

SD Post-covid subaigu (3-12 sem)
SD Post-Covid chronique persistant (>12 sem) et MPR

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JASFGG, novembre 2021



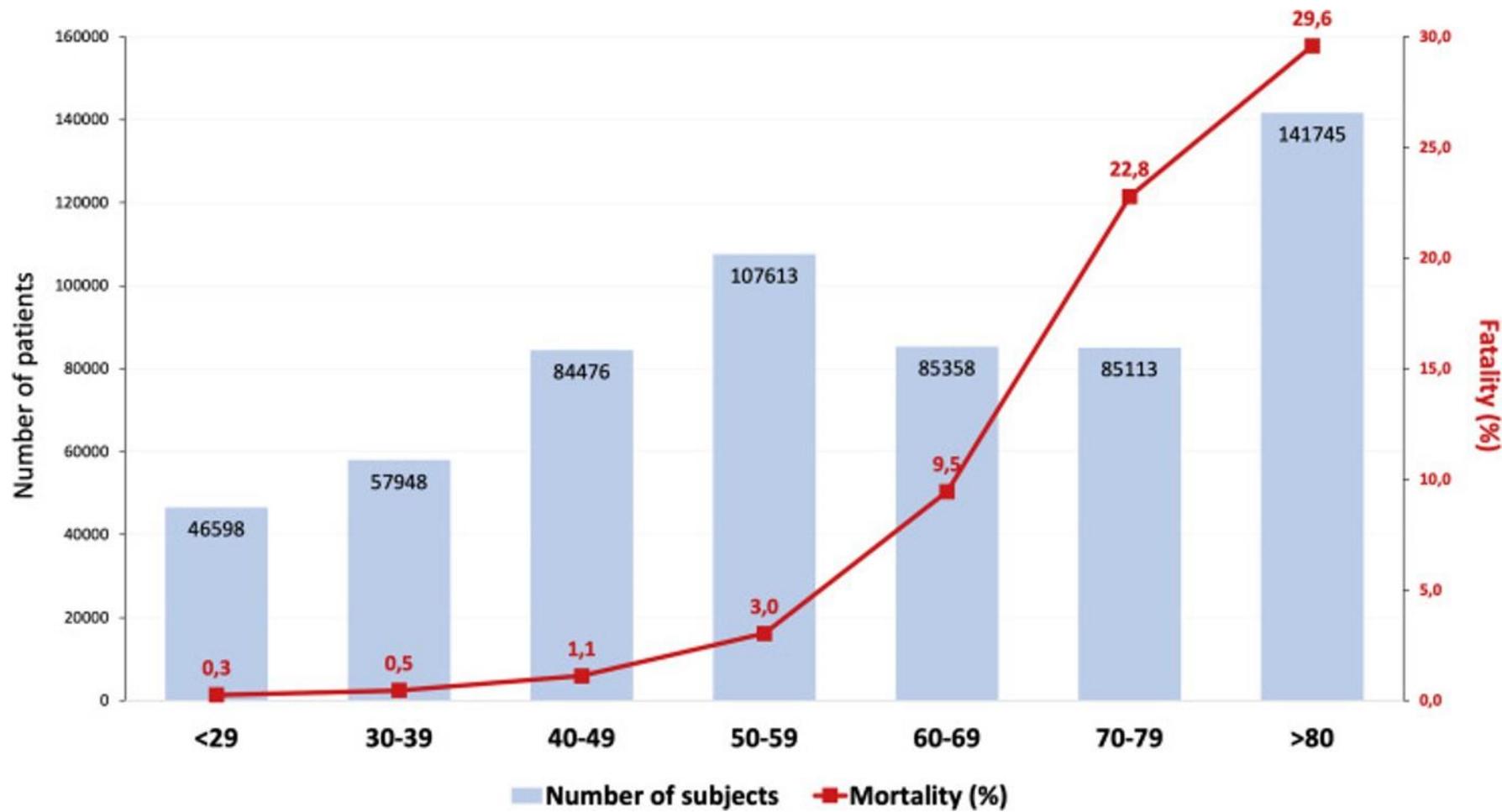
SD Post-Covid sub-aigu symptomatiques prolongés

SD Post-Covid chroniques persistants

1. Particularités chez les personnes âgées
2. Physiopathologie(s)
3. Prédiction du covid 'long' prolongé ou persistant
4. Formes cliniques : multi-systémiques dont POTS, HV et psychocognitif...
5. Besoins de rééducation, évaluations
6. Traitements
7. Résultats
8. Conclusions

L'effet de l'âge sur la mortalité chez les patients atteints de COVID-19: une méta-analyse avec 611 583 sujets

J Am Med Dir Assoc 2020



Frailty OR = 1,01 à 3,5

Démence OR = 5 à 11

Homme OR = 1,1 à 1,3

IRC OR = 3 à 16

COPD OR = 3 à 6

HTA

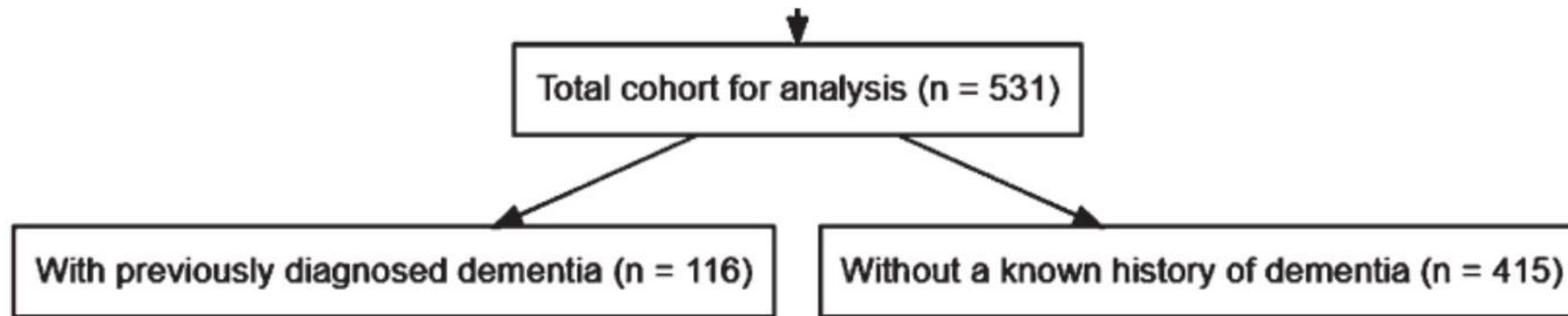
Diabetes

CV

Respiratoire

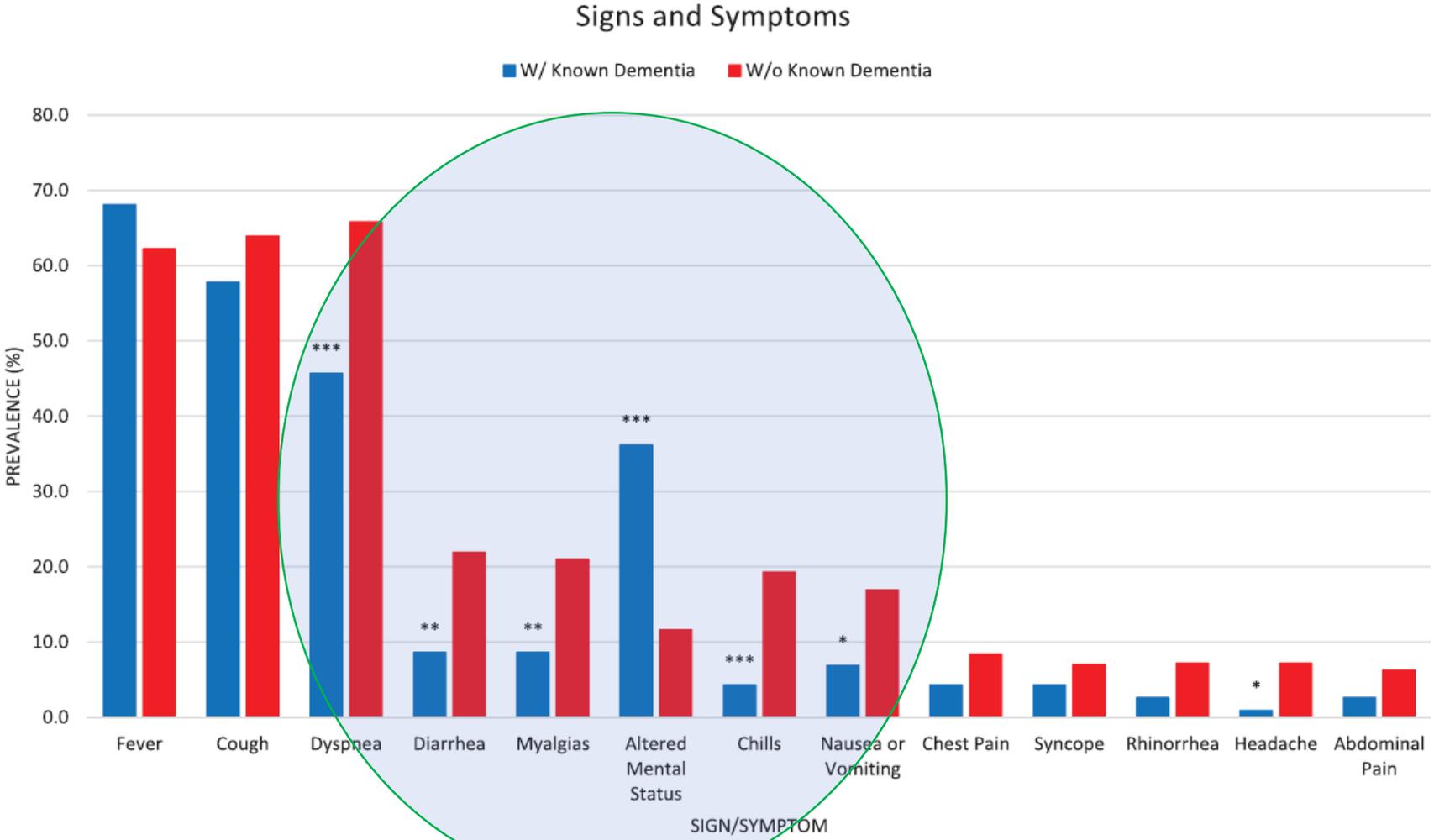
Clinical Features and Outcomes of Patients with Dementia Compared to an Aging Cohort Hospitalized During the Initial New York City COVID-19 Wave

Journal of Alzheimer's Disease 81 (2021) 679–690



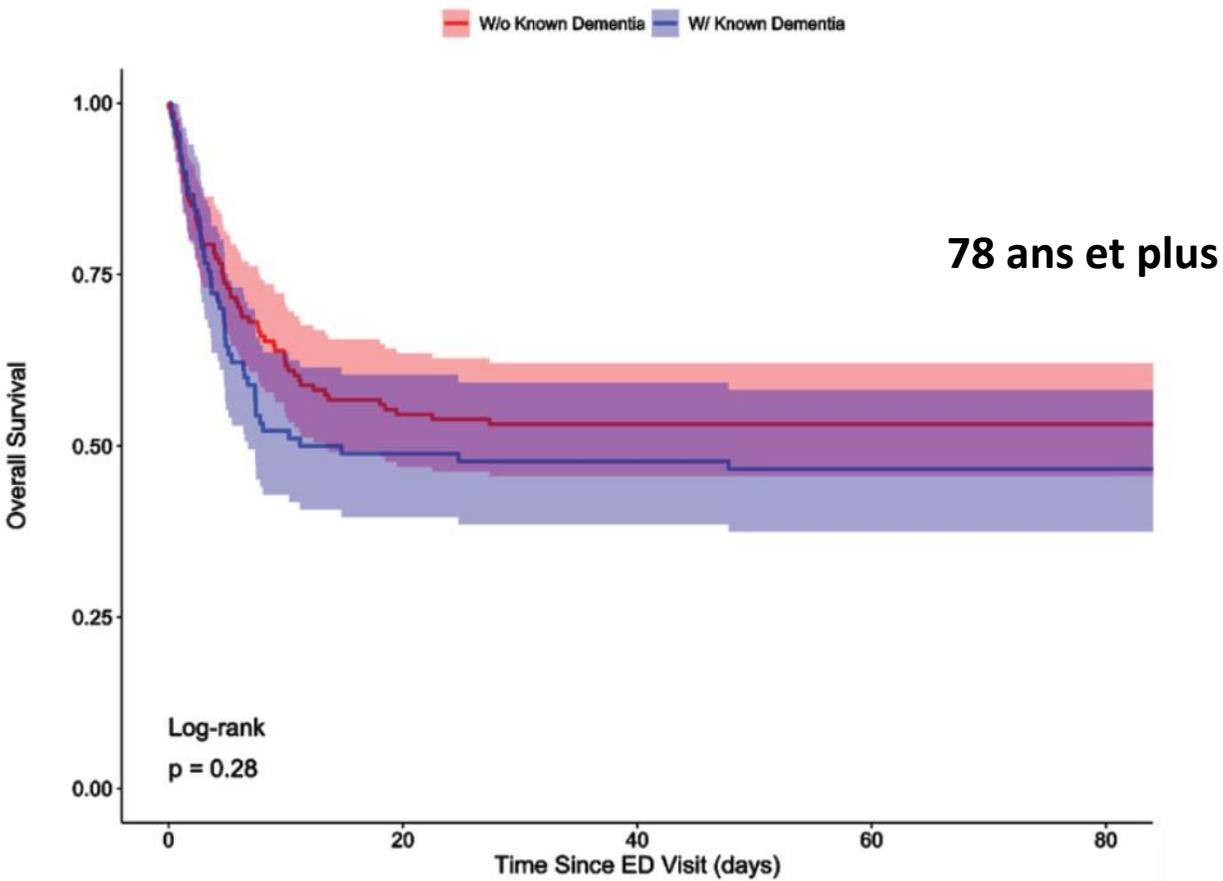
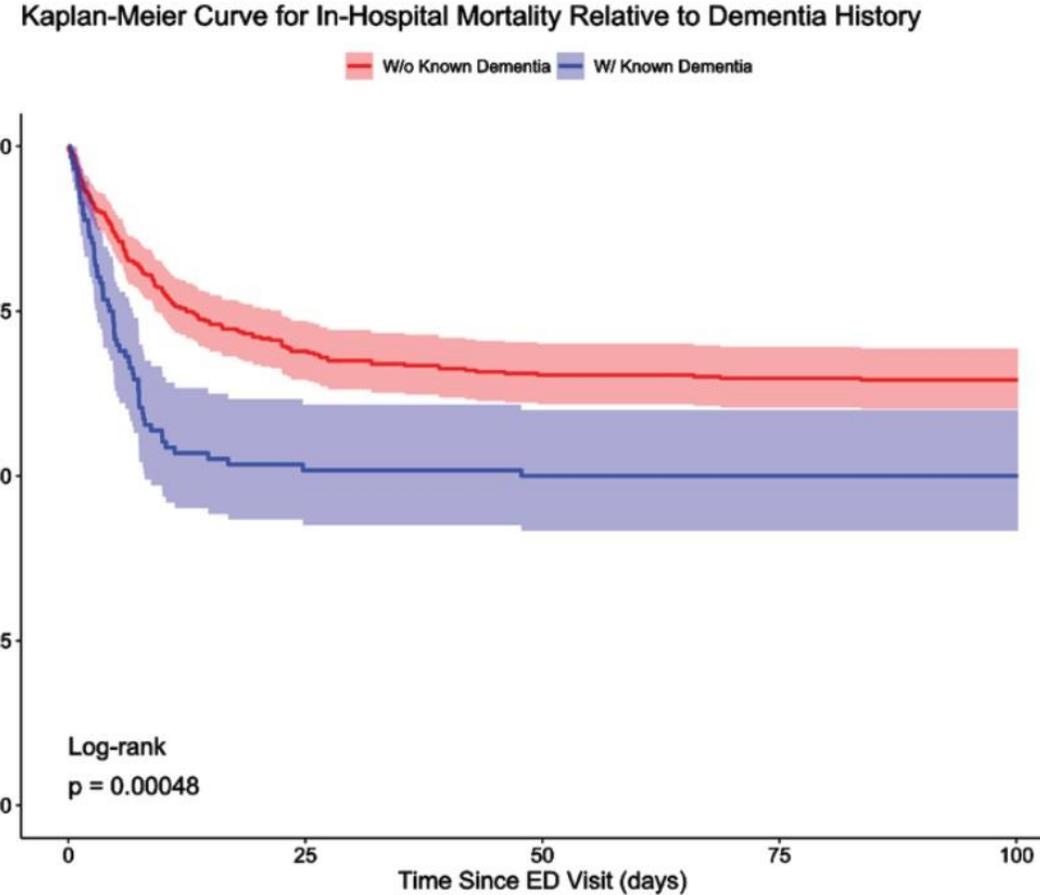
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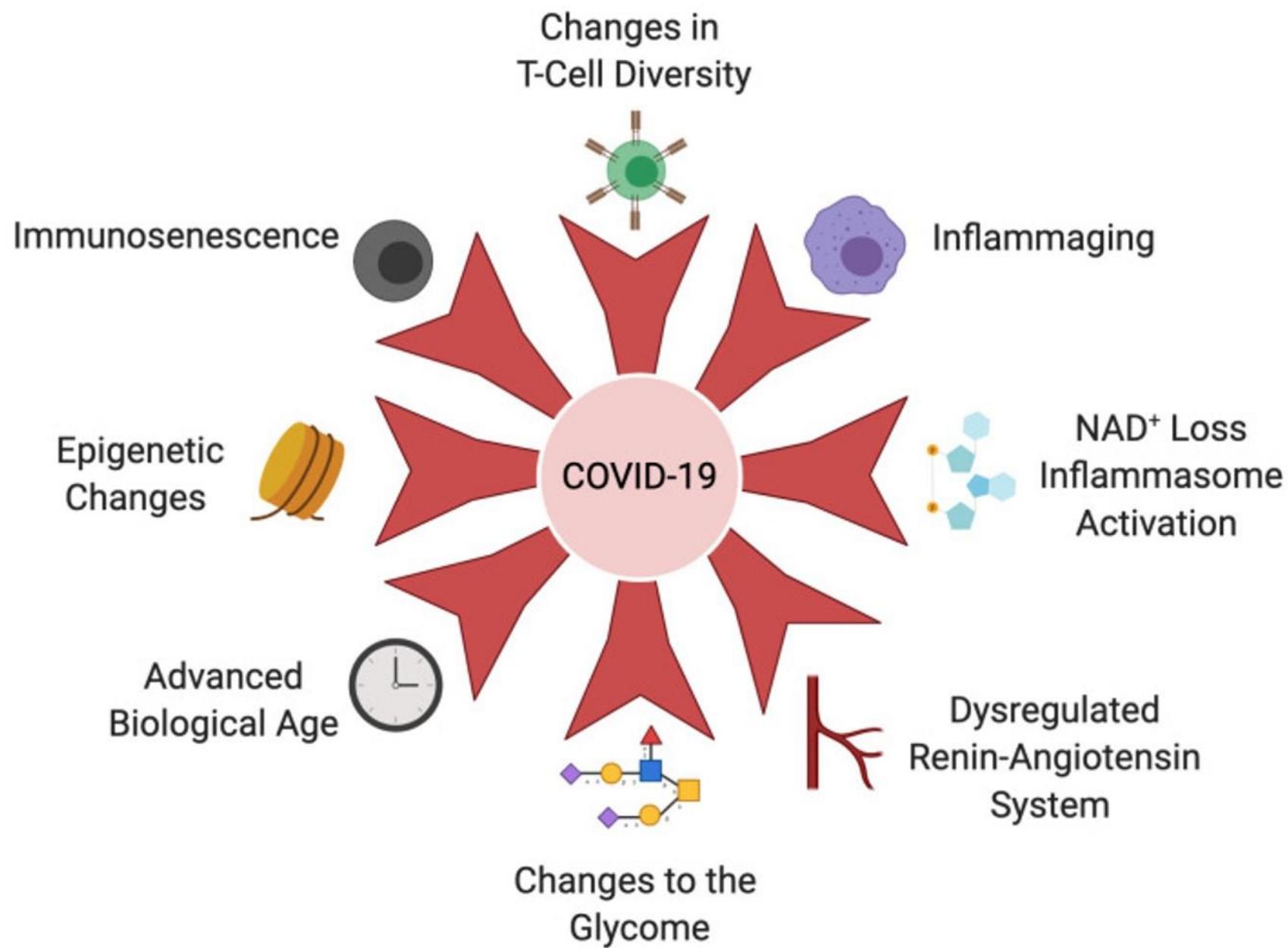
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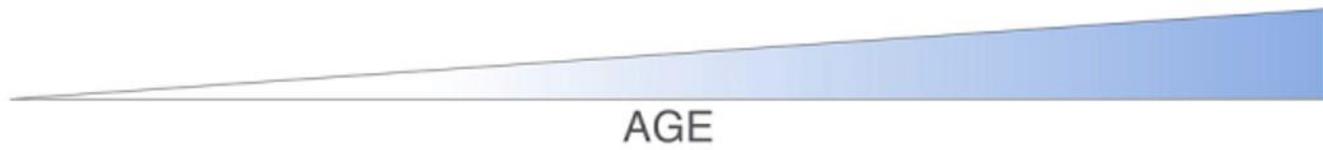
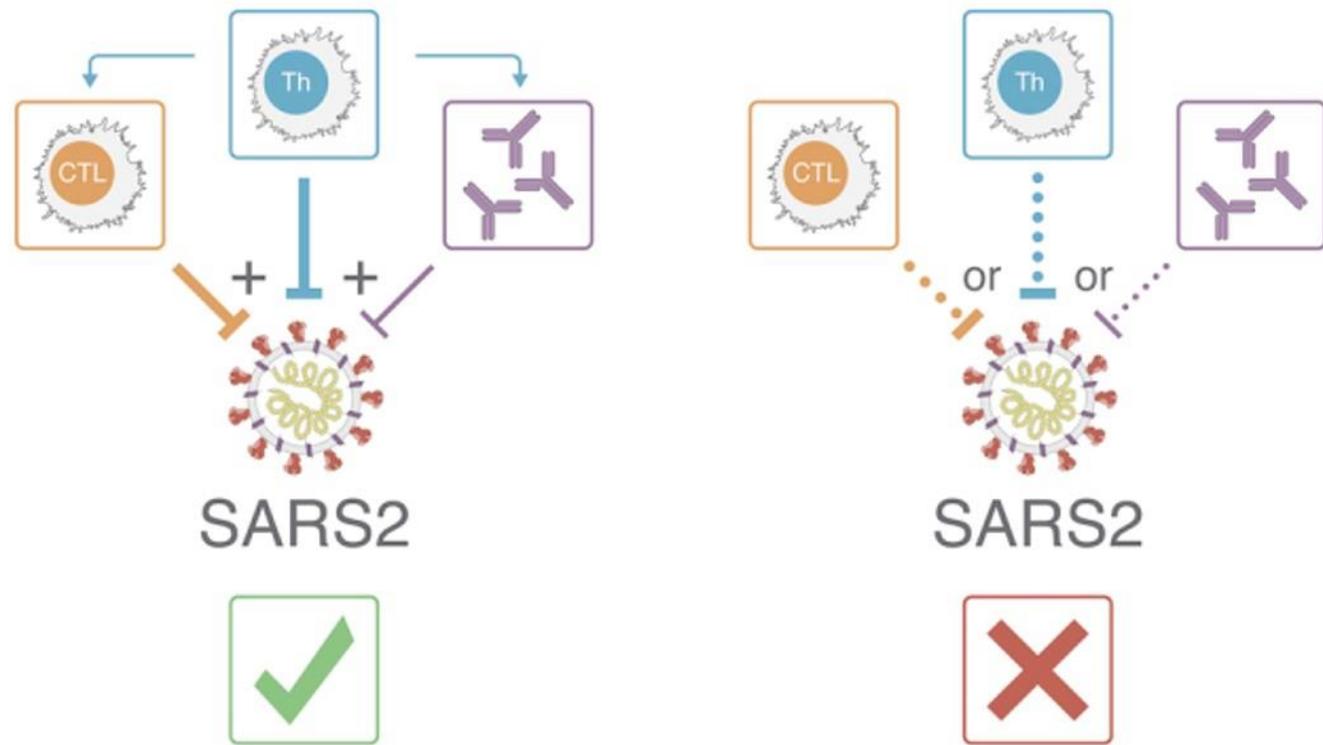


Patient Factors and Hospital Outcomes Associated With Atypical Presentation in Hospitalized Older Adults With COVID-19 During the First Surge of the Pandemic

J Gerontol A Biol Sci Med Sci, 2021

- Présentations atypiques
 - Déclin fonctionnel 25%
 - Altération des fct cognitives 11%
 - Délirium
 - Présentation atypiques associées avec
 - older age,
 - female gender,
 - Black race,
 - non-Hispanic ethnicity,
 - higher comorbidity index,
 - présence démence et diabetes mellitus.
 - Présentation typique = 1.39 times x plus de chance admission ICU.
 - Hospital outcomes
 - de mortalité,
 - de durée my de séjour,
 - de réadmission à 30-jours
- sont similaires entre présentations cliniques typiques et atypiques





Supplementary Table 5. Association between hospitalization for COVID-19 and prior receipt of full vaccination with a two-dose series of a mRNA vaccine, restricted to patients without immunocompromising conditions and aged ≥ 65 years.

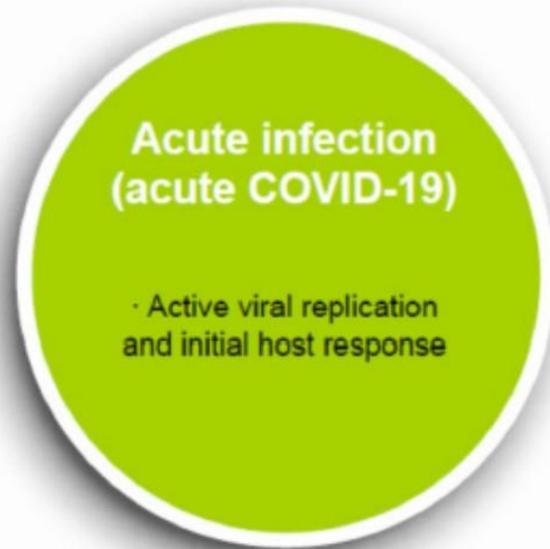
Subgroup	Vaccinated Case Patients / Total Case Patients (%)	Vaccinated Control Patients / Total Control Patients (%)	Absolute Difference (95% CI), %	Adjusted Odds Ratio (95% CI)
Overall	115/460 (25.0)	601/838 (71.7)	-46.7 (-51.7 to -41.7)	0.12 (0.09 to 0.16)
By time between vaccine dose #2 and illness onset				
14-120 days	53/398 (13.3)	472/709 (66.6)	-53.3 (-58.1 to -48.4)	0.09 (0.06 to 0.13)
>120 days	62/407 (15.2)	129/366 (35.2)	-20.0 (-26.0 to -14.0)	0.21 (0.13 to 0.32)
By month of illness onset overall and by time between vaccine dose #2 and illness onset				
March-June 2021 overall (Alpha period)	42/236 (17.8)	407/575 (70.8)	-53.0 (-59.1 to -46.9)	0.10 (0.06 to 0.14)
14-120 days since vaccination	39/233 (16.7)	385/553 (69.2)	-52.9 (-59.0 to -46.7)	0.09 (0.06 to 0.14)
>120 days since vaccination	3/197 (1.5)	22/190 (11.6)	-10.1 (-14.9 to -5.2)	0.13 (0.03 to 0.50)
July-August 2021 overall (Delta period)	73/224 (32.6)	194/263 (73.8)	-41.2 (-49.3 to -33.1)	0.12 (0.07 to 0.20)
14-120 days since vaccination	14/165 (8.5)	87/156 (55.8)	-47.3 (-56.2 to -38.4)	0.07 (0.03 to 0.14)
>120 days since vaccination	59/210 (28.1)	107/176 (60.8)	-32.7 (-42.1 to -23.3)	0.17 (0.10 to 0.30)
By vaccine product overall and by time between vaccine dose #2 and illness onset				
Pfizer-BioNTech overall	79/424 (18.6)	362/599 (60.4)	-41.8 (-47.2 to -36.4)	0.14 (0.10 to 0.19)
14-120 days since vaccination	31/376 (8.2)	280/517 (54.2)	-45.9 (-51.0 to -40.8)	0.09 (0.06 to 0.14)
>120 days since vaccination	48/393 (12.2)	82/319 (25.7)	-13.5 (-19.3 to -7.7)	0.25 (0.15 to 0.40)
Moderna overall	36/381 (9.4)	239/476 (50.2)	-40.8 (-46.1 to -35.4)	0.10 (0.07 to 0.15)
14-120 days since vaccination	22/367 (6.0)	192/429 (44.8)	-38.8 (-44.1 to -33.5)	0.09 (0.05 to 0.14)
>120 days since vaccination	14/359 (3.9)	47/284 (16.5)	-12.6 (-17.4 to -7.9)	0.13 (0.07 to 0.27)

Abbreviations: CI = confidence interval; OR = odds ratio

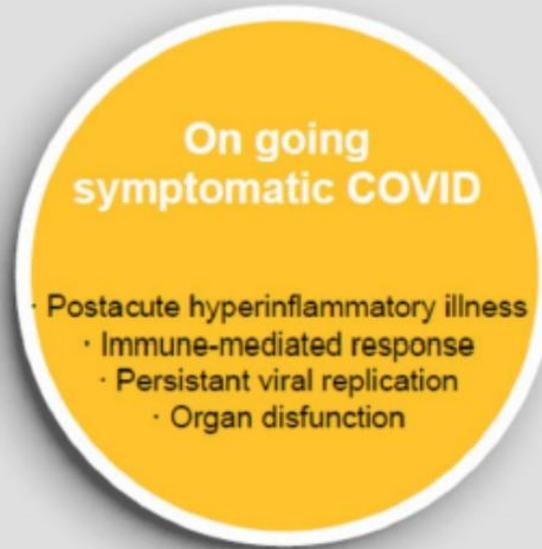
Définitions ??

ICU = 100%
Non ICU = 40%
Non hospit = 13%

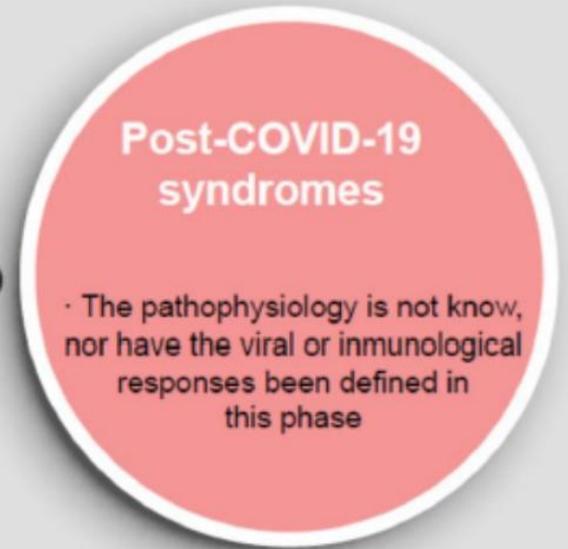
ICU = >12 mois
Non ICU = ?
Non hospit = 3-5%



4 weeks



12 weeks



PROLONGED COVID-19

Long COVID-19: An emerging pandemic in itself

King college London/ZOE COVID symptom app

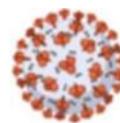
Estimation de 10-13% de patients
avec des symptômes prolongés ≥ 28 jours

Table 1. Reported clinical characteristics of long COVID

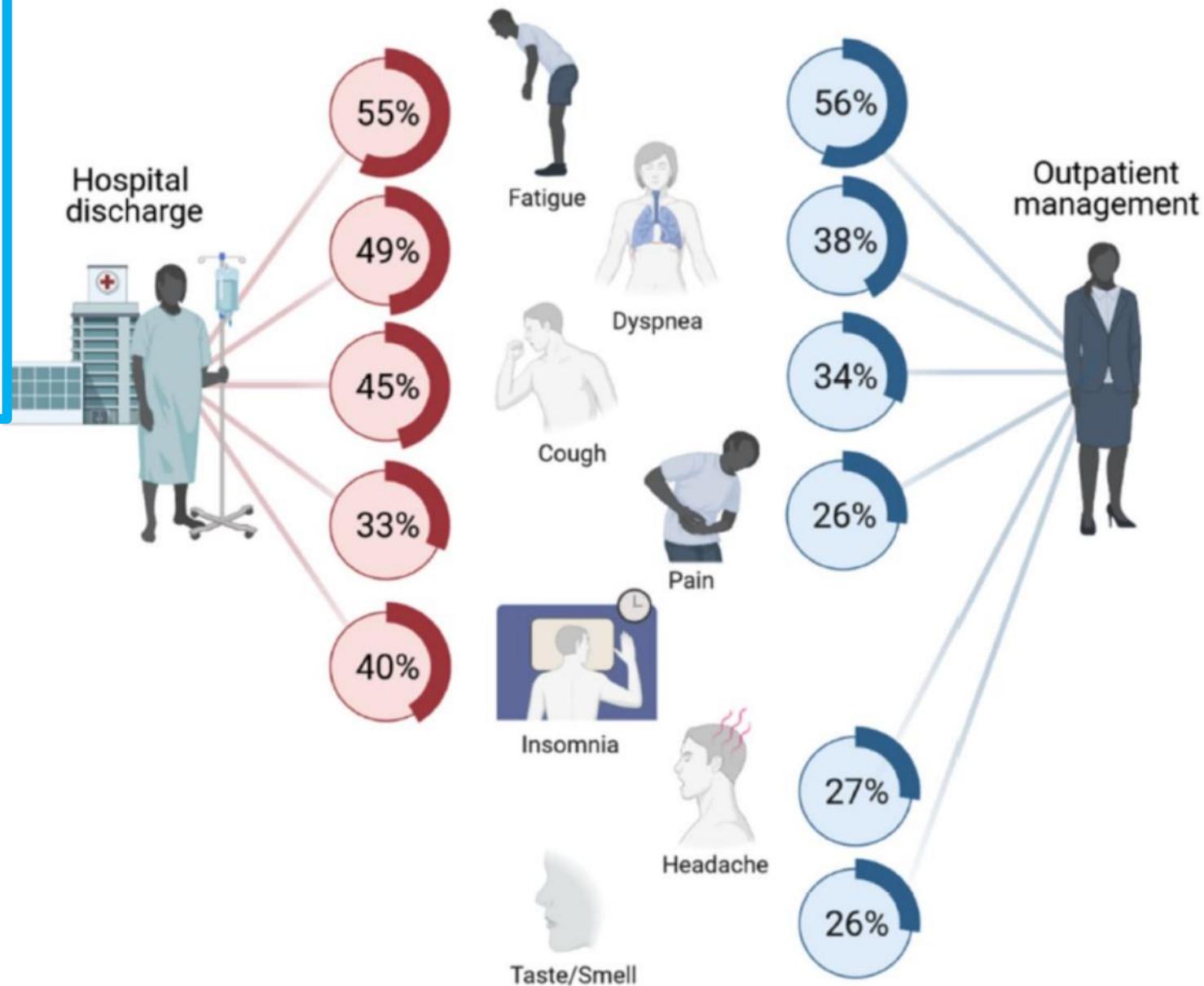
General	<ul style="list-style-type: none">• Fatigue• Tiredness• Sleep disturbances
Respiratory	<ul style="list-style-type: none">• Dyspnoea• Exacerbation of Asthma or COPD• Persistent cough
Mental Health	<ul style="list-style-type: none">• Emotional Disturbances• PTSD• Anxiety• Depression• Mood disturbances
Musculo-skeletal	<ul style="list-style-type: none">• Joint pain• Myalgia• Arthritis of small joints
Cardiovascular	<ul style="list-style-type: none">• Chest pain• Palpitations
Neurological	<ul style="list-style-type: none">• Pins and needles' sensation• Headache• Dizziness

COPD — chronic obstructive pulmonary disease; PTSD — post-traumatic stress disorder

Prévalence des symptômes en phase Post-aigue ?

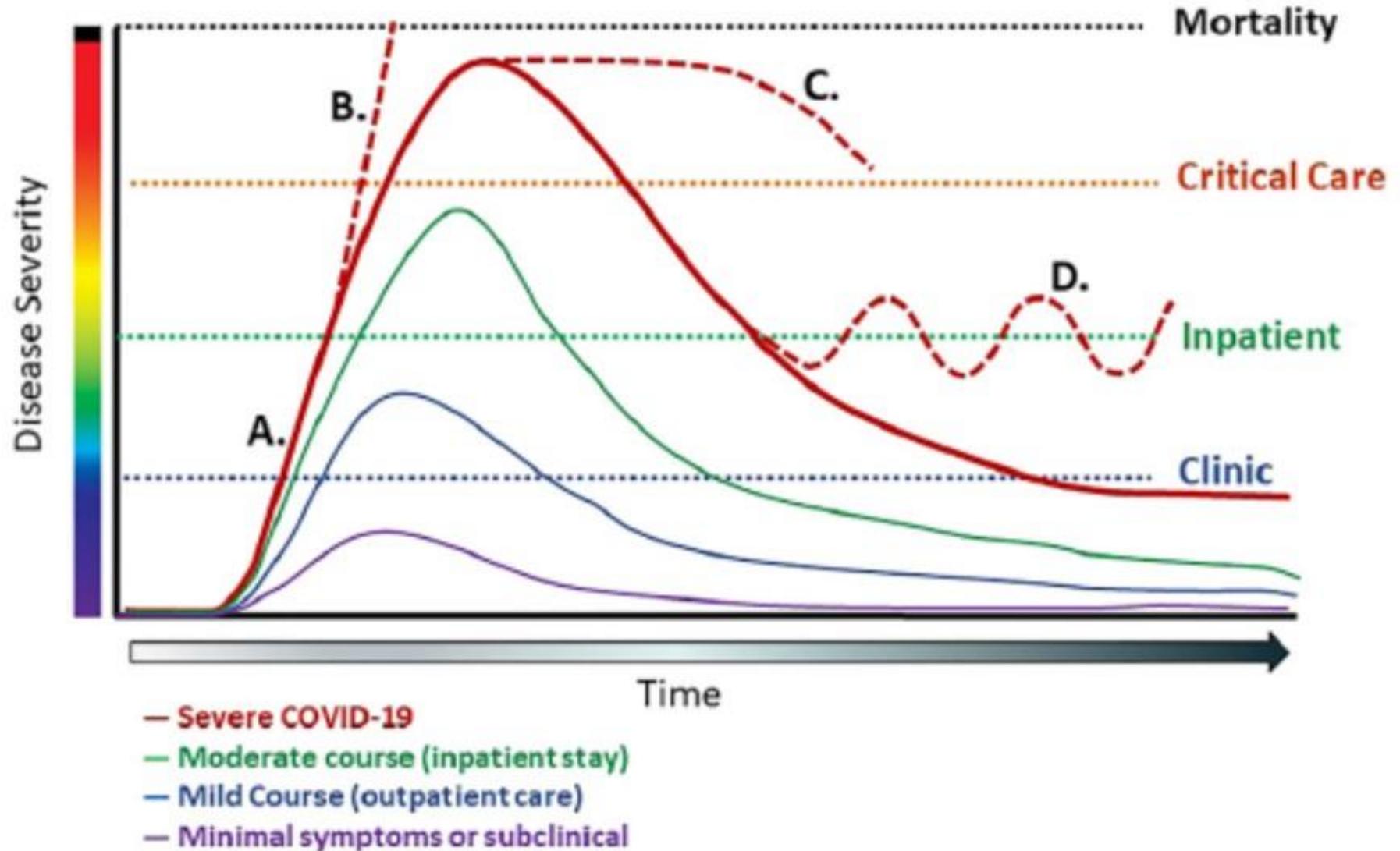


POST-COVID-19 SYNDROME MAIN SYMPTOMS (4-12 WEEKS)

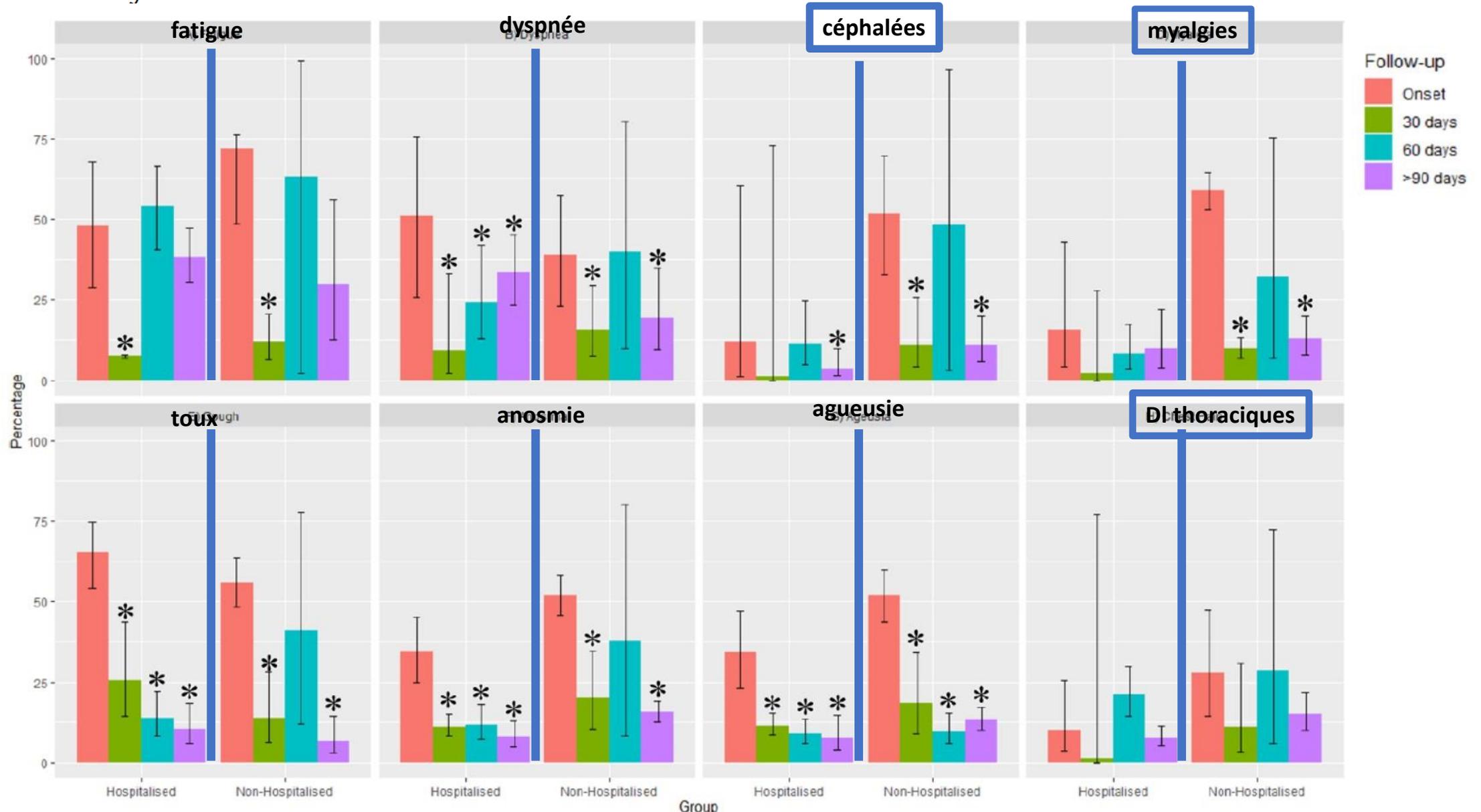


Cinétiques ?

Prototypical COVID-19 Courses



Prevalence of post-COVID-19 symptoms in hospitalized and non-hospitalized COVID-19 survivors: A systematic review and meta-analysis



Physio-pathologie du SD post-covid ???

Différencier

Atteintes focales organiques

1. Conséquences et sévérité de l'atteinte initiale (durée, hospitalisation, ICU)
2. Complications de immobilité
3. Complications organiques (pulmonaire, cardiaques, vesico-rénale....)
4. Acutisation et dégradation de comorbidités préexistantes ou latentes (organique, psychiatrique, psycho

Atteintes systémiques

1. Atteintes inflammatoires multisystémiques (immunologiques, vasculaires, neurologiques...)
2. Atteintes microvasculaires multisystémiques (capillaires...)
3. Atteintes virales directes ?

Conséquences fonctionnelles sur les capacités et la participation

1. AVQ, IADL, conduite
2. Professionnelle, sociales

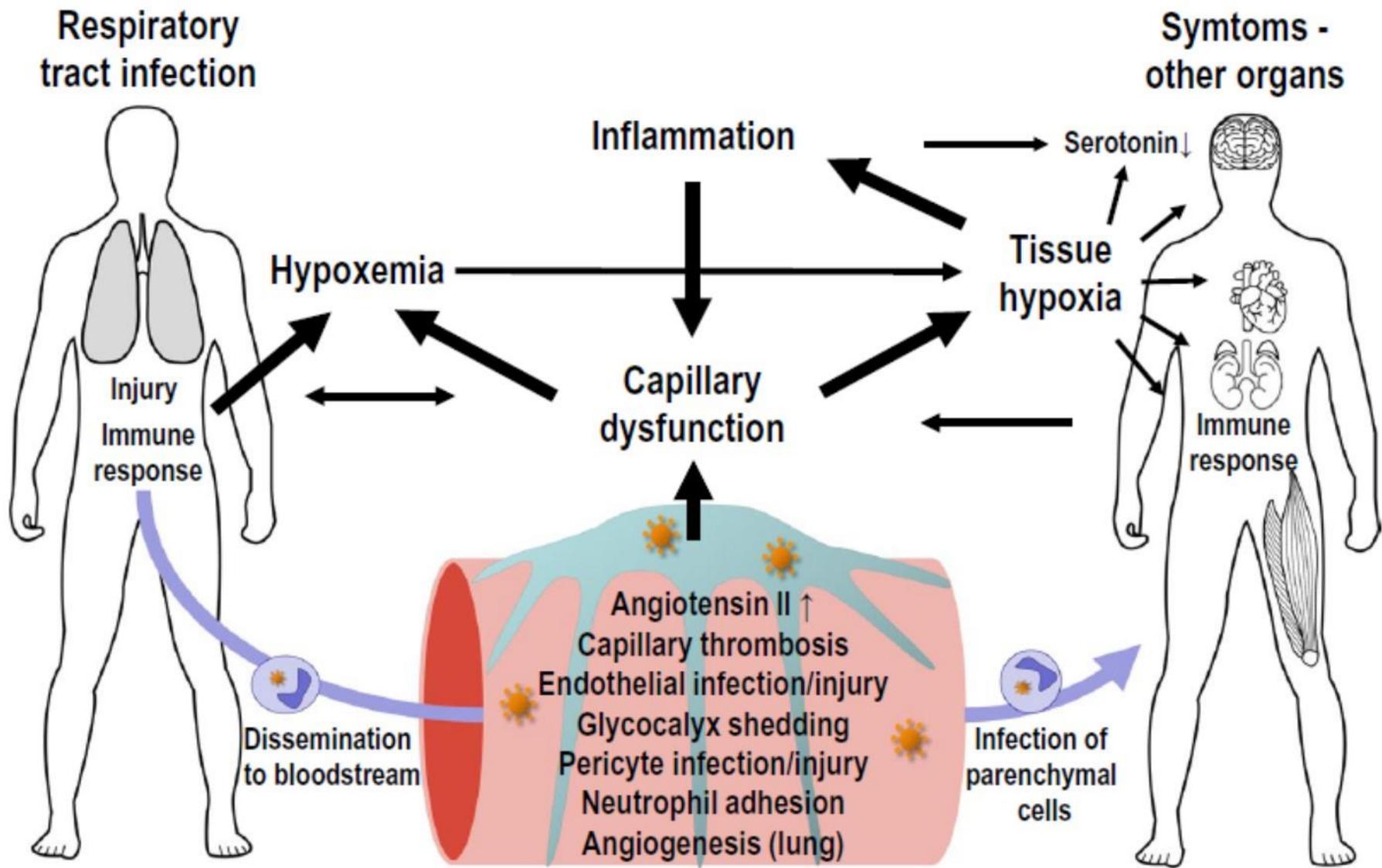
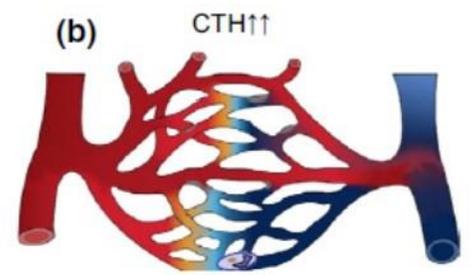
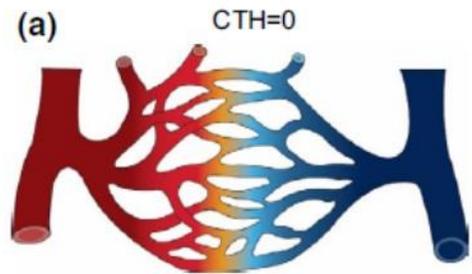
Pronostique : atteintes transitoires ou permanentes ?

Physio-pathologie systémique du SD post-covid ???

Hypothèses

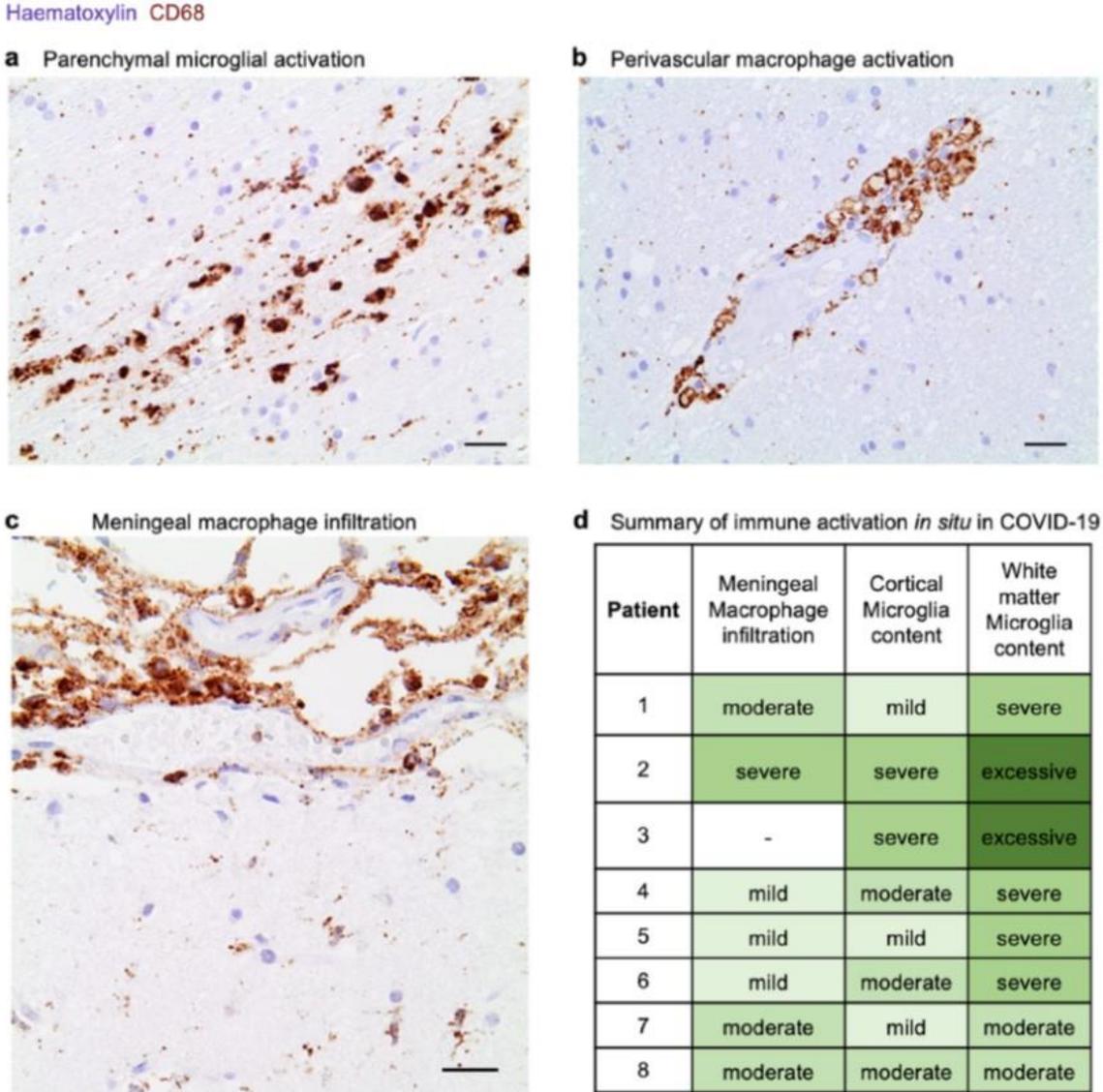
Atteintes multisystémiques

1. Réponse inflammatoire mal contrôlée, orage cytokinique
2. Dérégulation de la production de cytokines (ie IL6)
3. Réactivation des symptômes par faiblesse ou absence de production anticorps (immunodépression)
4. Productions d'auto-anticorps ? (antiphospholipide, IF, b2....
5. Atteintes des échanges gazeux capillaires et atteintes endothéliales
6. Atteintes du système nerveux autonomes ?
7. Atteintes neuro-invasives ?



Dysregulation of brain and choroid plexus cell types in severe COVID-19

Nature. 2021



Extended Data Fig. 11 i. Activation of parenchymal microglia and perivascular macrophages in COVID-19.

Dysregulation of brain and choroid plexus cell types in severe COVID-19

Nature. 2021

Yang et al.

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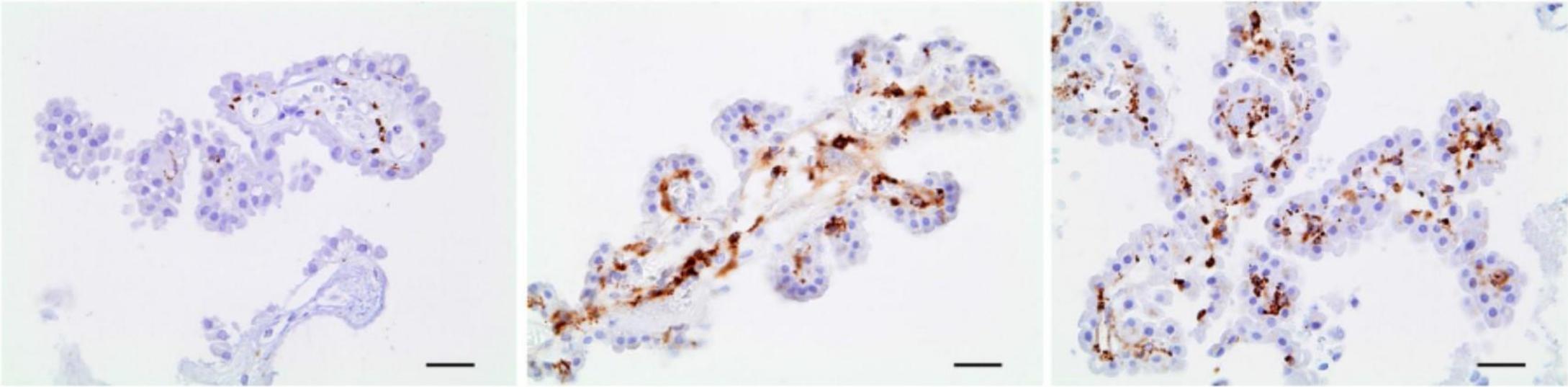
Macrophage activation in the COVID-19 choroid plexus

Haematoxylin CD68

Control patient

COVID-19 Patient 1

COVID-19 Patient 2



Extended Data Fig. 8 |. Choroid plexus inflammation in COVID-19.

Prévalence d'un covid subaigu prolongé (13%) ou chronique persistant (5 à 2%) ?

Attributes and predictors of long COVID

NATURE MEDICINE | VOL 27 | APRIL 2021 | 626-631 | www.nature.com/naturemedicine

N=4182 patient suivi app

LC \geq 28 jours => N=558 soit **13.3%**

LC \geq 56 jours => N=189 soit **4.5%**

LC \geq 84 jours => N= 95 soit **2.3%**

Short COVID \leq 10 jours versus Long Covid \geq 28 jours

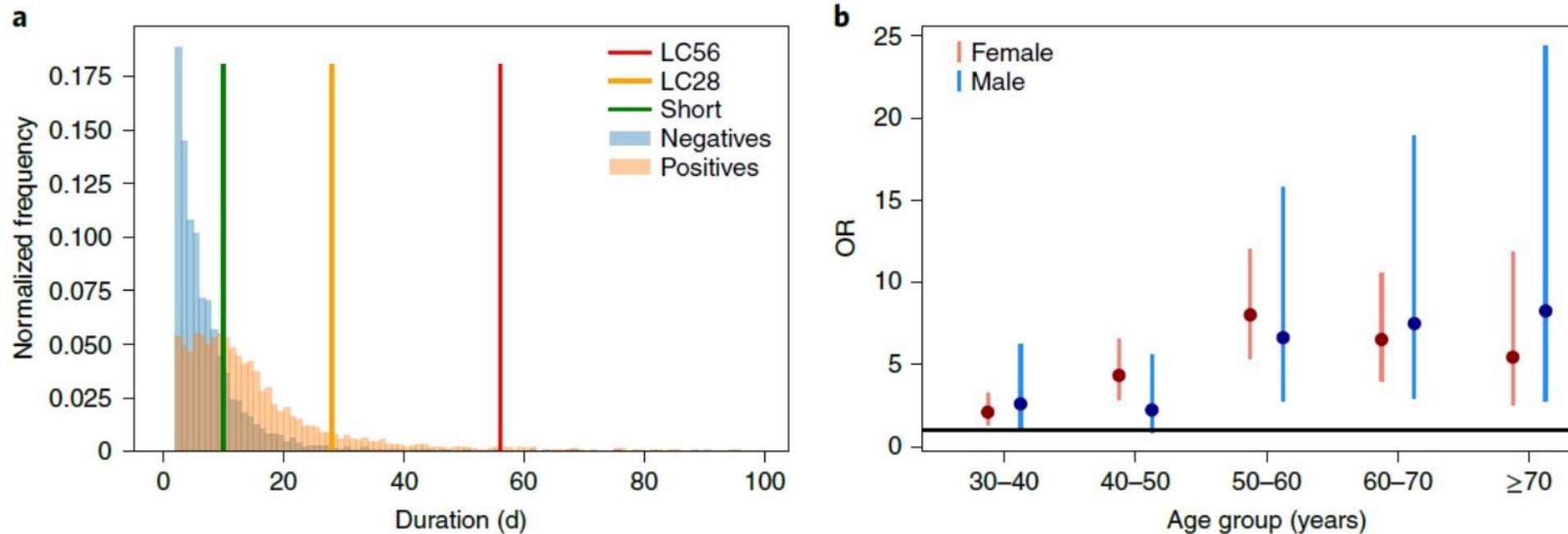


Fig. 1 | Distribution of disease duration and age effect on duration. **a**, Distribution of symptom duration in COVID-19. The colored bars indicate the limits to define short, LC28 and LC56 disease duration. The y axis represents the normalized frequency of symptom duration; 2.4% of negative controls and 3.3% of individuals with COVID-19 reported symptoms for \geq 28 d. **b**, ORs and 95% CIs of LC28 for each age decile compared to the 20- to 30-year-old age group when considering LC28 versus short COVID (1,516 females and 633 males). For males aged 20-30 years ($n=117$), the proportion who had LC28 was 4.5%, compared with 5.6% of females in same age range ($n=357$).

Prédiction du covid long?

Predictors / Risk Factors for Long-COVID

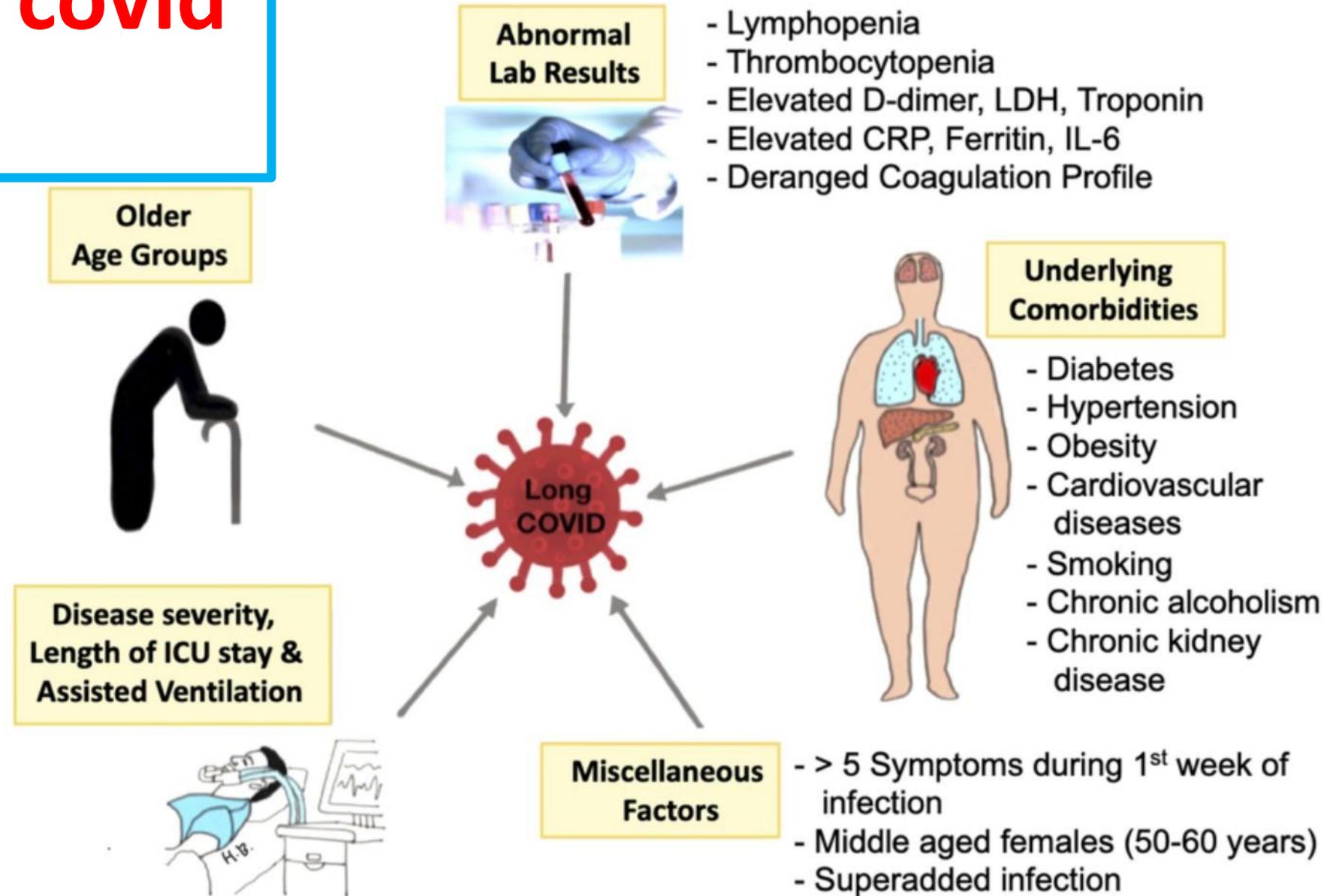
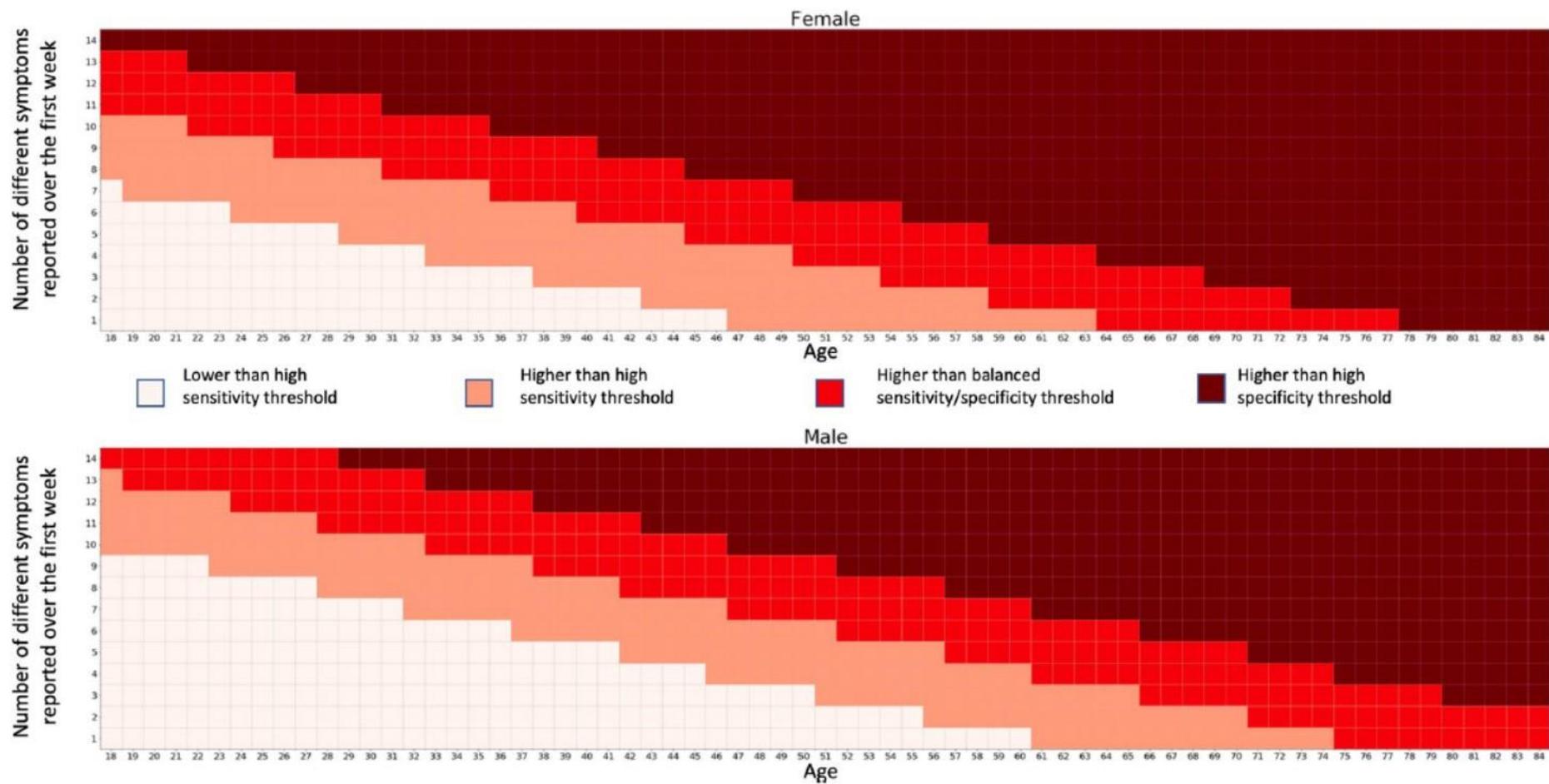


Figure 7 A pictorial demonstration of the various risk factors which when present, make the patients of COVID-19 more susceptible to develop Long-COVID-19.

Attributes and predictors of long COVID

NATURE MEDICINE | VOL 27 | APRIL 2021 | 626-631 | www.nature.com/naturemedicine



Clusters de Symptômes lors d'1 covid long =

fatigue, céphalée, dyspnée, anosmie, palpitations, dl ORL, dl neuropathiques, brain fog, myalgies

Perte de odorat pour les + de 70 ans (svt rare) devant fièvre et voix modifiée

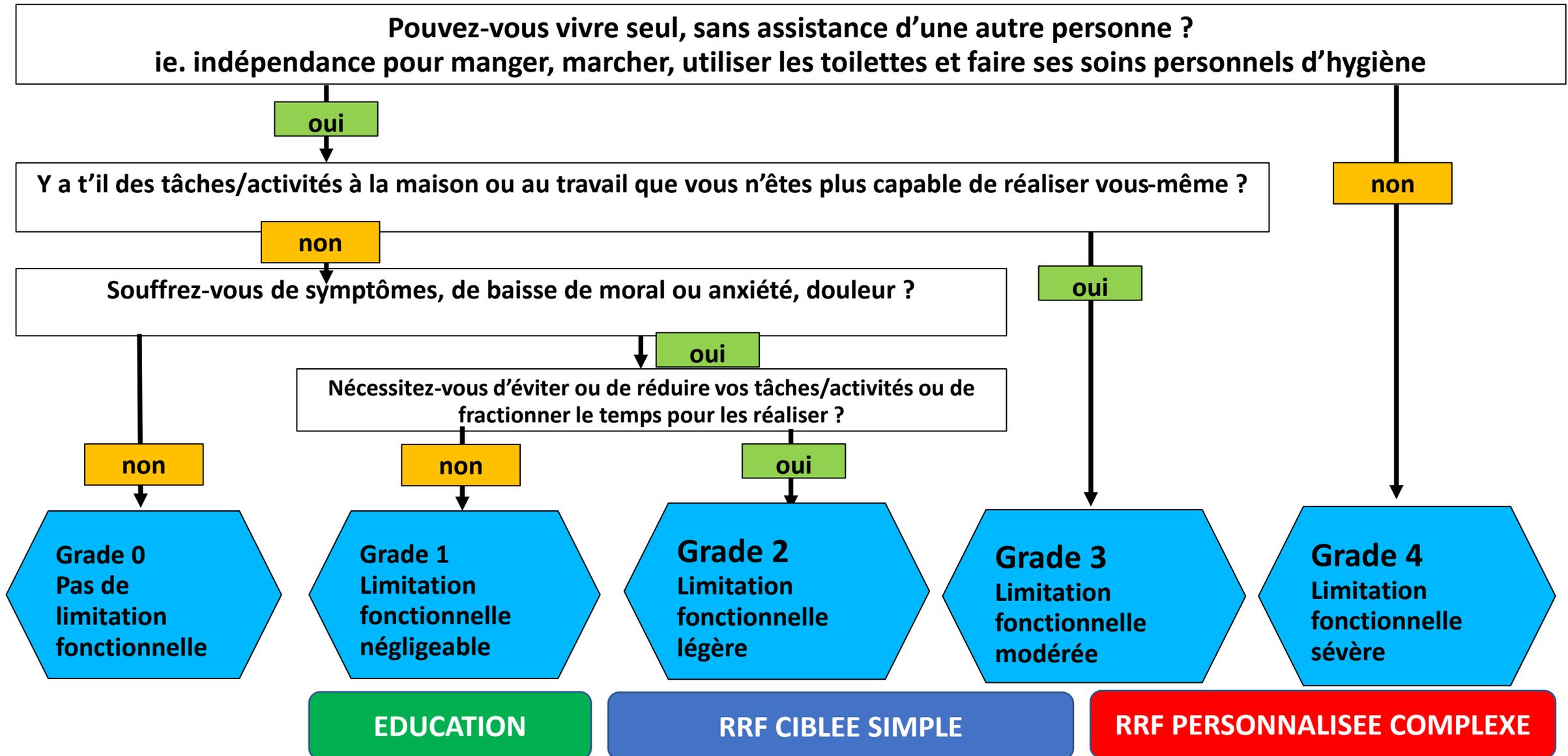
associé à
sexe féminin, BMI et
âge

Sd Post covid
OR= 3.56
Si

≥ 5 symptômes
dans la première semaine

Extended Data Fig. 8 | Nomograms. Example of nomograms that could be used to assess risk of developing LC28 based on 7 days of symptoms and corresponding table of sensitivity, specificity positive and negative predictive values at the different thresholds, given a prevalence of 13.3%. For a sensitive model, for example to apply further monitoring for the development of Long-COVID, the threshold between white and pink could be used, with a PPV of 34% and NPV of (98%), whereas more specific model, for example to recruit to trials to prevent Long-COVID, might use the dark red threshold, with a PPV of 60%, although some individuals who would go on to have Long-COVID would not be recruited (NPV 82%). Symptoms considered for the count: Fatigue - Headache - Shortness of breath - Fever - Persistent cough - Sore throat - Hoarse voice - Abdominal pain - Diarrhoea - Delirium - Chest pain - Loss of smell - Skipped meals - Unusual muscle pains.

Méthodes d'auto-évaluation de l'état fonctionnel post-COVID-19 (PCFS).



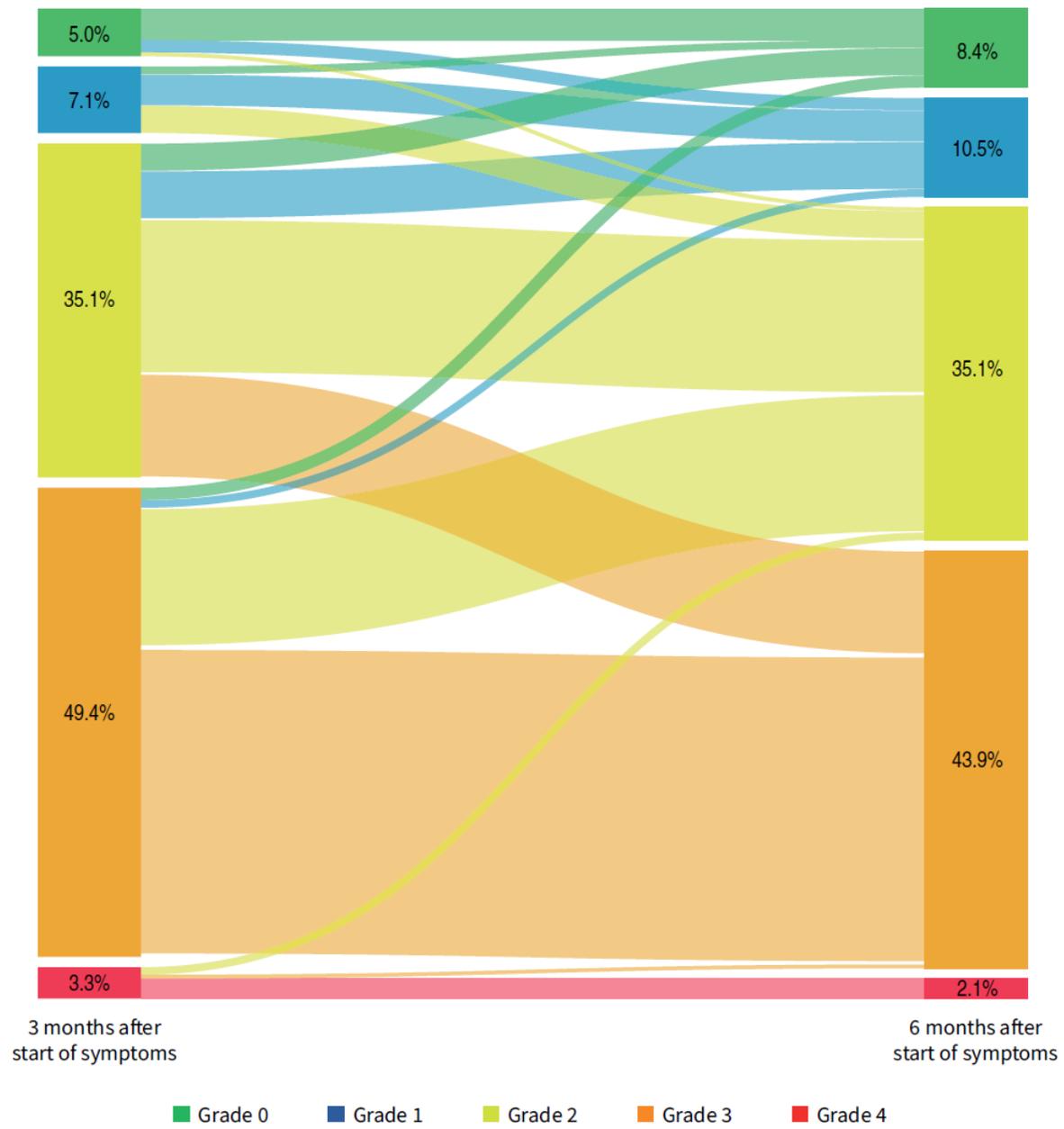
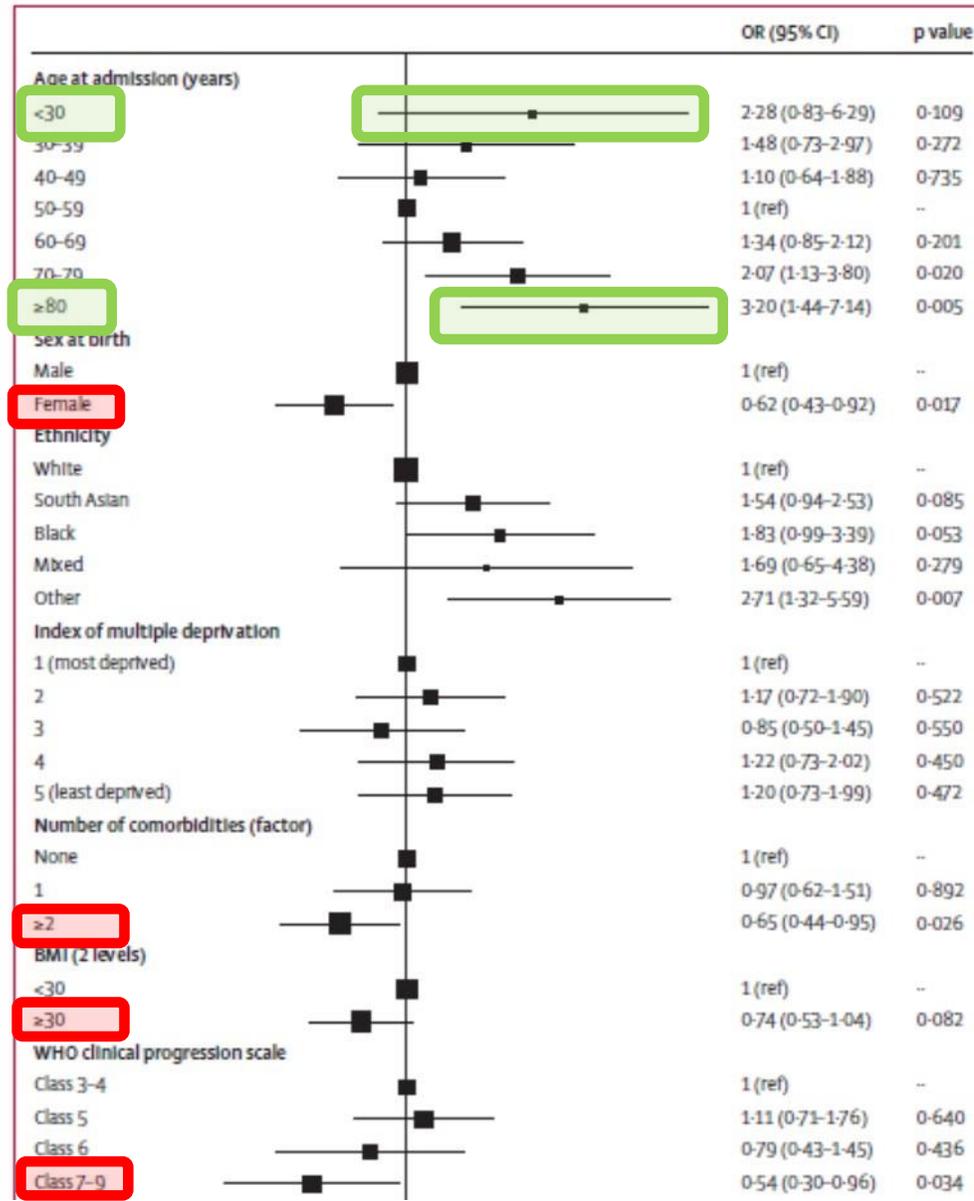


FIGURE 4 Post-coronavirus disease 2019 functional status scale after 3 and 6 months of follow-up. The width of lines is proportional to the flow rate.

Physical, cognitive, and mental health impacts of COVID-19 after hospitalisation (PHOSP-COVID): a UK multicentre, prospective cohort study

www.thelancet.com/respiratory Vol 9 November 2021



PHOSP-COVID UK à 6 mois

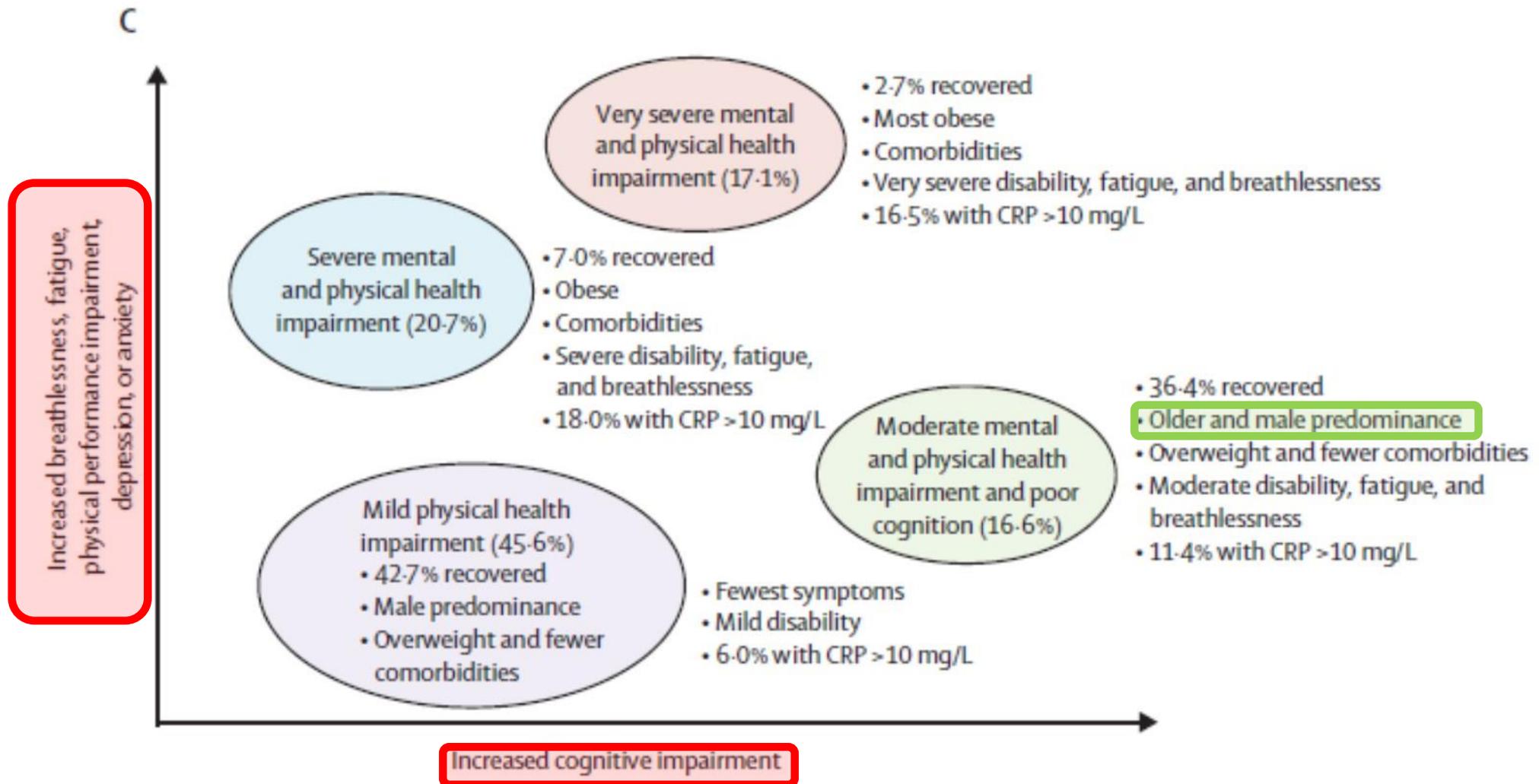
1077 patients discharged from hospital between March 5 and Nov 30, 2020

Facteurs de non recuperation à 6 mois :

- Femme
- 40 à 59 ans
- 2 ou plus de Comorbidités
- Infection aigue sévère

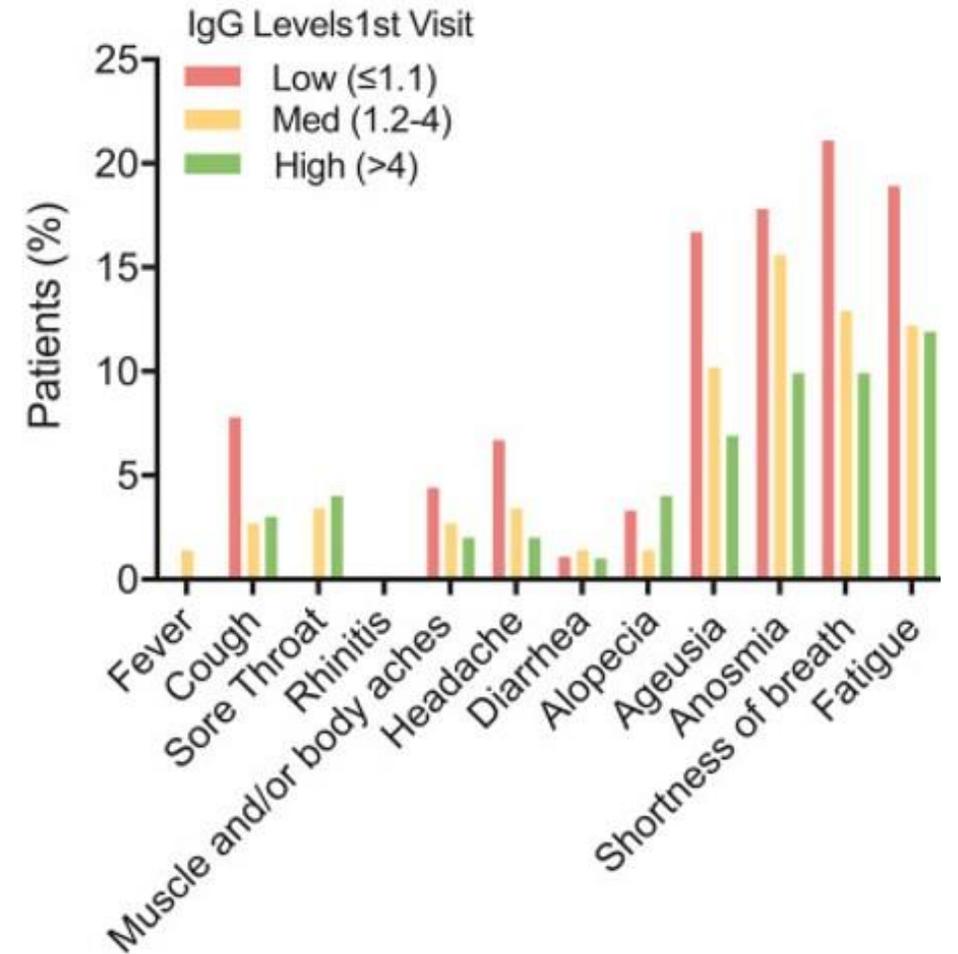
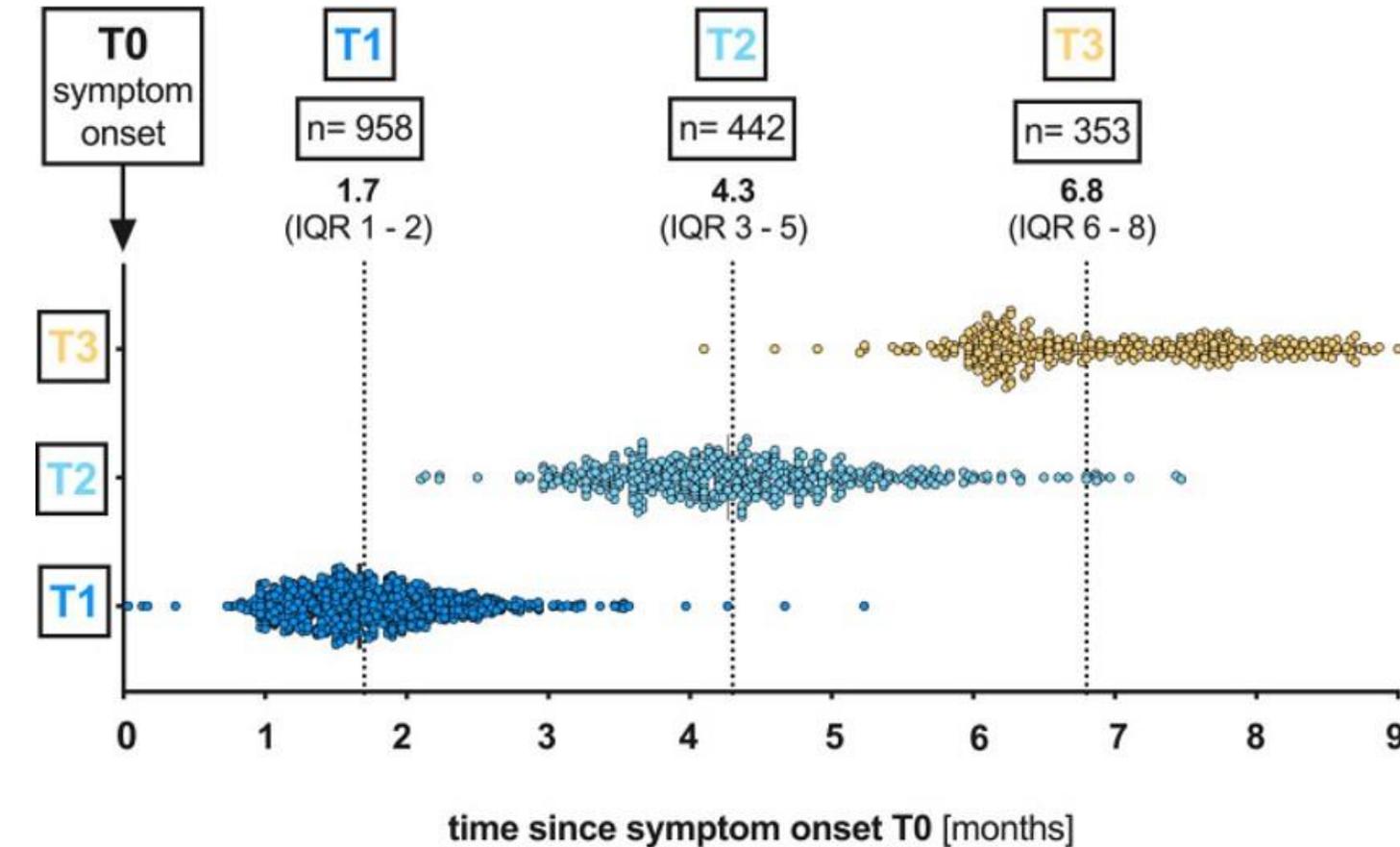
Physical, cognitive, and mental health impacts of COVID-19 after hospitalisation (PHOSP-COVID): a UK multicentre, prospective cohort study

www.thelancet.com/respiratory Vol 9 November 2021



Post-COVID syndrome in non-hospitalised patients with COVID-19: a longitudinal prospective cohort study

The Lancet Regional Health - Europe, July 2021

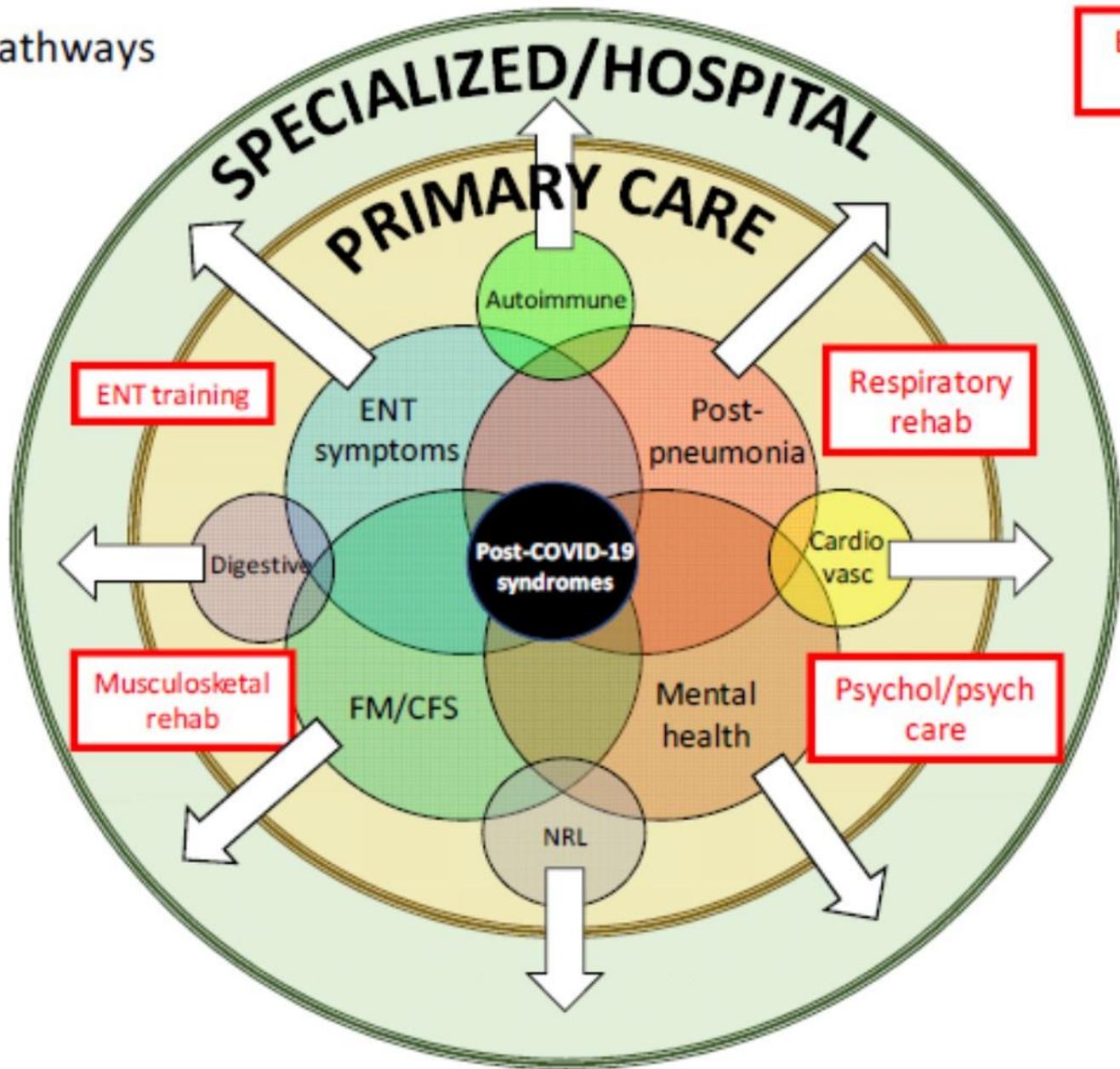




Referral pathways

Enhanced care areas

Formes cliniques
trainantes ?
= multisystémique



Evaluations multisystèmes globales et individualisées

Histoire de infection SARS-Cov2 aigue :

Hospitalisé =ICU/non ICU, intubation, ECMO , DMS
ou non hospitalisé =nb de symptômes les sept 1^{er} jours
PCR +/PCR -
Durée de épisode aigue, conditions, cas index, nosocomial
Reprise du travail ou des AVQ
Complications, aggravation de conditions comorbides
Biologie, imagerie et gênes actualisées

Données physiques :

Malaise post-effort ?
CPT, DLCO, KCO, courbe débit volume CVF, VEMS
PIMax, PEMax, Peak flow
VO2 max = % théorique, SV1 watts bpm %Vo2pic, PMA
TD6M = % de la distance prédite, SpO2, Borg, bpm
STS-1 min = 30-37/homme, 27-34/femme (classe 60-79 ans)
Test des escaliers chronométré
Impédancemétrie des 4 membres = masse maigre

Données psychologiques et douleurs :

Questionnaire de FACIT-Fatigue (score seuil $\leq 30/52$)
Questionnaire du sommeil de Spiegel =score seuil $\leq 18/30$
Questionnaire HADS =score A et D score seuil $\geq 11/21$
Questionnaire GAD-7 =score seuil ≥ 15
Questionnaire PTSD check list =score seuil ≥ 34 ou $44/85$
Questionnaire BPI-SF = sévérité/10 et interférence/10
WHOqol-Bref =dom phys, psycho, social et environnement

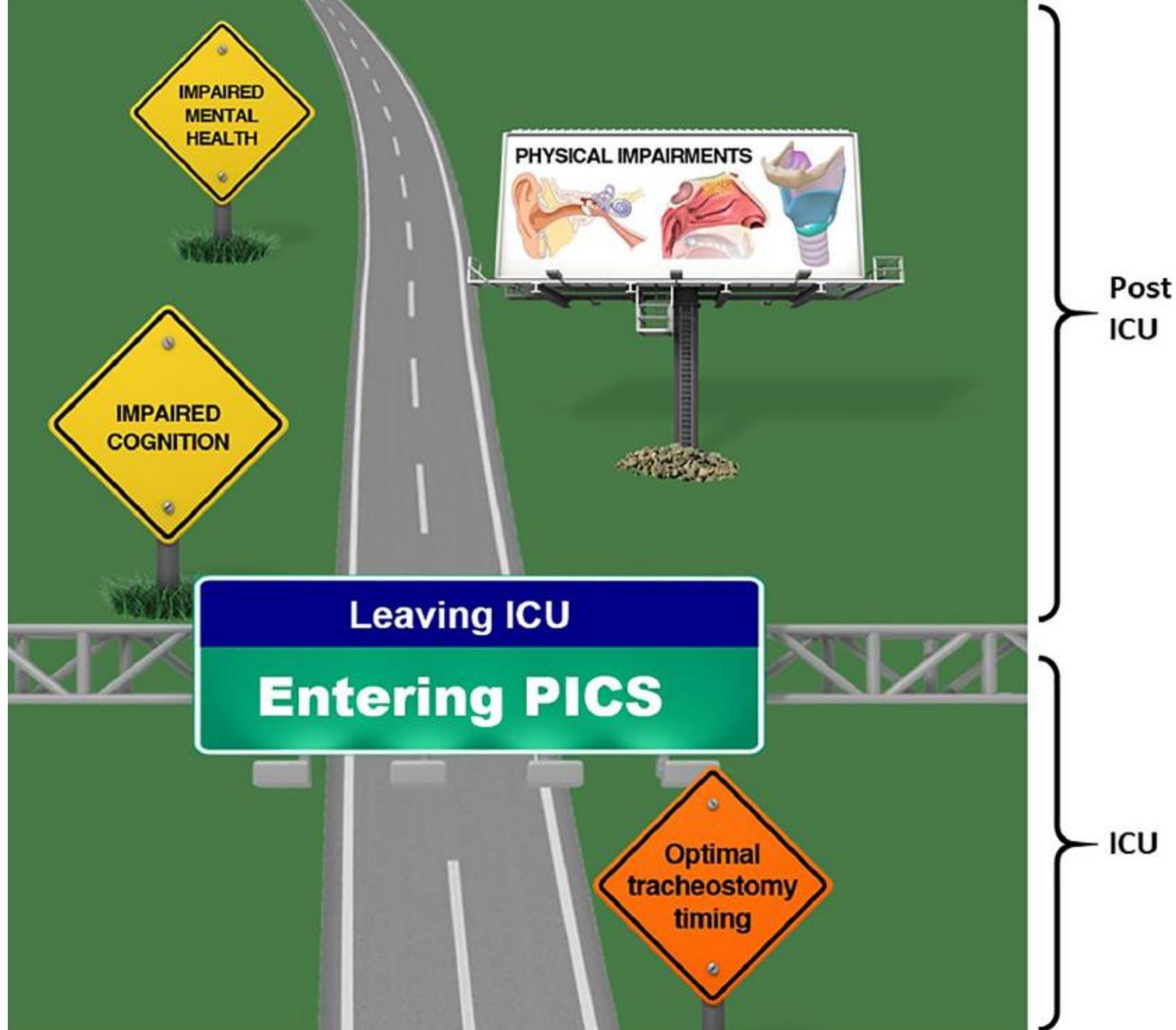
Données neuro-cognitives :

SDMT oral : 42 +/- 11 =éducation 12 ou - (classe 65-78 ans)
: 53 +/- 13 = éducation 13 et+ (classe 65-78 ans)
MoCA : 26-30=nle, 18-25=léger, 10-17=cognitif, <10=sévère

Formes cliniques (1)

SD de soins post-intensifs

PICS



Evaluations du PICS ? = ABCDE....

An A-E assessment of post-ICU COVID-19 recovery

Matthew Cadd* and Maya Nunn

Anxiety and other mental health diagnoses
Breathlessness
Central nervous system impairment
Dietary insufficiency and malnutrition
Embolic events

Pattern of cognitive deficits in severe COVID-19

Valérie Beaud ¹, Sonia Crottaz-Herbette ¹,
Vincent Dunet ², Julien Vaucher ³,
Raphaël Bernard-Valnet ⁴,
Renaud Du Pasquier ⁴,
Pierre-Alexandre Bart ³, Stephanie Clarke ¹

2 profils (lettre à éditeur)

1) Si MoCA nle = fct exécutives anormales

2) Si MoCA atteinte légères à sévères =
fct exécutives+attention visuo-spatiale + mémoire
+ vitesse de traitement

Discussion durée ICU et ventilation (no correlation)
Dommages structurels : atteintes profondes
ou dysconnexions ?

Step-by-step inpatient rehabilitation for critical illness after coronavirus disease 2019

A CARE-compliant case report

Dae-Won Gwak, MD^a, Jong-Moon Hwang, MD^{a,b,*} 



Figure 2. Step-by-step progress of rehabilitation tailored to functional recovery of the patient. A, Manual joint ROM exercise (step 1). B, Sitting balance training (step 2). C, Standing balance training (step 3) and sit-to-stand training (step 4).

Formes cliniques non hospit

Patients/atteintes aiguës modérées svt non hospit

The Current Caseload Demographic

- Young population-with average age of 48 (youngest is 27, oldest is 73)
- Majority of patients are female (68%)
- Majority have not had a hospital admission (74%)
- Many were infected during the first phase of the pandemic (March and April 2020) and continue to have symptoms (82%)
- Unable to work or have had to reduce hours (54%)*

Education thérapeutique et SD post-covid = fatigue

Table 5. Virtual Fatigue Management Course Modules.

Week	Module	Facilitator	Facilitated discussion questions
1	Overview and understanding fatigue	Occupational therapist and other MDT members	<p><i>Are you able to recognize when you are becoming fatigued, and how?</i></p> <p><i>Can you identify what may trigger your fatigue?</i></p> <p><i>What would you like to get out of the programme in order to improve your quality of life and best manage your levels of fatigue?</i></p>
2	Thinking about activity	Occupational therapist	<p><i>What activities have people found manageable or more challenging?</i></p> <p><i>Have people had experience of using an activity diary? How has this been incorporated into daily routines? How useful have these been?</i></p>
3	Activity grading	Occupational therapist	<p><i>How do you ensure you have a combination of activities?</i></p> <p><i>Do you know when your stopping point is, or do you tend to only stop when your body tells you to do so?</i></p>
4	Fatigue and exercise	Physiotherapist	<p><i>What daily exercise are people managing now?</i></p> <p><i>Has anyone tried to return to higher level exercise? How did this affect your fatigue levels and ability to do other activities?</i></p>
5	Diet and nutrition	Dietician	<p><i>Have you noticed a pattern between your fatigue and what you eat?</i></p> <p><i>Have you altered your diet to try and improve your fatigue? What did you try and did it help?</i></p>
6	Sleep hygiene	Neuro occupational therapist	<p><i>What do you find works well to improve your sleep to recover for the next day?</i></p>
7	Cognition and communication	Neuro occupational therapist	<p><i>What difficulties are you having with your memory, attention or communication?</i></p> <p><i>Can you see any strategies that would be beneficial within your daily routines?</i></p>
8	Mindfulness	Neuro occupational therapist	<p><i>Can you see any strategies that would be beneficial within your daily routines?</i></p>

POTS et SD post-covid = reconditionnement fractionné

POTS is a multifactorial syndrome rather than a specific disease. It is characterized by all of the following^{1,4-6}:

- An increase in heart rate of ≥ 30 bpm, or ≥ 40 bpm for those under age 19, within 10 minutes of standing from a supine position
- Sustained tachycardia (> 30 seconds)
- Absence of orthostatic hypotension (a fall in blood pressure of $\geq 20/10$ mm Hg)
- Frequent and chronic duration (≥ 6 months).

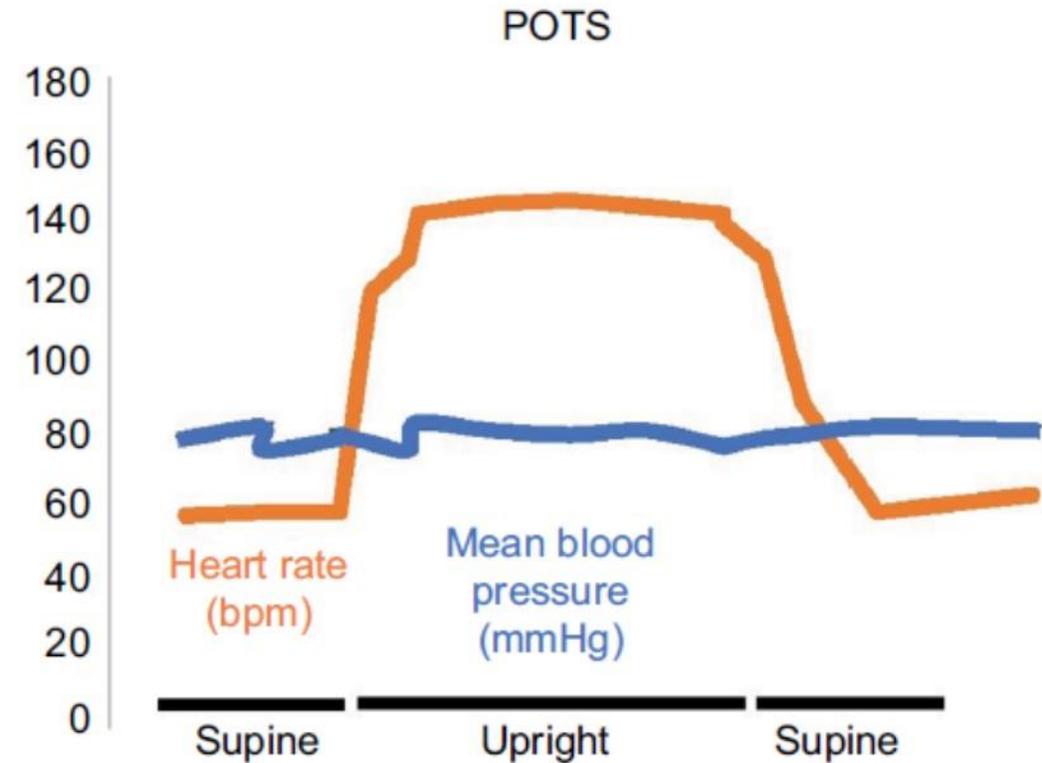
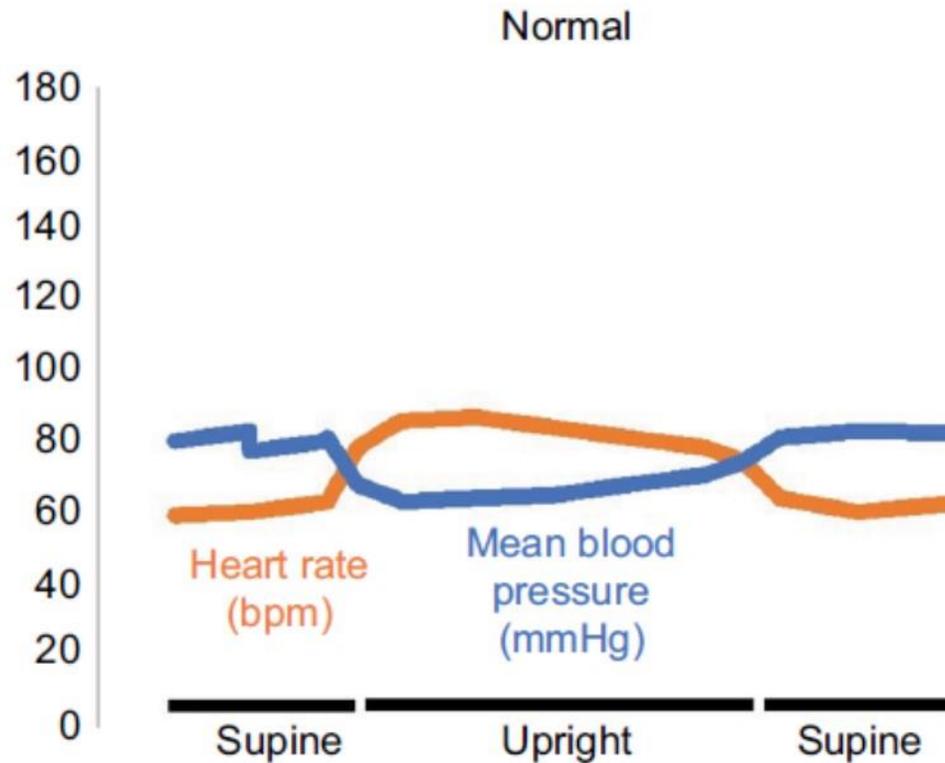
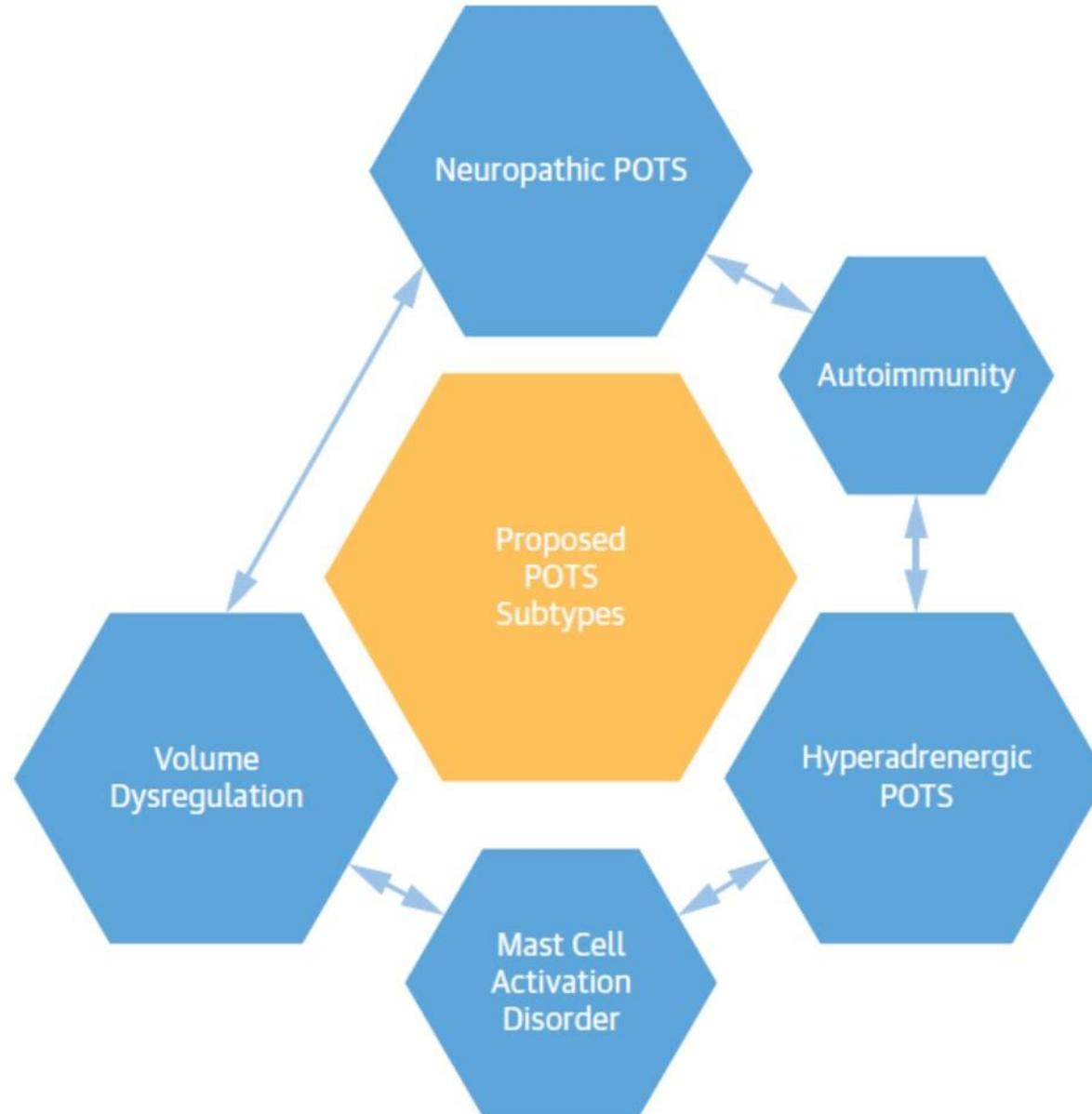
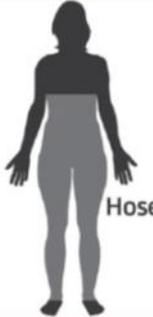


FIGURE 3 POTS and Proposed Subtypes



Avoid Situations That Can Exacerbate Symptoms	Liberal Intake of Salt and Water	Sleep With Head of Bed Elevated
 <p>Large/Heavy Meals</p>  <p>Heat Exposure</p>  <p>Alcohol Intake</p>		 <p>Head posts should be elevated 4-6 inches</p>
Use of Compression Garments	Physical Counter Maneuvers	Drinking Water Before Getting Up In The Morning
 <p>Abdominal Binder</p>  <p>Hose</p>	 <p>Leg Crossing Maneuver</p>  <p>Squatting</p>	<p>Drinking a 16 oz glass of water quickly before getting out of bed in the morning or prolonged standing to minimize orthostatic symptoms</p> 
Strategies to Avoid Upright Exercise		
 <p>Seated Rower</p>	 <p>Swimming</p>	 <p>Recumbant Bicycle</p>

Evaluations :

- 1) Score de Nijmegen **score > 24/64**
- 2) Test chronométré d'une tenue d' une apnée **ne 30-60 sec, SHV = 10-12 sec**
- 3) Test de provocation d'une hyperventilation **PetCO₂, VO₂max...**
- 4) Inter-relations POTS et SHV

Thérapies :

Education thérapeutique

- 1) Expliquer, rassurer le patient
- 2) Insister sur l'absence de gravité et de conséquences du SHV
 - Eviter les excitants Café, Thé...
 - Eviter les boissons gazeuses
 - Eviter les ceintures et soutien-gorge serrés
 - Sommeil équilibré
 - Relaxation, Yoga
 - Eventuellement prise en charge psychologique

Rééducation

- 1) **Prise de conscience respiration thoracique vs respiration abdominale**
 - Respiration «Carrée» TI 4s, apnée 4s, TE 4s ,
 - Travail des apnées apnée 4s
 - Respiration dans sac plastique-(cas + sévères !) biofeedback petCO₂
- 2) **Travail de la \sphericalangle fréquence sans augmentation du VT**
 - Travail sur le rythme (escaliers, métronome)
 - Relâchement au niveau du thorax haut

Cognitif et SD post-covid = évaluation et remuscler le cerveau

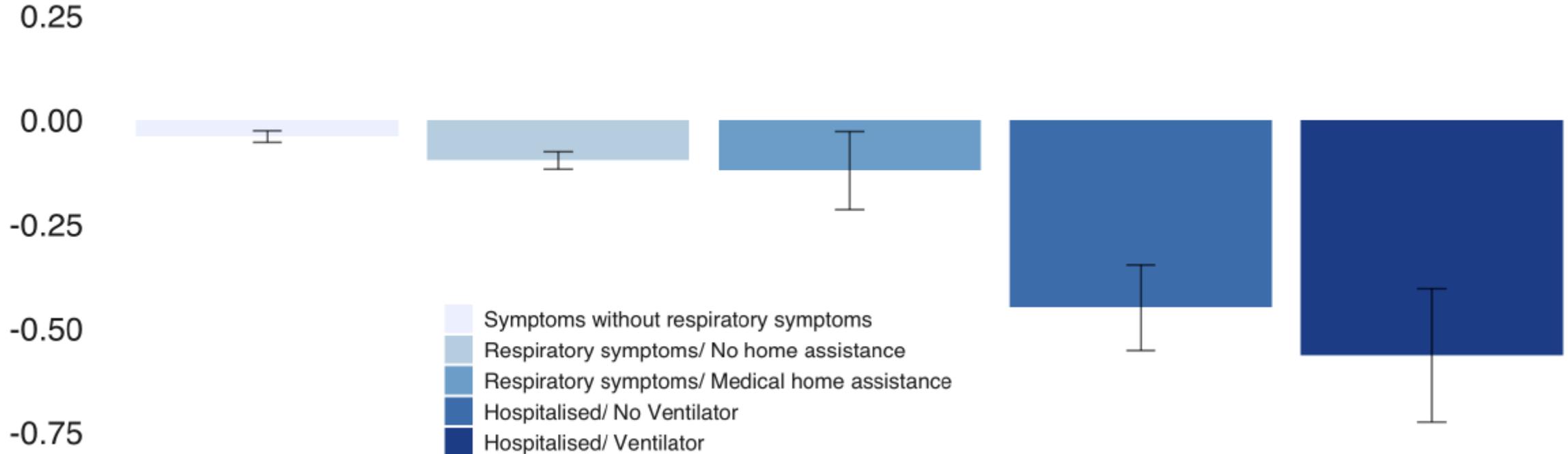
Cognitive deficits in people who have recovered from COVID-19

relative to controls: An N=84,285 online study

Adam Hampshire^{1*}, William Trender¹, Samuel R Chamberlain^{2,3}, Amy Jolly¹, Jon E. Grant⁴,
Fiona Patrick⁵, Ndaba Mazibuko⁵, Steve Williams⁵, Joseph M Barnby⁵, Peter Hellyer^{1,5}, Mitul
A Mehta⁵

A | Global Cognitive Performance by COVID-19 Symptom Severity

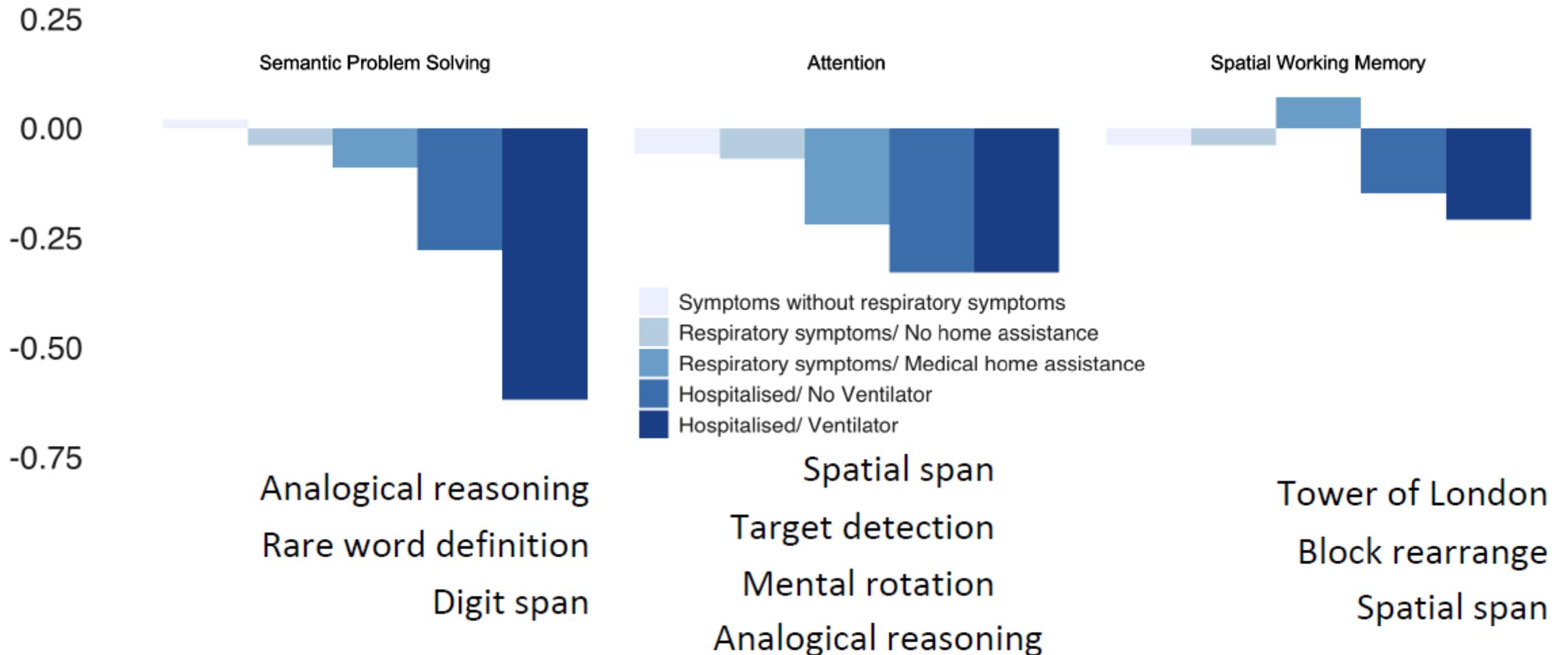
Standard deviations away from healthy controls



Cognitif et SD post-covid = évaluation et remuscler le cerveau

A | Principal Component Analysis Estimates

Estimates are standard deviations away from healthy controls



Caractéristiques des patients en réadaptation pour SD post-covid

Benefits of pulmonary rehabilitation in COVID-19: a prospective observational cohort study

ERJ Open Res 2021; 7: 00108-2021

Rainer Gloeckl^{1,2,7}, Daniela Leitl^{1,2,7}, Inga Jarosch^{1,2}, Tessa Schneeberger^{1,2}, Christoph Nell³, Nikola Stenzel⁴, Claus F. Vogelmeier⁵, Klaus Kenn^{1,2} and Andreas R. Koczulla^{1,2,6}

TABLE 2 Baseline characteristics

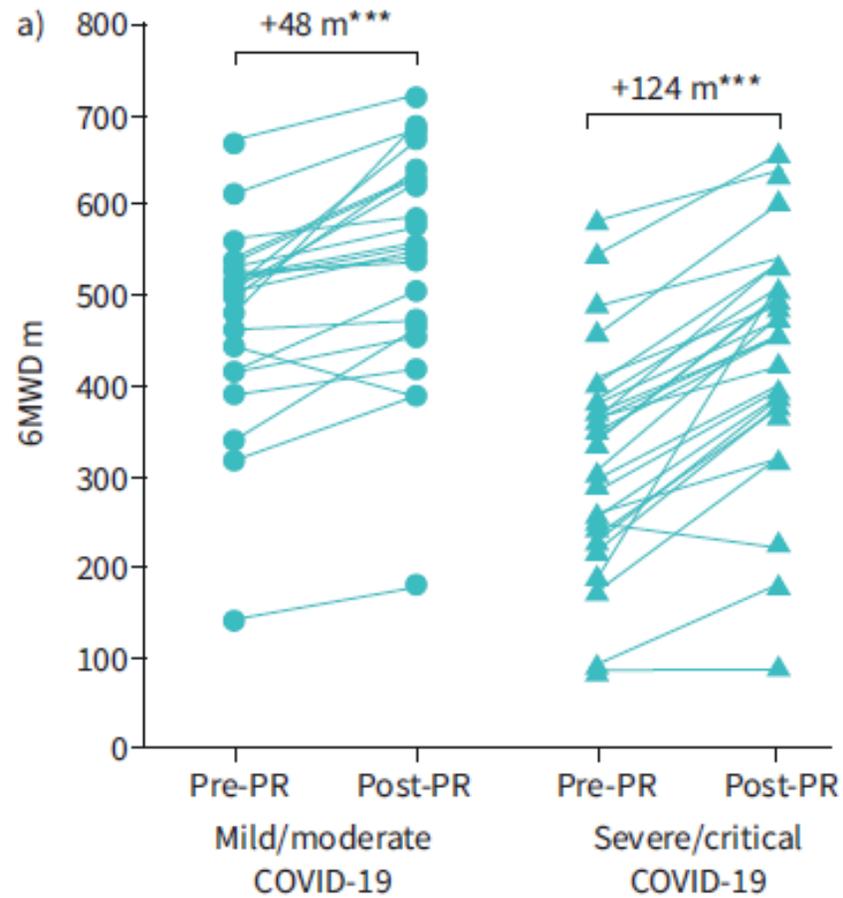
	Mild/moderate COVID-19	Severe/critical COVID-19
Subjects	24	26
Age years	52 (47–56)	66 (60–71)
Female	20 (83)	8 (31)
BMI kg·m ⁻²	24.7 (22.0–29.8)	26.9 (24.2–29.2)
Smoking status current/former/never/unknown	2/5/10/7	1/19/6/0
Hospitalisation	0 (0)	26 (100)
Duration of hospitalisation days	NA	37 (18–60)
ICU stay	0 (0)	22 (85)
Duration of ICU stay days	NA	28 (15–40)
Oxygen therapy during hospitalisation	0 (0)	24 (92)
Mechanical ventilation during ICU stay	0 (0)	15 (58)
Duration of mechanical ventilation days	NA	18 (11–43)
Duration between first positive PCR test and admission to pulmonary rehabilitation days	178 (127–217)	61 (40–108)
Duration between hospital discharge and	NA	18 (5–40)

Description du programme de réadaptation et SD post-covid

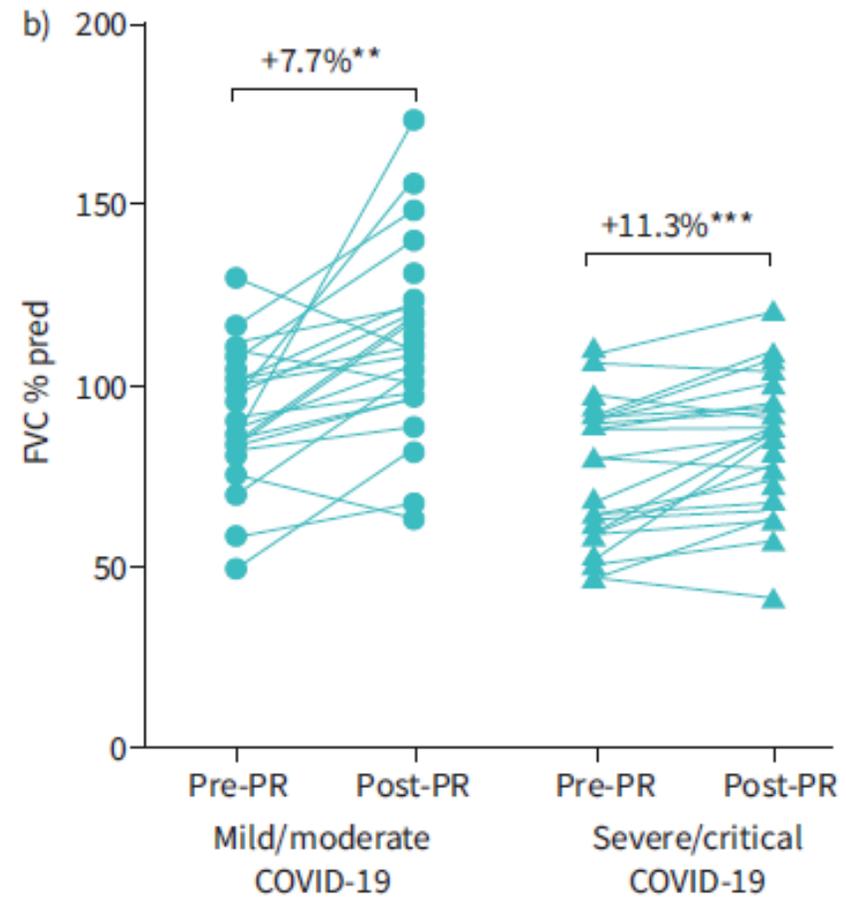
TABLE 1 Description of the standardised pulmonary rehabilitation programme in coronavirus disease 2019 (COVID-19)

Diagnostics and medical treatment	Initial physical check-up including body plethysmography, electrocardiography, cardiac ultrasound, blood sampling Continuous adaptation of drug treatment Initiation and adjusting of long-term oxygen therapy, if necessary If necessary, patients received a high-resolution chest computed tomography, sleep lab diagnostics or an online consultation with a neurologist
Endurance training	Cycle endurance training was performed for 10–20 min per session at 60–70% of peak work rate 5 days per week
Strength training	Strength training was performed using resistance training machines The following exercises were performed: leg press, knee extension, pull-down and push-down If possible, the following additional exercises were applied: butterfly forward/backward, rowing, back extension and abdominal trainer Patients performed three sets per exercise at an individual intensity to reach momentary muscular failure after 15–20 repetitions Resistance training usually took ~30 min per session and was applied 5 days per week
Patient education	Patients visited two educational sessions per week about COVID-19 as well as on general topics such as physical activity, oxygen therapy and smoking cessation
Respiratory physiotherapy	Individually tailored chest physiotherapy using various techniques such as breathing retraining, cough techniques, mucus clearance, connective tissue massage, energy conservation techniques, <i>etc.</i> was applied two to four times per week for 30 min each
Activities of daily living training	Activities of daily living training (calisthenics) was applied four to five times per week for 30 min In addition, Nordic walking or aqua fitness were applied twice per week for 30 min
Relaxation techniques	QiGong or progressive muscle relaxation (Jacobson technique) were applied twice per week for 30 min
Occupational therapy	Occupational therapy was used to treat individual neurological issues such as limited motor ability in the hands or insecure gait (if needed) Brain-performance training was performed to improve memory and concentration
Psychological support	A psychologist supported COVID-19 patients individually as well as during group therapy on aspects of disease management and coping with COVID-19 and its sequelae
Nutritional counselling	If necessary, nutritional counselling or nutritional supplements were provided to recover body composition (after body weight loss during hospital stay)

Résultats d'un programme de réadaptation et SD post-covid (1)



TD6M



CVF

Résultats d'un programme de réadaptation et SD post-covid (3)

TABLE 4 Additional outcome measures for the subgroup of 26 patients with severe/critical coronavirus disease 2019 (COVID-19) following pulmonary rehabilitation (PR)

	Pre-PR	Post-PR	Change	p-value
Muscle function				
Handgrip strength kg	25 (18–35)	30 (20–39)	5 (3–7)	0.002
Peak quadriceps strength % pred	78.4 (48.6–98.1)	99.6 (68.4–103.3)	21.2 (5.7–31.0)	0.008
Five-rep STST s	13.3 (10.5–15.5)	10.3 (8.5–13.2)	–3.0 (–4.3–0.3)	0.001
Psychological distress and (cognitive) impairment				
PHQ-9 score	7 (4–12)	4 (2–10)	–3 (–4–0)	0.002
Signs of at least mild depression according to PHQ-9 score ≥ 5	15 (58)	9 (35)	–6 (–23)	0.031
GAD-7 score	4 (2–8)	5 (1–7)	1 (0–2)	0.021
Signs of at least mild anxiety according to GAD-7 score ≥ 5	10 (38)	10 (38)	0 (0)	1.00
MoCA score	25 (23–28)	28 (25–28)	3 (1–3)	0.038
Cognitive impairment according to MoCA score < 26	12 (46)	6 (23)	–6 (–23)	0.005
mMRC score	2 (2–2)	2 (1–2)	0 (–1–0)	0.003
mMRC score ≥ 1	24 (92)	23 (88)	–1 (–4)	1.00
mMRC score ≥ 2	20 (77)	14 (54)	–6 (–23)	0.031

Conclusions

- Covid 'long' : prévalence, prédictions
- Soins basé sur les symptômes plus que la physiopathologie
- Multisystémique : physique/psycho/cognitif/métabolique/comorbidités = inter-discipline médicale + inter-professionnel de rééducation
- Atteinte fréquente +++ anxiété généralisée, PTSD, sommeil (dispo psy ?)
- Personnalisation, individualisation des évaluations et des thérapies
- Télé-réadaptation ?
- Recherche (clinical trials, histoire naturelle, racial difference, patient non hospit)