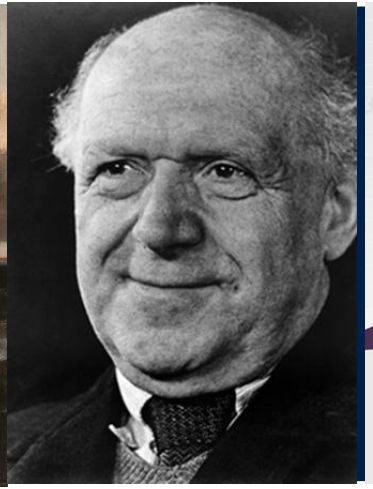
NUFFIELD DEPARTMENT OF
PRIMARY CARE
HEALTH SCIENCES

@trishgreenhalgh

UNIVERSITY OF
OXFORD



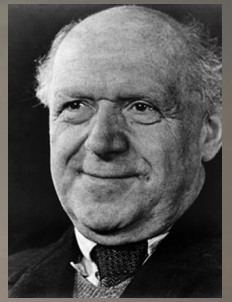
A quality improvement collaborative for long covid: Building the boat as we sailed it

Professor Trisha Greenhalgh, University of Oxford

Funding: UK National Institute for Health and Care Research (NIHR)

Acknowledging the wider LOCOMOTION research team, clinical practitioners and patient advisers

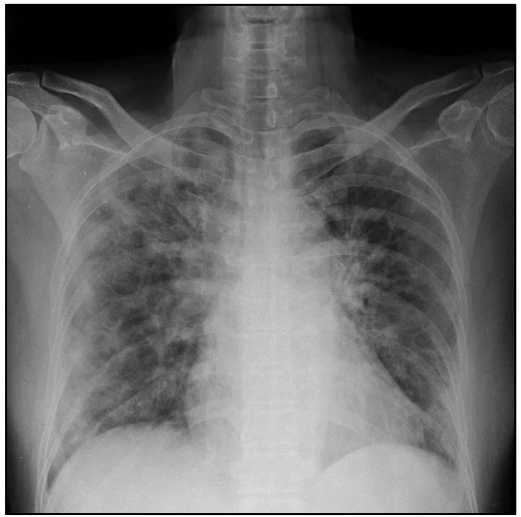
Otto Neurath (philosopher)



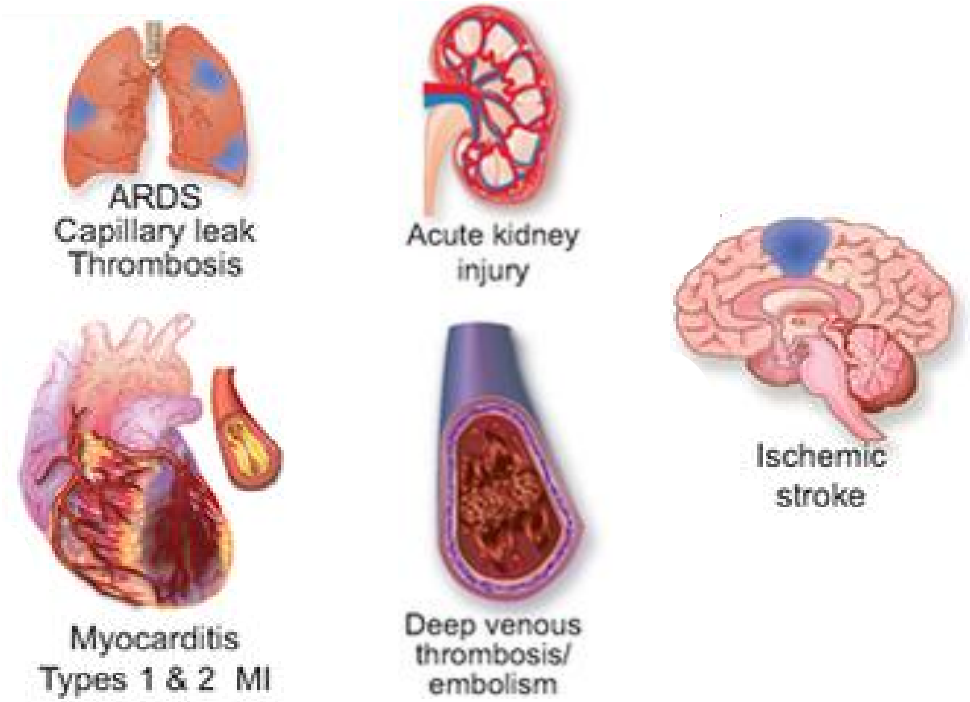
We are like sailors who have to rebuild their ship on the open sea, without ever being able to dismantle it in dry-dock and reconstruct it from the best components.

Otto Neurath

Covid-19: a changing disease



March 2020:
A disease of the lungs
Lasted ~2 weeks



Dec 2020: A multi-system endothelial disease

Libby Eur Heart J 2020; 41: 3038

What is the prognosis of long covid?

Around 1 in 3 Covid-19 patients still have symptoms 4 weeks after the acute illness

→

~Half of these will be symptom-free by 12 weeks (=> ~ 1 in 10 still troubled)

→

~Half of these will be symptom-free by 6 months (=> ~ 1 in 20 join the 'tail' of Covid long-haulers)

BUT estimates vary+++

LC mechanisms (hypothesized)	LC 'treatable traits' e.g. (not mutually exclusive)	LC symptoms (relapse and remit)
Endothelitis, platelet activation → **microclots**, failure of small blood vessel regulation	**Dysautonomia** (commonest = Postural Orthostatic Tachycardia Syndrome, POTS)	**Fatigue**; post-exertional symptom exacerbation (PESE)
Persisting viral antigen / **autoantibodies** → immune activation	**Breathing pattern disorder** ('vicious circle' of misalignments in breathing muscles)	**Breathlessness**, voice problems
	Cognitive malfunction with ⬇ memory and executive function	**Chest pain** ('burn'), tachycardia
	Psychological impacts of loss of work and social interaction	**Urticaria**, gastric reflux, bloating, sleep problems
	Mast Cell Activation Syndrome (?)	**'Brain fog'**
		Anxiety and **depression**
		FUNCTIONAL IMPAIRMENT+++

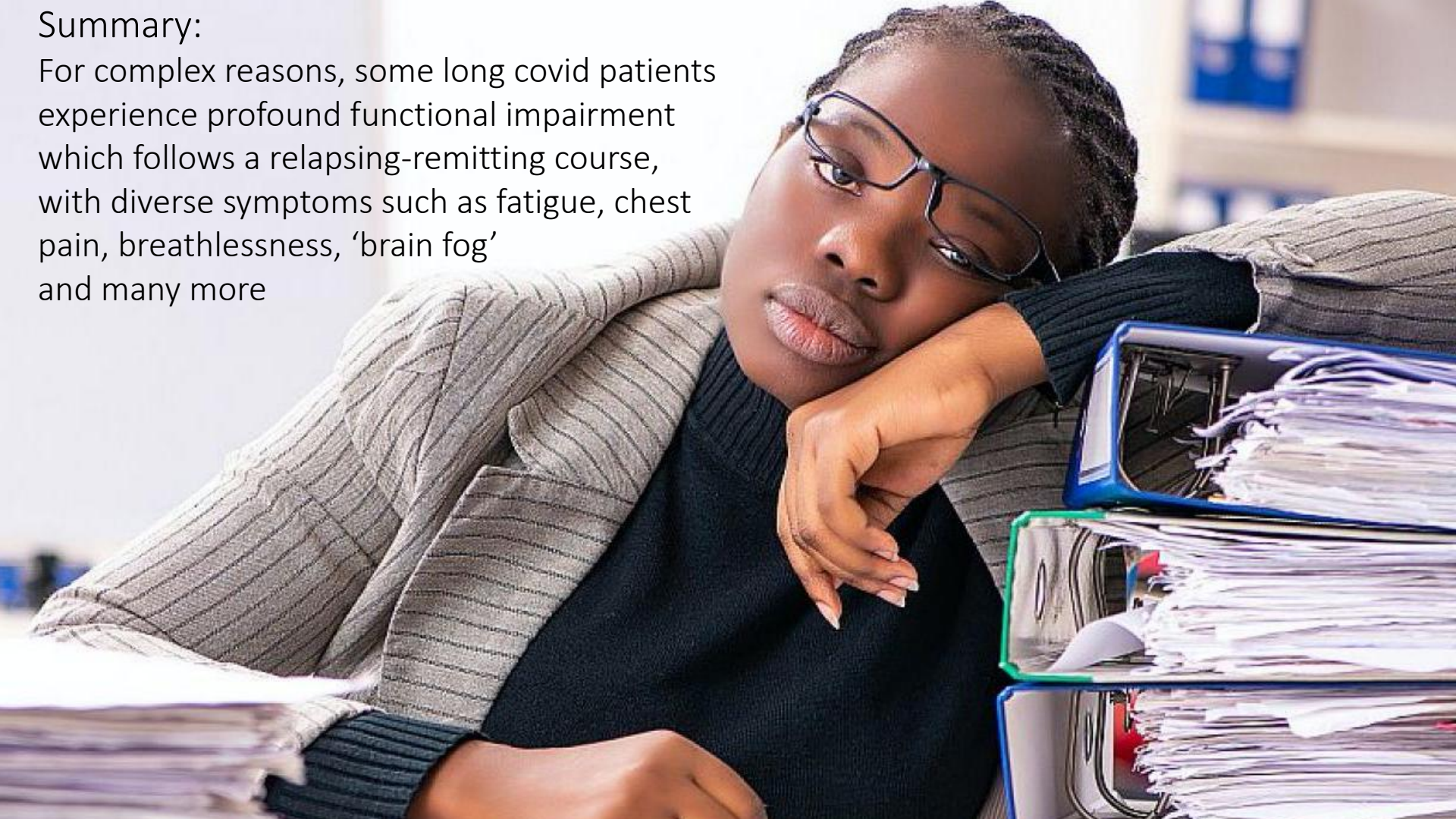
Thanks to Brendan Delaney for this slide

WHO case report form emphasises functional impairment

2.5 Functioning (*do not need complete this section for children <15yrs*)				
Ability to self-care: ☐Same as before COVID-19 ☐Worse ☐Better ☐Unknown				
Think back over the past 7 days. **How much difficulty has the participant had with the following:**	**Score:** **0** No Difficulty **1** Mild Difficulty **2** Moderate Difficulty **3** Severe Difficulty **4** Extreme Difficulty or Cannot do	**Compared to before COVID-19, are you better/worse/same?**		
		Better	Worse	Same
Standing for long periods such as 30 minutes?				
Taking care of your household responsibilities?				
Learning a new task, e.g. learning how to get to a new place?				
Joining in community activities (e.g. festivities, religious, other)?				
Being emotionally affected by your health problems?				
Concentrating on doing something for ten minutes?				
Walking a long distance such as a kilometre (or equivalent)?				
Washing your whole body?				
Getting dressed?				
Dealing with people you do not know?				
Maintaining a friendship?				
Your day-to-day work/school?				
TOTAL score				

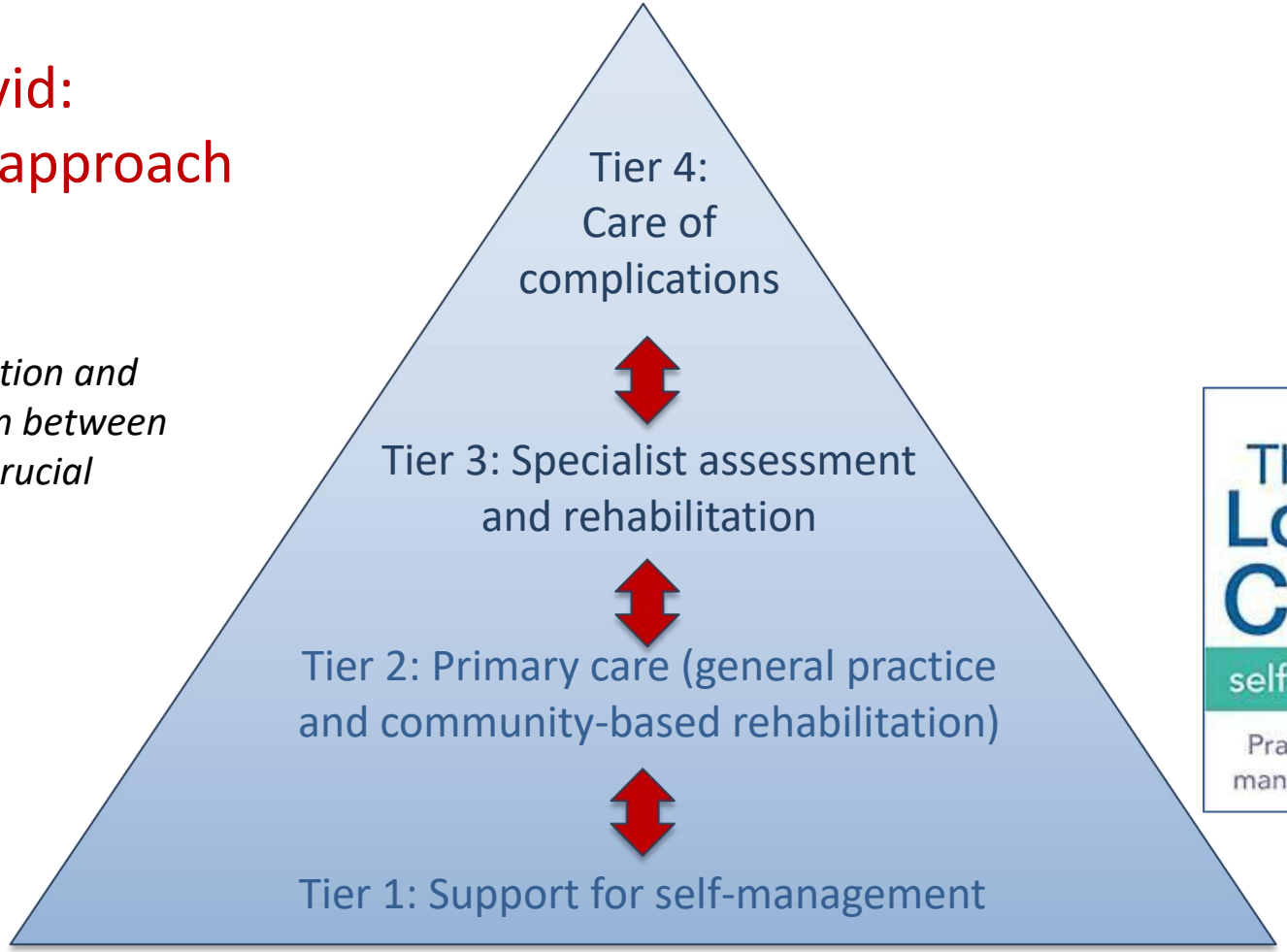
Summary:

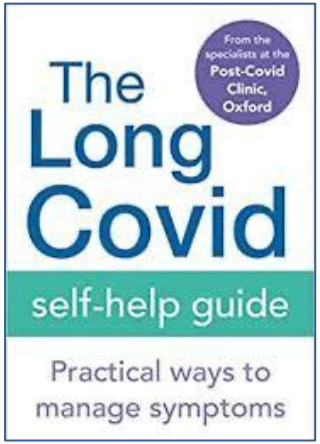
For complex reasons, some long covid patients experience profound functional impairment which follows a relapsing-remitting course, with diverse symptoms such as fatigue, chest pain, breathlessness, ‘brain fog’ and many more



Long Covid:
A tiered approach

Communication and coordination between the tiers is crucial





Long Covid:
Which paradigm?

1. Biomedical paradigm: a search for drugs to treat vasculitis / inflammation?

2. Rehabilitation paradigm: gradual increase in exercise, with self-pacing and cognitive support

3. Relationship-based care paradigm: clinician as witness to suffering, avoid over-investigating

LOCOMOTION Quality Improvement Collaborative

9 sites across England

Clinical research fellows – no QI training, no research training

Almost no RCTs to draw on!!! Much of the evidence is our embodied clinical wisdom along with the lived experience of patients.

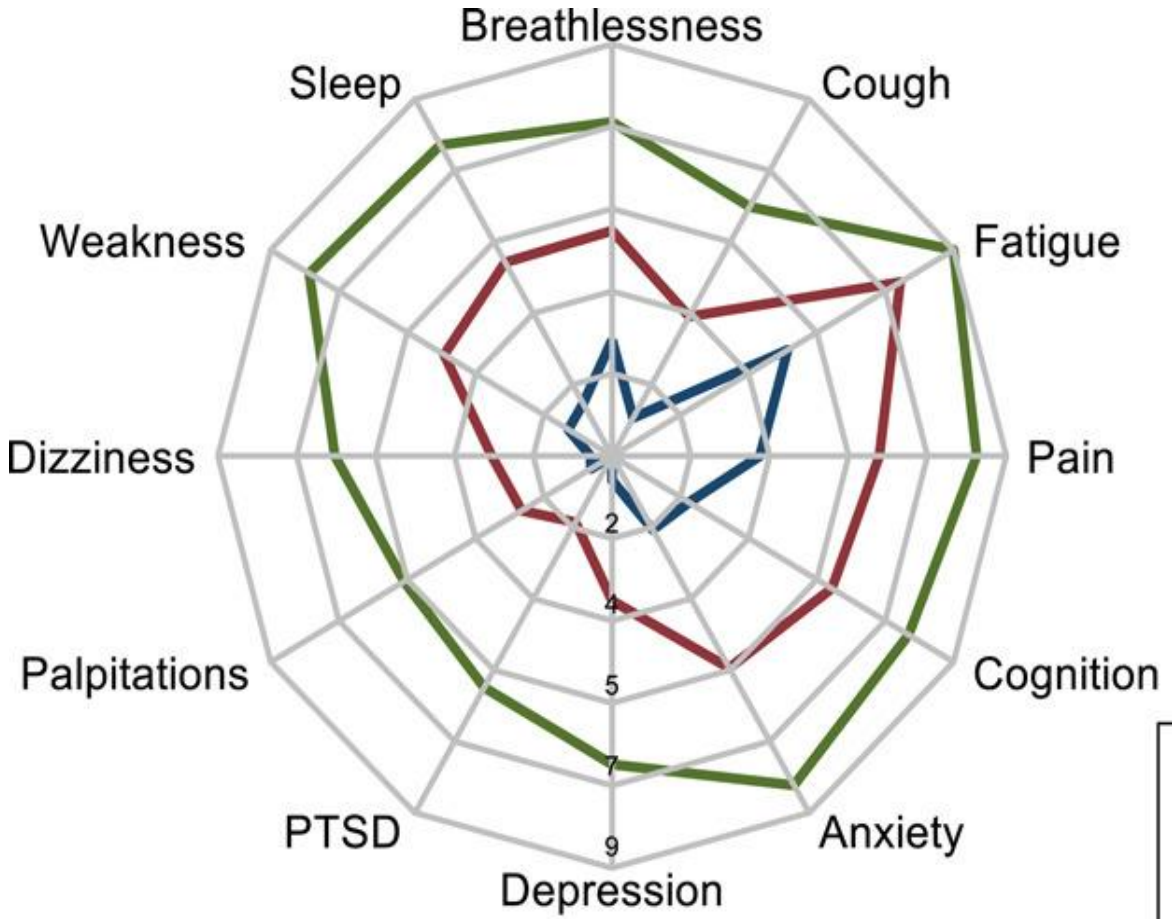
“Potentially better practices”

Crucially important to have rapid-cycle tests of change

LOCOMOTION Quality Improvement Collaborative

Q1: Should we standardize outcome measures within and across clinics?

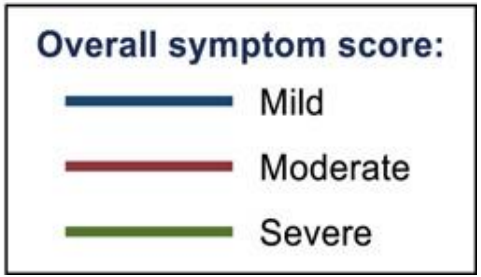
Fatigue	Fatigue Assessment Scale
	Borg
	Modified Fatigue Impact Scale
	Chalder
	Fatigue VAS
	Fatigue Severity Scale
Breathlessness	Dyspnea 12
	Brompton Pattern Assessment Tool
	MRC
	Nijmegan hyperventilation
	Sit to stand 1 min
Cough	VAS cough score
Depression	PHQ 9
Anxiety	GAD 7
PTSD	PTSD PCL-5
Cognition	Montreal cognitive assessment
Physical activity	GPPAQ
Quality of life	EQ5D
Vocation	Work and Social Adjustment Scale
Social	Therapy outcome measure
All	C19-YRS



Covid-19 Yorkshire Rehabilitation Scale (C19-YRS)

Symptom distribution in 370 clinic patients

Sivan M et al. J Medical Virology. 2022; 94:1419



Thanks to Manoj Sivan for this slide

LOCOMOTION Quality Improvement Collaborative

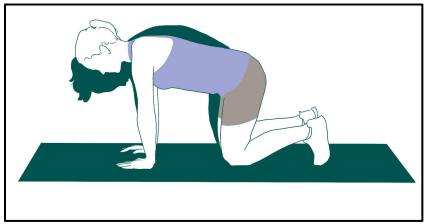
Q2: What should be the referral criteria for long covid clinics?

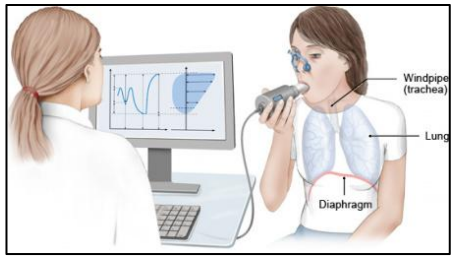
[depends what is being done, and what could be done, in primary care]

LOCOMOTION Quality Improvement Collaborative

Q3: What investigations and initial management should people have when seen in clinic?

[→ pre-investigation in primary care]





LOCOMOTION Quality Improvement Collaborative

An early finding was that many GPs had no knowledge of long covid, no confidence in managing it, and some did not “believe in” it.

They didn’t know what *kind of illness* long covid is. Symptoms were legion!

They feared ‘opening the floodgates’.

Patients talked about ’gaslighting’. Many had <u>never been seen</u> by a doctor.

We could not systematically improve quality in secondary care until we had addressed initial assessment and management in primary care.

BMJ September 2022

1 Nuffield Department of Primary Care Health Sciences, University of Oxford, Oxford, UK

2 Leeds Institute of Rheumatic and Musculoskeletal Medicine, University of Leeds, Leeds, UK

3 Institute of Global Health Innovation, Imperial College London, London, UK

4 Institute for Lung Health, Department of Respiratory Sciences, University of Leicester, Leicester, UK

5 School of Healthcare Enterprise and Innovation, University of Southampton, Southampton, UK

Correspondence to T Greenhalgh
trish.greenhalgh@phc.ox.ac.uk

Cite this as: *BMJ* 2022;378:e072117
http://dx.doi.org/10.1136/bmj-2022-072117
Published: 22 September 2022

PRACTICE POINTER

Long covid—an update for primary care

Trisha Greenhalgh, [1] Manoj Sivan, [2] Brendan Delaney, [3] Rachael Evans, [4] Ruairidh Milne[5]

What you need to know

- Long covid (prolonged symptoms following covid-19 infection) is common
- The mainstay of management is supportive, holistic care, symptom control, and detection of treatable complications
- Many patients can be supported effectively in primary care by a GP with a special interest

This article updates and extends a previous *BMJ* Practice Pointer published in August 2020 when almost no peer reviewed research or evidence based guidance on the condition was available.[1] In this update we outline how clinicians might respond to the questions that patients ask.

Definition

The term "long covid"[2] refers to prolonged symptoms following infection with SARS-CoV-2 that are not explained by an alternative diagnosis. It embraces

2000) has around 65 patients with long covid, 27 of whom will have been unwell for more than a year, and 12 for more than two years. Most general practices have far fewer patients with a long covid diagnostic code on their electronic health record[9] for a combination of reasons, including lack of presentation, lack of recognition, and inadequate coding. These figures do not cover children, who are outside the scope of this article.

Rates of long covid are lower in people who are triple vaccinated, but prevalence of long covid (persistent symptoms at 12-16 weeks after laboratory confirmed SARS-CoV-2 infection) remains high at 5% for the delta variant and 4.2% for omicron BA.2.[10]

Symptoms and case definition

Long covid may be diagnosed late or not at all,[11-13] so both generalists and specialists should be alert to it as a differential, while also being aware that patients can develop other persistent symptoms following acute covid-19 that are not necessarily

Table 1 | Symptoms, investigation, and management of long covid

Symptom cluster	Description and impact on daily life	Investigations (in addition to full clinical examination)	Management
Fatigue, low exercise tolerance, deconditioning (eg, post-ICU)	"Battery flat," unable to do usual activities. Trying to do more may worsen symptoms. In some cases, fatigue does not improve with rest	Bloods as appropriate (eg, full blood count, urea and electrolytes, renal, thyroid, vitamin D, C reactive protein, B12, ferritin). Exclude other causes of fatigue. Monitor symptom severity and frequency and pattern of relapses (eg, using the C19-YRS outcome measure). Consider autonomic dysfunction (see below)	Holistic management is key. Self-management to function within available energy limits (eg, prioritising, planning, building in breaks and rests, knowing when to stop[20]). Signpost to resources (see box, Resources for patients)
Post-exertional symptom exacerbation (PESE)	"Crash," "relapse" worsening of symptoms (physical, cognitive, or emotional), or new symptoms, following exertion	Monitor symptom severity and frequency and pattern of relapses (eg, using C19-YRS). A patient activity diary can record triggers (for relapse)	Signpost to resources. Pacing in phases (see WHO self-management booklet, box, Resources for patients)
Exertional breathlessness	Short of breath predominantly with physical activity	Guided by specific symptoms. Assess impact on function (eg, using item 1 of C19-YRS). Haemoglobin, spirometry, full lung function tests as indicated. Natriuretic peptides and echocardiogram as indicated if heart failure suspected. Pulse oximetry and sit-to-stand test for exertional hypoxia.[21] Chest x ray image (especially if patient was hospitalised) if persistent lung damage suspected and to exclude other causes.[22] D dimer if acute pulmonary embolism suspected (note that a negative result does not exclude chronic pulmonary emboli[23])	Refer according to clinical concern (eg, worsening symptoms, resting or exertional hypoxia, unexplained abnormal spirometry, abnormal chest x ray image)
Altered breathing/breathing pattern disorder	Pressure in chest ("covid squeeze"), shallow breathing, breathlessness with or without exertion, sense of needing to work harder to take a breath, or air hunger ("can't get enough air")	Exclude other causes of breathlessness as listed above, especially causes of episodic breathlessness such as asthma or recurrent pulmonary embolism	Recommend breathing control exercises, signpost to online resources for breathing pattern disorder (box, Resources for patients), and if no improvement refer to specialist

thebmj Visual summary

Long covid

A guide for primary care

Long covid produces a wide variety of general and organ specific symptoms. Some patients have profound functional impairment including difficulties with daily activities. This graphic gives a quick overview of what to look out for in primary care, and when to refer.

Person with symptoms of long covid

Prolonged symptoms following SARS-CoV-2 infection which are not explained by an alternative diagnosis

A positive covid-19 test is helpful if present but its absence does not exclude the diagnosis

History and examination

Conduct a full examination in a face-to-face appointment. Factors to look out for include:

- Onset in or after January 2020
- Course may be constant or relapsing-remitting, perhaps with specific triggers
- Risk factors
- Fatigue made worse by minor exertion
- Functional impairment - unable to do normal job or activities
- Red flag symptoms
- Wide range of associated symptoms

Risk factors:

- Occupational risk, such as health worker
- Female sex
- Age 35-69
- 2 or more pre-existing long term conditions

Associated symptoms, such as:

Sometimes, one organ system predominates

- Ear, nose, and throat: Tinnitus, poor hearing; Altered smell; Altered voice
- Respiratory: Breathlessness; Altered breathing pattern
- Skin and hair: Hair loss; Urticaria, chilblains
- Neurocognitive: Impaired executive function; Sleep disturbance; Poor memory; Poor concentration; Headache
- Mental health and wellbeing: Anxiety; Depression
- Muscle and joint pain
- Gastrointestinal: Reflux or regurgitation; Bloating; Difficulty swallowing; Diarrhoea
- Cardiovascular: Microvascular angina; Dizziness; Tachycardia, especially on standing
- Gynaecological: Menstrual irregularity; Premature menopause

Investigations

Guided by history and examination, for example:

General or fatigue
- Full blood count
- Renal and liver function
- Thyroid stimulating hormone
- C-reactive protein
- Vitamin D
- HbA1c

Respiratory
- Pulse oximetry
- Chest x ray
- Lung function tests

Cardiovascular
- Resting electrocardiogram
- N-terminal BNP*
- NASA lean test

An acutely unwell and deteriorating patient requires urgent action

Cardiorespiratory
- Chest pain on exertion
- Tachycardia (>100 bpm) at rest or on minimal exertion
- Desaturation >3% on exertion
- Syncope on exertion
- Blood oxygen <94% at rest
- Acute and progressive dyspnoea

Neurological
- New onset confusion
- Symptoms suggestive of stroke

Mental health
- Worsening anxiety or depression
- Thoughts of self-harm

What can primary care teams do?

Diagnosis
- Hear the patient's story
- Diagnose and code 'post covid-19 syndrome'
- Assess for postural tachycardia
- Exclude other diagnoses

Prognosis
- Share uncertainties
- Help set realistic goals
- Monitor progress
- Sickness certification
- Support return to work

Management
- Whole person care and wellbeing
- Manage symptoms and comorbidities
- Encourage self-management

Symptomatic relief, such as antihistamines for urticaria

Offer covid-19 vaccination if not fully up to date

Consider specialist service referral

Long covid clinic and rehabilitation
- Diagnosis in doubt
- Marked functional impairment
- Severe symptoms
- Not improving
- Specific condition requiring assessment (such as tachycardia)

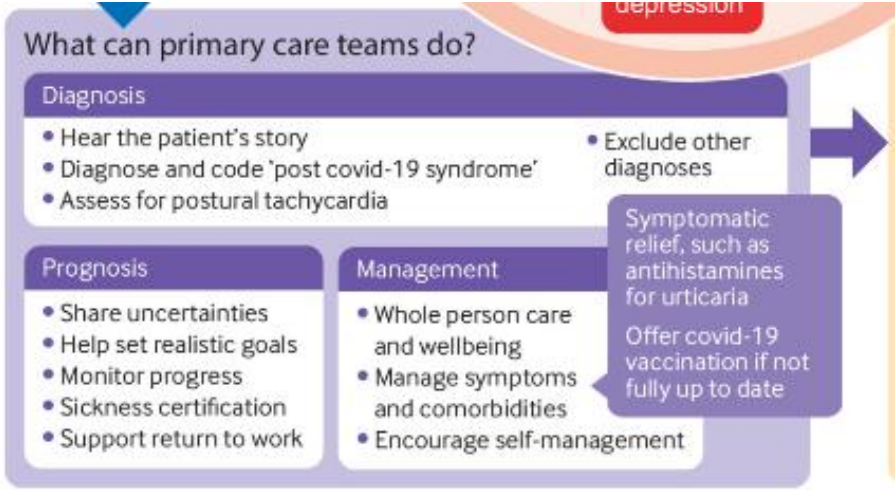
If no long covid clinic locally, consider for example:

Suspected pulmonary embolism or chronic lung damage	Respiratory
If postural tachycardia syndrome is severe or diagnosis is in doubt	Cardiology
Tinnitus, markedly altered voice	Ear, nose, and throat
Difficulty swallowing, chronic diarrhoea	Gastro-enterology
Cognitive dysfunction impairing ability to work	Memory clinic

thebmj Read the full article online https://bit.ly/bmj-long2

* BNP = b-type natriuretic peptide

See more visual summaries http://www.bmj.com/infographics



Hi All,

I just thought you might like to know that the first BMJ Long Covid practice pointer has been getting really good feedback from patients who have seen it. It has been mentioned a few times in our Long Covid Support Group on Facebook (55k+ members) and another member posted about it again yesteday, especially the visual summary. They agreed for me to share with you what they said:

> *"It definitely made my Doctor listen and willing to investigate. I told her I feel fobbed off and gaslit ever since I've had this condition and it's time they did something about it. I said I had a document from the BMJ and will bring it as they should be following these guidelines. At this point she seemed to listen. This will be the first time a doctor has actually seen me face to face since the pandemic began.*
>
> *It's a really helpful chart and I think this will be my gateway to get the relevant checks I need."*

Another person commented (and was also happy for me to pass this on):

> *"I will be using this and need it so much! Thanks all."*

There are several other comments too from people saying how good (*"fantastic"*, *"excellent"*, etc.!) the information is.

I just wanted to feed this back to you so you are aware of how well received the paper has been (at least by patients!) and that it is making a difference.

LOCOMOTION Quality Improvement Collaborative

Q4: Assessment and management of dysautonomia

Q5: Assessment and management of cognitive dysfunction

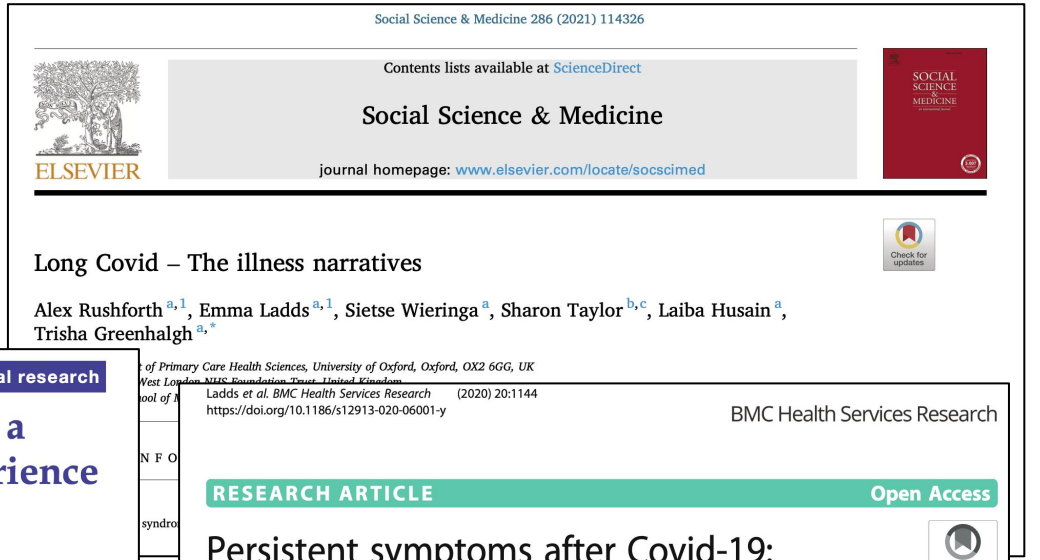
Q6: Assessment and management of breathing disorders

Q7: Getting patients back to work

etc

LOCOMOTION Quality Improvement Collaborative

The patient experience is central.



Social Science & Medicine 286 (2021) 114326

Contents lists available at ScienceDirect

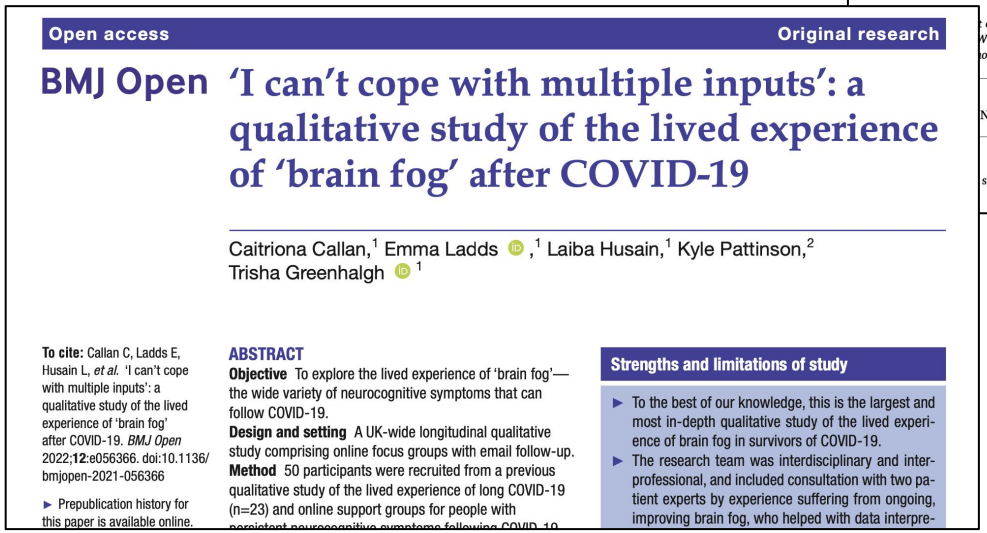
Social Science & Medicine

journal homepage: www.elsevier.com/locate/socscimed

Long Covid – The illness narratives

Alex Rushforth [a,1], Emma Ladds [a,1], Sietse Wieringa [a], Sharon Taylor [b,c], Laiba Husain [a], Trisha Greenhalgh [a,*]

of Primary Care Health Sciences, University of Oxford, Oxford, OX2 6GG, UK



Open access Original research

BMJ Open

'I can't cope with multiple inputs': a qualitative study of the lived experience of 'brain fog' after COVID-19

Caitriona Callan,[1] Emma Ladds ,[1] Laiba Husain,[1] Kyle Pattinson,[2] Trisha Greenhalgh [1]

To cite: Callan C, Ladds E, Husain L, *et al*. 'I can't cope with multiple inputs': a qualitative study of the lived experience of 'brain fog' after COVID-19. *BMJ Open* 2022;**12**:e056366. doi:10.1136/bmjopen-2021-056366

► Prepublication history for this paper is available online.

ABSTRACT

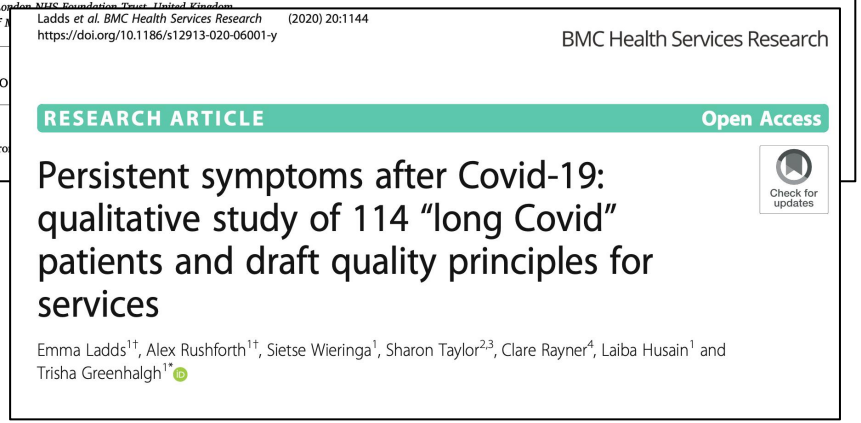
Objective To explore the lived experience of 'brain fog'—the wide variety of neurocognitive symptoms that can follow COVID-19.

Design and setting A UK-wide longitudinal qualitative study comprising online focus groups with email follow-up.

Method 50 participants were recruited from a previous qualitative study of the lived experience of long COVID-19 (n=23) and online support groups for people with

Strengths and limitations of study

- ► To the best of our knowledge, this is the largest and most in-depth qualitative study of the lived experience of brain fog in survivors of COVID-19.
- ► The research team was interdisciplinary and interprofessional, and included consultation with two patient experts by experience suffering from ongoing, improving brain fog, who helped with data interpre-



Ladds *et al. BMC Health Services Research* (2020) 20:1144
https://doi.org/10.1186/s12913-020-06001-y

BMC Health Services Research

RESEARCH ARTICLE Open Access

Persistent symptoms after Covid-19: qualitative study of 114 "long Covid" patients and draft quality principles for services

Emma Ladds[1†], Alex Rushforth[1†], Sietse Wieringa[1], Sharon Taylor[2,3], Clare Rayner[4], Laiba Husain[1] and Trisha Greenhalgh[1*]

LOCOMOTION QIC: Reflections

Running a QIC in an over-stressed healthcare system

Frictions with patient advisory group

Philosophical issues: embodied versus ‘objective’ knowledge

Local practicalities versus general truths

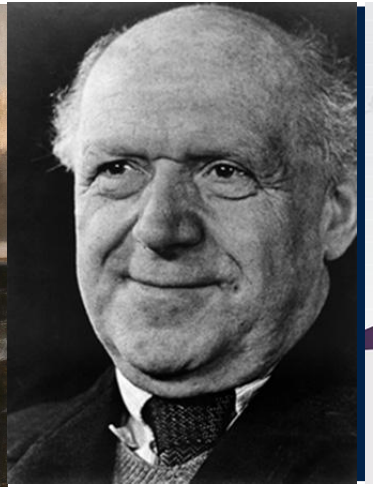
Unmet need – the missing denominator

Political and ideological issues

NUFFIELD DEPARTMENT OF
PRIMARY CARE
HEALTH SCIENCES

@trishgreenhalgh

UNIVERSITY OF OXFORD



Thank you for your attention

Professor Trisha Greenhalgh, University of Oxford

Funding: UK National Institute for Health and Care Research (NIHR)

Acknowledging the wider LOCOMOTION research team, clinical practitioners and patient advisers