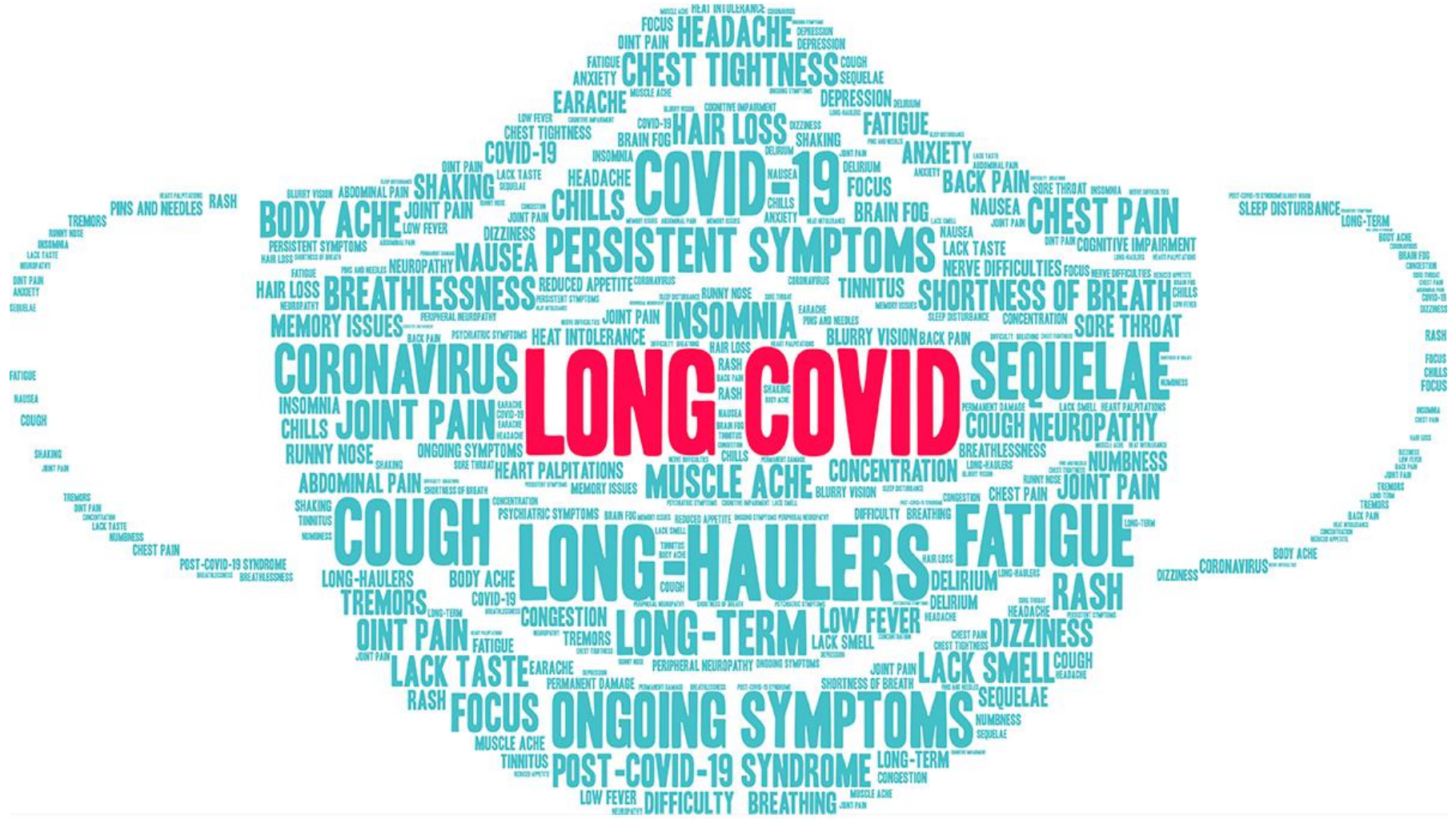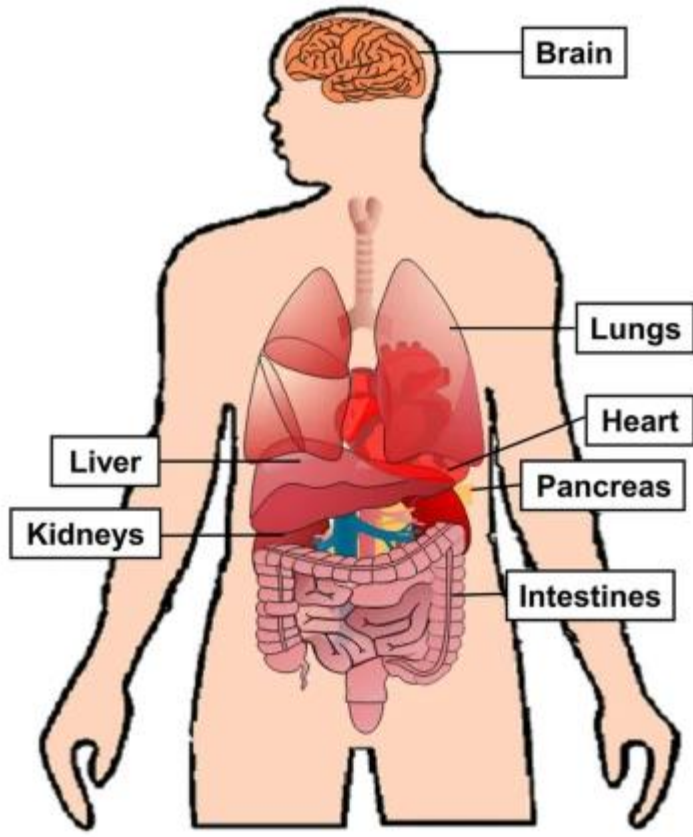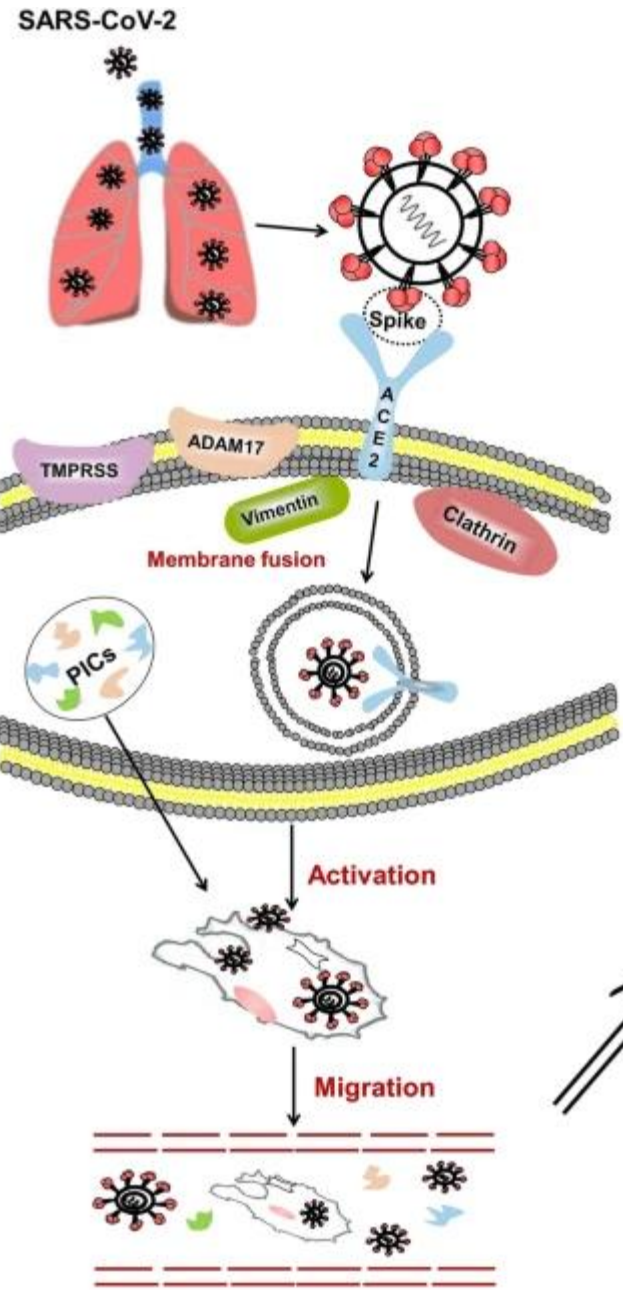# 8th Health & Care Webinar
Online
10 November 2021

Long COVID

Nicola Oliver, Longevity/mortality expert, Medical Intelligence, Co-chair C19-ARG
Adrian Baskir, Chief Underwriting Officer, Bupa Insurance Ltd, C19-ARG member
Josephine Robertson, FIA CERA MPH, C-19ARG member

Institute of Actuaries of India

- Long COVID
  - Definitions
  - Clinical Picture
  - Prevalence
  - Predictors
  - Impact

SARS-CoV-2

Spike

ACE2

TMPRSS   ADAM17

Vimentin   Clathrin

Membrane fusion

PICs

Activation

Migration

Brain

Lungs

Liver

Heart

Kidneys

Pancreas

Intestines

Multi-organ injury in COVID-19

Respiratory
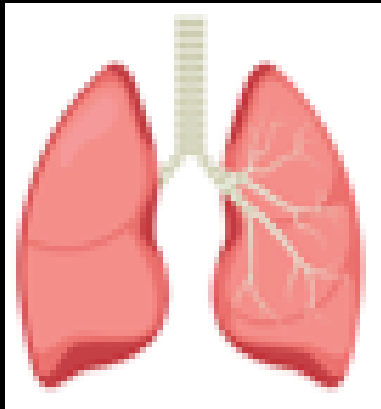
- Pulmonary fibrosis
- Reduced pulmonary function

Renal
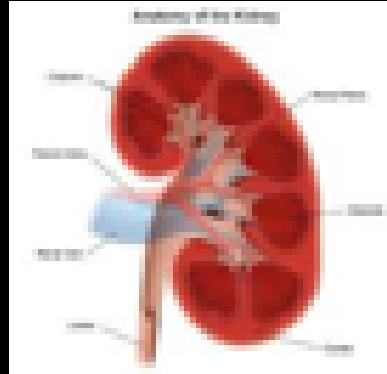
- Acute kidney injury
- Chronic kidney disease

Cardiovascular
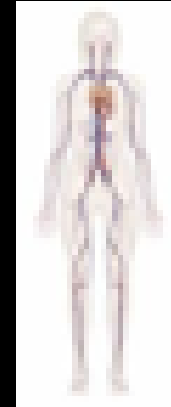
- Myocarditis
- Myocardial fibrosis

COVERSCAN Study
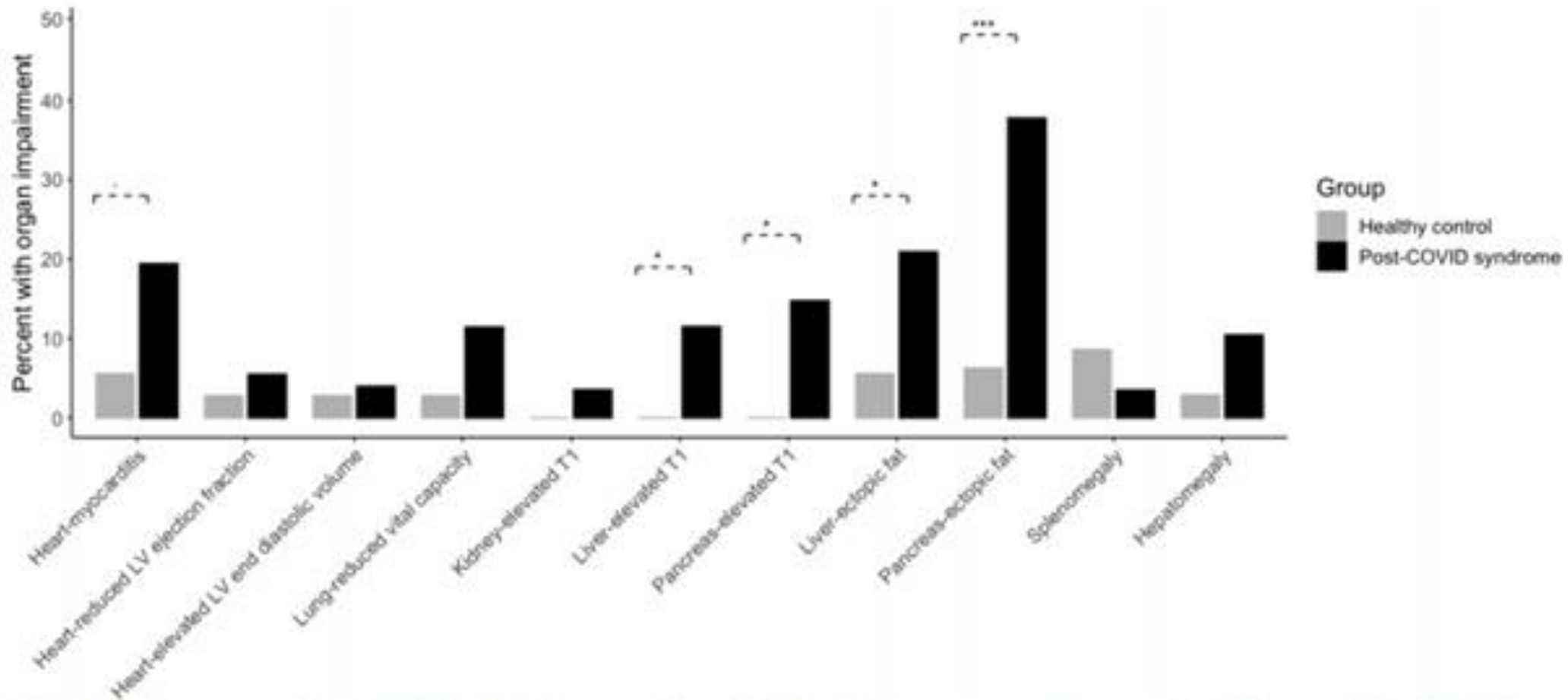
Figure 2 Percentage of patients (black) and controls (grey) with individual organ measures outside of the predefined normal range. Lines represent significant difference in the proportions between the two groups, with *p<0.05, **p<0.01, ***p<0.001. LV, left ventricular.

Age-specific prevalence of self-reported long COVID, as a percentage of the population, according to resulting activity limitation, UK, 2 May 2021
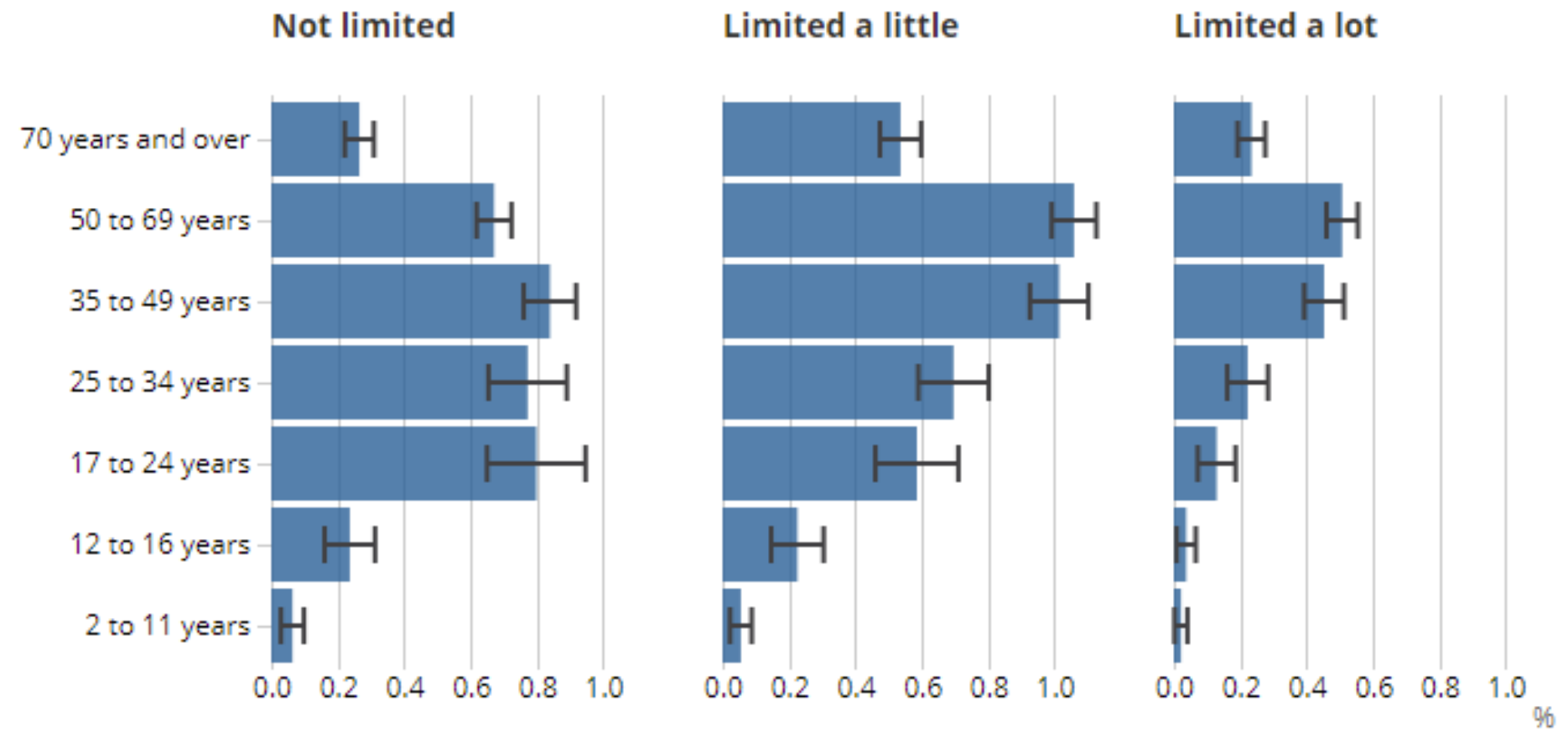
Source: Office for National Statistics

Long-term effects of COVID-19

80% at least one Symptom

Abnormal Chest XRay/CT (34%)
- D-dimer (20%)
- NT-proBNP (11%)
- CRP (8%)
- Serum ferritin (8%)
- Procalcitonin (4%)
- IL-6 (3%)

Legend:
- > 50%
- 30-50%
- 15-30%
- 5-15%
- < 5%

1% Hypertension
58% Fatigue
17% Sweat
7% Chills
11% Pain
12% Weight loss
44% Headache
27% Attention Disorder
21% Anosmia
16% Memory loss
13% Anxiety
12% Depression
11% Fever
11% Sleep disorder
8% Sleep Apnea
7% Mental Health
6% Psychiatric illness
3% Dizziness
3% Stroke
2% Dysphoria
2% Mood Disorders
2% OCD
1% PTSD
0.3% Paranoia

23% Ageusia
6% Red eyes
25% Hair Loss
15% Hearing loss Tinnitus
3% Throat Pain
3% Sputum
16% Nausea
19% Cough
21% Polypnea
24% Dyspnea
5% Pulmonary Fibrosis
16% Chest pain Discomfort
10% Reduced Pulmonary capacity
11% Resting heart rate increase
11% Palpitations
5% Discontinuous flushing
1% Myocarditis
0.4% Arrhythmia
4% Diabetes Mellitus
1% Renal Failure
12% Cutaneous signs
12% Digestive disorders
19% Joint Pain
3% Limb edema

% of long-term effects of COVID-19

Bar chart categories (top to bottom):
Paranoia
Arrythmia
PTSD
Renal Failure
Myocarditis
New Hypertension
OCD
Dysphoria
Mood Disorders
Throat Pain
Stroke
Dizziness
Limb edema
Sputum
Diabetes Mellitus
Discontinuous flushing
Pulmonary Fibrosis
Red Eyes
Psychiatric illness
Mental Health
Chills
Sleep Apnea
Reduced pulmonary capacity
Sleep Disorder
Intermittent Fever
Pain
Palpitations
Resting heart rate increase
Cutaneous signs
Weight loss
Digestive disorders
Depression
Anxiety
Hearing loss or tinnitus
Memory Loss
Chest Pain/Discomfort
Nausea or Vomit
Sweat
Cough
Joint Pain
Post-activity polypnea
Anosmia
Ageusia
Dyspnea
Hair Loss
Attention Disorder
Headache
Fatigue

Summary

The long tail of COVID is likely to be substantial
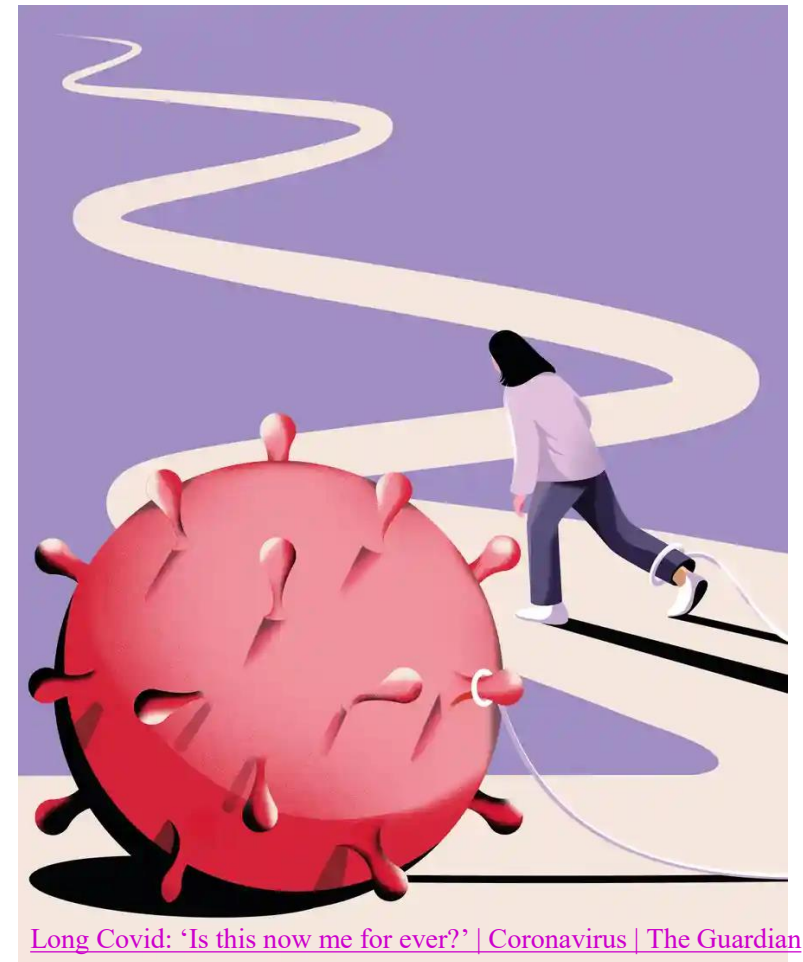
Multi-system damage

Future burden of morbidity and mortality

Additional impact of reduced access to other healthcare services

Impact

- Population
- Societal
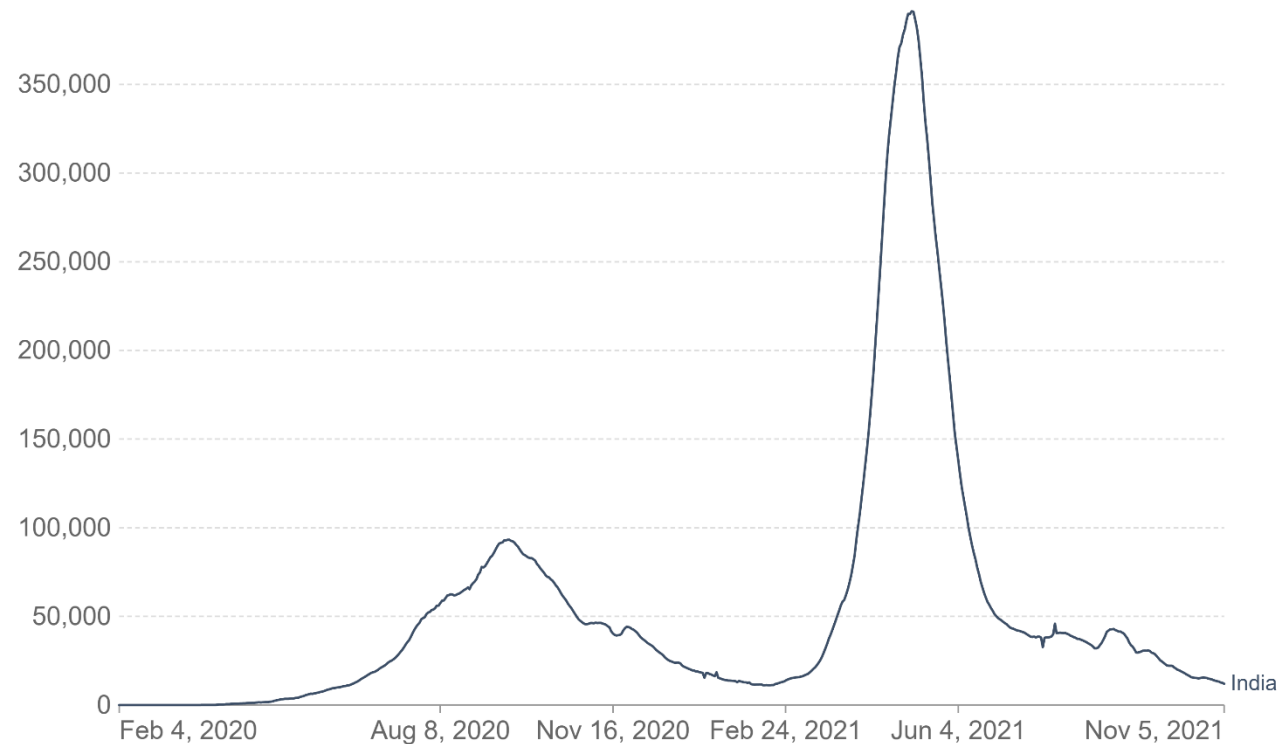
Population Impact

- Infections

Daily new confirmed COVID-19 cases
7-day rolling average. Due to limited testing, the number of confirmed cases is lower than the true number of infections.
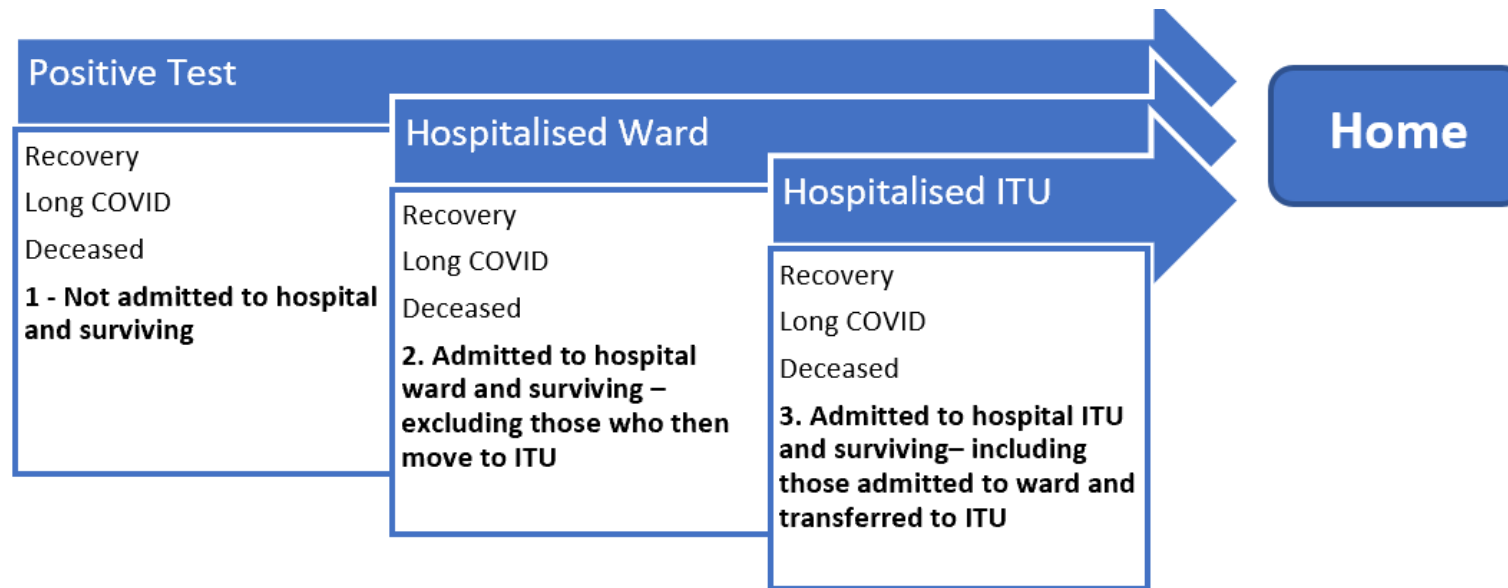

Source: Johns Hopkins University CSSE COVID-19 Data

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www.actuariesindia.org
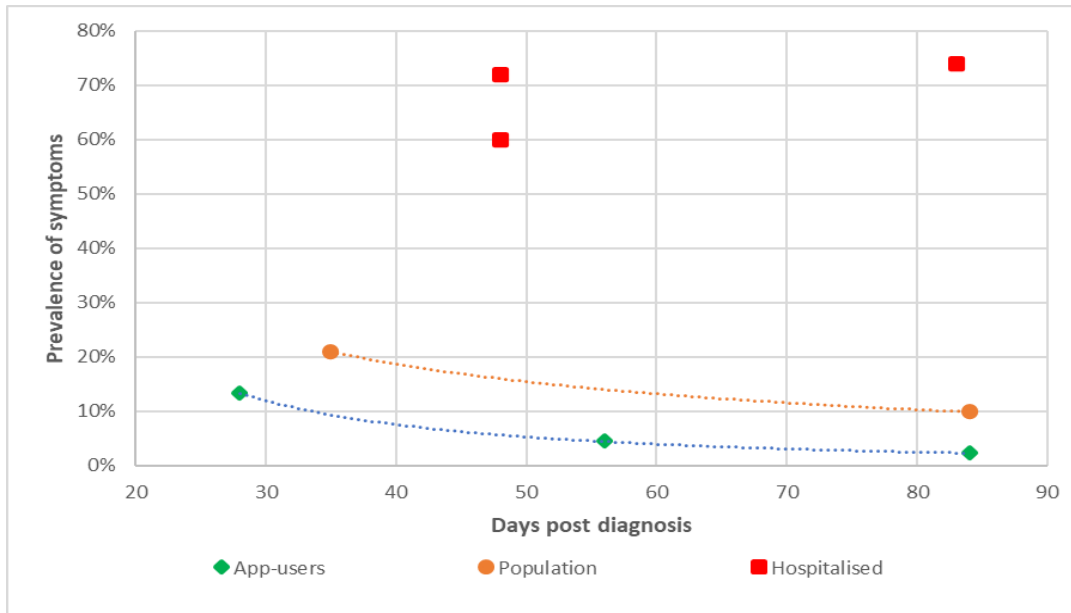
Population Impact

- Estimating disease burden

Possible pathways of care where long COVID can emerge

Population Impact

- ## Estimating disease burden
  - ### Estimating prevalence by symptoms

Symptom prevalence across studies identified in the UK by duration and severity groups

Symptomatic Long COVID
- Group 2 & 3
- Hospitalised and Non

COVID injured
- Group 1
- Long tail of permanent injury
- Hospitalised

Population Impact

- ## Estimating disease burden
  - ### Estimating the QALY impact

Equation 1

$$\Delta Q_{COVID} = \sum_{\substack{Cohort=(symptomatic\ COVID, \\ COVID\ injured)}} \left(\sum_{t=0}^{t=time\ horizon} \frac{T_I * P_{Cohort,t} * (1 - U_{Cohort})}{365.25 * (1 + d)^{\frac{t}{365.25}}} \right)$$
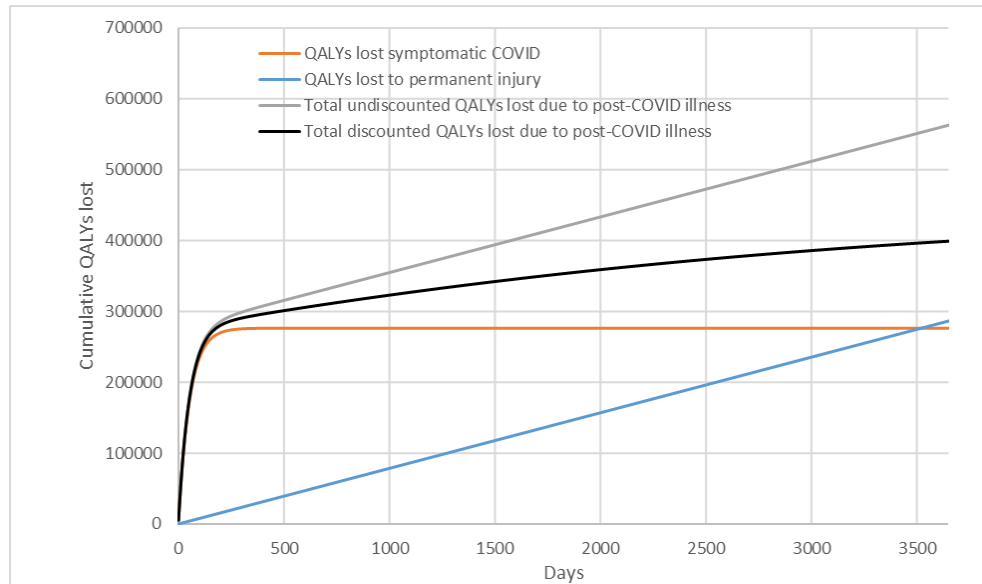
Where:

- ΔQ_{COVID} is the number of lost QALYs across the population as a result of COVID infection;
- t is the day with respect to time zero;
- T_I is the total number of people infected;
- $P_{Cohort,t}$ is the proportion of all infections that are symptomatic on day t;
- U_{Cohort} is the change in utility based on the quality-of-life index for a person who is symptomatic in each cohort; and
- d is the annual discount rate.

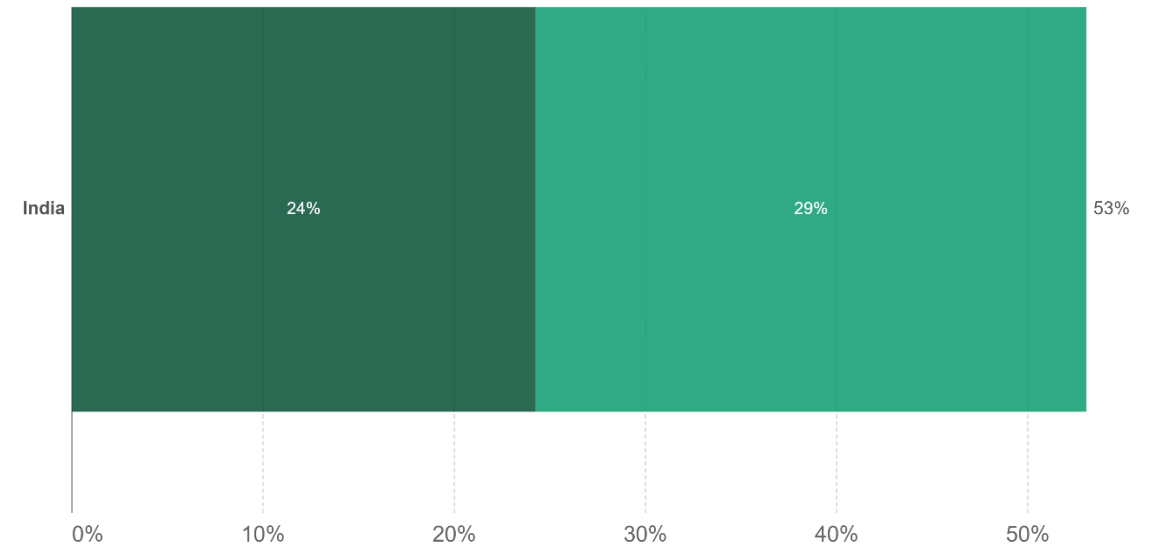# Population Impact

- Estimating disease burden

Cumulative lost QALYs for symptomatic COVID and permanent injury due to COVID

Societal Impact

- Intervention stages at each level of prevention

Tertiary prevention — Improved management of patients with established disease

Secondary prevention — Screening for asymptomatic early diseases

Primary prevention — Detection and management of risk factors for future disease

Primordial prevention — Actions to affect the systems which determine the risk factors of disease

Downstream → → → *Upstream*
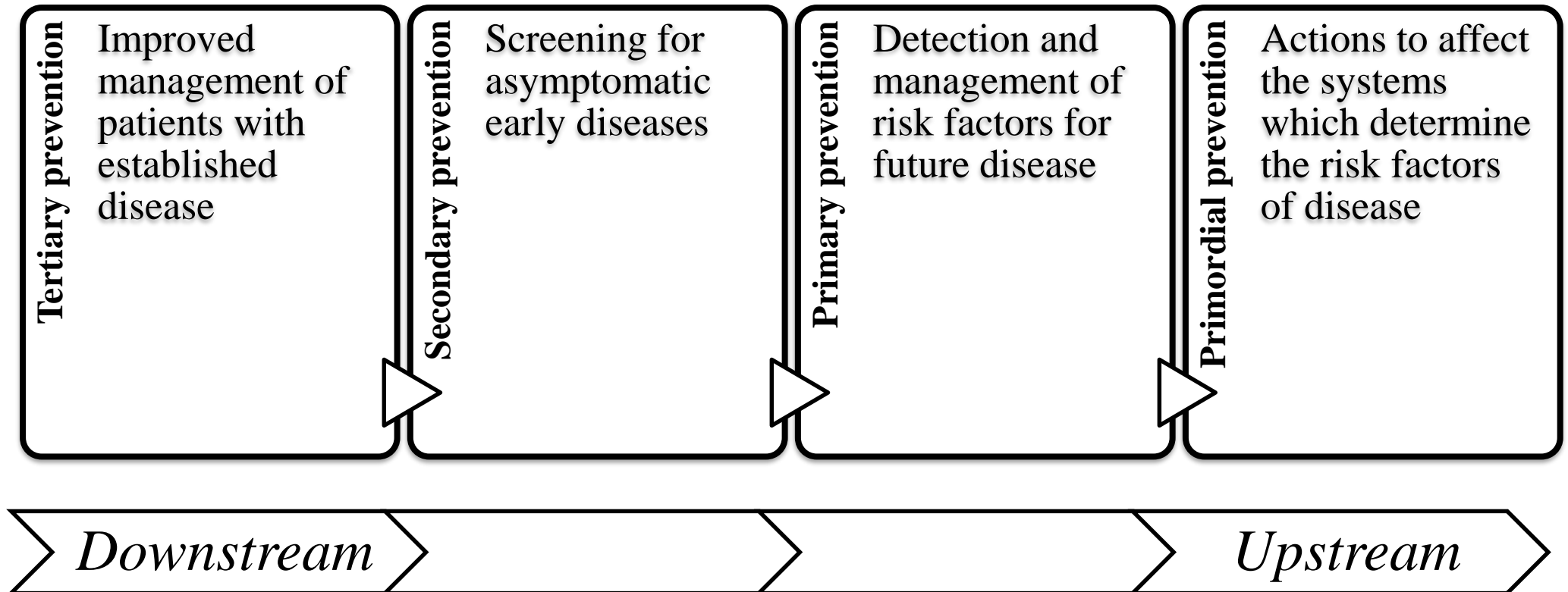
Long COVID - Insurance Perspective

Acute COVID-19

Signs and symptoms of COVID-19 for up to 4 weeks

Long COVID

Ongoing symptomatic COVID-19

Signs and symptoms of COVID-19 from **4 to 12 weeks**

Post COVID-19 syndrome

Signs and symptoms that develop during or after an infection consistent with COVID-19, continue for **more than 12 weeks** and are **not explained by an alternative diagnosis**

- The chances of developing long COVID <u>does not seem to be linked to severity</u> of the acute COVID infection
- Difficult to determine numbers … long COVID only recently started being recorded as a diagnosis in the UK and different studies use different definitions

As it is not understood what causes Long COVID there is not a diagnostic test for it; instead it is a diagnosis by exclusion. Similarly, treatment approach is determined by assessment and clinical judgement of the clinicians

Underwriting Implications

Treatment – Public Sector

National Health Service (NHS) - UK

- **NHS 111** – Assessing current COVID symptoms.
- **NHS Primary Care GP**
  - Still experiencing symptoms 4 weeks after a positive Covid-19 test, contact your GP.
  - Typically involve an initial consultation to understand symptoms and their impact.
  - Could result in a referral to the **Long COVID specialist rehabilitation service**
- **Dedicated NHS COVID Recovery website** –
  - One-stop portal for all COVID recovery and self-help support.
  - **For Long COVID, drives people to see their GP and from there to the Long COVID service**
- **NHS Long COVID Rehabilitation Services**
  - **A**vailable by GP referral only if still experiencing symptoms of COVID-19 beyond 12 weeks.
  - Appointments available virtually and face to face.
  - Patients undergo a number of physical, cognitive and psychological assessments.
  - Support plan to improve health outcomes / quality of life.
  - Signposted to existing Long COVID support services and will have access to the 'Living with COVID' App, offering patients education, support and encouragement.
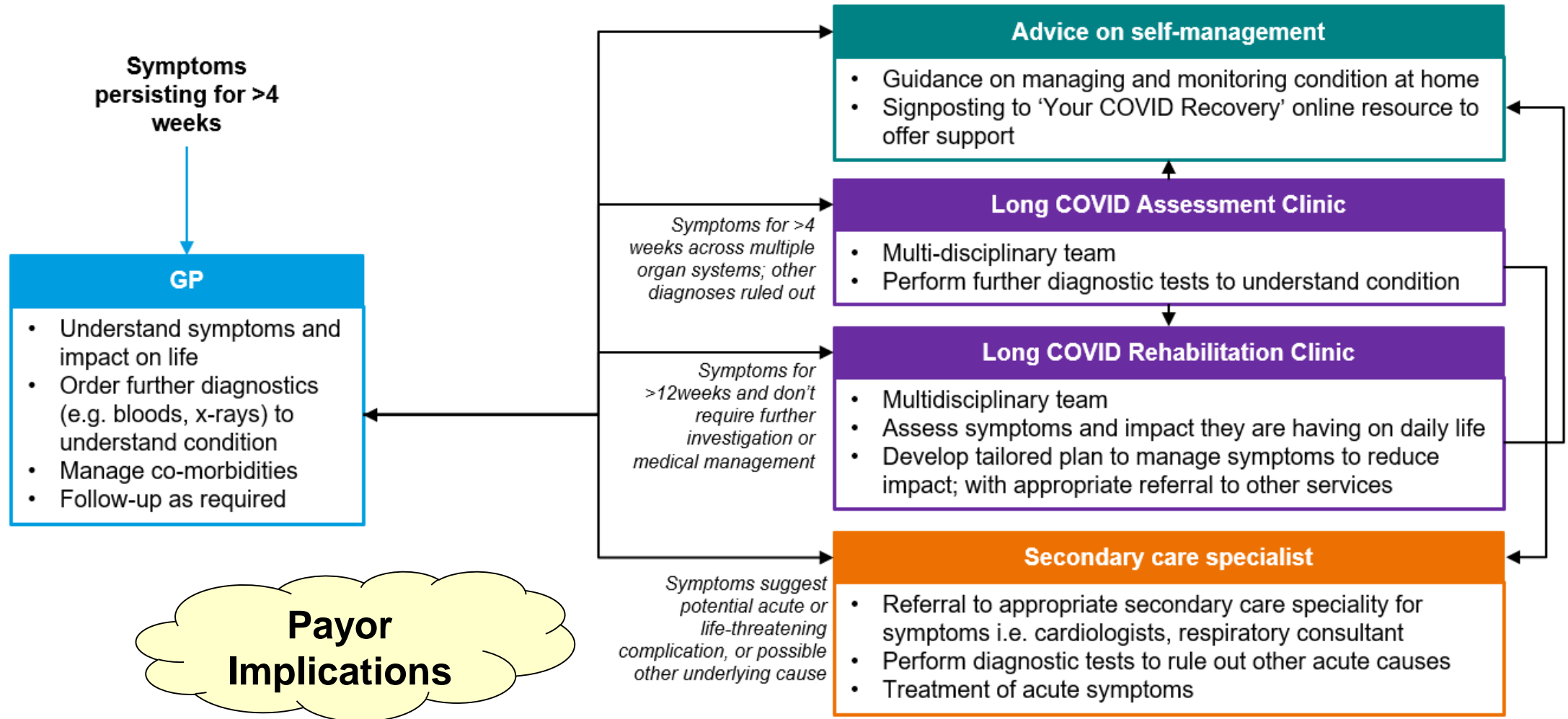- **90 Clinics today in England**

Treatment – Private Sector

Payor Implications

	Private sector - UK
Initial consultation	• **Private GPs.** An emerging number of private providers marketing long COVID consultation, investigation and tailored treatment services • **Hospital A.** Long COVID Clinic offers consultation, diagnostics tests and referrals to appropriate services • **Hospital Group B** offers a Post COVID Recovery Service; consultation, range of diagnostic tests plus referral to physio rehab service
General tests and investigations	
Specialist investigation	**Standard private provision**
Self management	n/a
Rehabilitation	• **Clinic Network C** – offering 12 week rehab programme triaged online by a Nuffield Physio. Access to rehab specialist virtually with home exercises, then referral to Nuffield gym. Plus weekly emotional support calls. • **Hospital Group D (Birmingham) -** marketing tailored, consultant-led rehabilitation programmes
Management of acute condition	**Standard private provision**

Paying for Long COVID
Diagnosis, treatment and management

How Many People Are Affected?

- Some **NHS** sources state **20-30%** have at least one ongoing symptoms by 4 weeks and **10%** by 12 weeks

- A study by **Imperial College** reported in June 2021 found c.**6%** of study participants reporting at least one of 29 symptoms linked with COVID-19 for 12 weeks or more

  - A rapid drop off in proportion of people with symptoms was observed after four weeks, with a smaller drop by 12 weeks. Little change was seen in proportion of people experiencing symptoms between 3 months and 5 months

- In October, the **ONS** reported an estimated **1.1 million** people living in the UK were experiencing self-reported long COVID symptoms

  - **77%** (831,000) had been experiencing their symptoms **for at least 12 weeks**, **and 37%** (405,000) had been experiencing the symptoms for **at least a year**

- Potential difference in exposure between insured and general populations – assumed to be lower in insured due to socio-demographic factors

- Exposure does not always translate into costs due to self-management or failure to seek further treatment

- Kings College London study … **vaccination can half the chance** of someone with acute COVID developing long COVID

Uncertainty for Insurers

Consider Underwriting Implications of Vaccines?

Insurance Policy Implications

This will vary from insurer to insurer but some general thoughts:

- There may be a **pandemic exclusion**

- **Complications** arising following COVID are **typically eligible** unless specifically excluded or covered by pandemic exclusion

- Coverage for all **acute condition/symptoms**, subject to the insurer's rules around **referral** (eg may require **pre-authorisation)** and the referral specifically requires **secondary care**.

- **Claims risk exposure along the claims pathway whilst alternative, eligible diagnoses are being ruled out**, and for treatment of acute conditions.

- **After a Long COVID diagnosis** the expected treatment and monitoring **may not be eligible**

- Typically **higher frequency, low severity events**
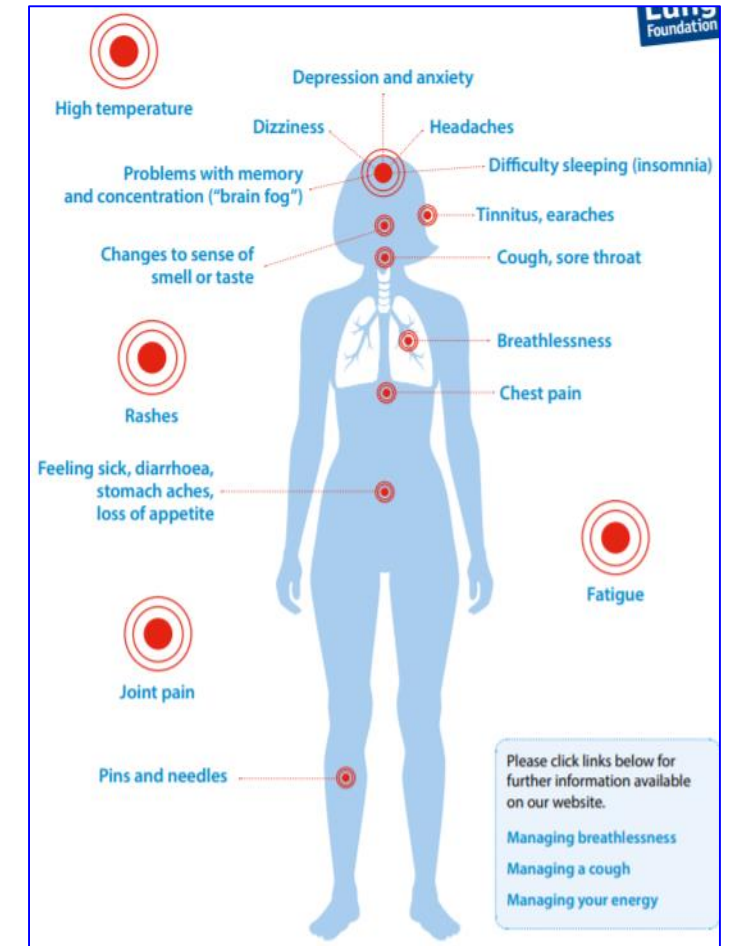
Underwriting Considerations

BUT …

- Chance that treatment for long COVID **remains undiagnosed** especially for those that were **asymptomatic**

- Difficulty of predicting **who will be at future risk** for long COVID

- In the absence of a Long COVID diagnosis, high prevalence of ("short") COVID in population makes **full exclusion unrealistic** for most insurers unless after a market niche as it will exclude too big a market

- Understanding of COVID-19, it's long-term consequences, and best practice for **diagnosing and managing these is still evolving** making it difficult to predict long term exposure

- If Long COVID were to be excluded:

  - It is **very challenging to identify if a claim** is related to a complication of COVID or other condition.

  - Even if the long-term effects were excluded, **additional costs may still be incurred by consultations/ diagnostics until the root cause** of the symptom is established

- A number of **private providers are marketing long COVID packages** which risks driving private demand … however, conversely this would **make claim identification easier**

Given the high frequency / low severity nature … and data challenges … COMMUNITY RATE THE IMPACT

Questions