

**ECONOMIST  
IMPACT**

# **An incomplete picture: understanding the burden of long Covid**



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# Contents

- 3** About this report
- 5** Executive summary
- 8** Introduction: medicine in the dark
- 12** What we do know is worrying: the impact of long Covid on patients
- 18** The prevalence of long Covid
- 21** Emerging good practice in care
- 25** A lack of integrated policy
- 28** Call to action: even in the darkness, some priorities are clear
- 30** Appendix A: Methodology
- 35** Appendix B: References
- 39** Appendix C: Country profiles

# About this report

This report, supported by Pfizer and created by Economist Impact, investigates the burden of long Covid globally and in eight countries of focus, analysing the societal, economic and health system challenges posed by this disease. The report examines national priorities and guidelines and the local healthcare system's response to long Covid and emphasises the need for multidisciplinary, patient-centred care provision and integrated policy frameworks to address long Covid. By researching the complexities of long Covid, this report serves as a resource for healthcare professionals, policymakers and stakeholders seeking to understand and address the multifaceted implications of this condition.

The Economist Impact team would like to thank the following individuals (listed alphabetically by country) for generously contributing their time and insights, which have been critical to the creation of this article.

- **Ziyad Al-Aly**, MD, Physician and Clinical Epidemiologist, Washington University in St. Louis (Global)
- **Jeromie Ballreich**, PhD, Associate Research Professor of Health Economics, Health Policy and Management, Johns Hopkins University (Global)
- **Philip Haywood**, MBChB, PhD, Associate Professor of Practice in Health Systems and Financing, University of Sydney (Global)
- **Julia Moore Vogel**, PhD, MBA, Long Covid Patient-Researcher, Patient-Led Research Collaborative; Senior Program Director, Scripps Research (Global)
- **Theo Vos**, MD, MSc, PhD, Professor Emeritus of Health Metrics Sciences, Institute for Health Metrics and Evaluation, University of Washington (Global)
- **Saulo Simoni Nacif**, MBA, MSc, Executive Director, Fundação Butantan (Brazil)
- **Carlos Roberto Ribeiro de Carvalho**, MD, PhD, Director, Pulmonology Division; Head of Respiratory Intensive Care Unit, Health Institute (InCor), Clinical Hospital of FMUSP (Brazil)
- **Pascal Crépey**, PhD, Professor, School of Advanced Studies in Public Health, Ecole des hautes études en santé publique (EHESP) (France)
- **Ho Namkoong**, PhD, Assistant Professor, Department of Infectious Disease, School of Medicine, Keio University (Japan)
- **Shuhei Nomura**, PhD, Associate Professor, Department of Health Policy and Management, School of Medicine, Keio University (Japan)
- **Shinya Tsuzuki**, PhD, Chief of Applied Epidemiology Division, Disease Control and Prevention Center, National Center for Global Health and Medicine (Japan)

- **Fayssal Farahat**, MD, MSc, PhD, Director, Community and Public Health, Infection Prevention and Control Program, Ministry of National Guard Health Affairs, Riyadh (Saudi Arabia)
- **Anas Khan**, PhD, Director-General, Global Centre for Mass Gatherings Medicine, Saudi Ministry of Health (Saudi Arabia)
- **Asociación Madrileña de Covid Persistente** - AMACOP (Spain)
- **Pablo Guisado Vasco**, MD, PhD, Physician, Department of Internal Medicine, Hospital Universitario Quirónsalud Madrid, Universidad Europea Madrid (Spain)
- **Tony Hsiu-Hsi**, PhD, Distinguished Professor, Institute of Epidemiology and Preventative Medicine, National Taiwan University
- **Yee-Chun Chen**, MD, PhD, Professor, College of Medicine, National Taiwan University Hospital, Taipei; Director, Infection Control Society of Taiwan (Taiwan)
- **Chih-Cheng Lai**, MD, Physician, Department of Internal Medicine, Chi Mei Medical Center (Taiwan)
- **Jean Tsai**, PhD, Director and Professor, Global Health and Health Security, Taipei Medical University (Taiwan)
- **British Medical Association** - BMA (UK)
- **Charles Shepherd**, MD, Trustee and Honorary Medical Adviser, Myalgic Encephalopathy (ME) Association (UK)
- **Helen Ward**, FRCP, FFPH, Professor of Public Health, Imperial College London (UK)
- **Katie Bach**, MBA, Board Chair, PolyBio Research Foundation (US)
- **David Cutler**, PhD, Otto Eckstein Professor of Applied Economics, Harvard University (US)
- **Bill Hanage**, PhD, Associate Professor of Epidemiology and Associate Director, Center for Communicable Disease Dynamics, Harvard University (US)
- **Lisa Sanders**, MD, FACP, Medical Director, Long Covid Multidisciplinary Care Center, Yale University (US)

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This research was managed by Miranda Baxa, supervised by Latifat Okara, and conducted by Alcir Santos Neto, Maria Clara Silva and Zhiqing Chen. The report was authored by Paul Kielstra and copyedited by Adam Green.

# Executive summary

Long Covid continues to exact a substantial health toll worldwide, the exact magnitude of which, however, remains unclear. The nature of the condition contributes to the lack of clarity. Long Covid is a blanket term covering hundreds of possible symptoms, which, although all ultimately arising from acute Covid infection, likely do not share a single post-Covid pathogenesis. Any of these sequelae\* may or may not affect a given patient. Meanwhile, the impact of the disease on those it affects ranges from mild to debilitating or even fatal. Researchers are working on numerous aspects of long Covid from diverse perspectives. However, the problem is so big and has existed for such a short time that such studies still resemble those of the blind men examining an elephant in the Indian parable: each can describe what they feel, but the beast remains an enigma.

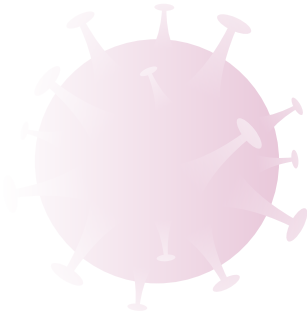
## Key findings

**Disparate views on how to describe and study long Covid continue to inhibit understanding.** To date, there is no generally accepted definition of long Covid. Due to the wide variation in long Covid manifestations and its relative novelty, several working definitions exist – with many specifying different symptomatology and time periods – and some

of these definitions do not encompass the experiences of all patients. The most cited definitions note that long Covid appears to have sequelae because symptoms arise after the acute phase, but the reason is still unknown. The lack of agreement on the wording of a definition reflects varied approaches to symptomatology and time frames used across long Covid-related medical records and research. Until these converge, it is impossible to aggregate the still limited information available to paint a complete picture of long Covid.

**Long Covid's physical symptoms suggest that it may represent a family of diseases, each capable of exerting a heavy individual burden.** Any overview of long Covid quickly turns into a list of statements with extensive qualifiers. The main risk factor for the condition is the severity of the original Covid infection. Still, even those with mild or asymptomatic cases may experience sequelae. Other risks include advanced age, female gender, a lack of vaccination when infected by Covid, unhealthy weight levels, regular smoking and the existence of long term prior health conditions. The most common symptoms are fatigue, shortness of breath and cognitive impairment (including 'brain fog' as encumbering as mild drunkenness). Yet, not all patients will have these symptoms;

\* Commonly used in descriptions of long Covid, sequelae refers to a condition resulting from a previous disease or infection (eg, Covid-19).



200 other symptoms of long Covid have been identified, which occur with varying frequency. These sequelae appear in clusters affecting different organs and body functions – cardiac and renal; respiratory, sleep and anxiety; musculoskeletal and nervous; and digestive and respiratory – groupings which suggest the possibility of distinct forms of long Covid. Finally, certain symptoms sometimes disappear, but not always, and may reappear or change in number or nature over time. Other sequelae can involve the onset of permanent, new chronic diseases.

**The impact, especially on those most severely affected, can upend lives and finances.** Patient surveys find that, while long Covid typically has some effect on their everyday lives and finances, in most cases, the impact is described as some synonym of “a little.” Depending on the country, however, between 12% and 30% report serious impediments to day-to-day activities. Self-assessed quality of life scores tend to be lower for those living with long Covid than among the overall population, but particularly so among those most severely affected (in one study, these individuals gave lower scores than those with metastatic cancer). Employment is also harder to maintain, especially in the absence of workplace accommodations. The associated economic difficulties may help explain the higher levels of housing insecurity among those with long Covid. Finally, self-stigma is a common issue for these individuals.

**Prevalence reports in our study countries vary widely due to diverse methodologies, but experts estimate that between 2% and 7% of the population likely have long Covid in some form.** Early in the Covid-19 pandemic, studies showed very high levels of long Covid among those hospitalised with acute infection. In some study countries, these findings remain the only information available. In a few – the United Kingdom (UK), United States (US), France

and Japan – population-based studies typically give prevalence figures in the single digits, and experts interviewed in this study estimate the most likely figure is between 2% and 7%. While lower than initially feared, such numbers indicate patient numbers of the same order of magnitude as major non-communicable diseases (NCDs). Even for those with the most severe cases, the figures are in the same league as those for dementia. These are not estimates – the figures are not robust enough for that, let alone national or global health and financial burden calculations – but they do show the approximate size of what health systems are facing.

**Good practices are emerging in long Covid care.** Inevitably, health systems faced with a new and challenging problem have adopted a wide variety of arrangements to help those affected. Broadly speaking, three approaches are emerging:

- **Use the latest research to address specific symptoms.** Without an idea of long Covid’s cause, there is little prospect for a single cure given its multifaceted symptoms. Instead, clinicians need to focus on symptom alleviation. In some cases, this still relies on tools that have proven themselves in other contexts, but long Covid-specific knowledge is growing. Rapid translation from bench to bedside is, therefore, essential.
- **Improve diagnosis.** Health systems must not only offer treatment for those with long Covid but also help patients find those services. Patient and clinician education, as well as active case-finding among poorly served groups, should be basic parts of better diagnosis. Moreover, clinicians should not put off diagnosis for some arbitrary time after acute infection, but act as soon as the need becomes apparent.



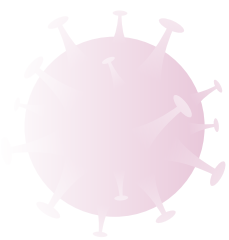


- **Create multidisciplinary, patient-centred care provision.** As with other conditions with complex individual requirements, long Covid care should begin with creating comprehensive treatment plans written jointly by the patient and a general practitioner, specialist or specialist committee. Based on the plan, the clinicians involved should arrange patient referrals to all the specialists needed in an individual's case and follow up on progress overall.
- **Look beyond the medical.** Care plans must address not only the health needs of patients but also, where relevant, their employment and social requirements. Support with return to work, securing workplace accommodations and references to social services are therefore essential.

**National policy frameworks to support those living with long Covid are often non-existent and, at best, under-developed.** To provide for all the diverse needs of people with long Covid requires not just medical care but, in some cases, integrated employment and social support. In most of the countries in this study, there is no policy coordination across these areas. In others, halting steps have failed to gain legislative traction. Taiwan's system of multidisciplinary medical provision, for instance, was dismantled when Covid there was reclassified from a pandemic to an endemic disease. The widest range of services formally open to those with long Covid are in the UK and US, but even in these countries, securing employment rights and disability payments can require legal action or sometimes opaque application processes.

#### **CALL TO ACTION: key points for policymakers and other stakeholders**

1. **Find a common framework for the description and study of long Covid:** major public health actors need an agreed definition. Convergence around a standard set of metrics and key time periods is essential.
2. **Prioritise data collection and better collation:** the global community must learn more about long Covid. Countries must use their limited data better, especially by leveraging existing disease registries.
3. **Focus on prevention:** preventing severe cases of Covid-19 can help to reduce the incidence of long Covid. Preventative measures, such as vaccination and early treatment of acute Covid-19, may help to reduce individual risk of long-term sequelae.
4. **Leverage effective tools for current symptom management:** medical treatment should focus on alleviating specific symptoms. This is a joint task for researchers and clinicians.
5. **Create multidisciplinary, patient-centered care pathways for those with long Covid:** diagnosis and individualised care plans are crucial. Patients should be linked to employment and social support where necessary.
6. **Develop a coherent policy framework:** effective delivery cannot occur solely within health systems. Policies outside of healthcare should complement multidisciplinary treatment.
7. **Stay the course:** long Covid shows no sign of going away. The stakes are too high to leave so many people with insufficient care.



# Introduction: medicine in the dark



Any health system surprised by long Covid's arrival simply failed to pay attention. Dr Bill Hanage, Associate Professor of Epidemiology and Associate Director of the Center for Communicable Disease Dynamics at Harvard University, warns, "We should expect an epidemic of viral illness to produce something like this, and we should be ready for it." Moreover, the frequencies of certain symptoms of long Covid – notably continued coughing, sleep problems and muscle pains – do not differ significantly from other serious respiratory diseases—such as SARS (severe acute respiratory syndrome) and MERS (Middle East respiratory syndrome) – including, chronic fatigue, shortness of breath and several psychiatric conditions.<sup>1,2</sup> Nor are these difficulties short-term: problems with fatigue remained present in some patients 18 years after recovery from acute SARS.<sup>3</sup>

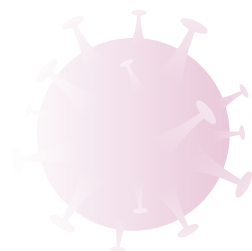
**“We should expect an epidemic of viral illness to produce something like this, and we should be ready for it.”**

Dr Bill Hanage, Associate Professor of Epidemiology and Associate Director, Center for Communicable Disease Dynamics, Harvard University



All the same, long Covid did surprise the world in the pandemic's early days. Indeed, one public health expert living with the condition said that, because initially clinicians did not seem to be listening, "long Covid is likely the first illness in history that has been defined by patients through social media platforms."<sup>4</sup>

Those days are past. Knowledge is accruing, as described in this study. Nevertheless, long Covid remains an enigma. One expert compares the situation to the parable of the blind men and the elephant. In the long Covid version, any number of researchers, impeded by the dense shadows of novelty, can focus only on specific parts of the long Covid elephant. Those near the figurative trunk or tail may say it resembles a snake, although they disagree on what kind; those near a leg liken it to a tree. Everyone senses, however, that the darkness masks fundamental characteristics of something large and complex.







This uncertainty has impeded even something so fundamental as a common definition for long Covid. That of the World Health Organization (WHO) from 2021 is similar to many and a useful starting point:

*[Long Covid] occurs in individuals with a history of probable or confirmed SARS-CoV-2 infection, usually 3 months from the onset of Covid-19 with symptoms that last for at least 2 months and cannot be explained by an alternative diagnosis. Common symptoms include fatigue, shortness of breath, cognitive dysfunction and others and generally impact everyday functioning. Symptoms may be new onset following initial recovery from an acute Covid-19 episode, or persist from the initial illness. Symptoms may also fluctuate or relapse over time.<sup>5</sup>*

Similar to several other definitions from influential bodies – including the US Centres for Disease Control and Prevention (CDC),<sup>6</sup> England’s National Institute for Health and Care Excellence (NICE),<sup>7</sup> and France’s Haute Autorité de Santé (HAS)<sup>8</sup> – embedded in the WHO’s text is an implicit admission that much remains unknown. Long Covid consists of sequelae of unpredictable number and duration, for which nobody can determine a reason – other than a previous Covid infection likely being involved. Indeed, several national treatment guidelines discussed below tell clinicians that the first step in dealing with long Covid is to see whether they can find other reasons for the symptoms of presenting patients.

**Figure 1: Defining long Covid**

Time frames specified by different definitions of long Covid, by organisation

		Initial infection	WEEK 4	WEEK 8	WEEK 12	AND BEYOND
2021	WHO <sup>5</sup>	Acute Covid-19			Post-Covid-19 condition	
2022	NICE/SIGN/RCGP <sup>7*</sup>	Acute Covid-19	Post-acute or ongoing symptomatic Covid-19 (long Covid)		Post Covid syndrome (long Covid)	
2023	CDC <sup>6</sup>	Acute Covid-19	Post Covid conditions			
2023	HAS <sup>8</sup>	Acute Covid-19	Long Covid			

\*Scottish Intercollegiate Guidelines Network (SIGN); Royal College of General Practitioners (RCGP)



Overall, the WHO, CDC, NICE and HAS definitions vary in detail but not in substance. The major difference relates to time (see Figure 1). Those from the US and France define a transition from acute to long Covid around four weeks after initial infection, compared to the WHO, which puts the figure at three months. This, though, is a distinction without a difference. As discussed later, WHO guidelines make no mention of waiting a set time before investigating potential cases of long Covid.<sup>9</sup> NICE, meanwhile, splits the difference. It defines “acute Covid-19” as signs and symptoms of the condition lasting up to four weeks; “ongoing symptomatic Covid-19” as the continuation of those signs and symptoms between four and 12 weeks; and describes “post-Covid-19 syndrome,” which occurs from 12 weeks on—similar to how others define long Covid. However, NICE considers “long Covid” to begin at four weeks, including both “ongoing symptomatic Covid-19” and “post-Covid-19 syndrome.”<sup>7</sup> These amount to varying descriptions, but do not denote any disagreement over clinical need or appropriate interventions.

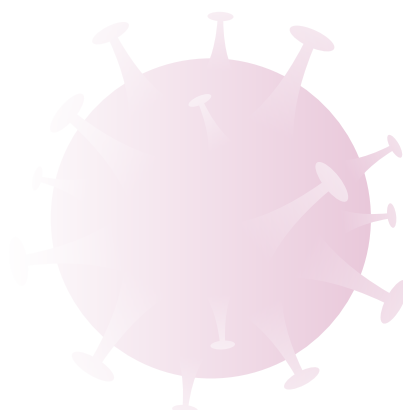
**“If you use different definitions, the conclusions [of long Covid studies] are not similar between different countries.”**

Dr Pablo Guisado Vasco, Physician, Department of Internal Medicine, Hospital Universitario Quirónsalud Madrid, Universidad Europea Madrid



Dr Hanage is not surprised at the difficulties in coming up with a single, coherent definition. Long Covid “is a lot of different things,” he says, ranging from heart conditions through fatigue to a loss of smell – to name a few. Moreover, causation is not always clear: a given symptom could be a long-term reaction to the virus, an after-effect of intubation while being treated for acute Covid, or arise from something else. Dr Ho Namkoong, Assistant Professor of the Department of Infectious Diseases at Keio University School of Medicine in Japan, agrees. “It’s very difficult to define the core concept,” he says. “We don’t know the real clinical features.”

The lack of unanimous agreement around a common definition greatly impedes efforts to understand long Covid. A 2021 literature review, for example, found that almost every study, electronic health record database and patient-reported outcome repository in practice worked with slightly different definitions of the condition and groupings of those affected.<sup>10</sup> As a result, it was often impossible to aggregate data in a meaningful way. Dr Pablo Guisado Vasco, who works in internal medicine at the Hospital Universitario Quirónsalud in Madrid, explains that, in his experience, “if you use different definitions, the conclusions [of long Covid studies] are not similar between different countries.”





**“We need to learn how to understand this better.”**

Dr Ziyad Al-Aly, Physician and Clinical Epidemiologist,  
Washington University in St. Louis

This problem both exacerbates and highlights one of the biggest challenges in seeking to address long Covid: a gaping lack of data. Of course, certain relevant information is still unknowable: the global Covid pandemic dates back only to 2020; what a person with long Covid can expect after ten years with the condition thus remains unclear. As this study discusses, though, much of what individuals and societies are currently experiencing is as yet poorly understood: the root causes of long Covid. This encompasses all its risk factors, from medical to socio-economic; the prevalence of symptoms; the natural history of the condition, including the extent to which it may worsen

or dissipate over time; its impact on health systems and economies; and best practices in medical treatment, return to work programs and social care – to name a few. Adding to the complications, Covid itself continues to evolve, with uncertain implications for the number likely to develop long Covid and how it will manifest.

Dr Ziyad Al-Aly, Physician and Clinical Epidemiologist at Washington University in St. Louis, sums it up: “We need to learn how to understand this better.” As a small contribution toward that goal – or to create a more comprehensive view of this challenge – this Economist Impact study, sponsored by Pfizer, considers what we have learned about long

# What we do know is worrying: the impact of long Covid on patients

## Covid and the state of policies to address it

Long Covid's common symptoms include one or more of fatigue, shortness of breath, various neurological and psychological conditions (including so-called "brain fog"), chest pains, and loss of taste and smell.<sup>11,12</sup> This is a partial list of the over 200 identified sequelae.<sup>13</sup> As Dr Al-Aly says, "Long Covid can affect nearly every organ system" including multiple ones simultaneously.

The estimated frequency of each of these health problems tends to vary by study, especially because researchers' symptom classifications and time frames for measurement differ. A systematic review, for example, found that fatigue was present in 32% of those with long Covid 12 weeks after acute infection, but some studies put this figure at over half.<sup>14</sup> Meanwhile, the prevalence of shortness of breath generally falls between 20% and 40%. The meta-analysis cited found that 22% experienced cognitive dysfunction.<sup>12,14</sup> Obviously, many of the myriad symptoms will be less common, but they still individually and collectively represent a substantial health burden.

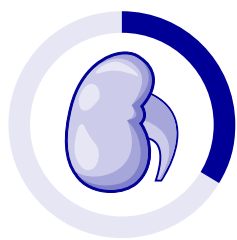
As important as prevalence estimates is an appreciation of symptom intensity. In most cases, they are mild enough that people suffer at most limited impediments to their daily lives, but at the extreme, they can be debilitating or, potentially, lethal. Long Covid fatigue, for example, often goes beyond common tiredness. A spokesperson for Spain's Asociación Madrileña de Covid Persistente describes it as "an exhausting [state] that prevents you from living a normal life."



Dr Lisa Sanders, Medical Director of Yale University’s Long Covid Multidisciplinary Care Center, says, “People who are already worried about developing dementia can be particularly distressed by brain fog – a common symptom of long Covid.” She affirms, “Even forgetting a word in the midst of a conversation can trigger fears of possible dementia.” One UK study found that those with long Covid experience cognitive decline equivalent to being at the legal alcohol limit for driving.<sup>15</sup> Finally, the impact on organs can be extensive, with diabetes, cardiac arrest, stroke, general nervous system problems (dysautonomia) and death in general all a higher risk among those with long Covid.<sup>13</sup>

These symptoms do not appear randomly but in clusters. The most extensive effort to map them used machine learning to observe groupings of over 137 sequelae among 34,000 patients. It found four long Covid subphenotypes in terms of effect: cardiac and renal (34% of patients); respiratory, sleep and anxiety (33%); musculoskeletal and nervous system (23%); and digestive and respiratory (10%).<sup>16</sup> As Figure 2 shows, the demographics of each group differ. Long Covid had the largest impact on those with pre-existing conditions. This suggests potentially different mechanisms causing the sequelae, so long Covid may be a family of diseases rather than one.

Figure 2: Long Covid subphenotypes<sup>16</sup>

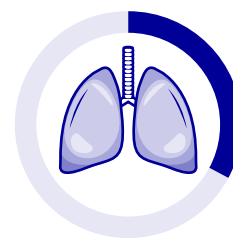


**Cardiac and renal**

**33.8%** of patients have cardiac and circulatory conditions, renal failure, anemia and fluid, or electrolyte disorders

Demographics: 65 median age, males (48.5%)

- Higher acute severity of Covid-19
- Higher burden of pre-existing conditions
- High level of incident prescriptions of medications for treating circulatory and endocrine conditions and anemia
- Use of mechanical ventilation (4%)
- Use of critical care services (10%)



**Respiratory, sleep and anxiety**

**32.8%** of patients have respiratory conditions, sleep disorders, anxiety or symptoms such as headache and chest pain

Demographics: 51 median age, females (62.8%)

- Higher acute severity of Covid-19
- Higher baseline comorbidity burdens for respiratory conditions, such as upper respiratory sequelae and chronic obstructive pulmonary disease
- Higher incident prescription rates for anti-asthma, anti-allergy and anti-inflammatory medications, including inhaled steroids, levalbuterol and montelukast

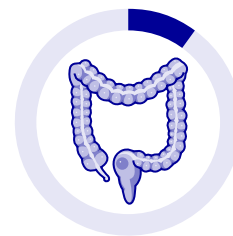


**Musculoskeletal and nervous**

**23.4%** of patients have musculoskeletal pain, headaches or sleep-wake disorders

Demographics: 57 median age, females (60.7%)

- Higher baseline comorbidity burdens of autoimmune and allergy conditions, such as rheumatoid arthritis and asthma, as well as other musculoskeletal and nervous system conditions, including soft tissue, bone and sleep disorders
- More incident prescriptions for pain medications (for example, ibuprofen and ketorolac)



**Digestive and respiratory**

**10.1%** of patients have digestive system or respiratory conditions

Demographics: 54 median age, females (61.6%)

- Highest rates of zero baseline emergency visits (57.1%)
- Lowest rates of mechanical ventilation (0.8%) and critical care admission (2.8%) in the acute phase of SARS-CoV-2 infection

Given that not all individuals with SARS-CoV-2 infection develop long Covid, it is imperative to grasp the underlying risk factors that heighten the likelihood of its occurrence. Here, too, studies have yielded varied results. The most important risk, as Dr Al-Aly says, is the severity of the original disease. Not only are those with the most serious acute infection more likely to develop one or more of these symptoms, but often sequelae also appear before full recovery from the virus or involve Covid symptoms which do not go away. Nevertheless, those who escape the worst of the initial infection are not immune. Mild and even asymptomatic cases sometimes induce sequelae either immediately or even months after full recovery from Covid itself.<sup>17,18</sup>

Other patient attributes also significantly affect the risk of developing long Covid. A comprehensive meta-analysis of studies covering, in aggregate, 860,783 people found that advanced age, a female gender, a lack of vaccination when infected by Covid, elevated body mass index (BMI), smoking habits, the presence of pre-existing health conditions, and a history of hospitalisation or intensive care unit admission all raise the odds.<sup>19</sup> This is consistent with the emerging consensus from a growing body of studies.

Finally, while long Covid symptoms diminish or disappear in certain individuals, this is not universal. The appearance of Covid itself is too recent to give long-term figures, but several studies report that certain patients continue to

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exhibit unresolved long Covid symptoms two years after initial infection.<sup>20</sup> In that sense, Covid is yet another infection that leaves long-term conditions in its wake, which medicine can only manage. In practice, a major new NCD has appeared, even if it is not yet classed as such.

### The impact on patients' lives

An additional challenge to understanding long Covid's burden is that, like everything else about the condition, the severity of symptoms varies markedly. Most population-based studies find that most people who report having long Covid experience only a limited impact on their quality of life. In the UK, for example, an Office of National Statistics (ONS) survey found that, of all of those in private households with long Covid, 80% said that it affected their ability to live their lives "not at all" (21%) or just "a little" (59%). This included 77% of the people

**“Depending on how severe long Covid symptoms are, the loss of income can be major, and [the wider impact on family finances] devastating.”**

Julia Moore Vogel, Senior Program Director, Participant Center, All of Us Research Program

who traced their long Covid back to an acute infection of more than two years earlier. The remainder said that the condition affected their lives “a lot.”<sup>21</sup> Those who reported themselves most affected also experienced a median of 12 different symptoms; those least so, just two.<sup>22</sup>

Although surveys in other countries use different terminology, the proportions saying that they are significantly affected in France (30%)<sup>23</sup> and the US (hovering around a quarter over the past year)<sup>24</sup> are higher, but only modestly. In a Japanese study covering three urban areas, on the other hand, only 12% of those with long Covid said that their symptoms created serious difficulties.<sup>25</sup>

The impact on those most seriously affected is severe, however. A Spanish study found that those with long Covid had lower quality of life scores than those in the control group, and the functional impact of the condition was directly related to those scores.<sup>26</sup> Meanwhile, British research surveyed patients whose symptoms were sufficiently severe to attend a specialist long Covid clinic. In this group, quality of life was self-rated as lower than by patients with advanced or metastatic cancer. The biggest problem was fatigue, which many patients rated worse than people living with severe kidney disease.<sup>27</sup>

Long Covid also impacts livelihoods. Common symptoms such as fatigue and brain fog can inhibit people's capacity to work, sometimes leading to presenteeism – lower productivity while still at a job – or unemployment.

Quantifying the livelihood and productivity impact is more complicated than extrapolating from long Covid prevalence in general. In an unpublished survey which she conducted, Katie Bach, Board Chair of the PolyBio Research

Foundation, found that some of those suffering from extensive symptoms stayed in employment. They typically either needed the money, secured workplace accommodations or could still meet the job's requirements. Ms Bach adds, "They said that they just pushed through symptoms."

Most research into long Covid's employment impact does not use a representative sample of those with the condition, nor of the wider population, making broader conclusions difficult.<sup>28</sup> And studies with better sampling give mixed messages. In one from the US Federal Reserve Bank of Minneapolis, around a quarter of those with long Covid said it affected them at work. Within this group, however, just 10% had left employment, although half worked fewer hours. On the other hand, the take-home pay had not changed to a statistically significant degree among those working less.<sup>29</sup>

Meanwhile, an Urban Institute survey found that 10% of those with long Covid had stopped working at some point. However, only 5% were still unemployed because of their condition at

the end of 2022.<sup>30</sup> Finally, a UK ONS analysis found that those with self-reported long Covid which had lasted between 30 and 51 weeks were more likely to be economically inactive than they had been before infection. However, among those with long Covid lasting more than a year, it was possible – within the margin of error – that such unemployment had not increased. Moreover, those who had recovered from long Covid showed no sign of an economic impact.<sup>31</sup>

The conclusion is that some of those most affected by long Covid cannot work; others with the condition, even the severely affected, can continue. Much depends on employers. For certain participants in one study, despite wanting to work, long Covid had made their previous jobs impossible, leading to unemployment. Others, often only through employer accommodation, could continue. An important part of such arrangements was the ability to work from home, especially on days when their long Covid symptoms were particularly intense.<sup>32</sup>







Higher unemployment contributes to the economic difficulties associated with long Covid, which can be serious enough to affect access to at least one basic necessity: housing. Researchers examining US Household Pulse Survey data found that 11.3% of those with long Covid were behind on rent or mortgage payments compared to 6.3% for others. The equivalent figures for those facing likely eviction or foreclosure were 4.2% and 1.7%. Again, these issues are not widespread, but concentrated in those with the worst symptoms. Those with the most significant health effects were over seven times more likely to face eviction or foreclosure than those without the condition.<sup>33</sup>

Economic hardships exacerbate existing socio-economic disparities. A UK analysis of ONS survey data found those in the bottom 10% of the population economically were 1.46 times more likely to develop long Covid than those in the top 10%.<sup>34</sup> Certain results would likely arise from this difference. The US housing study noted above found that those renting – who presumably had less capital than homeowners – had a higher risk of losing their accommodation than those who owned their homes.<sup>33</sup>

Beyond overall quality of life, employment and financial matters, experts say those with long Covid often face stigma, even from the medical community. Dr Vasco, who works in internal medicine at the Hospital Universitario Quirónsalud in Madrid, reports that some colleagues who had developed long Covid were met with disbelief. Stigma is notoriously hard to

measure and existing studies contain good and bad news. On the one hand, stigma from others tends to be occasional. Internalised stigma, however, is much more common, with over half of those with long Covid reporting that they feel it about themselves often or always.<sup>35</sup> Dr Shuhei Nomura, Associate Professor in the Department of Health Policy and Management at the School of Medicine at Keio University, tells us, “Stigma is the biggest thing” in addressing long Covid because it prevents people from seeking help. Education about long Covid should include the message that it is not a reason for self-reproach.

Some researchers have tried to extrapolate existing research to construct national pictures of long Covid, such as the cost of illness studies. These, however, rely on extensive assumptions, not all even based on data from the country being studied.<sup>36,37</sup> More generally, as Philip Haywood, Associate Professor of Practice in Health Systems and Financing at the University of Sydney, explains, any such analysis continues to have “problems because of the quality of the data and the inability to tease things [related to long Covid] out” from the effects of many other possible factors. Dr Jeromie Ballreich, Associate Research Professor of Health Economics at Health Policy and Management at Johns Hopkins University’s School of Health Policy and Management, adds that a proper analysis requires good epidemiological and demographic information, and “then you can start thinking about [things such as] costing for economics.” As the next section shows, though, such basic data remain far from robust.

# The prevalence of long Covid

## A percentage potpourri

An obvious question for any study of long Covid's impact is the number of people affected. Global estimates need to fall back on national or local data. As a group, however, these are – in Dr Hanage's words – "wildly disparate," ranging from as low as 3% in the UK to over half in Brazil and Saudi Arabia (see Table 1).

Due to differences in what was studied, how and when, such variations complicate public discussion about long Covid. Research with the highest prevalence figures – from Saudi Arabia, Brazil and Spain in particular – looked specifically at people who had Covid, in some cases exclusively those who were hospitalised for it. The lowest figures are estimates for the entire population. The sample sizes also

## Estimating the prevalence of long Covid

Best available prevalence estimates in our eight countries of focus

Country	Prevalence	Year	Group covered
UK <sup>21</sup>	2.9%	2023	National adult population living in private households
US <sup>42</sup>	3.4%	2022	National adult population, that had long Covid at the time of the study
	6.9%	2022	National adult population, that has ever had long Covid
France <sup>43</sup>	4.0%	2022	National adult population
Taiwan <sup>44</sup>	10.0%	2023	Not specified
Japan <sup>25</sup>	15.0%	2020-22	Self-administered, online survey of 34,852 people from 5-79 years in Yao City in the Osaka Prefecture Note: 6.3% of children (5-17 years) and 15% of adults (18-79 years)
Spain <sup>45</sup>	48.9%	2020-21	248 Covid patients in northwest Spain who participated in a six-month post-diagnosis follow-up
Brazil <sup>46</sup>	50.2%	2020-21	646 Covid patients in southeast Brazil monitored for 14 months after diagnosis
Saudi Arabia <sup>47,48</sup>	15.8%	2023	Survey of 5,909 patients of all ages registered in the Health Electronic Surveillance Network (HESN) national registry system
	51.2%	2022	Social media-based, self-selecting survey of 213 adults in Saudi Arabia with confirmed diagnosis of Covid at least three months before answering questions.



vary markedly. The studies finding the highest prevalence are based on several hundred subjects from one or two centres; those reporting lower results draw on much larger urban – in Japan’s case – or nationwide data.

Study subject self-selection, whether direct or indirect, can also potentially confound results. Dr Al-Aly explains that surveys – such as those from Saudi Arabia – rely on voluntary participants, who will not “necessarily represent the broader population.” Similarly, the Spanish study had to rely on patients enrolled in the research who came back for checks three and six months after infection. Those who feel healthier are less likely to do so.

The object of measurement also differed. Many studies asked respondents about ongoing or newly arisen symptoms typical of long Covid. Dr Theo Vos, Professor Emeritus of Health Metrics Sciences at the University of Washington in St. Louis, points out a weakness in this approach: all these symptoms are very common in the general population. Therefore, a control group, absent in any of the high prevalence studies, is essential. The Japanese research

did include a control group of those who had not been infected with acute Covid. Among them, 5.5% had experienced long Covid-like symptoms, or just over a third of those patients reported as having long Covid. The approach of the UK and US research differed in whether respondents were asked about self-diagnosed long Covid, which poses accuracy issues.

The headline prevalence figures also fail to capture the effect of long Covid on quality of life. As discussed above, population-based results put the proportion significantly affected anywhere between 12% and 30% of those with long Covid.

Finally, timing can influence results. As Dr Al-Aly points out, pre-vaccination studies are less likely to reflect current prevalence because of the risk-reduction effect of vaccination. It still arises, but less often. More generally, long Covid prevalence is a moving target. In the UK government research, the number of those reporting that they currently had long Covid dropped by 18% between August 2022 and March 2023. On the other hand, two extensive studies by Santé Publique France – the French public health research institution – found the same proportion of the population with the condition in early and late 2022. The US fell in between. Data from the Household Pulse Survey showed a drop of around 20% for those reporting long Covid in the second half of 2022, but then the number stabilised for the following six months.<sup>38</sup>

This shows that point-in-time studies need to be recent. It does not, though, indicate that long Covid is going away. A review in *Nature* found that, while symptoms often disappeared within a year of appearance, thereafter spontaneous remission became much less likely.<sup>39</sup>

### Stepping back to see the big picture

What do these studies, with their strengths and caveats, tell us about the real prevalence and severity of long Covid?

Current data are inadequate for producing national or global cost of illness or detailed burden of disease studies, let alone enabling comprehensive workforce planning by organisations. At the same time, they are contributing to a clearer picture of the problem at hand.

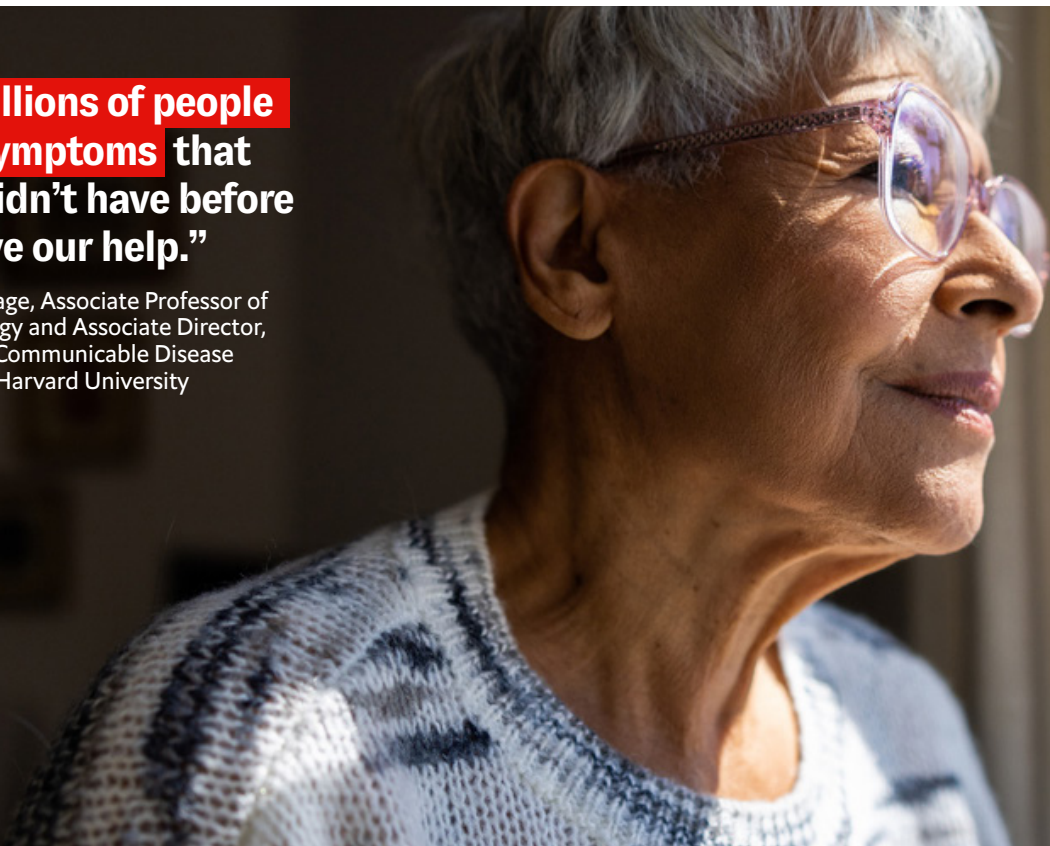
The good news is that early worries of a long Covid pandemic almost as big as Covid itself were overblown. Dr Hanage describes estimates of 10% to 30% of the population having long Covid as “bluntly, absurd. We don’t have an increase in the constellation of

symptoms that we would consider as long Covid” of that magnitude. Nevertheless, “long Covid is a big thing,” says Dr Al-Aly, mirroring the expert consensus. “The credible estimates [for population prevalence] are all in the single digits, ranging anywhere from 2% to 7%.” He personally suspects the true figure to be at the latter end of the scale.

This is not a trivial number. Dr Hanage points out that “even 2% of people developing [long Covid] is a very serious population-level consequence of the pandemic.” The average of the two lowest population prevalence estimates – those of the US and UK – multiplied by the global adult population suggest that over 230m people worldwide have some degree of long Covid. That is around half of the number of people living with diabetes or those with any cancer.<sup>40,41</sup>

**“The millions of people with symptoms that they didn’t have before deserve our help.”**

Dr Bill Hanage, Associate Professor of Epidemiology and Associate Director, Center for Communicable Disease Dynamics, Harvard University



# Emerging good practice in care



As Dr Sanders argues, “there is no treatment for long Covid... because we don’t really know what causes it.” Instead, she – and other clinicians – focus on symptom management. Treatments often rely on common sense and experience from similar conditions. For example, a survey of German general practitioners found that, frustrated with a lack of options, they fell back on prescribing ibuprofen and paracetamol for headaches and standard bronchodilators for breathing difficulties.<sup>49</sup> Similarly, the guidelines of the Société de Pneumologie de Langue Française advise that oxygen therapy to address symptoms follow the same rules applied with other conditions, as long as no reason exists not to.<sup>50</sup>

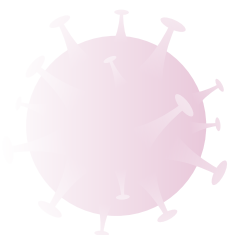
**“The biggest [long Covid-related] call to action should be for funding effective studies to assess treatment options.”**

Dr Jeromie Ballreich, Associate Research Professor of Health Economics, Health Policy and Management, Johns Hopkins University

These apparently sensible steps, however, require careful use and close monitoring because long Covid is a distinct condition. Exercise to build the strength of those with fatigue and muscle reduction might seem intuitive. Any physical rehabilitation program, however, needs to avoid the risks of Post-Exertional Symptom Exacerbation – a common long Covid side-effect where increased activity triggers days, occasionally weeks, of deeper fatigue.<sup>51</sup>

Positively, evidence and in-practice experience are gradually building around the medical interventions to alleviate symptoms. Respiratory therapy, for example, appears to reduce breathlessness.<sup>52</sup> Clinical trials show that, in a handful of cases, drugs to treat specific organ dysfunctions arising from other causes also help long Covid patients.<sup>53</sup> Early evidence indicates that cognitive therapy may reduce brain fog.<sup>54,55</sup>

This is not a comprehensive or authoritative list, nor medical advice, but it does indicate a groundswell of discoveries. While such interventions are worthwhile for easing specific problems, none is eliminating them in every case and more progress is needed.



Indeed, there is no overarching treatment for long Covid on the horizon. Those with the condition are unlikely to be able to move from specialist to specialist, seeking help for whichever of their over 200 symptoms – the nature and intensity of which are protean – may be amenable to treatment. Although extensive data are not available, one small study found that in the average of nine months – a median figure – that its participants had experienced long Covid symptoms, they saw an average of three specialists.<sup>56</sup>

Unfortunately for those living with long Covid, in Dr Haywood's words, "health systems were poorly designed to deal with chronic, fluctuating problems," and long Covid provides "almost the perfect example" of the resultant difficulties. Even basic administrative arrangements need revision: in Japan and Spain, for example, experts say those with long Covid have immense difficulty finding doctors because the health insurance system does not formally cover the condition.

## A new care model for long Covid

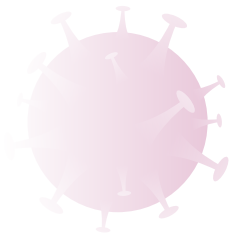
Better models exist, however, notably those designed to overcome health system deficiencies related to care of NCDs and conditions with complex sequelae.<sup>57</sup> Based on these, and the recent experience of long Covid itself, a consensus is starting to emerge on best practice for care. Dr Haywood says, "Almost everything that I've seen has been a variation on a theme: multidisciplinary." Close behind is patient-centricity.

Prevention may play a role. Several studies, notably large ones in Sweden<sup>58</sup> and the US,<sup>59</sup> have found that pre-infection vaccination against SARS-CoV-2 may reduce the probability of post-infection sequelae. Broader literature reviews also point to the need to generate stronger evidence to demonstrate this association conclusively.<sup>60,61</sup> Moreover, existing studies typically consider those who have had at most three vaccinations. Several found a dose response, with each inoculation further reducing the probability of developing long Covid. More research is needed to investigate the association between repeated vaccination and a reduced risk of developing long Covid..

Ongoing vaccination programs, already important for preventing severe Covid-19 illness, may therefore have a beneficial effect on long Covid incidence. Similarly, active treatment of serious acute cases could, by reducing symptom severity, reduce the likelihood of post-infection sequelae.

Once infected with Covid, an integrated patient journey for potential long Covid should be initiated, with two elements: education and diagnosis. WHO guidelines on long Covid care, last renewed in August 2023, recommend that patients with acute Covid infections and their caregivers should be made aware of persistent symptoms or new ones which might appear, and encouraged to seek medical care if they occur.<sup>9</sup> Clinicians also need the necessary



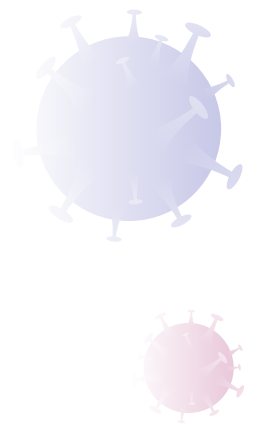
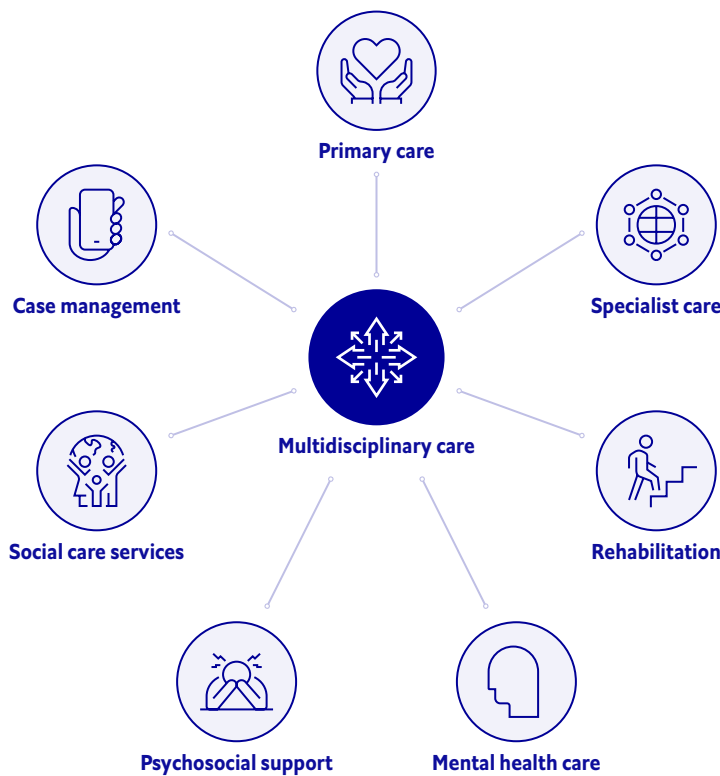


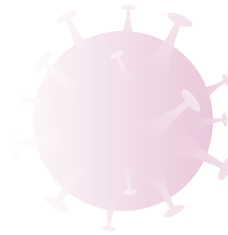
awareness to diagnose. Dr Al-Aly believes that “professional societies should do a better job of educating” clinicians to ensure early recognition. Even small steps can be important. After NICE guidelines evolved to accommodate lessons from a report, which showed low use of formal long Covid diagnostic codes within the English National Health Service (NHS), the number of recognised cases rose.<sup>62</sup>

Diagnosis efforts should also address socio-economic disparities. Dr Sanders relates the experience of colleagues: “The people who have reached out to them are mostly well-informed, well-educated and well-paid.” She is working with social workers on how best to reach other populations. Meanwhile, in the UK, the NHS recommends active case finding to address this issue,<sup>63</sup> and supporting an extensive pilot project to determine effective ways to do so.<sup>64</sup>

Dr Haywood adds that long Covid services, when patients present, need “an element of triage,” to allocate limited resources. Consistent with good NCD practice, such triage is the first step in providing individualised treatment plans – a necessity given the large variety of symptoms and combinations. The WHO guidelines recommend that care pathways “be established that can include primary care providers... relevant specialists, multidisciplinary rehabilitation professionals, mental health and psychosocial providers, and social care services...management should be tailored according to patient needs and coordinated” (see Figure 3).<sup>9</sup>

Figure 3: Features of multidisciplinary care for long Covid





### Multidisciplinary provision: health system experience

Examples from Taiwan and England suggest ways that this general advice might be operationalised. In December 2021, Taiwan's Ministry of Health and Welfare issued its "Integrated Healthcare Plan for COVID-19 Survivors." In the package, eligible individuals are those who have recovered from acute Covid at least three months before seeking help. Contact with the program began with a specialist, either a pulmonologist or an infection expert, at a hospital clinic. These designated doctors screened patients and could consult a wide range of other experts as needed. Patients experiencing financial difficulties could, after assessment by a hospital social worker, be referred to appropriate social programs. After enrollment, the hospital regularly monitored patient progress using standardised measures for, among other areas, breathlessness and quality of life. Finally, patients needed to pay only a single co-pay when entering the program, greatly reducing their costs for multiple health system interactions.

By the end of September 2022, about 130 Taiwanese hospitals provided these services. The major problem with the program was that, as of then, only 4,489 patients had been treated – a presumably low figure given that it represented under 1% of overall acute Covid cases at that point.<sup>65,66</sup> In England, NICE has produced detailed, regularly updated long Covid treatment guidelines for NHS use since 2020. The NHS, meanwhile, has improved provision for such patients in line with annual plans from 2021 onwards.<sup>7,63</sup>

As noted earlier, the NHS is working to improve diagnosis and case finding. As for treatment, a primary care doctor coordinates all interactions with the wider health service. When a patient presents with suspected long

Covid and other potential causes are ruled out, general practitioners are advised to order all relevant tests based on the individual's symptoms. Patients and clinicians then work together to decide on a treatment plan which could include, depending on the severity of the condition, supported self-management with needed medical service coordination by primary care, or referral to a specialist, multidisciplinary long Covid clinic. As of April 2023, over 100 such facilities existed.<sup>67</sup>

The care plan – whether managed at the clinic or in primary care – is meant to encompass whichever physical, mental and emotional health services the specific patient may require and wish for. Clinicians are further advised to assist with wider patient needs, such as helping "people in discussions with their...employer about returning to...work, for example, by having a phased return."<sup>67</sup> Indeed, for the NHS, return to work, for those wishing it, is a core component of long Covid rehabilitation. This includes advocating for patient needs with employers. Meanwhile, for vulnerable people, the NHS requires commissioned services to address instances of social isolation, loneliness and bereavement.

The system is not perfect. Equity remains a challenge. Dr Charles Shepherd, Trustee and Honorary Medical Adviser of the Myalgic Encephalopathy (ME) Association, explains that the quality of treatment and clinic referrals "can be a postcode lottery." Those referred can also face lengthy waiting times, which in a third of cases run to eight weeks or more.<sup>68</sup> Whatever the failings, though, this is the most comprehensive multidisciplinary care in the countries under study.

Overall, examples of multidisciplinary care for medical and wider needs exist. Rolling them out widely, however, requires supportive policy frameworks. These turn out to be rare.

\* "Postcode lottery" is a common British term for public, often healthcare, services which vary markedly by geographic location, usually arising from differences in the average socio-economic status between locations.





## A lack of integrated policy



If efforts to understand long Covid are currently reminiscent of the elephant parable, broad national policy responses bring to mind instead another proverbial elephant – the one standing in the room, ignored by all.

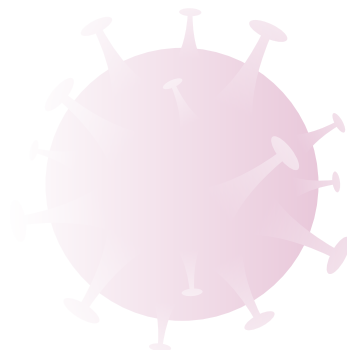
As discussed above, the number of people living with long Covid is comparable to that of some other common NCDs. Moreover, those in the substantial minority with the most life-impeding post-Covid sequelae have multifaceted and overlapping medical, economic, and social needs.

**“In general, you’d have to give low marks across the world for dealing with long Covid.”**

Dr Philip Haywood, Associate Professor of Practice in Health Systems and Financing, University of Sydney

For those affected by a similar range of difficulties from certain other conditions – notably cancer and rare diseases – many jurisdictions rely on coordinated national plans. It would be a counsel of perfection to expect any country to have one in place already for long Covid. But within the realm of what is reasonably possible, “in general, you’d have to give low marks across the world for dealing with long Covid,” argues Dr Haywood. Coherent, overarching policy frameworks to meet the needs of those affected by long Covid remain absent or undeveloped in the countries on which this study focuses.

Our research found no evidence of legislative action or strategy documents related to long Covid in Japan, Saudi Arabia or Spain. In Brazil, no legislative proposals have gone through the necessary steps for enactment.<sup>69</sup> Meanwhile, Taiwan’s once-promising Integrated Healthcare Plan has been discontinued. Patients can still seek help through primary care, but coordinated, multidisciplinary services are now absent.





In the US, according to Dr Sanders, her clinic is “one of the handful that brings together all these different disciplines.” These facilities are predominantly in large academic health centres, which serve only a minority of the population.<sup>70</sup> Here too, legislative proposals have seen little success to date.<sup>71,72,73,74</sup>

Instead, the biggest element of the US response has been research-related, including over \$1bn in government funding for the RECOVER program – so far, largely for observational research and clinical trials<sup>75</sup>– and a broader National Research Action Plan on long Covid which covers, in addition to medical research, relevant social and economic issues.<sup>76</sup>

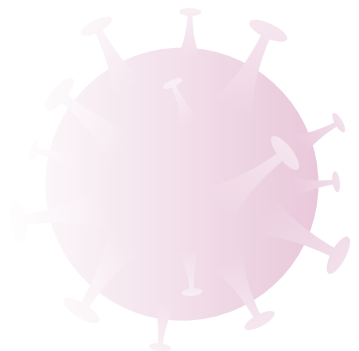
As discussed, the English NHS has in place multidisciplinary, personalised physical and mental healthcare, as well as rehabilitation services and back-to-work support. On the research side, it has established a long Covid data registry, although access is not yet fully public.\* Moreover, OpenSafely, a secure platform containing anonymised data from most NHS electronic health records, has also been used for long Covid studies.<sup>62</sup>

Looking beyond medicine and research, both the US and UK governments have encouraged those with serious cases of long Covid to take advantage of long-established general programs for social payments to, and employment support for, individuals with demonstrable long-term sickness and disabilities. Relevant legislation includes the Americans with Disabilities Act and the UK Equality Act.<sup>77,78</sup>

The problem with such provision is a lack of clarity around whether individual cases of long Covid will qualify for economic assistance and of coordinated help for such individuals. Participants in a recent US study reported difficulties in navigating the relevant applications and enrollments. “It was almost like it’s set up for people to fail at getting this help,” one subject said.<sup>32</sup>

For those seeking rights to reasonable accommodation under employment law, the situation is, if anything, even less well defined. As of early 2024, only a few judicial cases have reached US courts and UK Employment Tribunals. It will take time for a body of precedent and practice to build up, thereby clarifying the attributes of individuals with long Covid who do, and do not, fall under these protections.<sup>79,80</sup>

Two themes arise from this review of broader policies for long Covid.<sup>†</sup> First, few countries have made substantial efforts in the area. During the pandemic, this reflected an intense focus on acute Covid with few resources available to do much more. As Dr Pascal Crépey, Professor of the School of Advanced Studies in Public Health in France, explains, at the peak, the immediate sustainability of hospital systems dominated other concerns: “when your house is burning, you don’t care much if you see your garden burning.”



**“It is a big worry that, because breakthroughs have not been made, interest [in long Covid] is going to go away.”**

Dr Charles Shepherd, Trustee and Honorary Medical Adviser,  
Myalgic Encephalopathy (ME) Association

\* NHS England, “Commissioning guidance for post-COVID services for adults, children and young people,” mentions the registry several times as an existing facility with aggregate data available on the Long Covid Dashboard. The link provided, however, restricts access to those with assigned accounts (<https://ppds.palantirfoundry.co.uk/multipass/login/all>)

† For in depth discussions of long Covid in our eight countries of focus, see Appendix A: Country profiles

With the pandemic abated, though, so has interest in Covid-related efforts. Brazil and Taiwan provide examples above, but are not unique. In the US, Dr Hanage sees “an incredibly significant loss of support for Covid research in general. It’s beginning to be neglected again – and long Covid probably in particular.” Across the Atlantic, Dr Shepherd says of the English NHS clinics: “Some are now under threat of

not being able to continue to function. It is a big worry that, because breakthroughs have not been made, interest is going to go away.”

Long Covid itself, though, is not going away. Health systems, and broader government support mechanisms, must respond given the scale of prevalence and the debilitating impacts.



# Call to action: even in the darkness, some priorities are clear

While there are frustrating knowledge gaps about the long Covid elephant, the burden is significant, with global incidence on par with other major NCDs and figures for the most affected minority comparable to that of dementia and HIV/AIDS. Moreover, long Covid brings many overlapping burdens on affected individuals – in terms of health, employment and wider finances – which can be extensive, especially for those with the most severe cases. This study has highlighted key gaps in data, definitions and practice:

## **Find a common framework for the description and study of long Covid**

Currently, major public health actors lack an agreed definition of the condition. Yet more important is a lack of convergence around a common set of metrics and key time periods for studying long Covid. This would facilitate comparative research across countries, enable the aggregation of data and findings, and point to robust relationships and outcomes.

## **Focus on prevention**

A SARS-CoV-2 infection is a prerequisite to long Covid. And those with severe cases of Covid-19 are most at risk for long-term sequelae. Preventative measures, such as vaccination and early treatment of acute Covid-19, may help to reduce individual risk.

## **Prioritise data collection and better collation**

A common framework will help alleviate a problem identified by experts in this study: lack of robust and usable data. Countries should also harness their limited data better, including through developing registries which are invaluable in other complex, chronic diseases.

## **Leverage effective tools for symptom management**

Barring the unlikely appearance of a cure for long Covid, medical treatment is likely to focus on alleviating specific symptoms. Long Covid care must harness existing treatment options that have been repurposed from other conditions, and develop deeper insights into long Covid itself. This is a joint task for researchers and clinicians.

## **Create of multidisciplinary, patient-centred care pathways**

Alongside better symptom management, health systems need to develop and enhance structures and pathways to provide multidisciplinary, patient-centred long Covid care. Although precise arrangements may vary, several attributes should be universal:

- **Diagnosis:**  
Patients will not be able to benefit from

provision if not identified. This should occur as soon as relevant symptoms appear, not after an arbitrary waiting period such as 12 weeks rather than four after acute infection. This involves steps such as making acute Covid patients aware of the risks and signs of long Covid; better informing clinicians about the condition and what to do if found; and active case-finding to overcome access inequities.

- **Development and execution of an individualised care plan in cooperation with the patient:**

After diagnosis, the clinician responsible for coordinating care should work with the patient to create a care plan, including referrals to all the specialists, clinicians and therapists a patient might need for specific mental and physical health issues. The responsible doctor should also monitor the plan's progress

and seek a multidisciplinary approach.

- **Link patients to employment and social support where necessary:**

Long Covid can impede the ability of individuals to work and pose substantial financial burdens on them. Care providers should have clear pathways to refer patients to relevant bodies to assist with these areas.

### **Develop a coherent policy framework**

Effective delivery across the entire breadth of individual long Covid patient needs cannot occur solely within health systems. It must be embedded in a coherent, or at least consistent, set of policies. Delivery outside of healthcare should complement multidisciplinary treatment to provide holistic support. A useful starting point includes simplifying the processes to secure, enhanced sick leave, workplace accommodation, and eligibility for disability and other social benefits where required and appropriate. Assessment and provision should be straightforward and transparent, rather than relying on policy to build up – a potentially years-long process.

### **Stay the course**

Long Covid shows no sign of going away. Too many examples already exist, however, of policymakers cutting back on their efforts and experts fear further regress. The stakes are too high to leave so many people with insufficient care.

While these steps specifically help those living with long Covid, they have the potential to help everyone. Dr Al-Aly explains that new pandemics always arise, and “we cannot go into the next only to be surprised by a wave of chronic illness following it. We have already paid the price for this horror movie. It is inexcusable not to learn from it and be better prepared next time.”



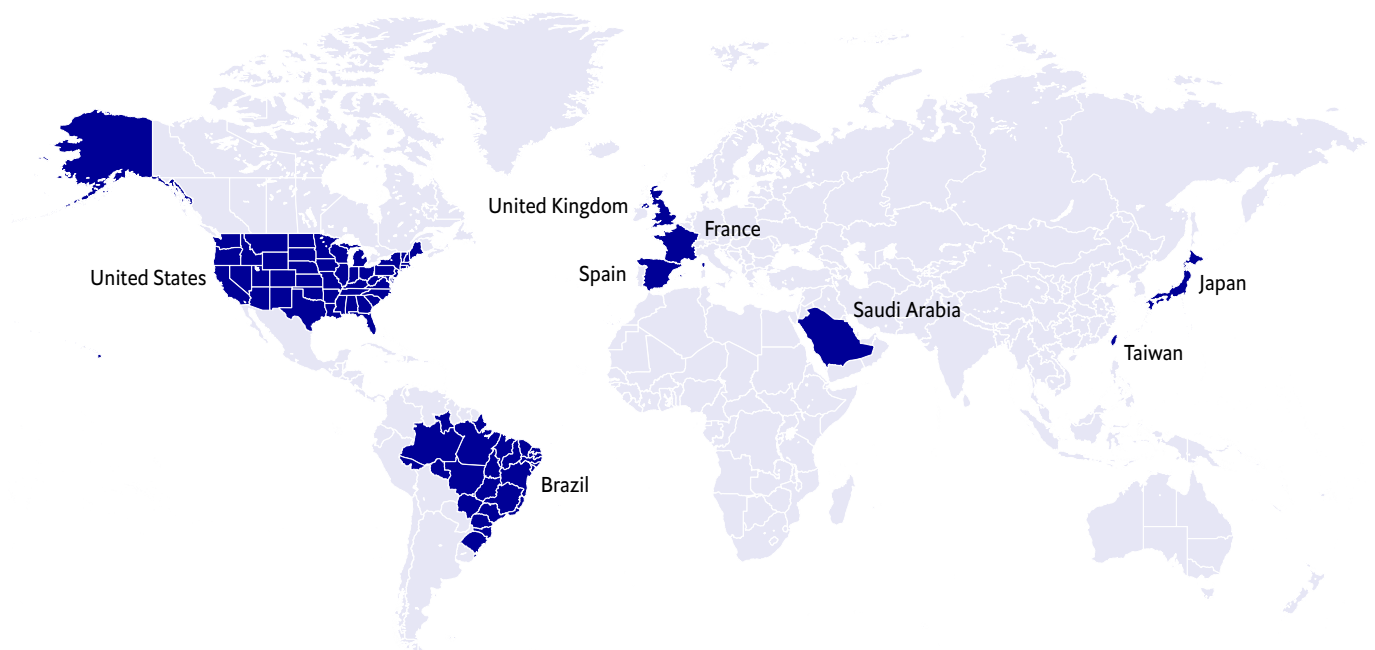
# Appendix A: Methodology

## Evidence review

Economist Impact began with a targeted literature review, following a pragmatic methodology to understand the scale, scope and impact of long Covid. Two searches were conducted: the first focused on long Covid globally, while the second focused

on eight priority countries (Brazil, France, Japan, Spain, Saudi Arabia, Taiwan, the UK and US). The reviews were not systematic in nature but rather, served as a high-level exploration of long Covid and its ramifications.

Figure A1: Priority countries





### Databases

The following databases were consulted to obtain relevant literature:

- PubMed
- Medline via OVID
- EMBASE via OVID
- Trip Medical Database
- Google Scholar

### Research questions

The following research questions served as the basis of our review:

- How is long Covid defined?
- What are the future risks of long Covid?
- What mitigation strategies exist?
- Are there any ongoing actions to minimise the impact of long Covid on health?
- What are the socioeconomic consequences?
- How does long Covid impact the economy?
- What are the key indicators for understanding the impact of long Covid on health systems, economies and broader society?

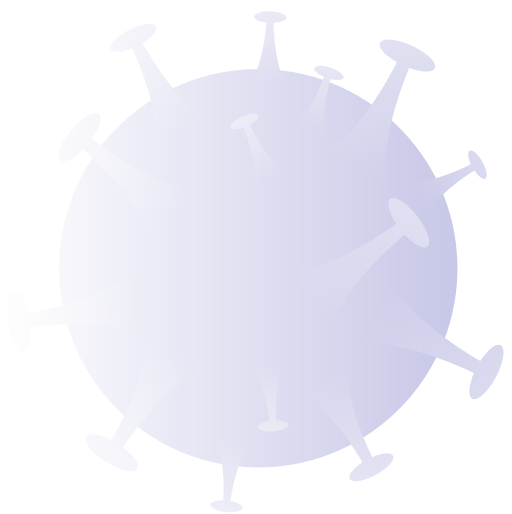
Our inclusion criteria covered academic studies and grey literature published in English since 2020, focusing on pre-selected MeSH terms in selected countries. Additional hand searching was conducted in Spanish, Brazilian Portuguese and Chinese. The review was designed to identify key papers and indicators to form the foundation for this study.

### Expert interviews

Following the targeting literature review, the research team conducted a total of 31 interviews with experts from a variety of disciplines related to this topic. This approach aimed to provide a nuanced understanding of long Covid's impact, future risks, and mitigation strategies, ensuring a well-rounded synthesis of global and country-level insights to comprehend the consequences of long Covid on health and society.

### Economic modelling

As part of our analysis, we adapted the economic model discussed in our report, Understanding the economic consequences of Covid-19, to provide outputs specific to long Covid. The model allows us to estimate the impact of long Covid on the workforce in 2024 for each of our eight countries of focus. The results of this analysis are included in Appendix C: Country profiles.





### Data and methods

The model considers two key drivers of economic impact due to long Covid in the population. These are productivity (measured by GDP per hour worked) and prevalence of long Covid (measured by the percentage of the working population with long Covid).

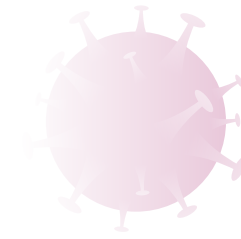
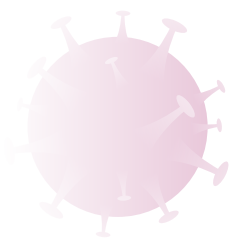
- Productivity is calculated by dividing a country's 2024 estimated GDP<sup>81</sup> by the cumulative hours worked within the country (2024 employed population<sup>82</sup> average annual working hours per worker<sup>83</sup>).
- Prevalence rate for the purposes of the model is calculated one of two ways:  
For countries with a prevalence rate that has been reported by a government source, confirmed by alternative sources and/or validated by our experts:
  - We applied the reported rate of long Covid\* within the country (generally, cases of long Covid / the total population) to the working population

For countries without a reported prevalence that has been reported by a government source and confirmed by alternative sources:

- We applied the most likely prevalence rate, based on similar markets and discussions with our experts, to the working population

### Step 1: Work hours lost

The first stage of the analysis estimates the labour market impacts of long Covid for each country of focus. Labour market impacts are calculated as lost hours of work resulting from long Covid—that is, absenteeism, which can be driven by a number of factors including: temporary time off work due to initial illness; extended time off work due to long Covid symptoms; and long-Covid-induced exit from the labour force.



The model disaggregates the employed population into two groups:

- Those that are not impacted by long Covid
- Those that develop long Covid

For each country, the percentage of working-age individuals falling into the first group (those not impacted by long Covid) is defined by country-specific prevalence rates. For example, in a hypothetical country where 3% of the total population has long Covid, 97% of the population is assumed to fall into this category.

For those that develop long Covid, the model assumes three possibilities for how the condition may impact an individual's workforce participation. These groups are:

1. Those who continue to work but reduce their working hours due to long Covid symptoms, after taking time off work for acute Covid-19
2. Those that leave the workforce due to long Covid symptoms<sup>†</sup>
3. Those who take time off work for acute Covid-19 but continue working while experiencing long Covid symptoms (ie, "business as usual")

The relative proportion of individuals falling into category one was taken from a study by the Urban Institute<sup>30</sup> and recommended by our experts. The relative proportion of individuals falling into category two was computed by using a combination of in-depth literature analysis<sup>‡</sup> and expert interviews. The proportion of individuals falling into the final category (ie, "business as usual") was considered to be any individuals with long Covid that did not fall within categories one or two.

For the purposes of this analysis, these parameters are assumed to be consistent across countries (see Table A1).

\* Reported rates of long Covid are subject to the definition of long Covid used within the study. See country profiles for more information.

† Individuals within this group are considered absent from the workforce for the entirety of 2024.

‡ Considering a combination of academic articles, advocacy groups and grey literature sources including The Urban Institute and the US Federal Reserve.



**Table A1: Long Covid population parameters**

Parameter	Value
% of employed people with long Covid that reduce their working hours <sup>30</sup>	<b>25%</b>
% of employed people with long Covid that exit the labour force <sup>29*</sup>	<b>10%</b>
% of people with long Covid that continue working (after an initial absence during the acute phase)	<b>65%</b>

\*Economist impact calculation based on expert recommendations

Having estimated the number of people that fall into each category based on these parameters, the model then calculates the total working

hours lost across each group based on the assumptions below (Table A2).

**Table A2: Loss of work hours parameters**

Parameter	Value
Average work hours lost during acute Covid-19 <sup>84</sup>	<b>50.55 hours</b>
Estimated decrease for those that reduce their working hours <sup>85,86</sup>	<b>25%</b>
Estimated duration of reduced work hours <sup>87*</sup>	<b>6 months</b>

\*Economist impact calculation based on expert recommendations

Using population estimates for the above groups, along with annual working hours per worker, the model arrives at:

- the number of work hours lost due to exiting the workforce
- the number of work hours lost for those that continue working after the acute phase
- the number of work hours lost for those that reduce their working hours

These three values are aggregated into total work hours lost due to long Covid.

### Step 2: GDP loss

Then, the model estimates the GDP cost of the lost work hours estimated in Step 1 above. GDP loss is calculated by multiplying the estimated hours lost by country-specific productivity estimates, defined as GDP per hour worked.

We include the results of this analysis as % of GDP and value in USD.

### Limitations of the model

This model illustrates the effect that long Covid has on labour markets by providing an estimated cost of work hours lost due to the condition. The results are likely to be an underestimate of the true effect, because the model does not consider the wide variation in duration or type of Long Covid symptoms (ie, it does not consider work hours lost for those that reduce their hours >6 months or those with new or worsening chronic diseases as a result of long Covid).

The parameters used in this model are constant over time, which is a simplification of the reality: the SARS-CoV-2 virus is constantly changing, with a variety of predictions for the future evolution of the virus. For this reason, variation in long Covid prevalence and burden due to emerging variants are not included in the model, as transmission, morbidity and prevalence rates may differ by variant. The outcomes reported are merely expected consequences in 2024 based on the data available at the time of publication. Uncertainty about the true prevalence of long Covid affects the results of this study.

As noted in our report, the lack of comparable data presents challenges for long Covid research—this model is no exception. Definitions of long Covid vary from country to country. The prevalence rates included in this model do not necessarily apply the same definition across all eight countries of focus.

The most consistent prevalence estimates available at the time this research was conducted were reported rates of long Covid among the total population of the study countries. Our experts indicated that it was reasonable, and mathematically sound, to apply these prevalence rates to the countries' working populations. However, it should be noted that not all individuals with long Covid will have been participating in the workforce prior to their initial

SARS-CoV-2 infection and subsequent long Covid illness. And not all long Covid patients will fall within the working age (15 to 64).

Finally, this model also does not consider medical costs due to long Covid, such as hospitalisation or treatment, nor direct costs, such as home-care or out-of-pocket expenses. The impact on non-labour-market participants, such as students or unpaid workers, is also not accounted for in this model. In addition, the method for computing productivity (ie, GDP per hour worked) does not differentiate based on type of worker or sector.

Overall, the limitations imposed by the simplification of the complex dynamics of long Covid contribute to the uncertainty and likely underestimation of the true impact of the condition.

### Expert feedback

Experts with experience in the economic consequences of long Covid and/or health economics were asked to assess the model, provide feedback and critique the measures and methodology used. Overall, they found the model to be a simple and conceptually sound method for estimating the workforce impact of long Covid, albeit within the limitations of the data available.

In addition, the model incorporates low-end values for the parameters listed above, allowing for reasonable, global comparisons.

The experts noted that the model's simplicity allows the reader to follow each input and tie it to the output. However, the simplicity of the model misses nuances in the impacts of long Covid on the affected population. For example, one expert noted that some long Covid patients may take a medical leave from work rather than reduce their working hours or exit the workforce.

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# Appendix C: Country profiles

- 40** Country profiles: Brazil
- 44** Country profiles: France
- 48** Country profiles: Japan
- 52** Country profiles: Saudi Arabia
- 57** Country profiles: Spain
- 61** Country profiles: Taiwan
- 66** Country profiles: United Kingdom
- 70** Country profiles: United States

## LONG COVID COUNTRY PROFILES

## Brazil

While frustrating knowledge gaps about long Covid remain, the burden is clear: long Covid continues to exact a substantial health toll worldwide, with implications for health, employment and economies. The following provides a snapshot of country-level efforts to mitigate the consequences of this complex condition and provide support for affected individuals.



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## Key takeaways

- According to experts in Brazil, medical professionals generally agree with the World Health Organization's (WHO) definition of long Covid.
- Brazilian labour laws support workers who may require additional time to recover from chronic illnesses, with legal precedent potentially applying to long Covid cases.
- While experts suggest that long Covid has tangible economic repercussions in Brazil, formal economic analyses are needed to fully understand the scope of this impact. However, our analysis suggests that long Covid could result in more than 803.3m lost work hours in 2024 – a potential cost of more than US\$ 11bn.
- Brazil's policy response to long Covid is nascent. A bill was presented in 2021 in the Chamber of Deputies but has been on hold since 2022. Financial incentives were provided to municipalities on an exceptional and temporary basis in 2022 to help primary healthcare services to adapt to the needs of long Covid patients based on various qualifying factors.
- Experts highlight the prevalence of think tanks for knowledge generation and scientific dissemination, but highlight a gap in initiatives targeting vulnerable populations.

## Long Covid in numbers

According to one estimate, 50.2% of Brazil's population of approximately 215m (2022) are reportedly experiencing the effects of long Covid.<sup>1</sup> However, this data is primarily based on a small study conducted by a non-governmental organisation hospital and a municipal hospital in one of the most affluent and populous cities in Latin America. As such, it may not accurately represent the socioeconomic, racial and ethnic diversity of the Brazilian population. Saulo Simoni Nacif, a representative from Fundação Butantan, a research institute, emphasises the importance of further research and monitoring in light of the over 37.4m cumulative Covid-19 cases recorded by May 2023 and the uncertain reversibility of long Covid's effects.

## Background measures

Total population <sup>2</sup>	215.3m
% of population who have ever had long Covid <sup>1*</sup>	50.2%
<b>Vaccination rate<sup>3</sup></b>	
• At least one dose	87%
• Complete primary series	81%
• At least one booster	52%
Cumulative cases of Covid-19 <sup>4**</sup>	37.4m

<sup>1</sup>This prevalence data is reported from a longitudinal study with 646 patients with confirmed acute SARS-CoV-2 infection being attended by emergency room clinicians of the Hospital da Baleia or the Hospital Metropolitan Dr Celio de Castro, hospitals with referral care for Covid-19 in Belo Horizonte, Brazil.

<sup>2</sup>Cumulative case data include all reported cases from the start of the Covid-19 pandemic through the end of the Covid-19 emergency period (5 May 2023), when many countries ended consistent collection of Covid-19 data.

**“We need to maintain the state of alertness [about long Covid] that we had during the pandemic, across municipalities, states and the federal government.”**

Saulo Simoni Nacif, Executive Director, Fundação Butantan



**“As people are still going through long Covid, we don’t know the chances of a reversal ...How do we respond to this? We have to start measuring long Covid right now and follow up with these patients [over time].”**

Saulo Simoni Nacif, Executive Director, Fundação Butantan

**Defining long Covid**

Interviews indicate that the definitions used by medical professionals in Brazil align with the WHO’s definition of long Covid, which demonstrates an emerging consensus on the criteria for diagnosing and managing this condition. Carlos Carvalho, the Director of the Pulmonology Division at the Heart Institute (InCor) of the Clinical Hospital of the Faculdade de Medicina da Universidade de São Paulo (FMUSP), argues that simplifying the definition of long Covid might further support international alignment. Initially, only symptoms that persisted after four weeks could be referred to as “Post Acute Covid Syndrome” (PASC), but there has been a shift towards recognising long Covid after three months, a definition that he supports because of its clarity and specificity. This shift highlights the evolving understanding of long Covid within the medical community.

**“The definition of long Covid needs to be simplified. An attempt was made to unify the symptoms after four weeks as “Post Acute Covid Syndrome” (PASC), but now the tendency is to focus on long Covid after 3 months, which I endorse.”**

Carlos Carvalho, Director, Pulmonology Division, Heart Institute (InCor), Clinical Hospital of FMUSP

**Figure 1: Defining long Covid**

		Initial infection	WEEK 4	WEEK 8	WEEK 12	AND BEYOND
2021	WHO <sup>5</sup>	Acute Covid-19			Post-Covid-19 condition	

**Addressing long Covid**

**Legislation**

Brazil’s policy landscape is still in the early stages of addressing long Covid. In 2021, Bill No. 2369/2021 was introduced, aiming to create a treatment program for patients with long Covid syndrome.<sup>6</sup> The bill was connected to others with similar content in the Finance and Taxation Committee (CFT) Chamber of Deputies. However, at the end of 2023, a request was submitted to archive several bills dealing with Covid-19, including the above mentioned bill, and the request is awaiting further action.

The Minister of Health issued Ordinance No. 377 in 2022, which established a financial incentive for municipalities—on a temporary basis—to support primary healthcare services related to the care of people experiencing long-term effects of Covid-19.<sup>6</sup> This single award by the National Health Fund would be given based on several qualifying factors, such as a municipality’s Social Vulnerability Index, population size

and Covid-19 mortality rate per hundred thousand inhabitants. Based on the total classification score, municipalities were awarded between US\$73,809.35 and US\$221,428.04.<sup>†</sup> These examples indicate the emerging recognition of long Covid in Brazil, backed by legislative efforts and financial incentives to address the condition’s impact on public health.

**Strategies**

As in other countries, managing long Covid in Brazil requires a multidisciplinary approach. Interventions should address individual symptoms and improve overall well-being.<sup>9</sup> Rehabilitation programs, including physical and occupational therapy, have been implemented to help individuals regain functional capacity and reduce disability.<sup>9</sup> Psychological support and counselling are also essential components of this treatment strategy.<sup>8</sup>

**“We can’t just leave it up to the government and the states; companies and the media need to disseminate the existence of Long Covid. Many doctors still don’t know [about long Covid].”**

Saulo Simoni Nacif, Executive Director, Fundação Butantan

**Legislation on long Covid**

Legislation	Last Action
PL 2369/2021(6)	Receipt by CFT, attached to PL-1487/2021
PORTARIA GM/MS No.377(7)	Passed in 2022

<sup>†</sup> A 1 USD to 5.0749 exchange rate was used from February 22, 2022, the date of ordinance release, to calculate its equivalent in dollars. No inflation rate was used in the calculation.

**Understanding the economic impact**

The Consolidation of Labor Laws (CLT), Decree-Law No. 5,452/1943, provides various provisions to support and protect people with long Covid.<sup>10</sup> The CLT has several stipulations related to work hours, rest periods and protections for workers facing health issues in order to ensure that they are not unfairly terminated or discriminated against due to their condition. The applicability of the CLT to long Covid patients depends on the individual's work dynamics and the extent of long Covid's effects. For example, if a patient cannot work due to their health condition, they may be entitled to sick leave under the CLT, allowing them to take the necessary time off work to recover without fear of losing their job.

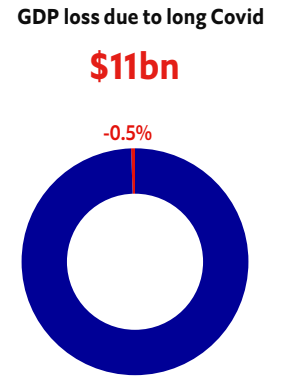
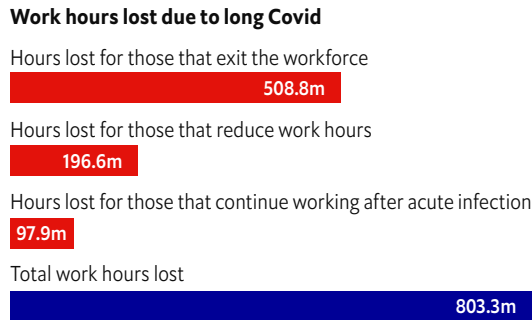
**Understanding health economics in Brazil**

Indicator	Value
Gross Domestic Product (GDP) in US\$ <sup>11</sup>	<b>\$2.3trn</b>
Current Health Expenditure (CHE) <sup>12</sup>	<b>\$163.2bn</b>
CHE as % GDP <sup>12</sup>	<b>10%</b>
CHE per capita in US\$ <sup>12</sup>	<b>\$761</b>
Out-of-pocket Expenditure (OOPS) as % of CHE <sup>12</sup>	<b>23%</b>
Out-of-Pocket Expenditure (OOPS) per capita in US\$ <sup>12</sup>	<b>\$172</b>

**Workforce impact**

While long Covid symptoms have prompted some individuals to leave the workforce, others take time off work or reduce their work hours due to symptoms. When these changes in employment status are considered, long Covid could result in 803.3m work hours lost in 2024<sup>§</sup> – a potential cost of more than US\$ 11bn.

**Figure 2: Estimating the workforce impact**



Economist impact calculation

**“We must account for this [economic] burden. We should project the direct costs over time at an aggregate level, as well as the costs of associated lost income.”**

Saulo Simoni Nacif, Executive Director, Fundação Butantan

**Raising awareness**

According to Saulo Simoni Nacif, there are many think tanks active in knowledge generation and scientific dissemination—such as joint research networks on public policies. However, he points out a glaring gap in initiatives specifically targeting vulnerable populations. Nacif emphasises the crucial need to officially acknowledge the existence of long Covid as the pivotal first step towards addressing the multifaceted challenges faced by these marginalised groups. Nacif emphasises the crucial need to address the existence of long Covid, marking it as the pivotal first step towards addressing the multifaceted challenges long Covid patients face. “The main initiatives that have come to my attention are think tanks and are focused on the production of knowledge and the dissemination of scientific knowledge, for example, a joint research network on public policies. But, I have yet to see initiatives that focus on vulnerable populations” he tells us.

Furthermore, Nacif calls for increased awareness about the impact of long Covid to ensure that it garners recognition as a priority. Inadequate understanding of the condition has led to neglect by municipalities, states and the federal government, which impedes the establishment of necessary treatment and support networks. Nacif also emphasises the absence of a formal declaration acknowledging the severity of long Covid both Brazil and globally to support mobilisation.

**“We’re facing a new disease that we know little about.”**

Carlos Carvalho, Director of the Pulmonology Division, Heart Institute (InCor) of the Clinical Hospital of FMUSP

<sup>§</sup> Assuming 3% of the total population has long Covid, as suggested by our experts

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Economist Impact would like to thank the following experts for sharing their insights and experiences:

- **Saulo Simoni Nacif, MBA, MSc, Executive Director, Fundação Butantan**
- **Carlos Roberto Ribeiro de Carvalho, Director of the Pulmonology Division at the Heart Institute (InCor) of the Clinical Hospital of FMUSP; head of Respiratory intensive care unit (ICU).**

Economist Impact bears sole responsibility for the content of this profile. The findings and views expressed herein do not necessarily reflect the views of our sponsor or the experts we interviewed.

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## LONG COVID COUNTRY PROFILES

## France

While frustrating knowledge gaps about long Covid remain, the burden is clear: long Covid continues to exact a substantial health toll worldwide, with implications for health, employment and economies. The following provides a snapshot of country-level efforts to mitigate the consequences of this complex condition and provide support for affected individuals.

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## Key takeaways

- Haute Autorité de Santé (HAS), the French health authority, defines long Covid as symptoms persisting for more than four weeks following a confirmed or probable Covid-19 encounter. It also recognises variability across patients in terms of symptoms and severity.
- Long Covid is not currently integrated into France's Affection de Longue Durée (ALD), the long term condition list, due to a lack of diagnostic consensus. Rectifying this would grant patients full coverage of associated healthcare costs, acknowledging the condition's severity and financial impact.
- While experts suggest that long Covid has tangible economic repercussions in France, formal economic analyses are needed to fully understand the scope of this impact. However, our analysis suggests that long Covid could result in more than 295.1m lost work hours in 2024 – a potential cost of more than US\$ 21bn.
- France has established a national monitoring system for long Covid patients, improving referrals and ensuring they receive necessary care and attention, either through dedicated protocols or specialised treatment centres.
- The Long Covid Association France connects individuals to international research studies, raises awareness about treatment obstacles, and provides resources for community engagement.

## Long Covid in numbers

A comprehensive survey conducted in France from August to November 2022, involving 10,615 participants, reported that 4% of the total population and 8% of those previously infected with Covid-19 exhibited symptoms consistent with long Covid, as defined by the World Health Organization (WHO).<sup>1</sup> Notably, the likelihood of experiencing long Covid was significantly elevated among individuals with a history of acute Covid-19 hospitalisation, the unemployed, those in middle-age, and particularly among women, highlighting specific risk factors and the need for targeted health interventions.<sup>1</sup>

## Background measures

Total population <sup>2</sup>	68m
% of population who have ever had long Covid <sup>1*</sup>	4%
<b>Vaccination rate<sup>3</sup></b>	
• At least one dose	84%
• Complete primary series	82%
• At least one booster	63%
Cumulative cases of Covid-19 <sup>**</sup>	38.8m

\*Cumulative case data include all reported cases from the start of the Covid-19 pandemic through the end of the Covid-19 emergency period (5 May 2023), when many countries ended consistent collection of Covid-19 data.

**“The reality in France is that the [long Covid] literature is still scarce... we’re still trying to characterise the different forms of long Covid.”**

Dr Pascal Crépey, Professor, School of Advanced Studies in Public Health, Ecole des hautes études en santé publique (EHESP)

## Defining long Covid

HAS defines long Covid as symptoms persisting for more than four weeks following a confirmed or probable Covid-19 encounter, and emphasises variability across patients in terms of symptoms and severity.<sup>5</sup> WHO characterises long Covid as symptoms that persist or appear three months after the infection and last beyond two months, recognising over 200 symptoms that interfere with daily life.<sup>6</sup> Both definitions acknowledge that extended health effects can arise following a Covid-19 infection, yet they differ in the criteria for onset and duration.

Figure 1: Defining long Covid

		Initial infection	WEEK 4	WEEK 8	WEEK 12	AND BEYOND
2021	WHO <sup>6</sup>	Acute Covid-19			Post-Covid-19 condition	
2023	HAS <sup>5</sup>	Acute Covid-19	Long Covid			

## Addressing long Covid

### Legislation

In 2022, Law No. 2022-53 established a national monitoring system specifically designed for long Covid patients, with the primary goal of enhancing voluntary patient referrals.<sup>7</sup> The system allows registered patients to receive care from their doctors following a specialised protocol or to be referred to a dedicated long Covid treatment centre within a local hospital for more critical situations.<sup>7</sup> This approach aims to ensure that all affected individuals receive the necessary care

### National guidance

The HAS has published a resource offering national guidance to health professionals, which was updated in May 2022. The document helps identify risk factors like patient hospitalisation and recognised new dermatological and digestive symptoms.<sup>8</sup> It emphasises the importance of early intervention for persistent symptoms that last beyond four weeks, including the importance of alternative diagnosis and rehabilitation processes. Overall, it advocates for a holistic primary care approach for long Covid.

### National guidance on long Covid

Guidance	Issuing agency	Year
Rapid Responses in the Context of Covid-19: Prolonged Symptoms Following Covid-19 in Adults - Diagnosis and Management <sup>8</sup>	HAS	Updated 2022

## Understanding the economic impact

The Affection de Longue Durée (ALD) list in France is a system that identifies chronic illnesses that are entitled to 100% coverage of healthcare costs related to the specified condition by the French health insurance system.<sup>11</sup> Currently, the list does not include long Covid or Covid-19, as these conditions have not been formally recognised as chronic illnesses due to a lack of diagnostic consensus.<sup>12</sup> Because HAS acknowledges long Covid, patients might be able to receive a care protocol from their physician, and those with existing ALD conditions worsened by Covid-19 or experiencing after-effects that align with ALD-listed conditions could seek expanded coverage or apply for non-listed ALD status based on the severity of their symptoms.<sup>12</sup>

Patients would benefit significantly if long Covid were categorised under the ALD scheme, which would recognise the condition as a severe and long-term illness that requires prolonged treatment and entails significant costs. Consequently, patients would receive full coverage of all related healthcare expenses, including consultations, medications, hospitalisations, and specific treatments, without the standard co-payment charges that are usually part of the French healthcare system.

### Understanding health economics in France

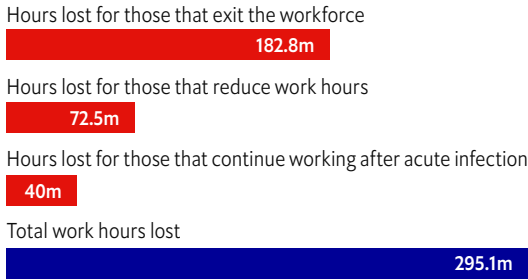
Indicator	Value
Gross Domestic Product (GDP) in US\$ <sup>9</sup>	<b>\$3.2trn</b>
Current Health Expenditure (CHE) <sup>10</sup>	<b>\$364.1bn</b>
CHE as % GDP <sup>10</sup>	<b>12%</b>
CHE per capita in US\$ <sup>10</sup>	<b>\$5,381</b>
Out-of-pocket Expenditure (OOPS) as % of CHE <sup>10</sup>	<b>9%</b>
Out-of-Pocket Expenditure (OOPS) per capita in US\$ <sup>10</sup>	<b>\$480</b>

**Workforce impact**

While long Covid symptoms have prompted some individuals to leave the workforce, others take time off work or reduce their work hours due to symptoms. When these changes in employment status are considered, long Covid could result in 295.1m work hours lost in 2024<sup>1</sup> – a potential cost of more than US\$ 21bn.

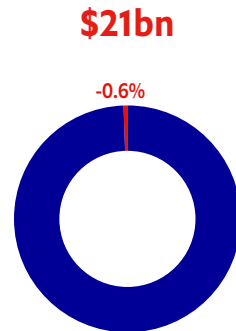
**Figure 2: Estimating the workforce impact**

**Work hours lost due to long Covid**



Economist impact calculation

**GDP loss due to long Covid**



**“The best way to quantify this [economic cost associated with long Covid] would be to use health insurance databases and look for an increase in sick leave. It’s an advantage in France, [as there is] a centralised database, where you get the [data of the] employed population... to see if a person has stopped working.”**

Dr Pascal Crépey, Professor, School of Advanced Studies in Public Health, Ecole des hautes études en santé publique (EHESP)

**Supporting long Covid patients**

France Long Covid Association connects individuals with ongoing international research studies seeking participants while also raising awareness around potential obstacles that patients may encounter when seeking treatment.<sup>13</sup> This organisation provides various resources to keep its users connected to the most recent developments surrounding long Covid. The association aims to involve community members in ongoing conversations on long Covid, forging alliances with other bodies and initiatives.

Additionally, the French health insurance service, l’Assurance Maladie, has developed a webpage dedicated to helping patients and medical providers obtain additional resources and connect with institutes for care coordination.<sup>14</sup> Their website helps users find advice for everyday life management and overcome difficulties associated with education and work due to health complications imposed by long Covid.

The goals of the France Association of Long Covid<sup>13</sup> include:

- Recognition of long Covid based on symptoms and not solely on tests
- Multidisciplinary care in all territories
- Communication with doctors and the general public
- Research involving patients

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Economist Impact would like to thank the following experts for sharing their insights and experiences:

- **Pascal Crépey, PhD, Professor, School of Advanced Studies in Public Health, EHESP**

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## LONG COVID COUNTRY PROFILES

## Japan

While frustrating knowledge gaps about long Covid remain, the burden is clear: long Covid continues to exact a substantial health toll worldwide, with implications for health, employment and economies. The following provides a snapshot of country-level efforts to mitigate the consequences of this complex condition and provide support for affected individuals.



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## Key takeaways

- In Japan, the commonly used definition of long Covid is based on the guidelines provided by the World Health Organization (WHO) and defined as the continuation or development of new symptoms three months after the initial SARS-CoV-2 infection, with these symptoms lasting for at least two months with no other explanation.
- While experts suggest that long Covid has tangible economic repercussions in Japan, formal economic analyses are needed to fully understand the scope of this impact. However, our analysis indicates that more than 1.8bn work hours may be lost due to long Covid in 2024—a potential cost of more than US\$72.2bn.
- Japan's Ministry of Health, Labour and Welfare has issued guidelines for diagnosing and managing long Covid. These cover scientific findings, observations, symptoms to monitor, and criteria for referral to specialist hospitals.
- In Japan, few support groups are exclusively focused on meeting the requirements of people with long Covid. This absence of assistance is exacerbated by a general lack of knowledge and comprehension of the condition, ultimately resulting in stigma and misunderstanding.

## Long Covid in numbers

A 2022 survey of the Japanese population revealed that 10-20% has had long Covid.<sup>1</sup>

## Background measures

Total population <sup>2</sup>	125.1m
% of population who have ever had long Covid <sup>1</sup>	10-20%
<b>Vaccination rate<sup>3</sup></b>	
• At least one dose	83%
• Complete primary series	82%
• At least one booster	68%
Cumulative cases of Covid-19* <sup>4</sup>	33.8m

\*Cumulative case data include all reported cases from the start of the Covid-19 pandemic through the end of the Covid-19 emergency period (5 May 2023), when many countries ended consistent collection of Covid-19 data.

**“It is crucial to emphasise the significance of the overall impact of long Covid, not just its effects on health”**

Dr Shuhei Nomura, Associate Professor, Department of Health Policy and Management, School of Medicine, Keio University



## Defining long Covid

In Japan, the commonly used definition of long Covid is based on the guidelines provided by the World Health Organization (WHO). According to the WHO, long Covid refers to the persistence or emergence of new symptoms for three months following the initial SARS-CoV-2 infection, lasting for at least two months without any other identifiable cause.<sup>5</sup>

The findings of a cross-sectional self-reported questionnaire survey indicate that ongoing prolonged symptoms negatively impact the quality of life of recovered Covid-19 patients. Specifically, participants experiencing persistent symptoms reported lower scores on measures of overall health and quality of life, such as the EQ-VAS and EQ-5D-3L, than those who were symptom-free.<sup>5</sup>

Figure 1: Defining long Covid

		Initial infection	WEEK 4	WEEK 8	WEEK 12	AND BEYOND
2021	WHO <sup>5</sup>	Acute Covid-19			Post-Covid-19 condition	

## Addressing long Covid

### Legislation

The Japanese government has enacted laws to tackle the immediate consequences of acute Covid-19.<sup>7</sup> Nevertheless, there is an urgent requirement for measures aimed at addressing the enduring impacts of the virus. By acknowledging and responding to the distinct challenges presented by long Covid, Japan can guarantee extensive assistance and treatment for individuals enduring prolonged symptoms. These efforts should encompass the creation of protocols for diagnosis, treatment and recovery, along with providing mental health support and educational programs for patients and healthcare practitioners.

### National guidance

Japan’s Ministry of Health, Labour and Welfare has issued guidelines for the diagnosis and management of long Covid.<sup>8</sup> These incorporate the latest scientific findings, and identify the symptoms to be monitored, and criteria and timing for referrals to specialist hospitals. The proper management of long Covid includes symptom relief, rehabilitation, mental health support and patient education. However, due to the complex nature of the condition, individually tailored treatment plans are necessary.

### Long Covid strategies

One study in Japan proposed a multidisciplinary approach to understanding and managing long Covid that includes relevant medical specialties and various other disciplines, such as chemistry, engineering, materials science and computer science.<sup>9,10</sup> This is necessary because long Covid affects various aspects of a patient’s life, including physical, mental and social well-being. Bringing together experts from different fields allows for a comprehensive understanding of the condition and the development of innovative solutions to address its effects. Collaborative efforts can boost treatment, rehabilitation and support systems, improving the quality of life for recovered Covid-19 patients.

**“After the WHO declared the end of the pandemic, Japan downgraded the legal classification of the Covid-19... On the other hand, measures to address long Covid were strengthened—for the first time, the Ministry of Health, Labour and Welfare authorised medical remuneration for the treatment of long Covid, encouraging more medical institutions to accept long Covid patients.”**

Dr Shuhei Nomura, Associate Professor, Department of Health Policy and Management, School of Medicine, Keio University

### National guidance on long Covid

Guidance	Issuing agency	Year
Covid-19 infection: management of post-morbid symptoms <sup>8</sup>	Japan’s Ministry of Health, Labour and Welfare	2023

**Understanding the economic impact**

**Understanding health economics in Japan**

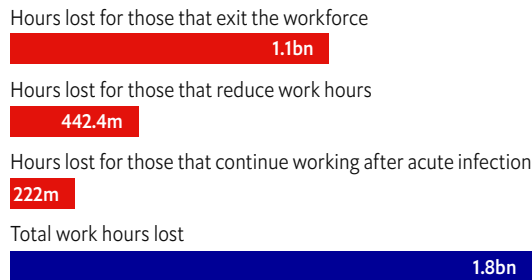
Indicator	Value
Gross Domestic Product (GDP) in US\$ <sup>11</sup>	<b>\$4.5trn</b>
Current Health Expenditure (CHE) <sup>12</sup>	<b>\$541.7bn</b>
CHE as % GDP <sup>12</sup>	<b>11%</b>
CHE per capita in US\$ <sup>12</sup>	<b>\$4,347</b>
Out-of-pocket Expenditure (OOPS) as % of CHE <sup>12</sup>	<b>12%</b>
Out-of-Pocket Expenditure (OOPS) per capita in US\$ <sup>12</sup>	<b>\$523</b>

**Workforce impact**

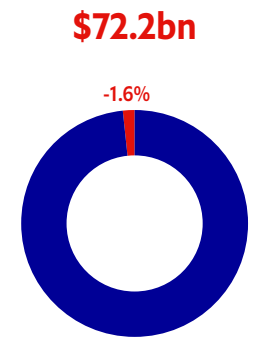
While long Covid symptoms force some individuals to leave the workforce, others take time off work or reduce their work hours due to symptoms. When factoring these changes in employment, long Covid could result in more than 1.8bn work hours lost in 2024,<sup>†</sup> a potential cost of more than US\$72.2bn (See Figure 2).

**Figure 2: Estimating the workforce impact<sup>‡</sup>**

**Work hours lost due to long Covid**



**GDP loss due to long Covid**



<sup>†</sup> Economist impact calculation  
<sup>‡</sup> For more information, see Appendix A: Methodology

**Supporting long Covid patients**

There are no formal patient advocacy groups for long Covid in Japan. However, patients have created informal support groups on social media which can provide support and community for individuals.

**Raising awareness**

Japan needs more awareness-raising programmes related to long Covid. Dr Shuhei Nomura, an Associate Professor from Keio University, tells us, "I believe there are very few educational programs on long Covid. Meanwhile, the Japanese government has launched an information page on long Covid, introducing symptoms, treatment methods, insurance benefits, subsidies, and consultation services." But the understanding of long Covid among the general public is still insufficient. Dr Nomura explains, "the lack of awareness could lead to stigma and also to a reluctance to go to the hospital for diagnosis. These issues make it difficult to fully understand the prevalence and scope of long Covid." By increasing awareness and providing resources for patients, Japan can work towards improving the overall management and understanding of long Covid.

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Economist Impact would like to thank the following experts for sharing their insights and experiences:

- **Ho Namkoong, PhD, Assistant Professor, Department of Infectious Diseases, Keio University School of Medicine**
- **Shuhei Nomura, PhD, Associate Professor, Department of Health Policy and Management, School of Medicine, Keio University**
- **Shinya Tsuzuki, MD, PhD, Chief of Applied Epidemiology Division, Disease Control and Prevention Center, National Center for Global Health and Medicine**

Economist Impact bears sole responsibility for the content of this profile. The findings and views expressed herein do not necessarily reflect the views of our sponsor or the experts we interviewed.

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## LONG COVID COUNTRY PROFILES

## Saudi Arabia

While frustrating knowledge gaps about long Covid remain, the burden is clear: long Covid continues to exact a substantial health toll worldwide, with implications for health, employment and economies. The following provides a snapshot of country-level efforts to mitigate the consequences of this complex condition and provide support for affected individuals.



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## Key takeaways

- The Saudi Ministry of Health (MoH) outlines long Covid in a structured framework, categorising post-Covid conditions into four clinical categories to clarify the syndrome's scope.
- The national leave platform in Saudi Arabia is an integrated network connecting the MoH with various government ministries, supporting patients who need leave for medical care and recovery.
- While experts suggest that long Covid has tangible economic repercussions in Saudi Arabia, formal economic analyses are needed to fully understand the scope of this impact. However, our analysis suggests that long Covid could result in more than 670.7m lost work hours in 2024—a potential cost of more than US\$ 24.4bn.
- The MoH has established long Covid clinics offering comprehensive care, showcasing a proactive approach to addressing the prolonged impacts of Covid-19.
- Although Saudi Arabia has advanced clinical support for long Covid, the region lacks dedicated patient advocacy groups, though external organisations offer some support and resources.

## Long Covid in numbers

A prevalence study in Saudi Arabia revealed that 9.2% of the participants (92 out of 1,000) were experiencing persistent post-Covid-19 conditions, commonly known as long Covid, during the study period. The research highlighted the significance of understanding long Covid, characterised as “signs and symptoms that developed during or after a Covid-19 infection, persisting for more than 12 weeks and not attributable to another diagnosis.”<sup>26</sup> This underscores the chronic nature of long Covid, and the need for ongoing research to grasp its long-term impacts fully and develop appropriate healthcare responses.

Another study on long Covid in Saudi Arabia found that 51.2% of individuals (109 of 213 participants) with a post-Covid-19 diagnosis experienced three months or more of residual symptoms.<sup>2</sup> The cross-sectional survey targeted individuals with a confirmed diagnosis, excluding self-diagnosed cases, to ascertain long-term prevalence. Key findings included a notable percentage of individuals experiencing lingering symptoms like fatigue and altered sense of smell, with a significant proportion not returning to their usual state of health.

## Background measures

Total population <sup>1</sup>	<b>36.4m</b>
% of population who have ever had long Covid <sup>2,3</sup>	<b>15.8-51.2%</b>
<b>Vaccination rate<sup>4</sup></b>	
• At least one dose	<b>78%</b>
• Complete primary series	<b>73%</b>
• At least one booster	<b>46%</b>
Cumulative cases of Covid-19 <sup>5*</sup>	<b>840,525</b>

\*Cumulative case data include all reported cases from the start of the Covid-19 pandemic through the end of the Covid-19 emergency period (5 May 2023), when many countries ended consistent collection of Covid-19 data.

**“For long Covid, the best approach is to prevent Covid-19 to begin with, and the government of Saudi Arabia and Ministry of Health have led many activities and initiatives to decrease or mitigate its occurrence from the beginning...the initiatives by the [health] system and community efforts were fruitful in decreasing the burden of Covid-19 and long Covid as a consequence.”**

Dr Anas Khan, Director-General, Global Centre for Mass Gatherings Medicine, Saudi Ministry of Health

**Defining long Covid**

The Saudi Ministry of Health (MoH) recognises the need for international agreement on the definition of long Covid. As such, in the National Guideline in Post-COVID-19 Clinical Care, published in 2022, the MoH categorised the post-syndrome into four clinical categories.<sup>8</sup>

- **Acute Covid-19:** up to four weeks;
- **Ongoing Symptomatic Covid-19:** from four to 12 weeks;
- **Post-Covid-19 Syndrome:** after 12 weeks;
- **Long Covid:** the term used to describe both the Ongoing Symptomatic Covid-19 and Post-Covid-19 Syndrome categories above.

Dr Farahat elaborates on the challenges caused by a lack of consensus: “Initially, the challenge was related to case definition and diagnosis. The question is, who qualifies as a long Covid patient? This dilemma persisted, hampering the ability to reach a clear, definitive diagnosis.” According to Dr Farahat, the struggle to establish a universally accepted definition and diagnostic criteria may also stem from the absence of a singular marker to identify those with long Covid.

**“We need to make sure that there is a standardised and scientifically sound methodology for diagnosing [long Covid].”**

Dr Anas Khan, Director-General, Global Centre for Mass Gatherings Medicine, Saudi Ministry of Health

**Figure 1: Defining long Covid**

		Initial infection	WEEK 4	WEEK 8	WEEK 12	AND BEYOND
2021	WHO <sup>7</sup>	Acute Covid-19			Post-Covid-19 condition	
2022	Saudi Arabia Ministry of Health <sup>8</sup>	Acute Covid-19	Ongoing symptomatic Covid-19 (long Covid)		Post Covid-19 syndrome (long Covid)	

**“As soon as long Covid symptoms emerged, we monitored the situation closely and analysed our data. As it was identified as a consistent risk, long Covid clinics were established nationwide, with media communication to educate the public to encourage them to seek care if required.”**

Dr Anas Khan, Director-General, Global Centre for Mass Gatherings Medicine, Saudi Ministry of Health

### Addressing long Covid

In 2022, the MoH launched long Covid clinics throughout Saudi Arabia.<sup>9</sup> Covid-19 patients with persistent symptoms can call 937 and access the Post-Covid-virtual clinic, which offers care coordination, patient education resources and self-assessment.<sup>8</sup> Once triaged, patients can access Post-Covid-19 clinical secondary care via a referral system through a primary healthcare provider or the Post-Covid-virtual clinic. Patients can access mental health services, rehabilitation and other specialist services (such as pulmonology and cardiology) at the clinic.<sup>6</sup> Digital health apps have also been developed to allow patients to fill prescriptions remotely, book appointments and participate in teleconsultations.<sup>10</sup>

Saudi Arabia has demonstrated a proactive approach in harnessing its sophisticated health IT infrastructure to address the challenges posed by Covid-19, ensuring comprehensive support for those suffering from long Covid. The strategic use of technology has facilitated a coordinated response, integrating healthcare services and data systems. This has been crucial for early detection, efficient patient management and the provision of necessary healthcare services, minimising the pandemic’s overall impact. Dr Khan emphasises the system’s effectiveness and immediate application during the pandemic, stating: “When Covid-19 came, [this system] was utilised immediately, and integrated into the national lab system where following any positive tests of the diseases of concern, including Covid-19, the patient would be issued a link to their national [identification] number and receive a registration form, through the unified data centre, where you would be granted sick leave.”

### National guidance on long Covid

Guidance	Issuing agency	Year
National Guideline in the Post-Covid-19 Clinical Care <sup>8</sup>	Ministry of Health	Updated 2022

**“Covid is distinct because it is a multisystemic disease affecting many systems. Therefore, a multidisciplinary team approach is essential. Identifying the economic implications is just as crucial, ensuring the team functions optimally, integrating rehabilitation, pulmonary care, and mental health.”**

Dr Fayssal Farahat, Director, Community and Public Health, Infection Prevention and Control Program, Ministry of National Guard Health Affairs, Riyadh.

### Understanding the economic impact

Saudi Arabia has leveraged its advanced information technology infrastructure to manage the pandemic’s economic impact. For example, the government deployed an integrated national sick leave platform which allows healthcare providers to issue sick leave and share it with beneficiaries electronically.<sup>13</sup> This allows people who receive sick leave from illnesses, including long Covid, to recuperate. The platform has been pivotal in streamlining healthcare services, ensuring timely medical intervention and assisting the workforce in recovery. Dr Anas Khan, the Director-General of the Global Centre for Mass Gatherings Medicine at the Saudi MoH, highlighted the effectiveness of this system. He explained: “We have a national centralised platform... any sick leave prescribed by a healthcare practitioner or physician would be uploaded through the hospital or health centre to this national platform where it would be verified through their [the patient’s] account. They [the patient] would be issued an electronic certificate of sick leave, and the employer would have access to how many times [the patient] obtained sick leave...”

### Understanding health economics in Saudi Arabia

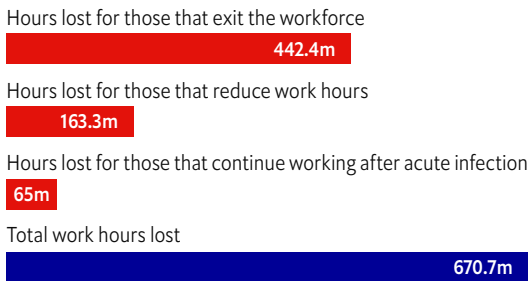
Indicator	Value
Gross Domestic Product (GDP) in US\$ <sup>11</sup>	<b>\$1.1trn</b>
Current Health Expenditure (CHE) <sup>12</sup>	<b>\$51.8b</b>
CHE as % GDP <sup>12</sup>	<b>6%</b>
CHE per capita in US\$ <sup>12</sup>	<b>\$1,442</b>
Out-of-pocket Expenditure (OOPS) as % of CHE <sup>12</sup>	<b>10%</b>
Out-of-Pocket Expenditure (OOPS) per capita in US\$ <sup>12</sup>	<b>\$146</b>

**Workforce impact**

While long Covid symptoms have prompted some individuals to leave the workforce, others take time off work or reduce their work hours due to symptoms. When these changes in employment status are considered, long Covid could result in 670.7m work hours lost in 2024† – a potential cost of more than US\$ 24.4bn.

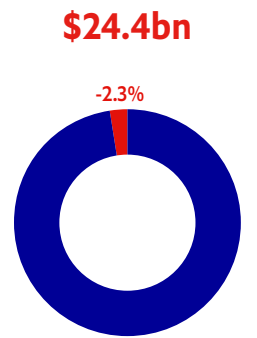
**Figure 2: Estimating the workforce impact**

**Work hours lost due to long Covid**



Economist impact calculation

**GDP loss due to long Covid**



**“I believe there is a significant yet overlooked problem that patients are often unaware of their condition, exacerbating the challenge of managing long Covid effectively.”**

Dr Fayssal Farahat, Director, Community and Public Health, Infection Prevention and Control Program, Ministry of National Guard Health Affairs, Riyadh.

**Supporting long Covid patients**

The multidisciplinary clinics in Saudi Arabia offer an important support mechanism for individuals who continue to experience Covid-19 symptoms a month after contracting the virus.<sup>9</sup> While clinical support is offered, patient representation through patient support or advocacy groups has yet to materialise due to the temporary impact of long Covid in Saudi Arabia. According to Dr Khan, Saudi Arabia has no specific long Covid patient advocacy group or association. Still, organisations such as Survivor Cops offer resources and information connecting patients to long Covid multidisciplinary long-term recovery clinics and rehabilitation and therapy clinics in the Middle East.<sup>14</sup> Patients can attend clinics in the United Arab Emirates, particularly in Dubai and Ras al Khaimah.<sup>14</sup>

**“It is evident that people require support, yet when it comes to responding to chronic conditions, the sense of urgency is lacking... many are affected and continue to suffer invisibly, without any tangible aid. No one can see or act on their behalf. Hence, we must acknowledge this epidemic that is looming large.”**

Dr Fayssal Farahat, Director, Community and Public Health, Infection Prevention and Control Program, Ministry of National Guard Health Affairs, Riyadh.

† Assuming 15% of the total population has long Covid (see Background measures)

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Economist Impact would like to thank the following experts for sharing their insights and experiences:

- **Fayssal Farahat, MD, MSc, PhD, Director, Community and Public Health, Infection Prevention and Control Program, Ministry of National Guard Health Affairs, Riyadh**
- **Anas Khan, PhD, Director-General, Global Centre for Mass Gatherings Medicine, Saudi Ministry of Health**

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#### Endnotes:

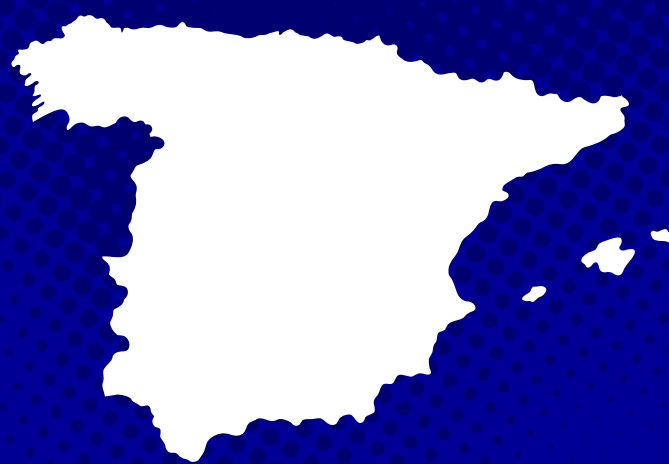
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## LONG COVID COUNTRY PROFILES

## Spain

While frustrating knowledge gaps about long Covid remain, the burden is clear: long Covid continues to exact a substantial health toll worldwide, with implications for health, employment and economies. The following provides a snapshot of country-level efforts to mitigate the consequences of this complex condition and provide support for affected individuals.



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## Key takeaways

- A 2021 study by Spain's Ministry of Health found that post-Covid conditions involve "a collection of multi-organ symptoms that persist or fluctuate following acute Covid-19 infection and cannot be attributed to other causes."
- Although experts suggest that long Covid has tangible economic repercussions in Spain, formal economic analyses are needed to fully understand the scope of this impact. However, our analysis suggests that long Covid could result in more than 167.8m work hours lost in 2024—a potential cost of more than US\$7.8bn.
- Spain is actively researching effective strategies for managing long Covid. Using community resources for rehabilitation in north-eastern Spain has yielded positive results in patients' physical and mental health. However, an interdisciplinary approach involving specialists from various medical fields is necessary to provide care for individuals with long Covid.
- In 2021, the SEMG (Sociedad Española de Médicos Generales y de Familia) proposed a set of guidelines to provide comprehensive and effective strategies for managing long Covid.
- In Spain, AMACOP serves as a patient advocacy organisation that aims to raise awareness and campaign for the recognition of long Covid as a separate disease. They engage in research to understand the causes of this condition and investigate possible treatment options.

## Long Covid in numbers

In one long Covid study, researchers examined the clinical follow-up of patients in a health area with a population of 569,534 after being diagnosed with SARS-CoV-2/Covid-19. Out of the total number of patients, only 246 completed the follow-up. The study found that 48% of these patients experienced one or more persisting symptoms at the six-month mark, which experts believe is higher than the country's true prevalence of long Covid.<sup>1</sup>

## Background measures

Total population <sup>2</sup>	47.8m
% of population who have ever had long Covid <sup>1</sup>	48%
<b>Vaccination rate<sup>3</sup></b>	
• At least one dose	87%
• Complete primary series	79%
• At least one booster	56%
Cumulative cases of Covid-19* <sup>4</sup>	13.9m

\*Cumulative case data include all reported cases from the start of the Covid-19 pandemic through the end of the Covid-19 emergency period (5 May 2023), when many countries ended consistent collection of Covid-19 data.

**Defining long Covid**

The Spanish Ministry of Health initiated the CIBERPOSTCovid project in 2021 to understand the characteristics of post-Covid conditions. This project sought to identify areas of consensus among stakeholders about post-Covid and its clinical and diagnostic features within the Spanish healthcare system. The study found that post-Covid refers to “a collection of multi-organ symptoms that persist or fluctuate following acute Covid-19 infection and cannot be attributed to other causes.” These symptoms last for a minimum of 3 months.<sup>5</sup> This definition is consistent with that of the World Health Organization (WHO).<sup>6</sup>

**“[In Spain], we use the WHO definition. If different definitions are used, conclusions will not be similar between different countries.”**

Dr Pablo Guisado Vasco, Department of Internal Medicine, Hospital Universitario Quirónsalud Madrid, Universidad Europea (Madrid)

**Figure 1: Defining long Covid**

		Initial infection	WEEK 4	WEEK 8	WEEK 12	AND BEYOND
2021	WHO <sup>6</sup>	Acute Covid-19			Post-Covid-19 condition	
2021	Spanish Ministry of Health <sup>5</sup>	Acute Covid-19			Post-Covid-19 condition	

**Addressing long Covid**

**Legislation**

Spain’s government has implemented legislation to address the immediate impacts of acute Covid-19.<sup>7</sup> However, there is a pressing need for policies explicitly targeting long-term symptoms. By recognising and addressing the unique challenges of long Covid, Spain can ensure comprehensive support for individuals experiencing prolonged symptoms. Efforts must include the development of guidelines for diagnosis, management, and rehabilitation, as well as the provision of mental health resources and educational initiatives for both patients and healthcare professionals.

**National guidance**

In 2021, the SEMG (Spanish Society of General and Family Physicians; Sociedad Española de Médicos Generales y de Familia) put forward a set of guidelines to provide comprehensive and effective strategies for managing long Covid. These were developed to address the unique challenges posed by this condition and equip healthcare professionals with the necessary tools and knowledge to provide optimal patient care. By offering clear and evidence-based recommendations, the SEMG aims to improve outcomes and quality of life for individuals affected by long Covid. These guidelines are a valuable resource for healthcare providers, enabling them to stay up-to-date with advances in the field and deliver the best possible care to patients.<sup>8</sup>

**Long Covid strategies**

Spain has been actively involved in clinical research to identify effective strategies for managing long Covid. For example, in north-eastern Spain, the use of community resources, including community health centres and social support networks, has been an effective mechanism for rehabilitating individuals with long Covid.<sup>9</sup> An interdisciplinary approach is needed to care for individuals, bringing together specialists from various medical fields.<sup>10</sup>

**National guidance on long Covid**

Guidance	Issuing agency	Year
Clinical Guide for Care of the Long Covid Patient (Guía Clínica para la Atención al Paciente Long Covid/Covid Persistente) <sup>8</sup>	SEMG	2021

**Understanding the economic impact**

**Understanding health economics in Spain**

Indicator	Value
Gross Domestic Product (GDP) in US\$ <sup>11</sup>	<b>\$1.7trn</b>
Current Health Expenditure (CHE) <sup>12</sup>	<b>\$153.3bn</b>
CHE as % GDP <sup>12</sup>	<b>11%</b>
CHE per capita in US\$ <sup>12</sup>	<b>\$3,234</b>
Out-of-pocket Expenditure (OOPS) as % of CHE <sup>12</sup>	<b>21%</b>
Out-of-Pocket Expenditure (OOPS) per capita in US\$ <sup>12</sup>	<b>\$679</b>

**“We need more capacity in Spain to quantify the exact economic impact of Long Covid.”**

Dr Pablo Guisado Vasco, Department of Internal Medicine, Hospital Universitario Quirónsalud Madrid, Universidad Europea (Madrid)

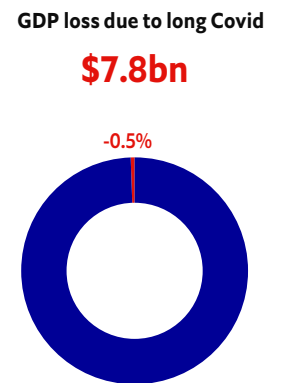
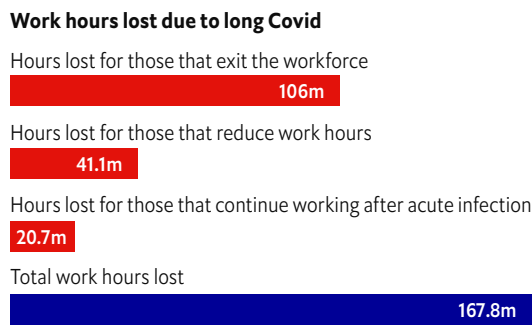
**“The health system has spent a lot of money to try to improve the diagnosis of long Covid and care for the patients. But real solutions are still lacking.”**

Dr Pablo Guisado Vasco, Department of Internal Medicine, Hospital Universitario Quirónsalud Madrid, Universidad Europea (Madrid)

**Workforce impact**

While long Covid symptoms force some individuals out of the workforce, others take time off work or reduce their hours. When these changes in employment status are considered, long Covid could result in more than 167.8m work hours lost in 2024<sup>†</sup> – a potential cost of more than US\$7.8bn (See Figure 2).

**Figure 2: Estimating the workforce impact<sup>‡</sup>**



Economist impact calculation  
<sup>‡</sup> For more information, see Appendix A: Methodology

**Supporting long Covid patients**

In Spain, a patient advocacy group called AMACOP (Asociación de Pacientes con Covid Persistente; Madrid Association of Long Covid) plays a crucial role in addressing the challenges of long Covid. AMACOP’s primary objective is to raise awareness and advocate for the recognition of long Covid as a distinct disease. They are dedicated to fostering research into the etiopathological cause of this condition and exploring potential treatments.

Additionally, AMACOP strives to ensure the effective implementation of specific healthcare protocols within public health services and provides support to individuals affected by long Covid. They also collaborate closely with scientific societies, relevant associations and other entities to enhance quality of life for patients.<sup>13</sup>

**Raising awareness**

AMACOP’s explains, “It’s pretty difficult for the patients to find a doctor who can see long COVID patients,” highlighting a significant challenge faced by individuals dealing with long-term effects of Covid-19. The emergence of long Covid, also known as post-acute sequelae of SARS-CoV-2 infection (PASC), presents a complex and poorly understood medical condition that requires specialised care. The novelty and complexity of long Covid requires more healthcare professionals with specialist expertise in the condition. A scarcity of specialised care providers leaves patients struggling to find doctors who can adequately address their needs. Addressing this issue requires concerted efforts to increase awareness among healthcare professionals about the unique challenges posed by long Covid and provide specialised training and resources to enable them to diagnose and manage the condition effectively. Additionally, establishing dedicated clinics or support networks tailored explicitly to long Covid patients could help bridge the gap in care and provide support for those grappling with this protracted illness.

<sup>†</sup> Assuming 3% of the total population has long Covid, in line with the United Kingdom and United States

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Economist Impact would like to thank the following experts for sharing their insights and experiences:

- **AMACOP - Asociación Madrileña de Covid Persistente (Madrid Association of long Covid)**
- **Pablo Guisado Vasco, MD, PhD - Department of Internal Medicine, Hospital Universitario Quirónsalud Madrid, Universidad Europea (Madrid)**

Economist Impact bears sole responsibility for the content of this profile. The findings and views expressed herein do not necessarily reflect the views of our sponsor or the experts we interviewed.

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## LONG COVID COUNTRY PROFILES

## Taiwan

While frustrating knowledge gaps about long Covid remain, the burden is clear: long Covid continues to exact a substantial health toll worldwide, with implications for health, employment and economies. The following provides a snapshot of country-level efforts to mitigate the consequences of this complex condition and provide support for affected individuals.



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## Key takeaways

- Taiwan's approach to managing long Covid utilises tailored healthcare interventions, offering a potential solution for addressing post-viral conditions.
- Taiwan's Integrated Healthcare Plan for Long Covid illustrates a strategic, multidisciplinary approach to healthcare, providing comprehensive, fully insured treatment, although it lacked data to evaluate its long-term effectiveness. The program was discontinued after the end of the Covid-19 emergency period.
- Long Covid primarily affects the working-age population, particularly women, threatening economic productivity due to workforce health challenges. Our analysis suggests that long Covid could result in more than 352.7m lost work hours in 2024 – a potential cost of more than US\$12.2bn or 1.5% of the GDP.
- Taiwan's long Covid response lacks a strong support system, emphasising the need for policy development, educational outreach, and public empowerment through social media.

## Long Covid in numbers

Taiwan's approach to long Covid reflects the country's proactive and adaptable healthcare strategy in response to the Covid-19 pandemic itself. Taiwan took comprehensive measures to address post-viral conditions, including integrating long Covid care into the national health insurance system. Reported statistics indicate that 10% of the population is affected by long Covid, highlighting the importance of ongoing vigilance and support for those impacted.<sup>1</sup> Taiwan's high vaccination rate, with 94% of the population having received at least one dose, plays a crucial role in mitigating the spread of Covid-19 and its potential long-term effects, aligned with global health recommendations.<sup>2</sup> Demographic data emphasises the need for tailored healthcare interventions that cater to the population's diverse needs, ensuring that both men and women receive appropriate care.

## Background measures

Total population <sup>3</sup>	<b>23.4m</b>
% of population who have ever had long Covid <sup>1</sup>	<b>10%</b>
<b>Vaccination rate<sup>2</sup></b>	
• At least one dose <sup>4</sup>	<b>94%</b>
• Complete primary series	<b>89%</b>
• At least one booster	<b>77%</b>
Cumulative cases of Covid-19 <sup>5*</sup>	<b>10.2m</b>

\*Cumulative case data include all reported cases from the start of the Covid-19 pandemic through the end of the Covid-19 emergency period (5 May 2023), when many countries ended consistent collection of Covid-19 data.

**“Policymakers need to recognise that long Covid is a global health problem. Therefore, we must consolidate resources from a global perspective. This is particularly crucial because, after the pandemic, there has been a return to international travel and migration. Adopting a global approach is, in my opinion, a good solution.”**

Tony Hsiu-Hsi Chen, Distinguished Professor, Institute of Epidemiology and Preventive Medicine, National Taiwan University, Taiwan

**“Currently, there are various definitions of long Covid, and the complexity is well-acknowledged. Based on surveys and expert discussions in Taiwan, the most coherent and technically sound approach seems to be the one provided by the WHO.”**

Dr Jean Tsai, Director and Professor, Global Health and Health Security, Taipei Medical University

**Defining long Covid**

Taiwan’s approach to the long-lasting effects of Covid-19, in line with the World Health Organization’s (WHO) definition, highlights the complexities and difficulties associated with recognising and treating this condition. According to the WHO, long Covid refers to symptoms that persist for over three months after a person is infected with the SARS-CoV-2 virus without any other identifiable cause.<sup>5</sup> This recognition is crucial because the diverse symptoms make it challenging to establish a standardised diagnosis.

**Figure 1: Defining long Covid**

	Initial infection	WEEK 4	WEEK 8	WEEK 12	AND BEYOND
2021 WHO <sup>6</sup>	Acute Covid-19			Post-Covid-19 condition	

**“Taiwan has integrated a multidisciplinary approach, attempting to leverage the hierarchical medical care system from primary care to medical centres, to address this multidisciplinary issue. However, we lack data to evaluate whether this approach is sufficient for managing the problems associated with long Covid.”**

Tony Hsiu-Hsi Chen, Distinguished Professor, Institute of Epidemiology and Preventive Medicine, National Taiwan University, Taiwan

**Addressing long Covid**

**National guidance**

The Ministry of Health and Welfare in Taiwan implemented the Integrated Healthcare Plan as a comprehensive framework to address the challenges of long Covid.<sup>6</sup> Under this plan, the National Health Insurance system covers treatments for long Covid patients.<sup>6</sup> The primary goal of this framework is to ensure a coordinated approach to managing the symptoms and providing care by implementing a case management system and working with multidisciplinary healthcare teams.

Interviewed experts highlighted the research and policy gaps in addressing long Covid. They emphasise the importance of data-driven strategies and increasing public awareness about this condition, indicating that Taiwan’s unique epidemiological situation, in terms of proximity to China, prompted early government engagement with long Covid. This led to the Taiwan Centers for Disease Control (CDC) establishing long Covid centres and subsequent outpatient services in medical centres, in accordance with the criteria set by the WHO. The integration of long Covid care into the national health insurance system aimed to ensure better patient distribution across departments. However, this plan was phased out after the conclusion of the Covid-19 emergency phase.

**National guidance on long Covid**

Guidance	Issuing agency	Year
Integrated Healthcare Plan <sup>8</sup>	Ministry of Health and Welfare	Updated 2021

**“We currently lack sufficient research in Taiwan to fully understand the severity and details of long Covid, along with clear policy recommendations for addressing these issues... There’s a consensus on the need for more policy responses, but society at large is still trying to understand the condition.”**

Dr Jean Tsai, Director and Professor, Global Health and Health Security, Taipei Medical University

**Understanding the economic impact**

Taiwan’s economy is still experiencing the consequences of long Covid, particularly among the working-age population. One study suggests that roughly 70% of patients enrolled in the program are 20 to 60 years old, with the highest proportion of patients being 30 to 40 years old.<sup>7</sup> This demographic, vital to the labour force, are experiencing symptoms such as fatigue and burnout that are directly hampering economic productivity. The significant presence of women among those affected adds another layer of complexity, given their dual role in the workforce and the care economy. The potential economic impact is considerable, encompassing not only productivity losses but also an increase in sick leave. Urgent and comprehensive research is needed in Taiwan to quantify these effects, inform policy decisions, and mitigate the long-term economic repercussions of long Covid.

**“The government, including the healthcare and insurance systems, needs to deliberate on how to reallocate resources, considering policy [measures] or funding, and support for the health system and research.”**

Dr Yee-Chun Chen, Professor, College of Medicine, National Taiwan University Hospital, Taipei; Director, Infection Control Society of Taiwan

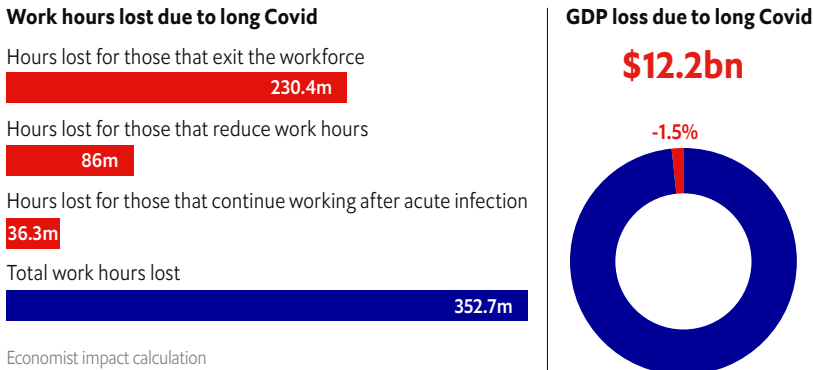
**Understanding health economics in Taiwan**

Indicator	Value
Gross Domestic Product (GDP) in US\$ <sup>9</sup>	<b>\$760.9bn</b>
Current Health Expenditure (CHE) <sup>10</sup>	<b>\$47.1bn</b>
CHE as % GDP <sup>10</sup>	<b>7%</b>
CHE per capita in US\$ <sup>10</sup>	<b>\$2,274</b>
Out-of-pocket Expenditure (OOPS) as % of CHE <sup>10</sup>	<b>34%</b>
Out-of-Pocket Expenditure (OOPS) per capita in US\$ <sup>10</sup>	<b>No data</b>

**Workforce impact**

While long Covid symptoms have prompted some individuals to leave the workforce, others take time off work or reduce their work hours due to symptoms. When these changes in employment status are considered, long Covid could result in 352.7m work hours lost in 2024† – a potential cost of more than US\$ 12.2bn.

**Figure 2: Estimating the workforce impact**



**“Our physicians sometimes don’t acknowledge the existence of long Covid. They tend to dismiss it, which leads to underestimates of these conditions.”**

Tony Hsiu-Hsi Chen, Distinguished Professor, Institute of Epidemiology and Preventive Medicine, National Taiwan University, Taiwan

**Supporting long Covid patients**

During the initial phase of the pandemic, Taiwan’s health authorities actively distributed comprehensive information, including the ‘Guidelines for Post-COVID-19 Condition’ published by the Taiwan CDC.<sup>11</sup> Experts such as Dr Jean Tsai and Dr Chih-Cheng Lai have identified gaps in policy, support, and education that must be addressed. Social media platforms could serve as effective channels for reaching a larger audience.

**“I believe that both our physicians and the general public have not received adequate education, particularly now that Covid-19 has become less severe in Taiwan and most people do not regard it as a significant disease. As a result, it has been largely neglected. I think more education is still needed for our people and our physicians.”**

Dr Chih-Cheng Lai, Department of Internal Medicine, Chi Mei Medical Center

As the urgency surrounding the pandemic subsided in late 2022, public communication decreased, resulting in a lack of awareness about the long-term effects of Covid-19. This led to the neglect of long Covid symptoms in medical practice, as highlighted by Dr Chih-Cheng Lai. The connection between media coverage and public health literacy suggests insufficient reporting on long Covid could hamper awareness.<sup>12</sup> The medical community in Taiwan has not fully recognised the extended health implications of long Covid, showing the importance of enhancing health literacy and providing continuous education for healthcare providers, particularly in primary care. This situation underscores the need for an integrated and multidisciplinary education program to effectively address and manage the prolonged effects of long Covid.

**“Social media is crucial; we need it to help communicate directly with the public. Not everything should be directed to the healthcare system alone. Empowering the public through education is essential, ensuring they possess basic knowledge about infectious diseases, especially during crises.”**

Dr Yee-Chun Chen, Professor, College of Medicine, National Taiwan University Hospital, Taipei; Director, Infection Control Society of Taiwan

† Assuming 10% of the total population has long Covid, as reported by the Taitung County Public Health Bureau



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Economist Impact would like to thank the following experts for sharing their insights and experiences:

- **Tony Hsiu-Hsi Chen, Distinguished Professor, Institute of Epidemiology and Preventive Medicine, National Taiwan University, Taiwan**
- **Yee-Chun Chen, MD, PhD, Professor, College of Medicine, National Taiwan University Hospital, Taipei; Director, Infection Control Society of Taiwan**
- **Chih-Cheng Lai, MD, Department of Internal Medicine, Chi Mei Medical Center**
- **Jean Tsai, PhD, Director and Professor, Global Health and Health Security, Taipei Medical University**

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## LONG COVID COUNTRY PROFILES

# United Kingdom

While frustrating knowledge gaps about long Covid remain, the burden is clear: long Covid continues to exact a substantial health toll worldwide, with implications for health, employment and economies. The following provides a snapshot of country-level efforts to mitigate the consequences of this complex condition and provide support for affected individuals.



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## Key takeaways

- In the United Kingdom (UK), there are multiple definitions of long Covid in use. UK agencies define long Covid according to varying amounts of time from the initial infection, including four, five, and 12 weeks. Varying definitions result in unclear guidelines for diagnosis and potentially exclude patients from support programmes.
- Long Covid has tangible economic repercussions in the UK, with more than 80,000 people leaving the workforce in 2022 due to long Covid symptoms.<sup>1</sup> Our analysis indicates that more than 251.8m work hours may be lost due to long Covid in 2024—a potential cost of more than US\$15.5bn.
- The UK has made progress in addressing long Covid by developing comprehensive guidelines. The National Institute for Health and Care Excellence (NICE) has issued guidelines for recognising, investigating, and rehabilitating patients with long Covid.
- A lack of awareness about long Covid has resulted in misdiagnosis and discrimination for some patients. Education programmes for patients and providers can help ensure that individuals with long Covid receive the necessary treatment and support.

## Long Covid in numbers

The UK Office for National Statistics (ONS) found that approximately 1.9m individuals residing in private households in the UK, roughly 2.9% of the population, were encountering self-reported long-term effects of Covid-19 (symptoms persisting for over four weeks after the initial confirmed or suspected coronavirus infection, with no other explanation).<sup>2</sup>

### Background measures

Total population <sup>3</sup>	<b>67m</b>
% of population who have ever had long Covid <sup>2</sup>	<b>2.9%</b>
<b>Vaccination rate<sup>4</sup></b>	
• At least one dose	<b>79%</b>
• Complete primary series	<b>75%</b>
Cumulative cases of Covid-19* <sup>5</sup>	<b>103.3m</b>

\*Cumulative case data include all reported cases from the start of the Covid-19 pandemic through the end of the Covid-19 emergency period (5 May 2023), when many countries ended consistent collection of Covid-19 data.

## Defining long Covid

The UK's National Health Service (NHS) defines long Covid as symptoms that last 12 or more weeks after the initial infection,<sup>2</sup> in line with the World Health Organization (WHO). Some UK agencies define long Covid differently (see Figure 1). For example, NICE divides long Covid patients into two groups depending on the time: people presenting with symptoms 4–12 weeks beyond acute infection have “ongoing symptomatic Covid-19.” In contrast, those with symptoms 12 weeks or more beyond the initial SARS-CoV-2 infection are diagnosed with “post-Covid-19 syndrome.” Both ongoing symptomatic Covid-19 and post-Covid-19 syndrome are considered long Covid patients.<sup>6</sup> In contrast, the ONS, which has researched the prevalence of long Covid, views five weeks beyond the initial infection as long Covid's starting point.<sup>2</sup>

**“Different people have different definitions. The ME Association considers long covid to be symptoms that are present at 12 weeks after an infection and without an alternative diagnosis.”**

Dr Charles Shepherd, Trustee and Honorary Medical Adviser, ME Association

**Figure 1: Defining long Covid**

		Initial infection	WEEK 4	WEEK 8	WEEK 12	AND BEYOND
2021	WHO <sup>7</sup>	Acute Covid-19				Post-Covid-19 condition
2021	NHS <sup>8</sup>	Acute Covid-19	Ongoing symptomatic Covid-19 (long Covid)			Post Covid-19 syndrome (long Covid)
2022	NICE/SIGN/RCGP <sup>6,5</sup>	Acute Covid-19	Ongoing symptomatic Covid-19 (long Covid)			Post Covid-19 syndrome (long Covid)
2023	COVIDENCE UK <sup>9</sup>	Acute Covid-19	Long Covid			
2023	DHSC UK <sup>10*</sup>	Acute Covid-19	Long Covid			
2023	ONS <sup>2</sup>	Acute Covid-19		Long Covid		

## Addressing long Covid

The UK has taken significant steps to address the challenges of long Covid, developing comprehensive guidelines to guide management and treatment. NICE-issued guidelines focus on recognising, investigating and rehabilitating patients with long Covid.<sup>6</sup> These recommend assessing people with new or ongoing symptoms, conducting investigations and referrals, planning care and managing the condition, including self-management strategies. The guidelines also emphasise the importance of providing appropriate support and rehabilitation services to individuals with long Covid.

The NHS has established post-Covid services across England, offering assessments, tests, and tailored treatment and support for adults and children with long Covid. However, after March 2024, Integrated Care Boards will be responsible for long covid treatment. The deployment of £90m (US\$113.3m) in funding further supports services.<sup>8</sup> These guidelines and services aim to address the long-term effects of Covid-19, provide comprehensive care, and empower individuals and healthcare professionals to effectively manage and support those affected.

### National guidance on long Covid

Guidance	Issuing agency	Year
Covid-19 rapid guideline: managing the long-term effects of Covid-19 <sup>6</sup>	NICE	2021
Addressing the health challenge of long Covid <sup>11</sup>	BMA (British Medical Association)	2022

<sup>5</sup> The National Institute for Healthcare and Excellence (NICE); Scottish Intercollegiate Guidelines Network (SIGN); Royal College of General Practitioners (RCGP)  
<sup>#</sup> Department of Health and Social Care (DHSC)

**Understanding the economic impact**

Long Covid has had a notable impact on the UK economy. The long-term healthcare costs associated with managing the symptoms, rehabilitation and mental health pose a considerable financial challenge.<sup>14</sup> In the coming years, publications investigating the long-term healthcare clinical and economic burden of long Covid in the UK are expected to increase. Additionally, the impact on workforce productivity and potential long-term disability resulting from this condition further contribute to the economic burden, with an estimated 80,000 people having left employment due to long Covid.

**Understanding health economics in UK**

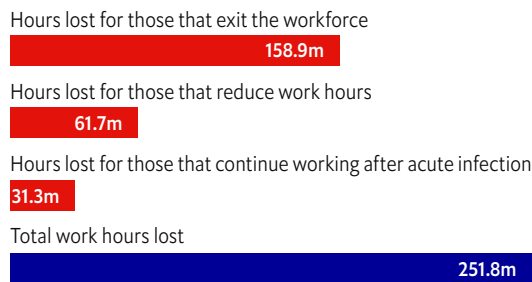
Indicator	Value
Gross Domestic Product (GDP) in US\$ <sup>12</sup>	<b>\$3.4trn</b>
Current Health Expenditure (CHE) <sup>13</sup>	<b>\$386.1bn</b>
CHE as % GDP <sup>13</sup>	<b>12%</b>
CHE per capita in US\$ <sup>13</sup>	<b>\$5,738</b>
Out-of-pocket Expenditure (OOPS) as % of CHE <sup>13</sup>	<b>14%</b>
Out-of-Pocket Expenditure (OOPS) per capita in US\$ <sup>13</sup>	<b>\$775</b>

**Workforce impact**

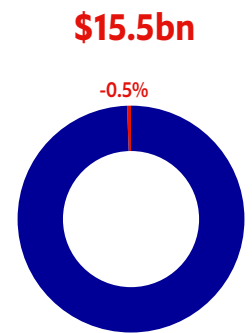
While long Covid symptoms have prompted some individuals to leave the workforce, others take time off work or reduce their work hours due to symptoms. When these changes in employment status are considered, long Covid could result in more than 251.8m work hours lost in 2024† – a potential cost of more than US\$15.5bn (See Figure 2).

**Figure 2: Estimating the workforce impact†**

**Work hours lost due to long Covid**



**GDP loss due to long Covid**



Economist impact calculation  
† For more information, see Appendix A: Methodology

**Supporting long Covid patients**

Advocacy groups in the UK such as “Long Covid Support” and “Long Covid SOS” play a crucial role in addressing and combating this stigma. They raise awareness about long Covid, educate the public and challenge misconceptions. These groups advocate for the rights and needs of long Covid patients, promoting access to healthcare, disability accommodations and supportive resources. By destigmatising long Covid and fostering a supportive and inclusive environment, advocacy groups help individuals with long Covid feel validated, understood, and empowered to seek the care and support they need.

**Long Covid Support<sup>15</sup>**

- Long Covid Support was involved in a pilot workshop exploring body mapping as a creative research method to visualise the diverse experiences of women living with long Covid in the UK.
- Long Covid Support and Long Covid Kids have published the first-ever data on the effect of Covid reinfections on people with long Covid.

**Long Covid SOS<sup>16</sup>**

- Along with Pandemic Aid Networks and Long Covid Kids, Long Covid SOS has worked to highlight the flaws in a highly publicised study that suggested that most people with long Covid recover within a year.
- In collaboration with academics, Long Covid SOS launched their survey on the impact of vaccines on long Covid in March 2021.

**“I think it’s important to acknowledge that gaslighting is a real phenomenon. Many people, including physicians, are sceptical about its existence and believe it to be a psychosomatic condition. This undermines the experiences of those affected. This lack of recognition makes it challenging for people to find support and access beneficial treatments for their symptoms.”**

Dr Helen Ward, Professor of Public Health, Imperial College London

† Assuming 2.9% of the population has long covid, as reported by UK ONS

## Raising awareness

Patients' self-advocacy has played a major role in identifying and understanding long Covid. As Dr Charles Shepherd tells us, "Physicians and researchers were scratching their heads and running in parallel to try to understand the condition. It was the patient community with these symptoms that labeled this long covid."

Still, affected individuals face challenges and discrimination due to the lack of understanding and awareness of the condition. Many people dismiss their symptoms as psychosomatic or attribute them to other causes, leading to feelings of invalidation and isolation. This stigma can also result in a lack of support and access to appropriate healthcare services. As Dr Helen Ward explains, "From a clinical perspective, there has not been enough capacity to treat long Covid. Mostly, there has not been sufficient training or education for clinicians across the board. So many long Covid patients go to their general doctors who may not know much about long Covid and may be unsupportive." Better awareness for patients and providers is essential to providing adequate support for long Covid patients.

Economist Impact would like to thank the following experts for sharing their insights and experiences:

- **British Medical Association (BMA)**
- **Charles Shepherd, MD, Trustee and Honorary Medical Adviser, ME Association**
- **Helen Ward, FRCP, FFPH, Professor of Public Health, Imperial College London**

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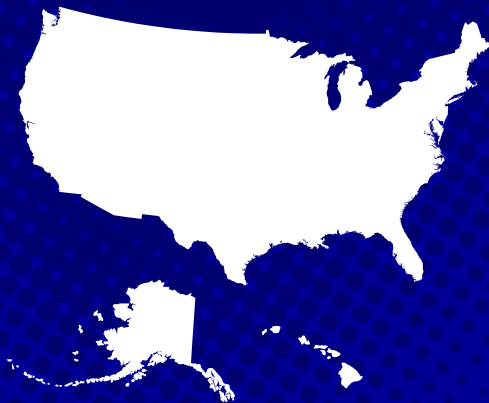
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## LONG COVID COUNTRY PROFILES

# United States

While frustrating knowledge gaps about long Covid remain, the burden is clear: long Covid continues to exact a substantial health toll worldwide, with implications for health, employment and economies. The following provides a snapshot of country-level efforts to mitigate the consequences of this complex condition and provide support for affected individuals.



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## Key takeaways

- In the United States (US), long Covid refers to individuals who experience symptoms for more than four weeks after an initial Covid-19 infection. This definition includes patients with any symptoms beyond the acute phase.
- Long Covid has tangible economic repercussions in the US, with experts estimating its impact as high as US\$230bn annually, approximately 1% of the total US Gross Domestic Product (GDP). Our analysis suggests that long Covid could result in more than 1.5bn lost work hours in 2024—a potential cost of more than US\$ 152.6bn.
- Federal initiatives and new legislation, such as the Secretary’s Advisory Committee on long Covid and the Office of Long Covid Research and Practice, aim to enhance awareness about long Covid and the resources available for managing the condition. If successfully passed, this legislation could improve support for patients.
- Long Covid clinics play a pivotal role but are under-funded.

**“Long Covid is defined in different ways in different settings and many researchers are using a “catch all” approach in the absence of a theoretically rigorous definition.”**

Dr David Cutler, Otto Eckstein Professor of Applied Economics, Harvard University

## Long Covid in numbers

The US Household Pulse Survey, carried out by the US Census Bureau, revealed that 3.4% of the population had long Covid at the time of the study, and 6.9% have had long Covid at some point.<sup>1</sup> This equates to more than 11m people currently.

### Background measures

Total population <sup>2</sup>	<b>333.3m</b>
% of population who have ever had long Covid <sup>1</sup>	<b>3.4%</b>
% of population who have ever had long Covid <sup>1</sup>	<b>6.9%</b>
<b>Vaccination rate<sup>3</sup></b>	
• At least one dose	<b>82%</b>
• Complete primary series	<b>70%</b>
• At least one booster	<b>36%</b>
Cumulative cases of Covid-19* <sup>4</sup>	<b>103.3m</b>

\*Cumulative case data include all reported cases from the start of the Covid-19 pandemic through the end of the Covid-19 emergency period (5 May 2023), when many countries ended consistent collection of Covid-19 data.

## Defining long Covid

The US follows the Centers for Disease Control and Prevention (CDC) definition of long Covid, which refers to individuals who continue to experience symptoms for more than four weeks after the initial infection.<sup>5</sup> The CDC definition contrasts with the World Health Organization (WHO) definition, which specifies a broader range of symptoms and specifies 12 weeks beyond acute infection as the time frame (Figure 1). Both definitions acknowledge the importance of further research and understanding of the long-term effects of Covid-19.<sup>6</sup>

Figure 1: Defining long Covid

		Initial infection	WEEK 4	WEEK 8	WEEK 12	AND BEYOND
2021	WHO <sup>6</sup>	Acute Covid-19			Post-Covid-19 condition	
2023	CDC <sup>5</sup>	Acute Covid-19	Post-Covid conditions			

## Addressing long Covid

### Legislation

Proposed legislation in the US indicates growing awareness among policy makers about the need to address long Covid and its impact.

The bipartisan CARE for Long Covid Act,<sup>9,10</sup> another legislative proposal, addresses post-acute sequelae of SARS-CoV-2 infection (PASC) by fostering research, data collection, and resource development to understand and mitigate its impacts on individuals' rights and health care. It further seeks to improve information dissemination and legal support for PASC sufferers. Both initiatives reflect a strategic effort to bolster awareness and support for long Covid/PASC, marking significant progress towards a national coordinated response.

The Long Covid RECOVERY NOW Act,<sup>11</sup> another legislative proposal, focuses on combating long Covid through grants for health services and research, emphasising a comprehensive treatment approach and addressing social challenges impacting recovery. It also aims to enhance data sharing for research and guide support through Medicaid and the Children's Health Insurance Programme (CHIP).

### National guidance

The US government has issued multiple guidance documents for understanding and addressing long Covid, including the necessary information for securing disability benefits as a result of the condition.

### Agencies

In November 2023, the US Department of Health and Human Services (HHS) formed the Secretary's Advisory Committee on Long Covid. The primary objective of this committee is to provide recommendations on research and innovation in the government's comprehensive response to the enduring effects of Covid-19. The committee's focus on health equity is notable, ensuring that all individuals have access to the necessary resources and support regardless of their background or circumstances.<sup>15,16</sup>

### Strategies

To better address long Covid in the US, HHS is set to provide nine grant awards of US\$1m each for up to five years to support existing multidisciplinary Long Covid clinics.<sup>17</sup>

### Legislation on long Covid

Legislation	Last action
S.2560 Long Covid Support Act <sup>7</sup>	Introduced July 2023
H.R.3258 TREAT Long Covid Act <sup>8</sup>	Introduced May 2023
H.R.1616 CARE for Long Covid Act <sup>9</sup>	Introduced March 2023
S.801 CARE for Long Covid Act <sup>10</sup>	Introduced March 2023
H.R.1114 Long Covid RECOVERY NOW Act <sup>11</sup>	Introduced February 2023

### National guidance on long Covid

Guidance	Issuing agency	Year
Guidance on "Long Covid" as a Disability Under the ADA, Section 504, and Section 1557 <sup>12</sup>	US Department of Health and Human Services, Office for Civil Rights (OCR)	July 2021
Long Covid: A Guide for Health Professionals on Providing Medical Evidence for Social Security Disability Claims <sup>13</sup>	Social Security Administration	June 2023
National Covid-19 Preparedness Plan <sup>14</sup>	White House	March 2022

**Understanding the economic impact**

Long Covid brings economic consequences, affecting individuals' work capacity, necessitating ongoing healthcare, and potentially leading to long-term disability. Kathryn Bach, an expert in Long Covid's labour market impacts, has observed a significant number of people unable to work: "We probably have about 700,000 people fully out of work due to long Covid," she tells us.

One study estimated the annual medical costs ranging from \$43bn to \$172bn and lost income from \$101bn to \$430bn, based on nearly 86m documented US Covid-19 survivors as of June 25, 2022, and a range of 5-20% of those survivors currently afflicted with long Covid.<sup>18</sup>

**Understanding health economics in US**

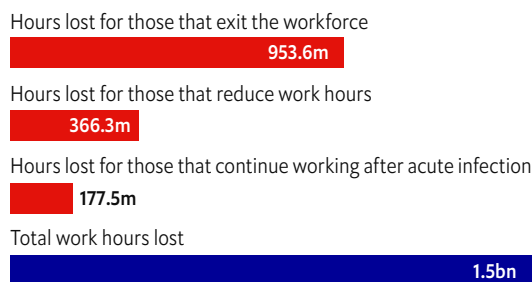
Indicator	Value
Gross Domestic Product (GDP) in US\$ <sup>19</sup>	<b>\$28.5trn</b>
Current Health Expenditure (CHE) <sup>20</sup>	<b>\$4.0trn</b>
CHE as % GDP <sup>20</sup>	<b>17%</b>
CHE per capita in US\$ <sup>20</sup>	<b>\$12,012</b>
Out-of-pocket Expenditure (OOPS) as % of CHE <sup>20</sup>	<b>11%</b>
Out-of-Pocket Expenditure (OOPS) per capita in US\$ <sup>20</sup>	<b>\$1,285</b>

**Workforce impact**

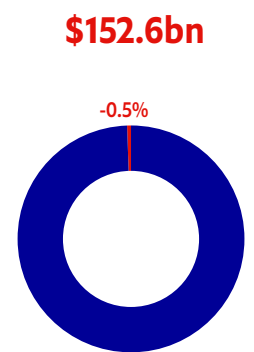
While long Covid symptoms have prompted some individuals to leave the workforce, others take time off work or reduce their work hours due to symptoms. When these changes in employment status are considered, long Covid could result in 1.5bn work hours lost in 2024<sup>†</sup> – a potential cost of more than US\$152.6bn (See Figure 2).

**Figure 2: Estimating the workforce impact<sup>‡</sup>**

**Work hours lost due to long Covid**



**GDP loss due to long Covid**



Economist impact calculation  
<sup>‡</sup> For more information, see Appendix A: Methodology

**Supporting long Covid patients**

Advocacy groups play a pivotal role in addressing the challenges of long Covid by creating awareness, advocating for enhanced support and resources, and influencing policy reforms. These groups are essential in drawing attention to the difficulties experienced by individuals and addressing their requirements.

Prominent advocacy groups in the US include:

**Long Covid Alliance<sup>21</sup>**

- The Long Covid Alliance has collaborated with the National Academies of Sciences, Engineering, and Medicine Symposium on Long Covid, sharing best practices.
- They have endorsed the reintroduction of S.801 CARE for Long Covid Act and H.R.7482 TREAT Long Covid Act, which offer support and resources to individuals affected by long Covid.
- The Long Covid Alliance has been granted US\$77,000 by the CDC Foundation to develop the Infection-Associated Chronic Conditions initiative.

**Survivor Corps<sup>22</sup>**

- Survivor Corps is another influential advocacy group dedicated to addressing long Covid. It has undertaken various initiatives, including organising support groups, disseminating information and resources, and conducting surveys to gather data on long Covid.
- Survivor Corps aims to drive policy changes and improve support services by amplifying the voices of individuals with long Covid and collecting valuable data.

**“It can be quite hard for people with long Covid to receive proper care. People with this new condition might not realise what can be done about it or their symptoms may not be linked to long Covid.”**

Dr Bill Hanage, Associate Professor of Epidemiology and Associate Director, Center for Communicable Disease Dynamics, Harvard University

<sup>†</sup> Assuming 3.4% of the US population has long Covid, per US Household Pulse Survey



## Raising awareness

Despite the efforts of advocacy groups, many physicians in the US are still unfamiliar with this condition, and public health messaging has been lacking, according to patient advocate Dr Julia Moore Vogel, “There are a lot of Physicians out there [in the US] who aren’t even familiar with long Covid, and the public health messaging has not been there, and then even for people that are aware of it a lot of times you go to a physician and if they aren’t aware or tends to dismiss this type of symptom, that makes you doubt yourself.”

This lack of awareness and attention can undermine patients’ efforts to seek proper treatment and result in limited support for long Covid patients, as Dr Bill Hanage, an Associate Professor of Epidemiology at Harvard University, explains, “There’s been a very significant loss of support for Covid research in general. [...] It’s beginning to be neglected again... and longer Covid, probably in particular.”

It is essential for public health messaging to acknowledge the severity of long Covid and provide the necessary resources and support for those dealing with its lingering effects on their mental health. This will ensure that long Covid patients receive the care and assistance they need. Dr Julia Moore Vogel explains, “I think, unfortunately, the public health messaging about Covid has made it even harder for those that are dealing with the lingering effects to get the support that they need to be able to maintain their mental health.”

Economist Impact would like to thank the following experts for sharing their insights and experiences:

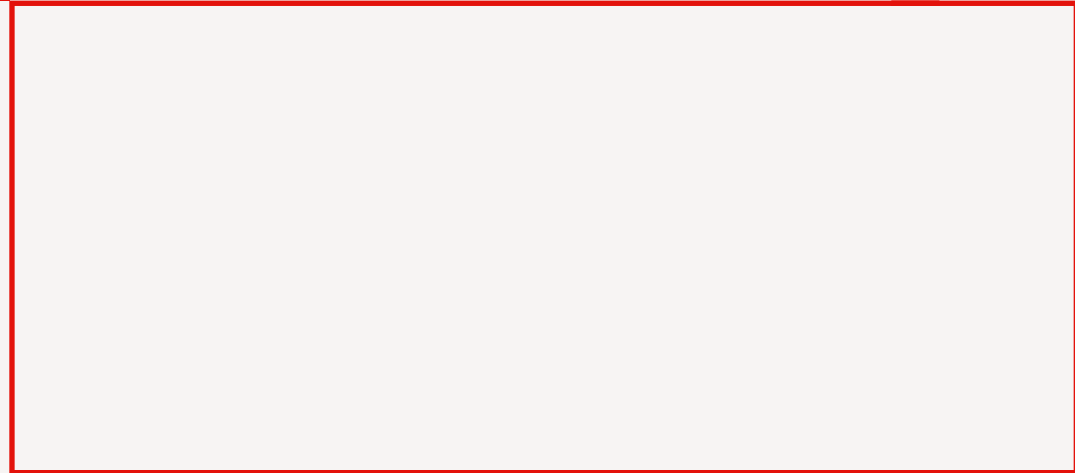
- **Katie Bach, MBA, Board Chair, PolyBio Research Foundation**
- **David Cutler, PhD, Otto Eckstein Professor of Applied Economics, Harvard University**
- **Bill Hanage, PhD, Associate Professor of Epidemiology and Associate Director, Center for Communicable Disease Dynamics at Harvard University**
- **Lisa Sanders, MD, FACP, Medical Director, Long Covid Multidisciplinary Care Center, Yale University**
- **Julia Moore Vogel, PhD, MBA, Long Covid patient-researcher, Patient-Led Research Collaborative; Senior Program Director, Scripps Research**

Economist Impact bears sole responsibility for the content of this profile. The findings and views expressed herein do not necessarily reflect the views of our sponsor or the experts we interviewed.

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### **LONDON**

The Adelphi  
1-11 John Adam Street  
London WC2N 6HT  
United Kingdom  
Tel: (44) 20 7830 7000  
Email: london@economist.com

### **GENEVA**

Rue de l'Athénée 32  
1206 Geneva  
Switzerland  
Tel: (41) 22 566 2470  
Fax: (41) 22 346 93 47  
Email: geneva@economist.com

### **SÃO PAULO**

Rua Joaquim Floriano,  
1052, Conjunto 81  
Itaim Bibi, Sao Paulo - SP  
04534-004  
Brasil  
Tel: +5511 3073-1186  
Email: americas@economist.com

### **NEW YORK**

900 Third Avenue  
16th Floor  
New York, NY 10022  
United States  
Tel: (1.212) 554 0600  
Fax: (1.212) 586 1181/2  
Email: americas@economist.com

### **DUBAI**

Office 1301a  
Aurora Tower  
Dubai Media City  
Dubai  
Tel: (971) 4 433 4202  
Fax: (971) 4 438 0224  
Email: dubai@economist.com

### **WASHINGTON DC**

1920 L street NW Suite 500  
Washington DC  
20002  
Email: americas@economist.com

### **HONG KONG**

1301  
12 Taikoo Wan Road  
Taikoo Shing  
Hong Kong  
Tel: (852) 2585 3888  
Fax: (852) 2802 7638  
Email: asia@economist.com

### **SINGAPORE**

8 Cross Street  
#23-01 Manulife Tower  
Singapore  
048424  
Tel: (65) 6534 5177  
Fax: (65) 6534 5077  
Email: asia@economist.com