A study to develop a quarantine guideline for medical and public health personnel who have been exposed to COVID-19

Submitted to: World Health Organization (WHO) Thailand Country Office

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Version: 26 June 2020

1. Background and rationale

The coronavirus disease 2019 (COVID-19) is a pandemic respiratory infectious disease caused by the SARS-CoV-2 which was first identified in the Chinese city of Wuhan in December 2019 (1). There are now more than a million confirmed cases of the disease across the world (2) and COVID-19 has been designated as a pandemic by the World Health Organization (WHO). As of 4 April 2020, Thailand has a total of 2,067 confirmed cases, with more than 24,474 Patients Under Investigation (PUI) (3).

In Thailand, the case definition for PUI has been continuingly modified over time, especially for health care workers (HCW). The current version (as of 1 May 2020), HCWs with one of the respiratory symptom (cough, runny nose, sore throat, loss of smell (anosmia), shortness of breath, dyspnoea, OR history of fever OR body temperature of ≥37.5 OR pneumonia) AND suspected to contract SAR-CoV-2 (determine by other medical professionals) OR contact COVID-19 confirmed cases OR contact suspect COVID-19 patient are identified as PUI. Also, if there is a cluster of respiratory infection (within a workplace & within a week) for more than 5 people, they will be identified as PUI cluster as well.

As a routine surveillance system in Thailand, HCWs who has been identified as PUI will be assessed by the Thai Joint Investigation Team (JIT)—a part of Surveillance and Rapid Response

Team (SRRT)—using "Patients investigation form for coronavirus disease 2019: the case of health workers". HCWs will receive a test for diagnosis of COVID-19 when met the PUI criteria.

In Thailand, the current gold standard for the diagnosis of COVID-19 is nucleic-acid amplification test (NAAT) by real-time reverse-transcription polymerase chain reaction (RT-PCR) or real-time RT-PCR. RT-PCR tests to confirm COVID-19 positive cases were based on the RNA-dependent RNA polymerase (RdRp) gene of the ORF1ab sequence and N gene of the SARS-CoV-2 genome with the following criteria (4):

1) an absence of the two genes (2 negative positions) meaning no infection with SARS-CoV-2;
2) a presence of the two genes (2 positive positions) meaning infection with SARS-CoV-2; or
3) Conflicting results from the two genes, consider the 3rd position.

The rapidly increasing number of cases puts significant stress on the health system. HCWs who are at the frontline responding to the crisis are particularly susceptible to this highly transmissible infection, given their long and close exposure to infected persons. The incubation period for SAR-CoV-2 virus ranged between 2 to 7 days (5-9) (see details in **Table 1**). However, there are 18% to 40% of the COVID-19 patients are asymptomatic (10, 11).

Table 1 The average incubation period in COVID-19 patients.

Study	Number of COVID-19 cases	Mean, 95%CI (days)	95th percentile, 95%CI (days)	Sources
Linton *et al*., 2020	158	5.6 (5.0 to 6.3)	10.8 (9.3 to 12.9)	(5)
Li *et al*., 2020	10	5.2 (4.1 to 7.0)	12.5 (9.2 to 18)	(6)
Backer *et al*., 2020	88	6.4 (5.6 to 7.7)	10.3 (8.6 to 14.1)	(7)
Lauer *et al*., 2020	181	5.1* (4.5 to 5.8)	11.5 (8.2 to 15.6)**	(8)
Leung *et al*., 2020	175 travellers to Hubei	1.8 (1.0 to 2.7)	3.2 (1.0 to 3.8)	(9)
	175 non-travellers	7.2 (6.1 to 8.4)	14.6 (12.1 to 17.1)	

* Median ** 97.5 percentile

As per existing international guidelines, those who are exposed to the virus (through contact with an infected patient) would need to self-quarantine for 14 days (12, 13), by which time a

majority of the HCWs would have displayed symptoms. This 14-day quarantine period is meant to keep the society safe as COVID-19 cases could be asymptomatic. Such persons can become carriers of the virus, and can infect others unknowingly. Applying this guideline to HCWs would, however, render a large proportion of them unavailable to support the patients in health care facilities on a regular basis. Decision makers are in need of information in order to appropriately determine a quarantine guideline and policy for medical and public health personnel, while maximizing the patient's safety and ensuring continuous provision of services to our society.

2. Objectives

The primary objective of this study is to develop a guideline for quarantining HCWs who have been exposed to COVID-19.

The secondary objectives are:

1. To estimate the proportion of HCWs with COVID-19 by nucleic-acid amplification test (NAAT) within the quarantine period and the difference in proportions of HCWs with COVID-19 by NAAT at day 5, 10 and 14 of the quarantine period.
2. To descriptively report the incubation period (from the date of exposure to COVID-19 source case to when the symptom fist appear (symptomatic case) or to when the NAAT is positive (asymptomatic case).
3. To estimate the proportion of asymptomatic COVID-19 among those HCWs with COVID-19

3. Framework

The development of a guideline for quarantining HCWs who have been exposed to COVID-19 rely on four important information namely, the proportion of HCWs became positive during the quarantine period, the proportion of asymptomatic cases, the incubation period and the risk of being infected. The proportion of HCWs became positive during the quarantine period and the proportion of asymptomatic cases will help to guide the number of days required for quarantine and re-test time interval. For the latter two information, it will be used to inform which type of HCWs (with what risk) should be continuously monitored. **Figure 1** shows the conceptual framework of this research.

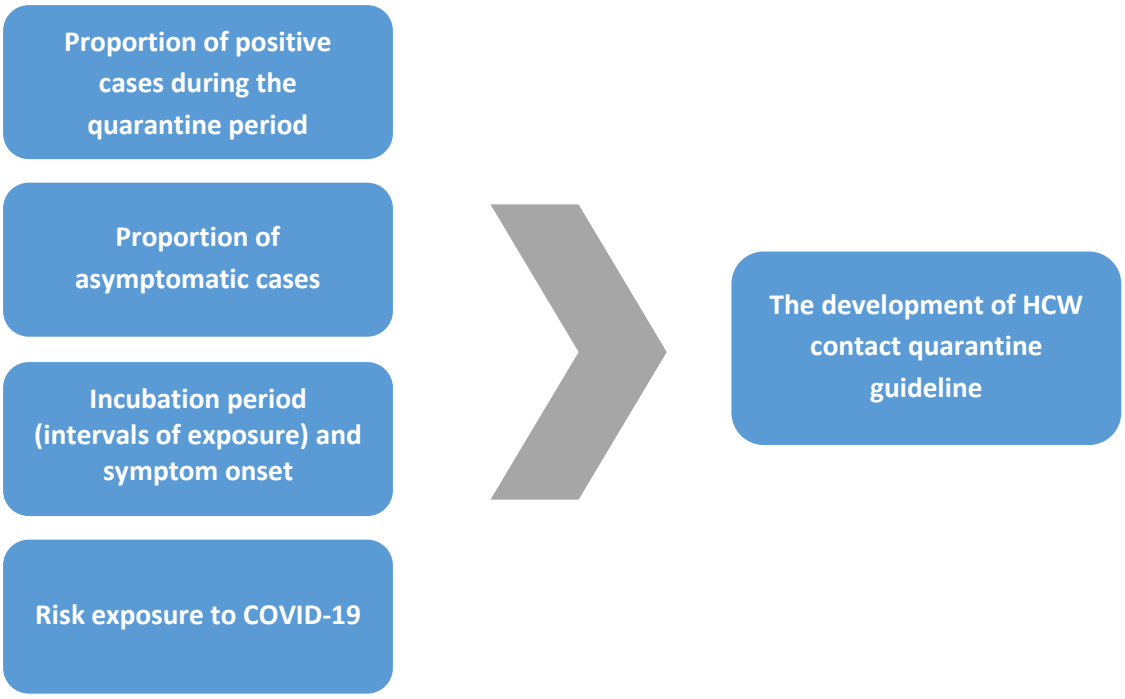


Figure 1 Conceptual framework

4. Methods

This is a prospective cohort study to identify the incidence of COVID-19 among health care workers who had been in contact with COVID-19 suspected/confirmed cases, with initial PCR test is negative and being in a 14-day quarantine period (see population section).

Study population

The inclusion criteria were HCWs aged over 18 years old who have been identified as HCWs in which a patient with laboratory-confirmed COVID-19 infection or COVID-19 suspected patient is receiving care. In this study, we will refer to these HCWs 'HCWs contact'. Following the initial routine test (Nucleic acid amplification tests, RT-PCR), if the result is PCR negative 'HCWs contact' with or without any respiratory symptoms and works in a health care facility will be included for this study. The definition of health care workers (HCW) in this study defined as any member of staff in the health care facility involved in the provision of care for COVID-19 or suspected COVID-19 patient. This will include health care professionals, allied health workers and auxiliary health workers.

The exclusion criteria will be HCWs contact who has PCR positive at day 0 (both true positive and false positive) and those who do not provide inform consent.

Sampling methodology

All possible HCWs contact from all level of health care facility (including private hospitals) will be contacted by research team due to the low number of outbreak of COVID-19 in Thailand. In the case where there are more possible HCWs contact, samples will be stratified by risk of COVID-19 infection (High/ Low) using the proper use of PPE in health facility as a proxy.

Sample size calculation

The sample size calculation was determined based on formula (14, 15)

$$n = \frac{Np(1-p)z^2_{1-\alpha/2}}{d^2(N-1)+p(1-p)z^2_{1-\alpha/2}}$$

where n = sample size

p = proportion of HCWs contact with COVID-19

N = Population

$z^2_{1-\alpha/2}$ = level of statistical significance

d = precision of estimate

To estimate the population proportion, when the population is 1,000, the precision of estimates of 0.05 at the confidence level of 99%, and the sample proportion of 50% (maximum number of sample size calculation), the sample size calculation are 400.

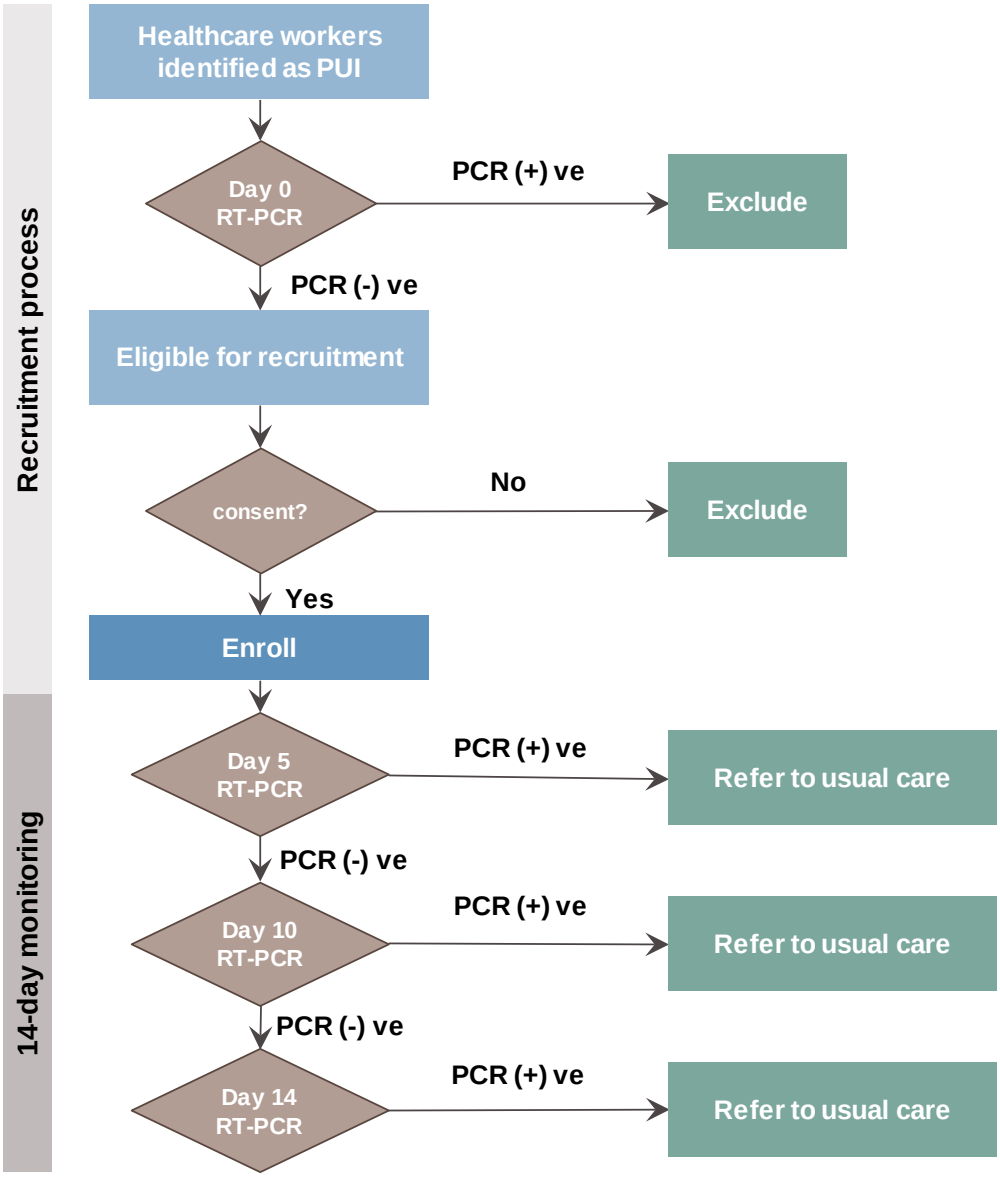
Research site

The research site will be the Institute of Medical Biosciences, Department of Medical Sciences, Ministry of Public Health and Health Intervention and Technology Assessment Program.

Study procedure

In total, 400 HCWs contact will be invited to the study after their initial routine test for COVID-19 is negative, and they are willing to participate (see **Figure 1**). Researcher will contact the

eligible HCWs, informed them about this research (**Appendix 2**) and ask for consents (**Appendix 3**).



Note: All HCWs contact will be evaluated according to the current investigations protocols and forms of the Department of Disease Control, Ministry of Public Health, Thailand. For PCR positive cases, routine data collection will be used for further analysis.

Figure 1 Recruitment process and monitoring process

Data collection

Once consented, participants will be provided with one digital thermometer and three COVID-19 RT-PCR sample collection kits (containing viral transport media, triple packaging system, and ice pack for category B transport requirement). Participants will be invited to a designated hospital to test for COVID-19 antibodies (serum IgA, IgM and IgG) once registered in the study. Participants will be urged to self-monitor their temperature and symptoms every day and report the results through an online questionnaire. Telephone interviews will be conducted to monitor participants' temperature and symptoms in case of missing data. Participants will be asked to carry out nasopharyngeal swab, oropharyngeal swabs and sputum collection early in the morning on days 5 and 10 after recruitment. The samples will be transported (cold chain system) to the research team to reduce movement of staff and the process. Additionally, participants will be invited to a designated hospital for nasopharyngeal swab, oropharyngeal swabs and sputum collection and test for COVID-19 antibodies on day 14. **Table 1** summarizes the research tools for this study.

Table 1 Research tools

Research tools	Day			
	0	**5**	**10**	**14**
Baseline information (Appendix 3)	✔			
Symptoms monitoring (Appendix 4)	✔	✔	✔	✔
Self-monitoring temperature (Appendix 4)	✔	✔	✔	✔
Nasopharyngeal & oropharyngeal swabs*		✔	✔	✔
Early morning sputum*		✔	✔	✔
Nucleic acid amplification tests (NAAT) *		✔	✔	✔
Serum IgA, IgM, and IgG	✔			✔

* monitor until real-time reverse-transcription polymerase chain reaction results are positive

Safety and feasibility of self-swab

Self-collected swab for influenza are found to be acceptable and accurate (16). However, self-collected nasopharyngeal swab can be challenges even taken by healthcare professional. With the scarcity of personal protective equipment, this method has been inconsideration to be used in other counties such as United Kingdom[1] and India (17).

To ensure, the safety and the quality of the procedure, a video tutorial to demonstrate self-swabbing with explanation in Thai will be made prior to any self-collected swab. An alternative of NP swab with other healthcare professional will be offered to participant if they do not wish to conduct self-swab.

Analysis methods and tools

For routine confirmation of COVID-19 cases is based on detection of unique sequences of virus RNA by Nucleic acid amplification tests such as real-time reverse-transcription polymerase chain reaction (rRT-PCR). For monitoring purposed, serum immunoglobulin A G and immunoglobulin M (IgA, IgG, and IgM) will be analyzed by ELISA for antibody against SAR-CoV-2 virus. The specimens will be analyzed by a certified laboratory at the Department of Medical Sciences, with the routine published protocol. Antibody titre of both baseline (Day 0) and the end of quarantine period (Day 14) will be measured. The change in serum level of specific antibodies to COVID-19 virus between the two time periods will be calculated using geometric mean titres.

Descriptive statistics will be used to describe participants' characteristics, incubation period, risk of being infected, clinical symptoms, virological and serological data. The McNemar test will be used to determine if there are differences on the proportion of all binary variables (e.g. PCR+ or -, high or low exposure risk, asymptomatic/symptomatic, etc.). PPE availability, IPC measures, exposure risk, and expected COVID-19 contact outside hospital settings will be used as covariates to observe any possible association between the positive tests and these factors. All analyses will be undertaken using StataMP14.

[1] https://www.youtube.com/watch?v=9WayjX6vCdk

Information on the proportion of HCWs became positive during the quarantine period, the proportion of asymptomatic cases, the incubation period and the risk of being infected will be presented to the Ministry of Public Health Intelligence Unit and medical professional associations to further develop the quarantine guideline.

5. Ethical considerations

Any data collection that involve human is subjected to Ethical Review process in Thailand. Approval from the Institute for the Development of Human Research Protections (IHRP), Ministry of Public Health was obtained prior to any data collection (**Appendix 6**).

Informed consent

Written informed consent will be obtained from all study participant. They will receive the information regarding the background and purpose of the research, details of steps that must be taken or treated, potential benefits, potential risks and discomforts and risk management plan as well as payment/compensation before any data collection. Participants will be informed that the participation of this research is voluntarily and they have the right to withdraw at any given time without provisions of any reason. Refuse to participate or withdrawal from this research will not affect their current or future health care provisions or their professional responsibilities in any way. Participants will receive compensation in total of 2,000 baht, dividing into 1,000 baht for enrollment and 1,000 baht for completion of blood sample. If the participants decide to withdraw from the research before the completion, they will not receive the second payment. The compensation will cover round-trip of up to 20 kilometres of taxi fare (500 baht) and standard compensation for time loss using a half-day meeting remuneration for government officers (500 baht).

Data privacy and confidentiality

Participant confidentiality will be maintained throughout the study period, including the enrollment, consent process, and data collection. A study identification number will be assigned to research participants by the research team for the labelling of questionnaires and clinical specimens. The linking of research identification to individuals will be managed by the investigation team and the information will not be disclosed. In the case where the test results became positive indicating that the participant is infected with COVID-19, the research team

is abiding by the Thai law to inform the Department of Disease Control so the participant can receive medical care promptly and prevent further spread of diseases. Any personal information that would reveal their identity will be kept from the public.

Data protection and anonymized data

All identifiable data that could be linked to any personal information (e.g. encrypted ID) will be stored in a separate file and will be removed from the dataset once the dataset has been merged and cleaned. All electronic data will be stored on the database with protected password access. Any hard copies of data will be kept in a locked cabinet in the Health Intervention and Technology Assessment Program (HITAP), during the data collection period. Any files that contained identifiable data will be marked as confidential. Checked, validated, and cleaned data will be backed up and stored electronically with no link to any personal information. Data will be stored for 5 years after submitting the reports to the funder.

Data storage

For short-term storage, any hard copies of data such as questionnaires and consent form will be kept separately in a locked cabinet at the Health Intervention and Technology Assessment Program (HITAP), during the data collection period. All electronic data will be stored on researchers' computer, with protected password access. All identifiable data that could be linked to any personal information (e.g. contact details) will be stored in a separate file and will be removed from the dataset once the dataset has been merged and cleaned. Any files that contained identifiable data will be marked as confidential and will be encrypted with a protected password to prevent the possibility of data leakage.

For long-term storage, checked, validated and cleaned data will be backed up and stored electronically with no link to any personal information (anonymization data). Data will be stored for 5 years after submitting the reports to the funder.

The storage and destruction of blood sample and swab sample

Sample Storage

Genomics Medicine and Innovation Support Division (GEMIS), Department of Medical Sciences, Ministry of Public Health, Thailand will be responsible for the storage and destruction of all biological specimens.

Any leftover NP swab- and sputum-containing VTM will be transferred to leak-proof 2 ml-collection tube and leftover serum specimen will be transferred to another 2 ml-collection tube, separately. All specimen tube will be appropriately labelled with the study identification number. The collection tubes will be stored in plastic containers in -80°C freezer at GEMIS by the laboratory officer from GEMIS. The specimens will be stored anonymously without any linking information to participants. All leftover specimen will be kept for 14 days for quality control purposes before discard, and it will not be used for any other study.

Sample destruction

Collection tubes of both VTM and serum samples will be put in red trash bag labelled as biohazard waste and sealed properly then decontaminated by autoclave before disposal.

6. Deliverables

The following outputs will be completed as part of this study:

1. Materials for conducting the study (e.g. interview protocol)
2. New guideline for quarantining medical and public health personnel in Thailand

After completion of this project, we will submit a manuscript to an open-access peer-reviewed journal to disseminate the findings of this study.

7. Timeline

The study will be conducted for **6 months** from July 2020 to Dec 2020.

Project Activities	Time Frame (Month)					
	1	2	3	4	5	6
Literature review & statistical analysis plan	←	→				
Ethical clearance		←	→			
Participant recruitment			←	→		
Data collection			←	→	→	
Data management and data cleaning			←	→	→	

Data analysis						
Report and policy brief writing						
Producing and disseminating reports						

8. Research team

Name	Affiliation and contact details	Qualification	Position
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9. References

1. Chan JF, Yuan S, Kok KH, To KK, Chu H, Yang J, et al. A familial cluster of pneumonia associated with the 2019 novel coronavirus indicating person-to-person transmission: a study of a family cluster. Lancet. 2020;395(10223):514-23.

2. Worldometer. Confirmed coronavirus cases and deaths by country, territory, or conveyance 2020 [4 April 2020]. Available from: https://www.worldometers.info/coronavirus/.

3. The Coronavirus Disease 2019 News release: Special Announcement of COVID-19 on 4 April 2020 [press release]. Department of Disease Control, Ministry of Public Health, Thailand 2020.

4. Department of Medical Sciences. Laboratory guidelines for the diagnosis of coronavirus 2019 infection (COVID-19): Ministry of Public Health, Thailand; 2020. Available from: https://ddc.moph.go.th/viralpneumonia/file/guidelines/G37.pdf.

5. Linton NM, Kobayashi T, Yang Y, Hayashi K, Akhmetzhanov AR, Jung SM, et al. Incubation Period and Other Epidemiological Characteristics of 2019 Novel Coronavirus Infections with Right Truncation: A Statistical Analysis of Publicly Available Case Data. J Clin Med. 2020;9(2).

6. Li Q, Guan X, Wu P, Wang X, Zhou L, Tong Y, et al. Early Transmission Dynamics in Wuhan, China, of Novel Coronavirus-Infected Pneumonia. N Engl J Med. 2020;382(13):1199-207.

7. Backer JA, Klinkenberg D, Wallinga J. Incubation period of 2019 novel coronavirus (2019-nCoV) infections among travellers from Wuhan, China, 20-28 January 2020. Euro Surveill. 2020;25(5).

8. Lauer SA, Grantz KH, Bi Q, Jones FK, Zheng Q, Meredith HR, et al. The Incubation Period of Coronavirus Disease 2019 (COVID-19) From Publicly Reported Confirmed Cases: Estimation and Application. Ann Intern Med. 2020.

9. Leung C. The difference in the incubation period of 2019 novel coronavirus (SARS-CoV-2) infection between travelers to Hubei and non-travelers: The need of a longer quarantine period. Infect Control Hosp Epidemiol. 2020:1-8.

10. Mizumoto K, Kagaya K, Zarebski A, Chowell G. Estimating the asymptomatic proportion of coronavirus disease 2019 (COVID-19) cases on board the Diamond Princess cruise ship, Yokohama, Japan, 2020. Euro Surveill. 2020;25(10).

11. Nishiura H, Kobayashi T, Suzuki A, Jung SM, Hayashi K, Kinoshita R, et al. Estimation of the asymptomatic ratio of novel coronavirus infections (COVID-19). Int J Infect Dis. 2020.

12. World Health Organization. Risk assessment and management of exposure of health care workers in the context of COVID-19: interim guidance, 19 March 2020: World Health Organization; 2020. Available from: https://apps.who.int/iris/handle/10665/331496.

13. Centers for Disease Control and Prevention (CDC). Interim U.S. Guidance for Risk Assessment and Public Health Management of Healthcare Personnel with Potential Exposure in a Healthcare Setting to Patients with Coronavirus Disease (COVID-19), 7 March 2020: Centers for Disease Control and Prevention; 2020. Available from: https://www.cdc.gov/coronavirus/2019-ncov/hcp/guidance-risk-assesment-hcp.html.

14. Daniel WW. Biostatistics: A Foundation for Analysis in the Health Sciences, 6th Edition: John Wiley&Sons, Inc.; 1995.

15. Ngamjarus C, Chongsuvivatwong V. n4Studies: Sample size and power calculations for iOS. The Royal Golden Jubilee Ph.D. Program - The Thailand Research Fund&Prince of Songkla University; 2014.

16. Seaman CP, Tran LTT, Cowling BJ, Sullivan SG. Self-collected compared with professional-collected swabbing in the diagnosis of influenza in symptomatic individuals: A meta-analysis and assessment of validity. J Clin Virol. 2019;118:28-35.

17. Bhandary S, Aroor R, Sreesan P, Jittu MV, Bhat V. Self-swabbing in coronavirus pandemic-A game changer which can be introduced in field. Indian J Comm Health. 2020;32(2-Special Issue):309-10.

10. Appendix

Appendix 1 Patients investigation form for coronavirus disease 2019: the case of health workers

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1. General information

1.1 First name and last name…….....1.2 Health conditions …….....…
1.3 Workplace (hospital/clinic) …….....……
1.4 Type of work □ Medical doctor □ Dentist □ Nurse □ Assistant nurse □ Cleaners
□ Admission/reception clerks □ Other, specify: …….....
1.5 Department (Tick all that apply)

□ IPD, specify ……. □ ICU
□ OPD, specify: …….. □ ER
□ OR, specify: ……. □ ARI clinic
□ Cohort ward for COVID-19 patients □ Laboratory clinic
□ Other, specify: ……

1.6 Smoking status □ Yes □ No

2. HCW risk assessment

2.1 Adherence to infection prevention and control (IPC) measures information

1. Have you ever attend infection prevention and control training (IPC training) such as putting on or taking off PPE?	□ Yes, please state the date of your most recent IPC training (dd/mm/yyyy) ___/___/___ and how much □ Less than 2 hours □ More than 2 hours □ No □ Not sure
2. Have you ever attend coronavirus-2019 infection training?	□ Yes, please state the date of your most recent IPC training (dd/mm/yyyy) ___/___/___ and how much □ Less than 2 hours □ More than 2 hours □ No □ Not sure
3. Have you ever received training for nasopharyngeal swab sampling collection	□ Yes □ No □ Not sure
4. Do you follow recommended hand hygiene practices?	□ Always □ Most of the time □ Occasionally □ Rarely
5. Do you use alcohol-based hand rub or soap and water before touching a patient or before cleaning/aseptic procedures?	□ Always □ Most of the time □ Occasionally □ Rarely
6. Do you use alcohol-based hand rub or soap and water after touching a patient or after cleaning/aseptic procedures?	□ Always □ Most of the time □ Occasionally □ Rarely
7. Do you use alcohol-based hand rub or soap and water after touching a patient's surroundings?	□ Always □ Most of the time □ Occasionally □ Rarely
8. Do you follow IPC standard precautions when in contact with any patient?	□ Always □ Most of the time □ Occasionally □ Rarely

	□ I don't know what IPC standard precautions are
9. Do you wear PPE when indicated according to the risk assessment within your workplace?	□ Always, according to the risk assessment □ Most of the time, according to the risk assessment □ Occasionally □ Rarely
10. Is PPE available in sufficient quantity in the health care facility? (PPE includes: medical mask, face shield, gloves, goggles/glasses, gown, coverall, head cover, respirator (for example, N95 or equivalent) and shoe covers)	□ Yes □ No □ Unknown

2.2 Exposures to COVID-19-infected patient or respiratory infection or pneumonia within health care facility

1. Have you had contact with COVID-19-infected patient?
□ Yes □ No □ Not sure

If you answer yes,	**If you answer no or not sure,**
2. Do you know beforehand whether the person you contact is COVID-19-infected patient? □ Yes □ No □ Not sure 2.1 If answer no or not sure, what are the reasons? (Tick all that apply) □ The patient has no risk history □ The patient has risk history but do not notify health care workers before treatment □ Waiting for laboratory confirmation for COVID-19 □ others, please specify ……..…….	2. Have you had contact with **patients with respiratory symptoms such as upper respiratory infection (URI) and pneumonia who have not been confirmed or do not know that they are infected with COVID-19** in health facility? □ Yes □ No □ Not sure
Exposures to COVID-19-infected patient interview	**Exposures to patients with respiratory symptoms such as URI and pneumonia who have not been confirmed or do not know that they are infected with COVID-19**
3. Have you had close contact (< 2 metre) with COVID-19-infected patient? □ ***Yes*** □ ***No*** □ ***Not sure***	***3. Have you had close contact (< 2 metre) with patients with respiratory symptoms such as URI and pneumonia who have not been confirmed or do not know that they are infected with COVID-19*** □ ***Yes*** □ ***No*** □ ***Not sure***
3.1 If you answer yes,	**3.1 If you answer yes,**
3.1.1 How many times (total)?	3.1.1 How many times (total)?

……...…….. times	……...…….. times
3.1.2 For how long each time? □ < 5 minutes □ 5–15 minutes □ > 15 minutes	3.1.2 For how long each time? □ < 5 minutes □ 5–15 minutes □ > 15 minutes
3.1.3 Did you have prolonged face-to-face exposure (> 15 minutes)? □ Yes, please describe activities …….. □ No □ Not sure **3.1.3.1 If yes**, did you wear PPE? □ Yes □ No □ Not sure 3.1.3.1.1 **If you use PPE**, what type? Tick all that apply: □ Cloth mask □ Surgical mask □ N95 or equivalent □ Goggles/glasses □ Face shield □ Gloves □ Gown □ Coverall □ Head cover □ Boots □ Shoe covers 3.1.3.1.2 Did you adapt PPE? □ Yes, what type……..……. □ No □ Not sure 3.1.3.1.3 Did you reuse PPE? □ Yes, what type……..……. □ No □ Not sure 3.1.3.1.4 Did you use tape for mask? □ Yes, to □ Surgical mask □ N95 □ No □ Not sure 3.1.3.1.5 Did you take a shower at the health facility after contact with the patient? □ Always	3.1.3 Did you have prolonged face-to-face exposure (> 15 minutes)? □ Yes, please describe activities …….. □ No □ Not sure **3.1.3.1 If yes**, did you wear PPE? □ Yes □ No □ Not sure 3.1.3.1.1 **If you use PPE**, what type? Tick all that apply: □ Cloth mask □ Surgical mask □ N95 or equivalent □ Goggles/glasses □ Face shield □ Gloves □ Gown □ Coverall □ Head cover □ Boots □ Shoe covers 3.1.3.1.2 Did you adapt PPE? □ Yes, what type……..…….. □ No □ Not sure 3.1.3.1.3 Did you reuse PPE? □ Yes, what type……..…….. □ No □ Not sure 3.1.3.1.4 Did you use tape for mask? □ Yes, to □ Surgical mask □ N95 □ No □ Not sure

□ Most of the time □ Occasionally □ Rarely □ Never If shower, you shower with: □ Soap and water □ Water Did you change your clothes after taking a shower? □ Yes □ No	3.1.3.1.5 Did you take a shower at the health facility after contact with the patient? □ Always □ Most of the time □ Occasionally □ Rarely □ Never If shower, you shower with: □ Soap and water □ Water Did you change your clothes after taking a shower? □ Yes □ No
3.2 If you were wearing gloves, did you remove them after contact with the patient? □ Yes □ No	3.2 If you were wearing gloves, did you remove them after contact with the patient? □ Yes □ No
3.3 Did you perform hand hygiene before touching a patient or cleaning/aseptic procedures? □ Always □ Most of the time □ Occasionally □ Rarely with: □ Alcohol-based hand rub □ Soap and water □ Water	3.3 Did you perform hand hygiene before touching a patient or cleaning/aseptic procedures? □ Always □ Most of the time □ Occasionally □ Rarely with: □ Alcohol-based hand rub □ Soap and water □ Water
3.4 Did you perform hand hygiene after touching a patient or cleaning/aseptic procedures? □ Always □ Most of the time □ Occasionally □ Rarely with: □ Alcohol-based hand rub □ Soap and water □ Water	3.4 Did you perform hand hygiene after touching a patient or cleaning/aseptic procedures? □ Always □ Most of the time □ Occasionally □ Rarely with: □ Alcohol-based hand rub □ Soap and water □ Water
3.5 Were you present for any aerosolizing procedures performed on the patient such as	3.5 Were you present for any aerosolizing procedures performed on the patient such as

nasopharyngeal wash, intubation CPR, bronchoscopy, autopsy, and nebulizer? □ Yes, describe the procedure …… □ No □ Not sure	nasopharyngeal wash, intubation CPR, bronchoscopy, autopsy, and nebulizer? □ Yes, describe the procedure …… □ No □ Not sure
3.5.1 If yes, did you wear PPE? □ Yes □ No □ Not sure	**3.5.1 If yes,** did you wear PPE? □ Yes □ No □ Not sure
3.5.1.1 If you use PPE, what type? Tick all that apply: □ Cloth mask □ Surgical mask □ N95 or equivalent □ Goggles/glasses □ Face shield □ Gloves □ Gown □ Coverall □ Head cover □ Boots □ Shoe covers	**3.5.1.1 If you use PPE**, what type? Tick all that apply: □ Cloth mask □ Surgical mask □ N95 or equivalent □ Goggles/glasses □ Face shield □ Gloves □ Gown □ Coverall □ Head cover □ Boots □ Shoe covers
3.5.1.2 Did you adapt PPE? □ Yes, what type……..…….. □ No □ Not sure	3.5.1.2 Did you adapt PPE? □ Yes, what type……..…….. □ No □ Not sure
3.5.1.3 Did you reuse PPE? □ Yes, what type……..…….. □ No □ Not sure	3.5.1.3 Did you reuse PPE? □ Yes, what type……..…….. □ No □ Not sure
3.5.1.4 Did you use tape for mask? □ Yes, to □ Surgical mask □ N95 □ No □ Not sure	3.5.1.4 Did you use tape for mask? □ Yes, to □ Surgical mask □ N95 □ No □ Not sure
3.5.1.5 Did you take a shower at the health facility after contact with the patient? □ Always □ Most of the time □ Occasionally □ Rarely □ Never If shower, you shower with:	3.5.1.5 Did you take a shower at the health facility after contact with the patient? □ Always □ Most of the time □ Occasionally □ Rarely □ Never If shower, you shower with:

□ Soap and water □ Water Did you change your clothes after taking a shower? □ Yes □ No	□ Soap and water □ Water Did you change your clothes after taking a shower? □ Yes □ No
3.6 Did you come into contact with the patient's body fluids? □ Yes, which body fluids ……..…….. □ No □ Not sure **3.6.1 If yes,** did you wear PPE? □ Yes □ No □ Not sure 3.6.1.1 **If you use PPE**, what type? Tick all that apply: □ Cloth mask □ Surgical mask □ N95 or equivalent □ Goggles/glasses □ Face shield □ Gloves □ Gown □ Coverall □ Head cover □ Boots □ Shoe covers 3.6.1.2 Did you adapt PPE? □ Yes, what type……..…….. □ No □ Not sure 3.1.6.3 Did you reuse PPE? □ Yes, what type……..…….. □ No □ Not sure 3.1.6.4 Did you use tape for mask? □ Yes, to □ Surgical mask □ N95 □ No □ Not sure 3.1.6.5 Did you take a shower at the health facility after contact with the patient? □ Always □ Most of the time □ Occasionally □ Rarely	3.6 Did you come into contact with the patient's body fluids? □ Yes, which body fluids ……..…….. □ No □ Not sure **3.6.1 If yes,** did you wear PPE? □ Yes □ No □ Not sure 3.6.1.1 **If you use PPE**, what type? Tick all that apply: □ Cloth mask □ Surgical mask □ N95 or equivalent □ Goggles/glasses □ Face shield □ Gloves □ Gown □ Coverall □ Head cover □ Boots □ Shoe covers 3.6.1.2 Did you adapt PPE? □ Yes, what type……..…….. □ No □ Not sure 3.1.6.3 Did you reuse PPE? □ Yes, what type……..…….. □ No □ Not sure 3.1.6.4 Did you use tape for mask? □ Yes, to □ Surgical mask □ N95 □ No □ Not sure 3.1.6.5 Did you take a shower at the health facility after contact with the patient? □ Always □ Most of the time □ Occasionally □ Rarely

□ Never If shower, you shower with: □ Soap and water □ Water Did you change your clothes after taking a shower? □ Yes □ No	□ Never If shower, you shower with: □ Soap and water □ Water Did you change your clothes after taking a shower? □ Yes □ No
4. Have you had direct contact with the patient's materials since their admission? □ ***Yes*** □ ***No*** □ ***Not sure***	***4. Have you had direct contact with the patient's materials since their admission?*** □ ***Yes*** □ ***No*** □ ***Not sure***
4.1 If you answer yes,	**4.1 If you answer yes,**
4.1.1 Which materials you had direct contact with? (Tick all that apply) □ Clothes □ Personal items □ Bed sheet or pillowcase □ Medical devices used on the patient □ Medical equipment connected to the patient (ventilator, infusion pump etc.) □ Other: …….	4.1.1 Which materials you had direct contact with? (Tick all that apply) □ Clothes □ Personal items □ Bed sheet or pillowcase □ Medical devices used on the patient □ Medical equipment connected to the patient (ventilator, infusion pump etc.) □ Other: …….
4.1.2 How many times (total)? …….. times	4.1.2 How many times (total)? …….. times
4.1.3 Did you wear PPE? □ Yes □ No □ Not sure 4.1.3.1 **If you use PPE**, what type? Tick all that apply: □ Cloth mask □ Surgical mask □ N95 or equivalent □ Goggles/glasses □ Face shield □ Gloves □ Gown □ Coverall □ Head cover □ Boots □ Shoe covers 4.1.3.2 Did you adapt PPE? □ Yes, what type……..…….. □ No □ Not sure 4.1.3.3 Did you reuse PPE? □ Yes, what type……..…….. □ No	4.1.3 Did you wear PPE? □ Yes □ No □ Not sure 4.1.3.1 **If you use PPE**, what type? Tick all that apply: □ Cloth mask □ Surgical mask □ N95 or equivalent □ Goggles/glasses □ Face shield □ Gloves □ Gown □ Coverall □ Head cover □ Boots □ Shoe covers 4.1.3.2 Did you adapt PPE? □ Yes, what type……..…….. □ No □ Not sure 4.1.3.3 Did you reuse PPE? □ Yes, what type……..…….. □ No

□ Not sure 4.1.3.4 Did you use tape for mask? □ Yes, to □ Surgical mask □ N95 □ No □ Not sure 4.1.3.5 Did you take a shower at the health facility after contact with the patient? □ Always □ Most of the time □ Occasionally □ Rarely □ Never If shower, you shower with: □ Soap and water □ Water Did you change your clothes after taking a shower? □ Yes □ No	□ Not sure 4.1.3.4 Did you use tape for mask? □ Yes, to □ Surgical mask □ N95 □ No □ Not sure 4.1.3.5 Did you take a shower at the health facility after contact with the patient? □ Always □ Most of the time □ Occasionally □ Rarely □ Never If shower, you shower with: □ Soap and water □ Water Did you change your clothes after taking a shower? □ Yes □ No
4.2 If you were wearing gloves, did you remove them after contact with the patient? □ Yes □ No	4.2 If you were wearing gloves, did you remove them after contact with the patient? □ Yes □ No
4.3 Did you perform hand hygiene before touching a patient or cleaning/aseptic procedures? □ Always □ Most of the time □ Occasionally □ Rarely with: □ Alcohol-based hand rub □ Soap and water □ Water	4.3 Did you perform hand hygiene before touching a patient or cleaning/aseptic procedures? □ Always □ Most of the time □ Occasionally □ Rarely with: □ Alcohol-based hand rub □ Soap and water □ Water
4.4 Did you perform hand hygiene after touching a patient or cleaning/aseptic procedures? □ Always □ Most of the time □ Occasionally □ Rarely with:	4.4 Did you perform hand hygiene after touching a patient or cleaning/aseptic procedures? □ Always □ Most of the time □ Occasionally □ Rarely with:

□ Alcohol-based hand rub □ Soap and water □ Water	□ Alcohol-based hand rub □ Soap and water □ Water
5. Have you had direct contact with the surfaces around the patient? □ ***Yes*** □ ***No*** □ ***Not sure***	***5. Have you had direct contact with the surfaces around the patient?*** □ ***Yes*** □ ***No*** □ ***Not sure***
5.1 If you answer yes,	**5.1 If you answer yes,**
5.1.1 Which surfaces you had contact with? (Tick all that apply) □ Bed □ Bathroom □ Ward corridor □ Patient table □ Other: …….	5.1.1 Which surfaces you had contact with? (Tick all that apply) □ Bed □ Bathroom □ Ward corridor □ Patient table □ Other: …….
5.1.2 How many times (total)? …….. times	5.1.2 How many times (total)? …….. times
5.1.3 Did you come into contact with the patient's body fluids? □ Yes, which body fluids ……..…….. □ No □ Not sure 5.1.3.1 If yes, did you wear PPE? □ Yes □ No □ Not sure 5.1.3.1.1 **If you use PPE**, what type? Tick all that apply: □ Cloth mask □ Surgical mask □ N95 or equivalent □ Goggles/glasses □ Face shield □ Gloves □ Gown □ Coverall □ Head cover □ Boots □ Shoe covers 5.1.3.2 Did you adapt PPE? □ Yes, what type……..…….. □ No □ Not sure 5.1.3.3 Did you reuse PPE? □ Yes, what type……..……..	5.1.3 Did you come into contact with the patient's body fluids? □ Yes, which body fluids ……..…….. □ No □ Not sure 5.1.3.1 If yes, did you wear PPE? □ Yes □ No □ Not sure 5.1.3.1.1 **If you use PPE**, what type? Tick all that apply: □ Cloth mask □ Surgical mask □ N95 or equivalent □ Goggles/glasses □ Face shield □ Gloves □ Gown □ Coverall □ Head cover □ Boots □ Shoe covers 5.1.3.2 Did you adapt PPE? □ Yes, what type……..…….. □ No □ Not sure 5.1.3.3 Did you reuse PPE? □ Yes, what type……..……..

□ No □ Not sure 5.1.3.4 Did you use tape for mask? □ Yes, to □ Surgical mask □ N95 □ No □ Not sure 5.1.3.5 Did you take a shower at the health facility after contact with the patient? □ Always □ Most of the time □ Occasionally □ Rarely □ Never If shower, you shower with: □ Soap and water □ Water Did you change your clothes after taking a shower? □ Yes □ No	□ No □ Not sure 5.1.3.4 Did you use tape for mask? □ Yes, to □ Surgical mask □ N95 □ No □ Not sure 5.1.3.5 Did you take a shower at the health facility after contact with the patient? □ Always □ Most of the time □ Occasionally □ Rarely □ Never If shower, you shower with: □ Soap and water □ Water Did you change your clothes after taking a shower? □ Yes □ No
5.1.4 Did you perform hand hygiene after contact with the surfaces around the patient? □ Always □ Most of the time □ Occasionally □ Rarely with: □ Alcohol-based hand rub □ Soap and water □ Water	5.1.4 Did you perform hand hygiene after contact with the surfaces around the patient? □ Always □ Most of the time □ Occasionally □ Rarely with: □ Alcohol-based hand rub □ Soap and water □ Water
6. Did you wear coverall or gown □ Yes □ No □ Not sure If you answer yes, Was there any health care colleague to monitor on taking off PPE? □ Yes □ No □ Not sure How often □ Always □ Most of the time □ Occasionally □ Rarely	

7. Have you had contact with colleagues whose work involved with COVID-19 patients and did not wear PPE?
□ Yes □ No □ Not sure

If yes, what types of contact?
□ Sitting and eating together
□ Talking without surgical mask in close range less than 2 meters
□ Work in the same office space
□ Sleep in the same bedroom
□ Other: …….

2.3 History of COVID-19 infection

8. Do you think you have infected with COVID-19 from?
□ community □ health facility □ Not sure

8.1 If you think that you have been infected from the health facility, do you think which activities cause the infection?
……

Investigator……..

Comparing protocols

Protocols

1. **WHO:** Protocol for assessment of potential risk factors for coronavirus disease 2019 (COVID-19) among health workers in a health care setting
2. **Thai DDC:** Patients investigation form for coronavirus disease 2019: the case of health workers
3. Research protocol

Topics	WHO	Thai DDC	Research protocol
Day 1: Exposure to COVID-infected patients	**Form 1: Initial reporting form for health worker (Day 1)** - Status: alive/dead/unknown/lost to follow-up - Personal detail (name, DoB, gender, contact details, pre-existing conditions, smoking status (Y/N), occupation, work setting - **Adherence to infection prevention and control measures information** - **Exposure to COVID-19 infected patient** - Respiratory symptoms + date - Other symptoms + date - Pre-existing condition - Specimen collection **(DAY1)** including date collected, received, types of test, COVID-19, and outcome (antibody titres) - Data collector details	**Patients investigation form:** - Personal detail (name, DoB, gender, contact details, pre-existing conditions, smoking status (Y/N), occupation, work setting - Clinical information, including CBC, influenza test, SARS-CoV-2 - **Risk of exposure (general exposure, e.g. travel history)** - Risk of exposure (specific to healthcare workers), **similar to the WHO protocol** on the adherence to infection prevention and control measures information and exposure to COVID-19 infected patient) **with additional questions about adapting PPE, reusing PPE** - **Activities and travelling for the past <u>14-day before being unwell</u>.** - Data collector details	Will use information collected from the routine patients investigation data collection from Thai DDC **Data collection via telephone interview:** age, gender, occupation (types of healthcare professionals), work setting (e.g. OPD, IPD, ICU, etc.), pre-existing conditions, smoking history, COVID-19 exposure detail and date, body temperature and symptoms (see the following symptoms)
Symptom diary daily monitoring	**Form 3: Symptom diary for health workers**	Self-monitoring through LINE chatbot "@sabaideebot" - Temperature monitoring, - Symptoms include headache, diarrhea, fatigue/malaise,	**Data collection via self-administer online questionnaire** (with SMS reminders, and follow-up telephone interview at day 5, 10, 14)

Topics	WHO	Thai DDC	Research protocol
	Symptoms include fever ≥ 38 °C, runny nose, cough, sore throat, shortness of breath, and other symptoms for **21** days	shortness of breath, myalgia, dizzy, rash, blocked nose	- Temperature monitoring (morning and evening) - Symptoms include fever chills, headache, myalgia, fatigue, malaise, dry cough, productive cough, sneeze, sore throat, runny nose/blocked nose, nausea / vomit, loss of appetite, anosmia/ageusia, diarrhea, chest discomfort, shortness of breath for **14** days
Monitoring	**Form 2: Follow-up reporting form for health worker (Day > 21)** - Status: alive/dead/unknown/lost to follow-up - Pre-existing condition: pregnancy - Respiratory symptoms + date - Other symptoms + date - Specimen collection (**DAY21**) including date collected, received, types of test, COVID-19, and outcome (antibody titres)	-	**Specimen collection** - **Day 5, 10, 14:** Self-collected nasopharyngeal & oropharyngeal swabs and morning sputum - **Day 0, 14:** serum IgA, IgM, and IgG
Health care facility assessment	**Form 4: Health care facility infection prevention and control assessment** Assessment for infection prevention and control (IPC) programme within the facility e.g. guideline availability, IPC training, PPE availability, auditing and surveillance system	-	-

Appendix 2
Participant information sheet

You are invited to participate in this study because you are a health care worker who has been exposed to a suspected COVID-19 patient or laboratory-confirmed COVID-19 patient and you met the criteria classified as 'Patient Under Investigation'. Please take your time to read and understand the following information before you decide to participate in this research project. If you are unclear about any of the information below, please do not hesitate to ask the researcher using the contact information listed below until you understand. You may request this document to be read at home to consult or discuss with relatives, close friends, or other doctors to help you decide. When you have sufficient time to make an independent decision and decide whether to participate in this research project, you will be asked to sign a letter of intent to participate in this research project.

Research title: "A study to develop a quarantine guideline for medical and public health personnel who have been exposed to COVID-19"

Principal investigator's name Pritaporn Kingkaew, Ph.D.

Research settings Department of Medical Sciences, Department of Disease Control, Ministry of Public Health, and Health Intervention and Technology Assessment Program

Principal investigator's workplace and 24-hour reachable contact

Health Intervention and Technology Assessment Program, 6 floor, 6 building, Department of Health, Ministry of Public Health, Taladkwan, Muang, Nonthaburi, Thailand, 11000

24-hour Tel +66(0)96-816-9456 Email pritaporn.k@hitap.net

Funder World Health Organization (WHO) SEARO and Health System Research Institute (HSRI), Thailand

Conflict of Interest with funder ☑ No ☐ Yes

Study period May 2020 - 30 October 2020

Background

The health care workers (HCWs) who are at the frontline responding to the crisis are particularly susceptible to this highly transmissible infection, given their long and close exposure to COVID-19 infected persons. Infected HCWs may lead to the spread of the disease to patients, colleagues, family members and communities.

Therefore, close monitoring and understanding the epidemiological situation of COVID-19 in HCWs may lead to the development of appropriate quarantine measures and reduce the risk of HCWs receiving or transmitting COVID-19.

Objective

The primary objective of this study is to develop a guideline for quarantining HCWs who have been exposed to COVID-19 based on the information of the proportion of HCWs became positive during the 14-day quarantine period, the proportion of asymptomatic cases, the incubation period and the risk of being infected.

Participant in this study 400 participants

What you need to do?

Once you decide to participate this research project and provide consent, you will be invited to a medical facility to test for IgA, IgM and IgG antibodies by drawing the blood on the research enrolment (day 0). You will be provided with one digital thermometer and two test kits. Research staff will interview you via telephone call using a structured questionnaire. The content of this questionnaire includes information about you and your workplace, your symptoms, infection prevention and control measures, exposure to COVID-19 patient or respiratory infection or pneumonia within the health care facility, and use of PPE in the workplace. It should take about 15 minutes to complete this interview.

You will be urged to self-monitor your temperature twice a day (morning and evening) and monitor your symptoms and quality of life every day and report the results through an online questionnaire or telephone interview by research staff, depending on your preference. Research staff will contact you on days 5, 10 and 14 after recruitment at least to monitor your symptoms. Each interview will last for 5 minutes.

You will be asked to carry out nasopharyngeal & oropharyngeal swabs and sputum collection early in the morning on days 5 and 10 after recruitment. Cold chain courier will be arranged for pick-up and drop-off the specimen for you with no additional cost. You will be invited to a designated hospital to receive nasopharyngeal & oropharyngeal swabs, sputum collection and draw blood test for COVID-19 antibodies (serum IgM and IgG) on day 14.

During the study period, if you have been diagnosed with COVID-19 from the laboratory results, you and relevant agencies will be notified immediately so you can promptly receive the standard care for COVID-19 according to the current practice guideline.

Potential risk to participants you might have and precaution measures

Risk from interview

You may feel uncomfortable, wasting time, inconvenient, uncomfortable to answer some questions. You can skip that question or stop responding immediately without having to specify the reason. The research team will ensure the anonymity and confidentiality of the information provided by you. Your responses will be used for research purpose only. We urge you to provide truthful responses for questions that you decided to answer. Information about PPE use in the facility will be kept confidential and will not be shared to your peers or your supervisors. There will be no consequences if you did not follow standard procedures for the use of PPE.

Risk from sample collections

You are at risk of pain, bleeding, bruising, swelling at specimen and blood sample collection areas, and fainting. Additionally, there is a rare chance of infection at blood sample collection area. If other abnormal conditions occur except events, side effects or discomfort showed in this document, you should immediately inform the principle investigator for your safety in order to be supported and provided treatment for those consequences.

Confidentiality and use of personal information

Your personal and sensitive data will be kept strictly confidential and will not be shared to the public as an individual. All electronic data, including interview results and laboratory results will be stored on a database with protected password access. Any hard copies of data will be kept in a locked cabinet in the Health Intervention and Technology Assessment Program (HITAP). Research data can only be revealed as research summary. Disclosure of data will only be available to organization responsible for research monitoring purposes.

You will receive care for injuries or illnesses resulting from involving this research project. Health Intervention and Technology Assessment Program (6 floor, 6 building, Department of Health, Ministry of Public Health, Tiwanon road, Muang, Nonthaburi, 11000) will be responsible for any expenses other than what you can reimbursement through your public health insurance.

Participation and withdrawn from this research

Your participation is voluntary. When you feel discomfort participating in this research study, responding to any questions or taking any biological samples, you have the right to refuse to take part in any particular procedure. Also, you have a right to withdraw consent and withdraw the right to use your data and biological samples at any point during this research. This will not affect your current or future health care provision or your professional responsibilities in any way.

Benefits that you might receive from this study

There is no direct benefit from participating in this study. However, the information you provided will be useful for the development of appropriate policies and guidelines to reduce the risk of health care workers receiving or transmitting COVID-19.

Payment/Compensation for participation

You will receive compensation for giving interview and specimens' collection in total of 2,000 baht, by dividing into 1,000 baht only for each hospital visit (once on the enrolment and the end of the research project). If you decide to withdraw from the research before the completion, you will not receive the second payment.

The payment that you will be responsible:

You will not responsible for any payment from your participation in this research study.

If there is any further information on both potential benefits and risks, the research team will inform the participants immediately without any information concealment.

How will your information be stored and kept confidential?

Any identifiable personal information will be concealed and remain confidential throughout the study. Your responses from the interview and laboratory results will be kept strictly confidential. Any leftover biological specimen will be kept at Genomics Medicine and Innovation Support Division (GEMIS), Department of Medical Sciences, Ministry of Public Health, Thailand for 14 days for quality control purposes. The specimens will be stored anonymously without any link to your personal information.

Checked, validated, and cleaned research data will be backed up and stored electronically with no link to your personal information. Research data will be stored for 5 years after submitting the reports to the funder. The results of this research will only be published in overall information and unable to reveal your identity.

The institutional review board, the funder, governmental body, and research auditor can only access your medical records and research results if they maintain the confidentiality of your data.

Please note that your laboratory results will be kept confidential except when the result become positive, indicating that you are infected with COVID-19. The research team is abide by law to inform the Department of Disease Control so that you can receive medical care promptly and prevent further spread of diseases. Any personal information that would reveal your identity will be kept from the public.

If you have any questions or concerns about the research or experience any problems in this research, you can contact

Pritaporn Kingkaew, Ph.D. Health Intervention and Technology Assessment Program, 6 floor, 6 building, Department of Health, Ministry of Public Health, Talat Kwan, Muang, Nonthaburi, Thailand, 11000 24-hour Tel +66(0)9-6816-9456 Email pritaporn.k@hitap.net

If the study protocol is conducted inappropriately and unrelated as mentioned in the participant information sheet or you have any questions/concerns/problems about your rights, you can contact

The chairman of the Institute for the Development of Human Research Protections (IHRP), 8th Building 7th floor room 702, Department of Medical Sciences, Ministry of Public Health, Tiwanon Rd, Talat Kwan, Mueang Nonthaburi District, Nonthaburi, 11000, Thailand. Telephone +6 6 (0) 2591-3876, +66(0)-2591 3517 Fax +66(0)-2591-4125

Research title	*Document type*	*Version*	*Date*	*Page*
A study to develop a quarantine guideline for medical and public health personnel who have been exposed to COVID-19	Participant information sheet	3	26/06/2020	4

Appendix 3
Informed Consent Form

Project name: A study to develop a quarantine guideline for medical and public health personnel who have been exposed to COVID-19

Consent date: Date ..... Month ..... Year (B.E.) .....

I (Mr/Miss/Ms.) ..... Family's name ..... Age ..... years House No. ..... Village No..... Alley/Lane ..... Road/Street ..... Sub-district/ Sub-area..... District / Area..... Province ..... have read the foregoing information of "A study to develop a quarantine guideline for medical and public health personnel who have been exposed to COVID-19", or it has been read to me and thoroughly understood that information.

Before signing this consent form, I acknowledge that I have received the information regarding to the background and purpose of the research, details of steps that must be taken or treated, potential benefits, potential risks and discomforts and risk management plan as well as payment/compensation for participation. I have read and received the information listed above from the participant information sheet and had the opportunity to ask questions about it and any questions that I have asked have been answered to my satisfaction. I consent voluntarily to participate as a participant in this research.

I acknowledge that I have the right to refuse or withdraw from research participation at any given time without providing any reasons. I have a right to withdraw consent and withdraw the right to use my data and biological samples at any point during this research. This will not affect my current or future health care provision or my professional responsibilities in any way. I understand that I will receive compensation for giving interview and specimens' collection 1,000 baht each hospital visit, in total of 2,000 baht. I will not receive the second if I decide to drop out before the completion of data collection.

I have agreed that research information obtained in this study can be used in the future research but will remain confidential. I understand that my biological samples will be kept for 14 days and will be destroyed afterward. All stored information must be anonymised with no linkage to my name or personal information and future research project that want to use this research information must be approved by the Research Ethics Committee only. When the results of the research are published, they must be published in overall information and unable to reveal my individual identity.

Research title	*Document type*	*Version*	*Date*	*Page*
A study to develop a quarantine guideline for medical and public health personnel who have been exposed to COVID-19	Consent form	4	26/06/2020	1

The researcher states that any danger occurs from this research I will receive free treatment and will be compensated for the lost revenue during the treatment as well as compensation for disability that may occur. The details about additional treatment or compensation thereof I can contact at Health Intervention and Technology Assessment Program, 6 floor, 6 building, Department of Health, Ministry of Public Health, Talat Kwan, Muang, Nonthaburi, Thailand, 11000. I can contact Dr. Pritaporn Kingkaew Tel. +66(0)-96-861-9456 E-mail: pritaporn.k@hitap.net if I have any questions or concerns about the research or experience any problems that differs from the information I have received.

If the study protocol is conducted inappropriately and unrelated as mentioned in the participant information sheet or have any questions/concerns/problems about my rights as a study subject, I can contact the Development of Human Research Protections (IHRP), 8th Building 7th floor room 702, Department of Medical Sciences, Ministry of Public Health, Tiwanon Rd, Talat Kwan, Mueang Nonthaburi District, Nonthaburi, 11000, Thailand. Telephone +66(0)2591-3876, +66(0)-2591 3517 Fax +66(0)-2591-4125.

As a participant/ legal representative, I thoroughly understand the details in the participant information sheet and informed consent form. By signing this form, I am agreeing to take part in this study and receiving a copy of this form.

Signed.....	Signed.....
(.....)	(.....)
Print Name of Participant/ legal representative	Print Name of person taking the consent/ Principal Investigator
Date.....	Date.....
Day/month/year (B.E.)	*Day/month/year (B.E.)*

Research title	***Document type***	***Version***	***Date***	***Page***
A study to develop a quarantine guideline for medical and public health personnel who have been exposed to COVID-19	Consent form	4	26/06/2020	2

Appendix 4
Baseline information

Interview date (dd/mm/yyyy) ☐☐/☐☐/☐☐☐☐

Research ID .....

Details	Variable name
1. Age ☐☐ years old	age
2. Gender ☐ 1. Male ☐ 2. Female	gender
3. Types of health care workers (occupation) ☐ 1. Medical doctors, general practitioner ☐ 2. Medical doctors, specialist ☐ 3. Dentist ☐ 4. Registered Nurse ☐ 5. Assistant nurse ☐ 6. Pharmacist/Pharmacy assistant ☐ 7. Laboratory personnel ☐ 8. Other, specify	type
4. Workplace ☐ 1. OPD ☐ 2. IPD ☐ 3. ER ☐ 4. ICU ☐ 5. ARI clinic ☐ 6. Cohort ward ☐ 7. Laboratory ☐ 8. Pharmacy ☐ 9. Other, specify	**loca**
5. Pre-existing conditions ☐ 1. No pre-existing conditions ☐ 2. Pregnancy	**dis**

☐ 3. Respiratory disease such as asthma, emphysema, or COPD ☐ 4. Obesity ☐ 5. Diabetes Mellitus ☐ 6. Hypertension ☐ 7. Cardiovascular disease ☐ 8. Chronic kidney disease ☐ 9. Chronic liver disease ☐ 10. Cancer ☐ 11. Immunocompromised condition or using immunosuppressive drugs ☐ 12. Other, specify ……..	
6. Smoking history ☐ 1. No smoking ☐ 2. Former smoker ☐ 3. current smoker (smoke ≥ 1 cigarette over the past 7 days)	**smo**
7. COVID-19 suspected/ case positive contact history **……**	**contact**
8. Date of contact (dd/mm/yyyy) ☐☐/☐☐/☐☐☐☐	**cdate**
9. If you have measured your temperature today, what is your body temperature? Morning temperature …… Evening temperature ……	**temp**

10. Do you have these symptoms today? (Answer: NO/Yes/Unknown)

No.	Symptoms	Answers	Variable name
1.	Fever	No (0) ☐ Yes (1) ☐ Unknown (9) ☐	d0symp1
2.	Chills	No (0) ☐ Yes (1) ☐ Unknown (9) ☐	d0symp2
3.	Headache	No (0) ☐ Yes (1) ☐ Unknown (9) ☐	d0symp3
4.	Myalgia	No (0) ☐ Yes (1) ☐ Unknown (9) ☐	d0symp4
5.	Fatigue / Malaise	No (0) ☐ Yes (1) ☐ Unknown (9) ☐	d0symp5
6.	Dry cough	No (0) ☐ Yes (1) ☐ Unknown (9) ☐	d0symp6
7.	Productive cough	No (0) ☐ Yes (1) ☐ Unknown (9) ☐	d0symp7

8.	Sneeze	No (0) ☐ Yes (1) ☐ Unknown (9) ☐	d0symp8
9.	Sore throat	No (0) ☐ Yes (1) ☐ Unknown (9) ☐	d0symp9
10.	Runny nose / Blocked nose	No (0) ☐ Yes (1) ☐ Unknown (9) ☐	d0symp10
11.	Nausea / Vomit	No (0) ☐ Yes (1) ☐ Unknown (9) ☐	d0symp11
12.	Loss of appetite	No (0) ☐ Yes (1) ☐ Unknown (9) ☐	d0symp12
13.	Loss of smell (Anosmia) or taste (Ageusia)	No (0) ☐ Yes (1) ☐ Unknown (9) ☐	d0symp13
14.	Diarrhea	No (0) ☐ Yes (1) ☐ Unknown (9) ☐	d0symp14
15.	Chest discomfort	No (0) ☐ Yes (1) ☐ Unknown (9) ☐	d0symp15
16.	Dyspnoea	No (0) ☐ Yes (1) ☐ Unknown (9) ☐	d0symp16
17.	Other symptoms, if yes please specify	……	d0symp17

11. Quality of life

Section Under each heading, please tick ✓ the ONE box that best describes your health TODAY.

1. Mobility ☐ 1. I have no problems in walking about ☐ 2. I have slight problems in walking about ☐ 3. I have moderate problems in walking about ☐ 4. I have severe problems in walking about ☐ 5. I am unable to walk about	**5l_d1**
2. Self-care ☐ 1. I have no problems washing or dressing myself ☐ 2. I have slight problems washing or dressing myself ☐ 3. I am moderate problems washing or dressing myself ☐ 4. I am severe problems washing or dressing myself ☐ 5. I am unable to wash or dress myself	**5l_d2**
3. Usual Activities *(e.g. work, study, housework, family or leisure activities)* ☐ 1. I have no problems doing my usual activities ☐ 2. I have slight problems doing my usual activities	**5l_d3**

☐ 3. I have moderate problems doing my usual activities ☐ 4. I have severe problems doing my usual activities ☐ 5. I am unable to do my usual activities	
4. Pain/Discomfort ☐ 1. I have no pain or discomfort ☐ 2. I have slight pain or discomfort ☐ 3. I have moderate pain or discomfort ☐ 4. I have severe pain or discomfort ☐ 5. I have extreme pain or discomfort	**5l_d4**
5. Anxiety/Depression ☐ 1. I am not anxious or depressed ☐ 2. I am slightly anxious or depressed ☐ 3. I am moderately anxious or depressed ☐ 4. I am severely anxious or depressed ☐ 5. I am extremely anxious or depressed	**5l_d5**

Appendix 5
Daily self-assessment for symptoms questionnaire

Date of assessment (dd/mm/yyyy) ☐☐/☐☐/☐☐☐☐

Research ID .....

Morning temperature .....

Evening temperature .....

Do you have these symptoms today? (Answer: NO/Yes/Unknown)

No.	Symptoms	Answers	Variable name
1.	Fever	No (0) ☐ Yes (1) ☐ Unknown (9) ☐	dNsymp1
2.	Chills	No (0) ☐ Yes (1) ☐ Unknown (9) ☐	dNsymp2
3.	Headache	No (0) ☐ Yes (1) ☐ Unknown (9) ☐	dNsymp3
4.	Myalgia	No (0) ☐ Yes (1) ☐ Unknown (9) ☐	dNsymp4
5.	Fatigue / Malaise	No (0) ☐ Yes (1) ☐ Unknown (9) ☐	dNsymp5
6.	Dry cough	No (0) ☐ Yes (1) ☐ Unknown (9) ☐	dNsymp6
7.	Productive cough	No (0) ☐ Yes (1) ☐ Unknown (9) ☐	dNsymp7
8.	Sneeze	No (0) ☐ Yes (1) ☐ Unknown (9) ☐	dNsymp8
9.	Sore throat	No (0) ☐ Yes (1) ☐ Unknown (9) ☐	dNsymp9
10.	Runny nose / Blocked nose	No (0) ☐ Yes (1) ☐ Unknown (9) ☐	dNsymp10
11.	Nausea / Vomit	No (0) ☐ Yes (1) ☐ Unknown (9) ☐	dNsymp11
12.	Loss of appetite	No (0) ☐ Yes (1) ☐ Unknown (9) ☐	dNsymp12
13.	Loss of smell (Anosmia) or taste (Ageusia)	No (0) ☐ Yes (1) ☐ Unknown (9) ☐	dNsymp13
14.	Diarrhea	No (0) ☐ Yes (1) ☐ Unknown (9) ☐	dNsymp14
15.	Chest discomfort	No (0) ☐ Yes (1) ☐ Unknown (9) ☐	dNsymp15
16.	Dyspnoea	No (0) ☐ Yes (1) ☐ Unknown (9) ☐	dNsymp16
17.	Other symptoms, if yes please specify	.....	dNsymp17

Quality of life

Section Under each heading, please tick ✓ the ONE box that best describes your health TODAY.

1. Mobility ☐ 1. I have no problems in walking about ☐ 2. I have slight problems in walking about ☐ 3. I have moderate problems in walking about ☐ 4. I have severe problems in walking about ☐ 5. I am unable to walk about	**5l_d1**
2. Self-care ☐ 1. I have no problems washing or dressing myself ☐ 2. I have slight problems washing or dressing myself ☐ 3. I am moderate problems washing or dressing myself ☐ 4. I am severe problems washing or dressing myself ☐ 5. I am unable to wash or dress myself	**5l_d2**
3. Usual Activities *(e.g. work, study, housework, family or leisure activities)* ☐ 1. I have no problems doing my usual activities ☐ 2. I have slight problems doing my usual activities ☐ 3. I have moderate problems doing my usual activities ☐ 4. I have severe problems doing my usual activities ☐ 5. I am unable to do my usual activities	**5l_d3**
4. Pain/Discomfort ☐ 1. I have no pain or discomfort ☐ 2. I have slight pain or discomfort ☐ 3. I have moderate pain or discomfort ☐ 4. I have severe pain or discomfort ☐ 5. I have extreme pain or discomfort	**5l_d4**
5. Anxiety/Depression ☐ 1. I am not anxious or depressed ☐ 2. I am slightly anxious or depressed ☐ 3. I am moderately anxious or depressed ☐ 4. I am severely anxious or depressed ☐ 5. I am extremely anxious or depressed	**5l_d5**

Appendix 6

Ethical clearance from the Institute for the Development of Human Research Protections (IHRP), Thailand

COA No. IHRP2020062
IHRP No. 059-2563

Ethics Committee

Institute for the Development of Human Research Protections (IHRP)

Building 8 Floor 7 Room 702 Department of Medical Science Ministry Public Health Nonthaburi Thailand 11000

Certificate of Approval

Title of Project: A study to develop a quarantine guideline for medical and public health personnel who have been exposed to COVID-19

Principal Investigator: Pritaporn Kingkaew

Responsible Organization: Health Intervention and Technology Assessment Program, Ministry of Public Health.

Document Reviewed:

1. Proposal (version 2 Date 15/05/2020)
2. Participant Information Sheet (version 2 Date 15/05/2020)
3. Informed Consent Form (version 2 Date 15/05/2020)
4. Study instrument (version 2 Date 15/05/2020)
5. Study Budget/Forecast Expenses for Study Conducting (Protocol: Covid-19 HCWs version 2 Date 15/05/2020)
6. Curricular Vitae of Investigators

The Ethics Committee of Institute for the Development of Human Research Protections (IHRP) had reviewed the research proposal. Concerning on scientific, ICH-GCP and ethical issues, the committee has approved for the implementation of the research study mentioned above.

Signature: .....
(Dr.Vichai Chokevivat)
Chairman

Signature: .....
(Dr.Pramote Stienrut)
Committee and Secretary

Date of Approval: May 22, 2020