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Healthcare workers and the COVID-19 pandemic

- A mixed methods study

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ACADEMIC DISSERTATION

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”Jag tror livet är ett underligt äventyr, man ska utforska alla dess kringelikorkar”.

- Tove

Kiitokset ohjaajilleni,
perheelleni sekä ystävilleni tästä
seikkailusta.

Abstract

The COVID-19 pandemic placed unprecedented pressure on healthcare systems and healthcare workers (HCWs). Frontline HCWs faced both an increased infection risk and psychological distress. By combining a register-based study (Study I) and a questionnaire-based study (Studies II and III), as well as quantitative and qualitative methods, this mixed methods thesis aims to improve our understanding of work-related health risks and stressors among HCWs during the first 15 months of the COVID-19 pandemic in Finland's capital region (until April 2021), across primary and tertiary care.

Methods: Study I combined national and local registry data from public and private healthcare to assess the difference in COVID-19 outcomes between HCWs and non-HCWs. The outcomes considered were infections, hospitalizations, ICU admissions, and mortality among working-age individuals. The dataset included 26,271 COVID-19 infections, of whom 2,201 (8.4%) were HCWs. Logistic regression models were employed to analyze hospitalization, ICU admission, and mortality odds.

Studies II and III were based on an online survey assessing HCWs' COVID-19-related working conditions and work-related well-being. The questionnaire was conducted from June 2020 to April 2021 with 1,580 volunteering HCWs (895 in tertiary, 685 in primary care). Additionally, 579 respondents submitted 1,666 prompted free-text responses. The responses were analyzed using quantitative and qualitative methods.

Results: The HCWs were overrepresented in SARS-CoV-2 infection statistics. While their risks of ICU admission and mortality did not differ from the general population, they had a higher likelihood of hospitalization (OR 1.25, 95% CI 1.02–1.53, p = 0.031). Unlike in the general population, higher income did not appear protective among HCWs; rather, it was associated with an increased hospitalization risk (OR 2.00, 95% CI 1.16–3.45, p = 0.013), likely due to job-related exposure and the inability to work remotely.

Primary care HCWs reported more challenges in their work-related well-being than those in tertiary care, despite the similar self-reported infection rates and less frequent care of COVID-19 patients. Personal protective equipment (PPE) shortages and changing infection prevention and control (IPC) guidelines were identified as major stressors. Clear IPC guidance correlated with better recovery from work (OR 1.51, 95% CI: 1.06–2.14, p <0.05), while inadequate PPE availability was linked to greater work-related stress (OR 1.49, CI: 1.18–1.88, 0.001) and an excessive workload (OR 1.51, CI: 1.01–2.25, p <0.05).

Conclusion: The pandemic exposed HCWs to significant occupational risks, with heightened infection and hospitalization rates and key stressors tied to PPE availability

and unclear IPC guidance. The association between the income level and the risk of hospitalization differed markedly between HCWs and the general population, as the hospitalization risk among HCWs with COVID-19 did not follow the typical socioeconomic gradient in health, in which individuals with a lower socioeconomic status experience a higher disease burden. In this study, higher income among HCWs was associated with an increased risk of hospitalization, which likely reflects the frontline working conditions, including those in higher-income healthcare roles as well. In addition, challenges in their work-related well-being were more pronounced in primary care. Future preparedness efforts should address HCW risks more promptly. The reasons behind increased hospitalization among HCWs warrant further study.

Abstrakti

COVID-19-pandemia aiheutti tullessaan ennennäkemätöntä kuormitusta terveydenhuoltojärjestelmille sekä terveydenhuollon työntekijöille (THT). Etulinjan THT:t altistuivat sekä lisääntyneelle tartuntavaaralle että psyykkiselle kuormitukselle. Tämän väitöskirjan tavoitteena on lisätä ymmärrystä THT:n työhön liittyvistä terveysriskeistä ja kuormitustekijöistä pandemian ensimmäisten 15 kuukauden aikana (huhtikuuhun 2021 asti) pääkaupunkiseudulla niin perusterveydenhuollossa kuin erikoissairaanhoidossa. Tässä monimenetelmätutkimuksessa aihetta lähestytään sekä rekisteripohjaisen (Tutkimus I), että kyselypohjaisen (Tutkimus II sekä Tutkimus III) tutkimuksen keinoin, jonka lisäksi kyselypohjaisen tutkimuksen aineiston analyyseissä on käytetty laadullisia sekä määrällisiä menetelmiä.

Menetelmät: Tutkimuksessa I selvitettiin THT:n ja muun työikäisen väestön COVID-19 päätetapahtumien eroja. Arvioituja päätetapahtumia olivat tartunnat, sairaalahoitoon päätyminen, teho-osastohoitoon päätyminen sekä kuolemat. Tutkimuksessa yhdistettiin kansallisia ja paikallisia julkisen ja yksityisen terveydenhuollon rekisteritietoja kattavan aineiston aikaansaamiseksi. Aineisto sisälsi 26 271 COVID-19-tartuntaa, joista 2 201 (8,4 %) THT:lla. Sairaalahoidon, tehohoidon ja kuoleman riskien arviointiin käytettiin logistista regressioanalyysiä.
Tutkimukset II ja III perustuivat verkkokyselyyn, johon vastasi kesäkuun 2020 ja huhtikuun 2021 välillä 1 580 vapaaehtoista THT:ää (895 erikoissairaanhoidossa ja 685 perusterveydenhuollossa. Kyselyssä selvitettiin terveydenhuollon COVID-19:n liittyviä työoloja sekä työhyvinvointia. Laadullinen analyysi toteutettiin 579 vastaajan antamista, yhteensä 1 666 täydentävästä kirjallisesta vastauksesta.

Tulokset: THT:t olivat yliedustettuina SARS-CoV-2-tartuntatilastoissa. Vaikka heidän riskinsä joutua tehohoitoon, ja kuolleisuutensa eivät poikenneet muun väestön riskeistä, heidän riskinsä joutua sairaalahoitoon oli suurempi (OR 1,25; 95 % CI: 1,02–1,53; p = 0,031). Toisin kuin muussa väestössä, korkeampi tulotaso ei näyttänyt suojaavalta tekijältä THT:lla, vaan siihen liittyi suurempi sairaalahoidon riski (OR 2,00; 95 % 1,1 CI: 6–3,45; p = 0,013), mikä selittynee työperäisellä altistuksella ja etätyömahdollisuuksien puutteella.
Perusterveydenhuollon työntekijät raportoivat enemmän työhön liittyviä hyvinvointiongelmia kuin erikoissairaanhoidossa työskentelevät, huolimatta samantasoisesta itseraportoitujen tartuntojen määrästä ja vähäisemmästä COVID-19-potilaiden hoidosta. Henkilönsuojainten puute ja muuttuvat infektioiden torjuntaan ja ehkäisyyn liittyvät ohjeistukset olivat merkittäviä kuormitustekijöitä. Selkeä ohjeistus oli

yhteydessä parempaan työstä palautumiseen (OR 1,51; 95 % CI: 1,06–2,14; p < 0,05), kun taas riittämätön henkilösuojainten saatavuus lisäsi työn kuormittavuutta (OR 1,49; 95 % CI: 1,18–1,88; p = 0,001) ja ylikuormitusta (OR 1,51; 95 % CI: 1,01–2,25; p < 0,05).

Johtopäätökset: Pandemia altisti THT:t merkittäville työperäisille riskeille, kuten kohonneelle tartuntariskille ja sairaalahoitotarpeelle. Tulotason vaikutus sairaalahoidon riskiin poikkesi merkittävästi THT:n ja muun väestön välillä, sillä THT:n sairaalahoidon riski COVID-19:n yhteydessä ei noudattanut tavanomaista terveyden sosioekonomista jakaumaa, jossa heikommassa asemassa olevat sairastavat enemmän. Tässä tutkimuksessa THT:n korkea tulotaso oli yhteydessä suurempaan sairaalahoidon riskiin, mikä liittynee paljolti THT:n työolosuhteisiin etulinjassa, myös korkeamman tulotason työtehtävissä. Lisäksi THT:n keskeisimmät esiin nousseet stressitekijät liittyivät henkilösuojainten saatavuuteen ja epäselvään ohjeistukseen. Työhyvinvoinnin haasteet olivat erityisen korostuneita perusterveydenhuollossa. Mahdollisessa uusiin pandemioihin varautumisessa THT:n riskit tulisi tunnistaa ja huomioida viiveettä. THT:n kohonneen sairaalahoidon taustatekijät edellyttävät lisätutkimusta.

Abbreviations

ACE2	Angiotensin-converting enzyme 2
ARDS	Acute respiratory distress
cDNA	Complementary deoxyribonucleic acid
CFR	Case fatality rate
CH	the City of Helsinki
CI	Confidence interval
CLIA	Chemiluminescence immunoassays
COVID-19	Coronavirus disease 2019
DIC	Disseminated intravascular coagulopathy
ELISA	Enzyme-linked immunosorbent type assays
FFP	Filtering face piece
HCW	Healthcare worker
HUS	Helsinki University Hospital
ICD-10	International Statistical Classification of Diseases and Related Health Problems 10th Revision
Ig	Immunoglobulin
IPC	Infection prevention and control
LFA	Lateral flow type assay
MERS	Middle East respiratory syndrome coronavirus
mmHg	Millimeters of mercury
OR	Odds ratio
OSHA	the Occupational Safety and Health Administrator
OxCGRT	the Oxford Coronavirus Government Response Tracker
PAPR	Powered air-purifying respirators
PPE	Personal protective equipment
RNA	Ribonucleic acid
RR	Respiratory rate
RT-PCR	Real-time reverse transcription polymerase chain reaction
SARS-CoV	Severe acute respiratory syndrome
SARS-CoV-2	Severe acute respiratory syndrome coronavirus 2
SOFA	Sequential organ failure assessment
WHO	World Health Organization

Index

List of original publications

This thesis is based on the following publications:

I Aulanko I, Sanmark E, Oksanen L, Geneid A. COVID-19, healthcare workers and the effect of income. *Submitted*.

II Aulanko I, Sanmark E, Oksanen L, Oksanen S, Lahdentausta L, Kivimäki A, Paju S, Pietiäinen M, Pussinen P, Geneid A. Working conditions during the COVID-19 pandemic in primary and tertiary healthcare: a comparative cross-sectional study. Int J Occup Med Environ Health. 2023 Mar 2;36(1):139-150. doi: 10.13075/ijomeh.1896.01944.

III Aulanko I, Nikuri P, Oksanen L, Oksanen S, Lahdentausta L, Pietiäinen M, Paju S, Kivimäki A, Pussinen P, Geneid A, Sanmark E. "*As protective gear began to run low, guidance on protection became looser*" - Healthcare workers' perspectives on infection prevention and control during the COVID-19 pandemic. Front Public Health. 2022 Nov 10;10:982738. doi: 10.3389/fpubh.2022.982738.

The publications are referred to in the text by their Roman numerals.

1 Introduction

At the end of December 2019, reports of a concerning new form of pneumonia began to emerge from China. I recall reading these news stories with growing apprehension. At the time, I was working as a frontline physician in a children's hospital, constantly surrounded by a wide range of infectious diseases.

Then, in March 2020, the World Health Organization declared COVID-19—a disease caused by the novel coronavirus SARS-CoV-2—a global pandemic. It quickly became evident that healthcare workers were at a particularly high risk of infection. We were confronted not only with the fear of contracting the virus ourselves, but also with the anxiety of potentially transmitting it to our loved ones. At the same time, we carried a profound moral responsibility to continue caring for our patients, despite the risks. Navigating these challenges required us to place trust in the evolving guidance on how to best protect ourselves and those under our care. The entire healthcare system—and indeed, society at large—appeared to be in a state of upheaval.

The pandemic created an urgent and unprecedented demand for scientific knowledge to inform public health responses, clinical practices, and policy decisions. With the support of my supervisors, I began to ask pressing questions: What was the actual risk faced by healthcare workers (HCWs) in the Helsinki capital region? Were we at a higher risk of infection, hospitalization, or even death compared to the general population? Which groups of HCWs were the most vulnerable? I also felt a strong need to give voice to the lived experiences of HCWs during the pandemic—what it truly felt like to work on the frontlines, and which factors were perceived as the most distressing.

Moreover, having spent years working in primary care and being acutely aware of the sector's chronic under-resourcing, I was particularly interested in exploring how primary care HCWs were coping. How were their working conditions and overall well-being affected amid the unprecedented demands of the pandemic?

2 Review of the literature

2.1 The outbreak of COVID-19 pandemic

On March 11, 2020, a new leaf turned in history as the World Health Organization (WHO) pronounced the new COVID-19 pandemic, caused by the severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) (1). Beforehand, starting from late December 2019, hospitals in Wuhan, China, had been crowded with patients with pneumonia of unknown origin. In the spring of 2020, cases spread elsewhere in China and the world at an unstoppable rate (2–4). Despite the great steps taken in modern medicine, the virus put the world on its knees, causing dramatic changes in everyday life as we knew it.

SARS-CoV-2 belongs to the group of enveloped ribonucleic acid (RNA) viruses, coronaviruses, that commonly cause infections in many species of wild and domestic animals and humans (5, 6). The prefix corona, which means crown in Latin, stems from the spike-covered exterior of the virus resembling the corona of the sun (7, 8). In humans, coronaviruses mainly cause symptoms in the upper respiratory and gastrointestinal tracts (9). Thus far, seven coronavirus strains are known to cause disease in humans (2, 9). Four strains, 229E, OC43, HKU1 and NL63, are typical pathogens of the common cold in healthy humans (5, 9). Three other strains of the human coronaviruses, SARS-CoV, SARS-CoV-2, and MERS, are associated with a potentially fatal illness and of zoonotic origin (6, 10). SARS-CoV, severe acute respiratory syndrome coronavirus, caused outbreaks in 2002 and 2003 in China and elsewhere in the world (6, 10, 11). Meanwhile, in 2012, MERS, Middle East respiratory syndrome coronavirus, induced severe respiratory disease outbreaks in the Middle East and South Korea (9, 12, 13). SARS-CoV-2, the name of which is derived from its relation to human and bat SARS-CoVs, was the causal agent of the COVID-19 pandemic that started in 2020 (14).

SARS-CoV-2 is suspected of being of zoonotic origin due to being closely related to a bat coronavirus, the first cases of which were linked to the Huanan Seafood Wholesale Market in Wuhan, China (15–18). The market is known for the sale of live wild and farmed animals. It is believed that bats are the original source of human SARS-CoVs, and a mammalian intermediate host facilitated the

transmission of the virus to humans; similar CoV to SARS-CoV-2 has been detected in palm civets and racoon dogs in a live-animal market in southern China (19–22).

At the beginning of the epidemics in Wuhan, SARS-CoV-2 was estimated to have a high reproductive number, from 2.2 to 3.6, indicating a potential pandemic development (23, 24). The reproductive number indicates the expected number of additional cases that one case will generate in an uninfected population. The rapid spread of SARS-CoV-2 in comparison to previous concerning coronaviruses is believed to be due to SARS-CoV-2 possessing a higher affinity for the host cell receptor, the angiotensin-converting enzyme 2 (ACE2) in the human respiratory tract epithelium (25). Patients with COVID-19 also showed 1000 times higher peak RNA concentrations compared to SARS-CoV, suggesting a higher viral load/shedding in the patients (26). In addition, the viral load in patients with SARS-CoV-2 peaks within the first week after the onset of symptoms, whereas with SARS-CoV, the peak takes place later, around 10 days after the onset of symptoms (27, 28).

With a high reproductive number and early reports showing a case fatality rate between 4.3% and 28%, various practices were adopted to control the spread of the disease (29–31). These measures included social distancing, avoiding large gatherings, quarantines, testing for SARS-CoV-2, and protective gear in healthcare premises and public gatherings. However, at the very beginning of the pandemic, little was known about the transmission mode or course of the new virus. Therefore, the containment measures were based on studies on previously known viruses causing respiratory infections and their best guesses.

2.2 Coronavirus disease 2019 (COVID-19)

The first reports of COVID-19 encompassed critically ill, hospitalized patients with acute respiratory distress (ARDS), kidney and cardiac injury, sepsis, and mortality up to 22% (29, 31–34). Patients typically suffered from atypical pneumonia with symptoms, such as fever, cough, dyspnea, myalgia, malaise, rhinorrhea, arthralgia, chest pain, headache, fatigue, and vomiting (29, 32, 33, 35). Neurologic symptoms, including dizziness, headache, impaired consciousness, cerebrovascular disease, and taste and smell impairment, were also reported in many patients with COVID-19 (36). In addition, lymphocytopenia and ground glass opacity on chest computed tomography (CT) were common findings in hospitalized patients (31, 33, 35, 37).

Later reports covering a larger group of patients, not only hospitalized patients, showed that the majority of patients underwent mild disease, and the case fatality rate was estimated to be lower, between 2% and 3% (38–40). Patients with mild disease most likely suffer from headaches, loss of smell, nasal obstruction, cough, asthenia, myalgia, and rhinorrhea (41). Some people create no symptoms in SARS-

CoV-2 infections; however, estimations of the proportion of asymptomatic cases vary widely, from 1.6% to 33.3% (38, 42–44).

Besides respiratory distress, a hyperreactive inflammatory response induced by SARS-CoV-2, a so-called cytokine storm, plays a significant role in severe disease and deaths associated with COVID-19 (45, 46). In a state of hyperreactive, uncontrolled inflammation, the immune system no longer only protects but also causes serious harm to the body. Inflammation and infection favor the development of thrombosis, and another factor contributing to the mortality and morbidity of COVID-19 is the coagulopathy associated with the disease (47–49). Up to 46% to 69% of ICU patients have been reported to have a thrombotic complication, such as peripheral venous thromboembolism or pulmonary embolism (49–51). The risk of thromboembolism is elevated during COVID-19, and the most severe forms of the disease are associated with disseminated intravascular coagulopathy (DIC) (47, 52).

Previous studies show that mortality in COVID-19 is associated with d-dimer over 1 μg/mL on admission, higher SOFAs score, a major complication, such as ARDS, acute kidney injury and sepsis, besides the previously addressed comorbidities, male sex, and older age (29, 32). In addition, severe or critical disease is associated with oxygen saturation <88% at admission, lymphopenia, leukocytosis, raised lactate dehydrogenase, creatine kinase, troponin, c-reactive protein, ferritin, creatine and d-dimer (29, 30, 32, 34, 53). High serum/plasma cytokines have also been detected in critically ill patients (31, 34). The elevated common laboratory inflammation markers and high cytokine levels are in line with the significance of the hyper-inflammatory response to SARS-CoV-2 -related severe disease and death (46).

The SARS-CoV-2 infection has not only presented as acute COVID-19, but a notable share of patients also created long-lasting symptoms after the infections, so-called long COVID-19 symptoms. The most common persisting symptoms after the SARS-CoV-2 infection are fatigue, headache, respiratory symptoms, muscle weakness, anosmia, depression, anxiety, and sleeping problems (54–56). Additionally, a wide variety of symptoms, such as cardiac symptoms, concentration and memory problems, tinnitus, and neuropathy, have been linked to long COVID-19 (55). Studies have shown these possible symptoms lasting for weeks or months after the SARS-CoV-2 infection (54, 55). Women and patients with increasing age and body mass index appear to be the most susceptible to long COVID-19 (54–56).

While SARS-CoV-2 can infect all age groups, children and young adults usually have mild disease (38, 44). According to a report from China with 72,314 patients, symptoms range from upper respiratory tract symptoms to respiratory failure with a decreasing percentage; up to 81% of the COVID-19 cases are mild, 14% severe, and 5% critical, as shown in Figure 1 (38). Case series and cohort studies have reported 5.0% to 32% of COVID-19 patients requiring treatment in an intensive care unit

(29, 31, 35, 57, 58). Mortality among patients hospitalized and treated in the ICU is high, up to 26% and 49–57%, respectively (38, 53, 57).

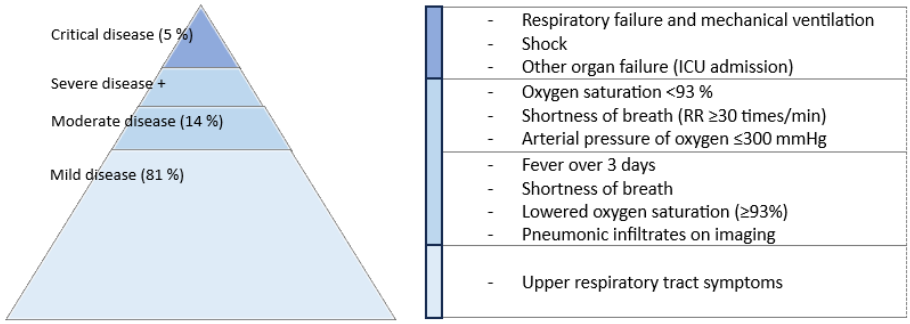

Figure 1 Clinical Classification of the severity of COVID-19, according to the National Health Commission of the Republic of China (59).

2.2.1 Susceptibility to severe COVID-19

In the early stages of the pandemic, it became evident that certain pre-existing conditions and high age are risk factors for severe COVID-19 and mortality, as many of the hospitalized, critically ill patients suffered from chronic diseases and were of older age (35, 38, 57, 60). In particular, people with hypertension, diabetes, old age, chronic kidney disease, chronic liver disease, chronic respiratory disease, chronic heart disease, dementia, cancer, obesity, or immunosuppressive conditions are at risk for severe COVID-19 (34, 38, 53, 57, 60). In addition, the male sex and Black or South Asian ethnicity have also been linked to more severe manifestations of the disease (53, 57, 58, 60–62).

Although mortality in COVID-19 is higher in older people with comorbidities, the risk for potentially severe disease in young adults has still been estimated to be higher compared to influenza, and in a large cohort study in the United Kingdom, 23% of hospitalized patients had no pre-existing comorbidities (57, 63).

Despite early reports suggesting that as a contagious disease, unlike chronic diseases, COVID-19 would hit everyone equally, it soon became evident that COVID-19 was characterized by substantial inequality, as lower socioeconomic status has been associated with higher incidence and mortality (62, 64, 65).

2.2.2 Typical course of the coronavirus disease 2019 (COVID-19)

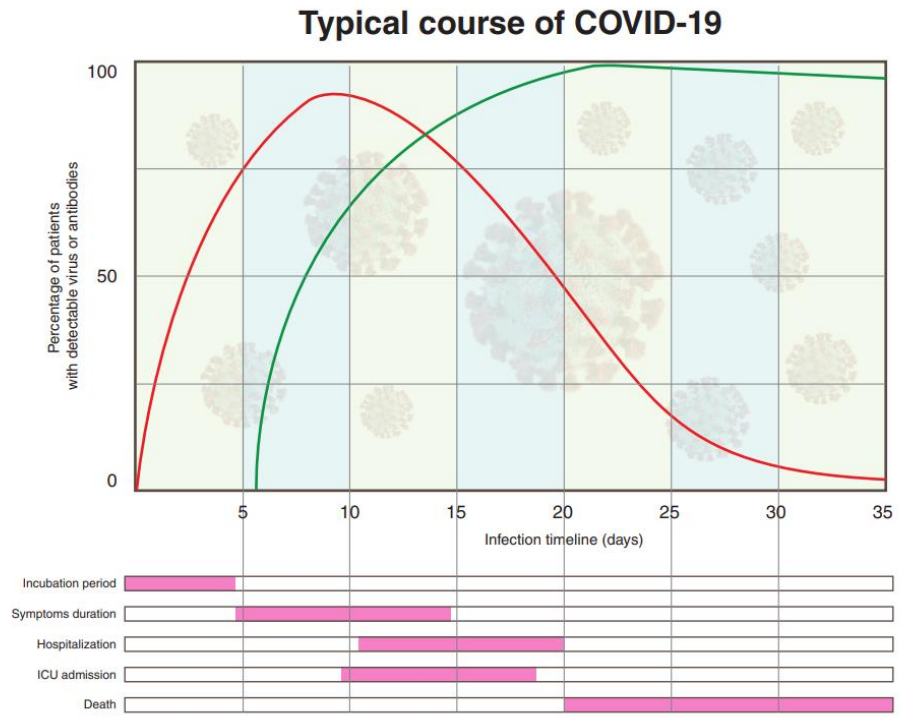

Figure 2 Typical course of COVID-19. Infographic of the disease timeline in days. The percentage of patients with detectable viruses (PCR) is indicated with a red line, whereas the green line shows the percentage of patients with detectable virus antibodies. Pink blocks indicate the average timepoint of indicated disease phases (26, 27, 29–31, 35, 37, 44, 57, 58, 66–74).

SARS-CoV-2 infection typically occurs through airborne, droplet, or close contact transmission (59, 75). After infection with the SARS-CoV-2 virus, an incubation period of typically 4 to 7 days (35, 66, 67) occurs. With SARS-CoV-2 infection, the viral load peak occurs within the first week after the onset of symptoms (27, 68, 69), during which the pharyngeal viral shedding is high (26). Typically, the virus levels start to decline soon after the first week of symptoms, although the duration of viral shedding often outlasts the symptoms, and a prolonged viral shedding of up to six to eight weeks is not uncommon (26, 27, 67, 69, 70). In addition, severe COVID-19 disease is associated with longer viral shedding and higher viral loads (69, 71). In a Chinese study of 191 patients, the median duration of viral shedding was estimated to be 20 days (range 8 to 37) (29). Antibodies to SARS-CoV-2 can be detected in 25–50% of patients within the first

week after the onset of symptom and typically in almost all patients in two to three weeks (26, 69, 72, 74).

Symptoms last on average for 10 days (26, 29, 67). Patients often appear stable at the beginning of the symptoms, but with a small proportion of patients, their condition deteriorates with time in severe disease types. In patients with severe and critical disease, the duration of symptoms before the onset of dyspnea is typically 5–8 days and when present, the development of ARDS is approximately 8–12 days (29–31). In case of pneumonia, radiological confirmation occurred approximately 3–5 days after the onset of the symptoms (32, 35). Hospitalization typically occurs at 4–11 days from symptom onset (29, 30, 37, 57, 58), and in deteriorating patients, ICU admission follows in 9.5–12 days from symptoms onset (29, 30, 32, 76). The median time from dyspnea to intubation was 10 days, and from symptoms onset to mechanical ventilation, 14.5 days (29). In previous studies, the median hospital stay for COVID-19 patients lasted around 7–12 days, whereas in a study from New York, for patients with critical illness, the median hospital stay was up to 36 days (29, 35, 53). For the COVID-19 patients needing intensive care, the median ICU stay was eight days (29). For the deceased, the mean duration from admission to the ICU to death was 7 days (32), and the death occurred 18.5–21 days from symptom onset (29, 73).

2.3 COVID-19 diagnostics

The diagnostics of COVID-19 is based on confirming a SARS-CoV-2 infection via laboratory testing. During our study period (from February 2020 to April 2021), SARS-CoV-2 testing was focused on identifying infections from symptomatic individuals and was not used for the screening of asymptomatic individuals for outbreak management. Suspected cases for testing were identified based on epidemiological history and clinical symptoms (77, 78). Especially during the first months of the pandemic, there were challenges in the laboratory testing of SARS-CoV-2: firstly, a new test for a previously unseen pathogen had to be created, following the shortness of reagents and thus preventing mass testing (79).

Laboratory testing for SARS-CoV-2 has had three typical options: (1) detection of viral genomic material, RNA, (2) detection of human antibodies produced by the immune system, or (3) detection of pieces of proteins outside the virus, so-called viral antigens. The diagnostics of an acute COVID-19/SARS-CoV-2 infection are based on the detection of SARS-CoV-2 RNA or antigen. Additionally, antibody testing can be used in the assessment of past infection and immunity. These three options, Real-Time Reverse Transcription Polymerase Chain Reaction (RT-PCR), antigen and antibody testing, were widely used in Finland during our study period. Other rarer options, such as field-effect transistors and surface plasmon principles,

are not discussed in detail (80). It is also worth noting that options for home testing were not widely available during our study period (81).

The detection of viral genomic material, RNA, via RT-PCR from specimens has been considered the most reliable method due to its high specificity and sensitivity and the so-called golden standard for SARS-CoV-2 detection (80, 82). Prior to the standardization of RT-PCR testing from upper respiratory samples, CT imaging and samples from the lower respiratory tract were utilized in the diagnosis of COVID-19 (83, 84). Moreover, RT-PCR is relatively quick, with the results often ready in 3 to 8 hours (85). Depending on the manufacturer, the sensitivity of the commercial RT-PCRs varies from 88.1% to 100% and the specificity from 93.1% to 100% (82). In March and April 2020, the sensitivity of PCR tests in HUSLAB was reported at 85.7% for inpatients and 95.5% for outpatients (86). In the RT-PCR technique, complementary deoxyribonucleic acid (cDNA) is first obtained from RNA by using the reverse transcription enzyme, after which the cDNA is amplified to a sufficient level for analysis (80). Typically, respiratory specimens are used for SARS-CoV-2 RT-PCR diagnostics. Nasopharyngeal swabs are considered the most sensitive for the purpose, as nasal, throat, or oral swabs and saliva samples and sputum samples are reported to have a lower sensitivity (87). Higher viral loads have been reported in swab samples compared to sputum samples, as well as in nose swabs compared to throat swab samples (26, 27). In addition, higher viral loads have been detected in severe cases (69, 71). Besides the upper and lower respiratory tract, SARS-CoV-2 RNA has been detected in urine, plasma, and stool samples (27, 88, 89). In patients infected with SARS-CoV-2, RNA shedding can last up to 83 days and the mean duration of shedding is 17 days (88). Viable SARS-CoV-2, however, has been detected to survive only up to 9 days in a human body; therefore, the detection of RNA cannot be used to estimate infectiousness (88).

Antigen detection directly identifies viral components, such as nucleocapsid protein and spike protein, and is another option for the laboratory diagnostics of an acute and current SARS-CoV-2 infection (80). The benefits of this method, compared to RT-PCR, are its low costs, portability, and ease of use that enables self-testing and testing with minimal training (82). Lateral flow type assay (LFA) or enzyme-linked immunosorbent type assay (ELISA) methods are used for antigen detection from samples, typically nasopharyngeal swabs (80). Compared to RT-PCR, antigen detection has a reported sensitivity of 68%-100% and a specificity of 100% in SARS-CoV-2 diagnostics (80, 90).

The human immune system produces antibodies to an antigen—in this case, SARS-Cov-2 surface proteins. Antibodies are also known as immunoglobulins (Ig): IgA, IgD, IgE, IgG, and IgM. In particular, IgM is an antibody that can be detected during an acute infection, whereas IgG persists as a sign of a previously encountered pathogen. Immunoglobulins can be detected in the blood and mucosa. The serologic diagnostics of SARS-CoV-2 are based on detecting immunoglobulins IgG

or IgM in blood samples. Serum antibodies have been detected in 50% of patients after 7 days, and in almost all patients by 21 days from symptom onset (26, 69, 72). Due to the late response, serological testing is more aimed at the population level estimation of the prevalence of the encountered infection, and in the case of COVID-19, for assessing the effectiveness of control measures. Typically, LFA, ELISA, or Chemiluminescence immunoassays (CLIA) methods are used in immunoglobulin detection from blood, serum, or plasma (91).

In patient records, according to the International Statistical Classification of Diseases and Related Health Problems 10th Revision (ICD-10), the code U07.1 COVID-19, virus identified is used for a laboratory-confirmed SARS-CoV-2 infection. For a non-confirmed case, the code U07.2 COVID-19, virus not identified is used (92).

2.4 COVID-19 in Finland

The first case of COVID-19 in Finland was identified on January 29, 2020 in a Chinese tourist (93). In the spring of 2020, SARS-CoV-2 spread throughout Finland, mainly with travelers from Austria, Italy, and Spain (94). In March 2020, the WHO declared the COVID-19 pandemic, and the epidemic threshold was attained in Finland. Compared to several other countries, Finland had a low incidence of SARS-CoV-2 infections. By the end of April 2021, the end of our study period, the number of reported cases in Finland was 85,357, and the number of deaths, 899 (95, 96), of which almost half were identified in the capital region consisting of Helsinki, Vantaa, Espoo, and Kauniainen (96).

In the pursuance of infection control through managing social contacts, several restrictions and policies were adopted, and gradually, a state of emergency was declared by the Finnish government, which lasted from March 13 to June 16, 2020 (97). The infection containment policies included travel restrictions, gathering restrictions, remote work recommendations, remote teaching in schools, quarantines of infected and exposed individuals, and restaurant closures. During the first weeks of the pandemic, the majority of the cases in Finland were tracked in the capital region in Uusimaa; between March 28 and April 15, the Uusimaa district went into lockdown and isolated itself from the rest of the country (98).

The stringency index by the Oxford Coronavirus Government Response Tracker (OxCGRT) compared the strictness of restrictions between countries. The index was calculated based on the country's school closures, workplace closures, restrictions on internal movements, international travel controls, cancellation of public events, restrictions on public gatherings, closures of public transport, stay-at-home requirements, and information campaigns (99). The higher the stringency code was, the stricter the restrictions. During the first wave of the pandemic in the spring

of 2020, Finland's stringency index was around 70, which was similar to the index of the United States, higher than Sweden, and lower than the index of China, Italy, and Germany. During the first year of the pandemic, China and Sweden took different approaches. Sweden adopted a less restrictive approach, focusing on mitigation rather than suppression, whereas China implemented a strict zero-COVID policy aimed at eradicating the virus entirely (100, 101). A study analyzing the global association of the stringency index and case fatality rate (CFR) found that intermediate values of the stringency index and higher levels of democracy were associated with a higher CFR (102). Low stringency indexes were most likely associated with a low epidemic wave, and strict restrictions were more straightforward to apply in autocratic regimes (102). The following graph from the OxGRT shows how adaptation according to the current epidemic status was typical to Finland's restrictions and how the stringency remained relatively low compared to several other countries after the first wave.

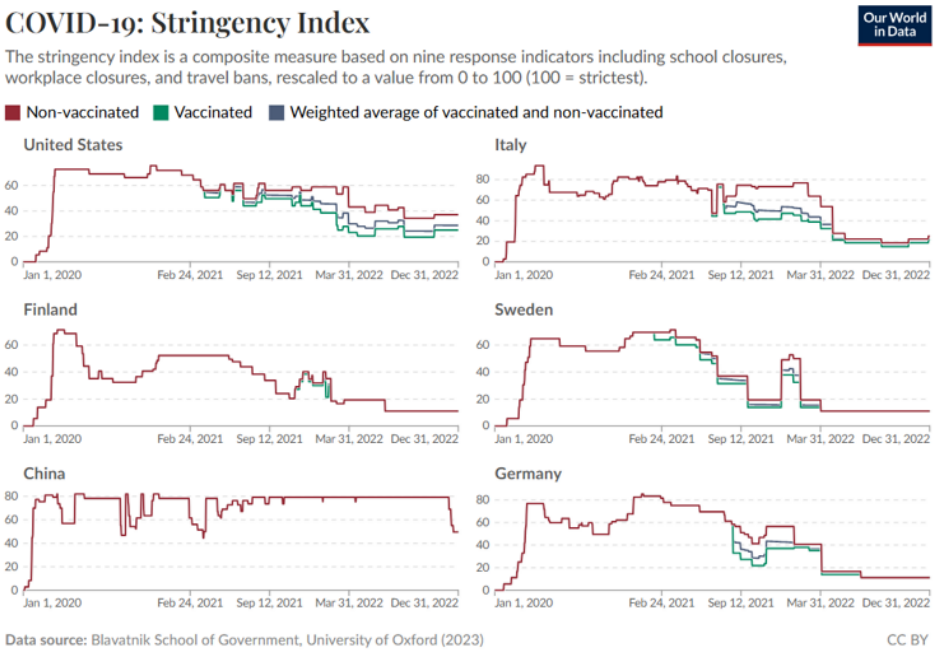

Figure 1. COVID-19 stringency index according to the OxGRT between January 2020 and December 2022 in six countries; United States, Italy, Finland, Sweden, China, and Germany. Image: Our World in Data (39).

The course of the pandemic differed from country to country due to factors, such as demographics, geographic location, hospital capacity, cultural differences, timing of first cases, and containment measures. In geographic location, Finland is not a central travel hub, resulting in a postponed spread compared to Italy and the United Kingdom. In a study exploring the COVID-19 CFR in 143 countries, a higher

CFR was associated with a higher prevalence of cardiovascular diseases and chronic respiratory diseases, older population, high gross domestic product (GDP) and high level of democracy (102).

The population in Finland is aging, with 22.7% of the population aged 65 or older (103). On the other hand, Finland is one of the most sparsely populated countries in Europe. In terms of maintaining distance from one another, the low population density was an advantage. Public relatively feasible healthcare, free COVID-19 testing, sick leave policies, and infectious disease allowance likely also played a significant role in Finland's infection control during the COVID-19 pandemic.

COVID-19 vaccinations were developed at an incredible pace after the start of the pandemic, with the first doses of the vaccine given on December 8, 2020 (104). The first vaccinations were given in Finland for HCWs on December 27, 2020 (105). At first, the availability of vaccinations limited the vaccination rate, and the available vaccinations were directed to HCWs and risk groups for severe COVID-19. By the end of January, most of the HCWs and elderly people in nursing homes were vaccinated, and by the end of April, over 30% of people had received their first vaccination (106) .

Vaccinations dramatically changed the course of the pandemic; it is estimated that the vaccinations prevented over 14 million deaths between December 8, 2020, and December 8, 2021 (107). With the reduced CFR, restrictions could be slowly lifted. On May 5, 2023, the WHO declared the end of the COVID-19 pandemic, and by the end of June 2023, COVID-19 was no longer classified as a generally hazardous communicable disease in Finland (1, 108).

As of February 2025, up to an estimated 7.1 million people have died because of COVID-19 worldwide and 777 million cases have been reported (109). During the COVID-19 pandemic, we experienced several diverse waves and variants of the virus. Each variant differed from the previous in how easily the virus spreads and the severity of the disease. In this thesis, I will focus on the timeline from the beginning of the pandemic until the end of April 2021. It is worth noting that during this addressed time interval, the prevailing COVID-19 variant in Finland was, according to the WHO nomenclature, the alpha variant (110, 111).

2.5 Healthcare workers, work-related well-being and COVID-19-related working conditions

According to the Finnish Ministry of Social Affairs and Health, occupational safety and well-being at work encompass the physical, mental, and social health and well-being of the employees (112). In addition, the Finnish Institute of Occupational Health defines well-being at work as meaningful and smoothly functioning work

carried out in a safe, health-promoting, and career-supporting work environment and community (113). At the individual level, the Institute further defines work-related well-being as the compatibility between physical and psychological demands and resources of the work, and the employee's own physical and mental conditions (114).

The working conditions refer to all circumstances under which the employees are required to work, including factors, such as safety, heating, ventilation, lighting, number of breaks, adequate staffing, working hours, and work equipment. Healthcare workers (HCWs) face hazardous working conditions, including long hours, high-stress situations, exposure to infections and chemicals, and physical demands like lifting. From an occupational health perspective, SARS-CoV-2 constitutes a biological hazard, making the working conditions related to safety and protection particularly essential in healthcare settings, and for the HCWs during the pandemic. In this thesis, the working conditions are examined largely from the perspective of occupational safety and well-being, and therefore, the availability and quality of personal protective equipment (PPE), implementation of infection prevention and control (IPC) guidance, workload, recovery from work, mental well-being and work-related exposure to COVID-19, and quarantines evaluated during the COVID-19 pandemic.

Due to their frontline working environment and consequent exposure to the virus, HCWs were more susceptible to SARS-CoV-2 infections and COVID-19 hospitalizations (115–117). According to the WHO estimates, 80,000–180,000 HCWs have died because of COVID-19 (118). Consequently, HCWs can be considered one of the groups hit the hardest by the pandemic. Not only was their physical health at risk due to exposure, but they also faced enormous psychological pressure as they worked under unexpected, uncertain, and highly stressful conditions, surrounded by a fearful community of fellow HCWs. Moreover, some mental health symptoms of distress, anxiety, depression, and insomnia have been reported among HCWs during the COVID-19 pandemic (119, 120). HCWs have reported, for example, fear for their own life, fear of infecting their loved ones, guilt associated with futile care, and overwhelming workload (121, 122). The preexisting workforce shortages and HCWs' high stress levels and burnout levels were exacerbated by the pandemic.

The burden of the COVID-19 pandemic was not evenly distributed among HCWs, and depending on their working environment and local circumstances, HCWs faced a different level of risk and distress. In a year-long monthly survey study from Finland, the local COVID-19 incidence and caring for COVID-19 patients were associated with the level of psychological distress (123). Among HCWs, the greatest risk for infection was observed in HCWs working in wards, ICUs, or emergency departments (124–126). In addition, from different occupational roles, nurses and assistant nurses were the group with the most infections (115, 127).

Moreover, longer working hours were associated with an increased risk for COVID-19 (124).

Safety and protection measures, such as PPE and IPC guidance, played a notable role in HCWs' working conditions during the COVID-19 pandemic. PPE is essential for protecting HCWs from infections when encountering infected patients (128). For the PPE to protect efficiently, it needs to be used correctly, along with other precautions, and this is where IPC instructions became important (128). Especially during the first months of the pandemic, there were serious challenges in the PPE supply (129, 130) that led to creative ways of coping, such as the reuse of PPE, using the same piece of PPE for extended periods, and obtaining PPE from wherever it was possible, often resulting in deteriorated quality (131). The scarcity, and even running out, of PPE were essential concerns among HCWs (132). During the pandemic, insufficient PPE was associated with reported distress and PPE reuse, with an increased risk for infection among HCWs (121, 133).

The burden of COVID-19 was also unevenly distributed across countries, and consequently among HCWs worldwide. For example, the initial waves in countries, such as the United States and Italy, reached catastrophic levels, with overcrowded hospitals and intensive care units, and numerous HCWs succumbing to the infection. In addition, especially in the most burdened countries, HCWs faced personnel shortages due to infections, quarantines, and caregiving responsibilities for infected family members. They were required to work excessive hours, often without adequate PPE, while elective and preventive care was postponed or halted altogether. In some cases, HCWs were forced to make ethically distressing decisions about which patients would receive treatment and which would be left without care (134–136).

3 Aims of the study

1. To examine how SARS-CoV-2 infections and disease outcomes among HCWs differ from those in the general population, and to analyze the effect of income on these outcomes in both groups.

2. To compare the working conditions of HCWs in primary and tertiary care settings during the COVID-19 pandemic.

3. To evaluate the key factors influencing the COVID-19-related working conditions in relation to self-reported work-related well-being and workload among HCWs during the COVID-19 pandemic.

4 Material and methods

4.1 Study setting

This mixed-methods study approaches the topic through both register-based data (Study I) and survey data (Studies II and III). In addition, the analyses of the survey-based material employ both qualitative and quantitative methods. The data for Study I were collected between February 1 and April 23, 2020. The questionnaire underlying Studies II and III was conducted among healthcare workers of the City of Helsinki (CH) and the Hospital District of Helsinki and Uusimaa (HUS) between June 12, 2020, and April 5, 2021. Figure 3 illustrates the timeline of the studies framed with the timeline of the COVID-19 pandemic.

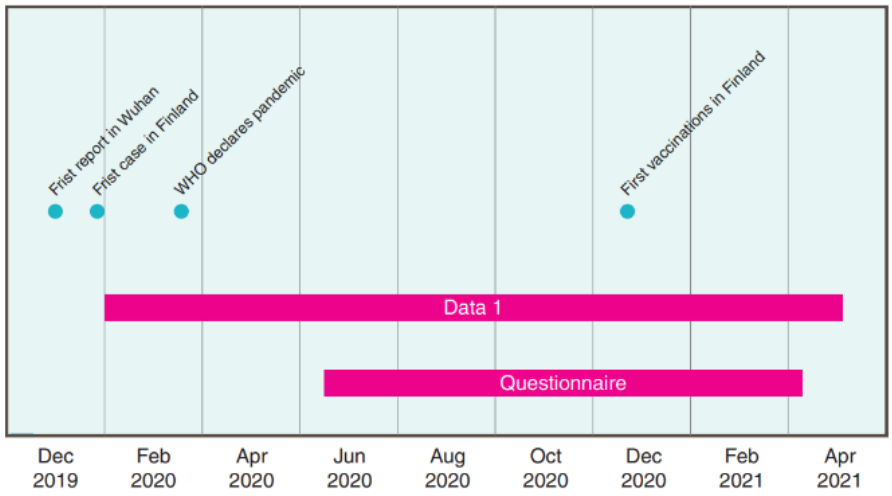

Figure 3 Timeline illustrating the periods of data collection for Study I (Data 1) and Studies II and III (Questionnaire) in relation to selected key events of the COVID-19 pandemic in Finland between December 2019 and April 2021.

4.2 Demographics of Uusimaa and the Helsinki University Hospital (HUS)

During the first waves of the pandemic, Uusimaa was the district with the most COVID-19 cases in Finland. A populous region in Southern Finland with 1.7 million, Uusimaa is home to over 30% of Finland's 5.5 million inhabitants (103). The largest cities in the Uusimaa region are Helsinki, Espoo, and Vantaa. At the end of 2021, Helsinki had 658,457 inhabitants, Espoo 297,132, and Vantaa 239,206 (103).

Helsinki University Hospital (HUS) provides tertiary healthcare for the inhabitants of Uusimaa in 22 different hospitals. In 2021, up to 670,000 patients were treated in HUS, and 2.2 million residents belonged to the HUS Specific Catchment Area (137). In addition, HUS operates centralized nationwide specialist care for demanding diseases, such as the treatment of patients with cleft lips and palate, severe burns, and organ transplantations.

Primary care in Finland is characterized by dispersion into small units. In Helsinki, primary healthcare is divided into 23 healthcare centers, several home care units, child and maternal health clinics, dental clinics, and school health care. In Finland, primary healthcare is provided by the municipalities/cities, and in some cases, especially in the working-age population, by a private operator.

In 2019, Finland's healthcare expenditures totaled 22.0 billion euros (138). The share of tertiary healthcare in costs is the largest at 8.0 billion euros, increasing consistently each year. Simultaneously, the expenditure on primary healthcare (3.4 billion) has remained at a similar level for decades (138). In 2019, public financing comprised 76.8% and private financing, 23.2% of Finland's total annual healthcare expenditures (138). The largest private healthcare operators in Finland are Terveystalo and Mehiläinen. Private healthcare operators provide care that can be categorized as both primary and tertiary care.

4.3 Healthcare workers in the capital region

In 2018, a total of 142,979 people worked as healthcare and social workers in Uusimaa (139). In Finland, HCWs account for 5.3% of the population nationally and 3.1% in Uusimaa region (140, 141). At the timepoint of the study in 2020, a total of 27,162 healthcare and social workers were employed by HUS, 14,609 by the City of Helsinki, 3844 by the City of Espoo, and approximately 3450 by the City of Vantaa (137, 139, 142–144). Up to 85% of healthcare and social workers in Finland are women, and the gender distribution is similar with the largest employers of our study group, the City of Helsinki and HUS (CH: 84.7% / 15.3%, HUS 83.9% / 16.1%) (103, 137, 143).

4.4 Methods

4.4.1 Register based study, Study I

4.4.1.1 Identifying individuals with COVID-19

For Study I, data from several registries were combined to conclude a representative sample of the effects of the COVID-19 pandemic on the HCWs, between February 1, 2020, and April 23, 2020. The individuals with COVID-19 were identified based on positive COVID-19 test results (PCR, antibody- and antigen tests) from the registries of HUS, Terveystalo and Mehiläinen. Each person with an identified COVID-19 infection received a unique ID-code for the data analysis. Positive test results from the same ID recorded less than 90 days apart were considered a singular infection (145).

4.4.1.2 Outcomes

The health outcomes analyzed in this study were COVID-19-related hospitalizations, intensive care unit (ICU) admissions, and deaths. COVID-19 was considered severe in hospitalized and deceased patients. From the cohort of individuals with identified COVID-19 infections, the hospital stays and the ICU admissions were identified from the registries of HUS and the Cities of Helsinki, Espoo, and Vantaa. All the hospital stays had to include the diagnostic code U07.1 (COVID-19 infection, virus identified). Hospital stays that lasted for at least one night were included in the analysis. Readmission to a hospital was considered a part of one admission if it occurred within 30 days from the last hospital stay. The data on hospital stays from HUS also included the information on possible ICU admissions, as the hospitals of the Cities of Helsinki, Espoo, and Vantaa do not have ICUs.

For the deceased, the date of death was collected from the Digital and Population Data Services Agency (DVV). The deaths occurring within 35 days from the last hospital stay were considered COVID-19-related. All COVID-19-related deaths in this study occurred in hospital care.

Additionally, based on the data on their hospital stay, patients with four or more ICD-10 codes associated with their hospital stay were categorized as multimorbid. Typically, multimorbidity is defined as having at least two underlying conditions (146). Among hospitalized patients, pneumonia was frequently diagnosed with COVID-19. For individuals with more than four diagnosis codes, a more detailed assessment was conducted, excluding codes from the O-, R-, and Z-groups. The

ICD-10 codes starting with "O" relate to pregnancy, childbirth, and the puerperium, while those beginning with "R" denote symptoms, signs, and abnormal clinical or laboratory findings not classified elsewhere. Codes in the "Z" category refer to factors influencing health status and contact with health services.

The end date of the study interval was determined for financial reasons, as the adaptation of the patient records system Apotti (Epic Systems) took place in Helsinki after this date and would have caused a significant increase in data expenditures.

Table 1 Registries of Study I.

Variables	Data	Registry
Predictors and covariates		
SARS-CoV-2 infections	COVID-19 test results	HUS: from the HUS catchment area
	COVID-19 test results	Terveystalo: from Helsinki, Vantaa, and Espoo
	COVID-19 test results	Mehiläinen: from Helsinki, Vantaa, and Espoo
Healthcare worker status	Healthcare worker license	National Registry of Social Welfare and Healthcare Professionals
Income	Individual public income and capital income tax information for the year 2020	Tax Administration
Multimorbidity	ICD-10 codes from hospitalized patients	HUS, Cities of Helsinki, Espoo, and Vantaa Hospitalization data
Outcomes		
Hospitalization, ICU admission	Hospital records with U07.1	HUS
	Hospital records with U07.1 s	City of Helsinki hospitals
	Hospital records with U07.1	City of Espoo hospitals
	Hospital records with U07.1	City of Vantaa hospitals
Death	Deceased individuals	Digital and Population Data Services Agency

4.4.1.3 Identifying healthcare workers

The healthcare worker status was retrieved from the National Supervisory Authority for Welfare and Health (Valvira). This registry contains information on all individuals with a right to work as legalized healthcare workers. The registry holds information on existing healthcare professional rights, not whether these individuals are actively working as healthcare professionals. Hence, to obtain a reliable estimation of people with healthcare worker status who are actively working, we combined the data on HCW status with individuals' public income and age. The public income and capital tax information for the year 2020 was collected from the Tax Administration. The study's cohort of active healthcare workers included individuals with a healthcare profession, between 18 and 64 years of age, and with an earned income level of 12,000 euros per year or more. The 12,000 euros per year corresponds to a salary of an assisting nurse working 50% of full-time hours in Finland at the time point of the study (147). For further analysis, the healthcare workers cohort was divided into five subgroups: (1) doctors (doctors and dentists), (2) nurses, (3) nursing assistants, (4) other nursing staff (midwives, laboratory nurses, radiology nurses, dental nurses, and health nurses), and (5) other healthcare professionals (occupational therapists, auxiliary equipment technicians, foot therapists, psychotherapists, physiotherapists, dental technicians, psychologists, speech therapists, nutritionists, hospital physicists, and hospital chemists).

The data for Study I was collected and combined from the previously mentioned registries by the Finnish Social and Health Data Permit Authority Findata, according to the Act on the Secondary Use of Social and Health Data (THL/4848/14.02.00/2020).

4.4.2 Questionnaire based study, Studies II and III

4.4.2.1 The questionnaire

The questionnaire used in Studies II and III was constructed for its intended purpose and designed to comprehensively assess healthcare workers' COVID-19-related working conditions, individual susceptibility to SARS-CoV-2 infection and severe COVID-19, and safety.

Health- and behavior-related, and socioeconomic factors assessed in the study included, for example, smoking, recent travel, pregnancy, chronic pulmonary or cardiac diseases, immunocompromising conditions, living circumstances, and age, as these factors were known or presumed to increase the risk of severe COVID-19 and/or SARS-CoV-2 infection.

Regarding HCWs, COVID-19-related working conditions and work-related well-being assessed in the questionnaire were self-reported mental well-being, workload, excessive working hours, availability and quality of personal protective equipment (PPE), guidance on PPE use, the treatment of patients with COVID-19, and how infection prevention and control guidance measures were implemented in the respondent's work unit. In addition, the questionnaire collected information on direct occupational factors, including the unit which the respondent worked on, employer status, and occupation.

COVID-19-related outcomes assessed in the questionnaire were self-reported SARS-CoV-2 infections, hospitalizations, COVID-19-like symptoms, potential psychiatric symptoms, sick leaves, quarantines, and exposures to SARS-CoV-2. Quarantines in the questionnaire were defined as official quarantines mandated by an infectious diseases doctor.

4.4.2.2 Execution of the survey

The electronic survey was conducted among the healthcare workers of the City of Helsinki (CH) and HUS between June 12, 2020, and April 5, 2021. The original questionnaire comprised 53 (CH) and 50 (HUS) questions and was based on ICD-10 classification criteria, the Finnish Current Care Guidelines and previously published literature on COVID-19. The questionnaire consisted of forced-choice, multiple-choice and open-ended questions. Response rates varied across items, as answering every question was not mandatory. Since answering all the questions was not mandatory, the number of responses is not constant, varying from question to question.

To be included in the study, participants had to be over 18 years old and work as healthcare workers with direct patient contact. Both groups were asked to evaluate their working conditions starting from March 16, 2020, the date on which the first COVID-19 restrictions were implemented in Finland. Due to the longer permission-granting process for the CH, the original questionnaire was executed six months earlier among HUS's employers compared to the CH's. To obtain a similar reference period, an additional follow-up questionnaire was executed among HUS workers between July 12, 2020, and February 28, 2021.

The survey was administered by the communications teams through mass emails and intranet announcements, inviting healthcare workers to participate on a voluntary basis. A total of 2835 (8.6 %) healthcare and social workers participated in the study. Regarding the distribution of e-mails being executed by the communications teams, we unfortunately do not have the knowledge of employers the e-mail reached, nor whether there were inactive accounts included in the delivery. Altogether, 1580 volunteering HCWs were included in the study, from

whom 579 shared free text responses. Figure 4 shows a more detailed enrollment process.

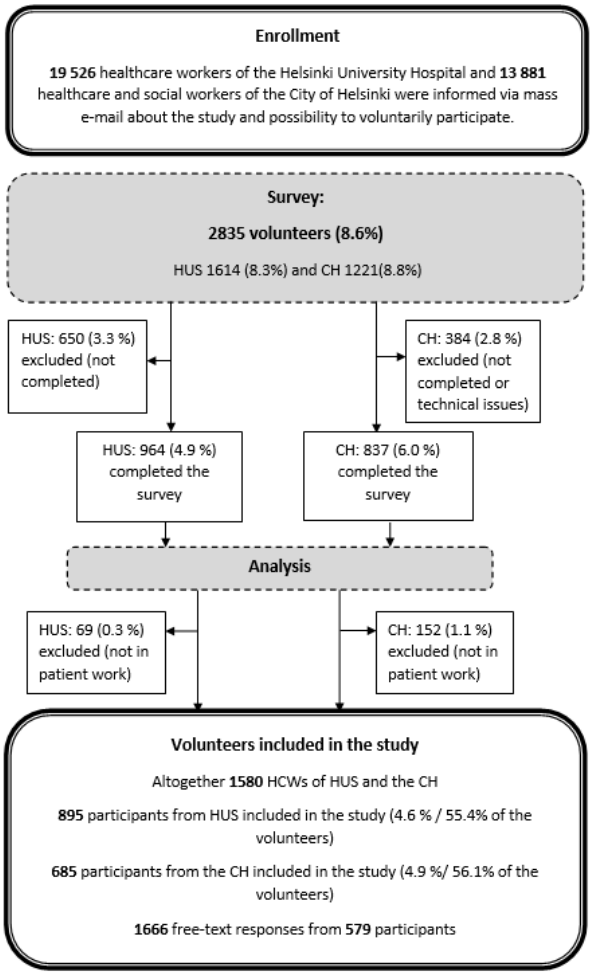

Figure 4 Enrollment process of the volunteers, Studies II and III.

4.4.2.3 Studies II and III

In Study II, we analyzed the responses to 28 forced-choice and multiple-choice questions from the questionnaire and compared the results between primary care (CH) and tertiary care (HUS).

Meanwhile, in Study III, we evaluated responses to the prompted open-ended questions of the questionnaire. The original questionnaire had four open-ended questions:

(i) If there have been significant changes in how you use your personal protective equipment during the epidemic, you can open the stages here (please indicate both the protective equipment used and the time (e.g., March).

(ii) If you reported any abnormalities in access to protective equipment, at what time and at what point were these abnormalities reported?

(iii) Is there anything else you would like to share? and

(iv) Would you like to give more information about your well-being? In what ways have you independently sought to alleviate the symptoms caused by any increased workload, and have you experienced any of these means/activities as helpful?

Of the questions, the first three (i-iii) were included in the analysis. The qualitative analysis of the participants' responses was accompanied by a statistical analysis of the background and working conditions (14 questions) of these 579 participants.

Participants were not obligated to provide open-ended responses. Instead, questions (i) and (ii) were designed to allow respondents to share additional information about PPE usage. This approach aimed to capture valuable insights from frontline workers that might have been missed if the questionnaire had consisted solely of multiple-choice questions.

4.5 Data analysis

4.5.1 Statistical analysis

The statistical analysis was conducted using IBM SPSS 25 and 29 (IBM Corp., Armonk, NY). In Study I, $\chi 2$ test, Fisher's exact test, and binary logistic regression analysis with a $p < 0.05$ significance level, were used. In addition, the COVID-19 rates among HCWs and non-HCWs was assessed using the graph builder and cross tabulation. When examining the associations with COVID-19-related

hospitalization, ICU admission and death, the logistic regression analyses were adjusted for age, gender and income, since the HCWs and the rest of the cohort differed in these factors. The possible interaction effect with gender, age, and income status was also analyzed for HCW status. The significant interaction effect with income and HCW status was analyzed separately among HCWs and other workers.

In Studies II and III, the statistical methods used were the $\chi 2$ test, Fisher's exact test and binary logistic regression analysis, with a $p < 0.05$ significance level. To inform later decisions concerning the adjustments in the multivariate models, the associations were analyzed by using $\chi 2$ tests. The two groups differed in occupational distribution, age distribution, smoking, number of pregnancies, heavy alcohol usage, and living conditions. The following binary logistic regression analyses were adjusted with these factors except for heavy alcohol usage. Responses indicating heavy alcohol usage were rare, and many participants had not answered this question, which reduced the reliability of the response.

4.5.2 Qualitative analysis

In the qualitative analysis, a modified version of Colaizzi's phenomenological method was applied on three (i-iii) prompted open-ended questions. The method was adapted such that the analysis was not returned to the participants for validation due to the pseudonymized nature of the data and the large number of participants in the study.

In the first phase of the analysis, one author analyzed the data and divided it between two thematic categories, using QSR N Vivo 12 software. In the second phase, two authors independently reviewed the categorized material, and during a consensus meeting, further divided the data into smaller subcategories based on the themes emerging from the free-text responses. In the third phase, one author further analyzed the material, conducted a more detailed content analysis, and integrated the findings into the manuscript.

Direct quotations from participants were translated from Finnish to English. Because a single response could be assigned to several subcategories, the total number of coded entries exceeds the number of original responses.

4.6 Ethical considerations

All procedures involving human participants were in accordance with the ethical standards of the institutional research committee and the 1964 Declaration of Helsinki and its amendments or comparable ethical standards. For Studies II and III, the Ethical Committee of HUS (HUS/1450/2020 and HUS/1815/2020) and the CH (HEL 2020- 007596 T 13 02 01) approved the study protocol. All the data was

analyzed and pseudonymized, and the participants were not contacted. In Studies II and III, all the responses analyzed were anonymized. All participants in Studies II and III were volunteers.

5 Results

5.1 Participants of the studies

The characteristics of participants in the three studies are presented in the following tables. In the register-based study, 8.4% of the study population were HCWs, as shown in Table 2.

Table 2 Characteristics of the working-age individuals with COVID-19/SARS-CoV-2 infection in the capital region of Finland area between February 1, 2020, and May 24, 2021.

	HCWs n=2201 (8.4%) n (%)	Non-HCWs n=24070 (91.6%) n (%)	P-value
Gender			<0.001
Women	1785 (81.1%)	11,045 (46.0%)	
Men	416 (18.9%)	12,982 (54.0%)	
Age (years)			<0.001
50–64	530 (24.1%)	4743 (19.7%)	
30–49	1214 (55.2%)	11,265 (46.8%)	
18–29	457 (20.8%)	8062 (33.5%)	
Income			<0.001
Highest quartile (>56 300e/year)	204 (9.3%)	2340 (9.9%)	
Mid-high (37 600–56 300)	489 (22.2%)	3268 (13.8%)	
Mid-low (18 800–37 600)	1329 (60.4%)	7366 (31.1%)	
Lowest quartile (< 18 800 e/year)	179 (8.1%)	10 673 (45.1%)	
Multimorbid *	19 (0.9%)	228 (0.9%)	0.806
Outcomes			

	HCWs n=2201 (8.4%) n (%)	Non-HCWs n=24070 (91.6%) n (%)	P-value
Hospitalized	129 (5.9%)	1215 (5.0%)	0.104
ICU	16 (0.7%)	277 (1.2%)	0.077
Deceased	<5	33 (0.1%)	0.766

* Only available on hospitalized patients

In the survey-based study, 56.6% of the respondents worked in tertiary care and 43.4% in primary care. Characteristics of the participants are shown in Table 3.

Table 3 Characteristics of the survey participants in Study II.

n=1580	Tertiary Healthcare (HUS), n=895, n (%)	Primary Healthcare (CH), n=685, n (%)	P-value
Gender, n=1580			0.261
Women	797 (89.1)	611 (89.2)	
Men	98 (10.9)	72 (10.5)	
Occupation n=1485			<0.001
Doctors/Dentists	149 (18.4)	84 (12.5)	
Nursing staff	559 (68.9)	465 (69.0)	
Others	103 (12.7)	125 (18.5)	
Age, n=1566			0.017
18 – 29 years	143 (16.0)	104 (15.5)	
30 – 39 years	264 (29.5)	190 (28.3)	
40 – 49 years	243 (27.2)	145 (21.6)	
50 – 59 years	195 (21.8)	178 (26.5)	
60 – 69 years	50 (5.6)	54 (8.0)	
Comorbidities, n=1569			
Age (> 70 years)	0 (0)	1 (0.1)	0.437
Severe heart disease	2 (0.2)	2 (0.3)	1.000
Lung disease, not clinically stabilized	24 (2.7)	9 (1.3)	0.075
Diabetes involving organ injury	2 (0.2)	2 (0.3)	1.000
Chronic liver/kidney failure	0 (0)	3 (0.4)	0.083
Immunosuppressive disease	8 (0.9)	9 (1.3)	0.469
Immunosuppressive medication	11 (1.2)	10 (1.5)	0.826

n=1580	Tertiary Healthcare (HUS), n=895, n (%)	Primary Healthcare (CH), n=685, n (%)	P-value
No listed comorbidities	844 (95.5)	653 (95.3)	0.904
Other health-related topics			
Smoking, n=1580	86 (9.6)	94 (13.7)	0.013
Pregnancy, n=1575	23 (2.6)	5 (0.7)	<0.001
Obesity (BMI > 30), n=1571	184 (20.7)	151 (22.1)	0.535
Regular medication, n=1579	435 (48.7)	325 (47.4)	0.648
Heavy alcohol usage, n=1050	27 (5.1)	13 (2.5)	0.035
Living conditions, n=1576			0.006
Lives alone	175 (19.6)	168 (24.6)	
With one other person	323 (36.2)	222 (37.3)	
With two other people	124 (13.9)	102 (14.9)	
With three or more other people	271 (30.3)	158 (23.1)	

Regarding the qualitative data, 64.4% of the shared comments originated from tertiary care and 35.6% from primary care, as shown in Table 4.

Table 4 Characteristics of the participants for Study III.

Employer, n=579	
HUS	373 (64.4)
CH	206 (35.6)
Has treated COVID-19 patients, n=578	258 (44.6)
Gender, n=577	
Women	535 (92.4)
Men	43 (7.4)
Occupation, n=539	
Doctors/dentists	88 (15.2)
Nursing staff	346 (59.8)
Other	105 (19.5)
Age, n=577	
18-29	87 (15.0)
30-39	164 (28.3)

40-49	150 (25.9)
50-59	139 (24.0)
60-69	37 (6.4)
Health -related factors	
Comorbidities, n=575	41 (7.1)
Smoking, n=579	62 (10.7)
Pregnant, n=578	14 (2.4)
Regular medication, n=579	279 (48.2)

5.2 Healthcare workers and SARS-CoV-2 infections

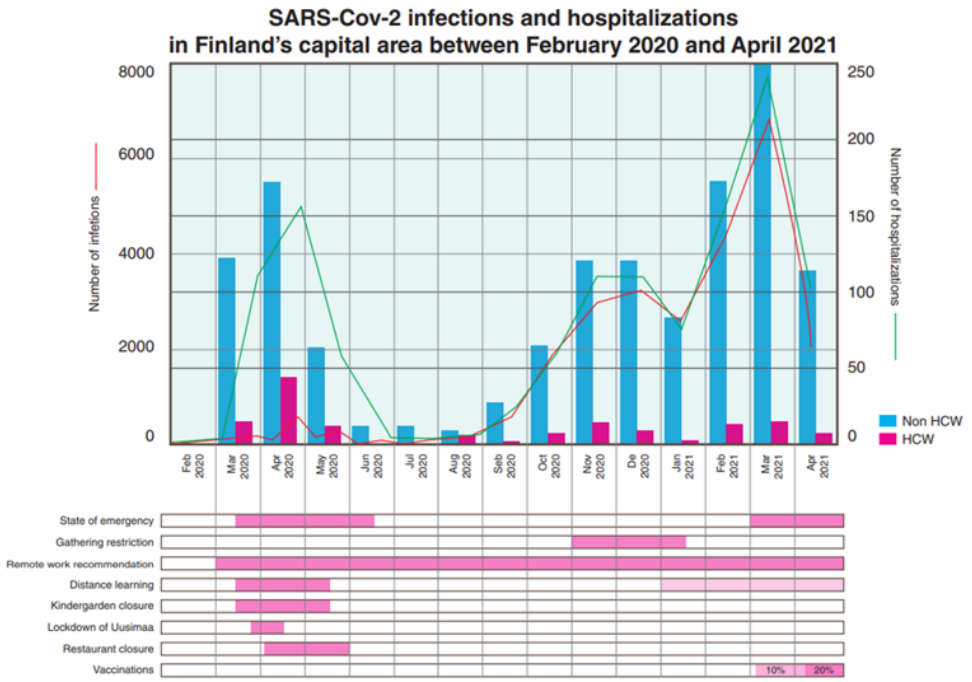

Figure 5 SARS-CoV-2 infections, hospitalizations and COVID-19-related restrictions in Finland's capital area between February 2020 and April 2021.

In Study I, we identified 26,271 SARS-CoV-2 infections in the working-age population in Finland's capital area between February 1, 2020, and April 24, 2021. A total of 2201 (8.4%) of the infections were in HCWs. As visualized in Figure 5, framed with the phases of the COVID-19 restriction policies, during the early months of the pandemic, HCWs' share of infections was overrepresented: up to

19.4% (39/201) and 21.8% (156/714) of the infections were in HCWs in March and April 2020, respectively. Table 5 depicts more details on the infection distribution by each month.

Table 5 Healthcare workers and non-healthcare workers infections between February 2020 and April 2021 in Finland's capital area.

	Total	Non-HCW	HCW	Share of HCWs
Feb 2020	1	1	0	0.0%
March 2020	201	162	39	19.4%
Apr 2020	714	558	156	21.8%
May 2020	324	278	46	14.2%
Jun 2020	71	71	0	0.0%
Jul 2020	42	40	2	4.8%
Aug 2020	141	126	15	10.6%
Sep 2020	522	483	39	7.5%
Oct 2020	1896	1747	149	7.9%
Nov 2020	3129	2786	343	11.0%
Dec 2020	3341	3012	329	9.8%
Jan 2021	2654	2431	223	8.4%
Feb 2021	4371	4115	256	5.9%
March 2021	6794	6357	437	6.4%
Apr 2021	2070	1903	167	8.1%
Total	26,271	24,070	2201	8.4%

In Study II, we found the self-reported infection rate to be similar in primary and specialized care, as 4.9% of the primary and 5.0% of the tertiary HCWs reported a positive PCR test. In addition, the rate of self-reported work-related COVID-19 infections was also similar, as 2.9% (26/895) HCWs from tertiary and 3.1% (21/685) from primary healthcare reported a work-related infection. Treating patients with COVID-19 was an independent risk factor for COVID-19 for both primary and specialized care HCWs (OR 1.59, 95% CI: 1.01–2.52, p = 0.047).

5.3 Healthcare workers, quarantines, and sick leaves

5.3.1 Quarantines

In Study II, we found primary healthcare workers' odds for reporting work-related quarantines greater than that of tertiary healthcare workers (OR 1.96, 95% CI: 1.38–2.79, p <0.001), although primary HCWs were less likely to treat COVID-19 patients (OR 0.45, 95% CI: 0.37–0.56, p <0.001). In primary HCWs, smoking was associated with an elevated risk of work-related quarantine (OR 5.37, 95% CI: 1.80–15.96, p = 0.003). Reported quarantine periods were more likely for both groups when treating COVID-19 patients (OR 1.88, 95% CI: 1.36–2.59, p <0.001).

Table 6 Reported COVID-19/SARS-CoV-2 infections and quarantines in healthcare workers of the City of Helsinki (primary healthcare) and Helsinki University Hospital (tertiary healthcare), between June 12, 2020, and April 5, 2021.

OR adjusted for age, occupation, living conditions, pregnancy, smoking and treating COVID-19-positive patients; main effects model.

Non-adjusted OR

* Tested for significant interaction between background factor treating COVID-19 patients and with group.

" Tested for significant interaction between background factor smoking and group.

If interactions are significant, a sub-group analysis is presented.

	Tertiary Healthcare, n= 895, n (%)	Primary Healthcare , n= 685, n (%)	P-value	Adjusted OR Primary vs Tertiary Healthcare, (95% CI)
Treated COVID-19 patients, n=1560	424 (47.6)	196 (29.3)	<0.001	0.45 (0.37 - 0.56)#
COVID-19 laboratory tests				
Positive PCR test, n=1574	44 (4.9)	34 (5.0)	0.900	0.97 (0.59 – 1.60)
Positive antibody test, n=225	46/171 (26.9)	10/54 (18.5)	0.147	0.49 (0.19 – 1.28)
Quarantines, n=1574				
Work-related quarantine	73 (8.2)	94 (13.7)	<0.001	1.96 (1.38 – 2.79) *
-Smokers	5 (5.8)	22 (23.4)	0.003	5.37 (1.80 – 15.96)
-Non-smokers	68 (8.5)	72 (12.2)	0.006	1.70 (1.16 – 2.50)
Leisure-time related quarantine	22 (2.5)	27 (3.9)	0.293	1.39 (0.75 – 2.58)"

5.3.2 Sick leaves

In Study II, the prevalence of self-reported sick leaves (yes/no) due to COVID-19-like symptoms was higher among primary HCWs compared to tertiary HCWs, 73.1% vs 41.7% (p<0.001). Among different occupational groups, sick leaves were the most common in both primary and tertiary healthcare in nursing staff. More detailed information is shown in Table 7.

Table 7 Sick leave due to COVID-19-like symptoms of healthcare workers in Helsinki University Hospital (tertiary healthcare) and the City of Helsinki (primary healthcare).

OR adjusted for age, occupation, living conditions, pregnancy, smoking and treating COVID-19-positive patients

	Tertiary Healthcare, n= 895, n (%)	**Primary Healthcare, n= 685, n (%)**	**P-value**	**Adjusted OR Primary vs Tertiary Healthcare, (95% CI)**
Sick leaves, n=1330	401 (41.7)	351 (73.1)	<0.001	3.22 (2.47 – 4.21)
Yes/no				
Doctors	48 (33.8)	43 (75.4)	<0.001	6.12 (2.90 – 12.93)
Nursing staff	267 (50.5)	243 (78.6)	<0.001	3.61 (2.57 – 5.06)
Others	47 (47.5)	61 (57.5)	0.136	1.56 (0.87 – 2.81)
Age 18 – 29	72 (52.9)	69 (83.1)	<0.001	4.60 (2.21 – 9.57)
Age 30 – 39	129 (51.8)	88 (71.0)	0.001	2.35 (1.42 – 3.89)
Age 40 - 49	112 (47.9)	73 (70.9)	<0.001	2.69 (1.57 – 4.61)
Age 50 – 59	76 (41.1)	86 (71.1)	<0.001	3.09 (1.81 – 5.26)
Age 60 - 69	12 (25.0)	30 (76.9)	<0.001	19.48 (5.18 – 73.26)
Lives alone	71 (42.8)	83 (76.9)	<0.001	5.20 (2.80 – 9.67)
Lives with another person	137 (44.2)	134 (73.2)	<0.001	3.95 (2.54 – 6.15)
Lives with two other people	53 (45.3)	52 (70.3)	0.005	2.59 (1.34 – 5.01)
Lives with three or more other people	140 (54.5)	80 (72.1)	0.018	1.89 (1.11 – 3.20)

5.4 Healthcare workers and disease outcomes

5.4.1 Hospitalizations, ICU admissions and mortality

In Study I, we identified 1,344 COVID-19-related hospitalizations, accounting for 5.2% of all COVID-19 cases. Among HCWs with SARS-CoV-2 infection, 5.8% (129 individuals) needed hospital care. A total of 293 COVID-19-related ICU admissions were recorded in the cohort, representing 1.1% of all infections and 21.8% of all hospitalizations. Among healthcare workers, 16 individuals (0.7%) required ICU treatment. In addition, a total of 34 COVID-19-related deaths were recorded, accounting for 0.1% of all infections and 2.5% of all hospitalizations. Mortality among HCWs was similar to the overall working-age cohort, and there was no significant difference between the groups (p=0.766).

Healthcare workers had significantly increased odds of hospitalization compared to other working-age individuals (OR 1.25, 95% CI 1.02–1.53, p = 0.030). Additionally, there was a significant interaction between the HCW status and income level (p = 0.021). Interestingly, among healthcare workers, the highest income level was associated with increased odds for hospitalization (OR 2.00, 95% CI 1.16–3.45, p = 0.013). Unlike in the overall cohort in Study I, where a lower income was associated with a higher risk of hospitalization, among healthcare workers, the lowest income group was not linked to an increased hospitalization risk. On the contrary, there was a trend approaching a significant decrease in hospitalization odds (OR 0.36, 95% CI 0.12–1.15, p = 0.086). In the entire cohort, low-income status was associated with an increased odds of hospitalization compared to the highest-income group (OR 1.64, 95% CI 1.35–1.99, p <0.001).

Table 8 Healthcare workers' SARS-CoV-2 infections and COVID-19-related hospital care in capital region, between February 1, 2020, and April 24, 2021.

	SARS-CoV-2 infections n=2201, (% of the HCWs)	Hospitalized n=129, (% within profession)	P-value	ICU n=16, (% within profession)	P-value
Occupation			p = 0.004		p = 0.781
Doctors	163 (7.8%)	13 (7.8%)		<5	
Nurses	508 (23.2%)	48 (9.0%)		5 (0.9%)	
Assistant nurses	1127 (51.5%)	57 (4.5%)		7 (0.6%)	
Other nursing staff	186 (8.5%)	11 (5.5%)		<5	
Other HCWs	204 (9.3%)	9 (4.1%)		<5	

In Study II, reports of COVID-19-related hospitalization or treatment in an ICU were rare among the participating HCWs. Altogether, 0.5% of the participants (8/1580) reported being hospitalized, and less than five reported being treated in an ICU.

5.5 Healthcare workers, COVID-19-related working conditions and work-related well-being

5.5.1 Working conditions: PPE and guidance

In Study III, our analysis revealed that participants experienced significant distress due to issues with the availability of personal PPE and the frequent changes in related guidelines. In particular, running out of masks and respirators was highlighted in the responses. In addition, working with inadequate PPE was associated with reported excessive workload (OR 1.51, CI 95% 1.01–2.25, p <0.05) and working hours (OR 2.01, 95% CI 1.24–3.24, p <0.05). In both groups, the insufficient availability of PPE was associated with increased stress at work (OR = 1.49, 95% CI: 1.18–1.88, p = 0.001). Furthermore, clear IPC guidance was associated with better levels of reported recovery from work (OR 1.51, CI 95% 1.06–2.14, p <0.05). In Study II, the primary HCWs reported instructions to be more uniform, but on the other hand, were more likely to report receiving no instructions for using PPE (OR 2.03, 95% CI: 1.36–3.02, p <0.001). Table 9 shows more detailed results on the working conditions compared between primary and tertiary HCWs.

Table 9 Comparison of working conditions between healthcare workers of the City of Helsinki (primary healthcare) and Helsinki University Hospital (tertiary healthcare).

OR adjusted for age, occupation, living conditions, pregnancy, smoking and treating COVID-19-positive patients; main effects model.

Non-adjusted OR

* Tested for significant interaction between background factor treating COVID-19 patients and with group.

** Tested for significant interaction between background factor treating COVID-19 patients and with group.

If interactions are significant, a sub-group analysis is presented.

	Tertiary Healthcare, n= 895, n (%)	Primary Healthcare , n= 685, n (%)	P-value	Adjusted OR Primary vs Tertiary Healthcare, (95% CI)
Treated COVID-19 patients, n=1560	424 (47.6)	196 (29.3)	<0.001	0.45 (0.37 - 0.56) #
PPE-training				
Non-uniform PPE instructions, n=1574	500 (56.4)	264 (34.6)	<0.001	0.52 (0.42 – 0.64) **
No instructions for using PPE, n=1562	50 (5.6)	77 (11.3)	<0.001	2.03 (1.36 – 3.02) *
Guided training for using PPE, n=1571	362 (40.6)	235 (34.6)	0.227	0.87 (0.69 – 1.09) *)
-Doctors	48 (32.4)	34 (40.5)	0.117	1.67 (0.88 – 3.16)
-Nurses	247 (44.3)	176 (38.2)	0.388	0.89 (0.68 – 1.16
-Others	38 (37.3)	22 (17.6)	0.001	0.31 (0.15 – 0.60)
Knows how to don/doff PPE, n=1568	810 (91.3)	626 (91.9)	0.176	1.31 (0.89 – 1.95) *
-Treated COVID-19 patients	417 (98.8)	190 (96.9)	0.091	0.32 (0.08 – 1.20)
-Did not treat COVID-19 patients	388 (84.3)	422 (89.8)	0.045	1.53 (1.01 – 2.31)
Personal protective equipment (PPE), n=1547				
Nonsufficient PPE	254 (29.5)	147 (21.5)	0.033	0.76 (0.59 – 0.98) *
Worked without PPE	25 (1.6)	18 (1.2)	0.840	1.07 (0.54 – 2.13)
Reuse of facemask at work	43 (5.0)	26 (3.8)	0.606	0.87 (0.50 – 1.49)

Participants' prompted free-text responses were subcategorized, as shown in Table 10.

Table 10 Content of free-text responses.

Qualitative analysis of data: 949 free-text responses from 579 participants

The theme of the response	n=579, n
Personal Protective Equipment (PPE)	457
Problems with PPE availability	351
Scarcity of PPE	325
Scarcity of masks	167
Scarcity of gowns	87
Scarcity of visors	52
Reuse	36

Varying PPE	27
Outdated	19
Creative obtaining of PPE	16
Infection prevention and control guidance	430
Changing instructions	178
Unclear or missing instructions	84
Clear instructions	5

Participants' more detailed experiences, feelings, and insights regarding PPE, IPC guidance, and management are illustrated in the collection of quotations, presented in Table 11.

Table 11 Free-text quotations from the participants of Study III. Translated from Finnish to English.

Direct translated quotations from free-text responses	
Personal protective equipment	*"I have received PPE in accordance with the instructions, because according to the instructions, PPE was systematically lightened during the spring. For example, whereas FFP2 / FFP3 respirators were initially used in the ward (as in MERS isolation, for example), it was no longer necessary to use it at the end of March according to HUS instructions (except with aerosols). If we had been allowed to use it (as we would have liked), there would certainly have been a shortage of them."*
	"The protective gowns broke when put on. It did not protect us from vomit or other fluids as secretions came through to the skin."
Infection prevention and control guidance	*"As protective gear began to run low, guidance on protection became looser."*
	"Absolutely the most burdensome aspect of the whole epidemic was the ever-changing guidelines, many of which conveyed that even the authors did not know what to do and therefore ended up with some kind of panic solution that had no head or tail."
	"We had the impression at first that protective equipment was not needed, but when it became more available, it was recommended to use it despite no real change in the situation of the pandemic."

Direct translated quotations from free-text responses	
	"The guidelines changed so often that I couldn't stay on the page about the right way. Aseptic conscience has had to be suppressed because we must act against the instructions that we have learned are correct."
	"We hope lessons will be learned, and that instructions will be given in advance in situations like this. You should not need to fight for protective equipment to do your job, you should use your energy for work. This created a really nasty atmosphere in our workplace. Some of the staff thought we didn't matter."
	"IPC information should be centralized. Now guidance has come from various sources. Organizational structures should be followed even during an epidemic, and information should flow normally."
Management	*"The situation has not been made easier by the employer's complete lack of support and understanding in a difficult situation."*
	"There has been a feeling that no one wants to protect us."

5.5.2 Work-related well-being

In Study II, in several reported variables, work-related well-being was inferior among primary HCWs compared to tertiary HCWs; in terms of feeling more stressed at work (OR 3.20, 95% CI: 2.55–4.02, p <0.001), not recovering from work (OR 0.49, 95% CI: 0.39–0.62, <0.001), reported their mental well-being below normal levels (OR: 1.59, 95% CI: 1.26–2.00, <0.001), and increased working hours (OR 1.63, 95% CI: 1.25–2.12, p <0.001). In all participants, low mental well-being was associated with suboptimal recovery from work (OR 15.87, 95% CI: 11.44–22.02, p <0.001). In addition, insufficient PPE availability was associated with increased levels of stress at work (OR 1.49, 95% CI: 1.18–1.88, p = 0.001) and with increased stress at work (OR = 1.49, 95% CI: 1.18–1.88, p = 0.001). There was no significant association between low mental well-being and a positive PCR test (OR 0.89, 95% CI: 0.56–1.44, p = 0.643), treating COVID-19 patients (OR 0.98, 95%

CI: 0.79–1.22, p = 0.877), guided PPE training (OR = 1.20, 95% CI: 0.96–1.49, p = 0.104), reuse of PPE (OR 0.80, 95% CI: 0.49–1.33, p = 0.392) or leisure-time-related quarantine (OR 0.79, 95% CI: 0.42–1.48, p = 0.460). The association between low mental well-being and work-related quarantine (OR 0.71, 95% CI: 0.52–1.00, p = 0.053) showed a trend approaching a significant level.

Table 12 Well-being of healthcare workers (HCWs) in relation to COVID-19-related working conditions in Helsinki University Hospital (tertiary healthcare) and the City of Helsinki (primary healthcare).

OR adjusted for age, occupation, living conditions, pregnancy, smoking and treating COVID-19-positive patients

& Tested for non-significant interaction between background factor age and group.

	Tertiary Healthcare n= 895, n (%)	Primary Healthcare n= 685, n (%)	P-value	Adjusted OR Primary vs Tertiary Healthcare, (95% CI)
Mental well-being below normal, n=1555	259 (29.9)	260 (38.3)	<0.001	1.59 (1.26 – 2.00) &
-Doctors, n=255	32 (22.1)	27 (32.1)	0.117	1.69 (0.88 – 3.26)
-Nursing staff, n=992	169 (30.8)	192 (41.6)	<0.001	1.64 (1.25 – 2.15
-Others, n=217	26 (25.7)	36 (29.3)	0.393	1.33 (0.69 – 2.54)
Increased working hours, n=1559	155 (17.4)	171 (25.6)	<0.001	1.63 (1.25 – 2.12) &
-Doctors, n=226	34 (22.8)	23 (28.0)	0.263	1.47 (0.75 – 2.90)
-Nursing staff, n=993	98 (17.6)	127 (27.9)	<0.001	1.76 (1.29 – 2.41)
-Others, n=216	13 (12.6)	19 (15.8)	0.312	1.54 (0.67 – 3.53)
Feeling more stressed at work, n=1563	338 (38.0)	422 (64.9)	<0.001	3.20 (2.55 – 4.02)
-Doctors, n=220	45 (30.2)	38 (50.0)	0.002	2.58 (1.40 – 4.77)
-Nursing staff, n=983	227 (40.9)	316 (70.9)	<0.001	3.73 (2.82 – 4.93)
-Others, n=215	35 (34.0)	62 (52.5)	0.004	2.37 (1.32 – 4.27)
Recovers normally from work, n=1580	448 (50.2)	239 (34.9)	<0.001	0.49 (0.39 – 0.62) &
-Doctors, n=228	92 (61.7)	34 (40.5)	0.001	0.36 (0.20 – 0.66)
-Nursing staff, n=1004	267 (47.9)	154 (33.1)	<0.001	0.51 (0.39 - 0.66)
-Others, n=221	53 (51.5)	48 (38.4)	0.015	0.49 (0.27 – 0.87)

6 Discussion

"There has been a feeling that no one wants to protect us."
This is a direct quote from one of our survey participants. According to the Finnish law, the employer's duty is to ensure the occupational safety and health of their employees by all necessary measures. During the COVID-19 pandemic, HCWs' health and safety were clearly compromised. Since it would be unreasonable to expect a pandemic to be predicted in advance, the relevant question becomes: how was HCWs' employee safety managed in Finland during the crisis—and what lessons can be drawn from this experience?

In this dissertation, I have analyzed the COVID-19 pandemic, from the viewpoint of the HCWs, through a comprehensive register-based study and a survey-based study among both primary and tertiary HCWs. Our study was conducted early in the pandemic, prior to widespread vaccination and amid social restrictions, highlighting the significance of occupational exposure risks. The questionnaire study was conducted in real-time during the pandemic, capturing HCWs' experiences as they navigated the evolving challenges and changes, and thereby enhancing the accuracy and relevance of the findings.

6.1 Occupational risk-assessment

In terms of occupational health, SARS-CoV-2 is a biological hazard. According to the Finnish law, if workplace activities involve potential exposure to a biological hazard, such as SARS-CoV-2, the employer is responsible for assessing both the likelihood of employees contracting the infection and the severity of the illness it may cause (Occupational Safety and Health Act 738/2022)(148). Based on this assessment, the level of risk to employees can be determined, and appropriate measures can be planned and implemented to reduce these risks. The overall objective of risk assessment is to mitigate occupational hazards to an acceptable level (149). In the case of COVID-19 pandemic, such measures included, for example, the use of PPE, implementation of remote and hybrid working arrangements, air filtration improvements, and vaccination programs.

Where one works significantly impacts the risk of SARS-CoV-2 infection. Remote work, which was more readily accessible to individuals in higher-income

occupations outside the healthcare sector, appeared as a protective effect against COVID-19; prior studies have demonstrated that essential workers, who were generally unable to work remotely, faced elevated risks of SARS-CoV-2 infection and associated mortality (150, 151). Furthermore, research from the United States indicated that the ability to work remotely accounted for much of the observed disparity in age-adjusted COVID-19 mortality across different socioeconomic groups (65).

The physical work environment plays a critical role in exposure risk, as individuals working in high-contact or densely populated settings are more vulnerable to infection. The United States Occupational Safety and Health Administration (OSHA) classified healthcare and morgue workers who operate in close proximity to individuals known or suspected to be infected with SARS-CoV-2 as being at a high or very high risk of exposure to the virus (152). Previous studies have shown that HCWs, particularly those employed in hospital wards, intensive care units, or emergency departments, experienced a heightened risk of infection due to the nature of their clinical responsibilities (124, 125). Furthermore, a register-based study from the United Kingdom with 158,445 healthcare workers showed that patient-facing HCWs and household members were at a greater risk of hospitalization due to COVID-19 when compared to non-patient-facing HCWs (153).

Besides direct exposure to patients with COVID-19, extended working hours and suboptimal hand hygiene have been associated with a higher risk of HCWs acquiring SARS-CoV-2 infections (124). In addition, PPE-related factors, such as the shortage of PPE, inadequate PPE, and incorrect use of PPE, have been associated with an elevated risk of nosocomial infections (125, 133, 154).

6.2 Healthcare workers and COVID-19

6.2.1 SARS-CoV-2 infections

Healthcare workers elevated risk for SARS-CoV-2 infection during the COVID-19 pandemic has been extensively reported (115, 117, 155). Systematic reviews and meta-analyses have estimated that healthcare workers (HCWs) accounted for approximately 10–11% of SARS-CoV-2 infections in 2020 (156, 157). However, reported proportions vary widely between studies, ranging from 3.5% to 19%, reflecting differences in local pandemic conditions and testing policies (35, 158). Comparing the global rates of infection, hospitalization, and mortality remains difficult due to variations in health policies, detection practices, quality of care, and healthcare system capacity. Furthermore, geographic factors played a role in the

spread of the pandemic, as nations with major travel hubs experienced a faster and wider spread.

Our results align with studies showing HCWs' overrepresentation in infections. In Study I, during the first 15 months of COVID-19 in Finland, HCWs represented 8.5% of infections, which is higher than their share (3.1%) in the region (140). Especially during the first months of the pandemic in Finland, the HCWs were disproportionately affected by SARS-CoV-2 infections: in March and April 2020, HCWs accounted for as much as 19.4% and 21.8% of all reported cases, respectively. Similar findings have been reported in Canada, where, as of April 2020, up to 25.2% of confirmed SARS-CoV-2 infections were among people working in healthcare settings (159). In comparison, the corresponding figure in Los Angeles between March and May 2020 on HCWS was 9.6% (160). We observed the highest infection rate in assistant nurses (51.5%), followed by nurses (23.2%), other nursing staff (8.5%), and doctors (7.8%). Previous studies have also identified nurses and assistant nurses as the occupational group with the highest number of infections (115, 127, 161). However, it is worth noting that due to the restricted testing volume, HCWs were more likely to be tested early in the pandemic, which could at least partly explain the higher infection rates among HCWs.

In the questionnaire study (Studies II and III), the self-reported infection rate remained lower, with a total of 4.9% (44) of the primary and 5.0% (34) of the tertiary HCWs reporting positive PCR tests. There was no significant difference between the rate of self-reported SARS-CoV-2 infections (p=0.900), although primary HCWs were less likely to report taking care of patients with COVID-19 (OR 0.45, 95% CI: 0.37–0.56, p <0.001). Moreover, primary HCWs reported more frequent work-related quarantines (OR 1.96, 95% CI: 1.38–2.79, p <0.001). Altogether, 8.2% (73) of tertiary HCWs reported work-related quarantines, compared to 13.7% (94) of primary HCWs. However, having treated patients with COVID-19 was an independent risk factor for SARS-CoV-2 infection (OR 1.59, 95% CI: 1.01–2.52, p = 0.047) and work-related quarantines (OR 1.88, 95% CI: 1.36–2.59, p <0.001) in both groups.

Given the established role of the physical work environment in influencing the risk of SARS-CoV-2 infection, it is noteworthy that no difference in reported infections was observed between primary and tertiary healthcare workers in the questionnaire study, and that quarantines and sick leaves due to COVID-19-like symptoms were more frequently reported in primary care. This raises the question of whether the risk of COVID-19 was adequately assessed in primary care settings.

Sick leave was consistently more prevalent in primary healthcare across different occupational categories. The disparity was the most marked among doctors; those in primary care exhibited 6.12-fold higher odds of sick leave than their counterparts in tertiary care. The highest rates of sick leave were reported among nursing staff, 50.5% in tertiary care and 78.6% in primary care. This aligns

with findings from our register-based study (Study I) showing that nurses had the highest incidence of SARS-CoV-2 infections among HCWs.

6.2.2 Healthcare workers and disease outcome

6.2.2.1 Hospitalization

Our findings clearly indicate that HCW status was associated with an elevated risk of hospital admission following SARS-CoV-2 infection during the first 15 months of COVID-19 in Finland (OR 1.25, 95% CI 1.02–1.53, p = 0.031). This is line with the previous study on COVID-19-related hospitalizations and deaths in HCWs in nine European countries reporting an elevated risk for both hospitalizations and ICU admissions among HCWs (117). We observed the highest hospitalization rate in nurses (9.0%), followed by doctors (7.8 %), other nursing staff (5.5 %), and assistant nurses (4.5%). Early case series from China demonstrated a similar trend in hospitalizations, with nurses representing the most affected occupational group (162, 163). As HCWs typically delay seeking medical care, earlier access to care should not explain these results (164, 165).

Among HCWs, those in the highest income group demonstrated a significantly increased risk of hospitalization (OR 2.00, 95% CI 1.16–3.45, p = 0.013). In contrast, HCWs in the lowest income group did not show elevated odds of hospital admission; rather, there was a non-significant trend toward a reduced risk in this group (OR 0.36, 95% CI 0.12–1.15, p = 0.086). This finding contrasts with patterns observed in the general population, where a lower income is typically associated with a lower life expectancy, an increased risk for chronic diseases, and an increased risk for mortality from respiratory infections (166–171). Our results highlight the role of the physical working environment in shaping the COVID-19-realated hospitalization risk and reveal a distinct income-related risk profile among HCWs compared to the non-HCW working-age population in the same geographic area. To our knowledge, no previous studies have reported this finding.

Previous studies have showed that higher age, male sex, and multimorbidity, low economic status, low personal income, immigrant status from a low-income country, living in the poorest area, and ethnicity (Black/South Asian, Hispanic) are associated with a higher risk for COVID-19-related mortality (29, 35, 58, 60, 76, 150, 172). In addition, previous studies also revealed a higher risk for hospitalization with male gender, multimorbidity, increasing age, ethnicity other than white, and living in the poorest areas (173, 174). Also, in our register-based study in the capital region in the whole cohort, low-income status, male sex, and older age were independent risk factors for hospitalizations, ICU admissions, and

COVID-19-related deaths. In this study, as well as in previous studies, higher incomes are associated with better disease outcomes in the entire cohort.

6.2.2.2 ICU admissions and mortality

In our study, no significant difference was found in ICU admissions or mortality between HCWs and non-HCWs. Overall, mortality among individuals with confirmed SARS-CoV-2 infections remained low in our register-based study, with only 0.1% of infected patients and 2.5% of hospitalized patients having died. In both questionnaire-based and register-based studies, the number of healthcare workers requiring ICU treatment or deceasing due to COVID-19 was low, limiting the ability to conduct more detailed analyses of mortality or ICU admissions.

Although HCWs exhibit higher rates of SARS-CoV-2 infection, their COVID-19 mortality has generally been reported to be comparable to, or lower than, that of the general population (117, 159, 175, 176). This discrepancy may be explained by several factors, including the younger age profile and overall better health status of HCWs, which are associated with more favorable prognoses, as well as the potential for better levels of care. Another contributing factor may be the so-called "healthy worker effect," whereby individuals with pre-existing health conditions are less likely to remain in frontline roles, resulting in a workforce composed of comparatively healthier individuals (177, 178). However, in our study, we did not observe a significant difference in the prevalence of multimorbidity between HCWs and non-HCWs, suggesting that this effect may not fully account for differences in disease outcomes.

6.3 Healthcare workers, COVID-19-related working conditions and work-related well-being

6.3.1 Personal protective equipment (PPE)

During the early months of the pandemic, hybrid and remote working arrangements were adopted where feasible, COVID-19 patients were cohorted in designated wards, and the development of vaccines remained a distant prospect. For frontline HCWs, PPE and adherence to evolving guidelines were the primary means of protection against COVID-19. It is therefore unsurprising that in the qualitative analysis of questionnaire responses, the availability and quality of PPE emerged as the most distressing concerns reported by HCWs.

Most questionnaire responses (92.6%) related to PPE availability reported problems with sufficient availability. Masks and respirators drew the most

comments, particularly regarding the availability and quality, accounting for 74.5% of quality-related and 45.6% of availability-related feedback. In comparison, coats and visors were mentioned less frequently across both categories. Besides PPE availability, recurring concerns emerged about the reuse of disposable items, outdated products, declining quality, poor fitness, side effects, and unequal distribution of the PPE.

Previous studies have linked the shortages of PPE, frequently changing guidelines, and lack of training during the COVID-19 pandemic to increased emotional distress among HCWs (132, 179). Our findings support this association, as HCWs who reported insufficient PPE availability had 1.49 times higher odds of experiencing increased stress at work (95% CI: 1.18–1.88, p = 0.001). Additionally, inadequate PPE was associated with reported excessive workload (OR 1.51, 95% CI: 1.01–2.25, p <0.05) and working hours (OR 2.01, 95% CI 1.24–3.24, p <0.05).

At the onset of the COVID-19 pandemic, PPE, particularly masks, was the subject of widespread debate. Guidelines varied significantly between countries and were frequently revised as new information emerged (180). The global scarcity of PPE likely contributed to these inconsistencies. Much of the controversy centered on the effectiveness of various mask types (e.g., N95 respirators, surgical masks, and cloth masks) in protecting the general public in community settings. A 2023 Cochrane review concluded that wearing a mask or respirator does not significantly reduce the transmission of respiratory viruses in the general population (181).

In contrast, multiple studies have demonstrated that respirators provide better protection for healthcare workers compared to surgical masks in clinical environments (125, 182–184). Furthermore, a systematic review of 64 studies on coronaviruses identified PPE use as the most consistently supported factor associated with reduced infection risk (128). Within healthcare settings, another Cochrane review found that powered air-purifying respirators (PAPRs) offered superior protection compared to standard respirators in preventing the transmission of highly infectious diseases. This review also noted limited evidence supporting the assumption that covering additional body areas offers increased protection. Moreover, the use of more extensive PPE was associated with greater difficulties in donning and doffing procedures, as well as increased adverse effects (185).

Given that respirators are recommended for use in high-risk, contagious environments, it raises important questions as to why PPE during the COVID-19 pandemic relied so heavily on surgical masks (186). This prompts further inquiry into whether surgical masks offer adequate protection in settings, such as hospital wards. In the prompted free-text responses of the questionnaire, common concerns included shortages of respirators and surgical masks, as well as their replacement with lower-grade protective equipment—highlighting significant apprehension among HCWs regarding the adequacy and safety of available PPE.

6.3.2 Infection prevention and control (IPC) guidance

In Study III, 41.4% (178/430) of the responses on IPC guidance referred to frequently changing instructions. Furthermore, clear IPC guidance was associated with better reported recovery from work (OR 1.51, CI 95% 1.06–2.14, p <0.05). The investment of time and effort in developing clear and consistent instructions is not wasted, as previous studies have demonstrated that ambiguous guidance and frequently changing protocols cause confusion and diminish trust in their reliability (132, 187, 188). Non-uniform and unclear instructions are also associated with poorer performance among HCWs (189). In contrast, transparent communication and the provision of adequate information regarding PPE are associated with increased perceptions of safety (154, 190).

In Study II, the majority of participants reported receiving training on the use of personal PPE, with only 5.6% of tertiary and 11.3% of primary HCWs indicating they had not received any instructions. The odds of not receiving PPE instructions were significantly higher for primary care HCWs compared to those in tertiary care (OR 2.03, 95% CI: 1.36–3.02, p <0.001). However, a substantial proportion of respondents reported inconsistencies in the guidance provided: 56.4% of tertiary and 36.4% of primary HCWs experienced non-uniform instruction. Additionally, guided PPE training was offered to 40.6% of tertiary and 34.6% of primary HCWs. These findings are consistent with previous studies, which have shown that PPE availability was more comprehensive in higher-risk settings.

6.3.3 Working conditions and work-related well-being

Burnout and emotional exhaustion were not rare among HCWs before the pandemic (191, 192). During the COVID-19 pandemic, HCWs experienced symptoms of anxiety, depression, distress, insomnia, burnout, and exhaustion, especially when working with COVID-19 patients (120, 193, 194). During the pandemic, many HCWs were compelled to make professional decisions under conditions of resource scarcity, often in conflict with their personal standards of care, leading to experiences of moral distress, or even moral injury (195, 196). HCWs on the frontlines of an unprecedented pandemic faced heightened risks of infection and hospitalization, along with the ethical conflict between their professional duty to care for patients and the personal risk to their own health and that of their loved ones. It is therefore unsurprising that the pandemic significantly impacted their well-being, both in and outside the workplace.

In Study II, up to 29.9% of HCWs in tertiary care and 38.3% in primary care reported their mental well-being below the normal range at the time of the survey. A majority of primary care HCWs (64.9%) reported experiencing increased stress at work, compared to 38.0% of their counterparts in tertiary care. Furthermore,

only 34.9% of primary care HCWs and 50.2% of those in tertiary care reported recovering normally from work-related strain. Increased working hours were also commonly reported, with 25.6% of primary care HCWs and 17.4% of tertiary care HCWs indicating a rise in their working hours.

By several assessed measures, the occupational well-being of primary healthcare workers was poorer than that of tertiary healthcare. During the pandemic, feeling more stressed at work (OR 3.20, 95% CI: 2.55–4.02, p <0.001), and reported increased working hours (OR 1.63, 95% CI: 1.25–2.12, p <0.001) were significantly more prevalent among primary HCWs. In addition, recovering normally from work was less likely for primary HCWs (OR 0.49, 95% CI: 0.39–0.62, p <0.001). Moreover, primary HCWs' odds of experiencing below-normal mental well-being were 1.59 times higher than those of tertiary HCWs' (95% CI: 1.26–2.00, p <0.001). In both groups, mental well-being reported below normal levels was associated with suboptimal recovery from work (OR 15.87, 95% CI: 11.44–22.02, p <0.001).

When comparing the working conditions between primary and tertiary healthcare in Finland, it is important to recognize that resource allocation has increasingly favored tertiary care over the past several decades (138). Another factor that may partially account for the more favorable work-related well-being outcomes observed among tertiary HCWs is their routine exposure to critically ill patients and high-pressure clinical environments. As a result, tertiary HCWs may be generally more accustomed to managing unexpected and life-threatening situations. In contrast, the COVID-19 pandemic likely placed primary HCWs in unfamiliar and challenging circumstances, pushing them beyond their typical scope of practice.

6.4 Practical implications and future aspects

During the COVID-19 pandemic—and in any future pandemics—healthcare workers should not be required to compromise their health and well-being in the course of fulfilling their professional duties. Previous studies on virus outbreaks' psychological effect on HCWs' sufficient access to PPE, clear communication, adequate rest, and the provision of both practical and psychological support were associated with lower morbidity rates, whereas long working hours, the lack of support and essential equipment, feelings of vulnerability or loss of control, concerns about personal and family health, and experiences of isolation have been identified as significant risk factors (197, 198). Our findings align with this, as the availability of PPE and frequent changes in IPC guidance emerged as the most distressing issues identified in the questionnaire-based study. Additionally, working with inadequate PPE was associated with reported excessive workload and

working hours. Furthermore, clear IPC guidance was associated with better reported recovery from work.

The well-being of HCWs extends beyond the scope of occupational health; it has significant implications for patient care and safety. Prolonged working hours and elevated stress levels have been shown to adversely impact job performance, while overwork and fatigue are associated with increased incidences of workplace injuries and errors in patient care (124, 199, 200). Ultimately, failure to care for the well-being of healthcare workers leads to a decline in the quality of patient care.

During a pandemic, frontline HCWs are inherently exposed to elevated risks due to the nature of their profession. Ensuring that they can perform their life-saving duties as safely as possible must be a priority. Based on our findings, we propose the following recommendations for future updated pandemic preparedness: (1) Further acknowledge and address the high-risk environments in which frontline HCWs operate, ensuring that this recognition translates into concrete protective measures and support systems, (2) Strengthen the focus on primary care settings in assessing the occupational health and well-being risks of HCWs, (3) Ensure the adequate and timely provision of PPE, and (4) Provide clear, consistent, and concise IPC guidance.

The reasons behind the increased odds of hospitalization among healthcare workers, both in this study and in others, remain unclear. One possibility is that certain characteristics of the mode of transmission may influence the severity of the resulting illness. However, this question remains unresolved and warrants further investigation in future research.

6.5 Strengths and limitations

The use of mixed methods enabled a comprehensive understanding of the phenomenon. In these studies, we combined high-quality administrative register data with a purpose-built questionnaire administered to primary and tertiary care HCWs, to obtain both a representative overview of COVID-19 outcomes and a detailed picture of COVID-19-related working conditions and work-related well-being. In addition, the questionnaires' large dataset of responses provided an opportunity for a more in-depth exploration of personal experiences.

The results of this dissertation are strongly affected by the local circumstances and are not applicable as such. One limitation of the questionnaire-based study was the difference in the timing of participation between primary and tertiary HCWs. To reduce potential bias, the authors collected follow-up data from tertiary HCWs and updated their responses to enhance comparability over time. The original questionnaire yielded a response rate of 4.6% in tertiary care and 4.9% in primary

care. The low participation rate may be attributed to the distribution method, a non-personal mass email, which most recipients overlooked. The original number of recipients may also have been overestimated, as the number of sent e-mails remained unknown. Nevertheless, up to 55.7% of those who opened the e-mails, also completed the survey, a rate considered sufficiently representative for a questionnaire-based study. A similar proportion of HCWs were enrolled from the City of Helsinki and HUS, enabling comparison-based analyses. A concern in survey research is self-selection bias, whereby individuals with negative experiences, infections, or exposures may be more inclined to respond. On the other hand, there is also evidence of the sickest not responding in surveys (201). As the self-reported infection rate in the questionnaire-based study remained lower than that observed in the register-based study, self-selection bias does not appear to have significantly affected the results, at least with regard to the reported infections.

A limitation of the register-based study is that, despite combining data from the largest national registries, we were unable to include all smaller private healthcare providers. COVID-19 testing was conducted by numerous organizations, and for financial reasons, we prioritized data collection from the largest care providers. Another limitation concerns the inclusion of non-active HCWs in the registry; individuals who were no longer actively employed in healthcare but retained professional status may have been counted as HCWs. This could potentially compromise the accuracy of our estimates regarding infection rates among HCWs. Additionally, our information on multimorbidity was restricted to hospitalized patients, which limited our ability to assess its role in hospitalization risk. A limitation of our cross-sectional study design is that it does not allow for causal inferences. A limitation in both studies is that we have no data on ethnicity for the cohorts.

7 Conclusions

The COVID-19 pandemic posed several risk factors to HCWs' health and well-being through their working environment.

(1) Due to their exposure to the virus, HCWs had a higher infection rate. During the first 15 months of the pandemic, HCWs with SARS-CoV-2 infection were at an increased risk for hospital admission, although their risk for ICU admission and COVID-19-related mortality did not differ from the general population.
(2) Unlike the general population, higher income did not appear as a protective factor for severe COVID-19 outcomes, but on the contrary, HCWs with a higher income were more likely to be hospitalized, which likely results from their working conditions and no possibility of remote working.
(3) HCWs in primary care reported more challenges of work-related well-being when compared to tertiary HCWs. In addition, the reported infection rate was similar despite the fact that primary HCWs less frequently reported taking care of patients with COVID-19.
(4) HCWs reported distress caused by challenges in PPE availability and changing infection prevention and control guidelines. Clear IPC guidance was associated with better levels of reported recovery from work. HCWs reporting insufficient availability of PPE were more likely to report increased stress at work, and inadequate PPE was associated with reported excessive workload.

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References

1. WHO chief declares end to COVID-19 as a global health emergency | UN News. (2023). Available at: https://news.un.org/en/story/2023/05/1136367 [Accessed 20 February 2025].
2. N. Zhu, *et al.*, A Novel Coronavirus from Patients with Pneumonia in China, 2019. *New England Journal of Medicine* **382**, 727–733 (2020).
3. X.-W. Xu, *et al.*, Clinical findings in a group of patients infected with the 2019 novel coronavirus (SARS-Cov-2) outside of Wuhan, China: retrospective case series. (2020). https://doi.org/10.1136/bmj.m606.
4. Coronavirus Disease (COVID-19) Situation Reports. Available at: https://www.who.int/emergencies/diseases/novel-coronavirus-2019/situation-reports [Accessed 16 May 2025].
5. P. M. Howley, *Fields virology: Emerging viruses - Volume 1*, 7th ed. (Wolters Kluwer, 2021).
6. S. R. Weiss, J. L. Leibowitz, Coronavirus pathogenesis. *Adv Virus Res* **81**, 85–164 (2011).
7. A. S. Monto, Medical reviews. Coronaviruses. *Yale J Biol Med* **47**, 234–251 (1974).
8. M. M. C. Lai, D. Cavanagh, The Molecular Biology of Coronaviruses. *Adv Virus Res* **48**, 1–100 (1997).
9. S. Su, *et al.*, Epidemiology, Genetic Recombination, and Pathogenesis of Coronaviruses. *Trends Microbiol* **24**, 490–502 (2016).
10. C. Drosten, *et al.*, Identification of a Novel Coronavirus in Patients with Severe Acute Respiratory Syndrome. *New England Journal of Medicine* **348**, 1967–1976 (2003).
11. J. S. M. Peiris, K. Y. Yuen, A. D. M. E. Osterhaus, K. Stöhr, The Severe Acute Respiratory Syndrome. *New England Journal of Medicine* **349**, 2431–2441 (2003).
12. A. M. Zaki, S. Van Boheemen, T. M. Bestebroer, A. D. M. E. Osterhaus, R. A. M. Fouchier, Isolation of a Novel Coronavirus from a Man with Pneumonia in Saudi Arabia. *N Engl J Med* **367**, 1814–1820 (2012).
13. B. J. Cowling, *et al.*, Preliminary epidemiological assessment of MERS-CoV outbreak in South Korea, May to June 2015. *Euro Surveill* **20**, 7–13 (2015).
14. A. E. Gorbalenya, *et al.*, The species Severe acute respiratory syndrome-related coronavirus: classifying 2019-nCoV and naming it SARS-CoV-2. *Nat Microbiol* **5**, 536–544 (2020).
15. D. S. Hui, *et al.*, The continuing 2019-nCoV epidemic threat of novel coronaviruses to global health — The latest 2019 novel coronavirus

outbreak in Wuhan, China. *International Journal of Infectious Diseases* **91**, 264–266 (2020).

16. S. Jiang, Du ,Lanying, Z. and Shi, An emerging coronavirus causing pneumonia outbreak in Wuhan, China: calling for developing therapeutic and prophylactic strategies. *Emerging Microbes & Infections* **9**, 275–277 (2020).
17. P. Zhou, *et al.*, A pneumonia outbreak associated with a new coronavirus of probable bat origin. *Nature* **579**, 270–273 (2020).
18. M. Worobey, *et al.*, The Huanan Seafood Wholesale Market in Wuhan was the early epicenter of the COVID-19 pandemic. *Science* **377**, 951–959 (2022).
19. Y. Guan, *et al.*, Isolation and Characterization of Viruses Related to the SARS Coronavirus from Animals in Southern China. *Science* **302**, 276–278 (2003).
20. C. Tu, *et al.*, Antibodies to SARS Coronavirus in Civets. *Emerg Infect Dis* **10**, 2244–2248 (2004).
21. Severe acute respiratory syndrome coronavirus-like virus in Chinese horseshoe bats | PNAS. Available at: https://www.pnas.org/doi/full/10.1073/pnas.0506735102 [Accessed 16 May 2025].
22. W. Li, *et al.*, Bats are natural reservoirs of SARS-like coronaviruses. *Science* **310**, 676–679 (2005).
23. Q. Li, *et al.*, Early Transmission Dynamics in Wuhan, China, of Novel Coronavirus–Infected Pneumonia. *New England Journal of Medicine* **382**, 1199–1207 (2020).
24. S. Zhao, *et al.*, Preliminary estimation of the basic reproduction number of novel coronavirus (2019-nCoV) in China, from 2019 to 2020: A data-driven analysis in the early phase of the outbreak. *Int J Infect Dis* **92**, 214–217 (2020).
25. D. Wrapp, *et al.*, Cryo-EM structure of the 2019-nCoV spike in the prefusion conformation. *Science* **367**, 1260–1263 (2020).
26. R. Wölfel, *et al.*, Virological assessment of hospitalized patients with COVID-2019. *Nature* **581**, 465–469 (2020).
27. L. Zou, *et al.*, SARS-CoV-2 Viral Load in Upper Respiratory Specimens of Infected Patients. *N Engl J Med* **382**, 1177–1179 (2020).
28. J. Peiris, *et al.*, Clinical progression and viral load in a community outbreak of coronavirus-associated SARS pneumonia: a prospective study. *Lancet* **361**, 1767–1772 (2003).
29. F. Zhou, *et al.*, Clinical course and risk factors for mortality of adult inpatients with COVID-19 in Wuhan, China: a retrospective cohort study. *The Lancet* **395**, 1054–1062 (2020).
30. D. Wang, *et al.*, Clinical Characteristics of 138 Hospitalized Patients With 2019 Novel Coronavirus–Infected Pneumonia in Wuhan, China. *JAMA* **323**, 1061–1069 (2020).
31. C. Huang, *et al.*, Clinical features of patients infected with 2019 novel coronavirus in Wuhan, China. *The Lancet* **395**, 497–506 (2020).

32. X. Yang, *et al.*, Clinical course and outcomes of critically ill patients with SARS-CoV-2 pneumonia in Wuhan, China: a single-centered, retrospective, observational study. *The Lancet Respiratory Medicine* **8**, 475–481 (2020).

33. N. Chen, *et al.*, Epidemiological and clinical characteristics of 99 cases of 2019 novel coronavirus pneumonia in Wuhan, China: a descriptive study. *Lancet* **395**, 507–513 (2020).

34. C. Wu, *et al.*, Risk Factors Associated With Acute Respiratory Distress Syndrome and Death in Patients With Coronavirus Disease 2019 Pneumonia in Wuhan, China. *JAMA Intern Med* **180**, 1–11 (2020).

35. W. Guan, *et al.*, Clinical Characteristics of Coronavirus Disease 2019 in China. *N Engl J Med* NEJMoa2002032 (2020). https://doi.org/10.1056/NEJMoa2002032.

36. L. Mao, *et al.*, Neurologic Manifestations of Hospitalized Patients With Coronavirus Disease 2019 in Wuhan, China. *JAMA Neurol* **77**, 1–9 (2020).

37. P. K. Bhatraju, *et al.*, Covid-19 in Critically Ill Patients in the Seattle Region — Case Series. *N Engl J Med* NEJMoa2004500 (2020). https://doi.org/10.1056/NEJMoa2004500.

38. Z. Wu, J. M. McGoogan, Characteristics of and Important Lessons From the Coronavirus Disease 2019 (COVID-19) Outbreak in China: Summary of a Report of 72 314 Cases From the Chinese Center for Disease Control and Prevention. *JAMA* **323**, 1239–1242 (2020).

39. E. Mathieu, *et al.*, COVID-19 Pandemic. *Our World in Data* (2020).

40. A. Kantele, *et al.*, SARS-CoV-2 infections among healthcare workers at Helsinki University Hospital, Finland, spring 2020: Serosurvey, symptoms and risk factors. *Travel Medicine and Infectious Disease* **39**, 101949 (2021).

41. J. R. Lechien, *et al.*, Clinical and epidemiological characteristics of 1420 European patients with mild-to-moderate coronavirus disease 2019. *J Intern Med* **288**, 335–344 (2020).

42. K. Mizumoto, K. Kagaya, A. Zarebski, G. Chowell, Estimating the asymptomatic proportion of coronavirus disease 2019 (COVID-19) cases on board the Diamond Princess cruise ship, Yokohama, Japan, 2020. *Euro Surveill* **25**, 2000180 (2020).

43. H. Nishiura, *et al.*, Estimation of the asymptomatic ratio of novel coronavirus infections (COVID-19). *Int J Infect Dis* **94**, 154–155 (2020).

44. X. Lu, *et al.*, SARS-CoV-2 Infection in Children. *N Engl J Med* **382**, 1663–1665 (2020).

45. M. Merad, J. C. Martin, Pathological inflammation in patients with COVID-19: a key role for monocytes and macrophages. *Nat Rev Immunol* **20**, 355–362 (2020).

46. R. J. Jose, A. Manuel, COVID-19 cytokine storm: the interplay between inflammation and coagulation. *Lancet Respir Med* **8**, e46–e47 (2020).

47. T. Iba, J. H. Levy, M. Levi, J. Thachil, Coagulopathy in COVID-19. *J Thromb Haemost* **18**, 2103–2109 (2020).

48. J. Nahum, *et al.*, Venous Thrombosis Among Critically Ill Patients With Coronavirus Disease 2019 (COVID-19). *JAMA Netw Open* **3**, e2010478 (2020).

49. L. Zhang, *et al.*, Deep Vein Thrombosis in Hospitalized Patients With COVID-19 in Wuhan, China: Prevalence, Risk Factors, and Outcome. *Circulation* **142**, 114–128 (2020).

50. F. A. Klok, *et al.*, Confirmation of the high cumulative incidence of thrombotic complications in critically ill ICU patients with COVID-19: An updated analysis. *Thromb Res* **191**, 148–150 (2020).

51. J. Llitjos, *et al.*, High incidence of venous thromboembolic events in anticoagulated severe COVID-19 patients. *J Thromb Haemost* **18**, 1743–1746 (2020).

52. F. A. Klok, *et al.*, Incidence of thrombotic complications in critically ill ICU patients with COVID-19. *Thromb Res* **191**, 145–147 (2020).

53. C. M. Petrilli, *et al.*, Factors associated with hospital admission and critical illness among 5279 people with coronavirus disease 2019 in New York City: prospective cohort study. *BMJ* **369**, m1966 (2020).

54. L. Sigfrid, *et al.*, Long Covid in adults discharged from UK hospitals after Covid-19: A prospective, multicentre cohort study using the ISARIC WHO Clinical Characterisation Protocol. *Lancet Reg Health Eur* **8**, 100186 (2021).

55. C. H. Sudre, *et al.*, Attributes and predictors of long COVID. *Nat Med* **27**, 626–631 (2021).

56. D. L. Sykes, *et al.*, Post-COVID-19 Symptom Burden: What is Long-COVID and How Should We Manage It? *Lung* **199**, 113–119 (2021).

57. A. B. Docherty, *et al.*, Features of 20 133 UK patients in hospital with covid-19 using the ISARIC WHO Clinical Characterisation Protocol: prospective observational cohort study. *The BMJ* **369**, m1985 (2020).

58. S. Richardson, *et al.*, Presenting Characteristics, Comorbidities, and Outcomes Among 5700 Patients Hospitalized With COVID-19 in the New York City Area. *JAMA* **323**, 2052–2059 (2020).

59. 2023 Released by National Health Commission of People's Republic of China & National Administration of Traditional Chinese Medicine on January 5, Diagnosis and treatment protocol for COVID-19 patients (Tentative 10th Version). *Health Care Science* **2**, 10–24 (2023).

60. E. J. Williamson, *et al.*, OpenSAFELY: factors associated with COVID-19 death in 17 million patients. *Nature* **584**, 430–436 (2020).

61. G. Onder, G. Rezza, S. Brusaferro, Case-Fatality Rate and Characteristics of Patients Dying in Relation to COVID-19 in Italy. *JAMA* **323**, 1775–1776 (2020).

62. S. Drefahl, *et al.*, A population-based cohort study of socio-demographic risk factors for COVID-19 deaths in Sweden. *Nat Commun* **11**, 5097 (2020).

63. K. Tolksdorf, S. Buda, E. Schuler, L. H. Wieler, W. Haas, Influenza-associated pneumonia as reference to assess seriousness of coronavirus disease (COVID-19). *Euro Surveill* **25**, 2000258 (2020).

64. L. Sesé, *et al.*, Impact of socioeconomic status in patients hospitalised for COVID-19 in the Greater Paris area. *European Respiratory Journal* **56** (2020).

65. E. B. Pathak, J. M. Menard, R. B. Garcia, J. L. Salemi, Joint Effects of Socioeconomic Position, Race/Ethnicity, and Gender on COVID-19

Mortality among Working-Age Adults in the United States. *International Journal of Environmental Research and Public Health* **19**, 5479 (2022).

66. J. A. Backer, D. Klinkenberg, J. Wallinga, Incubation period of 2019 novel coronavirus (2019-nCoV) infections among travellers from Wuhan, China, 20-28 January 2020. *Euro Surveill* **25**, 2000062 (2020).

67. SARS-CoV-2 viral load and shedding kinetics | Nature Reviews Microbiology. Available at: https://www.nature.com/articles/s41579-022-00822-w [Accessed 15 February 2025].

68. Y. Pan, D. Zhang, P. Yang, L. L. M. Poon, Q. Wang, Viral load of SARS-CoV-2 in clinical samples. *Lancet Infect Dis* **20**, 411–412 (2020).

69. J. Sun, *et al.*, The kinetics of viral load and antibodies to SARS-CoV-2. *Clin Microbiol Infect* **26**, 1690.e1-1690.e4 (2020).

70. A. T. Xiao, Y. X. Tong, S. Zhang, Profile of RT-PCR for SARS-CoV-2: A Preliminary Study From 56 COVID-19 Patients. *Clin Infect Dis* **71**, 2249–2251 (2020).

71. Y. Liu, *et al.*, Viral dynamics in mild and severe cases of COVID-19. *Lancet Infect Dis* **20**, 656–657 (2020).

72. Q.-X. Long, *et al.*, Antibody responses to SARS-CoV-2 in patients with COVID-19. *Nat Med* **26**, 845–848 (2020).

73. B. A. McGrath, *et al.*, Tracheostomy in the COVID-19 era: global and multidisciplinary guidance. *The Lancet Respiratory Medicine* **8**, 717–725 (2020).

74. J. Zhao, *et al.*, Antibody Responses to SARS-CoV-2 in Patients With Novel Coronavirus Disease 2019. *Clin Infect Dis* **71**, 2027–2034 (2020).

75. T. Greenhalgh, *et al.*, Ten scientific reasons in support of airborne transmission of SARS-CoV-2. *Lancet* **397**, 1603–1605 (2021).

76. G. Grasselli, *et al.*, Baseline Characteristics and Outcomes of 1591 Patients Infected With SARS-CoV-2 Admitted to ICUs of the Lombardy Region, Italy. *JAMA* **323**, 1574–1581 (2020).

77. G.-Q. Wang, L. Zhao, X. Wang, Y.-M. Jiao, F.-S. Wang, Diagnosis and Treatment Protocol for COVID-19 Patients (Tentative 8th Edition): Interpretation of Updated Key Points. *Infectious Diseases & Immunity* **1**, 17–19 (2021).

78. Coronavirus Disease 2019 (COVID-19) 2021 Case Definition | CDC. (2021). Available at: https://ndc.services.cdc.gov/case-definitions/coronavirus-disease-2019-2021/ [Accessed 3 February 2025].

79. H. Jarva, *et al.*, Laboratory-based surveillance of COVID-19 in the Greater Helsinki area, Finland, February–June 2020. *Int J Infect Dis* **104**, 111–116 (2021).

80. M. Yüce, E. Filiztekin, K. G. Özkaya, COVID-19 diagnosis —A review of current methods. *Biosensors and Bioelectronics* **172**, 112752 (2021).

81. O. of the Commissioner, Coronavirus (COVID-19) Update: FDA Authorizes Antigen Test as First Over-the-Counter Fully At-Home Diagnostic Test for COVID-19. *FDA* (2024). Available at: https://www.fda.gov/news-events/press-announcements/coronavirus-covid-19-update-fda-authorizes-antigen-test-first-over-counter-fully-home-diagnostic [Accessed 30 January 2025].

82. O. Filchakova, *et al.*, Review of COVID-19 testing and diagnostic methods. *Talanta* **244**, 123409 (2022).

83. T. A. Harahwa, *et al.*, The optimal diagnostic methods for COVID-19. *Diagnosis* **7**, 349–356 (2020).

84. W. Alsharif, A. Qurashi, Effectiveness of COVID-19 diagnosis and management tools: A review. *Radiography* **27**, 682–687 (2021).

85. What tests could potentially be used for the screening, diagnosis and monitoring of COVID-19 and what are their advantages and disadvantages? | The Centre for Evidence-Based Medicine. Available at: https://www.cebm.net/covid-19/what-tests-could-potentially-be-used-for-the-screening-diagnosis-and-monitoring-of-covid-19-and-what-are-their-advantages-and-disadvantages/ [Accessed 31 January 2025].

86. E. Kortela, *et al.*, Real-life clinical sensitivity of SARS-CoV-2 RT-PCR test in symptomatic patients. *PLOS ONE* **16**, e0251661 (2021).

87. N. N. Y. Tsang, *et al.*, Diagnostic performance of different sampling approaches for SARS-CoV-2 RT-PCR testing: a systematic review and meta-analysis. *The Lancet Infectious Diseases* **21**, 1233–1245 (2021).

88. M. Cevik, *et al.*, SARS-CoV-2, SARS-CoV, and MERS-CoV viral load dynamics, duration of viral shedding, and infectiousness: a systematic review and meta-analysis. *Lancet Microbe* **2**, e13–e22 (2021).

89. J. Fajnzylber, *et al.*, SARS-CoV-2 viral load is associated with increased disease severity and mortality. *Nat Commun* **11**, 5493 (2020).

90. J. M. Koskinen, *et al.*, Clinical validation of automated and rapid mariPOC SARS-CoV-2 antigen test. *Sci Rep* **11**, 20363 (2021).

91. D. S. Y. Ong, *et al.*, How to interpret and use COVID-19 serology and immunology tests. *Clinical Microbiology and Infection* **27**, 981–986 (2021).

92. ICD-10 Version:2019. Available at: https://icd.who.int/browse10/2019/en#/U07.1 [Accessed 7 February 2025].

93. A. Haveri, *et al.*, Serological and molecular findings during SARS-CoV-2 infection: the first case study in Finland, January to February 2020. *Eurosurveillance* **25**, 2000266 (2020).

94. P. Truong Nguyen, *et al.*, The phylodynamics of SARS-CoV-2 during 2020 in Finland. *Commun Med* **2**, 1–9 (2022).

95. Koronavirusepidemiaa koskevat infot ja tilannekuvat. *Sosiaali- ja terveysministeriö*. Available at: https://stm.fi/korona-tilannekuvat [Accessed 16 May 2025].

96. Coronavirus cases, tests, and deaths, daily and by region - COVID-19 cases in the infectious diseases registry - THL User Interface for Database Cubes and Reports. Available at: https://sampo.thl.fi/pivot/prod/en/epirapo/covid19case/summary_tshcd daily [Accessed 24 November 2025].

97. Finland declares a state of emergency. *Finnish Government*. Available at: https://valtioneuvosto.fi/en/-/10616/finland-declares-a-state-of-emergency [Accessed 23 May 2025].

98. Näin kaikki eteni 265 päivää sitten, kun Uusimaa laitettiin säppiin – kolme aitiopaikalla ollutta kertoo ennennäkemättömästä operaatiosta. *Yle Uutiset*

(2020). Available at: https://yle.fi/a/3-11692794 [Accessed 20 February 2025].

99. M. Roser, What is the COVID-19 Stringency Index? *Our World in Data* (2021).

100. J. F. Ludvigsson, The first eight months of Sweden's COVID-19 strategy and the key actions and actors that were involved. *Acta Paediatr* **109**, 2459–2471 (2020).

101. Z. Ba, *et al.*, Reflections on the dynamic zero-COVID policy in China. *Preventive Medicine Reports* **36**, 102466 (2023).

102. G. Sorci, B. Faivre, S. Morand, Explaining among-country variation in COVID-19 case fatality rate. *Sci Rep* **10**, 18909 (2020).

103. Tilastokeskus, Statistics Finland. Available at: https://stat.fi/tup/suoluk/suoluk_vaesto_en.html [Accessed 24 November 2025].

104. N. H. S. England, NHS England » Landmark moment as first NHS patient receives COVID-19 vaccination. (2020). Available at: https://www.england.nhs.uk/2020/12/landmark-moment-as-first-nhs-patient-receives-covid-19-vaccination/ [Accessed 20 February 2025].

105. Ensimmäiset koronarokotteet on annettu Suomessa – Rokotteen saanut sairaanhoitaja: "Olen erittäin iloinen, että sain tämän rokotteen." *Yle Uutiset* (2020). Available at: https://yle.fi/a/3-11715468 [Accessed 16 May 2025].

106. Vaccinations over time in Hospital Care Districts per age group - COVID-19 vaccinations in Finland (UPDATING ENDED) - THL User Interface for Database Cubes and Reports. Available at: https://sampo.thl.fi/pivot/prod/en/vaccreg/cov19cov/summary_cov19covareatime [Accessed 24 November 2025].

107. O. J. Watson, *et al.*, Global impact of the first year of COVID-19 vaccination: a mathematical modelling study. *The Lancet Infectious Diseases* **22**, 1293–1302 (2022).

108. COVID-19 no longer classified as generally hazardous communicable disease. *Ministry of Social Affairs and Health*. Available at: https://stm.fi/en/-/covid-19-no-longer-classified-as-generally-hazardous-communicable-disease [Accessed 24 November 2025].

109. COVID-19 deaths | WHO COVID-19 dashboard. *datadot*. Available at: https://data.who.int/dashboards/covid19/cases [Accessed 20 February 2025].

110. SARS-CoV-2 variants in analyzed sequences. *Our World in Data*. Available at: https://ourworldindata.org/grapher/covid-variants-area [Accessed 16 May 2025].

111. CDC, Coronavirus Disease 2019 (COVID-19). *COVID-19* (2025). Available at: https://www.cdc.gov/covid/index.html [Accessed 16 May 2025].

112. Wellbeing at work. *Ministry of Social Affairs and Health*. Available at: https://stm.fi/en/wellbeing-at-work/data-and-research [Accessed 25 November 2025].

113. S. Puttonen, M. Hasu, K. Pahkin, Työhyvinvointi paremmaksi: Keinoja työhyvinvoinnin ja työterveyden kehittämiseksi suomalaisilla työpaikoilla. (2016). Available at: https://www.julkari.fi/handle/10024/130787 [Accessed 25 November 2025].

114. 1.1 Työhyvinvointi | Työterveyslaitos. Available at: https://www.ttl.fi/oppimateriaalit/tyohyvinvoinnin-tiedolla-johtaminen-sote-alalla/osa-1-strateginen-tyohyvinvoinnin-johtaminen-ja-kasitteet/11-tyohyvinvointi [Accessed 25 November 2025].

115. A.-S. Rudberg, *et al.*, SARS-CoV-2 exposure, symptoms and seroprevalence in healthcare workers in Sweden. *Nat Commun* **11**, 5064 (2020).

116. K. Iversen, *et al.*, Risk of COVID-19 in health-care workers in Denmark: an observational cohort study. *The Lancet Infectious Diseases* **20**, 1401–1408 (2020).

117. L. Ferland, *et al.*, Risk of hospitalization and death for healthcare workers with COVID-19 in nine European countries, January 2020–January 2021. *Journal of Hospital Infection* **119**, 170–174 (2022).

118. Health and Care Worker Deaths during COVID-19. Available at: https://www.who.int/news/item/20-10-2021-health-and-care-worker-deaths-during-covid-19 [Accessed 16 May 2025].

119. N. W. S. Chew, *et al.*, A multinational, multicentre study on the psychological outcomes and associated physical symptoms amongst healthcare workers during COVID-19 outbreak. *Brain Behav Immun* **88**, 559–565 (2020).

120. J. Lai, *et al.*, Factors Associated With Mental Health Outcomes Among Health Care Workers Exposed to Coronavirus Disease 2019. *JAMA Netw Open* **3**, e203976 (2020).

121. M. Sharma, *et al.*, Healthcare professionals' perceptions of critical care resource availability and factors associated with mental well-being during COVID-19: Results from a US survey. *Clin Infect Dis* ciaa1311 (2020). https://doi.org/10.1093/cid/ciaa1311.

122. M. Eftekhar Ardebili, *et al.*, Healthcare providers experience of working during the COVID-19 pandemic: A qualitative study. *American Journal of Infection Control* **49**, 547–554 (2021).

123. T. Rosenström, *et al.*, Healthcare workers' heterogeneous mental-health responses to prolonging COVID-19 pandemic: a full year of monthly follow up in Finland. *BMC Psychiatry* **22**, 724 (2022).

124. L. Ran, *et al.*, Risk Factors of Healthcare Workers With Coronavirus Disease 2019: A Retrospective Cohort Study in a Designated Hospital of Wuhan in China. *Clinical Infectious Diseases* **71**, 2218–2221 (2020).

125. L.-M. Oksanen, *et al.*, Sources of healthcare workers' COVID-19 infections and related safety guidelines. *Int J Occup Med Environ Health* **34**, 239–249 (2021).

126. D. W. Eyre, *et al.*, Differential occupational risks to healthcare workers from SARS-CoV-2 observed during a prospective observational study. *eLife* **9**, e60675 (2020).

127. A. L. Garcia-Basteiro, *et al.*, Seroprevalence of antibodies against SARS-CoV-2 among health care workers in a large Spanish reference hospital. *Nature Communications* **11**, 3500 (2020).

128. J. H. Verbeek, *et al.*, Personal protective equipment for preventing highly infectious diseases due to exposure to contaminated body fluids in healthcare staff - Verbeek, JH - 2020 | Cochrane Library.

129. T. Burki, Global shortage of personal protective equipment. *The Lancet Infectious Diseases* **20**, 785–786 (2020).

130. Shortage of personal protective equipment endangering health workers worldwide. Available at: https://www.who.int/news/item/03-03-2020-shortage-of-personal-protective-equipment-endangering-health-workers-worldwide [Accessed 14 February 2025].

131. D. Kamerow, Covid-19: the crisis of personal protective equipment in the US. (2020). https://doi.org/10.1136/bmj.m1367.

132. K. Hoernke, *et al.*, Frontline healthcare workers' experiences with personal protective equipment during the COVID-19 pandemic in the UK: a rapid qualitative appraisal. (2021). https://doi.org/10.1136/bmjopen-2020-046199.

133. L. H. Nguyen, *et al.*, Risk of COVID-19 among front-line health-care workers and the general community: a prospective cohort study. *Lancet Public Health* **5**, e475–e483 (2020).

134. R. Abelson, Covid Overload: U.S. Hospitals Are Running Out of Beds for Patients. *The New York Times* (2020).

135. J. Horowitz, Italy's Health Care System Groans Under Coronavirus — a Warning to the World. *The New York Times* (2020).

136. Lost on the frontline | The Guardian. Available at: https://www.theguardian.com/us-news/series/lost-on-the-frontline [Accessed 1 July 2025].

137. Annual reports | HUS. Available at: https://www.hus.fi/en/about-us/annual-reports [Accessed 24 November 2025].

138. P. Matveinen, Terveydenhuollon menot ja rahoitus 2020. (2020).

139. Health and social services personnel, professionals and those trained in the field - THL User Interface for Database Cubes and Reports. Available at: https://sampo.thl.fi/pivot/prod/en/henkilo/tkaynti/fact_henkilo_tkaynti?&row=area-566563&column=time-566671.566562.566598.566596.566528.566650.566604.566612.629424.701905.980572 [Accessed 24 November 2025].

140. Tilastokeskus, Tilastokeskus. Available at: https://stat.fi/tup/alue/kuntienavainluvut.html#?year=2021&active1=MK01 [Accessed 31 October 2024].

141. S. Palmgren, E. Karvonen, Terveys- ja sosiaalipalvelujen henkilöstö 2021. (2021).

142. Henkilöstökertomus. *Vantaa* (2025). Available at: https://www.vantaa.fi/fi/kaupunki-ja-paatoksenteko/henkilostokertomus [Accessed 16 May 2025].

143. Henkilöstöraportti 2020 – Kaupunginhallitus | Decisions | City of Helsinki. (2022). Available at: https://paatokset.hel.fi/fi/asia/hel-2021-003303/3c6205d4-d72e-4199-b259-b8e04136a754 [Accessed 25 November 2025].

144. Toimintaympäristö 2022 henkilöstö.pdf. Available at: https://static.espoo.fi/cdn/ff/-mNFfG_vVY7yyZ77OjtZGj6Ckxf5a1YM7N4sjn5fJ4E/1649426802/public/2022-04/Toimintaymp%C3%A4rist%C3%B6%202022%20henkil%C3%B6st%C3%B6.pdf [Accessed 16 May 2025].

145. Changing the COVID-19 Case Definition – UK Health Security Agency. (2022). Available at: https://ukhsa.blog.gov.uk/2022/02/04/changing-the-covid-19-case-definition/ [Accessed 1 July 2025].

146. J. M. Valderas, B. Starfield, B. Sibbald, C. Salisbury, M. Roland, Defining Comorbidity: Implications for Understanding Health and Health Services. *The Annals of Family Medicine* **7**, 357–363 (2009).

147. kunta-alan_palkat_1.8.2020_ja_1.4.2021_id_14888.pdf. Available at: https://www.tehy.fi/fi/system/files/mfiles/muu_dokumentti/kunta-alan_palkat_1.8.2020_ja_1.4.2021_id_14888.pdf [Accessed 24 January 2025].

148. Arbetarskyddslag | 738/2002 | Legislation | Finlex. Available at: https://www.finlex.fi/en/legislation/2002/738 [Accessed 25 November 2025].

149. Instructions for workplaces for assessing the risk of COVID-19 infections. Available at: https://hyvatyo.ttl.fi/en/koronavirus/instructions-for-workplaces-for-assessing-the-risk-of-covid-19-infections [Accessed 25 November 2025].

150. M. Mutambudzi, *et al.*, Occupation and risk of severe COVID-19: prospective cohort study of 120 075 UK Biobank participants. *Occup Environ Med* **78**, 307–314 (2021).

151. Y.-H. Chen, *et al.*, Excess mortality associated with the COVID-19 pandemic among Californians 18-65 years of age, by occupational sector and occupation: March through November 2020. *PLoS One* **16**, e0252454 (2021).

152. COVID-19 - Hazard Recognition | Occupational Safety and Health Administration. Available at: https://www.osha.gov/coronavirus/hazards [Accessed 23 May 2025].

153. A. S. V. Shah, *et al.*, Risk of hospital admission with coronavirus disease 2019 in healthcare workers and their households: nationwide linkage cohort study. (2020). https://doi.org/10.1136/bmj.m3582.

154. E. Savoia, *et al.*, Factors associated with access and use of PPE during COVID-19: A cross-sectional study of Italian physicians. *PLOS ONE* **15**, e0239024 (2020).

155. L. Zheng, *et al.*, Analysis of the Infection Status of Healthcare Workers in Wuhan During the COVID-19 Outbreak: A Cross-sectional Study. *Clinical Infectious Diseases* **71**, 2109–2113 (2020).

156. A. K. Sahu, *et al.*, COVID-19 in health care workers – A systematic review and meta-analysis. *The American Journal of Emergency Medicine* **38**, 1727–1731 (2020).

157. S. A. Gómez-Ochoa, *et al.*, COVID-19 in Health-Care Workers: A Living Systematic Review and Meta-Analysis of Prevalence, Risk Factors, Clinical Characteristics, and Outcomes. *American Journal of Epidemiology* **190**, 161–175 (2021).

158. CDC COVID-19 Response Team, *et al.*, Characteristics of Health Care Personnel with COVID-19 — United States, February 12–April 9, 2020. *MMWR Morb. Mortal. Wkly. Rep.* **69**, 477–481 (2020).

159. P. H. A. of Canada, COVID-19 infections among people working in healthcare settings. (2021). Available at: https://www.canada.ca/en/public-health/services/diseases/coronavirus-

disease-covid-19/epidemiological-economic-research-data/infections-healthcare-workers-other-people-working-healthcare-settings.html [Accessed 1 July 2025].

160. S. Hartmann, *et al.*, Coronavirus Disease 2019 (COVID-19) Infections Among Healthcare Workers, Los Angeles County, February–May 2020. *Clinical Infectious Diseases* **73**, e1850–e1854 (2021).

161. E. S. Barrett, *et al.*, Prevalence of SARS-CoV-2 infection in previously undiagnosed health care workers in New Jersey, at the onset of the U.S. COVID-19 pandemic. *BMC Infectious Diseases* **20**, 853 (2020).

162. X. Wang, *et al.*, Clinical characteristics of 80 hospitalized frontline medical workers infected with COVID-19 in Wuhan, China. *J Hosp Infect* **105**, 399–403 (2020).

163. J. Liu, *et al.*, Epidemiological, Clinical, Radiological Characteristics and Outcomes of Medical Staff with COVID-19 in Wuhan, China: Analysis of 101 Cases. *International Journal of Medical Sciences* **18**, 1492–1501 (2021).

164. A. de Wilton, *et al.*, Delayed healthcare seeking and prolonged illness in healthcare workers during the COVID-19 pandemic: a single-centre observational study. *BMJ Open* **10**, e040216 (2020).

165. G. Kinman, K. Teoh, What could make a difference to the mental health of UK doctors? A review of the research evidence. (2018). Available at: http://www.louisetebboth.org.uk/news/ltf-funded-report-reveals-risks-to-doctors-mental-health/ [Accessed 14 May 2025].

166. R. Chetty, *et al.*, The Association Between Income and Life Expectancy in the United States, 2001–2014. *JAMA* **315**, 1750–1766 (2016).

167. M. G. Marmot, M. J. Shipley, G. Rose, INEQUALITIES IN DEATH—SPECIFIC EXPLANATIONS OF A GENERAL PATTERN? *The Lancet* **323**, 1003–1006 (1984).

168. G. Pappas, S. Queen, W. Hadden, G. Fisher, The Increasing Disparity in Mortality between Socioeconomic Groups in the United States, 1960 and 1986. *New England Journal of Medicine* **329**, 103–109 (1993).

169. K. H. Grantz, *et al.*, Disparities in influenza mortality and transmission related to sociodemographic factors within Chicago in the pandemic of 1918. *Proceedings of the National Academy of Sciences* **113**, 13839–13844 (2016).

170. S.-E. Mamelund, A socially neutral disease? Individual social class, household wealth and mortality from Spanish influenza in two socially contrasting parishes in Kristiania 1918–19. *Social Science & Medicine* **62**, 923–940 (2006).

171. C. J. Murray, A. D. Lopez, B. Chin, D. Feehan, K. H. Hill, Estimation of potential global pandemic influenza mortality on the basis of vital registry data from the 1918–20 pandemic: a quantitative analysis. *The Lancet* **368**, 2211–2218 (2006).

172. M. J. Cummings, *et al.*, Epidemiology, clinical course, and outcomes of critically ill adults with COVID-19 in New York City: a prospective cohort study. *The Lancet* **395**, 1763–1770 (2020).

173. J. Y. Ko, *et al.*, Risk Factors for Coronavirus Disease 2019 (COVID-19)–Associated Hospitalization: COVID-19–Associated Hospitalization Surveillance Network and Behavioral Risk Factor Surveillance System. *Clinical Infectious Diseases* **72**, e695–e703 (2021).

174. S. L. Li, *et al.*, Higher risk of death from COVID-19 in low-income and non-White populations of São Paulo, Brazil. *BMJ Global Health* **6**, e004959 (2021).

175. M. M. Alshamrani, A. El-Saed, M. Al Zunitan, R. Almulhem, S. Almohrij, Risk of COVID-19 morbidity and mortality among healthcare workers working in a Large Tertiary Care Hospital. *International Journal of Infectious Diseases* **109**, 238–243 (2021).

176. J. Y. Yang, *et al.*, Outcomes of COVID-19 Among Hospitalized Health Care Workers in North America. *JAMA Network Open* **4**, e2035699 (2021).

177. R. Chowdhury, D. Shah, A. R. Payal, Healthy Worker Effect Phenomenon: Revisited with Emphasis on Statistical Methods – A Review. *Indian J Occup Environ Med* **21**, 2–8 (2017).

178. A. J. McMichael, Standardized Mortality Ratios and the "Healthy Worker Effect": Scratching Beneath the Surface. *Journal of Occupational and Environmental Medicine* **18**, 165 (1976).

179. C. Vindrola-Padros, *et al.*, Perceptions and experiences of healthcare workers during the COVID-19 pandemic in the UK. *BMJ Open* **10**, e040503 (2020).

180. S. Feng, *et al.*, Rational use of face masks in the COVID-19 pandemic. *The Lancet Respiratory Medicine* **8**, 434–436 (2020).

181. Do physical measures such as hand-washing or wearing masks stop or slow down the spread of respiratory viruses? Available at: https://www.cochrane.org/CD006207/ARI_do-physical-measures-such-hand-washing-or-wearing-masks-stop-or-slow-down-spread-respiratory-viruses [Accessed 13 May 2025].

182. M. Ferris, *et al.*, Efficacy of FFP3 respirators for prevention of SARS-CoV-2 infection in healthcare workers. *eLife* **10**, e71131 (2021).

183. M. A. Baker, *et al.*, Rapid Control of Hospital-Based Severe Acute Respiratory Syndrome Coronavirus 2 Omicron Clusters Through Daily Testing and Universal Use of N95 Respirators. *Clinical Infectious Diseases* **75**, e296–e299 (2022).

184. R. Chou, *et al.*, Epidemiology of and Risk Factors for Coronavirus Infection in Health Care Workers. *Ann Intern Med* **173**, 120–136 (2020).

185. M. S. Kim, *et al.*, Comparative effectiveness of N95, surgical or medical, and non-medical facemasks in protection against respiratory virus infection: A systematic review and network meta-analysis. *Reviews in Medical Virology* **32**, e2336 (2022).

186. J. P. Thomas, *et al.*, Evaluating the national PPE guidance for NHS healthcare workers during the COVID-19 pandemic. *Clinical Medicine* **20**, 242–247 (2020).

187. A. Corley, N. E. Hammond, J. F. Fraser, The experiences of health care workers employed in an Australian intensive care unit during the H1N1 Influenza pandemic of 2009: A phenomenological study. *International Journal of Nursing Studies* **47**, 577–585 (2010).

188. H. S. Kang, Y. D. Son, S.-M. Chae, C. Corte, Working experiences of nurses during the Middle East respiratory syndrome outbreak. *International Journal of Nursing Practice* **24**, e12664 (2018).

189. C. Houghton, *et al.*, Barriers and facilitators to healthcare workers' adherence with infection prevention and control (IPC) guidelines for

respiratory infectious diseases: a rapid qualitative evidence synthesis - Houghton, C - 2020 | Cochrane Library.

190. S. Ehrenzeller, *et al.*, A qualitative study on safety perception among healthcare workers of a tertiary academic care center during the SARS-CoV-2 pandemic. *Antimicrobial Resistance & Infection Control* **11**, 30 (2022).

191. U. O. Imo, Burnout and psychiatric morbidity among doctors in the UK: A systematic literature review of prevalence and associated factors. *BJPsych Bulletin* **41**, 197–204 (2017).

192. T. Woo, R. Ho, A. Tang, W. Tam, Global prevalence of burnout symptoms among nurses: A systematic review and meta-analysis. *Journal of Psychiatric Research* **123**, 9–20 (2020).

193. R. G. Maunder, *et al.*, Trends in burnout and psychological distress in hospital staff over 12 months of the COVID-19 pandemic: a prospective longitudinal survey. *Journal of Occupational Medicine and Toxicology* **17**, 11 (2022).

194. A. Lasalvia, *et al.*, Levels of burn-out among healthcare workers during the COVID-19 pandemic and their associated factors: a cross-sectional study in a tertiary hospital of a highly burdened area of north-east Italy. *BMJ Open* **11**, e045127 (2021).

195. R. D. Williams, J. A. Brundage, E. B. Williams, Moral Injury in Times of COVID-19. *J Health Serv Psychol* **46**, 65–69 (2020).

196. P.-L. Riedel, A. Kreh, V. Kulcar, A. Lieber, B. Juen, A Scoping Review of Moral Stressors, Moral Distress and Moral Injury in Healthcare Workers during COVID-19. *International Journal of Environmental Research and Public Health* **19**, 1666 (2022).

197. S. Kisely, *et al.*, Occurrence, prevention, and management of the psychological effects of emerging virus outbreaks on healthcare workers: rapid review and meta-analysis. (2020). https://doi.org/10.1136/bmj.m1642.

198. G. Kinman, K. Teoh, A. Harriss, Supporting the well-being of healthcare workers during and after COVID-19. *Occupational Medicine* **70**, 294–296 (2020).

199. C. P. Landrigan, *et al.*, Effect of reducing interns' work hours on serious medical errors in intensive care units. *N Engl J Med* **351**, 1838–1848 (2004).

200. C. P. West, A. D. Tan, T. M. Habermann, J. A. Sloan, T. D. Shanafelt, Association of Resident Fatigue and Distress With Perceived Medical Errors. *JAMA* **302**, 1294–1300 (2009).

201. A. A. Schultz, *et al.*, Participant attrition from statewide, population-based Survey of the Health of Wisconsin into the longitudinal SHOW COVID-19 cohort. *Ann Epidemiol* **94**, 9–18 (2024).

Appendices

1. Questionnaire 1: administered to the employees of Helsinki University Hospital (HUS).
2. Questionnaire 2: administered to the employees of the City of Helsinki.
3. Questionnaire 3: a follow-up questionnaire administered to the employees of the HUS.
4. Questionnaire 4: a follow-up questionnaire administered to the employees of the City of Helsinki.
5. Translation of the questionnaire questions used in the study.

Covid-19-epidemian vaikutus terveydenhuoltohenkilöstön terveyteen ja hyvinvointiin

Tutkittavan sosiaaliset ja terveydelliset taustatiedot, täytetään kerran tutkimuksen alussa, sisältää ensimmäisen hyvinvointikyselyn ja oirekyselyn

1. Tutkimusnumeroni:

Henkilökohtaisen tutkimusnumerosi löydät tutkimukseen ilmoittautuessasi, osoitteesta covid19tutkimus@hus.fi saamastasi sähköpostista. Mikäli et muista tutkimusnumeroasi voit lähettää viestiä tutkimushoitajalle osoitteeseen covid19tutkimus@hus.fi tai soittaa numeroon 045 275 4442.

HUOM! Olemme saaneet joitakin ilmoituksia, että kysely toimii huonommin Internet Explorer-selaimella. Linkin voi kopioida yläpalkista Chromeen, joka on toiminut paremmin.

* _____

2. Työnantaja *

- ◯ HUS
- ◯ Kymsote
- ◯ Muu, mikä? _____

3. Ikä *

- ◯ 18-29
- ◯ 30-39
- ◯ 40-49
- ◯ 50-59
- ◯ 60-69
- ◯ yli 70

4. Sukupuoli *

- ◯ Mies
- ◯ Nainen

5. Kuulutko THL:n luokittelemaan riskiryhmään covid-19-infektiolle? (voit valita useita)

- ☐ yli 70v
- ☐ vaikea-asteinen sydänsairaus
- ☐ huonossa hoitotasapainossa oleva keuhkosairaus
- ☐ diabetes, johon liittyy elinvaurioita
- ☐ krooninen maksan tai munuaisen vajaatoiminta
- ☐ vastustuskykyä heikentävä tauti, kuten syöpä
- ☐ vastustukykyä voimakkaasti heikentävä lääkitys, kuten suuriannoksinen kortisonihoito
- ☐ en kuulu riskiryhmiin

6. Oletko raskaana?

- ◯ Kyllä
- ◯ Ei

7. Tupakoitko?

- ◯ Kyllä, savuketta / päivä _____
- ◯ Ei
- ◯ Lopettanut, minä vuonna? _____

8. Kuinka monta vuotta olet tupakoinut?

9. Käytätkö alkoholia?

- ◯ Kyllä, keskimäärin annosta/viikko
- ◯ Ei

10. Pituus ja paino

Pituus (cm)	
Paino (kg)	

11. Voitko käyttää normaalisti kirurgista suu-nenäsuojusta ja hengityssuojainta? (huomioiden kasvojen anatomia yms.)

- ◯ Kyllä
- ◯ Ei

12. Oletko noudattanut hallituksen antamia ohjeita ja rajoituksia vapaa-ajallasi epidemian aikana?

- ◯ Kyllä
- ◯ Ei, miten olet jättänyt noudattamatta ohjeita?

13. Onko sinulla säännöllinen lääkitys?

- ◯ Kyllä
- ◯ Ei

14. Käytätkö päivittäin seuraavia lääkkeitä (voit valita useita):

- ☐ inhaloitava glukokortikoidi (eli kortisoni) tai inhaloitavaa glukokortikoidia sisältävä yhdistelmävalmiste
- ☐ Suun kautta otettava kortisonivalmiste
- ☐ ACE-estäjä tai angiotensiinireseptoriestäjä (verenpainelääke, vaikuttavana aineena -priili /-sartaani)
- ☐ Asetyylisalisyylihappo (Aspiriini, Primaspan)
- ☐ Antikoaguloiva lääkitys (Marevan, Klexane, Innohep)
- ☐ Antikoaguloiva lääkitys (Eliquis, Xarelto, Pradaxa, Lixiana)
- ☐ Antitromboottia (Plavix, Clopidrogel, Efient, Brillique)
- ☐ Montelukasti
- ☐ Ei mitään edellisistä

15. Miten asut?

- ◯ Yksin
- ◯ Yhden muun henkilön kanssa
- ◯ kahden muun henkilön kanssa
- ◯ Kolmen tai useamman henkilön kanssa

16. Mikäli asut jonkun/joidenkin kanssa, ovatko kaikki muut samassa asunnossa asuvat olleet etätöissä/etäopetuksessa 16.3. lähtien rajoitusten purkamiseen asti?

- ◯ Kokonaan
- ◯ Osittain
- ◯ Ei lainkaan

17. Ovatko samassa taloudessa asuvat osallistuneet varhaiskasvatukseen tai perusopetukseen läsnäopetuksen muodossa?

- ◯ Kyllä
- ◯ Ei
- ◯ Osittain (esimerkiksi osana päivistä)

18. Altistus (voit valita useita)

- ☐ Olen matkustanut ulkomaille 1.1.2020-16.3.2020 välillä. Minne?
- ☐ Olen matkustanut ulkomaille 16.3.2020 jälkeen. Minne?
- ☐ Olen joutunut karanteeniin infektiolääkärin määräämänä työperäisen altistuksen takia. Milloin (pp.kk.-pp.kk)?
- ☐ Olen joutunut karanteeniin infektiolääkärin määräämänä vapaa-ajan altistuksen takia. Milloin (pp.kk-pp.kk)?
- ☐ Minulla on epäilty covid-19-infektiota. Milloin (pp.kk)?
- ☐ Minulta on otettu positiivinen covid-19-PCR-näyte. Milloin (pp.kk)?
- ☐ Minulta on otettu negatiivinen covid-19-PCR-näyte. Milloin (pp.kk)?
- ☐ Ei mitään edellisistä

19. Erikoisala, jossa työskentelet:

- ◯ Akuuttilääketiede
- ◯ Anestesiologia ja tehohoito
- ◯ Endokrinologia
- ◯ Endokrinologinen kirurgia
- ◯ Foniatria
- ◯ Fysiatria
- ◯ Gastroenterologia
- ◯ Gastroenterologinen kirurgia
- ◯ Geriatria
- ◯ Infektiotaudit
- ◯ Ihotaudit ja allerkologia
- ◯ Kardiologia
- ◯ Keuhkotaudit
- ◯ Kliininen farmakologia ja lääkehoito
- ◯ Kliininen fysiologia ja isotooppilääketiede
- ◯ Kliininen hematologia
- ◯ Kliininen kemia
- ◯ Kliininen mikrobiologia
- ◯ Kliininen neurofysiologia
- ◯ Korva-, nenä- ja kurkkutaudit
- ◯ Käsikirurgia
- ◯ Lastenkirurgia
- ◯ Lastenneurologia
- ◯ Lastenpsykiatria
- ◯ Lastentaudit
- ◯ Liikuntalääketiede
- ◯ Naistentaudit ja synnytys
- ◯ Nefrologia
- ◯ Neurokirurgia
- ◯ Neurologia
- ◯ Nuorisopsykiatria
- ◯ Oikeuslääketiede
- ◯ Oikeuspsykiatria
- ◯ Ortopedia ja traumatologia
- ◯ Patologia
- ◯ Perinnöllisyyslääketiede
- ◯ Plastiikkakirurgia
- ◯ Psykiatria
- ◯ Radiologia
- ◯ Reumatologia
- ◯ Silmätaudit
- ◯ Sisätaudit
- ◯ Suu- ja leukakirurgia
- ◯ Sydän- ja rintaelinkirurgia
- ◯ Syöpätaudit
- ◯ Terveydenhuolto
- ◯ Työterveyshuolto
- ◯ Urologia
- ◯ Verisuonikirurgia
- ◯ Yleislääketiede
- ◯ Yleiskirurgia

20. Missä työskentelet tällä hetkellä ensisijaisesti? *

- ◯ vuodeosastolla
- ◯ ajanvarauspoliklinikalla
- ◯ päivystyksessä
- ◯ valvonta- tai teho-osastolla
- ◯ erillisellä kohortoidulla covid-19-osastolla
- ◯ kuvantaminen
- ◯ näytteenotto tai laboratorio
- ◯ tutkijana / hallinnossa /muu ei-potilastyö
- ◯ leikkausosasto
- ◯ ensihoito

21. Missä työskentelit ensimmäisen epidemiahuipun aikana (3-5/2020)? *

- ◯ vuodeosastolla
- ◯ ajanvarauspoliklinikalla
- ◯ päivystyksessä
- ◯ valvonta- tai teho-osastolla
- ◯ erillisellä kohortoidulla covid-19-osastolla
- ◯ kuvantaminen
- ◯ näytteenotto tai laboratorio
- ◯ tutkijana / hallinnossa / muu ei-potilastyö
- ◯ leikkausosasto
- ◯ ensihoito

22. Teetkö / oletko tehnyt epidemian aikana työajallasi etätöitä? Paljonko?

- ◯ 0%
- ◯ 20%
- ◯ 40%
- ◯ 60%
- ◯ 80%
- ◯ 100%

23. Työskenteletkö osa-aikaisesti?

- ◯ Kyllä
- ◯ Ei

24. Covid-19-potilaiden hoitaminen

	Kyllä	Ei	En osaa sanoa
Olen hoitanut / Hoidan työssäni covid-19-infektioon sairastuneita potilaita	◯	◯	◯
Työskentelen / työskentelin kohortoidulla covid-19-infektio-osastolla tai covid-19-päivystyksessä	◯	◯	◯
Työskentelen / työskentelin tehohoidossa	◯	◯	◯
Hoidan / hoidin työssäni sekä covid-19-infektioon sairastuneita potilaita että muita potilaita	◯	◯	◯
En tapaa työssäni covid-19-infektioon sairastuneita potilaita	◯	◯	◯

25. Milloin hoidit Covid-19-potilaita? (pp.kk-pp.kk, vastaa vain kohtiin, joissa olet työskennellyt)

Kohorttiosastolla	
Tehohoidossa	
Infektiopäivystyksessä	
Poliklinikalla	
Näytteenottossa	
Kuvantamisessa	
Leikkausalissa	

26. Hygieniaohjeistus

	Kyllä	Ei
Saamani hygieniaohjeistus (käsienpesu yms.) on ollut selkeä ja riittävä	◯	◯
Minut on ohjeistettu varoamaan tartuntaa työpisteellä liikkuessa (kanslia yms.)	◯	◯
Minut on ohjeistettu pitämään turvaväliä muuhun henkilökuntaan mm kahvihuoneessa	◯	◯
Olen pystynyt pitämään vähintään 1 metrin turvavälin muuhun henkilökuntaan (kansliassa, kahvihuoneessa, ruokasalissa)	◯	◯

27. Suojavarusteiden käytön ohjeistus:

	Kyllä	Ei
Työnantajani on antanut minulle ohjeistuksen (kirjallinen, suullinen tai video) suojavarusteiden pukemisesta	◯	◯
Olen päässyt ohjatusti harjoittelemaan suojavarusteiden pukemisen ja riisumisen	◯	◯
Osaan pukea ja riisua suojavarusteet oikein	◯	◯
Saamani ohjeistus suojavarusteiden käytöstä eri potilaskontakteissa on ollut yksiselitteinen	◯	◯

Kirurginen suu-nenäsuojain FFP2 FFP3

28. Suojaus: (suositeltu suojavarustus sisältää: suojalasit tai kasvot peittävä visiiri, pitkähihainen suojatakki, suojakäsineet, muovinen esiliina, mikäli takki ei ole rois ne ovat joka kohdassa samat:

a) ei suojausta
b) kirurgista suu-nenäsuojusta
c) kirurgista suu-nenäsuojusta, mutta suositeltua vähäisempää suojavarustusta
d) kirurgista suu-nenäsuojusta ja suositeltua suojavarustusta
e) FFP2/3-hengityssuojainta, mutta suositeltua vähäisempää suojavarustusta
f) FFP2-hengityssuojainta ja suositeltua suojavarustusta
g) FFP3-hengityssuojainta ja suositeltua suojavarustusta
h) Raitisilmakypärää (PAPR) ja suositeltua suojavarustusta
i) en tee kyseisiä toimenpiteitä/ hoida kyseisiä potilaita

	a)	b)	c)	d)	e)
Käytän työssäni oireettomien (ei covid-19-epäilyjen) potilaiden kanssa vähintään:	○	○	○	○	○
Käytän työssäni infektiopotilaiden kanssa vähintään:	○	○	○	○	○
Käytän työssäni epäiltyjen covid-potilaiden kanssa vähintään:	○	○	○	○	○
Käytän työssäni varmennettujen covid-19-potilaiden kanssa vähintään:	○	○	○	○	○
Käytän työssäni aerosolia* tuottavissa toimenpiteissä ei-infektiopotilaiden kanssa vähintään:	○	○	○	○	○
Käytän työssäni aerosolia* tuottavissa toimenpiteissä infektiopotilaiden kanssa vähintään:	○	○	○	○	○
Käytän työssäni aerosolia* tuottavissa toimenpiteissä todennäköisten tai tunnettujen covid-19-potilaiden kanssa vähintään:	○	○	○	○	○
Käytän covid-19 potilaiden PCR-näytteenotossa vähintään:	○	○	○	○	○

*Aerosolitoimenpiteet ensimmäisen aallon aikaisen ohjeistuksen mukaisesti: Liman avoin imu hengitysteistä (sisältää trakeostomian hoidon), nebulisaattorihoito, bronkoskopia, laryngoskopia, intubaatio, ekstubaatio, noninvasiivinen ventilaatio esim. jatkuva positiivinen ilmatiepainehoito (CPAP) ja kaksoispaineventilaatio (BiPAP), suurivirtauksinen happihoito, resuskitaatio ennen intubaatiota, ruumiinavaus, ylämahasuolikanavan tähystystutkimukset, suu-, nenä- ja korvakirurgia, kasvokirurgia

29. Jos henkilökohtaisen suojavarustuksesi käytössä on tapahtunut merkittäviä muutoksia epidemian aikana, voit avata vaiheet tähän (merkitsethän sekä käytetyn suojavarustuksen että ajankohdan (esim. maaliskuu):

30. Suojavarusteiden saanti (voit valita useita):

- ☐ Olen saanut aina kulloinkin voimassa olleen ohjeistuksen mukaiset suojavarusteet
- ☐ Suojavarusteita on ollut saatavilla itselleni välillä vaillinaisesti verrattuna sillä hetkellä voimassa olevaan työnantajan suojavarusteohjeistukseen
- ☐ Olen joutunut työskentelemään välillä täysin ilman työnantajan ohjeistamia suojavarusteita
- ☐ Olen joutunut uusiokäyttämään kirurgista suu-nenäsuojusta tai FFP2/3-hengityssuojainta

31. Mikäli ilmoitit että suojavarusteiden saannissa on ollut poikkeavuuksia, niin minä ajankohtana ja missä työskentelypisteessä?

32. Muuta, mitä haluat kertoa:

33. Koetko henkisen hyvinvointisi tällä hetkellä

- ◯ Erittäin hyväksi
- ◯ Merkittävästi normaalia paremmaksi
- ◯ Normaalia paremmaksi
- ◯ Normaaliksi
- ◯ Normaalia huonommaksi
- ◯ Merkittävästi normaalia huonommaksi
- ◯ Erittäin huonoksi

34. Olen palautunut töistäni normaalisti vapaapäivieni aikana myös korona-aikana?

- ◯ Kyllä
- ◯ Ei
- ◯ Osittain
- ◯ En osaa sanoa

35. Olen voinut pitää suunnitellut lomat normaalisti?

- ◯ Kyllä
- ◯ Ei

36. Jos olen ollut lomalla, koen palautuvani normaalisti?

- ◯ Kyllä
- ◯ Ei
- ◯ Osittain
- ◯ En osaa sanoa

37. Työmäärä

	lisääntynyt	pysynyt samana	vähentynyt
Viikkotuntimääräni on	◯	◯	◯
Työpäivien kuormittavuus on	◯	◯	◯

38. Avun hakeminen ja saaminen maalis-kesäkuussa 2020

	Kyllä	Ei	En osaa sanoa
Olen hakenut henkiseen hyvinvointiin tukea ammattilaiselta	◯	◯	◯
Henkisen tuen tarpeeni on lisääntynyt	◯	◯	◯
Olen saanut tukea henkiseen hyvinvointiin ammattilaiselta (psykologi/psykiatri)	◯	◯	◯
Olen hyötynyt saamastani ammattilaisen tuesta	◯	◯	◯
Olen saanut lääkkeellistä hoitoa henkiseen hyvinvointiini	◯	◯	◯
Olen hyötynyt saamastani lääkkeellisestä hoidosta	◯	◯	◯
Työpaikallani on järjestetty purkukeskustelutilaisuuksia (debriefing) covid-19-tilanteeseen liittyen	◯	◯	◯
Olen saanut tukea henkiseen jaksamiseen kokeneemmalta kollegalta	◯	◯	◯
Olen saanut työnohjausta	◯	◯	◯
Olen saanut muuta tukea työpaikalla	◯	◯	◯
Koen työpaikalla saamani tuen riittäväksi	◯	◯	◯
Haluaisin lisää tukea työpaikallani henkiseen hyvinvointiini	◯	◯	◯

39. Onko sinulla ollut seuraavia oireita 16.3.2020 jälkeen? (voit valita useita)
HUOM! Jos sinulla ei ole ollut mitään oireita riittää kun vastaat viimeisen kohdan:

	Harvoin tai ei koskaan	Joskus	Melko usein	Lähes koko ajan
toistuvia, ahdistavia muistikuvia työpaikalta	◯	◯	◯	◯
työpaikkaan liittyviä painajaisia	◯	◯	◯	◯
takaumia tai toistumiskokemuksia	◯	◯	◯	◯
voimakasta ahdistuneisuutta työpaikkaan liittyen	◯	◯	◯	◯
traumasta muistuttavien asioiden, kuten töihin menon, välttely	◯	◯	◯	◯
fyysisiä reaktioita epidemian aikana koetuista tilanteista muistuttaviin ärsykkeisiin	◯	◯	◯	◯
vaikeuksia muistaa tapahtumia	◯	◯	◯	◯
mielihyvän ja mielenkiinnon laskua, tulevaisuuden näkymien kaventumista	◯	◯	◯	◯
nukahtamis- tai unessapysymisvaikeutta	◯	◯	◯	◯
ärtyneisyyttä tai vihanpurkauksia	◯	◯	◯	◯
keskittymisvaikeutta	◯	◯	◯	◯
korostunutta varuillaan oloa	◯	◯	◯	◯
motorista levottomuutta	◯	◯	◯	◯
somaattisia oireita: mm. sydämen tykytys, vapina, huimaus, hikoilu, vatsatuntemukset	◯	◯	◯	◯
ahdistusta	◯	◯	◯	◯
pelkoa	◯	◯	◯	◯
jatkuvaa jännittyneisyyttä, joka ilmenee mm. lihassärkyinä	◯	◯	◯	◯
masentunutta mielialaa	◯	◯	◯	◯
uupumusta/väsymystä	◯	◯	◯	◯
itseluottamuksen menetystä	◯	◯	◯	◯
kohtuutonta itsekritiikkiä tai perusteetonta syyllisyyden tuntoa	◯	◯	◯	◯
kuolemaan tai itsetuhoon liittyviä ajatuksia tai käytöstä	◯	◯	◯	◯
aloitekyvyttömyyttä	◯	◯	◯	◯
ruokahalun tai painon muutoksia	◯	◯	◯	◯
psykomotorista hidastuneisuutta	◯	◯	◯	◯
ei mitään yllä olevista (vastaa vain tähän "harvoin tai ei koskaan", mikäli sinulla ei ole ollut yo. oireita)	◯	◯	◯	◯

Jos huomaat, että sinulla on runsaasti psyykkistä kuormitusta, otathan yhteyttä työterveyshuoltoon (HUS 09 471 80800), omalle terveysasemallesi tai kolmannen sektorin toimijoihin (esimerkiksi Nyyti ry 0102357520).

40.
Oletko 16.3. jälkeen joutunut jäämään pois töistä (minkä tahansa) sairastumisen vuoksi?

- ◯ Kyllä
- ◯ En

41. Onko sinusta otettu 16.3. jälkeen COVID19 PCR-näyte?

- ◯ Kyllä, negativiinen
- ◯ Kyllä, positiivinen
- ◯ Kyllä, mutta tulos ei ole vielä valmistunut
- ◯ Ei

42. Onko sinusta otettu 16.3. jälkeen COVID19 vasta-ainetutkimus?

- ◯ Kyllä, negatiivinen
- ◯ Kyllä, positiivinen
- ◯ Kyllä, mutta tulos ei ole vielä valmistunut
- ◯ Ei

43. Oliko COVID-19 tartunnan lähde

- ◯ Työperäinen, potilas
- ◯ Työperäinen, työntekijä
- ◯ Työperäinen, ei tiedossa
- ◯ Vapaa-ajalta
- ◯ Ei tiedossa
- ◯ Perheenjäsen

44. Mikä suojavarustus sinulla oli käytössä epäiltynä tartuntahetkenä?

- ◯ Ei suojavarustusta
- ◯ Kirurginen suu-nenäsuojus, mutta suositeltua vähäisempi muu suojavarustus
- ◯ Kirurginen suu-nenäsuojus ja suositeltu suojavarustus
- ◯ FFP2/3-hengityssuojain, mutta suositeltua vähäisempi muu suojavarustus
- ◯ FFP2-hengityssuojain ja suositeltu suojavarustus
- ◯ FFP3-hengityssuojain ja suositeltu suojavarustus
- ◯ Raitisilmakypärä ja suositeltu suojavarustu
- ◯ Ei tiedossa

45.
Oletko joutunut 16.3. jälkeen karanteeniin covid-19 altistumisen vuoksi

- ◯ Kyllä
- ◯ En

46. Altistuminen tapahtui työpaikalla

- ◯ Kyllä
- ◯ Ei
- ◯ En osaa sanoa

47. Altistuksen lähde oli

- ◯ Potilas
- ◯ Toinen työntekijä
- ◯ Ei tiedossa

48. Onko sinulla ollut jotakin seuraavista oireista 16.3.2020 jälkeen? (Mikäli ei ole kyseistä oiretta / et muista oireitasi, älä vastaa kyseiselle riville)

Kysymys 48. \"Onko sinulla ollut jotakin seuraavista oireista 16.3.2020 jälkeen? (Mikäli ei ole kyseistä oiretta / et muista oireitasi, älä vastaa kyseiselle riville)\": Kenttien yhteenlasketun summan tulee olla pienempi kuin 0" data-validation-mode="0" data-validation-name="numericOptionsSumLessThan">

haju- tai makuaistin muutoksia

Mikäli sinulla oli tämä oire, niin minä päivänä oireet alkoivat? (esimerkiksi 05.05.2020)

Montako päivää oireet kestivät? (Merkitse pelkkä päivien lukumäärän numero, esim. 5)

hengenahdistusta

Mikäli sinulla oli tämä oire, niin minä päivänä oireet alkoivat? (esimerkiksi 05.05.2020)

Montako päivää oireet kestivät? (Merkitse pelkkä päivien lukumäärän numero, esim. 5)

poikkeavaa ihottumaa

Mikäli sinulla oli tämä oire, niin minä päivänä oireet alkoivat? (esimerkiksi 05.05.2020)

Montako päivää oireet kestivät? (Merkitse pelkkä päivien lukumäärän numero, esim. 5)

kuumetta (yli 38,0 C)

Mikäli sinulla oli tämä oire, niin minä päivänä oireet alkoivat? (esimerkiksi 05.05.2020)

Montako päivää oireet kestivät? (Merkitse pelkkä päivien lukumäärän numero, esim. 5)

kurkkukipua

Mikäli sinulla oli tämä oire, niin minä päivänä oireet alkoivat? (esimerkiksi 05.05.2020)

Montako päivää oireet kestivät? (Merkitse pelkkä päivien lukumäärän numero, esim. 5)

lihaskipuja, jotka eivät johdu esimerkiksi urheilusta

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nuhaa

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Mikäli vastasit, että sinulla on edelleen oireita niin soitathan työterveyshuoltoon tai kuntasi koronaneuvontaan tai päivystysaikana numeroon 116 117, mikäli sinusta ei ole vi

49. Oletko ollut oireiden vuoksi

- ◯ sairauslomalla
- ◯ käynyt lääkärissä arviossa terveysasemalla/yksityisella toimijalla ja ohjautunut takaisin kotiin
- ◯ käynyt sairaalan päivystyksessa ja ohjautunut takaisin kotiin
- ◯ sairaalahoidossa osastolla
- ◯ tehohoidossa
- ◯ en missään yllä olevassa

50. Haluatko vielä kertoa muuta voinnistasi?

Helsingin kaupunki

Covid-19-epidemian vaikutus sosiaali- ja terveydenhuoltohenkilöstön terveyteen ja hyvinvointiin

Tutkittavan sosiaaliset ja terveydelliset taustatiedot, täytetään kerran tutkimuksen alussa, sisältää ensimmäisen hyvinvointikyselyn ja oirekyselyn

1. Tutkimusnumeroni:

Henkilökohtaisen tutkimusnumerosi löydät tutkimukseen ilmoittautuessasi, osoitteesta covid19tutkimus@hus.fi saamastasi sähköpostista. Mikäli et muista tutkimusnumeroasi voit lähettää viestiä tutkimushoitajalle osoitteeseen covid19tutkimus@hus.fi tai soittaa numeroon 045 275 4442.

HUOM! Olemme saaneet joitakin ilmoituksia, että kysely toimii huonommin Internet Explorer-selaimella. Linkin voi kopioida yläpalkista Chromeen, joka on toiminut paremmin.

*

2. Sukupuoli *

- ◯ Mies
- ◯ Nainen
- ◯ Muu

3. Oletko saanut koronarokotteen?

- ◯ Kyllä
- ◯ Ei

4. Koronarokote

Kysymys 4. \"Koronarokote\": Kenttien yhteenlasketun summan tulee olla pienempi kuin 0" data-validation-mode="0" data-validation-name="numericOptionsSumLessThan">

Kysymys 4. \"Koronarokote\": Kenttien yhteenlasketun summan tulee olla pienempi kuin 0" data-validation-mode="0" data-validation-name="numericOptionsSumLessThan">

Rokote, annos 1

Rokotteen valmistaja

- ◯ Pfizer-BioNTech
- ◯ Moderna
- ◯ Oxford-AstraZeneca
- ◯ Muu
- ◯ En tiedä

Milloin sain rokotteen? (pp.kk.vv)

_____

Rokote, annos 2

Rokotteen valmistaja

- ◯ Pfizer-BioNTech
- ◯ Moderna
- ◯ Oxford-AstraZeneca
- ◯ Muu
- ◯ En tiedä

Milloin sain rokotteen? (pp.kk.vv)

_____

5. Rokotteen mahdolliset oireet

- ☐ Sain oireita ensimmäisestä rokotteesta, mitä? [ ]
- ☐ Sain oireita toisesta rokotteesta, mitä? [ ]
- ☐ En saanut oireita kummastakaan rokotekerrasta.

6. Kuulutko THL:n luokittelemaan riskiryhmään covid-19-infektiolle? (voit valita useita)

- ☐ yli 70v
- ☐ vaikea-asteinen sydänsairaus
- ☐ huonossa hoitotasapainossa oleva keuhkosairaus
- ☐ diabetes, johon liittyy elinvaurioita
- ☐ krooninen maksan tai munuaisen vajaatoiminta
- ☐ vastustuskykyä heikentävä tauti, kuten syöpä
- ☐ vastustukykyä voimakkaasti heikentävä lääkitys, kuten suuriannoksinen kortisonihoito
- ☐ en kuulu riskiryhmiin

7. Oletko raskaana?

- ◯ Kyllä
- ◯ Ei

8. Tupakoitko?

- ◯ Kyllä, savuketta / päivä [ ]
- ◯ Ei
- ◯ Lopettanut, minä vuonna? [ ]

9. Kuinka monta vuotta olet tupakoinut?

10. Käytätkö alkoholia?

- ◯ Kyllä, keskimäärin annosta/viikko
- ◯ Ei

11. Pituus ja paino

Pituus (cm)

Paino (kg)

12. Voitko käyttää normaalisti kirurgista suu-nenäsuojusta ja hengityssuojainta? (huomioiden kasvojen anatomia yms.)

- ◯ Kyllä
- ◯ Ei

13. Noudatitko hallituksen antamia ohjeita ja rajoituksia vapaa-ajallasi epidemian ensimmäisen aallon aikana (16.3.2020-15.6.2020)?

- ◯ Kyllä
- ◯ Ei, miten jätit noudattamatta ohjeita?

14. Olen osallistunut epidemia-aikana tapahtumiin, joiden maksimi osallistujamäärä on (merkitse suurin tapahtuma, jossa olet käynyt)

- ◯ 1-5
- ◯ 5-10
- ◯ 10-20
- ◯ 20-50
- ◯ 50-100
- ◯ 100-500
- ◯ yli 500

15. Oletko käynyt epidemia-aikana yökerhoissa, baarissa tai karaokessa?

- ◯ Kyllä
- ◯ Ei

16. Pidätkö kansallisen maskisuosituksen mukaisesti suu-nenäsuojusta julkisissa kulkuvälineissä ja paikoissa, joissa et pysty pitämään turvaväliä?

- ◯ Kyllä
- ◯ Ei

17. Onko sinulla säännöllinen lääkitys?

- ◯ Kyllä
- ◯ Ei

18. Käytätkö päivittäin seuraavia lääkkeitä (voit valita useita):

- [ ] Inhaloitava glukokortikoidi (eli kortisoni) tai inhaloitavaa glukokortikoidia sisältävä yhdistelmävalmiste
- [ ] Suun kautta otettava kortisonivalmiste
- [ ] ACE-estäjä tai angiotensiinireseptoriestäjä (verenpainelääke, vaikuttavana aineena -priili /-sartaani)
- [ ] Asetyylisalisyylihappo (Aspiriini, Primaspan)
- [ ] Antikoaguloiva lääkitys (Marevan, Klexane, Innohep)
- [ ] Antikoaguloiva lääkitys (Eliquis, Xarelto, Pradaxa, Lixiana)
- [ ] Antitromboottia (Plavix, Clopidrogel, Efient, Brillique)
- [ ] Montelukasti
- [ ] Ei mitään edellisistä

19. Miten asut?

- ◯ Yksin
- ◯ Yhden muun henkilön kanssa
- ◯ Kahden muun henkilön kanssa
- ◯ Kolmen tai useamman henkilön kanssa

20. Harrastatko / harrastaako perheenjäsenesi nyt epidemian aikana säännöllisesti jotakin sisätiloissa, ryhmässä harrastettavaa lajia (esim. ryhmäliikunta, kuorolaulu, kuntosali jne.)

- ◯ Kyllä, säännöllisesti
- ◯ Kyllä, toisinaan
- ◯ Kyllä, ennen kuin niistä suositeltiin luopumaan loppuvuodesta
- ◯ Ei

21. Asuuko taloudessasi varhaiskasvatukseen tai perusopetukseen osallistuva lapsi / nuori?

- ◯ Kyllä
- ◯ Ei

22. COVID-infektio ja altistukset

- [ ] **Minulla on epäilty COVID-19-infektiota. Milloin (pp.kk.vv) voit lisätä useita** _____
- [ ] **Minulla on todettu COVID-infektio. Milloin (pp.kk.vv), voit lisätä useita** _____
- [ ] **Minulta on otettu positiivinen COVID-19 PCR-näyte. Milloin (pp.kk.vv), voit lisätä useita** _____
- [ ] **Minulta on otettu negatiivinen COVID-19-PCR-näyte. Milloin (pp.kk.vv), voit lisätä useita** _____
- [ ] Olen matkustanut ulkomaille 1.1.2020 jälkeen. Minne ja milloin? (voit mainita useita kohteita ja ajanjaksoja) _____
- [ ] Olen joutunut karanteeniin infektiolääkärin määräämänä työperäisen altistuksen takia. Milloin (pp.kk.-pp.kk.vv)? _____
- [ ] Olen joutunut karanteeniin infektiolääkärin määräämänä vapaa-ajan altistuksen takia. Milloin (pp.kk-pp.kk.vv)? _____
- [ ] Samassa taloudessa asuvalla on todettu positiivinen COVID-19-PCR-näyte. Milloin (pp.kk.vv)? _____
- [ ] Olen saanut koronavilkussa altistusilmoituksen? Milloin (pp.kk.vv)? _____

23. Oliko tartunta jäljitetty

- ◯ Työperäiseksi
- ◯ Vapaa-ajaksi
- ◯ Epäselvä

24. Onko tartunnan lähde?

- ◯ Kollega
- ◯ Perhejäsen
- ◯ Tuttava
- ◯ Potilas
- ◯ Epäselvä

25. Minkälainen suojaus sinulla oli todennäköisellä tartuntahetkellä? Voit valita useita.

- ☐ Ei suojausta
- ☐ Turvaväli > 1 metriä
- ☐ Kansalaismaski
- ☐ Kirurginen suu-nenäsuojus
- ☐ FFP2
- ☐ FFP3
- ☐ Raitisilmakypärä
- ☐ Ei tiedossa

26.
Oletko 16.3.2020 jälkeen saanut mitään koronaan viittaavia oireita?

- ◯ Kyllä
- ◯ En

27. Onko sinulla ollut jotakin seuraavista oireista 16.3.2020 jälkeen? (Mikäli ei ole kyseistä oiretta / et muista oireitasi, älä vastaa kyseiselle riville)

Kysymys 27. \"Onko sinulla ollut jotakin seuraavista oireista 16.3.2020 jälkeen? (Mikäli ei ole kyseistä oiretta / et muista oireitasi, älä vastaa kyseiselle riville)\": Kenttien yhteenlasketun summan tulee olla pienempi kuin 0" data-validation-mode="0" data-validation-name="numericOptionsSumLessThan">

haju- tai makuaistin muutoksia

Mikäli sinulla oli tämä oire, niin minä päivänä oireet alkoivat? (esimerkiksi 05.05.2020)

Montako päivää oireet kestivät? (Merkitse pelkkä päivien lukumäärän numero, esim. 5)

hengenahdistusta

Mikäli sinulla oli tämä oire, niin minä päivänä oireet alkoivat? (esimerkiksi 05.05.2020)

Montako päivää oireet kestivät? (Merkitse pelkkä päivien lukumäärän numero, esim. 5)

poikkeavaa ihottumaa

Mikäli sinulla oli tämä oire, niin minä päivänä oireet alkoivat? (esimerkiksi 05.05.2020)

Montako päivää oireet kestivät? (Merkitse pelkkä päivien lukumäärän numero, esim. 5)

kuumetta (yli 38,0 C)

Mikäli sinulla oli tämä oire, niin minä päivänä oireet alkoivat? (esimerkiksi 05.05.2020)

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28. Oletko ollut oireiden vuoksi (voit valita useita)

- [ ] puhelin/etäkontaktissa terveydenhuoltoon
- [ ] sairaslomalla
- [ ] käynyt lääkärillä arviossa terveysasemalla/yksityisellä toimijalla ja ohjautunut takaisin kotiin
- [ ] käynyt sairaalan päivystyksessä ja ohjautunut takaisin kotiin
- [ ] osastohoidossa
- [ ] tehohoidossa
- [ ] en missään yllä olevista

29. Onko sinulle tehty COVID-19 vasta-ainetutkimus (verikoe)?

- ◯ Kyllä, negatiivinen
- ◯ Kyllä, positiivinen
- ◯ Kyllä, mutta tulos ei ole tiedossa
- ◯ Ei

30. Missä olet työskennellyt epidemian aikana? Voit valita useita.

- [ ] ajanvarauspoliklinikka
- [ ] apuvälinepalvelu
- [ ] asumispalvelut
- [ ] avohoito (muu)
- [ ] avokuntoutus
- [ ] erillinen kohortoitu covid-19-osasto
- [ ] erillinen kohortoitu infektioterveysasema
- [ ] epidemiologinen yksikkö
- [ ] hammashoito
- [ ] riskiryhmäläisten hammashoito
- [ ] hammashoidon päivystys
- [ ] jälkikuntoutus
- [ ] kotihoito
- [ ] kotipalvelu
- [ ] kotisairaala
- [ ] kouluterveydenhuolto
- [ ] kuvantaminen
- [ ] laitoskuntoutus
- [ ] leikkausosasto
- [ ] mielenterveyspalvelut
- [ ] nuorisoasema
- [ ] näytteenotto tai laboratorio
- [ ] neuvola
- [ ] puhelinpalvelu
- [ ] palvelukeskus
- [ ] palvelupiste
- [ ] päihdepalvelut
- [ ] päivystys
- [ ] päiväosasto
- [ ] päivätoiminta
- [ ] ryhmäkoti
- [ ] sosiaalineuvonta
- [ ] tutkijana / hallinto / muu ei-potilastyö
- [ ] valvonta- tai teho-osasto
- [ ] vuodeosasto
- [ ] muu osastohoito
- [ ] muu mikä

31. Missä kaikkialla olet työskennellyt epidemian aikana?

- [ ] Epidemiologinen yksikkö
- [ ] Etelä kouluterveys
- [ ] Haaga
- [ ] Herttoniemi
- [ ] Itä kouluterveys
- [ ] Itäkatu/Itäkeskus
- [ ] Jakomäki
- [ ] Kalasatama
- [ ] Kallio
- [ ] Kannelmäki
- [ ] Kivelä
- [ ] Kivikko
- [ ] Kontula
- [ ] Koskela
- [ ] Kustaankartano
- [ ] Laajasalo
- [ ] Laakso
- [ ] Lauttasaari
- [ ] Linnakoskenkatu
- [ ] Malmi
- [ ] Malminkartano
- [ ] Maunula
- [ ] Meilahti
- [ ] Munkkiniemi
- [ ] Myllypuro
- [ ] Oulunkylä
- [ ] Paloheinä
- [ ] Pihlajamäki
- [ ] Pitäjämäki
- [ ] Pohjoinen kouluterveys
- [ ] Porolahti
- [ ] Puistola
- [ ] Pukinmäki
- [ ] Roihuvuori
- [ ] Ruskeasuo/Mannerheimintie
- [ ] Suursuo
- [ ] Suutarila
- [ ] Töölö
- [ ] Valliila
- [ ] Viiskulma
- [ ] Vironniemi
- [ ] Vuosaari
- [ ] Muu, mikä? _____

32. Teetkö työajallasi etätöitä? Paljonko?

- ◯ 0%
- ◯ 20%
- ◯ 40%
- ◯ 60%
- ◯ 80%
- ◯ 100%

33. Työskenteletkö osa-aikaisesti?

- ◯ Kyllä
- ◯ Ei

34. Työskenteletkö lisäksi muilla työnantajilla? (valitse ne, joissa työskentelet)

- ☐ Yksityissektori
- ☐ Muu julkinen PTH-tasoinen toimipiste
- ☐ Sairaalapäivystys
- ☐ Erikoissairaanhoito

35. Covid-19-potilaiden hoitaminen

	Kyllä	Ei	En osaa sanoa
Olen hoitanut / Hoidan työssäni covid-19-infektioon sairastuneita potilaita	◯	◯	◯
Työskentelen / työskentelin kohortoidulla covid-19-infektio-osastolla tai covid-19-päivystyksessä	◯	◯	◯
Hoidan / hoidin työssäni sekä covid-19-infektioon sairastuneita potilaita että muita potilaita	◯	◯	◯
Hoidan työssäni potilaita, joilla on covidiin sopivia oireita, mutta infektio ei ole varmistunut	◯	◯	◯
Hoidan työssäni vain potilaita, joilla ei ole covid-19-infektioon viittaavia oireita	◯	◯	◯

36. Milloin hoidit mahdollisia COVID-19 potilaita (pp.kk.vv-pp.kk.vv) vastaa vain kohtiin, joissa olet työskennellyt

Asumispalveluissa	
Hammashoidossa	
Infektiopäivystyksessä	
Kohorttiosastolla	
Kotihoidossa	
Kuvantamisessa	
Leikkausalissa	
Näytteenottossa	
Poliklinikalla	
Vuodeosastolla	

37. Olen pystynyt noudattamaan annettua ohjeistusta:

	Kyllä	Ei
Käsihygienia	◯	◯
Turvavälit potilastyössä (>1,5m)	◯	◯
Turvavälit kahvihuoneessa ja ruokalassa (>1,5m)	◯	◯
Turvavälit henkilökunnan tiloissa (>1,5m)	◯	◯
Hygieniaohjeistus on ollut yksiselitteinen ja selkeä epidemian ensimmäisen aallon aikana?	◯	◯
Hygieniaohjeistus on ollut yksiselitteinen ja selkeä epidemian toisen aallon aikana?	◯	◯
	◯	◯

38. Suojavarusteiden käytön ohjeistus:

	Kyllä	Ei
Työnantajani on antanut minulle ohjeistuksen (kirjallinen, suullinen tai video) suojavarusteiden pukemisesta	◯	◯
Olen päässyt ohjatusti harjoittelemaan suojavarusteiden pukemisen ja riisumisen	◯	◯
Osaan pukea ja riisua suojavarusteet oikein	◯	◯
Saamani ohjeistus suojavarusteiden käytöstä eri potilaskontakteissa on ollut yksiselitteinen	◯	◯
Olen noudattanut työnantajan ohjeita suojavarustuksesta koko pandemian ajan	◯	◯
Olen pystynyt noudattamaan maskin käyttöä kaikissa työpaikan tiloissa ruokailua lukuunottamatta (ohjeen muutoksesta lähtien)	◯	◯
Olen pystynyt käyttämään maskia vapaa-ajalla julkisissa sisätiloissa ja liikennevälineissä	◯	◯

Kirurginen suu-nenäsuojain

FFP2

FFP3

39. Suojaus: (suositeltu suojavarustus sisältää: suojalasit tai kasvot peittävä visiiri, pitkähihainen suojatakki, suojakäsineet, muovinen esiliina, mikäli takki ei ole rois ne ovat joka kohdassa samat:

a) ei suojausta
b) kirurgista suu-nenäsuojusta
c) kirurgista suu-nenäsuojusta, mutta suositeltua vähäisempää suojavarustusta
d) kirurgista suu-nenäsuojusta ja suositeltua suojavarustusta
e) FFP2/3-hengityssuojainta, mutta suositeltua vähäisempää suojavarustusta
f) FFP2-hengityssuojainta ja suositeltua suojavarustusta
g) FFP3-hengityssuojainta ja suositeltua suojavarustusta
h) Raitisilmakypärää (PAPR) ja suositeltua suojavarustusta
i) en tee kyseisiä toimenpiteitä/ hoida kyseisiä potilaita

	a)	b)	c)	d)	e)
Käytän työssäni oireettomien (ei covid-19-epäilyjen) potilaiden kanssa vähintään:	◯	◯	◯	◯	◯
Käytän työssäni infektiopotilaiden kanssa vähintään:	◯	◯	◯	◯	◯
Käytän työssäni epäiltyjen covid-potilaiden kanssa vähintään:	◯	◯	◯	◯	◯
Käytän työssäni varmennettujen covid-19-potilaiden kanssa vähintään:	◯	◯	◯	◯	◯
Käytän työssäni aerosolia* tuottavissa toimenpiteissä ei-infektiopotilaiden kanssa vähintään:	◯	◯	◯	◯	◯
Käytän työssäni aerosolia* tuottavissa toimenpiteissä infektiopotilaiden kanssa vähintään:	◯	◯	◯	◯	◯
Käytän työssäni aerosolia* tuottavissa toimenpiteissä todennäköisten tai tunnettujen covid-19-potilaiden kanssa vähintään:	◯	◯	◯	◯	◯
Käytän covid-19 potilaiden PCR-näytteenotossa vähintään:	◯	◯	◯	◯	◯

*Aerosolitoimenpiteet ensimmäisen aallon aikaisen ohjeistuksen mukaisesti: Liman avoin imu hengitysteistä (sisältää trakeostomian hoidon), nebulisaattorihoito, bronkoskopia, laryngoskopia, intubaatio, ekstubaatio, noninvasiivinen ventilaatio esim. jatkuva positiivinen ilmatiepainehoito (CPAP) ja kaksoispaineventilaatio (BiPAP), suurivirtauksinen happihoito, resuskitaatio ennen intubaatiota, ruumiinavaus, ylämahasuolikanavan tähystystutkimukset, suu-, nenä- ja korvakirurgia, kasvokirurgia, aerosolia tuottavat hammastoimenpiteet, kuten turbiiniporan ja ultraäänen käyttö.

40. Jos henkilökohtaisen suojavarustuksesi käytössä on tapahtunut merkittäviä muutoksia epidemian aikana, voit avata vaiheet tähän (merkitsethän sekä käytetyn suojavarustuksen että ajankohdan (esim. maaliskuu):

41. Suojavarusteiden saanti (voit valita useita):

- [ ] Olen saanut aina kulloinkin voimassa olleen ohjeistuksen mukaiset suojavarusteet
- [ ] Suojavarusteita on ollut saatavilla itselleni välillä vaillinaisesti verrattuna sillä hetkellä voimassa olevaan työnantajan suojavarusteohjeistukseen
- [ ] Olen joutunut työskentelemään välillä täysin ilman työnantajan ohjeistamia suojavarusteita
- [ ] Olen joutunut uusiokäyttämään kirurgista suu-nenäsuojusta tai FFP2/3-hengityssuojainta

42. Mikäli ilmoitit että suojavarusteiden saannissa on ollut poikkeavuuksia, niin minä ajankohtana ja missä työskentelypisteessä?

43. Muuta, mitä haluat kertoa:

44. Koetko henkisen hyvinvointisi tällä hetkellä

- ◯ Erittäin hyväksi
- ◯ Merkittävästi normaalia paremmaksi
- ◯ Normaalia paremmaksi
- ◯ Normaaliksi
- ◯ Normaalia huonommaksi
- ◯ Merkittävästi normaalia huonommaksi
- ◯ Erittäin huonoksi

45. Olen palautunut töistäni normaalisti vapaapäivieni aikana myös korona-aikana?

- ◯ Kyllä
- ◯ Ei
- ◯ Osittain
- ◯ En osaa sanoa

46. Olen voinut pitää suunnitellut lomat normaalisti?

- ◯ Kyllä
- ◯ Ei

47. Jos olen ollut lomalla, koen palautuvani normaalisti?

- ◯ Kyllä
- ◯ Ei
- ◯ Osittain
- ◯ En osaa sanoa

48. Työmäärä

	lisääntynyt	pysynyt samana	vähentynyt
Viikkotuntimääräni on	◯	◯	◯
Työpäivien kuormittavuus on	◯	◯	◯

49. Harrastan sykettä kohottavaa ja/tai hengästyttävää liikuntaa viikossa yhteensä keskimäärin (tavallisena viikkona):

- ◯ en lainkaan
- ◯ vähemmän kuin 1h 15min
- ◯ 1h 15min - 2h 30min
- ◯ enemmän kuin 2h 30min

50. Harrastan lihaskuntoa ja liikehallintaa harjoittavaa liikuntaa viikossa yhteensä keskimäärin (tavallisena viikkona):

- ◯ en lainkaan
- ◯ yhden kerran viikossa
- ◯ kaksi kertaa viikossa
- ◯ useammin kuin kaksi kertaa viikossa

51. Avun hakeminen ja saaminen epidemian aikana

	Kyllä	Ei	En osaa sanoa
Olen hakenut henkiseen hyvinvointiin tukea ammattilaiselta	◯	◯	◯
Henkisen tuen tarpeeni on lisääntynyt	◯	◯	◯
Olen saanut tukea henkiseen hyvinvointiin ammattilaiselta (psykologi/psykiatri)	◯	◯	◯
Olen hyötynyt saamastani ammattilaisen tuesta	◯	◯	◯
Olen saanut ammattilaisen tukea henkiseen hyvinvointiini jo ennen epidemiaa	◯	◯	◯
Olen saanut lääkkeellistä hoitoa henkiseen hyvinvointiini	◯	◯	◯
Olen hyötynyt saamastani lääkkeellisestä hoidosta	◯	◯	◯
Olen saanut lääkkeellistä hoitoa henkiseen hyvinvointiini jo ennen epidemiaa	◯	◯	◯
Työpaikallani on järjestetty purkukeskustelutilaisuuksia (debriefing) covid-19-tilanteeseen liittyen	◯	◯	◯
Olen saanut tukea henkiseen jaksamiseen kokeneemmalta kollegalta	◯	◯	◯
Olen saanut työnohjausta	◯	◯	◯
Olen saanut muuta tukea työpaikalla	◯	◯	◯
Koen työpaikalla saamani tuen riittäväksi	◯	◯	◯
Haluaisin lisää tukea työpaikallani henkiseen hyvinvointiini	◯	◯	◯

52. Onko sinulla ollut seuraavia oireita 16.3.2020 jälkeen? (voit valita useita)
HUOM! Jos sinulla ei ole ollut mitään oireita riittää kun vastaat viimeisen kohdan:

	Harvoin tai ei koskaan	Joskus	Melko usein	Lähes koko ajan
toistuvia, ahdistavia muistikuvia työpaikalta	◯	◯	◯	◯
työpaikkaan liittyviä painajaisia	◯	◯	◯	◯
takaumia tai toistumiskokemuksia	◯	◯	◯	◯
voimakasta ahdistuneisuutta työpaikkaan liittyen	◯	◯	◯	◯
traumasta muistuttavien asioiden, kuten töihin menon, välttely	◯	◯	◯	◯
fyysisiä reaktioita epidemian aikana koetuista tilanteista muistuttaviin ärsykkeisiin	◯	◯	◯	◯
vaikeuksia muistaa tapahtumia	◯	◯	◯	◯
mielihyvän ja mielenkiinnon laskua, tulevaisuuden näkymien kaventumista	◯	◯	◯	◯
nukahtamis- tai unessapysymisvaikeutta	◯	◯	◯	◯
ärtyneisyyttä tai vihanpurkauksia	◯	◯	◯	◯
keskittymisvaikeutta	◯	◯	◯	◯
korostunutta varuillaan oloa	◯	◯	◯	◯
motorista levottomuutta	◯	◯	◯	◯
somaattisia oireita: mm. sydämen tykytys, vapina, huimaus, hikoilu, vatsatuntemukset	◯	◯	◯	◯
ahdistusta	◯	◯	◯	◯
pelkoa	◯	◯	◯	◯
harhaluulot	◯	◯	◯	◯
jatkuvaa jännittyneisyyttä, joka ilmenee mm. lihassärkyinä	◯	◯	◯	◯
masentunutta mielialaa	◯	◯	◯	◯
uupumusta/väsymystä	◯	◯	◯	◯
itseluottamuksen menetystä	◯	◯	◯	◯
kohtuutonta itsekritiikkiä tai perusteetonta syyllisyyden tuntoa	◯	◯	◯	◯
kuolemaan tai itsetuhoon liittyviä ajatuksia tai käytöstä	◯	◯	◯	◯
aloitekyvyttömyyttä	◯	◯	◯	◯
ruokahalun tai painon muutoksia	◯	◯	◯	◯
psykomotorista hidastuneisuutta	◯	◯	◯	◯
ei mitään yllä olevista (vastaa vain tähän "harvoin tai ei koskaan", mikäli sinulla ei ole ollut yo. oireita)	◯	◯	◯	◯

Jos huomaat, että sinulla on runsaasti psyykkistä kuormitusta, otathan yhteyttä työterveyshuoltoon (Helsingin kaupunki **09 310 54100**), omalle terveysasemallesi tai kolmannen sektorin toimijoihin (esimerkiksi Nyyti ry 0102357520).

53. Haluatko vielä kertoa muuta voinnistasi? Millaisin keinoin olet itsenäisesti pyrkinyt helpottamaan mahdollisen lisääntyneen kuormituksen aiheuttamia oireita, ja oletko kokenut näistä keinoista/asioista/toiminnoista olevan sinulle apua?

3) Seurantakysely HUS: tutkittavan hyvinvointi ja oireet (täytetään kuukauden välein)

1. Tutkimusnumeroni:

Henkilökohtaisen tutkimusnumerosi löydät tutkimukseen ilmoittautuessasi, osoitteesta covid19tutkimus@hus.fi saamastasi sähköpostista. Mikäli et muista tutkimusnumeroasi voit lähettää viestiä tutkimushoitajalle osoitteeseen covid19tutkimus@hus.fi tai soittaa numeroon 045 275 4442.

HUOM! Olemme saaneet joitakin ilmoituksia, että kysely toimii huonommin Internet Explorer-selaimella. Linkin voi kopioida yläpalkista Chromeen, joka on toiminut paremmin.

* [ ]

2. Koetko henkisen hyvinvointisi tällä hetkellä (viimeisen kuukauden aikana)

- ◯ Erittäin hyväksi
- ◯ Merkittävästi normaalia paremmaksi
- ◯ Normaalia paremmaksi
- ◯ Normaaliksi
- ◯ Normaalia huonommaksi
- ◯ Merkittävästi normaalia huonommaksi
- ◯ Erittäin huonoksi

3. Oletko palautunut töistäsi normaalisti vapaapäiviesi aikana edelliseen kyselyyn vastaamiseen jälkeen?

- ◯ Kyllä
- ◯ Ei
- ◯ Osittain
- ◯ En osaa sanoa

4. Olen voinut pitää suunnitellut lomat normaalisti viimeisen kuukauden aikana?

- ◯ Kyllä
- ◯ Ei

5. Jos olen ollut lomalla, koen palautuvani normaalisti?

- ◯ Kyllä
- ◯ Ei
- ◯ Osittain
- ◯ En osaa sanoa

6. Työmäärä

	lisääntynyt	pysynyt samana	vähentynyt
Viikkotuntimääräni on edelliseen kyselyyn vastaamisen jälkeen	◯	◯	◯
Työpäivien kuormittavuus on edelliseen kyselyyn vastaamiseen jälkeen	◯	◯	◯

7. Avun hakeminen ja saaminen edelliseen kyselyyn vastaamisen jälkeisenä aikana

	Kyllä	Ei	En osaa sanoa
Olen hakenut henkiseen hyvinvointiin tukea ammattilaiselta	◯	◯	◯
Henkisen tuen tarpeeni on lisääntynyt	◯	◯	◯
Olen saanut tukea henkiseen hyvinvointiin ammattilaiselta (psykologi/psykiatri)	◯	◯	◯
Olen hyötynyt saamastani ammattilaisen tuesta	◯	◯	◯
Olen saanut lääkkeellistä hoitoa henkiseen hyvinvointiini	◯	◯	◯
Olen hyötynyt saamastani lääkkeellisestä hoidosta	◯	◯	◯
Työpaikallani on järjestetty purkukeskustelutilaisuuksia (debriefing) covid-19-tilanteeseen liittyen	◯	◯	◯
Olen saanut tukea henkiseen jaksamiseen kokeneemmalta kollegalta	◯	◯	◯
Olen saanut työnohjausta	◯	◯	◯
Olen saanut muuta tukea työpaikalla	◯	◯	◯
Koen työpaikalla saamani tuen riittäväksi	◯	◯	◯
Haluaisin lisää tukea työpaikallani henkiseen hyvinvointiini	◯	◯	◯

8. Onko sinulla ollut seuraavia oireita edelliseen kyselyyn vastaamisen jälkeisenä aikana? (voit valita useita)
HUOM! Jos sinulla ei ole ollut mitään oireita riittää kun vastaat viimeisen kohdan:

	Harvoin tai ei koskaan	Joskus	Melko usein	Lähes koko ajan
toistuvia, ahdistavia muistikuvia työpaikalta	◯	◯	◯	◯
työpaikkaan liittyviä painajaisia	◯	◯	◯	◯
takaumia tai toistumiskokemuksia	◯	◯	◯	◯
voimakasta ahdistuneisuutta työpaikkaan liittyen	◯	◯	◯	◯
traumasta muistuttavien asioiden, kuten töihin menon, välttely	◯	◯	◯	◯
fyysisiä reaktioita epidemian aikana koetuista tilanteista muistuttaviin ärsykkeisiin	◯	◯	◯	◯
vaikeuksia muistaa tapahtumia	◯	◯	◯	◯
mielihyvän ja mielenkiinnon laskua, tulevaisuuden näkymien kaventumista	◯	◯	◯	◯
nukahtamis- tai unessapysymisvaikeutta	◯	◯	◯	◯
ärtyneisyyttä tai vihanpurkauksia	◯	◯	◯	◯
keskittymisvaikeutta	◯	◯	◯	◯
korostunutta varuillaan oloa	◯	◯	◯	◯
motorista levottomuutta	◯	◯	◯	◯
somaattisia oireita: mm. sydämen tykytys, vapina, huimaus, hikoilu, vatsatuntemukset	◯	◯	◯	◯
ahdistusta	◯	◯	◯	◯
pelkoa	◯	◯	◯	◯
jatkuvaa jännittyneisyyttä, joka ilmenee mm. lihassärkyinä	◯	◯	◯	◯
masentunutta mielialaa	◯	◯	◯	◯
uupumusta/väsymystä	◯	◯	◯	◯
itseluottamuksen menetystä	◯	◯	◯	◯
kohtuutonta itsekritiikkiä tai perusteetonta syyllisyyden tuntoa	◯	◯	◯	◯

	Harvoin tai ei koskaan	Joskus	Melko usein	Lähes koko ajan
kuolemaan tai itsetuhoon liittyviä ajatuksia tai käytöstä	◯	◯	◯	◯
aloitekyvyttömyyttä	◯	◯	◯	◯
ruokahalun tai painon muutoksia	◯	◯	◯	◯
psykomotorista hidastuneisuutta	◯	◯	◯	◯
ei mitään yllä olevista (vastaa vain tähän "harvoin tai ei koskaan", mikäli sinulla ei ole ollut yo. oireita)	◯	◯	◯	◯

Jos huomaat, että sinulla on runsaasti psyykkistä kuormitusta, otathan yhteyttä työterveyshuoltoon (HUS 09 471 80800), omalle terveysasemallesi tai kolmannen sektorin toimijoihin (esimerkiksi Nyyti ry 0102357520).

9.

Oletko joutunut jäämään pois töistä (minkä tahansa) sairastumisen vuoksi edelliseen kyselyyn vastaamisen jälkeisenä aikana?

- ◯ Kyllä
- ◯ En

10. Covid-19-potilaiden hoitaminen

	Kyllä	Ei	En osaa sanoa
Olen hoitanut edelliseen kyselyyn vastaamisen jälkeen työssäni covid-19-infektioon sairastuneita potilaita	◯	◯	◯
Olen työskennellyt edelliseen kyselyyn vastaamisen jälkeen kohortoidulla covid-19-infektio-osastolla tai covid-19-päivystyksessä	◯	◯	◯
Olen työskennellyt edelliseen kyselyyn vastaamisen jälkeen covid-19-tehohoidossa	◯	◯	◯
Olen hoitanut edelliseen kyselyyn vastaamisen jälkeen sekä covid-19-infektioon sairastuneita potilaita että muita potilaita	◯	◯	◯
En ole tavannut työssäni edelliseen kyselyyn vastaamisen jälkeen covid-19-infektioon sairastuneita potilaita	◯	◯	◯

11. Onko sinusta otettu viime kyselyn jälkeen COVID19 PCR-näyte?

- ◯ Kyllä, negatiivinen
- ◯ Kyllä, positiivinen
- ◯ Kyllä, mutta tulos ei ole vielä valmistunut
- ◯ Ei

12. Onko sinusta otettu viime kyselyn jälkeen COVID19 vasta-ainetutkimus?

- ◯ Kyllä, negatiivinen
- ◯ Kyllä, positiivinen
- ◯ Kyllä, mutta tulos ei ole vielä valmistunut
- ◯ Ei

13. Oliko COVID-19 tartunnan lähde

- ◯ Työperäinen, potilas
- ◯ Työperäinen, työntekijä
- ◯ Työperäinen, ei tiedossa

- ◯ Vapaa-ajalta
- ◯ Ei tiedossa
- ◯ Perheenjäsen

14. Mikä suojavarustus sinulla oli käytössä epäiltynä tartuntahetkenä?

- ◯ Ei suojavarustusta
- ◯ Kirurginen suu-nenäsuojus, mutta suositeltua vähäisempi muu suojavarustus
- ◯ Kirurginen suu-nenäsuojus ja suositeltu suojavarustus
- ◯ FFP2/3-hengityssuojain, mutta suositeltua vähäisempi muu suojavarustus
- ◯ FFP2-hengityssuojain ja suositeltu suojavarustus
- ◯ FFP3-hengityssuojain ja suositeltu suojavarustus
- ◯ Raitisilmakypärä ja suositeltu suojavarustu
- ◯ Ei tiedossa

15.
Oletko joutunut edelliseen kyselyyn vastaamisen jälkeen karanteeniin covid-19 altistumisen vuoksi

- ◯ Kyllä
- ◯ En

16. Altistuminen tapahtui työpaikalla

- ◯ Kyllä
- ◯ Ei
- ◯ En osaa sanoa

17. Altistuksen lähde oli

- ◯ Potilas
- ◯ Toinen työntekijä
- ◯ Ei tiedossa

18. Onko sinulla ollut jotakin seuraavista oireista edelliseen kyselyyn vastaamisen jälkeen? (Mikäli sinulla ei ole ollut kyseistä oiretta / et muista oireitasi, älä vastaa kyseiselle riville)

Kysymys 18. \"Onko sinulla ollut jotakin seuraavista oireista edelliseen kyselyyn vastaamisen jälkeen? (Mikäli sinulla ei ole ollut kyseistä oiretta / et muista oireitasi, älä vastaa kyseiselle riville)\":
Kenttien yhteenlasketun summan tulee olla pienempi kuin 0" data-validation-mode="0" data-validation-name="numericOptionsSumLessThan">

haju- tai makuaistin muutoksia

Mikäli sinulla oli tämä oire, niin minä päivänä oireet alkoivat? (esimerkiksi 05.05.2020)

_____

Montako päivää oireet kestivät? (Merkitse pelkkä päivien lukumäärän numero, esim. 5)

_____

hengenahdistusta

Mikäli sinulla oli tämä oire, niin minä päivänä oireet alkoivat? (esimerkiksi 05.05.2020)

Montako päivää oireet kestivät? (Merkitse pelkkä päivien lukumäärän numero, esim. 5)

poikkeavaa ihottumaa

Mikäli sinulla oli tämä oire, niin minä päivänä oireet alkoivat? (esimerkiksi 05.05.2020)

Montako päivää oireet kestivät? (Merkitse pelkkä päivien lukumäärän numero, esim. 5)

kuumetta (yli 38,0 C)

Mikäli sinulla oli tämä oire, niin minä päivänä oireet alkoivat? (esimerkiksi 05.05.2020)

Montako päivää oireet kestivät? (Merkitse pelkkä päivien lukumäärän numero, esim. 5)

kurkkukipua

Mikäli sinulla oli tämä oire, niin minä päivänä oireet alkoivat? (esimerkiksi 05.05.2020)

Montako päivää oireet kestivät? (Merkitse pelkkä päivien lukumäärän numero, esim. 5)

lihaskipuja, jotka eivät johdu esimerkiksi urheilusta

Mikäli sinulla oli tämä oire, niin minä päivänä oireet alkoivat? (esimerkiksi 05.05.2020)

Montako päivää oireet kestivät? (Merkitse pelkkä päivien lukumäärän numero, esim. 5)

nuhaa

Mikäli sinulla oli tämä oire, niin minä päivänä oireet alkoivat? (esimerkiksi 05.05.2020)

Montako päivää oireet kestivät? (Merkitse pelkkä päivien lukumäärän numero, esim. 5)

pahoinvointia

Mikäli sinulla oli tämä oire, niin minä päivänä oireet alkoivat? (esimerkiksi 05.05.2020)

Montako päivää oireet kestivät? (Merkitse pelkkä päivien lukumäärän numero, esim. 5)

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poikkeavaa ihottumaa

Mikäli sinulla oli tämä oire, niin minä päivänä oireet alkoivat? (esimerkiksi 05.05.2020)

Montako päivää oireet kestivät? (Merkitse pelkkä päivien lukumäärän numero, esim. 5)

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päänsärkyä, joka ei selkeästi ole lihasperäistä tai migreeniä

Mikäli sinulla oli tämä oire, niin minä päivänä oireet alkoivat? (esimerkiksi 05.05.2020)

Montako päivää oireet kestivät? (Merkitse pelkkä päivien lukumäärän numero, esim. 5)

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rintakipua

Mikäli sinulla oli tämä oire, niin minä päivänä oireet alkoivat? (esimerkiksi 05.05.2020)

Montako päivää oireet kestivät? (Merkitse pelkkä päivien lukumäärän numero, esim. 5)

---

ripulia

Mikäli sinulla oli tämä oire, niin minä päivänä oireet alkoivat? (esimerkiksi 05.05.2020)

Montako päivää oireet kestivät? (Merkitse pelkkä päivien lukumäärän numero, esim. 5)

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ruokahaluttomuutta

Mikäli sinulla oli tämä oire, niin minä päivänä oireet alkoivat? (esimerkiksi 05.05.2020)

Montako päivää oireet kestivät? (Merkitse pelkkä päivien lukumäärän numero, esim. 5)

---

vatsakipua

**Mikäli sinulla oli tämä oire,
niin minä päivänä oireet alkoivat?
(esimerkiksi 05.05.2020)**

_____

**Montako päivää oireet kestivät?
(Merkitse pelkkä päivien lukumäärän
numero, esim. 5)**

_____

yleistilan selkeää huononemista

**Mikäli sinulla oli tämä oire,
niin minä päivänä oireet alkoivat?
(esimerkiksi 05.05.2020)**

_____

**Montako päivää oireet kestivät?
(Merkitse pelkkä päivien lukumäärän
numero, esim. 5)**

_____

yskää

**Mikäli sinulla oli tämä oire,
niin minä päivänä oireet alkoivat?
(esimerkiksi 05.05.2020)**

_____

**Montako päivää oireet kestivät?
(Merkitse pelkkä päivien lukumäärän
numero, esim. 5)**

_____

Mikäli vastasit, että sinulla on edelleen oireita niin soitathan työterveyshuoltoon tai kuntasi koronaneuvontaan tai päivystysaikana numeroon 116 117, mik

19. Oletko ollut oireiden vuoksi

- ◯ sairauslomalla
- ◯ käynyt lääkärissä arviossa terveysasemalla/yksityisella toimijalla ja ohjautunut takaisin kotiin
- ◯ käynyt sairaalan päivystyksessa ja ohjautunut takaisin kotiin
- ◯ sairaalahoidossa osastolla
- ◯ tehohoidossa
- ◯ en missään yllä olevassa

20. Haluatko vielä kertoa muuta voinnistasi?

Helsingin kaupunki

HELSINKI: Seurantakysely
tutkittavan hyvinvointi ja oireet (täytetään n. kuukauden välein)

1. Tutkimusnumeroni:

Henkilökohtaisen tutkimusnumerosi löydät tutkimukseen ilmoittautuessasi, osoitteesta covid19tutkimus@hus.fi saamastasi sähköpostista. Mikäli et muista tutkimusnumeroasi voit lähettää viestiä tutkimushoitajalle osoitteeseen covid19tutkimus@hus.fi tai soittaa numeroon 045 275 4442.

HUOM! Olemme saaneet joitakin ilmoituksia, että kysely toimii huonommin Internet Explorer-selaimella. Linkin voi kopioida yläpalkista Chromeen, joka on toiminut paremmin.

* _____

2. Oletko saanut koronarokotteen edellisen kyselyn jälkeen?

- ◯ Kyllä
- ◯ Ei

5. COVID-infektio ja altistukset (*koskee aikaa edellisen kyselyn jälkeen, aimmissa kyselyissä ilmoitettuja altistumisia ja sairastumisia EI tarvitse ilmoittaa uudestaan*)

- ☐ **Minulla on epäilty COVID-19-infektiota. Milloin (pp.kk.vv) voit lisätä useita** _____
- ☐ **Minulla on todettu COVID-infektio. Milloin (pp.kk.vv), voit lisätä useita** _____
- ☐ **Minulta on otettu positiivinen COVID-19 PCR-näyte. Milloin (pp.kk.vv), voit lisätä useita** _____
- ☐ **Minulta on otettu negatiivinen COVID-19-PCR-näyte. Milloin (pp.kk.vv), voit lisätä useita** _____
- ☐ Olen matkustanut ulkomaille edellisen kyselyn jälkeen. Minne ja milloin? (voit mainita useita kohteita ja ajanjaksoja) _____
- ☐ Olen joutunut karanteeniin infektiolääkärin määräämänä työperäisen altistuksen takia. Milloin (pp.kk.-pp.kk.vv)? _____
- ☐ Olen joutunut karanteeniin infektiolääkärin määräämänä vapaa-ajan altistuksen takia. Milloin (pp.kk-pp.kk.vv)? _____
- ☐ Samassa taloudessa asuvalla on todettu positiivinen COVID-19-PCR-näyte. Milloin (pp.kk.vv)? _____
- ☐ Olen saanut koronavilkussa altistusilmoituksen? Milloin (pp.kk.vv)? _____

6. Onko sinulle tehty edellisen kyselyn jälkeen COVID-19 vasta-ainetutkimus (verikoe)?

- ◯ Kyllä, negatiivinen
- ◯ Kyllä, positiivinen
- ◯ Kyllä, mutta tulos ei ole tiedossa
- ◯ Ei

12.
Oletko edellisen kyselyn jälkeen saanut mitään koronaan viittaavia oireita?

- ◯ Kyllä
- ◯ En

13. Onko sinulla ollut jotakin seuraavista oireista edellisen kyselyn jälkeen? (Mikäli ei ole kyseistä oiretta / et muista oireitasi, älä vastaa kyseiselle riville)

Kysymys 13. \"Onko sinulla ollut jotakin seuraavista oireista edellisen kyselyn jälkeen? (Mikäli ei ole kyseistä oiretta / et muista oireitasi, älä vastaa kyseiselle riville)\": Kenttien yhteenlasketun summan tulee olla pienempi kuin 0" data-validation-mode="0" data-validation-name="numericOptionsSumLessThan">

haju- tai makuaistin muutoksia

Mikäli sinulla oli tämä oire, niin minä päivänä oireet alkoivat? (esimerkiksi 05.05.2020)

_____

Montako päivää oireet kestivät? (Merkitse pelkkä päivien lukumäärän numero, esim. 5)

_____

hengenahdistusta

Mikäli sinulla oli tämä oire, niin minä päivänä oireet alkoivat? (esimerkiksi 05.05.2020)

_____

Montako päivää oireet kestivät? (Merkitse pelkkä päivien lukumäärän numero, esim. 5)

_____

poikkeavaa ihottumaa

Mikäli sinulla oli tämä oire, niin minä päivänä oireet alkoivat? (esimerkiksi 05.05.2020)

_____

Montako päivää oireet kestivät? (Merkitse pelkkä päivien lukumäärän numero, esim. 5)

_____

kuumetta (yli 38,0 C)

Mikäli sinulla oli tämä oire, niin minä päivänä oireet alkoivat? (esimerkiksi 05.05.2020)

_____

Montako päivää oireet kestivät? (Merkitse pelkkä päivien lukumäärän numero, esim. 5)

_____

kurkkukipua

Mikäli sinulla oli tämä oire, niin minä päivänä oireet alkoivat? (esimerkiksi 05.05.2020)

_____

Montako päivää oireet kestivät? (Merkitse pelkkä päivien lukumäärän numero, esim. 5)

_____

lihaskipuja, jotka eivät johdu esimerkiksi urheilusta

Mikäli sinulla oli tämä oire, niin minä päivänä oireet alkoivat? (esimerkiksi 05.05.2020)

_____

Montako päivää oireet kestivät? (Merkitse pelkkä päivien lukumäärän numero, esim. 5)

_____

nuhaa

Mikäli sinulla oli tämä oire, niin minä päivänä oireet alkoivat? (esimerkiksi 05.05.2020)

_____

Montako päivää oireet kestivät? (Merkitse pelkkä päivien lukumäärän numero, esim. 5)

_____

Mikäli vastasit, että sinulla on edelleen oireita ja sinusta EI ole otettu koronanäytettä niin varaathan ajan koronabotista tai soitathan työterveyshuoltoon tai kuntasi koronane

14. Oletko ollut oireiden vuoksi (voit valita useita)

- [ ] puhelin/etäkontaktissa terveydenhuoltoon
- [ ] sairaslomalla
- [ ] käynyt lääkärillä arviossa terveysasemalla/yksityisellä toimijalla ja ohjautunut takaisin kotiin
- [ ] käynyt sairaalan päivystyksessä ja ohjautunut takaisin kotiin
- [ ] osastohoidossa
- [ ] tehohoidossa
- [ ] en missään yllä olevista

17. Covid-19-potilaiden hoitaminen

	Kyllä	Ei	En osaa sanoa
Olen hoitanut edellisen kyselyn jälkeen työssäni covid-19-infektioon sairastuneita potilaita	◯	◯	◯
Olen edellisen kyselyn jälkeen työskennellyt kohortoidulla covid-19-infektio-osastolla tai covid-19-päivystyksessä	◯	◯	◯
Olen edellisen kyselyn jälkeen hoitanut työssäni sekä covid-19-infektioon sairastuneita potilaita että muita potilaita	◯	◯	◯
Olen edellisen kyselyn jälkeen hoitanut työssäni potilaita, joilla on covidiin sopivia oireita, mutta infektio ei ole varmistunut	◯	◯	◯
Olen edellisen kyselyn jälkeen hoitanut oireetonta covid-potilasta, jonka infektio on varmistunut vasta myöhemmin	◯	◯	◯
Olen edellisen kyselyn jälkeen hoitanut työssäni vain potilaita, joilla ei ole covid-19-infektioon viittaavia oireita	◯	◯	◯

Kirurginen suu-nenäsuojain FFP2 FFP3

18. Suojaus EDELLISEN KYSELYN JÄLKEEN: (suositeltu suojavarustus sisältää: suojalasit tai kasvot peittävä visiiri, pitkähihainen suojatakki, suojakäsineet, muovir vastausvaihtoehdot avattu alla ja ne ovat joka kohdassa samat:

a) ei suojausta
b) kirurgista suu-nenäsuojusta
c) kirurgista suu-nenäsuojusta, mutta suositeltua vähäisempää suojavarustusta
d) kirurgista suu-nenäsuojusta ja suositeltua suojavarustusta
e) FFP2/3-hengityssuojainta, mutta suositeltua vähäisempää suojavarustusta
f) FFP2-hengityssuojainta ja suositeltua suojavarustusta
g) FFP3-hengityssuojainta ja suositeltua suojavarustusta
h) Raitisilmakypärää (PAPR) ja suositeltua suojavarustusta
i) en tee kyseisiä toimenpiteitä/ hoida kyseisiä potilaita

	a)	b)	c)	d)	e)
Käytän työssäni oireettomien (ei covid-19-epäilyjen) potilaiden kanssa vähintään:	◯	◯	◯	◯	◯
Käytän työssäni infektiopotilaiden kanssa vähintään:	◯	◯	◯	◯	◯
Käytän työssäni epäiltyjen covid-potilaiden kanssa vähintään:	◯	◯	◯	◯	◯
Käytän työssäni varmennettujen covid-19-potilaiden kanssa vähintään:	◯	◯	◯	◯	◯
Käytän työssäni aerosolia* tuottavissa toimenpiteissä ei-infektiopotilaiden kanssa vähintään:	◯	◯	◯	◯	◯
Käytän työssäni aerosolia* tuottavissa toimenpiteissä infektiopotilaiden kanssa vähintään:	◯	◯	◯	◯	◯
Käytän työssäni aerosolia* tuottavissa toimenpiteissä todennäköisten tai tunnettujen covid-19-potilaiden kanssa vähintään:	◯	◯	◯	◯	◯
Käytän covid-19 potilaiden PCR-näytteenotossa vähintään:	◯	◯	◯	◯	◯

*Aerosolitoimenpiteet ensimmäisen aallon aikaisen ohjeistuksen mukaisesti: Liman avoin imu hengitysteistä (sisältää trakeostomian hoidon), nebulisaattorihoito, bronkoskopia, laryngoskopia, intubaatio, ekstubaatio, noninvasiivinen ventilaatio esim. jatkuva positiivinen ilmatiepainehoito (CPAP) ja kaksoispaineventilaatio (BiPAP), suurivirtauksinen happihoito, resuskitaatio ennen intubaatiota, ruumiinavaus, ylämahasuolikanavan tähystystutkimukset, suu-, nenä- ja korvakirurgia, kasvokirurgia, aerosolia tuottavat hammastoimenpiteet, kuten turbiiniporan ja ultraäänen käyttö.

19. Muuta, mitä haluat kertoa:

20. Koetko henkisen hyvinvointisi edellisen kyselyn jälkeisellä ajanjaksolla

- ◯ Erittäin hyväksi
- ◯ Merkittävästi normaalia paremmaksi
- ◯ Normaalia paremmaksi
- ◯ Normaaliksi
- ◯ Normaalia huonommaksi
- ◯ Merkittävästi normaalia huonommaksi
- ◯ Erittäin huonoksi

21. Olen palautunut töistäni normaalisti vapaapäivieni aikana edellisen kyselyn jälkeen?

- ◯ Kyllä
- ◯ Ei
- ◯ Osittain
- ◯ En osaa sanoa

22. Olen voinut pitää suunnitellut lomat edellisen kyselyn jälkeen normaalisti?

- ◯ Kyllä
- ◯ Ei

23. Jos olen ollut lomalla, koen palautuvani normaalisti?

- ◯ Kyllä
- ◯ Ei
- ◯ Osittain
- ◯ En osaa sanoa

24. Työmäärä edellisen kyselyn jälkeen

	lisääntynyt	pysynyt samana	vähentynyt
Viikkotuntimääräni on	◯	◯	◯
Työpäivien kuormittavuus on	◯	◯	◯

25. Olen harrastanut edellisen kyselyn jälkeen sykettä kohottavaa ja/tai hengästyttävää liikuntaa viikossa yhteensä keskimäärin (tavallisena viikkona):

- ◯ en lainkaan
- ◯ vähemmän kuin 1h 15min
- ◯ 1h 15min - 2h 30min
- ◯ enemmän kuin 2h 30min

26. Olen harrastanut edellisen kyselyn jälkeen lihaskuntoa ja liikehallintaa harjoittavaa liikuntaa viikossa yhteensä keskimäärin (tavallisena viikkona):

- ◯ en lainkaan
- ◯ yhden kerran viikossa
- ◯ kaksi kertaa viikossa
- ◯ useammin kuin kaksi kertaa viikossa

27. Avun hakeminen ja saaminen edellisen kyselyn jälkeen

	Kyllä	Ei	En osaa sanoa
Olen hakenut henkiseen hyvinvointiin tukea ammattilaiselta	◯	◯	◯
Henkisen tuen tarpeeni on lisääntynyt	◯	◯	◯
Olen saanut tukea henkiseen hyvinvointiin ammattilaiselta (psykologi/psykiatri)	◯	◯	◯
Olen hyötynyt saamastani ammattilaisen tuesta	◯	◯	◯
Olen saanut ammattilaisen tukea henkiseen hyvinvointiini jo ennen epidemiaa	◯	◯	◯
Olen saanut lääkkeellistä hoitoa henkiseen hyvinvointiini	◯	◯	◯
Olen hyötynyt saamastani lääkkeellisestä hoidosta	◯	◯	◯
Olen saanut lääkkeellistä hoitoa henkiseen hyvinvointiini jo ennen epidemiaa	◯	◯	◯
Työpaikallani on järjestetty purkukeskustelutilaisuuksia (debriefing) covid-19-tilanteeseen liittyen	◯	◯	◯
Olen saanut tukea henkiseen jaksamiseen kokeneemmalta kollegalta	◯	◯	◯
Olen saanut työnohjausta	◯	◯	◯
Olen saanut muuta tukea työpaikalla	◯	◯	◯
Koen työpaikalla saamani tuen riittäväksi	◯	◯	◯
Haluaisin lisää tukea työpaikallani henkiseen hyvinvointiini	◯	◯	◯

28. Onko sinulla ollut seuraavia oireita edellisen kyselyn jälkeen? (voit valita useita)
HUOM! Jos sinulla ei ole ollut mitään oireita riittää kun vastaat viimeisen kohdan:

	Harvoin tai ei koskaan	Joskus	Melko usein	Lähes koko ajan
toistuvia, ahdistavia muistikuvia työpaikalta	◯	◯	◯	◯
työpaikkaan liittyviä painajaisia	◯	◯	◯	◯
takaumia tai toistumiskokemuksia	◯	◯	◯	◯
voimakasta ahdistuneisuutta työpaikkaan liittyen	◯	◯	◯	◯
traumasta muistuttavien asioiden, kuten töihin menon, välttely	◯	◯	◯	◯
fyysisiä reaktioita epidemian aikana koetuista tilanteista muistuttaviin ärsykkeisiin	◯	◯	◯	◯
vaikeuksia muistaa tapahtumia	◯	◯	◯	◯
mielihyvän ja mielenkiinnon laskua, tulevaisuuden näkymien kaventumista	◯	◯	◯	◯
nukahtamis- tai unessapysymisvaikeutta	◯	◯	◯	◯
ärtyneisyyttä tai vihanpurkauksia	◯	◯	◯	◯
keskittymisvaikeutta	◯	◯	◯	◯
korostunutta varuillaan oloa	◯	◯	◯	◯
motorista levottomuutta	◯	◯	◯	◯
somaattisia oireita: mm. sydämen tykytys, vapina, huimaus, hikoilu, vatsatuntemukset	◯	◯	◯	◯
ahdistusta	◯	◯	◯	◯
pelkoa	◯	◯	◯	◯
harhaluulot	◯	◯	◯	◯
jatkuvaa jännittyneisyyttä, joka ilmenee mm. lihassärkyinä	◯	◯	◯	◯
masentunutta mielialaa	◯	◯	◯	◯
uupumusta/väsymystä	◯	◯	◯	◯
itseluottamuksen menetystä	◯	◯	◯	◯
kohtuutonta itsekritiikkiä tai perusteetonta syyllisyyden tuntoa	◯	◯	◯	◯
kuolemaan tai itsetuhoon liittyviä ajatuksia tai käytöstä	◯	◯	◯	◯
aloitekyvyttömyyttä	◯	◯	◯	◯
ruokahalun tai painon muutoksia	◯	◯	◯	◯
psykomotorista hidastuneisuutta	◯	◯	◯	◯
ei mitään yllä olevista (vastaa vain tähän "harvoin tai ei koskaan", mikäli sinulla ei ole ollut yo. oireita)	◯	◯	◯	◯

Jos huomaat, että sinulla on runsaasti psyykkistä kuormitusta, otathan yhteyttä työterveyshuoltoon (Helsingin kaupunki **09 310 54100**), omalle terveysasemallesi tai kolmannen sektorin toimijoihin (esimerkiksi Nyyti ry 0102357520).

29. Haluatko vielä kertoa muuta voinnistasi? Millaisin keinoin olet itsenäisesti pyrkinyt helpottamaan mahdollisen lisääntyneen kuormituksen aiheuttamia oireita, ja oletko kokenut näistä keinoista/asioista/toiminnoista olevan sinulle apua?

Impact of the Covid-19 epidemic on the health and wellbeing of social and healthcare workers

1. My research number:

You can find your personal research number in the e-mail you received at covid19tutkimus@hus.fi. If you cannot remember your research number, please send a message to the research nurse at covid19tutkimus@hus.fi or by calling 045 275 4442.

2. Gender:

- Man
- Woman

3. Do you belong to a risk group for covid-19 infection according to the THL (Finnish Institue of Health and Welfare)? (you can choose several)

- Age over 70 years
- Severe heart disease
- Lung disease with poor therapeutic balance
- Diabetes with organ damage
- Chronic hepatic or renal insufficiency
- A disease that weakens the immune system, such as cancer
- Medications that weakens the immune system, such as high-dose cortisone treatment
- I do not belong to risk groups

4. Are you pregnant?

- Yes
- No

5. Do you smoke?

- Yes, cigarette(s) / day _____
- No
- Quitted smoking, what year? _____

6. Do you use alcohol?

- Yes, units / week _____
- No

7. Height and weight?

- Length (cm) _____
- Weight (kg) _____

8. Do you have regular medication?

- Yes
- No

9. How do you live?

- Alone
- With another person
- With two other people
- With three other people

10. COVID infection and exposures

- I have had a suspected COVID-19 infection. When (dd.mm.yy)? _____
- A positive COVID-19 PCR sample has been taken from me. When (dd.mm.yy)? _____
- A negative COVID-19 PCR sample has been taken from me. When (dd.mm.yy)? _____
- I have traveled abroad since 1.1.2020. Where and when? _____
- I have been quarantined by an infectious diseases doctor due to occupational exposure. When (dd.mm.yy)? _____
- I have been quarantined by an infectious diseases doctor due to recreational exposure. When (dd.mm.yy)? _____

11. Was the infection traced

- Work-related
- For leisure
- Unclear

12. Due to your symptoms have you (you can choose several)

- Called/ had remote contact for healthcare
- Been on sick leave
- Visited a doctor at a health center / private practitioner and been referred back home
- Visited the hospital emergency room and been referred back home
- Been in ward care
- Been in intensive care
- None of the above

13. Have you had a COVID-19 antibody test (blood test)?

- Yes, negative
- Yes, positive
- Yes, but the result is unknown
- No

14. Where have you worked during the epidemic? You can select several.

- Appointment clinic
- Assistive service
- Housing services
- Outpatient care (other)
- Vocal rehabilitation
- A separate cohort covid-19 ward
- A separate cohort infectious diseases health center
- Epidemiological unit
- Dental care
- Dental care for people at risk
- Dental emergency
- Rehabilitation
- Home care
- Home service
- Home hospital
- School health care
- Imaging
- Institutional rehabilitation
- Surgery department
- Mental health services
- Youth station
- Sampling or laboratory
- Counseling
- Telephone service
- Service center
- Service point
- Substance abuse services
- Acute care
- Day department
- Day activities
- Group home
- Social counseling
- As a researcher / administration / other non-patient work
- Intensive care unit
- Ward
- Other ward care
- Other, where _____

15. Do you telecommute? How big a part of your weekly working hours?

- 0%
- 20%
- 40%
- 60%
- 80%
- 100%

16. Treating of Covid-19 patients

- I have treated / I treat patients with covid19 infection in my work (Yes / No / I can't say)
- I work / worked in a cohort covid-19 infection ward or covid-19 emergency room

(Yes / No / I can't say)

- In my work, I treat / treat both patients with covid19 infection and other patients

(Yes / No / I can't say)

- I treat patients with covid19-like symptoms, but the infection is not confirmed.

(Yes / No / I can't say)

- I only treat patients with symptoms suggestive of covid-19 infection. (Yes / No / I can't say)

17. Instructions for use of personal protective equipment (PPE):

- My employer has given me instructions (written, oral or video) on wearing PPE (Yes / No)
- I have been able to practice wearing and removing PPE under supervision (Yes / No)
- I can donn/doff PPE correctly (Yes / No)
- The instructions I received on the use of PPE in different patient contacts have been non-uniform (Yes / No)

18. Access to personal protective equipment (PPE)(you can choose several):

- I have always received PPE in accordance with the current instructions
- The available PPE has sometimes been insufficient when compared to the employer's current PPE guidelines
- I have sometimes had to work completely without PPE
- I have had to reuse a surgical mask or FFP2 / 3 respirator

19. How would you prescribe your mental wellbeing at the moment?

- Very good
- Significantly better than normal
- Better than normal
- Normal
- Worse than normal
- Significantly worse than normal

- Very low

20. Have you recovered from my work normally during your holidays also during the covid-19?

- Yes
- No
- In part
- I can't say

21. Have you been able to take planned vacations normally?

- Yes
- No

22. If you have been on vacation, did you feel like you are recovering normally?

- Yes
- No
- In part
- I can't say

23. Workload

- My weekly working hours have (Increased / Stayed the same / Decreased)
- The workload of my working days has (Increased / Remained the same / Decreased)

24. Employer

- HUS
- Kymsote
- Other, what? _____

25. Age

- 18-29
- 30-39
- 40-49
- 50-59
- 60-69
- over 70 years

26. Where do you currently work primarily?

- Ward
- Appointment clinic
- Acute care
- Intensive care unit
- A separate cohort covid-19 compartment
- Imaging
- Sampling or laboratory
- As a researcher / in administration / other non-patient work
- Surgery department
- First aid

27. Where did you work during the first epidemic peak (3-5 / 2020)?

- Ward
- Appointment clinic
- Acute care
- Intensive care unit
- A separate cohort covid-19 compartment
- Imaging
- Sampling or laboratory
- As a researcher / in administration / other non-patient work
- Surgery department
- First aid