Anestesi etter COVID-19

Lars Malvik

Klækken 9/3-23

Covid-19 kan gi senskader på hjerte og lunger

Leger har så smått begynt å oppdage senskadene av koronaviruset. Hjerte, lunger, lever og blodomløp er spesielt utsatt for varige skader.

WUHAN, KINA: En pasient med Covid-19 vurderes av leger ved Red Cross Hospital.
FOTO: STR / AFP

Iselin Elise Fjeld
Journalist

Publisert 14. apr. 2020 kl. 09:33
Oppdatert 14. apr. 2020 kl. 12:09

Artikkelen er mer enn to år gammel.

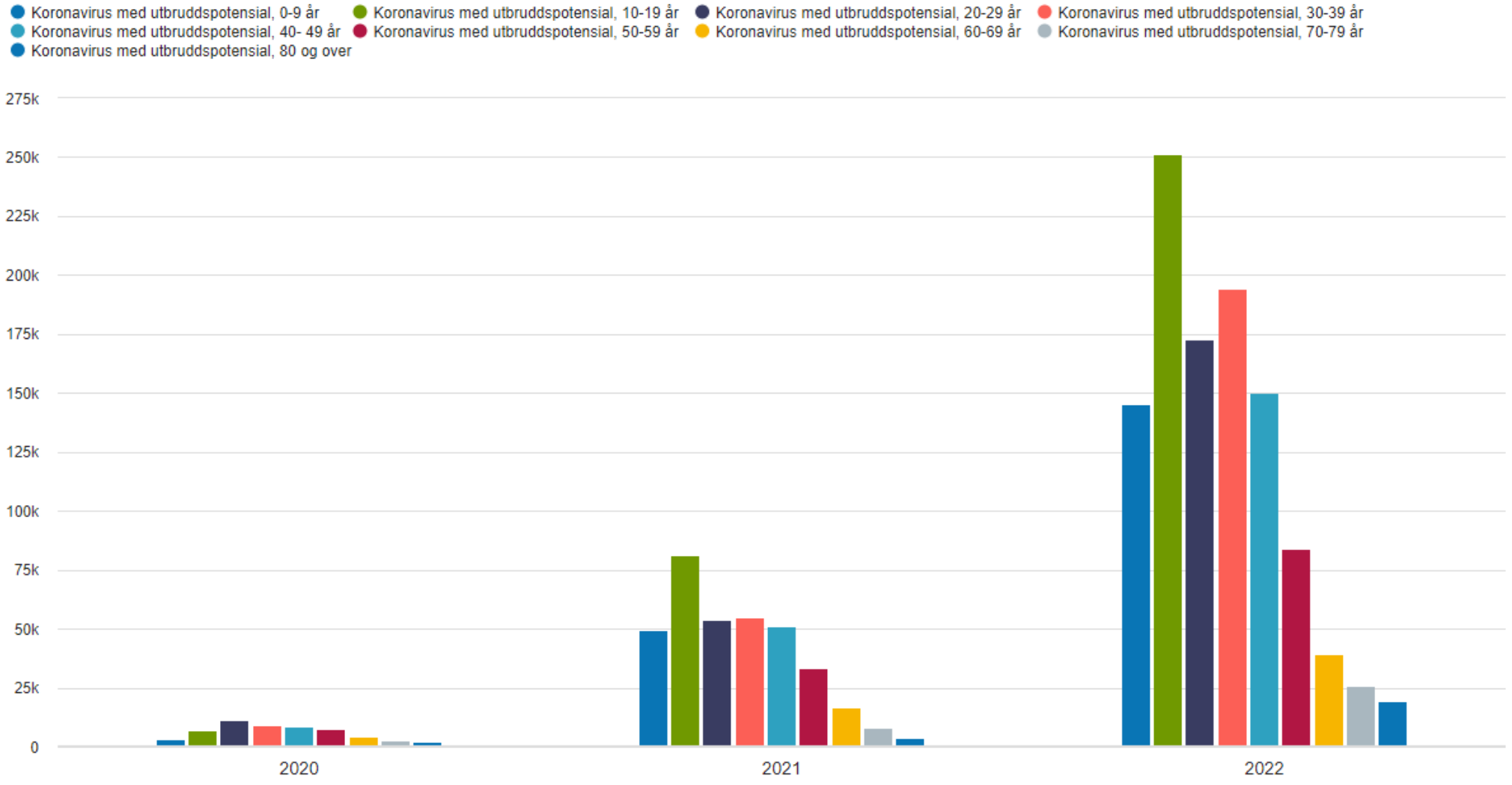
Utgjør gjennomgått COVID-19 en risiko for senere anestesi?

Vil selv mild eller asymptomatisk COVID-19 kunne føre til problemer?

Bør rutiner for preoperative vurderinger endres?

Hvor mange?

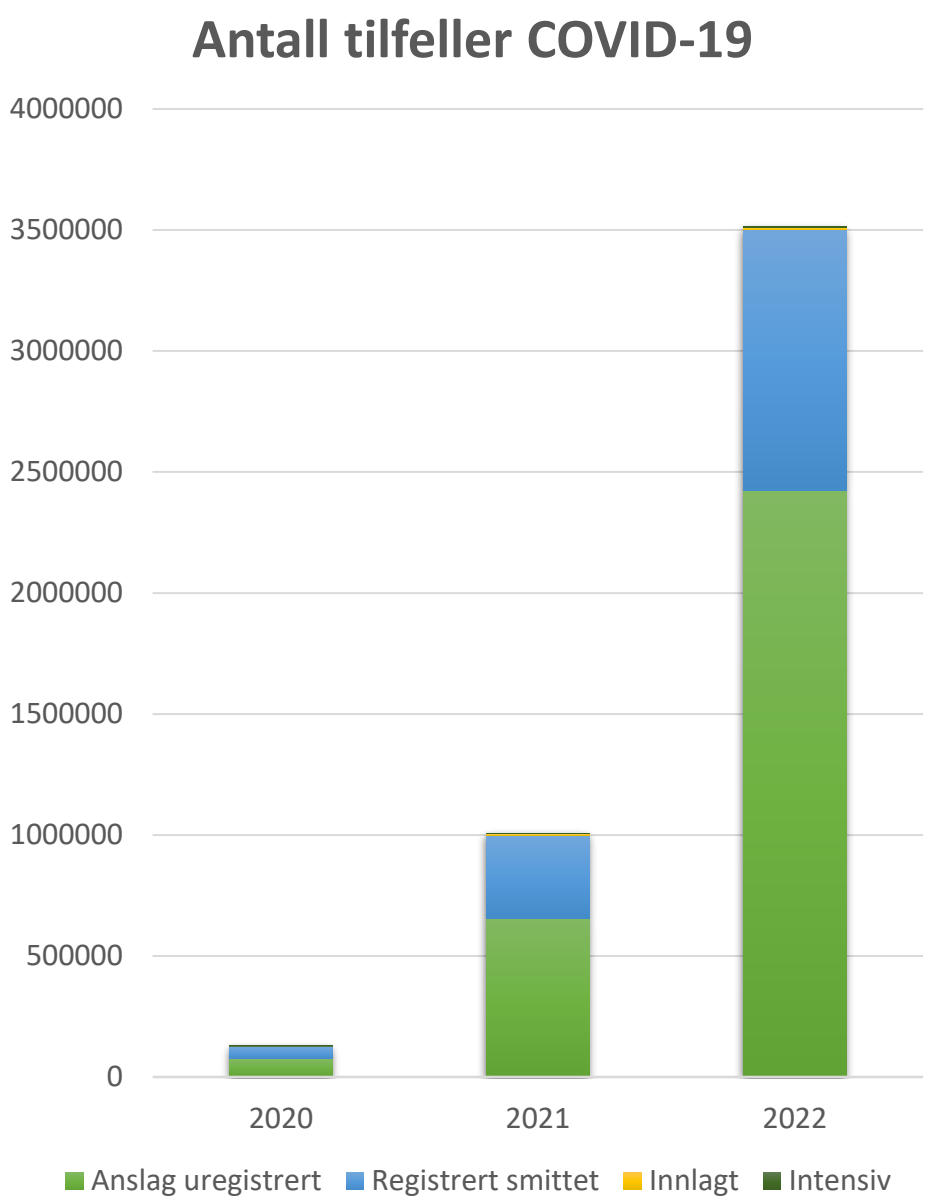
Tilfeller etter sykdom, 2020 - 2022



Oppdatert: 23.02.2023, 00:27

Det tar noe tid fra et smittetilfelle blir påvist til tilfellet registreres i MSIS. Dette medfører at tallene i MSIS ikke alltid reflekterer det reelle antall smittede.

Kilde: Meldingssystem for smittsomme sykdommer (MSIS), FHI



Anslag smittet		Anslag uregistrert	Registrert smittet	Innlagt	Intensiv
125000	2020	74782	50218	2221	401
1000000	2021	652476	347524	5103	1076
3500000	2022	2422483	1077517	12121	1060

Patiofysiologi

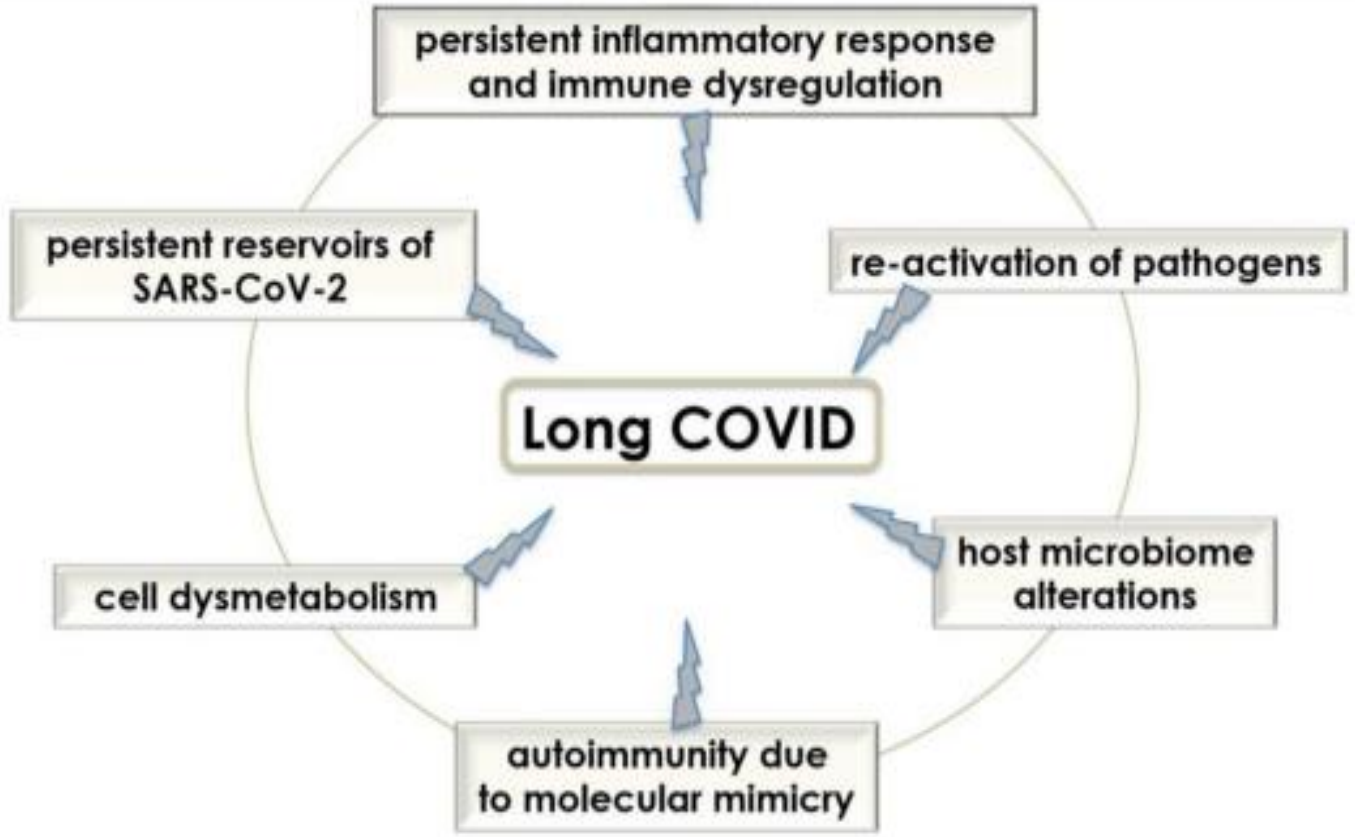


Fig. 3 Pathogenesis of Post-COVID syndrome

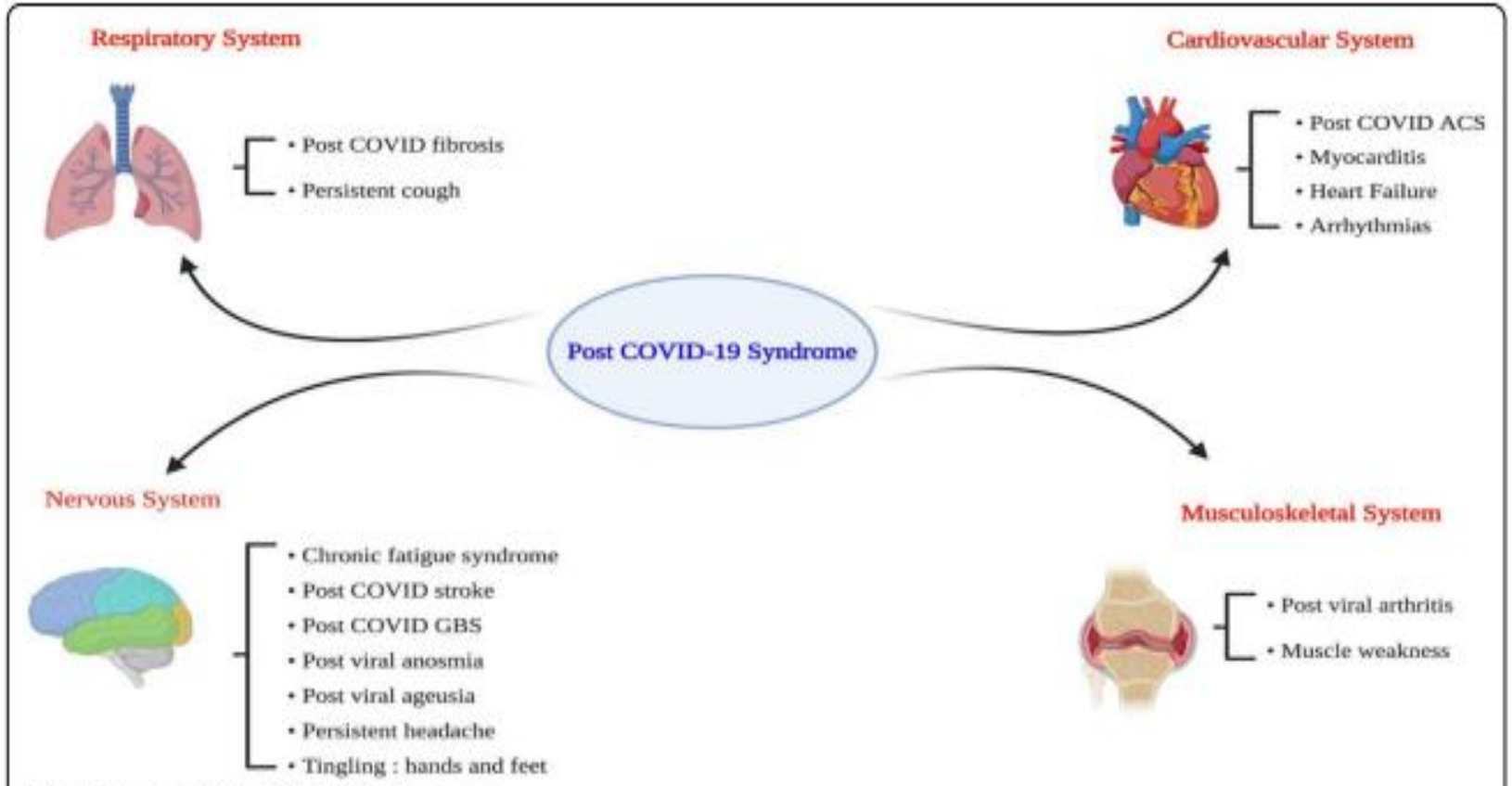
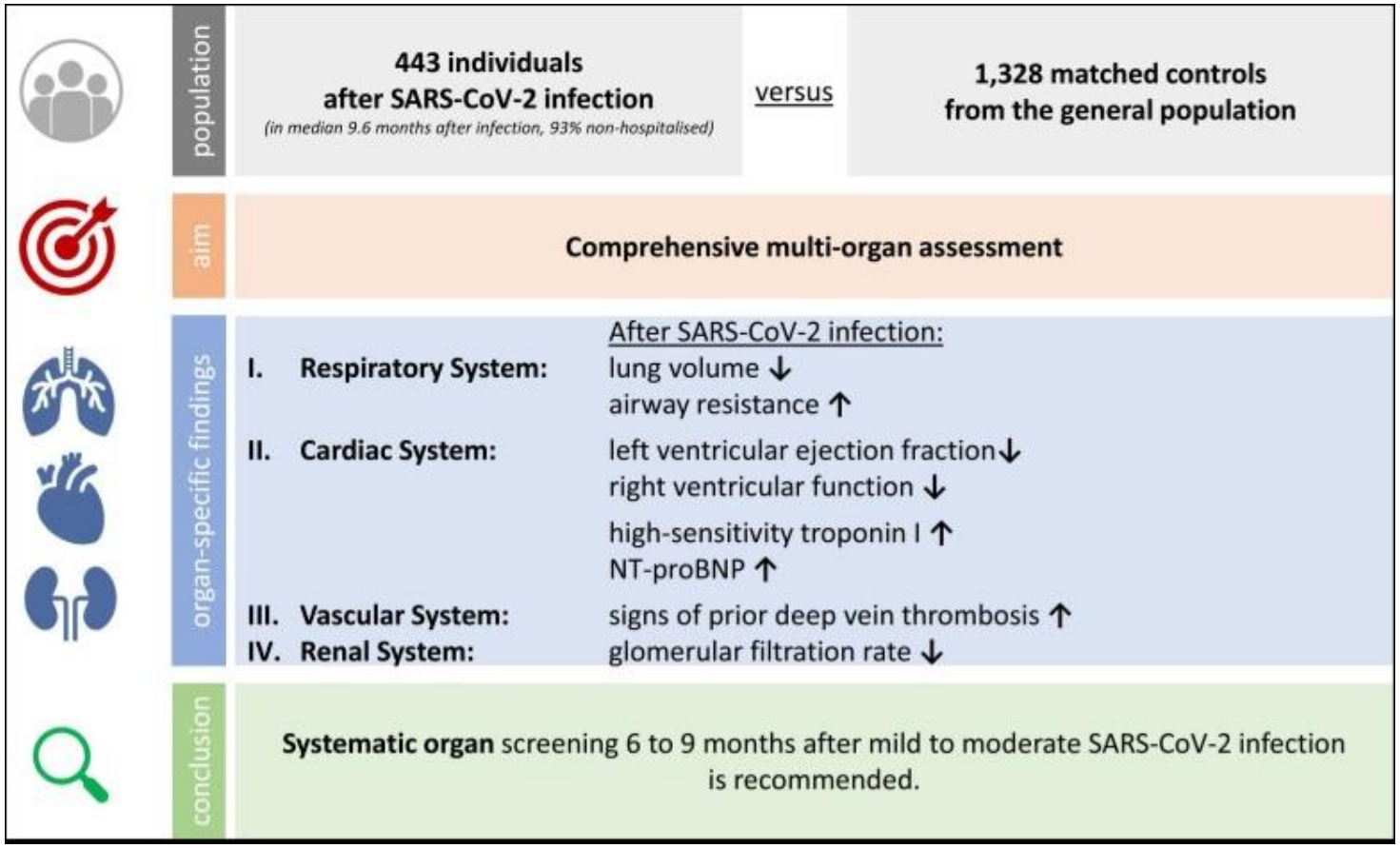


Fig. 4 Systemic effects of Post-COVID syndrome

	Acute phase	Short term	Long term
	• Dyspnea • Cough • Sore throat • Expectoration • Ground-glass opacity • Consolidation • Crazy-paving pattern • Impaired diffusing capacity • Restrictive / obstructive patterns	• Dyspnea • Cough • Sore throat • Expectoration • Ground-glass opacity • Fibrotic interstitial change • Impaired diffusing capacity • Restrictive disorders • Airway obstruction	• Dyspnea • Cough • Ground-glass opacity • Fibrotic interstitial change • Impaired diffusing capacity
	• Anxiety/ depression • Sleep disorder • Headache • Anorexia • Cognitive impairment • Stroke • Hypoxic encephalopathy • Neuromuscular weakness • Guillain-Barré syndrome • Encephalitis	• Anxiety • Depression • Sleep disorder • Insomnia • Cognitive impairment • Headache • Dizziness • Anorexia • PTSD	• Anxiety • Depression • Sleep disorder • Insomnia • Cognitive impairment • Headache • Dizziness • Anorexia • PTSD
	• Chest pain • Palpitation • Edema of lower limbs • Myocarditis • Myocardial infarction • Heart failure • Cardiogenic shock • Arrhythmia	• Chest pain • Palpitation • Edema in lower limbs • Myocarditis • Heart failure • Arrhythmia	• Chest pain • Palpitation • Edema of lower limbs • Myocarditis • Heart failure • Arrhythmia
	• Hypercoagulability / thrombosis • Leukopenia • Lymphopenia	• Thrombosis (rare)	• Thrombosis (rare)
	• Acute kidney injury • Decreased eGFR	• Chronic kidney disease • Decreased eGFR	• Chronic kidney disease • Decreased eGFR

Eur Heart J. 2022 Mar 14;43(11):1124-1137. doi: 10.1093/eurheartj/ehab914.

Multi-organ assessment in mainly non-hospitalized individuals after SARS-CoV-2 infection: The Hamburg City Health Study COVID programme



Funnene var veldig beskjedne, og det var ingen forskjell i opplevd helse mellom pasientene og kontrollene

Hvilke symptomer?

EClinicalMedicine. 2022 Dec 1;55:101762. doi: 10.1016/j.eclinm.2022.101762. eCollection 2023 Jan.

The prevalence and long-term health effects of Long Covid among hospitalised and non-hospitalised populations: A systematic review and meta-analysis

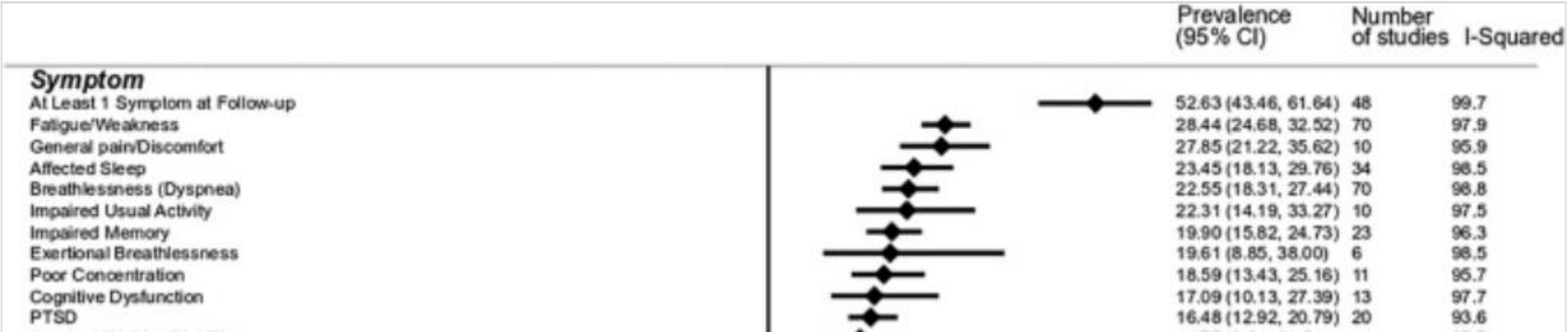
Lauren L O'Mahoney [1], Ash Routen [1], Clare Gillies [1 2], Winifred Ekezie [1], Anneka Welford [1], Alexa Zhang [3], Urvi Karamchandani [4], Nikita Simms-Williams [5], Shabana Cassambai [1], Ashkon Ardavani [1], Thomas J Wilkinson [1], Grace Hawthorne [1], Ffion Curtis [1], Andrew P Kingsnorth [1], Abdullah Almaqhawi [6], Thomas Ward [7], Daniel Ayoubkhani [2 8], Amitava Banerjee [9 10], Melanie Calvert [5 11 12], Roz Shafran [3], Terence Stephenson [3], Jonathan Sterne [13], Helen Ward [4], Rachael A Evans [7 14], Francesco Zaccardi [1 2], Shaney Wright [15], Kamlesh Khunti [1]

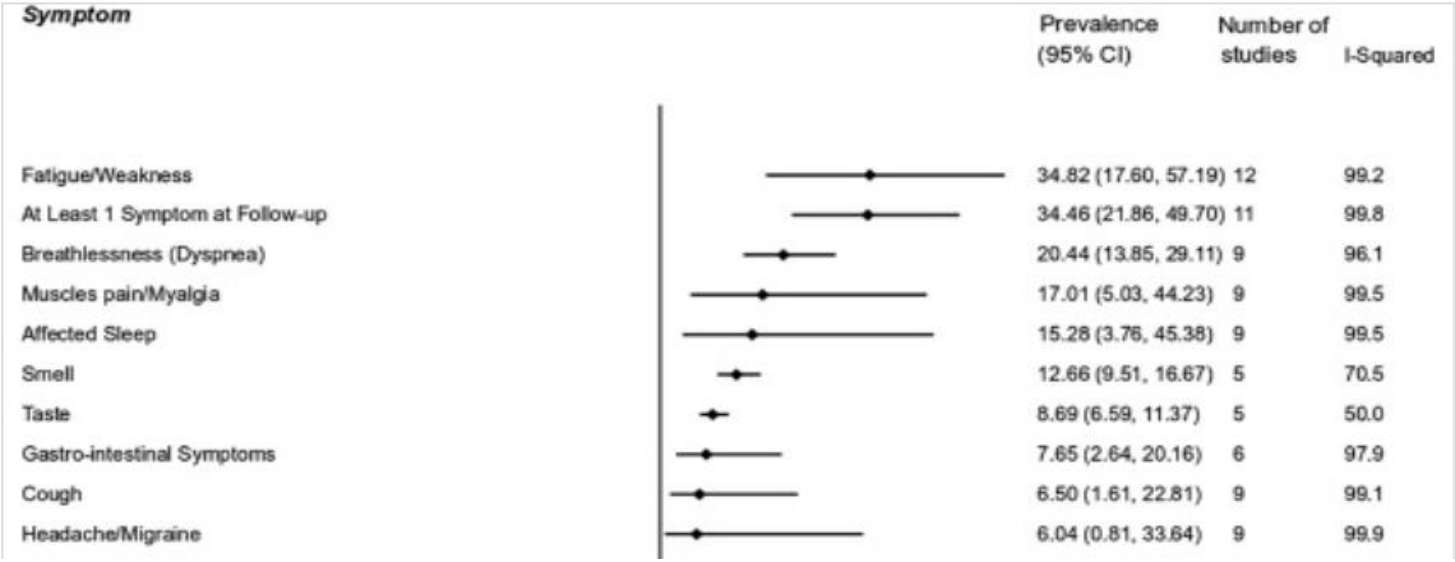
Affiliations + expand

PMID: 36474804 PMCID: PMC9714474 DOI: 10.1016/j.eclinm.2022.101762

Metaanalyse med 194 studier og 735,006 pasienter

Gjennomsnittlig oppfølging ca 3 måneder (1-12 mnd)


Prevalence (95% CI)
Number of studies
I-Squared
Symptom
At Least 1 Symptom at Follow-up 52.63 (43.46, 61.64) 48 99.7
Fatigue/Weakness 28.44 (24.68, 32.52) 70 97.9
General pain/Discomfort 27.85 (21.22, 35.62) 10 95.9
Affected Sleep 23.45 (18.13, 29.76) 34 98.5
Breathlessness (Dyspnea) 22.55 (18.31, 27.44) 70 98.8
Impaired Usual Activity 22.31 (14.19, 33.27) 10 97.5
Impaired Memory 19.90 (15.82, 24.73) 23 96.3
Exertional Breathlessness 19.61 (8.85, 38.00) 6 98.5
Poor Concentration 18.59 (13.43, 25.16) 11 95.7
Cognitive Dysfunction 17.09 (10.13, 27.39) 13 97.7
PTSD 16.48 (12.92, 20.79) 20 93.6


Symptom
Prevalence (95% CI)
Number of studies
I-Squared
Fatigue/Weakness 34.82 (17.60, 57.19) 12 99.2
At Least 1 Symptom at Follow-up 34.46 (21.86, 49.70) 11 99.8
Breathlessness (Dyspnea) 20.44 (13.85, 29.11) 9 96.1
Muscles pain/Myalgia 17.01 (5.03, 44.23) 9 99.5
Affected Sleep 15.28 (3.76, 45.38) 9 99.5
Smell 12.66 (9.51, 16.67) 5 70.5
Taste 8.69 (6.59, 11.37) 5 50.0
Gastro-intestinal Symptoms 7.65 (2.64, 20.16) 6 97.9
Cough 6.50 (1.61, 22.81) 9 99.1
Headache/Migraine 6.04 (0.81, 33.64) 9 99.9

Article | Open Access | Published: 30 November 2022

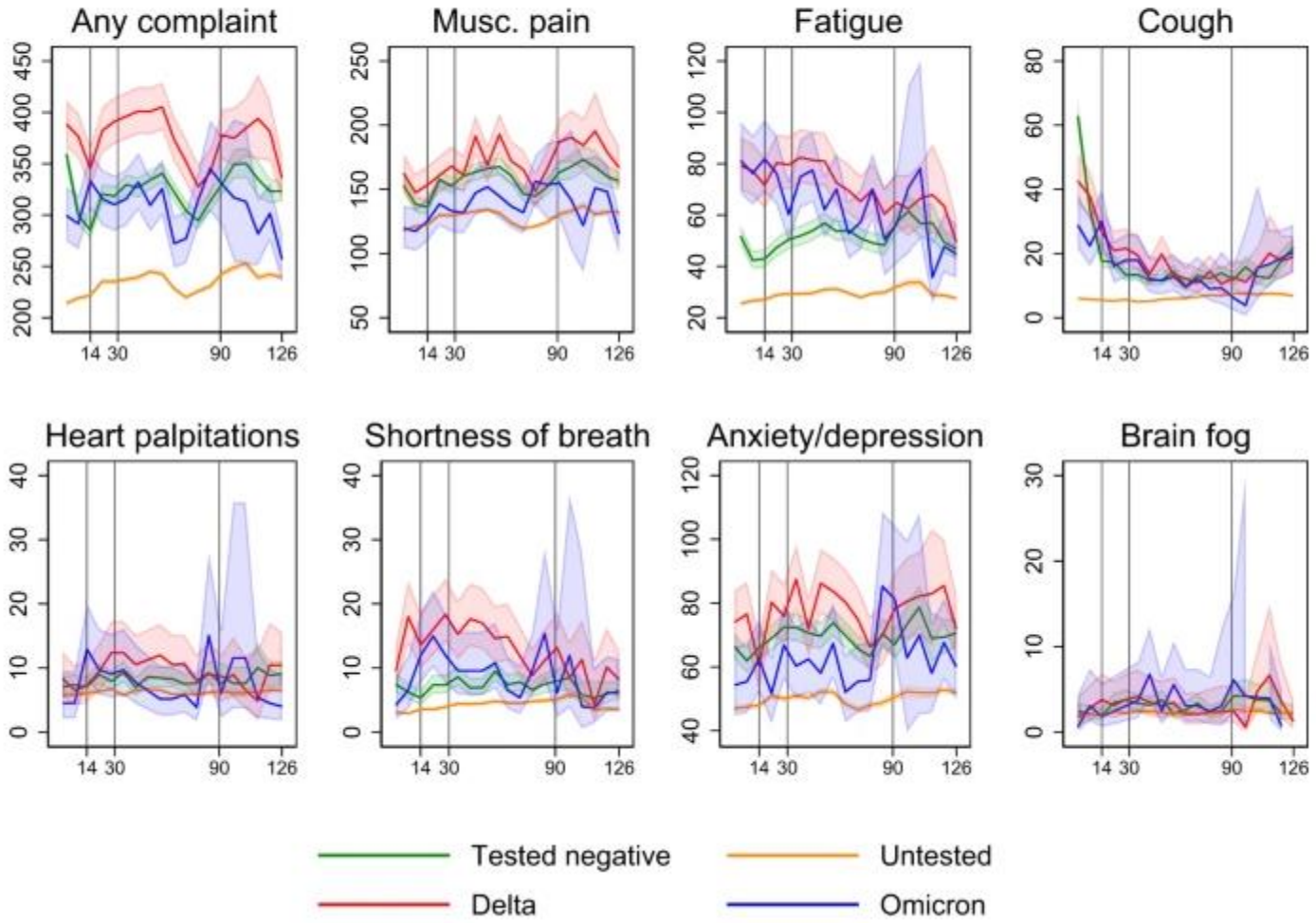
Post-covid medical complaints following infection with SARS-CoV-2 Omicron vs Delta variants

Karin Magnusson, Doris Tove Kristoffersen, Andrea Dell'Isola, Ali Kiadaliri, Aleksandra Turkiewicz, Jos Runhaar, Sita Bierma-Zeinstra, Martin Englund, Per Minor Magnus & Jonas Minet Kinge

Nature Communications **13**, Article number: 7363 (2022) | Cite this article

27k Accesses | **2** Citations | **351** Altmetric | Metrics

Fig. 4: Weekly proportions having post-covid complaints per 10 000 individuals in the acute (14–29 days), sub-acute (30–89 days) and chronic (≥90 days) post-covid phases, as distinguished by vertical lines for days 14, 30 and 90.



Lungeproblemer

Research | Open Access | Published: 12 September 2022

Lung function and radiological findings 1 year after COVID-19: a prospective follow-up

Julia Tarraso, Belen Safont, Juan A. Carbonell-Asins, Estrella Fernandez-Fabrellas, José N. Sancho-Chust, Elsa Naval, Beatriz Amat, Susana Herrera, José A. Ros, Juan J. Soler-Cataluña, Jose A. Rodriguez-Portal, Ada L. Andreu, Margarita Marín, Juan L. Rodriguez-Hermosa, Cruz Gonzalez-Villaescusa, Joan B. Soriano, Jaime Signes-Costa & COVID-FIBROTIC study team

Respiratory Research **23**, Article number: 242 (2022) | Cite this article

4775 Accesses | **4** Citations | **93** Altmetric | Metrics

Table 4 Chest CT at 12-month follow-up according to severity groups

From: Lung function and radiological findings 1 year after COVID-19: a prospective follow-up

	Severity group 1 n = 81	Severity group 2 n = 18	Severity group 3 n = 57	Total n = 156	*p*-value
Normal CT pattern	28 (34.6%)	2 (11.1%)	3 (5.3%)	33 (21.2%)	0.001
Consolidation	14 (17.3%)	0 (0%)	11 (19.3%)	25 (16%)	0.12
GGO	29 (35.8%)	11 (61.1%)	31 (54.4%)	71 (45.5%)	0.02
Reticular pattern	26 (32.1%)	4 (22.2%)	23 (40.4%)	53 (33.9%)	0.36
Traction bronchiectasis	14 (17.3%)	6 (33.3%)	28 (49.1%)	48 (30.8%)	0.001
Parenchymal bands	14 (17.3%)	6 (33.3%)	32 (56.1%)	52 (33.4%)	0.001
Fibrosis-like changes[a]	39 (48.1%)	15 (83.4%)	48 (84.2%)	102 (65.4%)	0.001

Data are n (%). Severity group 1: mild. Severity group 2: moderate. Severity group 3: severe

CT computed tomography, *GGO* ground glass opacity

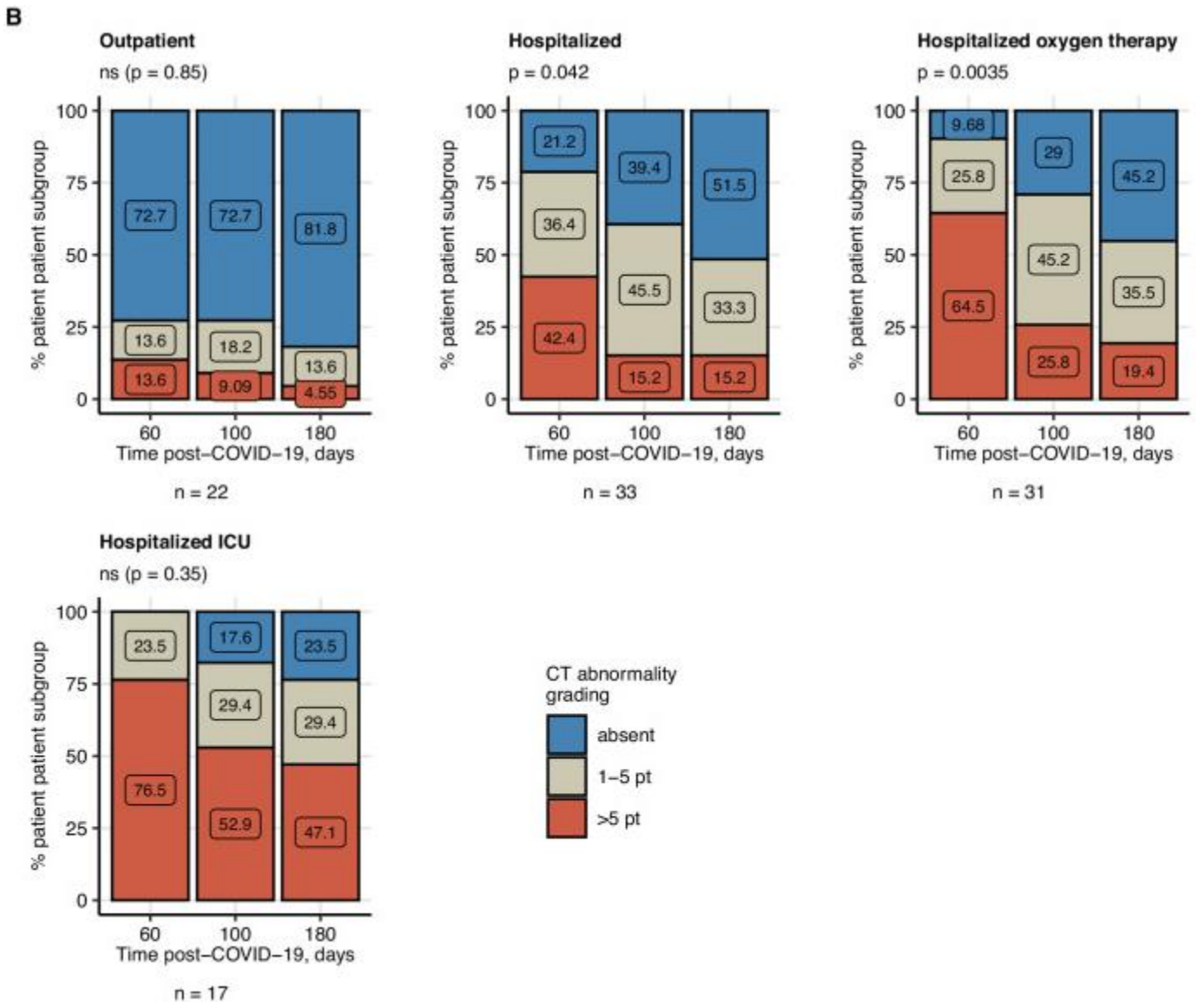
[a]Fibrotic-like changes: defined as the presence of traction bronchiectasis, reticular pattern and/or parenchymal bands

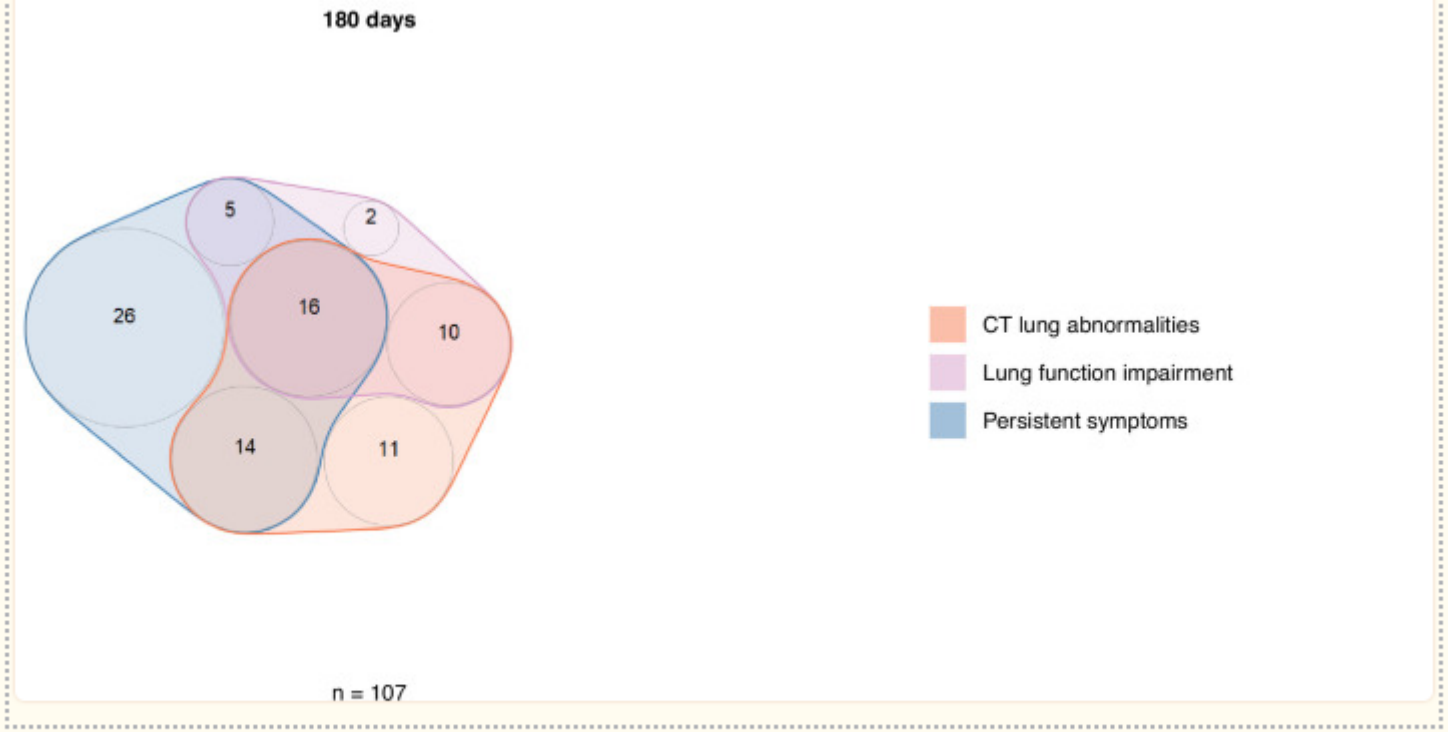
eLife. 2022; 11: e72500.
Published online 2022 Feb 8. doi: 10.7554/eLife.72500

PMCID: PMC8896831
PMID: 35131031

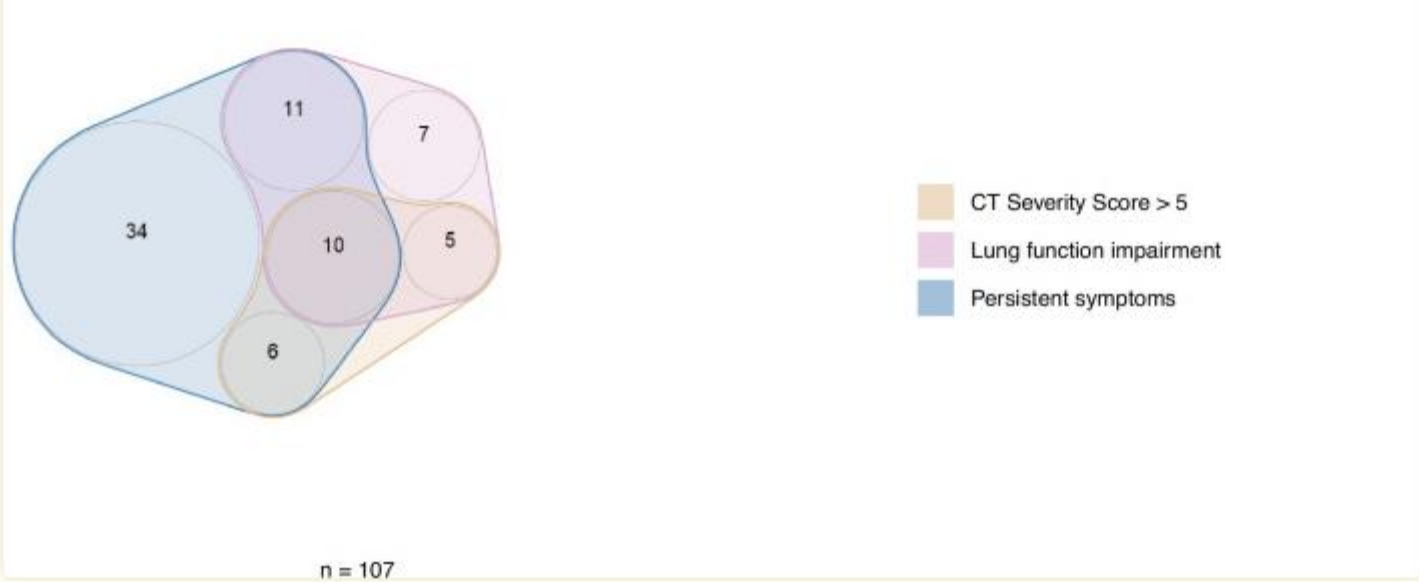
Investigating phenotypes of pulmonary COVID-19 recovery: A longitudinal observational prospective multicenter trial

Thomas Sonnweber,[#1,†] Piotr Tymoszuk,[#1,†‡] Sabina Sahanic,[1] Anna Boehm,[1] Alex Pizzini,[1] Anna Luger,[2] Christoph Schwabl,[2] Manfred Nairz,[1] Philipp Grubwieser,[1] Katharina Kurz,[1] Sabine Koppelstätter,[1] Magdalena Aichner,[1] Bernhard Puchner,[3] Alexander Egger,[4] Gregor Hoermann,[4,5] Ewald Wöll,[6] Günter Weiss,[1] Gerlig Widmann,[2] Ivan Tancevski,[1] and Judith Löffler-Ragg[1]


B
Outpatient
ns (p = 0.85)
% patient patient subgroup
100
75
50
25
0
72.7
72.7
81.8
13.6
18.2
13.6
13.6
9.09
4.55
60
100
180
Time post−COVID−19, days
n = 22
Hospitalized
p = 0.042
21.2
39.4
51.5
36.4
45.5
33.3
42.4
15.2
15.2
n = 33
Hospitalized oxygen therapy
p = 0.0035
9.68
29
45.2
25.8
45.2
35.5
64.5
25.8
19.4
n = 31
Hospitalized ICU
ns (p = 0.35)
23.5
17.6
23.5
29.4
29.4
76.5
52.9
47.1
n = 17
CT abnormality grading
absent
1−5 pt
>5 pt



Co-occurrence of lung computed tomography (CT) abnormalities, functional lung impairment, and any persistent symptoms.



Co-occurrence of moderate-to-severe lung computed tomography (CT) abnormalities, functional lung impairment, and any persistent symptoms.

Hjerteproblemer

JAMA Cardiol. 2022 Mar 1;7(3):298-308. doi: 10.1001/jamacardio.2021.5505.

Combined Cardiac Fluorodeoxyglucose-Positron Emission Tomography/Magnetic Resonance Imaging Assessment of Myocardial Injury in Patients Who Recently Recovered From COVID-19

Kate Hanneman [1], Christian Houbois [1 2], Alice Schoffel [3], Dakota Gustafson [4], Robert M Iwanochko [3], Bernd J Wintersperger [1], Rosanna Chan [1], Jason E Fish [4], Kathryn L Howe [5], Paaladinesh Thavendiranathan [1 3]

MR av hjertet gjennomsnittlig 67 dager etter COVID-19 diagnose
med kontroll etter 52 dager

Ved baseline hadde 17% (n=8) funn som kunne tyde på myokardbetennelse
Ved kontroll var alle normale

Observational Study > BMJ Open. 2021 Mar 30;11(3):e048391.
doi: 10.1136/bmjopen-2020-048391.

Multiorgan impairment in low-risk individuals with post-COVID-19 syndrome: a prospective, community-based study

Andrea Dennis [1], Malgorzata Wamil [2 3], Johann Alberts [4], Jude Oben [5 6], Daniel J Cuthbertson [7], Dan Wootton [8 9], Michael Crooks [10 11], Mark Gabbay [12], Michael Brady [1 13], Lyth Hishmeh [14], Emily Attree [15], Melissa Heightman [16], Rajarshi Banerjee [1], Amitava Banerjee [17 18 19]; COVERSCAN study investigators

Selvrapportert helse, blodprøver og MR. Mediant 141 dager etter sykdomsdebut

Myokarditt hos 19% av post-COVID pasienter (sammenlignet med 5.6% av friske controller)

Selvrapportert alvorlig post-COVID var assosiert med høyere sjanse for myokarditt sammenlignet med moderat post-COVID (25.0% vs 11.7%, p=0.027)

Hjertefunksjon ikke significant forskjellig hos post-COVID pasienter og friske kontroller

Systolisk dysfunksjon observert i 9% av post-COVID pasienter

JCI Insight. 2022 May 23;7(10):e157053. doi: 10.1172/jci.insight.157053.

Role of antibodies, inflammatory markers, and echocardiographic findings in postacute cardiopulmonary symptoms after SARS-CoV-2 infection

Matthew S Durstenfeld [1 2], Michael J Peluso [1 3], J Daniel Kelly [4 5 6], Sithu Win [1 2], Shreya Swaminathan [2], Danny Li [2], Victor M Arechiga [2], Victor Zepeda [2], Kaiwen Sun [1], Shirley Shao [7], Christopher Hill [7], Mireya I Arreguin [3], Scott Lu [3], Rebecca Hoh [3], Viva Tai [3], Ahmed Chenna [8], Brandon C Yee [8], John W Winslow [8], Christos J Petropoulos [8], John Kornak [4], Timothy J Henrich [9], Jeffrey N Martin [4], Steven G Deeks [3], Priscilla Y Hsue [1 2]

102 pasienter (81% var ikke innlagt med sin COVID-19)

4 pasienter med symptomer på hjertesykdom (tungpust, brystsmerter, hjertebank) hadde perikardvæske.

Ingen pasienter uten symptomer hadde funn ved ekkokardiografi.

Int J Cardiovasc Imaging. 2021 Dec;37(12):3451-3457. doi: 10.1007/s10554-021-02340-x.
Epub 2021 Jul 12.

Long term effects of mild severity COVID-19 on right ventricular functions

Fatih Akkaya [1], Feyza Nur Topçu Yenerçağ [2], Ahmet Kaya [1], Yusuf Ziya Şener [3], Ali Bağcı [4]

105 pasienter med mild COVID undersøkes med ekkokardiografi 3 måneder etter sykdom.

Signifikant forskjell i indikatorer som viser subklinisk dysfunksjon av høyre ventrikkel.

Internasjonale anbefalinger

American Society of Anesthesiologists and Anesthesia Patient Safety Foundation Joint Statement on Elective Surgery/Procedures and Anesthesia for Patients after COVID-19 Infection

Published: March 9, 2021
Last updated: February 22, 2022

Interval Between COVID Diagnosis and Surgery	30-day Mortality Rate for Elective Patients (%, CI)**
No COVID Diagnosis	0.62 (0.57-0.67)
0-2 weeks	3.09 (1.64-4.54)
3-4 weeks	2.29 (1.06-3.53)
5-6 weeks	2.39 (0.87-3.91)
≥7 weeks	0.64 (0.20-1.07)

Residual symptoms such as fatigue, shortness of breath, and chest pain are common in patients who have had COVID-19 [10,11]. These symptoms can be present more than 60 days after diagnosis [11]. In addition, COVID-19 may have long term deleterious effects on myocardial anatomy and function [12]. A more thorough preoperative evaluation, scheduled further in advance of surgery with special attention given to the cardiopulmonary systems, should be considered in patients who have recovered from COVID-19 and especially those with residual symptoms.

Communicating risk when considering surgery within 7 weeks of SARS-CoV-2 infection

This tool is to be used for patients who are no longer infectious (≥ 10 days after diagnosis).

STEP 1 Assess the patient's **BASELINE** risk and explain this to the patient.

➲ Baseline risk is the most important factor determining patient outcome.[1]

Baseline risk	High	Intermediate	Low
	Surgical mortality risk >1% with validated tool[2]	Lower risk of death, but risk of significant complications	Low risk of death and complications

STEP 2 Consider factors that create **ADDITIONAL** risk of proceeding with surgery within 7 weeks and explain this to the patient (risk modifiers).

➲ Risk is cumulative: each risk factor has a bigger impact on a patient with high baseline risk than on a patient with low baseline risk.[3]

- ☐ Age > 70 years
- ☐ ASA physical status 3–5[4]
- ☐ Major surgery
- ☐ Ongoing COVID-19 symptoms
- ☐ Previously hospitalised for COVID-19

Additional risk	High	Intermediate	Low
	>1 risk factor	1 risk factor	No risk factors

STEP 3 Now consider risk of deferring surgery for 7 weeks after SARS-CoV-2 infection.

➲ Clinicians and patients should balance the baseline (Step 1) and additional risk (Step 2) of proceeding with surgery against the risks of waiting.

Consider two patients undergoing major surgery: Patient A who is ASA physical status 2 has an estimated 1% risk of death from surgery, while Patient B who is ASA physical status 4 has a 10% risk (10-fold higher relative risk). If both patients have elective surgery within 2 weeks of a SARS-CoV-2 infection, the relative risk of death for each patient may increase four-fold, for example. For Patient A, their risk of death increases from 1% to 4%, whereas for Patient B it increases from 10% to 40%. Applying the same relative risk increase has increased Patient A's absolute risk by 3% and Patient B's by 30%. Thus, when considering undertaking surgery within 7 weeks of SARS-CoV-2 infection, it is necessary to calculate the individual patient's risk, using a validated risk score, and then apply the risk modifiers to understand how absolute risk changes.

Guidelines

A minimum of eight weeks of being symptom free prior to undergoing all but minor elective surgical procedures is recommended.

Patients should have a formal clinical review prior to surgery that particularly addresses the state of the cardiac and respiratory systems. This is recommended for all patients post known SARS-CoV 2 infection and is especially important in those who have any persisting symptoms (including fatigue) or who were hospitalised for SARS-CoV-2 care.

Preoperativ vurdering

Original Investigation

FREE

October 11, 1999

Self-reported Exercise Tolerance and the Risk of Serious Perioperative Complications

Dominic F. Reilly, MD; Marguerite J. McNeely, MD, MPH; Diane Doerner, MD, PhD; et al

» Author Affiliations | Article Information

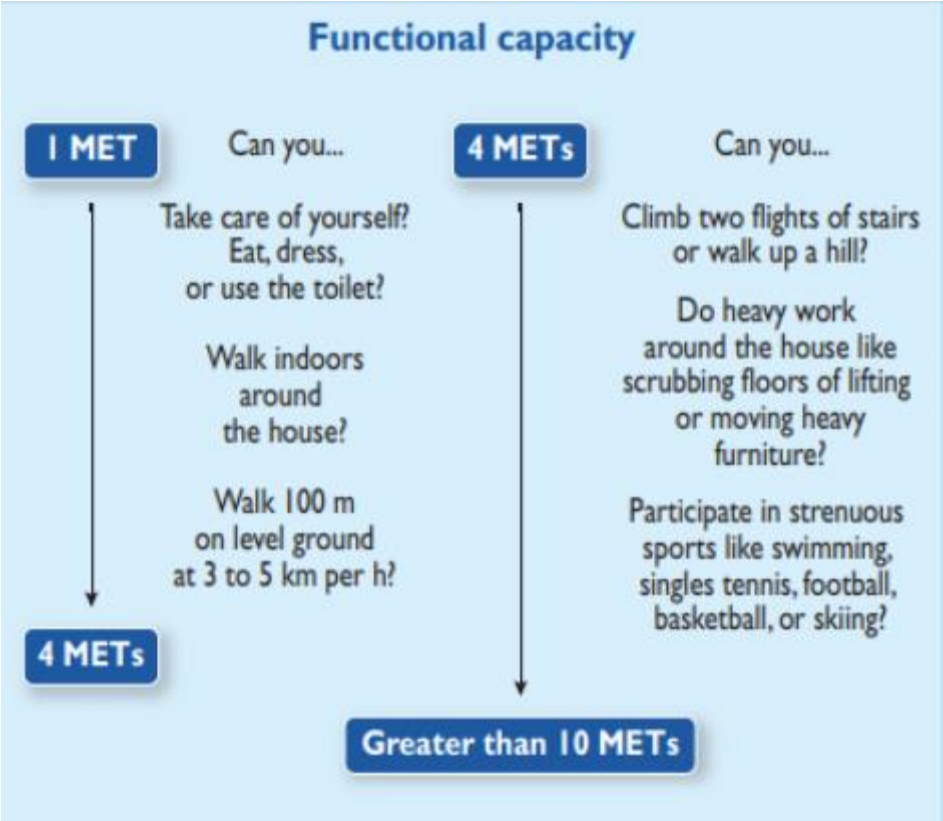
Arch Intern Med. 1999;159(18):2185-2192. doi:10.1001/archinte.159.18.2185

Table 3. Perioperative Complications Among Patients With Good or Poor Exercise Tolerance

Perioperative Complications†	No. (%) of Patients: Good Exercise Tolerance (n = 269)	No. (%) of Patients: Poor Exercise Tolerance (n = 343)	*P**
Total serious complications‖	28 (10.4)	70 (20.4)	.001

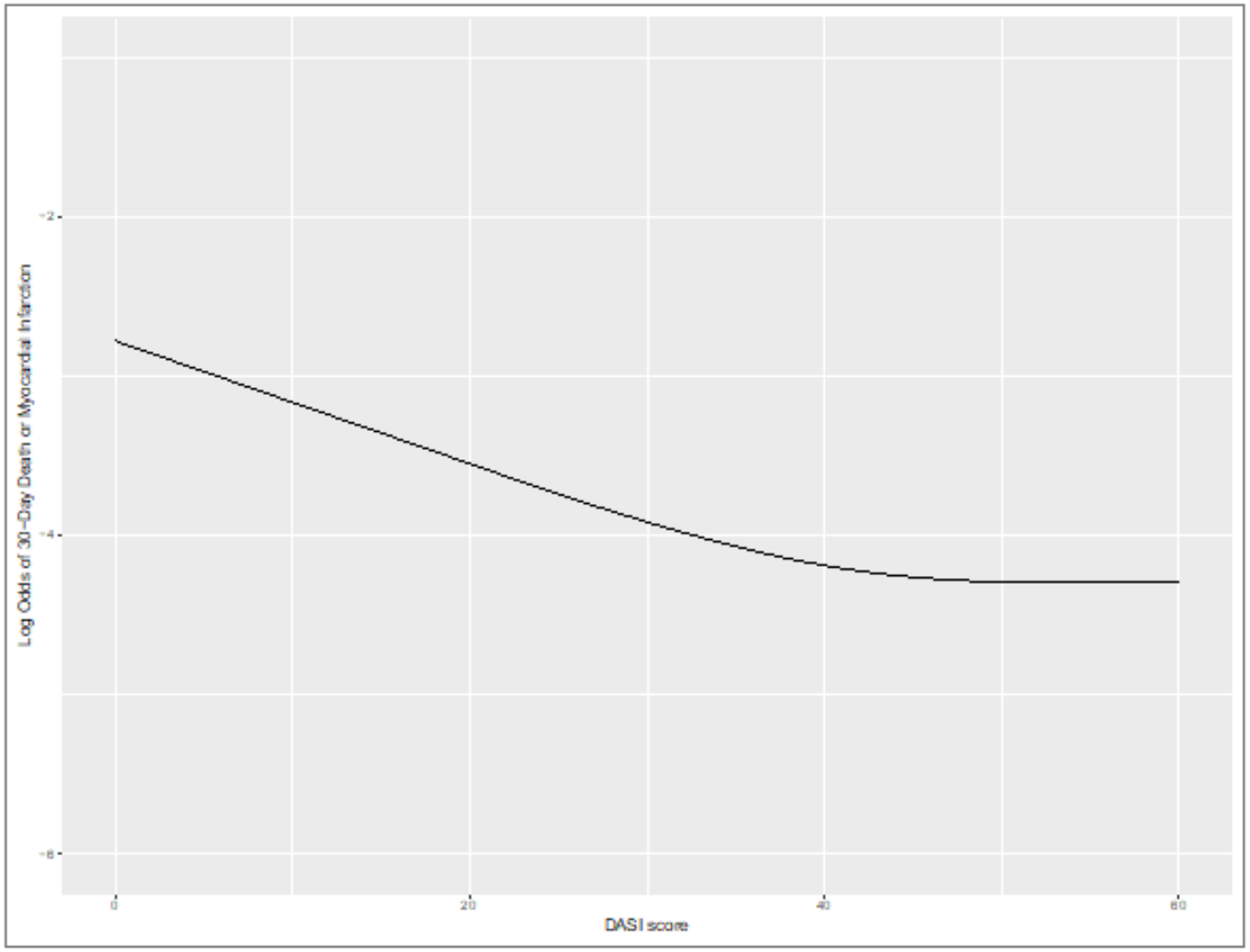
Self-reported exercise tolerance

We used the exercise tolerance ordinal data (0-4 blocks walked or 0-4 flights of stairs climbed) to explore potential cut points for differentiating patients with good vs poor exercise tolerance. The sensitivity, specificity, and likelihood ratios for predicting perioperative complications were calculated using various combinations of blocks walked and stairs climbed. We felt that a definition of poor exercise tolerance with the highest sensitivity for predicting perioperative complications would have the greatest clinical utility. Defining poor exercise tolerance as the inability to walk at least 3 blocks or climb 2 flights of stairs (n=207) yielded the greatest likelihood ratio (1.6), with a specificity of 0.69 but a sensitivity of only 0.49, for predicting perioperative events. However, we defined poor exercise tolerance as the inability to walk 4 blocks and climb 2 flights of stairs because it provided the highest sensitivity (0.71), albeit with a lower specificity (0.47) and likelihood ratio (1.3), for predicting all serious perioperative complications.


Functional capacity
1 MET
Can you...
Take care of yourself? Eat, dress, or use the toilet?
Walk indoors around the house?
Walk 100 m on level ground at 3 to 5 km per h?
4 METs
4 METs
Can you...
Climb two flights of stairs or walk up a hill?
Do heavy work around the house like scrubbing floors of lifting or moving heavy furniture?
Participate in strenuous sports like swimming, singles tennis, football, basketball, or skiing?
Greater than 10 METs

DASI-score

Can you	Yes	No
1. Take care of yourself, that is, eating, dressing, bathing, or using the toilet?	2.75	0
2. Walk indoors, such as around your house?	1.75	0
3. Walk a block or two on level ground?	2.75	0
4. Climb a flight of stairs or walk-up a hill?	5.50	0
5. Run a short distance?	8.00	0
6. Do light work around the house like dusting or washing dishes?	2.70	0
7. Do moderate work around the house like vacuuming, sweeping floors, or carrying in groceries?	3.50	0
8. Do heavy work around the house like scrubbing floors or lifting or moving heavy furniture?	8.00	0
9. Do yard work like raking leaves, weeding, or pushing a power mower?	4.50	0
10. Have sexual relations?	5.25	0
11. Participate in moderate recreational activities like golf, bowling, dancing, doubles tennis, or throwing a baseball or football?	6.00	0
12. Participate in strenuous sports like swimming, singles tennis, football, basketball, or skiing?	7.50	0

Cut-off 34 poeng

Supplemental Figure 2: Unadjusted association of the DASI score (modelled using restricted cubic splines) with 30-day postoperative death or myocardial infarction