Survey of Long Covid Burden and Practice in Healthcare Workers (ORCHESTRA-SCOPE-HCW)

V12 – 09/10/2025

Table of contents

List of acronyms

Acronym	Full Name
LC	Long COVID
IACC	Infection-Associated Chronic Condition
HCW	Healthcare Worker
KAP	Knowledge, Attitudes, and Practices
WHO	World Health Organization
NASEM	National Academies of Sciences, Engineering, and Medicine
GDPR	General Data Protection Regulation
EU	European Union
REDCap	Research Electronic Data Capture
PIs	Principal Investigators
SAR	Special Administrative Region
ICJME	International Committee of Medical Journal Editors

1. Background

Long COVID (LC), also known as post-COVID-19 condition, has been defined as an infection-associated chronic condition (IACC) that occurs after SARS-CoV-2 infection and is present for at least 3 months as a continuous, relapsing and remitting, or progressive disease state that affects one or more organ systems (1). These long-term sequelae of COVID-19 can have profound effects on quality of life and ability to participate in society, as well as loss of productivity and wider economic impacts.

While it is clear that LC continues to have substantial impacts at both the individual and societal level, estimating the true burden is challenging. As there is currently no definitive diagnostic test, diagnosis is based on clinical presentation, which can be difficult due to the wide variability and non-specific nature of symptoms among patients. LC can follow severe, mild, or even asymptomatic SARS-CoV-2 infections, including those previously undiagnosed, and LC symptom onset may be continuous from the time of acute infection or delayed for weeks or months following an apparent full recovery (1). Diagnoses of LC are highly dependent on clinicians' experience with and perceptions around LC (2). In addition, LC prevalence estimates vary depending on study context, methodology, and SARS-CoV-2 variant. Research in high-income settings suggest that between 10-30% of non-hospitalised COVID-19 patients (3) and up to 49% of hospitalised patients (4) may experience LC symptoms. Comparing 17 countries across four continents, a prospective cohort study found that 6-12 months following acute infection, 57% of COVID-19 patients in high-income countries reported persistent symptoms, compared with 40% in low-and-middle-income countries (LMICs) (5).

There remains limited evidence about the global burden of LC amongst healthcare workers (HCW), a critical population for ensuring a functioning healthcare system and for healthcare surge capacity. During the COVID-19 pandemic, HCWs, particularly those who were patient-facing, had high rates of SARS-CoV-2 infection (6), suggesting that there may be potential for a higher burden of LC amongst this group. A 2025 systematic review and meta-analysis reported a 40% prevalence of LC amongst HCWs who had a previous SARS-CoV-2 infection (7). However, results varied substantially by setting, and no countries from the eastern part of WHO European Region were included in the review.

Some studies have found that the prevalence of LC has decreased over time, which may be associated with the dominant circulating SARS-CoV-2 variant during different periods. A UK study conducted in 2024 that found that the percentage of individuals with persistent Long COVID symptoms declined from 52.9% during the wild-type period to 20.9% during the Omicron period in healthcare workers (*Foulkes, Sarah et al*). While more recent trends may continue to show a decrease in Long COVID prevalence, comprehensive data on the burden among healthcare workers in different settings is limited. This study will provide updated data and insights into current prevalence and trends since the pandemic started, a knowledge gap that has been identified by WHO and all of the country stakeholder sites involved in this survey

Additionally, little is known about the knowledge, attitudes, and practices (KAP) towards LC among HCWs. As HCW are responsible for the diagnosis and management of LC patients, their perceptions of the condition may have a large impact on patient experience and outcomes.

To support an adequate LC response within Europe and globally, and to learn from LC in HCWs in order to better plan and manage future post-emerging infection sequelae in HCWs, a better understanding of the burden and KAP related to LC amongst HCWs is needed. We plan to address these gaps by conducting a cross-sectional study consisting of two surveys across eight European countries (five of which are in the eastern part of WHO European Region), and Hong Kong Special Administrative Region (SAR) (China). The study objectives are i) to estimate and describe the burden of LC amongst HCWs (survey 1), and ii) to explore the KAP towards LC amongst HCWs (survey 2). Data will be analysed at both the aggregated and country-level to identify any differences in burden and perception of LC amongst countries. The results from this study will address knowledge gaps at both the country and regional-level to better inform resource allocation, interventions, and training needs related to LC in the region.

1.1. Objectives

This study has two objectives:

- **Objective 1 (burden)**: To estimate and describe the burden of LC, including its prevalence and impact on quality of life, among HCWs since the start of the COVID-19 pandemic in 2020;
- **Objective 2 (KAP)**: To explore the knowledge, attitudes, and practices (KAP) towards LC among healthcare providers.

2. Methods

2.1. Study design and overview

We will carry out a cross-sectional study using two electronic questionnaires administered to HCW across sites in nine participating countries. We invited public health practitioners and researchers in multiple countries to lead the surveys, and those that accepted the invitation have been included as co-investigators.

The study comprises two parts, which can be administered together or separately.

Part 1 (burden): This survey will be administered to all types of HCWs, including those in both clinical and non-clinical roles, across different healthcare settings. This questionnaire will capture information related to previous SARS-CoV-2 infection, LC diagnosis, LC symptoms, and impacts on quality of life.

Part 2 (KAP): This survey will be administered to clinicians who have direct contact with patients and may diagnose or manage LC patients in the context of their work. Target populations may include HCWs such as general practitioners (GPs) and nurses working in primary care, hospitals, and in specialised clinics that are involved in the diagnosis and management of LC patients.

Each participating institution will oversee its own survey implementation, including translation to the local language, survey distribution and data collection. A common set of core questions will be used to allow for pooled analysis and comparison of results. Institutions may adapt surveys by adding additional questions if desired.

2.2. Study Governance / Roles and Responsibilities

The following table outlines the main stakeholders involved in this study and their respective roles.

Stakeholder	Roles and Responsibilities
Participating site institutes	Lead study implementation at their sites, including coordination with local partners, obtaining ethical approval (when needed), recruitment, data collection, and where appropriate - analysis at the site/country level.

	Participating sites also contributed to the development of the protocol and questionnaire through an iterative and collaborative feedback process.
WHO/Europe	Conceptualized and proposed the study; coordinated development of the protocol, research questions, and core questionnaire with input from all sites; support collaboration across sites; provide technical guidance where appropriate; lead pooled, multi-country analysis.
Ministries of Health (where applicable)	Provide oversight and support local implementation as needed.
Professional associations (where applicable)	Facilitate engagement with healthcare workers (HCWs).

The study was initiated by WHO/Europe and subsequently developed in close collaboration with participating sites. Local investigators provided input during the design stage, particularly in shaping the protocol and questionnaire and ensuring that procedures are appropriate for their settings.

Participating researchers were mainly identified through an existing network of healthcare researchers collaborating with WHO/Europe. The study was first presented to this network, and interested members joined. Additional research groups were invited based on their expressed interest.

2.3. Study population

The survey will be conducted in sites across nine countries, eight of which are within the WHO Europe region. The following institutions in the following countries will participate:

1. Albania: Institute of Public Health, Tirana University Hospital “Mother Theresa”, Durres Regional Hospital, and Fier Regional Hospital
2. Armenia: National Center for Disease Control
3. Azerbaijan: Public Health and Reforms Center Ministry of Health
4. Estonia: Institute of family medicine and public health, University of Tartu
5. Georgia: National Center for Disease Control
6. Hong Kong SAR: The University of Hong Kong School of Public Health
7. Ireland, St James’s Hospital (SJH) in Dublin and University Hospital Galway (UHG)
8. Israel: Sheba Medical Center
9. Portugal: National Health Institute Doutor Ricardo Jorge (INSA)
10. Romania: Central Military Emergency University Hospital "Dr. Carol Davila", Bucharest
11. Spain: Miguel Servet University Hospital, IIS Aragón and University of Oviedo
12. EuCARE consortium:
    - Portugal: Unidade Local de Saúde de Lisboa Ocidental (ULSLO) - Lisbon
    - Italy: Azienda Socio-Sanitaria Territoriale Santi Paolo e Carlo (ASST) - Milan

  - Germany: Heinrich Heine University (HHU) - Dusseldorf
  - Poland: Pomorski Uniwersytet Medyczny (PUM) - Szczecin
  - Brasil: Universidade Federal de Minas Gerais (FUMG) - Minas Gerais
  -

13. The United Kingdom: UK Health Security Agency

Inclusion criteria:

- Currently ≥ 18 years of age
- Worked as a healthcare worker at any time since the start of the pandemic in one of the participating sites
- Capacity to give informed consent

Exclusion criteria:

- Currently < 18 years of age
- Not currently working in a healthcare role in one of the participating countries

2.4. Operational definitions

Healthcare worker (HCW) is defined as per the WHO international classification of health workers (8). HCWs are grouped into five broad categories: health professionals, health associate professionals, personal care workers in health services, health management and support personnel and other health service providers not elsewhere classified. Healthcare workers can include those in patient-facing and non-patient facing roles.

Long COVID (LC) definition:

- The National Academies of Sciences, Engineering, and Medicine (NASEM), 2024: “an infection-associated chronic condition (IACC) that occurs after SARS-CoV-2 infection and is present for at least 3 months as a continuous, relapsing and remitting, or progressive disease state that affects one or more organ systems.”(1)
- The WHO, 2022: “The continuation or development of new symptoms 3 months after the initial SARS-CoV-2 infection, with these symptoms lasting for at least 2 months with no other explanation”. (9)

LC burden will be evaluated using both the NASEM and WHO case definitions.

2.5. Participant recruitment and enrollment

Each site will carry out their own recruitment and enrolment of participants. While sites can approach recruitment according to their specific context they are encouraged to follow the general guidance below:

- The survey should be shared widely among HCWs to ensure a representative sample with respect to demographics, occupation, and geography in order to maximize the generalizability of the results. Efforts should be made to make the survey available to diverse HCW populations using diverse dissemination tools. Representativeness of the sample should be evaluated relative to the national demographic, occupational, and geographic distribution of HCWs, where these data are available.
- Local PIs will initiate recruitment through hospital management, professional associations, and/or occupational health professionals. These groups will support communication with prospective participants by disseminating study information and facilitating access to the study team or survey link.
- **Information sharing:** Potential participants will be informed of the study objectives, procedures, and voluntary nature of participation. They will be provided with clear instructions on how to contact the study team and/or access the survey link.

As each site will be responsible for disseminating the survey to their participants, the data collection process may vary.

For part 1 of the study, all types of HCW can be included (see above definition). Part 2 of the study should ideally target HCWs who are in roles where they could diagnose or manage LC patients, which may differ by country.

2.6. Sample size

For the first part of the survey, which addresses LC burden among HCWs, we assumed a conservative estimate of 20% overall prevalence of LC. Using this estimate, with a 95% confidence level and a 5% margin of error, we would need 246 respondents. However, assuming conservative estimate of a 20% non-completion rate, our target sample size would be a minimum of 308 participants per site.

For the KAP survey, we assumed conservatively that 50% of HCWs would provide a specific response of interest to questions regarding knowledge, attitudes, or practices related to Long COVID. For example, this could refer to the proportion of HCWs who correctly identify that Long

COVID can occur after mild or asymptomatic SARS-CoV-2 infection. Using 50% as an assumption is conservative and maximizes the estimated sample size, ensuring sufficient precision for prevalence estimates. Using the parameters of a 95% confidence level and a 5% margin of error, a minimum sample size of 384 is required. Assuming a similar non-completion rate, our target sample size would be 480 participants per site for this part of the survey.

3. Data

3.1. Data collection

Participants will complete either an online or paper-based questionnaire. Sites may wish to include a question and/or declaration at the beginning of the survey to verify that respondents are HCWs. Questionnaires will be sent electronically (e.g., via email or text message), hosted by REDCap or an alternative platform, or hard-copy questionnaires may be completed, in which case data will be later entered into the database.

If a link will be distributed, the following precautions will be taken:

- Participant contact details will be obtained through hospital management, professional associations, or occupational health offices. Only minimal information needed to deliver the invitation (e.g., email or phone number) will be used. Participants will receive the link or invitation without sharing their contact information with anyone outside the study team.
- Privacy Safeguards:
    - IP addresses will not be used to identify participants.
    - Responses will be de-identified
    - Sites should only share de-identified data, without unique ID numbers, when submitting data to the common database for the pooled analysis. In addition, specific ages should not be provided in the dataset submitted to the common database; instead, aggregated age bands should be provided.

In sites where paper-based questionnaires are used, these will be distributed to HCWs through hospital management or designated focal points. HCWs will complete them themselves. In some cases, trained interviewers from e.g. Public Health Institute may administer the survey by telephone (or in person, if required) and record responses.

REDCap is a secure web application for building and managing online surveys and databases. A shared REDCap questionnaire will be created for the two parts of the survey with a set of core questions agreed upon by participating sites. Sites will be able to adapt this template by adding additional site-specific questions if desired. The core set of questions will be included in all surveys.

The questionnaire will include demographic information, and will also include the following information:

Part 1 (burden) for all HCW:

1. History of chronic conditions other than LC
2. COVID-19 vaccination status (number of COVID-19 vaccine doses)
3. COVID-19 diagnosis and history
4. Long COVID diagnosis and history
5. Symptoms related to Long COVID
6. Long COVID impact on quality of life/work
7. Experience of Long COVID treatment/management

Part 2 (KAP) for HCW working with LC patients:

1. Knowledge of LC
    a. Symptom onset and duration
    b. Vaccination and recent infection
2. Attitudes towards LC
    a. Perception of LC as a medical condition
    b. Confidence in ability to identify and manage LC patients
    c. Training/training needs around LC
3. Practices related to LC
    a. Diagnosis
    b. Management approach
    c. Barriers and challenges

The two survey components is expected to take 11-17 minutes to complete in total.

3.2. Data management

Several options for data collection will be available. Sites can use the REDCap online questionnaire that stores the data on a secure WHO server. In addition, the REDCap questionnaire template will be shared, and sites will be able to use their own REDCap server. Alternatively, sites may use their own software for administering surveys and storing data if preferred.

Questionnaires can be adapted and translated as required. Countries/sites will be responsible for the translation of questionnaires to own language, if it is not English, and to adjust the questions to their cultural context. At all sites, the questionnaire should be piloted among a group of healthcare workers that is representative of the target population of the HCW population at the site, to the extent possible. Adjustments should be made to the wording of the questionnaire based on the piloting in order to tailor the survey to the local language and cultural setting where the survey is being administered.

The European Union (EU) General Data Protection Regulation (GDPR) prevents transfer of data outside of the EU. Therefore, in order to accommodate participating institutions based in EU countries and EU accession countries, only secure platforms hosted in EU member countries will be used for data transfer and storage.

Data ownership in this multi-site study resides with the individual participating sites, and the sharing of de-identified individual level data will be subject to country specific governance protocols and where it is lawful, ethical and safe to do so. Aggregated summary data will be released via publications in peer-reviewed journals, conference submissions or presentations, and reports.

Data sharing will be coordinated by WHO/Europe. Any individual-level data that include identifiers enabling linkage to specific participants will have these identifiers removed before sharing outside the local site or with the pooled dataset. Only de-identified data, where participants cannot be directly identified, will be shared for analysis.

Sites will be responsible for identifying and removing duplicate submissions. The process may differ by site.

3.3. Data analysis

Sites/countries will carry out analysis on data from their own participants (if they choose to do so), and in addition a pooled analysis will be carried out by WHO Europe with support and input from all sites.

For part 1 (burden), survey responses will be characterized using descriptive analysis (e.g. proportions/frequencies). We will estimate the prevalence (percentage) of LC amongst HCW will be estimated, both for clinically diagnosed and self-diagnosed LC. We will also characterize symptom profiles, as well as LC impact on quality of life/work. We will carry out multivariable analysis through calculating prevalence ratios using log-binomial regression or similar, examining associations between LC prevalence and factors such as demographics, comorbidities, and vaccination status. We will describe the burden of LC using both the WHO case definition and the NASEM case definition. Models will be run separately for each definition, and in additional we will include an analysis of LC by either definition.

For part 2 (KAP), we will conduct a descriptive analysis to characterize HCW responses in each of the three domains.

For both survey parts, analyses will be stratified by age group, sex, and HCW role to perform univariable analysis. In addition, multivariable analyses (e.g. logistic regression) may be carried out to explore associations between these factors and KAP.

Analyses of the pooled data will be carried out using R and/or STATA.

More details about the analysis will be provided in a separate statistical analysis plan.

3.4. Data storage and future analysis

Access to individual-level study data is limited to site PIs, the WHO study team, and authorized analysts. Data will be securely stored on password-protected systems, and only aggregated results will be shared outside the research team.

Pooled and de-identified data will be securely stored for 10 years after study end to allow for potential future use, including re-analysis, comparison with other studies, or secondary research. No personally identifiable information will be retained. Study end is defined as the publication of study results.

Data are owned by each site and data management will be the responsibility of the site. Sites retain the right to conduct analyses using their own site-specific data independently. All sharing and use will comply with the commitments described in the participant information and informed consent.

In order to address requests from sites or third-party researchers to access the data in order to conduct specific analyses, a steering committee will be established that will include a representative from WHO/Euro and one representative from each participating site. The steering committee will oversee all data sharing decisions. Researchers or third parties who wish to conduct sub-analyses will be required to submit a data access request. All members of the steering committee will be given the opportunity to review all data access requests or proposals for secondary use. The committee will consider the benefits and risks of data use, compliance with existing data protection regulations (e.g., GDPR) and how confidentiality and privacy has been proposed to be maintained.

Data will only be released once there is unanimous agreement among all the steering committee members. Once the steering committee approves a proposal for analysis, de-identified data will be shared via an encrypted email exchange, with passwords for protected files sent separately.

3.5. Biases and limitations

There are several sources of potential biases in this study, which may differ for each objective.

General biases (both survey parts):

- Selection bias:
    - Survey respondents may not be representative of the site HCW population, which may vary depending on the sampling strategy used. This could lead to biased prevalence estimates and limit generalizability of results and comparability across sites. Site-specific weighting for representativeness of the general population could, however, be considered.
    - Online-only surveys may exclude participants with limited internet access (e.g. those in rural or low-resource settings, and older HCWs less comfortable with technology). This could lead to underrepresentation of specific HCW subgroups. However, this bias is likely to be minimal in most sites.
- Information bias: some concepts or nuances may not translate equivalently across countries, which could affect comparability and validity of responses.

Part 1 (burden) biases:

- Selection (response):
    - HCWs who have experienced LC/LC symptoms are more likely to take part in the survey. This could lead to an overestimate of the burden. Where possible, the non-respondents' and respondents' characteristics will be compared in order to better understand the difference between the two populations and to potentially correct for non-response bias.
    - HCWs with severe or disabling LC may be less likely to take part in the survey because they may no longer be working as HCWs, which could lead to an underestimate of the LC burden overall and particularly for severe manifestations. Sites can, however, consider including HCWs who are no longer working as HCWs but worked as HCWs at some point since the start of the COVID-19 pandemic.
- Recall:

  - The survey asks respondents to recall symptoms over a long time period (since the start of the pandemic). As a result, some respondents may inaccurately remember or forget symptoms if they have resolved, particularly as many symptoms are non-specific and difficult to attribute to LC. Furthermore, symptoms like brain fog may impact participants recall. Lastly, participants already formally diagnosed with LC may recall better the symptoms and dates of SARS-CoV-2 positive tests.
  - Participants may not accurately remember dates of positive Covid tests, particularly if they tested positive several times throughout the pandemic.
- Misclassification:
  - LC following asymptomatic infections without a positive test will not be identified as LC, possibly leading to underestimation of LC prevalence.
  - Due to the non-specific nature of many LC symptoms and lack of diagnostic test, some participants may be misdiagnosed with LC if symptoms are due to other unidentified causes. This may lead to overestimation of LC prevalence. Conversely, many individuals might be misdiagnosed with another condition, but actually have or had Long COVID. If such individuals also do not report thinking they had Long COVID and describe their symptoms, this will lead to an underestimation of LC prevalence.
  - Comorbidities that develop following SARS-CoV-2 infection due to other causes may be incorrectly attributed to COVID-19.

Part 2 (KAP) biases:

- Response: There may be a lower response rate amongst HCWs with strong positive or negative attitudes and practices around LC.
- Selection: HCWs with strongly positive or negative attitudes and practices around LC may be more likely to respond
- Social desirability: HCWs may deliberately or inadvertently respond in a way that reflects what they believe is expected regarding LC

4. Ethical considerations

4.1. Protection of human subjects

As part of the survey, but before any questions related to the actual survey are asked, informed consent will be obtained from all participants. The first part of the survey will clearly describe the background and purpose of the study, what the survey will entail (emphasizing that participation is voluntary), storage and protection of data they provide, and how the findings will be used. HCWs will only be able to complete the survey once they have provided consent.

No personally identifying data, such as name and date of birth, will be recorded in REDcap. Special care will be taken to protect paper and electronic documents from destruction, accidental loss, distortion, unauthorized disclosure, or access and any other form of unlawful processing. Surveys will be hosted on secure servers and electronic data will be kept in a password-protected computers, and only handled by people directly involved in the study.

Data will not be used for any commercial purposes, and only used as described to participants in the informed consent. All responses will be de-identified and data reported at the aggregated level. Consent to participate and link the historical data will be obtained before any data collection and linking.

Social media may be used as an optional method to promote the survey. If this approach is used, no personal identifiers or metadata from social media platforms will be collected.

4.2. Risks and benefits

The risks to participants in this study are minimal. The survey is planned to be anonymous, and there will be no professional consequences for taking part or choosing not to take part; these points will be explained to potential participants as part of the informed consent.

As with many health surveys, there is a risk of possible emotional distress resulting from questions about LC symptoms and impacts on quality of life. To mitigate this risk, we will ensure the information sheet clearly states the topic of the survey and the nature of the questions that will be asked. We will ensure that questions are carefully phrased to avoid emotive language and demonstrate the appropriate level of sensitivity and respect. Participating study sites could consider including a country-specific resource sheet for those who report strong mental health impacts, and could ask participants if they are interested in receiving information about available mental health resources.

There are no direct benefits for the participants taking part in this study, which will be made clear to participants in the informed consent language. There are, however, indirect benefits to HCW and society, through addressing knowledge gaps regarding LC amongst HCW across eight countries. The findings may be used to inform resources allocation, training, and influence policy to support improvements in the health of this population.

4.3. Ethical approval

Each site will be responsible for seeking ethics approval from its national or institutional ethics committee. In addition, the protocol will be submitted to WHO Ethics Review Committee.

4.4. Sharing of results

In addition to scientific manuscript, the study findings will be shared with national stakeholders, including Ministries of Health, participating institutes, and professional associations Each country will then determine how best to use the results to inform resource allocation, training needs, or policies to support healthcare workers. At the regional level, WHO will synthesize and disseminate multi-country findings to inform broader strategies and guidance.

Local data can be evaluated and published at the discretion of local study investigators. For all scientific publications that result from data collected in this survey, all authors should meet ICJME authorship criteria. All pooled analyses should be agreed on by representatives of all participating institutions that have conducted the survey and contributed data to the pooled analysis. If a third party is interested in conducting analyses using pooled survey data, this will only be carried out with consensus agreement of all participating institutions that have provided data for the pooled analysis.

The results will also be shared with participants. Local study results will be shared at the discretion of each participating site. WHO/Europe together with input from all the partners will prepare a lay summary of the pooled multi-country results, which can be translated and provided to participants and relevant communities. Participating sites will determine the most appropriate way to share these summaries with their participants and communities.

5. Timeline and funding

Although the timing of survey administration may vary by site, the table below outlines a provisional timeline:

Activity	Month 1	Month 2	Month 3	Month 4	Month 5	Month 6	Month 7	Month 8
Finalise generic protocol	🟦							
Submit to WHO ERC and obtain approval	🟦	🟦						
Finalise site protocols (and ethical approval if required)		🟦	🟦					

Data collection (online followed by paper/phone if required)			🟦	🟦				
Data cleaning and analysis (Sites)				🟦	🟦			
Pooled data analysis					🟦	🟦		
Manuscript write-up						🟦	🟦	🟦

[Sites to add additional information on funding if required]

Each site is responsible for securing their own funding to support country specific activities. WHO European region will provide central co-ordination.

6. Appendices

6.1. Informed consent form

[All participants should receive a copy of the participant information sheet, either via the online questionnaire or as a hard copy]

Survey to understand Long COVID burden and knowledge, attitudes, and practices (KAP) amongst healthcare workers in Europe.

Study background and purpose

You are invited to take part in a survey being conducted by the *[National Public Health Institute/Ministry of Health*/Academic Institution), in collaboration with the World Health Organization (WHO) Regional Office for Europe, This multi-country survey aims to improve [National Public Health Institute/Ministry of Health/Academic Institution] and the World Health Organization (WHO) Regional Office for Europe's understanding of the burden and impact of Long COVID on healthcare workers in (your country), in the European region, and in the world. In addition, the survey aims to evaluate knowledge, attitudes and practice of healthcare providers around Long COVID

It has the following objective(s) [keep both or select only one objective]:

1. *To understand how common Long COVID is among healthcare workers*
2. *To evaluate how Long COVID has affected the quality of life of healthcare workers*
3. *To better understand what healthcare providers know and believe about Long COVID, and how healthcare providers diagnose and manage Long COVID patients as part of their regular practice*

We are especially interested in healthcare workers, because healthcare workers are essential for the health and well-being of society. The survey results will help improve healthcare services and interventions related to Long Covid in (your country), the European region, and the world.

What happens if I take part?

You are eligible to participate if you are a healthcare worker currently working in *[country].* Participation is entirely voluntary and there are no consequences if you choose not to take part. You can withdraw from the survey by selecting the option in the questionnaire to withdraw from the survey and not allow us to use any answers. If we are able to identify your responses, we will delete your data upon request. If your responses have already been de-identified and cannot be linked to you, we will not be able to remove them.

If you choose to take part, you will be asked to complete an online questionnaire with questions about:

[keep both or select only one objective]

1. Your personal experience with COVID-19 and Long Covid. This will include questions around COVID-19 infection history, vaccination status, persistent symptoms, and impacts on quality of life.
2. Your knowledge, attitudes, and practices (KAP) related to Long Covid and caring for Long Covid patients.

Depending on your role and experience, you may be invited to complete one or two parts of a questionnaire. The first part of the questionnaire should take up to 7-10 minutes to complete, and the second part of the questionnaire should take approximately 4-7 minutes to complete.

Benefits and risks

There is no direct benefit to you from taking part. However, your participation may help inform future healthcare policies and interventions for healthcare workers and patients affected by Long Covid.

There are no major risks associated with participation. Some questions may involve reflecting on your personal or professional experience during the COVID-19 pandemic, which some people may find emotionally sensitive. You can stop filling out the questionnaire at any time without submitting your answers.

Confidentiality and data protection

Your responses will be treated confidentially. While we will not collect your name, some details you provide (e.g., age, role, hospital) may allow identification. Only the study team will have access to individual responses. De-identified data (which has had any personally identifying information removed) from this survey will be shared with other EU countries taking part in the study so that we can compare results among different countries. We will only report combined responses from all the surveys we receive. We will not report individual responses from anyone who fills out survey. We will make sure that the combined results of the survey are shared with you when we are done with the analysis. Your survey responses will be stored in de-identified form for up to 10 years after the study results are published.

The information that you and other respondents provide in this survey will be used in accordance with WHO guidelines on responsible data sharing and reuse. Data from EU countries will be handled in compliance with the European Union (EU) General Data Protection Regulations (GDPR). Data will be stored securely on a WHO-hosted platform based in the EU.

Consent

Please confirm your agreement to the following by ticking the box below:

☐ I have read and understood the information provided above. I understand that my participation is voluntary and that I can withdraw at any time when I am filling out the survey.I understand that my responses will be anonymous and used only for research purposes.

I agree to participate in this survey.

By proceeding to the questionnaire, you confirm that you consent to participate in this survey.

If you have any questions, feedback, or concerns about the survey and your participation, please contact [contact details of survey coordinator]

6.2. Questionnaire part 1 : Demographics

You may skip questions that you do not wish to answer

1. **What is your age?**
2. **What is your gender**

3. **What is your occupation?**

   - ○ Doctor
   - ○ Nurse Midwife
   - ○ Medical technician
   - ○ Phlebotomist
   - ○ Physical Therapist
   - ○ Psychologist / Therapist / Counselor
   - ○ Pharmacist/Laboratory worker
   - ○ Radiologic Technologist / X-Ray Technician
   - ○ Paramedic / EMT (Emergency Medical Technician)
   - ○ Administrator staff/reception /Office staff
   - ○ Cleaning / Janitorial Services Staff
   - ○ Food Services Worker
   - ○ Nutritionist
   - ○ Medical Researcher
   - ○ Other

4. **For doctors/nurses – What is your speciality or area/department of work?**
   - ○ General practice/ Family practice
   - ○ Occupational health
   - ○ Surgery
   - ○ Critical Care/ICU
   - ○ Cardiology
   - ○ Neurology
   - ○ Nephology
   - ○ Gastroenterology
   - ○ Cardiology
   - ○ Internal Medicine
   - ○ Gynaecology/Obstetrics
   - ○ Paediatrics
   - ○ Psychiatry
   - ○ Emergency Department
   - ○ Other

5. **In which type of healthcare facility do you work?**

   - ○ Hospital
   - ○ Primary Care Center
   - ○ Specialized center for Long-COVID
   - ○ Rehabilitation Facility
   - ○ Mental Health Facility
   - ○ Other

6. **How long have you been working as a healthcare worker?**
   - ○ I started before COVID-19 pandemic - before 2020
   - ○ I started in 2020
   - ○ I started in 2021
   - ○ I started in 2022

- ○ I started in 2023
- ○ I started in 2024 or later

7. <u>In which city and region do you work?</u>

6.3. Questionnaire part 2: History of Long COVID and personal experiences associated with Long COVID

You may skip questions that you do not wish to answer

1. Do you have any chronic conditions? (list all)

	Do you have any chronic condition) *(Please select all that apply)*	For conditions you selected, Did you have it before your first COVID-19 infection?
Cancer	☐	Yes / No / I do not know
Chronic Heart Disease, excluding high blood pressure	☐	Yes / No / I do not know
High blood pressure/Hypertension	☐	Yes / No / I do not know
Chronic Kidney Disease	☐	Yes / No / I do not know
Chronic Liver Disease (such as cirrhosis, hepatitis, fatty liver disease)	☐	Yes / No / I do not know
Chronic Lung Disease (such as asthma, COPD, bronchitis, etc…)	☐	Yes / No / I do not know
Diabetes	☐	Yes / No / I do not know
Immunocompromised, including solid organ transplant and HIV	☐	Yes / No / I do not know
Neurological Disease, including cerebrovascular disease, epilepsy, multiple sclerosis, etc…	☐	Yes / No / I do not know
Obesity	☐	Yes / No / I do not know
Autoimmune disorder	☐	Yes / No / I do not know
Other	☐	Yes / No / I do not know
No, I do not have any chronic condition	☐	

2. Have you ever been vaccinated against COVID-19?

- ○ Yes
- ○ No
- ○ I do not know/remember

3. <u>If you were vaccinated against COVID-19, how many doses did you receive?</u>

- ○ 1
- ○ 2

    - 3
    - 4 or more

4. **Have you ever had COVID-19 / SARS-CoV-2 infection?**
    - Yes
    - No
    - I do not know/remember

5. **If yes, how many COVID-19 episodes / SARS-CoV-2 infections have you had?**
    - opens options to select how many – put 1-10

6. **Have you ever heard of Long COVID?**
    - Yes
    - No

7. **If you heard of long COVID, did you believe Long COVID exists?**
    - Yes
    - No

8. **Do you think you ever had Long COVID?**
    - Yes
    - No

9. **After your SARS-CoV-2 infection(s), have you ever experienced symptoms or worsening or new chronic conditions that are associated with Long COVID (even if you have not been officially diagnosed with Long COVID)?**

    - **Symptoms could have included tiredness or fatigue, difficulty thinking, concentrating, forgetfulness or memory problems, sometimes referred to as "brain fog," difficulty breathing or shortness of breath, joint or muscle pain, fast-beating or pounding heart (also known as heart palpitations), chest pain, dizziness on standing, depression, anxiety or mood changes.**
    - **Long COVID can also present as an exacerbation of an existing chronic condition or a new chronic condition. Here is a full definition of Long COVID (link or window that opens: https://www.nejm.org/doi/full/10.1056/NEJMsb2408466).**

    - Yes
    - No
    - I'm not sure

→ The rest of the questionnaire should be filled in by participants who answer Yes to question 88 or 99.

10. Who diagnosed your Long COVID episode?

○ It was diagnosed by healthcare provider
○ It was self-diagnosed
○ I do not know/remember

11. When did you first experience Long COVID symptoms?

○ In 2020
○ In 2021
○ In 2022
○ In 2023
○ In 2024
○ In 2025
○ I do not know/remember

12. What were the symptoms associated with Long COVID that you experienced?

		If yes, how long did symptoms last
Fatigue or exhaustion that doesn't improve with rest	○ Yes ○ No ○ I do not know	○ More than 1 month but less than 3 months ○ Between 3-6 months ○ Between 6-12 months ○ Between 1-2 years ○ More than 2 years ○ I do not know/remember
Difficulty concentrating or "brain fog"	○ Yes ○ No ○ I do not know	○ More than 1 month but less than 3 months ○ Between 3-6 months ○ Between 6-12 months ○ Between 1-2 years ○ More than 2 years ○ I do not know/remember
Shortness of breath or difficulty breathing	○ Yes ○ No ○ I do not know	○ More than 1 month but less than 3 months ○ Between 3-6 months ○ Between 6-12 months ○ Between 1-2 years ○ More than 2 years ○ I do not know/remember
Cough	○ Yes ○ No ○ I do not know	○ More than 1 month but less than 3 months ○ Between 3-6 months ○ Between 6-12 months ○ Between 1-2 years ○ More than 2 years ○ I do not know/remember
Muscle or joint pain	○ Yes ○ No ○ I do not know	○ More than 1 month but less than 3 months ○ Between 3-6 months

		○ Between 6-12 months ○ Between 1-2 years ○ More than 2 years ○ ○ I do not know/remember
Chest pain	○ Yes ○ No ○ I do not know	○ More than 1 month but less than 3 months ○ Between 3-6 months ○ Between 6-12 months ○ Between 1-2 years ○ More than 2 years ○ I do not know/remember
Recurring headaches	○ Yes ○ No ○ I do not know	○ More than 1 month but less than 3 months ○ Between 3-6 months ○ Between 6-12 months ○ Between 1-2 years ○ More than 2 years ○ I do not know/remember
Lightheadedness	○ Yes ○ No ○ I do not know	○ More than 1 month but less than 3 months ○ Between 3-6 months ○ Between 6-12 months ○ Between 1-2 years ○ More than 2 years ○ I do not know/remember
Sleep disturbances	○ Yes ○ No ○ I do not know	○ More than 1 month but less than 3 months ○ Between 3-6 months ○ Between 6-12 months ○ Between 1-2 years ○ More than 2 years ○ I do not know/remember
Problems with taste or smell (e.g. loss)	○ Yes ○ No ○ I do not know	○ More than 1 month but less than 3 months ○ Between 3-6 months ○ Between 6-12 months ○ Between 1-2 years ○ More than 2 years ○ I do not know/remember
Anxiety or depression	○ Yes ○ No ○ I do not know	○ More than 1 month but less than 3 months ○ Between 3-6 months ○ Between 6-12 months ○ Between 1-2 years ○ More than 2 years ○ I do not know/remember

Heart palpitations	○ Yes ○ No ○ I do not know	○ More than 1 month but less than 3 months ○ Between 3-6 months ○ Between 6-12 months ○ Between 1-2 years ○ More than 2 years ○ I do not know/remember
Digestive issues (e.g., diarrhea, nausea)	○ Yes ○ No ○ I do not know	○ More than 1 month but less than 3 months ○ Between 3-6 months ○ Between 6-12 months ○ Between 1-2 years ○ More than 2 years ○ I do not know/remember
Memory problems	○ Yes ○ No I do not know	○ More than 1 month but less than 3 months ○ Between 3-6 months ○ Between 6-12 months ○ Between 1-2 years ○ More than 2 years ○ I do not know/remember
Exacerbation of existing chronic condition	○ Yes ○ No ○ I do not know	
Have you been diagnosed with a new chronic condition after a SARS-CoV-2 infection	○ Yes ○ No ○ I do not know	If yes, please specify: ○ Interstitial lung disease and hypoxemia ○ Cardiovascular disease and arrhythmias ○ Diabetes ○ Stroke ○ Blood clots, ○ Migraine ○ Mood swings ○ Chronic kidney disease ○ Postural orthostatic tachycardia syndrome and other forms of dysautonomia, ○ Myalgic encephalomyelitis–chronic fatigue syndrome ○ Mast-cell activation syndrome, ○ Fibromyalgia, ○ Connective-tissue diseases, ○ Hyperlipidemia ○ Diabetes ○ Autoimmune disorder (i.e. lupus, rheumatoid arthritis, and Sjögren’s syndrome) ○ Other, specify __________

Other symptoms	○ Yes ○ No ○ I do not know Please specify: ____________	○ More than 4 weeks but less than 3 months ○ Between 3-6 months ○ Between 6-12 months ○ Between 1-2 years ○ More than 2 years ○ I do not know/remember
None		

13. **Do you recall having a SARS-CoV-2 (COVID-19) infection in the 3 months period before your Long COVID symptoms began?**
    - ○ Yes, it was confirmed by a positive test (PCR, rapid antigen test)
    - ○ Yes, it was diagnosed by a healthcare professional based on symptoms, I was not tested
    - ○ Yes, I assumed I had COVID-19 based on my symptoms or my exposure to someone infected, but I was not tested
    - ○ Yes, antibody (serology) test showed past infection
    - ○ No, I don't recall having SARS-CoV-2/ COVID-19 before my Long COVID symptoms started
    - ○ I don't know

14. **If you answered yes to previous question, were you hospitalized for that COVID-19 episode?**
    - ○ Yes, I was hospitalized
    - ○ No, I was not hosptalised
    - ○ I do not know

15. **Have you returned to your state of health as it was before you got sick with COVID-19?**
    - ○ Yes
    - ○ No

16. **If no, are you still experiencing symptoms of Long COVID now?**
    - ○ Yes
    - ○ No
    - ○ I do not know

17. **Have long-term symptoms reduced your ability to carry out day-to-day activities compared with the time before you had COVID-19?**
    - ○ Yes, a lot;
    - ○ Yes, a little;
    - ○ Not at all
    - ○ I do not know/remember

18. **In which areas of your daily life have you noticed the greatest impact due to your Long COVID?** (Select all that apply)
    - ○ Work and professional responsibilities
    - ○ Household tasks (e.g., cooking, cleaning, shopping)
    - ○ Socializing with family or friends

○ Physical activities or exercise
○ Mental focus or cognitive tasks (e.g., reading, problem-solving)
○ Personal hygiene or self-care
○ Sleep quality
○ None of the above
○ I do not know/remember

19. Non-work activities: Have you resumed your usual non-work activities (e.g., household chores, exercise, socializing) at the same level as before your COVID-19 infection??

○ Yes, I am fully back
○ Yes, I am partially back
○ No, I did not resume my activities

20. Have you returned to work-related activities you did before the COVID-19 infection with the same volume of activity?

○ Yes, I am fully back
○ Yes, I am partially back
○ No, I did not resume my activities

21. Have you had to take time off work due to your Long COVID?

○ Yes, I have taken time off from work
○ No, I have not had to take time off
○ I do not know/remember

22. If you have had to take time off work, approximately how much time from work in total have you missed due to Long COVID?

○ Less than 1 week
○ 1–2 weeks
○ 3–4 weeks
○ Between 1-3 months
○ Between 3-6 months
○ More than 6 months
○ I did not take time off

23. How would you describe your employer's attitude and flexibility regarding taking time off due to Long COVID?

○ Very understanding and flexible
○ Somewhat understanding and flexible
○ Neutral
○ Somewhat unsupportive or inflexible
○ Very unsupportive or inflexible
○ My employer did not know that I took time off due to Long COVID

24. Question on insurance coverage

[The WHO community engagement team that works with people who have or had long COVID suggested asking a question about health insurance coverage for long COVID. If there was occupational exposure, there may be compensations available. We think this isn't a core question for the questionnaire, but it might be interesting in some settings. Please see if it's relevant to your setting.]

25. Have you had to modify your work schedule or responsibilities due to Long COVID symptoms?

○ Yes, I have reduced my work hours
○ Yes, I have changed my job responsibilities
○ Yes, I have both reduced my work hours and changed my job responsibilities
○ No, I have not modified my work schedule or responsibilities
○ Not applicable

26. When you had symptoms of Long COVID, did you visit a healthcare provider for treatment or advice?

○ Yes
○ No
○ I do not know/remember

27. If yes, which kind of healthcare provider did you visit? (check all that apply)

○ General practitioner
○ Mental health specialist
○ Physiotherapist
○ Occupational health specialist
○ Dedicated Long COVID clinic
○ Pharmacy
○ Emergency department
○ Hospital
○ Rehabilitation center
○ Other
○ I do not know/remember

28. Did you ever see a healthcare provider who was dismissive of your Long COVID symptoms, or a healthcare provider that did not take your Long COVID symptoms seriously?

○ **Yes**
○ **No**

29. Based on your experience, do you believe the healthcare system should provide more resources or support for people who are affected by Long COVID?

○ Yes, significantly more resources are needed

- o Yes, but only moderately more resources are needed
- o No, the current level of resources is sufficient
- o I am not sure

6.4. Questionnaire part 3: KAP of healthcare providers about Long COVID in patients

You may skip questions that you do not wish to answer

Knowledge

1. **Have you ever heard of Long COVID?**
    - o Yes
    - o No

2. **If you heard of long COVID, did you think Long COVID exists?**
    - o Yes
    - o No

3. If No, could you very briefly state why you don't think/believe that Long COVID exists?

[if responded says No to the previous question → I do not think that Long COVID exists, we will offer the possibility to state the reason why they do not think it exists (open-ended question), and after the survey ends here for that respondent]

4. **Long COVID can affect people who had mild symptoms or people who had no symptoms following SARS-CoV-2 infection.**
    - o True
    - o False
    - o I am not sure

5. **How long can Long COVID last after the acute infection has resolved?** (select all that applies)
    - o 6 Months
    - o Up to one year
    - o More than one year
    - o All of the above
    - o I'm not sure

6. **COVID-19 vaccination can reduce the chance of getting Long COVID.**
    - ○ **True**
    - ○ **False**
    - ○ I am not sure

7. **Long COVID is a condition that affected people during the height of the COVID-19 pandemic, but people have not suffered from Long COVID in the past two years.**
    - ○ True
    - ○ False
    - ○ I am not sure

8. **Persons recently infected with SARS-CoV-2 can develop Long COVID.**
    - ○ True
    - ○ False
    - ○ I am not sure

Attitudes

9. **On a scale of 1-5, how confident are you in your ability to identify Long COVID in your patients? 1- Not confident at all, 5- very confident**
    - ○ 1-5 scale

10. **In your opinion, are patients with Long COVID often misunderstood by the healthcare system?**
    - ○ Yes, they are often misunderstood
    - ○ No, they are generally understood well
    - ○ It depends on the individual case
    - ○ I'm not sure

11. **In your opinion, do you believe Long COVID is a legitimate medical condition, rather than a reflection of underlying anxiety, depression, or other illnesses not related to a SARS-CoV-2 infection?"**
    - ○ **It is a legitimate medical condition**
    - ○ **It is not a legitimate medical condition**
    - ○ **I'm not sure**

Practices

12. **In your professional role, how are you involved with patients who have Long COVID? (Select all that apply)**
    - ○ I have seen patients who have Long COVID
    - ○ I have suspected Long COVID in my patients
    - ○ I have diagnosed Long COVID in my patients
    - ○ I have provided supportive care to patients with Long COVID
    - ○ I have not suspected, diagnosed or cared for patients with Long COVID

13. **When you suspect a patient has Long COVID, which of the following best describes your approach to managing their care?**
    - ○ **I prefer to manage the patient's care myself**
    - ○ **I prefer to refer the patient to a specialist (e.g., pulmonologist, neurologist, mental health specialist, rehabilitation specialist)**
    - ○ **I collaborate with a multidisciplinary team to manage the patient’s care**
    - ○ **I have never suspected that a patient of mine had Long COVID**
    - ○ **I am not sure**

14. **Are you aware of any national or international guidelines for diagnosing and managing Long COVID?**
    - ○ Yes
    - ○ No

15. **In your day-to-day work, do you feel that you have enough resources (e.g., time, staff, medical equipment) to manage patients with Long COVID effectively?**
    - ○ Yes
    - ○ No
    - ○ I am not sure

16. **What have been your main challenges in diagnosing or treating patients with Long COVID? (select all that apply)**

    - ○ The case definition of Long COVID is not clear
    - ○ Difficulty in confirming the Long COVID diagnosis (lack of a specific diagnostic test)
    - ○ Overlapping symptoms with other conditions
    - ○ Lack of clear and standardized treatment guidelines
    - ○ Patient skepticism or reluctance to accept Long COVID as a real condition
    - ○ Limited access to specialized care (rehabilitation, mental health services etc.)

- Uncertainty about long-term prognosis and outcome
- I haven’t seen any patients with suspected Long COVID so I have not had any challenges
- Other:______ *maybe we have to ask this in the free text*

→ Training needs

17. **Which of the following best describes your experience with training related to the management of Long COVID?**
    (Select all that applies)
    - **I have received formal training on Long COVID diagnosis and/or management (e.g., structured courses, workshops, webinars, or certifications organized by medical institutions or professional organizations).**
    - **I have received informal training on Long COVID diagnosis and/or management (e.g., team discussions, case reviews, or informal guidance from colleagues or supervisors).**
    - **I have independently read guidelines, research articles, or other resources to learn more about Long COVID management.**
    - **I have not received any formal or informal training on Long COVID, and I have not read independently about Long COVID.**

18. **How likely are you to engage in continuing education or training related to Long COVID in the future, if such training would be offered to you?**
    - Very likely
    - Likely
    - Unlikely
    - Very unlikely
    - I am not sure
    - Not applicable

19. Would you be interested in training on how to apply interpersonal communications skills in interactions with Long COVID patients?
    - Yes
    - No
    - I am not sure

Open-ended question:

20. What resources or support do you need to better manage Long COVID patients?

7. References

1. National Academies of Sciences, Engineering, and Medicine, Health and Medicine Division, Board on Health Sciences Policy, Board on Global Health, Committee on Examining the Working Definition for Long COVID, Goldowitz I, et al. A Long COVID Definition: A Chronic, Systemic Disease State with Profound Consequences. In: A Long COVID Definition: A Chronic, Systemic Disease State with Profound Consequences [Internet]. Washington (DC): National Academies Press (US); 2024 [cited 2025 May 6]. Available from: https://www.ncbi.nlm.nih.gov/books/NBK605675/

2. Calabrese L, Colloca L. Long COVID-19 and the Role of the Patient–Clinician Interaction in Symptom Management. J Patient Exp. 2022 Feb 9;9:23743735221077514.

3. Davis HE, McCorkell L, Vogel JM, Topol EJ. Long COVID: major findings, mechanisms and recommendations. Nature Reviews Microbiology. 2023;21(3):133–46.

4. Krysa JA, Buell M, Pohar Manhas K, Kovacs Burns K, Santana MJ, Horlick S, et al. Understanding the Experience of Long COVID Symptoms in Hospitalized and Non-Hospitalized Individuals: A Random, Cross-Sectional Survey Study. Healthcare (Basel). 2023 May 3;11(9):1309.

5. Pazukhina E, Garcia-Gallo E, Reyes LF, Kildal AB, Jassat W, Dryden M, et al. Long Covid: a global health issue – a prospective, cohort study set in four continents. BMJ Glob Health. 2024 Oct;9(10):e015245.

6. Dzinamarira T, Murewanhema G, Mhango M, Iradukunda PG, Chitungo I, Mashora M, et al. COVID-19 Prevalence among Healthcare Workers. A Systematic Review and Meta-Analysis. Int J Environ Res Public Health. 2021 Dec 23;19(1):146.

7. Al-Oraibi A, Woolf K, Naidu J, Nellums LB, Pan D, Sze S, et al. Global prevalence of long COVID and its most common symptoms among healthcare workers: a systematic review and meta-analysis. BMJ Public Health. 2025 Apr 17;3(1):e000269.

8. classifying-health-workers.pdf [Internet]. [cited 2025 May 7]. Available from: https://cdn.who.int/media/docs/default-source/health-workforce/dek/classifying-health-workers.pdf

9. Post COVID-19 condition (Long COVID) [Internet]. [cited 2025 May 26]. Available from: https://www.who.int/europe/news-room/fact-sheets/item/post-covid-19-condition