Surveillance protocol for SARS-CoV-2 infection among health workers

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Contents

1 Background

Coronavirus disease 2019 (COVID-19) was first detected in Wuhan city, China in December 2019. On 30 January 2020, the Director-General of WHO declared that the outbreak constituted a Public Health Emergency of International Concern. On 11 March 2020, after evaluating its seriousness and spread, the Director-General announced that the outbreak was to be considered as a pandemic that could still be controlled. According to current evidence, the causative SARS-CoV-2 virus is primarily transmitted between people through respiratory droplets and contact routes. Transmission of the virus can therefore occur via direct contact with infected people, via indirect contact with surfaces in the immediate environment or via objects used on an infected person (for example, a stethoscope or thermometer). Airborne transmission may also be possible in specific circumstances and settings in which procedures or support treatments that generate aerosols are performed. Asymptomatic and pre-symptomatic individuals may be able to transmit infection.

People who come into contact with a COVID-19 patient, and/or who care for COVID-19 patients, are most at risk of infection. This inevitably places health workers at high risk. Health workers play a critical role, not only in the clinical management of patients but also in ensuring that adequate infection and prevention control (IPC) measures are implemented in health care facilities. Assessing the potential risk factors for SARS-CoV-2 infection among health workers is essential for characterizing virus transmission patterns, preventing future infections of health workers and preventing health-care-associated infection with SARS-CoV-2.

This surveillance protocol is based upon the use of a questionnaire (Appendix A) that can be implemented in facilities where cases of COVID-19 have been reported among health workers. It is based on the review and adaptation carried out by WHO and the Istituto Superiore di Sanità of the document: *Health workers exposure risk assessment and management in the context of COVID- 19 virus – Interim guidance 4 March 2020*, available at: https://apps.who.int/iris/bitstream/handle/10665/331340/WHO-2019-nCov-HCW_risk_assessment-2020.1-eng.pdf.

Each country may need to tailor selected aspects of this protocol to align with their public health, testing and clinical systems related to health workers, according to capacity, availability of resources and cultural appropriateness. However, by using the standardized protocol provided below, surveillance data on COVID-19 among health workers and their epidemiological exposure can be systematically collected and rapidly shared in a format that can be easily aggregated, tabulated and analysed across settings locally, nationally and globally. This will then allow for the timely investigation of COVID-19 among health workers and their related exposure, thus informing public health responses and policy decisions. Such information is particularly important in the context of a novel respiratory pathogen such as SARS-CoV-2.

2 Aim of the surveillance protocol in health workers

The purpose of this protocol is to describe the epidemiology of COVID-19 among health workers, including their exposure characteristics and risk factors, as part of case investigation. The questionnaire should be used for surveillance and epidemiological purposes only and should not be used, for example, to identify health worker breaches in adherence to personal protective equipment (PPE) procedures or to expose health workers to the risk of legal action.

The results of such targeted surveillance will also support identification of the most appropriate IPC measures to be strengthened at facility and country level to better protect health workers. Furthermore, based on the findings of this surveillance, the international scientific community will obtain vital evidence to inform the updating of IPC and management guidance for the prevention of COVID-19 among health workers.

3 Role of WHO

WHO headquarters will provide technical support and coordination, and will host a secured database platform (Go.Data) for data collection that will be made available to countries. WHO will access the country data only if permission is granted by individual countries and will analyse data in aggregate form, if agreed. Countries will be able to access and analyse only their own data. Such targeted surveillance can also be implemented independently in countries and regions by using the current protocol along with existing national or regional data-collection systems.

4 Surveillance method

4.1 Design

It is proposed that national, regional and local health authorities undertake COVID-19 surveillance among health workers in conjunction with their ongoing COVID-19 surveillance efforts. Health authorities should decide how best to integrate such targeted surveillance into existing mechanisms for the surveillance of COVID-19 and/or other diseases among the general population.

The surveillance method will be based on the six-part questionnaire provided in Appendix A administered in survey format. It includes a number of essential questions that should always be answered and additional questions that are also important but not essential to be answered, in particular in case of time or resource constraints. The questionnaire can be administered directly to the health worker (on paper or electronically), during a phone interview or in person. If done in person, the interviewer should take all of the IPC measures recommended for contact with COVID-19 patients. All health workers interviewed should be willing and physically able to respond to the questionnaire.

4.2 Target population

Health workers who test positive for SARS-CoV-2 regardless of their symptoms are the main target population. The criteria for inclusion are all staff involved in the provision of care to a COVID-19 patient or working in a health care facility caring for COVID-19 patients. This will include personnel present in the patient's room and personnel who may not have provided direct patient care but who could have come into contact with a patient's biological fluid/respiratory secretions, or with potentially contaminated objects or environmental surfaces. The term "health worker" includes allied health workers and auxiliary health workers such as cleaning and laundry personnel, x-ray physicians and technicians, clerks, phlebotomists, respiratory therapists, nutritionists, social workers, physical therapists, laboratory personnel, cleaners, admission/reception clerks, patient transporters, catering staff and so on).

This protocol and its associated questionnaire should be adapted to the local context (for example, to ensure that the definition of "health worker" reflects local definitions) and to testing strategies (for example, administered to all health workers at the moment of testing where the routine testing of health workers is enforced). However, it would be highly advisable to maintain the essential questions (which are clearly marked in the questionnaire) to enable comparison across different settings.

Some countries may decide to retrospectively administer the questionnaire to all infected health workers, regardless of the time of infection. To avoid recall bias, it is advisable to administer the questionnaire only to health workers who tested positive in the previous 7 days, given that they will be asked to remember the events of the 14 days prior to being tested.

Investigators should also consider the risk of response bias regarding PPE use or close contact; this bias could be reduced by administering the questionnaire at the time of testing prior to the result becoming known.

4.3 Data collection and analysis

Each participating authority should identify a contact person for data collection. If requested by the participating authority, WHO will provide dedicated access to the Go.Data web platform to submit data and access related technical support. If shared with WHO, data should be inserted in pseudonymized form (alphanumeric identification code) into the Go.Data platform.

All health workers identified by the surveillance process will need to complete the questionnaire provided in Appendix A. This questionnaire covers: (1) information on the interviewer; (2) demographic information on the interviewee, and on potential exposure not related to the health facility; (3) information on the health care facility and on the health worker's basic knowledge of IPC measures and PPE use; (4) activities carried out during interaction with a COVID-19 patient; (5) adherence to IPC measures and on the availability and use of PPE; and (6) information on accidental exposure to biological material. To ensure the collection of at least the minimum required amount of information, questions considered to be essential are marked with an asterisk in the questionnaire. It is advisable to collect at least this minimum dataset at facility or ward level.

Data can be analysed in aggregate form to describe both structural indicators (for example, availability and access to PPE and to IPC components at the facility level) and procedural indicators (for example, knowledge and adherence to PPE) among infected health workers. Moreover, aggregate data can be analysed to determine the number of health workers found to be positive for SARS-CoV-2, ideally over the total number of health workers caring for COVID-19 patients or based on the total number of health workers tested, at the facility and/or ward level.

4.4 Suggested data-collection tool

Countries and institutions implementing this targeted surveillance protocol should adopt data-collection tools according to their needs and practice. Upon request, WHO will provide a Go.Data data-implementation template of the questionnaire shown in Appendix A. If the country or institution so requires, WHO will also offer access to a secured server to host the Go.Data collection tool. WHO will then provide technical support and coordination of data collection via the Go.Data platform. If data is shared with WHO, a data-sharing agreement will be signed by both parties.

The web questionnaire on the Go.Data platform consists mainly of closed-ended questions related to demographic information, exposure risk situations and IPC measures.

Go.Data is an electronic data-collection tool that has been designed to be used by WHO, the Global Outbreak Alert and Response Network (GOARN), Member States and partners to support and facilitate outbreak investigations. The tool includes functionality for case and contact field data collection, contact follow-up and visualization of chains of transmission. The tool comprises a web application and an optional mobile app, and is intended for use by any outbreak responders, including WHO staff, and staff from ministries of health and partner institutions.

Key features of the Go.Data software include (for more details and screen shots, please refer to Appendix B):

- it is open source and free for use with no licensing costs;
- it offers different types of operation (server or stand-alone) on different platforms (Windows, Linux, Mac);
- it allows for data collection from cases and contacts, including laboratory data;
- it is not built for a specific disease or specific country, and is highly configurable, with configurable reference, outbreak and location data;
- one Go.Data installation can be used to collect data for many outbreaks;
- it provides multilingual support, with the possibility of adding and managing additional languages though the user interface;

- it allows for granular user roles and permissions, including the possibility of providing user access at outbreak level;
- outbreak templates are included for easier creation of outbreak data-collection forms;
- it generates a contact follow-up list and visualizes chains of transmission;
- users with appropriate rights can configure the case-investigation form, contact follow-up form and laboratory data-collection form; and
- it has an optional mobile app (Android and iOS) focused on case and contact data collection, contact tracing and follow-up.

Several options are available for Go.Data hosting in countries (see Appendix B).

For further information contact: godata@who.int or visit https://www.who.int/godata

5 Ethical considerations

Ethical requirements will vary by country. It should be noted that this targeted surveillance data collection is considered to be part of public health surveillance in the context of COVID-19 (emergency response) and may not require ethical approval from an institutional review board.

The purpose of the surveillance questionnaire must be explained to all health workers included in the targeted surveillance activity, and informed consent from the interviewee might be required. Depending on the local context, each participant should be informed that participation in surveillance is voluntary and that they are free to withdraw, without justification, at any time without consequences and without affecting their professional responsibilities.

Participant confidentiality must be maintained throughout, especially in the case of health workers exposed to SARS-CoV-2. An identification number should be assigned to all participants by the surveillance team. The identification numbers assigned to individuals will be kept confidential and managed by the surveillance team and the country authority (Ministry of Health or equivalent) and will not be disclosed elsewhere.

If data are shared by the implementing organization with WHO or any agency or institution providing support for data analysis, it is the responsibility of the institution collecting the data to share pseudonymized data only (based on the use of an identification number and deletion of any personally identifiable information).

If groups implementing the surveillance opt to use open source Go.Data as a tool to run this targeted surveillance, then several options are available for Go.Data hosting in countries. Detailed information on this is presented in Appendix B of this document. The group implementing the surveillance will need to consider the best approach given the setting. If the Go.Data server is to be based at WHO, then access to the Go.Data application on this server will be restricted to users who have valid login credentials for the Go.Data application. Please see Appendix B for the terms of use of Go.Data.

Appendix A: Surveillance questionnaire for SARS-CoV-2 infection among health workers

Questions marked with an * should be considered as essential

1. Interviewer information and contextual information (to be filled in by interviewer; some questions might require information from the health care facility administrator)	
A. Interviewer name and last name	
B. Interview date (dd/mm/yyyy)	___/___/_____
C. Interviewer phone number/email	
*D. Test date (dd/mm/yyyy)	___/___/_____
*E. Reason for test	□ Onset of symptoms □ Face-to-face contact (within 1 metre) with a confirmed COVID-19 case □ Routine test □ Other, specify:
*F. To date, how many health workers have been tested in the same facility?	
*G. Test result [***If not yet known, complete when result is available***]	□ Positive □ Negative
*H. Are there COVID-19 patients in the health care facility?	□ Yes □ No □ Unknown Number of patients (approximate number if exact number not known):
*I. Are there areas dedicated to COVID-19 cases in the health care facility?	□ Yes □ No □ Unknown
*J. Are there health workers dedicated only to the care of COVID-19 patients?	□ Yes □ No □ Unknown
*K. If yes, how many health workers are dedicated to the care of COVID-19 patients in the same facility?	Number of health workers: □ Unknown

2. Health worker information	
A. Family name	
B. First name	
C. Date of birth (dd/mm/yyyy)	___/___/_____
D. Sex	□ Male □ Female □ Prefer not to answer
E. City	
*F. Country	
G. Contact details (email and/or phone number)	
*H. Type of health personnel [***Adapt to local context or review according to international terminology***]	□ Medical doctor □ Physician assistant □ Registered nurse (or equivalent) □ Assistant nurse, nurse technician (or equivalent) □ Radiology/x-ray technician

	□ Phlebotomist □ Ophthalmologist □ Physical therapist □ Respiratory therapist □ Nutritionist/dietician □ Midwife □ Pharmacist □ Pharmacy technician or dispenser □ Laboratory personnel □ Admission/reception clerk □ Patient transporter □ Catering staff □ Cleaner □ Other [***specify***]:
*I. Health care facility unit type in which the health worker works [***Adapt to local context***]	[***Tick all that apply***] □ Outpatient □ Emergency □ Medical unit □ Intensive care unit □ Cleaning services □ Laboratory □ Pharmacy □ Other [***specify***]:
J. Date of communication of the test result (dd/mm/yyyy) [***If not yet known, complete when result is available***]	___/___/_____
*K. In the 14 days prior to the onset of your symptomatology and/or day of the test, you have been **during your work** in close contact with:	□ Confirmed COVID-19 case □ Health worker with confirmed COVID-19 □ Neither of the above □ Unknown
*L. In the 14 days prior to the onset of your symptomatology and/or day of the test, you have been in close contact with:	□ Confirmed COVID-19 case or symptomatic person to whom you were providing care outside of your primary working context (e.g. while providing medical assistance to acquaintances) □ Confirmed COVID-19 case or symptomatic person at home □ Confirmed COVID-19 case or symptomatic person outside your working and domestic environments (e.g. means of transport, supermarket)