced long COVID. Omicron cases were less likely to experience long COVID for all vaccine timings, with an odds ratio ranging from 0·24 (0·20–0·32) to 0·50 (0·43–0·59). These results were also confirmed when the analysis was stratified by age group (figure).

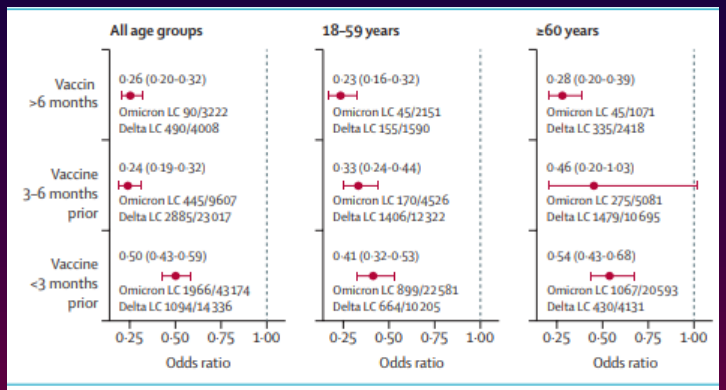


Figure: **Odds ratio of long COVID (LC) adjusted by age, sex, body-mass index, Index of Multiple Deprivation, presence of comorbidities, and vaccination status**
Omicron long COVID and delta long COVID indicate, for each stratum, the number of users with long COVID over the total number of users of that stratum.

Received: 14 August 2022 | Accepted: 10 October 2022
DOI: 10.1002/jmv.28214

RESEARCH ARTICLE

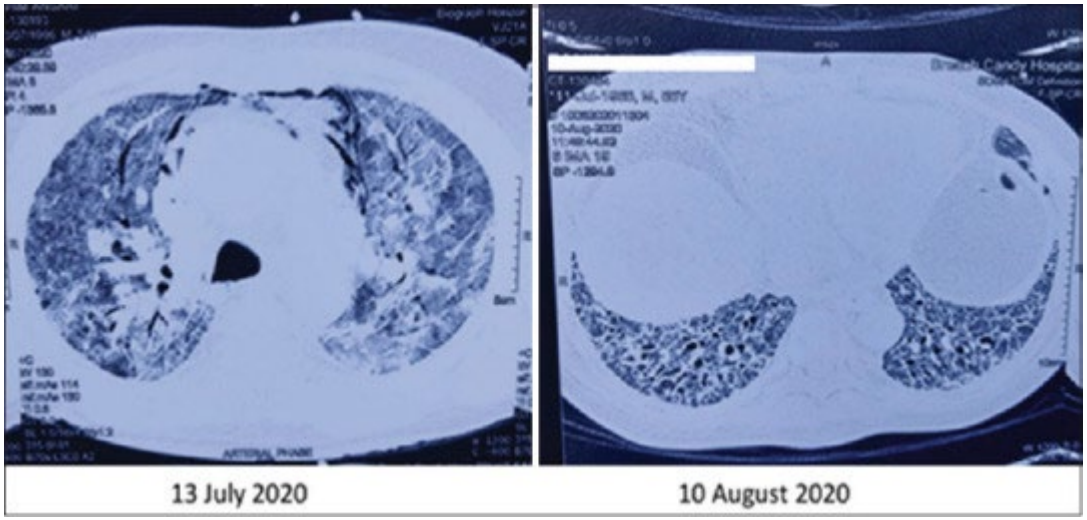
JOURNAL OF MEDICAL VIROLOGY WILEY

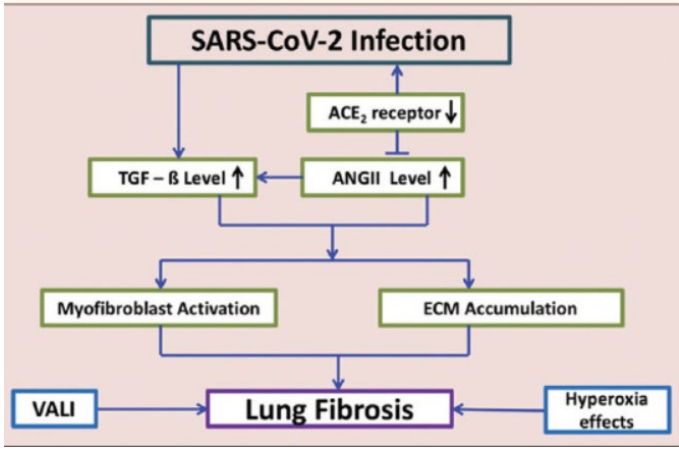
Long COVID following Omicron wave in Eastern India—A retrospective cohort study

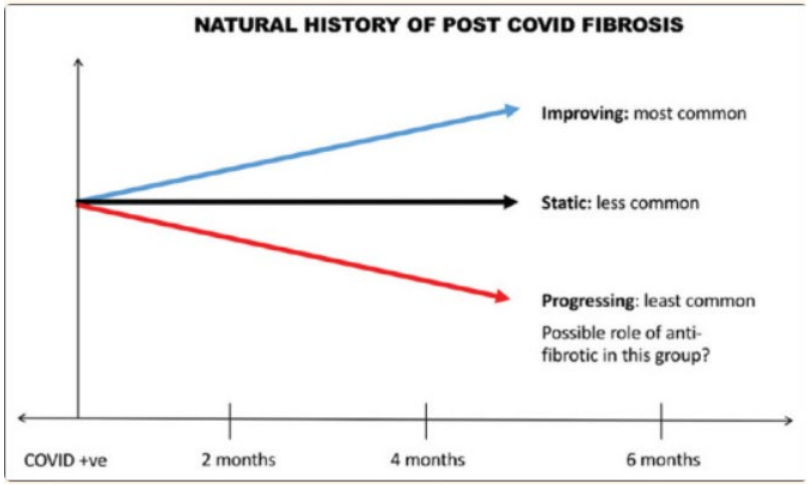
Pulmonary fibrosis and COVID-19: the potential role for antifibrotic therapy

Peter M George, Athol U Wells, R Gisli Jenkins

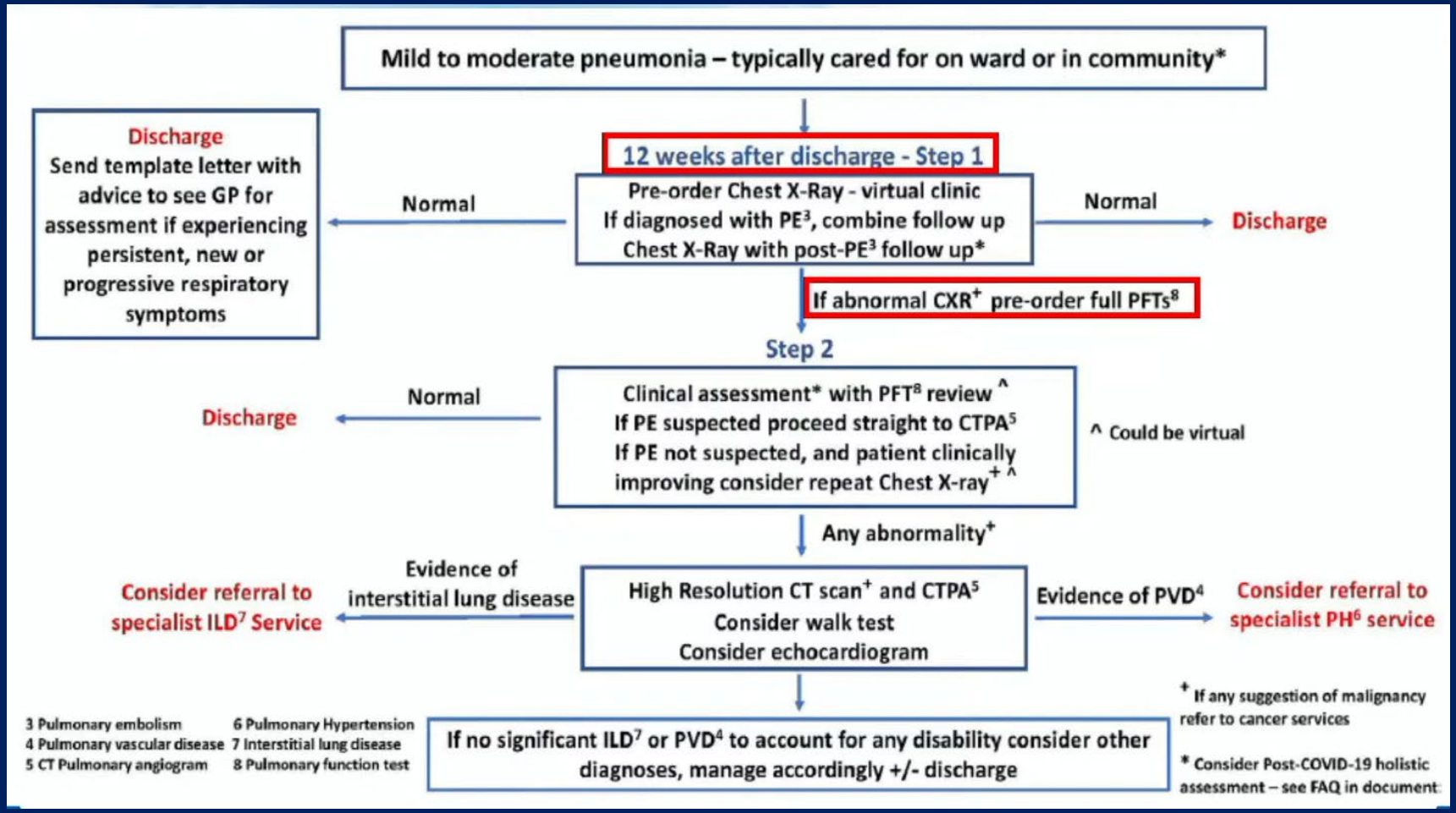
ALTRI VIDEO







Follow-up respiratorio: perché?

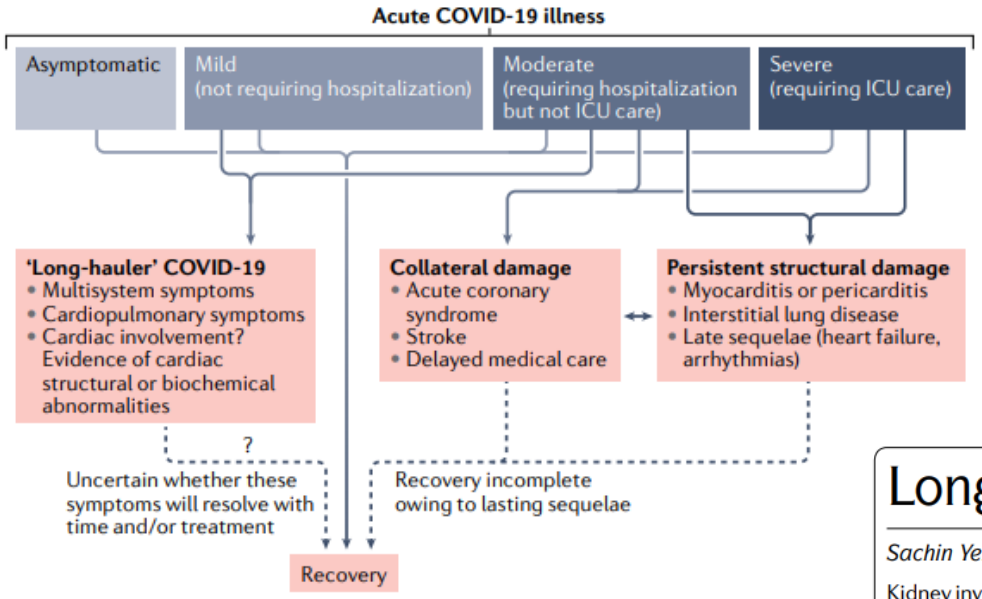


Thorax 2020

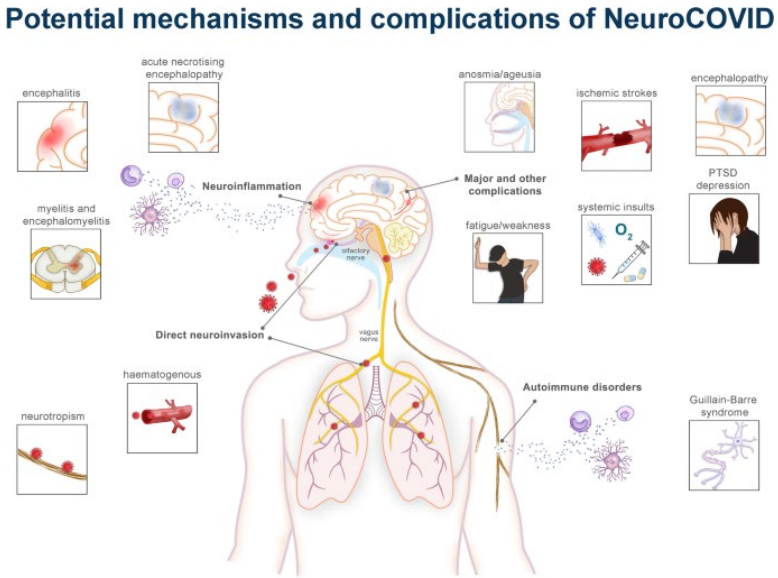
Multi-organ involvemente of Long-COVID

Cardiac involvement in the long-term implications of COVID-19

Benjamin A. Satterfield, Deepak L. Bhatt and Bernard J. Gersh



Nature 2022



Long COVID and kidney disease

Sachin Yende[1,2]✉ and Chirag R. Parikh[3,4]

Kidney involvement is common in patients with acute SARS-CoV-2 infection, and subclinical inflammation and injury may persist for many months, resulting in a progressive decline in kidney function that leads to chronic kidney disease. Continued research is imperative to understand these long-term sequelae and identify interventions to mitigate them.

Nature 2022

Centers for Disease Control and Prevention
CDC 24/7: Saving Lives, Protecting People™

National Center for Health Statistics

Management of Post-COVID Conditions

Medical management

For most patients, the goal of medical management of post-COVID conditions is to optimize function and quality of life. Ideally, healthcare professionals, in consultation with the relevant specialists, should develop a comprehensive management plan based on their patients' presenting symptoms, underlying medical and psychiatric conditions, personal and social situations, and their treatment goals.

Conclusions

COVID-19 is associated to symptoms improving within one year but lasting up up to two years in more severe cases

Severe and respiratory impairment is consequent to ARDS

Accurate stratification of patients with Post-acute sequelae of SARS-CoV-2 infection would allow precision clinical management strategies

Vaccination and variants may affect the risk of long-COVID