Office for Health
Improvement
& Disparities

Post-Covid-19 syndrome
London region

Health Needs Assessment of Post-COVID-19 syndrome in London

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Content

- Case definition

- Scale of the problem - impact of post-COVID-19 syndrome

- Post-COVID-19 cases in London – breakdown compared with population share

- Population characteristics- – modifiable and non modifiable risk factors (evidence reviews)

- Distribution of risk factors in London

- Clinical and cost-effective services (evidence reviews)

- Service provision – NHS post-COVID-19 services

- Conclusion

- Recommendations

- Bibliography

- Appendix

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Key questions

In view of health needs assessment- we have asked the following questions:

1. What is case definition of post-COVID-19 syndrome? How COVID-19 has impacted London?

2. Situational analysis: how many Londoners develop post-COVID-19 syndrome, how is it distributed across ICSs benchmarked against regions? What is data telling us? Who needs the service? What is the disease epidemiology and population characteristics of post-covid-19 cases? How are risk factors distributed in London population?

3. Evidence reviews: What are the clinical and cost –effective interventions of post-COVID-19 syndrome?

4. What are NHS post-COVID-19 services? How many people we expect to access the treatment centres?

5. How many have accessed the service? Is the provision of service equitably distributed?

6. What are the experiences of other stakeholders in the prevention and management of post-COVID-19?

7. Recommendations (understanding current need, which population should be targeted)

What is the case definition of post-COVID-19 syndrome?
How coronavirus infection has impacted London?

Case definition

- Post-COVID-19 syndrome (known colloquially as Long COVID) is a recognised sequela of acute COVID-19 infections. Occurring irrespective of age, co-morbidities, hospitalisation or severity of infection, it is used as an umbrella term to reflect a multitude of ongoing, wide ranging and fluctuating symptoms and can include (but is not limited) to breathlessness, chronic fatigue, "brain fog", anxiety and stress.

- The definition of post-COVID syndrome by National Institute of Clinical Excellence is based on duration of symptoms but takes no account of severity and complexity – which will vary between patients.

- **Acute COVID-19**: signs and symptoms of COVID-19 lasting for up to 4 weeks

- **Ongoing symptomatic COVID-19**: signs and symptoms of COVID-19 from 4 weeks up 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.

Post-COVID-19 syndrome is characterised by a variety of symptoms that can change over time and can affect different organs.

Over view- direct and indirect impact [1]

The COVID-19 pandemic has both highlighted and exacerbated existing health inequalities in London by disproportionately affecting non-white British communities, those living in deprived areas, the elderly, certain occupational and inclusion health groups, residents of care homes, individuals with learning disabilities, and people with comorbid conditions, such as, obesity. It is essential that post-COVID-19 services in London work to reduce inequalities in access to services and health outcomes by delivering services that are appropriate, equitable, clinically effective, and address population specific need

Rates of COVID-19 infection were highest in Black ethnic groups (486 in females and 649 in males, per 100,000 population) compared to other groups. COVID-19 has had a disproportionate impact on BAME communities [PHE report]. The mortality rate for people with learning disabilities linked to COVID-19 is reported to be 2.3 times the rate in the general population (in the reporting period February to 5 June 2020) [PHE report]

Greater London experienced greatest direct health impacts of COVID-19 infection

- London had the **highest rate of deaths** to April 2021 once population size and age were taken into account; it also had the greatest QALY losses from death and morbidity

- It experienced relatively lower reductions in elective and outpatient activity than other regions, though the **drop in emergency activity** in Greater London was **greater** than most regions (28.4% reduction compared to median of 24.9%)

- People in the **most deprived socioeconomic** groups have experienced **greater adverse health impacts** in almost all categories of harm for which we could consider deprivation

- From March 2020 to April 2021, the **mortality rate in the most deprived quintile** after controlling for age and population size was almost **double** that of the least deprived quintile (264.6 deaths per 100,000 people and 140.4, respectively)

Direct and Indirect health impacts of COVID-19 in England – 17th September 2021

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Situational analysis:
Post-covid-19 syndrome cases -London picture

London demographic

Not all people have the same risk of being infected with Covid-19 (3), and not all people have the same risk of experiencing Long Covid (4). Variation exists in population in disease severity, mortality and prevalence of post-covid-19 syndrome.

Population size

The population of London is estimated to be just over 9 million people in 2020. London makes 13.5% of England's population. 40.2% of residents identified with either the Asian, Black, Mixed or Other ethnic group. Higher proportion of the population is aged 16 to 44 years compared with the rest of the UK.

By gender, females make up of 52% of the London's population while the remaining 48% are males. London is a multi-racial city. 59.8% out of the total population are White, 20.9% of the London comprise of Asians and 15.6% are of Black and mixed-black ancestries

In London, 300+ languages are spoken, among which English is spoken by 77.9% of population as their first language. Some of the population is unable to speak English language

Socioeconomic picture

Levels of deprivation vary across London. There are wide inequalities between the most and least deprived areas in London. According to the IMD2019, three London Boroughs are ranked in the most deprived three deciles (Hackney, Haringey and Kensington and Chelsea)

(3) Drivers of the higher COVID-19 incidence, morbidity and mortality among minority ethnic groups, 23 September 2020 SAGE
(4) Short repot on Long covid

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How many Londoners develop post-COVID-19 syndrome ICSs breakdown benchmarked against regions

England region analysis: London has second least share of cases; Midlands has the highest, however all factors aren't equal so age distribution and other factors which do influence incidence aren't the same between regions; so there will be differences not captured by a simple comparison between different regions.

London region analysis: North west London shares the highest burden of cases compared to the other ICSs – whereas North Central the least. Data should be treated with caution. Variation exists in population size, demographic (age, gender and socioeconomic statuses)

England regions	Number (05.12.2021 to 13.02.2022)	Percentage share (05.11.2021-13.02.2022)
Midlands	91,905	22.76%
Yorkshire and Humber	49,955	12.37%
South West	60,945	15.09%
South East	54,390	13.47%
North West	35,155	8.70%
London	33,010	8.17%
North East	30,285	7.50%
East of England	48,000	11.89%
Total	403,645	

London ICS breakdown	Number (05.12.2021-13.02.2022)	Percentage share by region (05.12.2021 – 13.02.2022)
South West London	6,095	18.46%
South East London	6,005	18.19%
North Central London	5,670	17.17%
North West London	8,340	25.26%
East London	6,900	20.90%
Total	33,010 cases	

Post acute covid powerbi using nowcast - Power BI

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Breakdown and percentage share of post-COVID-19 cases in London region (December 2021 to February 2022)

New post-COVID-19 cases by Local authority
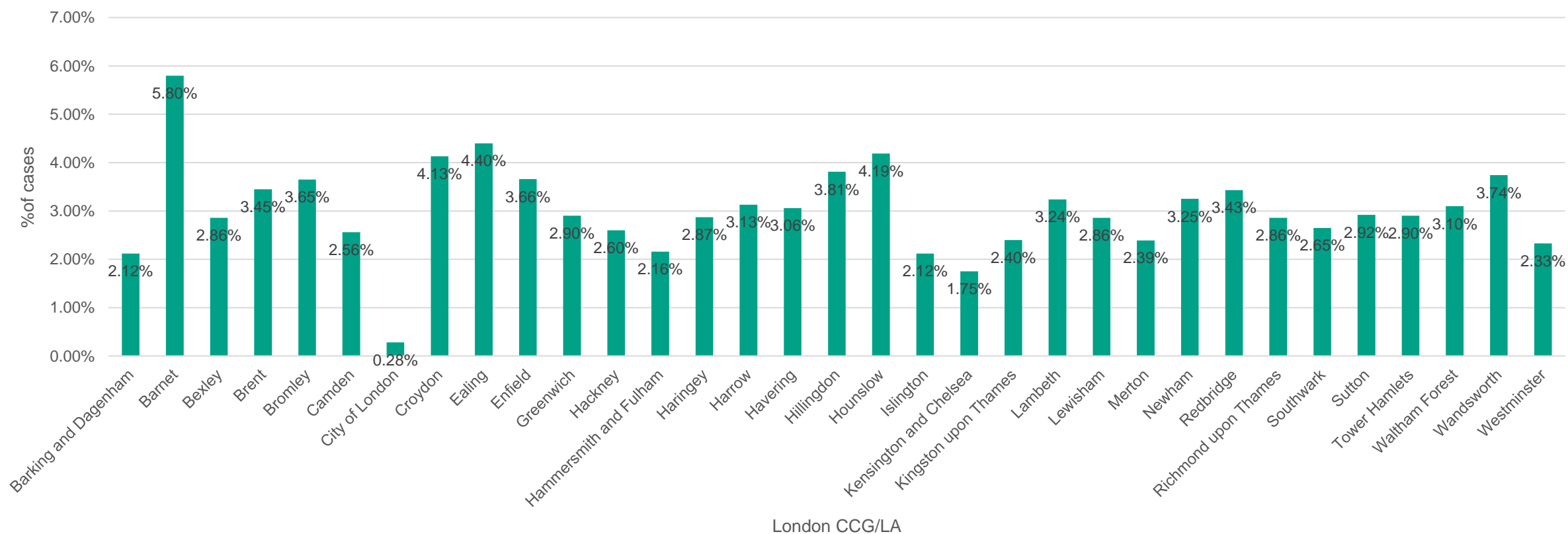
How many Londoners develop post-COVID-19 syndrome
Breakdown compared with population share November 21- February 2022

UTLA	Long Covid predicted incidence (05.12.2021 - 13.02.2022)	LA population ONS data set 2021 projection	Percentage of LA population with Long Covid ONS data set 2021 projection	Percentage share of region population ONS data set 2021 projection	Percentage of total Long Covid for region	Difference between share of population and share of Long Covid in region*
Barking and Dagenham	700	215,836	0.32%	2.37%	2.12%	-0.25%
Barnet	1,915	403,015	0.47%	4.43%	5.80%	+1.37%
Bexley	945	250,759	0.37%	2.75%	2.86%	+0.11
Brent	1140	337,289	0.33%	3.70%	3.45%	-0.25
Bromley	1,205	336,488	0.35%	3.69%	3.65%	-0.04%
Camden	845	275,541	0.30%	3.02%	2.56%	-0.46%
City of London	95	8,776	1.08%	0.09%	0.28%	+0.19%
Croydon	1,365	388,903	0.35%	4.27%	4.13%	-0.14%
Ealing	1,455	340,452	0.42%	3.74%	4.40%	+0.66%
Enfield	1,210	336,243	0.35%	3.69%	3.66%	-0.03%

Please note: Red is more than population percentage; Green is less than population percentage and Amber is the same as population percentage.

How many Londoners develop post-COVID-19 syndrome
Breakdown compared with population share Nov 2021- Feb 2022

UTLA (in rank order for percentage of total Long Covid for London region	Long Covid predicted incidence (05.12.2021 - 13.02.2022)	LA population ONS data set 2021 projection	Percentage of LA population with Long Covid ONS data set 2021 projection	Percentage share of Region population ONS data set 2021 projection	Percentage of total Long Covid for region	Difference between share of population and share of Long Covid in region*
Greenwich	960	295,947	0.32%	3.25%	2.90%	-0.35%
Hackney	870	288,421	0.30%	3.17%	2.60%	-0.57%
Hammersmith and Fulham	715	190,732	0.37%	2.09%	2.16%	-0.57%
Haringey	950	272,588	0.23%	2.99%	2.87%	-0.12%
Harrow	1,035	251,095	0.41%	2.76%	3.13%	+0.37%
Havering	1,010	263,897	0.38%	2.90%	3.06%	+0.16%
Hillingdon	1,260	311,126	0.40%	3.42%	3.81%	-0.24%
Hounslow	1,385	273,878	0.50%	3.01%	4.19%	+1.18
Islington	750	246,536	0.30%	2.71%	2.12%	-0.59%
Kensington and Chelsea	580	156,231	0.37%	1.71%	1.75%	+0.04%

Please note: Red is more than population percentage; Green is less than population percentage and Amber is the same as population percentage.

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How many Londoners develop post-COVID-19 syndrome
Breakdown compared with population share Nov 2021 – Feb 2022

UTLA (in rank order for percentage of total Long Covid for London region	Long Covid predicted incidence (05.12.2021-13.02.2022)	LA population ONS data set 2021 projection	Percentage of LA population with Long Covid ONS data set 2021 projection	Percentage share of Region population ONS data set 2021 projection	Percentage of total Long Covid for region	Difference between share of population and share of Long Covid in region*
Kingston upon Thames	795	178,691	0.44%	1.96%	2.40%	-1.96%
Lambeth	1,070	331,045	0.32%	3.63%	3.24%	-0.39%
Lewisham	945	310,816	0.30%	3.14%	2.86%	-0.28%
Merton	790	206,639	0.38%	2.27%	2.39%	+0.12%
Newham	1,075	361,726	0.29%	3.97%	3.25%	-0.72%
Redbridge	1,135	306,432	0.37%	3.36%	3.43%	+0.07%
Richmond upon Thames	945	199,795	0.47%	2.19%	2.86%	+0.67%
Southwark	875	326,899	0.26%	3.59%	2.65%	-0.94%
Sutton	965	208,027	0.46%	2.28%	2.92%	+1.92%
Tower Hamlets	985	338,239	0.29%	2.9%	2.90%	0%
Waltham Forest	1,025	281,829	0.36%	3.10%	3.10%	0%
Wandsworth	1,235	334,048	0.37%	3.74%	3.74%	0%
Westminster	770	267,521	0.29%	2.33%	2.33%	0%

Please note: Red is more than population percentage; Green is less than population percentage and Amber is the same as population percentage.

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Population characteristics

What are the risk factors of post-COVID-19 syndrome

Evidence reviews: What is the disease epidemiology and population characteristics of post-covid-19 syndrome?

Non modifiable risk factors	Modifiable risk factors
Age: Moderate to good evidence to support the finding that working age individuals are the most likely to experience Long COVID, which has negative implications for the workforce and wider economy. The prevalence of Long COVID was greatest in those aged 35-69 years, with 1 in 2 individuals with Long COVID reporting their work lives being affected compared with 1 in 3 individuals without COVID-19 ONS (2021)	**Hypertension and Comorbidities:** Moderate to good evidence to support that hypertension was the most common comorbidity with prevalence ranging from 15% (Townsend et al., 2021) to 41.9% (Mandal et al., 2021). Another study indicate diabetes, hypertension and high cholesterol all have an increased odds ratio for Long Covid symptoms at 4 weeks post infection however some of these results are not statistically clear
Gender: According to the ONS (2021), the percentage of people with self-reported Long COVID was greatest in females. Moderate to good evidence to support the finding that women are more at risk of Long COVID. Gaber et al. (2021), Taylor et al. (2021) and Sykes et al. (2021) all demonstrated a higher symptom burden in women compared to men. More specifically, Townsend et al. (2020) found that a greater proportion of those with severe post-COVID-19 fatigue were female (67.2%). **Analysis:** *Caution to be observed as women are more likely to present symptoms males. Results should be interpreted with caution given the disproportionate number of female App users*	**Obesity:** Overall, obesity is an established risk factor not only for severity of disease and mortality but also increased risk of Long COVID. Whitaker and colleagues in the REACT study, reported that persistent, Long COVID symptoms were more common in people who were overweight/obese
Ethnicity: Data on ethnicity and Long COVID symptoms is nuanced, with some studies reporting lower rates of Long COVID symptoms in individuals with a non-white ethnic background (Whitaker et al.; ONS, 2021), whilst other studies found that individuals from ethnic backgrounds were more likely to be hospitalised with COVID-19 and more likely to be re-admitted, die or, present with new multimorbidity's following discharge (Ayoubkhani et al., 2021). **Analysis***: Variation in the data may be explained by the health inequalities in accessing healthcare, access to Long COVID clinics and services and provision of quality care to those from ethnic minority background*	**Mental health:** There is increasing evidence to support poor mental health as being part of the Long COVID syndrome (Halpin & McIvor et al., 2020; Naidu et al., 2021). Efforts to screen patients for mental health sequelae – which may include anxiety or depression, in addition to more complex issues such as PTSD or suicidal ideation – may be effective means of identifying the needs of patients with Long COVID (Sykes et al., Taylor et al., Gaber et al.)

Prevalence and distribution of risk factors and disease epidemiology in London and ICSs

Prevalence of obesity in London region by ICS[3]
Prevalence of obesity in London and its ICSs is lower than national average (Fingertips 2019/20) however the trend on the increase. There also exist variation among ICSs

Prevalence of hypertension in London region by ICSs[4]
The table below shows the prevalence rate distribution of hypertension in London ICSs (2019/20)

Estimated incidence of new cases in London region by ICSs
The table below indicates the distribution of type 2 diabetes in London

Area Name	Obesity
England	10.51
London NHS Region	8.45
East London ICS	**9.90**
South East London ICS	**8.88**
North London ICS	8.6
North West London ICS	7.6
South West London ICS	7.14

Area Name	HTN prevalence
England	14.0
London NHS Region	11.01
South East London ICS	**11.45**
North London ICS	**11.44**
North West London	11.04
East London ICS	10.61
South West London ICS	10.56

Area Name	Diabetes
England	TBC
London NHS Region	TBC
East London ICS	TBC
South East London ICS	TBC
North London ICS	TBC
North West London ICS	TBC
South West London ICS	TBC

Analysis:
- East London ICSs have higher prevalence of biomedical risk factors (obesity and hypertension) compared to London average
- It may also mean that there is better diagnosis of hypertension and obesity in these ICSs indicating higher disease prevalence
- Diabetes data TBC

3, 4 PHE fingertips data

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Understanding population need

Who is at risk? What is the distribution of risk factors in London? Which population should be targeted?

Prevalence and distribution of risk factors in London and ICSs Initial analysis:

Prevalence of obesity in London region by ICS [3]
Prevalence of obesity in London and its ICSs is lower than national average (Fingertips 2019/20) however the trend on the increase. There also exist variation among ICSs

Area Name	Obesity
England	10.51
London NHS Region	8.45
East London ICS	**9.90**
South East London ICS	**8.88**
North London ICS	8.6
North West London ICS	7.6
South West London ICS	7.14

Prevalence of hypertension in London region by ICSs [4]
The table below shows the prevalence rate distribution of hypertension in London ICSs (2019/20)

Area Name	HTN prevalence
England	14.0
London NHS Region	11.01
South East London ICS	**11.45**
North London ICS	**11.44**
North West London	11.04
East London ICS	10.61
South West London ICS	10.56

Estimated incidence of new cases in London region by ICSs [5]
The table below indicates the distribution of estimated number of post-covid-19 cases in London overall and ICSs. Variation exists in the distribution of post-covid-19 cases in London.

London ICS breakdown	Number 05.12.2021-13.02.2022	Percentage share by region (05.12.2021 – 13.02.2022)
South West London	6,095	18.46%
South East London	6,005	18.19%
North Central London	5,670	17.17%
North West London	**8,340**	25.26%
East London	**6,900**	20.90%

Analysis :

- East London ICSs has second highest incidence of new cases, and higher prevalence of obesity compared to London average. Whereas there is better prevalence on hypertension. Further analysis into the hypertension prevalence gap is recommended
- Northwest London has the highest number of post-covid-19 syndrome patients however obesity and hypertension prevalence is better than London average. Data should be treated with caution: It may "also" mean that there is under diagnosis of hypertension and/or obesity in the Northwest ICS

3, 4 PHE fingertips data   5. PHE situational report modelling data

Evidence reviews:
Clinical and cost-effective interventions

What are the clinical and cost effective interventions of post-covid-19 syndrome?

Evidence reviews

- There is paucity of evidence for clinical and cost effective service for the treatment and management of post-COVID-19 syndrome.

- COVID-19 is a multisystem disease, certain cases will require full multidisciplinary team (MDT) rehabilitation to enable recovery.

- In the absence of high-quality clinical evidence, the consensus is to manage patients with post-COVID-19 syndrome pragmatically and symptomatically undertaking rehabilitative treatments for organ specific symptoms - treat the whole array of symptoms acknowledging the heterogeneity of these whilst evidence is gathered.

- The novel disease has presented significant challenges in determining the optimal management and monitoring of patients, during a patient's recovery. Appropriate assessment of holistic needs, and provision of rehabilitation care is vital to support the recovery of patients impacted by post-COVID-19 syndrome and this includes supporting and rehabilitating patients in their return to work (Vocational Rehabilitation).

Guidance and consensus statements

The novel disease has presented significant challenges in determining the optimal management and monitoring of patients, during a patient's recovery. Appropriate assessment of holistic needs, and provision of rehabilitation care is vital to support the recovery of patients impacted by post-COVID syndrome and this includes supporting and rehabilitating patients in their return to work (Vocational Rehabilitation).

- The National Institute of Healthcare and Excellence (NICE) has produced guidance on the treatment and management of post-COVID-19 syndrome

- The Faculty of Intensive Care put together a position statement and provisional guidance in the recovery and rehabilitation of patients after the pandemic

- The Royal College of Occupational Therapists published three guides to support people to manage post-viral fatigue and conserve their energy as they recover from COVID-19 (a) practical advice for people who have been treated in hospital, (b) practical advice for people who have recovered at home, (c) practical advice for people during and after having COVID-19 respectively

- The Chartered Society of Physiotherapy have also updated their rehabilitation standards

NHS post-COVID-19 service uptake Referrals and assessment

How many people we expect to access the treatment centres? How many have accessed the service? Is the provision of service equitably distributed?
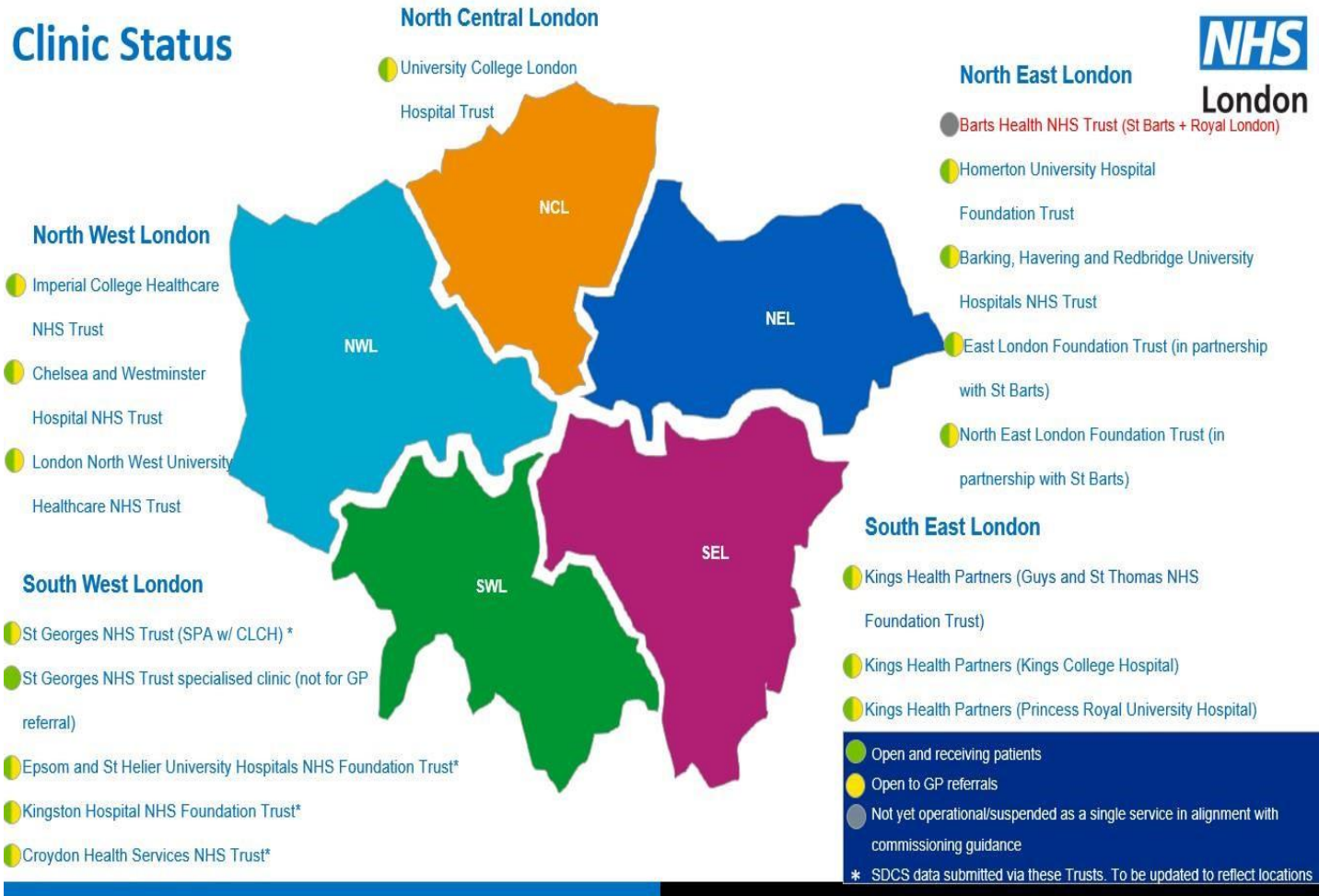
NHS post-COVID-19 services in London

In total there are 18 centres in London. In South West London the clinics submit data via these Trusts but are not their actual locations. There is also a pan-London CYP clinic run virtually and led between Imperial, UCLH and Evelina at present

The enhanced service specification for Long Covid (clause 7.3) requires Practices to consider how they can reduce 'potential inequity of access to Long COVID services' by potentially working with Patient Participation Groups (PPGs) and system partners, and to 'understand potential barriers to support'.

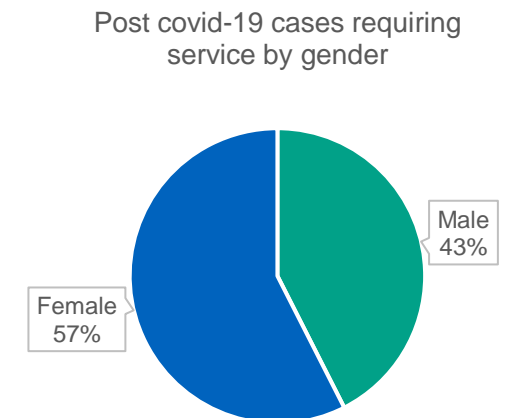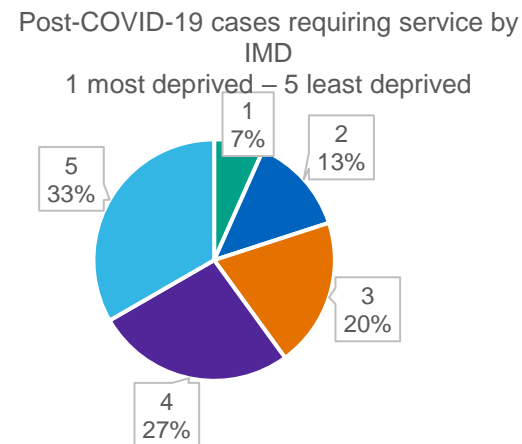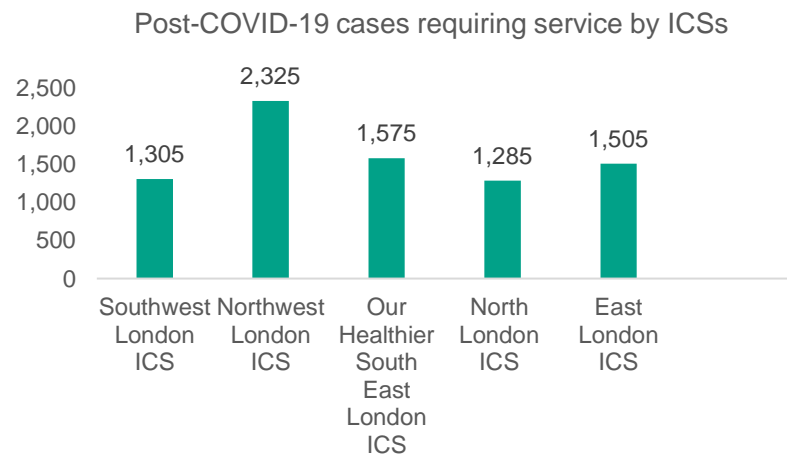Proactive case finding presents an opportunity for a whole system approach.

National guidance highlights the potential role of Social Prescribing professionals and outreach teams/initiatives in identifying and reaching patients not presenting with Post COVID symptoms.

Clinic Status

North Central London
- University College London Hospital Trust

North West London
- Imperial College Healthcare NHS Trust
- Chelsea and Westminster Hospital NHS Trust
- London North West University Healthcare NHS Trust

South West London
- St Georges NHS Trust (SPA w/ CLCH) *
- St Georges NHS Trust specialised clinic (not for GP referral)
- Epsom and St Helier University Hospitals NHS Foundation Trust*
- Kingston Hospital NHS Foundation Trust*
- Croydon Health Services NHS Trust*

North East London
- Barts Health NHS Trust (St Barts + Royal London)
- Homerton University Hospital Foundation Trust
- Barking, Havering and Redbridge University Hospitals NHS Trust
- East London Foundation Trust (in partnership with St Barts)
- North East London Foundation Trust (in partnership with St Barts)

South East London
- Kings Health Partners (Guys and St Thomas NHS Foundation Trust)
- Kings Health Partners (Kings College Hospital)
- Kings Health Partners (Princess Royal University Hospital)

- Open and receiving patients
- Open to GP referrals
- Not yet operational/suspended as a single service in alignment with commissioning guidance
- * SDCS data submitted via these Trusts. To be updated to reflect locations

Post-COVID-19 London picture
PHE modelling indicates that between April 21 – September 2021

- An estimated 7,975 new cases of post-COVID-19 syndrome in London

- PHE modelling indicates that North West London ICS has a higher incidence of cases

- The incidence of post-COVID-19 cases is higher amongst females compared to males

- Incidence of new cases is higher in less deprived quintiles (IMD 3-5)

Post-COVID-19 cases requiring service by ICSs

ICS	Cases
Southwest London ICS	1,305
Northwest London ICS	2,325
Our Healthier South East London ICS	1,575
North London ICS	1,285
East London ICS	1,505

Post-COVID-19 cases requiring service by IMD
1 most deprived – 5 least deprived

- 1: 7%
- 2: 13%
- 3: 20%
- 4: 27%
- 5: 33%

Post covid-19 cases requiring service by gender

- Male 43%
- Female 57%

The data should be treated with caution. It is complex to establish with certainty if variation in incidence is due to symptoms being more common in specific group, or due to equity of access or is it people from deprived areas are less likely to get Covid-19 tested due to socioeconomic implications e.g., employment loss

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Referrals and uptake of assessment clinics
## Demographic breakdown April 2021- September 2021

- The 16 London assessment clinics have received 5151 referrals between April-Sept. 4199 assessments have taken place

- There is higher uptake of post-covid-19 service in females compared to males. There is higher uptake of service from people from less deprived areas. Variation exists in the age distribution with higher uptake in ages between 44-64.


Service uptake: Male vs female breakdown
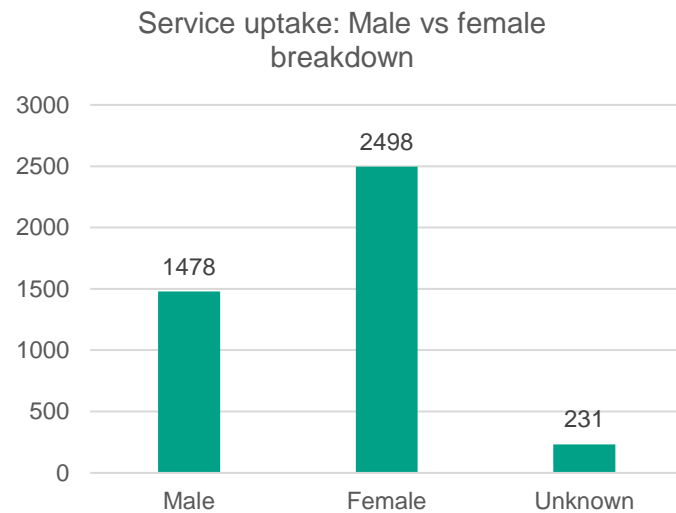
Service uptake: most deprived vs least
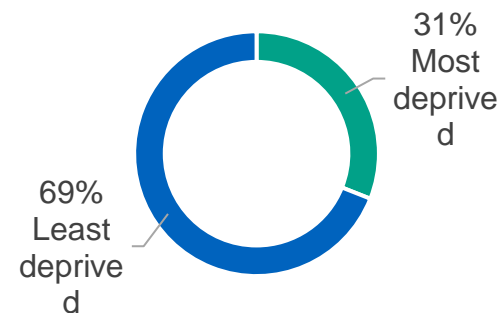
Age breakdown of patients receiving assessment
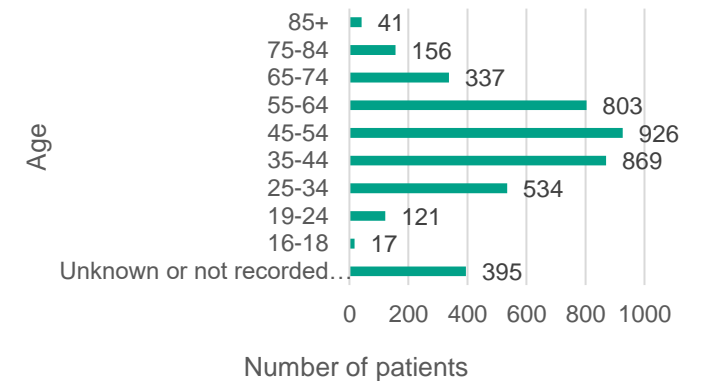
Analysis: *Data should be treated with caution for the quality of data is not fully affirmed. Moreover, the uptake of service is from working age group which is not a representative of entire population in need; females may have symptoms more defined than males or a proactive tendency of seeking healthcare compared to males.*

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London assessment clinics referrals

- Most accepted referrals come through Primary Care (67.7% in the latest September reporting period) followed by Secondary Care (inpatient and outpatient). See graph on right.

- Referrals were minimal or non-existent from: Asylum/refugee health services, Homelessness services, Mental health or Learning disability/Autism inpatient services and Prison service/criminal justice system.
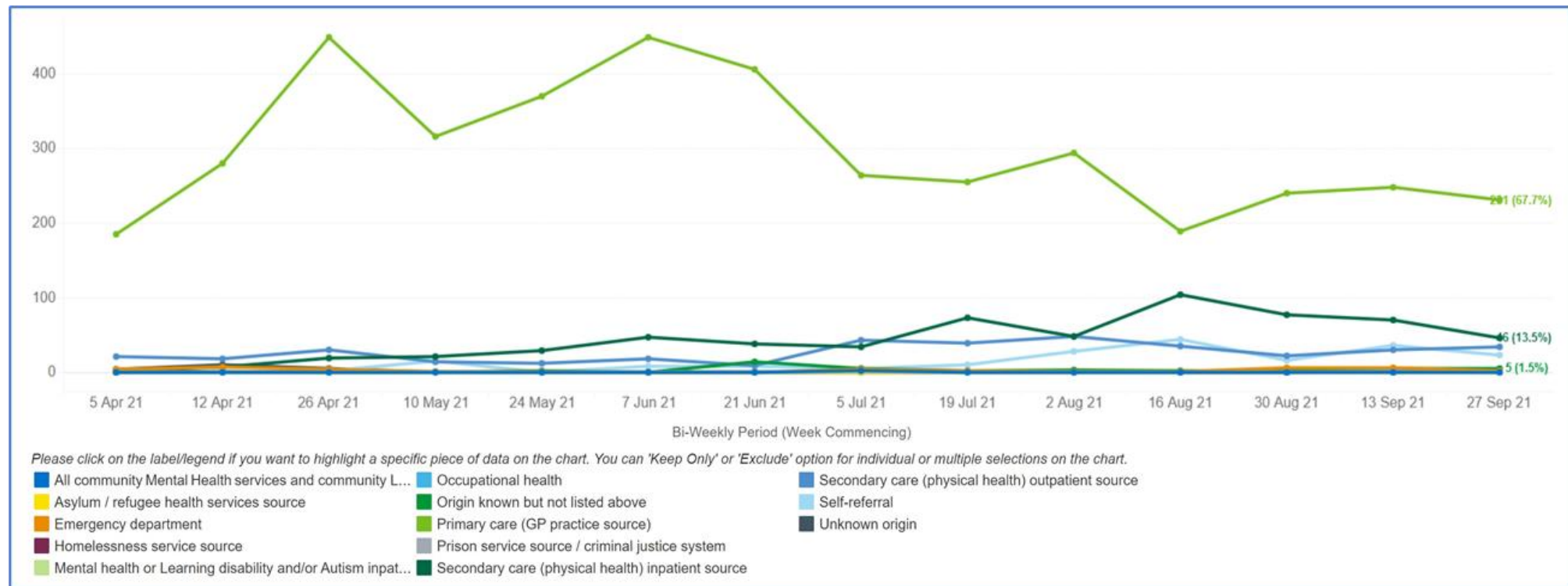
Conclusion

- The population of London is estimated to be just over nine million people. 40.2% of residents are identified as Asian, Black, Mixed or other ethnic group. The COVID-19 pandemic has highlighted and exacerbated existing health inequalities in London by disproportionately affecting the population.

- London has second lowest post-COVID-19 syndrome cases compared to other regions. There is variation in the distribution of post-COVID-19 cases in London. Northwest London ICS has the highest share of cases in the region.

- There is a geographic variation in the distribution and prevalence of post-COVID-19 syndrome risk factors. Population at higher risk are middle aged working class females; and population with pre-existing conditions such as obesity, hypertension, poor mental health.

- There is lack of ethnicity data for modelling post-COVID-19 cases. Although data is likely to be influenced primarily by age, sex and IMD profile of the population. Consideration should be given to ethnic makeup of population and the numbers of people who are in front line roles with greater risk of contracting Covid-19 e.g. health workers, police, prison staff, transport staff, care home workers.

- There is paucity of evidence of clinical and cost-effective services for the treatment and management of post-COVID-19 syndrome.

- There are 18 assessment centres in London.

- Post-COVID-19 syndrome is more prevalent in females than males. The uptake of post-COVID-19 service is higher amongst females than males

- The prevalence of post-COVID-19 cases is higher in less deprived areas (IMD 3-5). The service uptake is also higher in less deprived areas

- Only 52% of cases were assessed in post-COVID-19 assessment centres

- Common route of referrals is primary and secondary care; no referrals are made through community or other services.

- The service demand is unequally distributed. The access to the service is at the deep end of inverse care law.

Recommendations - what evidence tells us

- Undertake a health equity audit of the post-COVID-19 services (for example include mapping of existing services, referral pathways and activity, to identify needs not currently being met by the service model and modelling future service requirements. In addition systematically collect knowledge and views of clinical staff and service users)

- Further analysis is needed at a local level to understand the socio-economic factors which may lead to an increased incidence for Long COVID compared to other areas

- Data is likely to be influenced primarily by age, sex and IMD profile of the population. Consideration should be given to ethnic makeup of population and the numbers of people who are in front line roles with greater risk of contracting COVID-19 e.g. health workers, police, prison staff, transport staff, care home workers

- There is evidence that Long COVID could prevent people from returning to work. The Trades Union Congress called for the recognition of Long COVID as a disability and COVID-19 as an occupational disease in July 20216

- The British Medical Association called for Long COVID to be recognised as occupational disease in September 20217

- In March 2021, the World Health Organisation published its report "In the Wake of the Pandemic: Preparing for Long COVID", outlining how countries could develop policies to respond to Long COVID. They recommended action to address the wider consequences of Long COVID, such as employment rights, sick pay policies, and access to benefit and disability benefit packages.

- An Academy of Medical Sciences report also highlighted the need for equitable employment and educational support to reduce the risk of widening health inequalities.

6. TUC calls for long Covid to be urgently recognised as a disability to prevent "massive" discrimination | TUC

7 Covid-19: Long covid must be recognised as occupational disease, says BMA | The BMJ

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5. Covid situational awareness explorer Post acute covid powerbi using nowcast - Power BI

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7. Covid-19: Long covid must be recognised as occupational disease, says BMA | The BMJ

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Appendix

Modelling assumptions to consider when interpreting data

- The post COVID-19 cases requiring services is based on real-time data. PCR line list was extracted from PHE second generation surveillance system to inform the modelling

- The line list includes age, sex, deprivation quintile based on LSOA of residence

- Data is extracted since 30th August 2020 as PCR tests had reached sufficient levels. The modelling is estimated from November , 12 weeks later in line with National Institute of Healthcare and Excellence definition of post-COVID-19

- The model builds on logistic regression model provided by ONS. Accounting for sociodemographic factors, the model calculates the probability of developing post acute covid-19. We assume the probability continue to hold. This means, the effect of mass vaccination and changes to covid-19 treatment protocols have not ben included in the model

- In cases where age and sex are missing from line-list data, data is imputed based on previous distributions for that region

- Line list data is scaled to match the regional and age distributions in the nowcast estimated infections. In doing this, we assume that acquisition of cases is consistent between different genders and Index of Multiple Deprivation quintiles

- Health/disability status is estimated in the model based on population data. This assumes that the categories on which this data are available are representative of the categories used for the logistic regression, and that there are no biases in case acquisition and/or infection for these groups

- Those who require services are those whose activity is affected "a lot" by their post-COVID-19 symptoms

Post-COVID-19 syndrome model

Post Acute COVID-19 model - identifying initial need for services
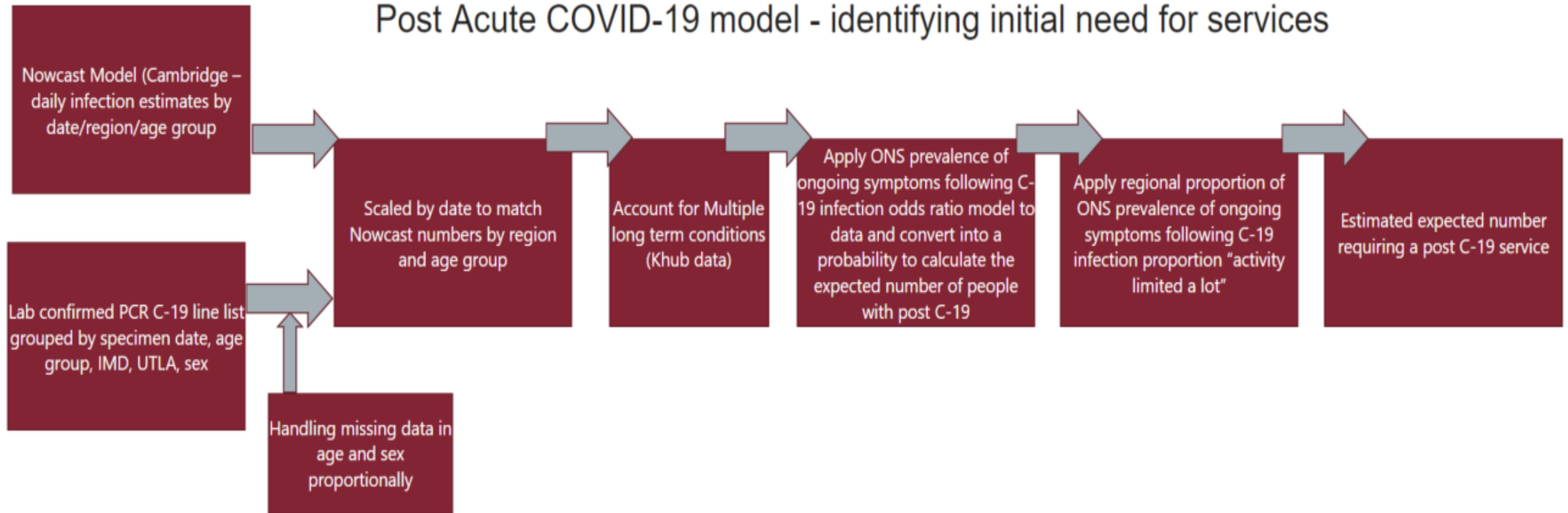
Model starts from 1st September 2020

Understanding the difference between PHE and NHS models

- The Oxford model uses a hospital admission to infection ratio as a parameter
  - they've found with the recent lower hospital admissions that the parameter is slightly off so are working to correct the model

- Aly's paper *(Aly et al., 2021, Nature paper,* https://www.nature.com/articles/s41586-021-03553-9*)* presents that Long COVID occurs in the vast majority in those with mild/moderate symptoms of COVID

- As the Oxford model takes into account hospital admissions this **may** help to explain why the NHS model has a lower number of post-COVID-19 cases than the PHE model.

- Tricky to ascertain all of the assumptions applied to both the Oxford and Cambridge models from currently published work.

- In the interim it may be recommended we consider both models as SAGE uses both the Oxford and Cambridge models in decision making

Limitations

- There are limitations to this work, and the numbers presented should be treated with caution. There is also a possibility that the denominator population may not include all the population or have an over estimation of the true number as this is a novel disease. The testing uptake by people may be oddly distributed across the region, and so masks the inequalities in infection rates between different groups and localities within the region

- Consideration should be given to the assumption, that the estimates for the number of patients with ongoing symptoms are likely to overestimate the demand for service, because a proportion may have recovered, some may have improving symptoms and some may have died during the course

- The evidence base is rapidly evolving so therefore caution should observed if some information appears less up to date

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Office for Health Improvement and Disparities

The Office for Health Improvement and Disparities (OHID) was established on 1 October 2021, and will work across DHSC, the rest of government, healthcare system, local government and industry to be creative about how we shift our focus towards preventing ill health, and in particular in the places and communities where there are the most significant disparities

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