# Schools and other educational institutions transmission investigation protocol for coronavirus disease 2019 (COVID-19)

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World Health Organization

**Reference:**

The emergence of a new virus means that understanding transmission patterns, severity, clinical features and risk factors for infection will be limited at the start of an outbreak. To address these unknowns, WHO has provided protocols for special investigations in different settings.

Data collected using these investigation protocols will be critical to refine recommendations for case definitions and surveillance; characterize key epidemiological features of COVID-19; help understand the spread, severity and spectrum of disease and impact on the community; and inform guidance for application of countermeasures such as case isolation and contact tracing. These protocols are designed to enable the rapid and systematic collection of data in a format that facilitates comparison across different settings globally.

They are available on WHO website here: https://www.who.int/emergencies/diseases/novel-coronavirus-2019/technical-guidance/early-investigations

COVID-19 investigations and study protocols available include:

***1. The First Few X cases and contacts (FFX) investigation protocol for coronavirus disease 2019 (COVID-19)***

***2. Household transmission investigation protocol for coronavirus disease 2019 (COVID-19)***

***3. Protocol for assessment of potential risk factors for coronavirus disease 2019 (COVID-19) among health workers in a health-care setting: cohort or case control designs***

***4. Population-based age-stratified seroepidemiological investigation protocol for coronavirus 2019 (COVID-19) infection***

***5. Surface sampling of coronavirus (COVID-19) virus: a practical "how to" protocol for health-care and public health professionals***

***6. Schools and other educational institutions transmission investigation protocol for coronavirus disease 2019 (COVID-19)***

Please contact earlyinvestigations-2019-nCoV@who.int for any questions.

All WHO protocols for COVID-19 are available on the WHO website together with the technical guidance documents.

## Contents

## Summary


| Schools and other educational institutions investigation protocol for coronavirus disease 2019 (COVID-19). | |
|---|---|
| **Population** | Students and staff of schools and other educational institutions with a laboratory-confirmed case of COVID-19 |
| **Potential output and analysis** | The overall aim is to rapidly and systematically collect data to gain an understanding of the transmission dynamics of COVID-19 infection among cases and contacts within schools and other educational institutions.<br>Primary objectives are:<br>• to estimate infection rates for overall and secondary SARS-CoV-2 infections in the school setting<br>• to estimate the secondary clinical attack rate of SARS-CoV-2 in this setting<br>• to estimate the fraction of asymptomatic SARS-CoV-2 infections within schools and other educational institutions<br>• to describe the epidemiological and clinical characteristics of primary and secondary cases of COVID-19<br>• to identify potential risk/protective factors associated with the SARS-CoV-2 infection risk.<br>The secondary objectives are:<br>• to estimate the incubation period of SARS-CoV-2 and the duration of infectiousness and of detectable shedding;<br>• to estimate the serial interval of SARS-CoV-2 infection in this setting;<br>• to estimate the reproduction numbers: $R_0$ and $R$ of SARS-CoV-2 in this setting; and<br>• to characterize the serological response following confirmed COVID-19 infection. |
| **Design** | Prospective case-ascertained investigation of school contacts of a laboratory-confirmed case of COVID-19. |
| **Duration** | Post-identification of school contacts of the first laboratory-confirmed case(s), the investigation will continue until no laboratory-confirmed COVID-19 cases are detected among the contacts of confirmed cases in the school setting. |
| **Recruitment** | School contacts of laboratory-confirmed primary case(s) will be invited to participate in the investigation according to a predetermined country-specific sampling strategy. |
| **Minimum data and specimens to be obtained from participants** | • Data collection: epidemiological data, including basic demographics and clinical characteristics of primary/secondary/subsequent cases and contacts; and school characteristics.<br>• Specimens: respiratory and blood (and/or saliva samples, when validated saliva tests become available). |


Comments for the user's consideration are provided in purple text throughout the document, as the user may need to modify methods slightly because of the local context in which this investigation will be carried out.

# 1. Background

## 1.1 Introduction

Coronavirus disease 2019 (COVID-19), first reported from Wuhan city, China in December 2019 *(1)*, was declared by World Health Organization (WHO) Director-General a Public Health Emergency of International Concern on 30 January 2020 and described as a pandemic on 11 March 2020. The etiological agent of COVID-19, severe respiratory syndrome coronavirus 2 (SARS-CoV-2), is primarily transmitted between people through respiratory droplets and contact routes: direct contact with infected people and indirect contact with surfaces in the immediate environment or objects used on an infected person. Airborne transmission may also be possible in aerosol-producing circumstances. Asymptomatic and pre-symptomatic individuals are able to transmit infection.

Available evidence to date suggests that children and adolescents may be less susceptible and present with a less severe clinical course than adults. A meta-analysis of contact tracing studies *(2)* reported that for all studies, children were less likely to become infected as a contact than adults for all studies (odds ratio [OR], 0.44; 95% confidence interval [CI], 0.29–0.68; $n = 8$; $I^2 = 63\%$), regardless of whether studies included household-only contact tracing (OR, 0.19; 95% CI, 0.10–0.37; $n = 3$; $I^2 = 0\%$) or all close contacts (OR, 0.63; 95% CI, 0.50–0.80; $n = 5$, $I^2 = 0\%$). There is little/no published evidence on how transmissible children may be compared to adults. Early cluster investigations in France *(3)*, Ireland *(4)* and Australia *(5)* suggested that children were not associated with significant transmission in schools. However, in a serologic investigation of a high-school cluster in France prior to enforcing social distancing measures *(6)*, the infection crude attack rates were 92/240 (38%) in pupils of high school age, 23/53 (43%) in teachers and 16/27 (59%) in school staff (overall response rate = 58%). In the same study, the proportion of seropositive individuals among asymptomatic participants in the study was 14% (29/209).

Although COVID-19 is considered less severe in children, there are recent reports from Europe and North America of an increased number of cases of severe paediatric multi-system inflammatory syndrome with features of Kawasaki disease and toxic shock syndrome since the beginning of the COVID-19 pandemic. The causal relationship between this severe disease in children and adolescents and SARS-CoV-2 infection is still being investigated *(7)*.

For the COVID-19 pandemic response, WHO has defined four transmission scenarios for COVID-19 *(8)*:

1. countries with no cases (No cases);
2. countries with one or more cases, imported or locally detected (Sporadic cases);
3. countries experiencing case clusters in time, geographic location and/or common exposure (Clusters of cases); and
4. countries experiencing larger outbreaks of local transmission (Community transmission).

Many countries implemented large-scale public health and social measures (PHSM) according to these transmission scenarios, including closure of schools and other educational intuitions to minimize the risk of transmission between adult staff and children and adolescents. WHO recommends adjusting these measures according to the evolving disease transmission pattern in the country *(9)*. As of 13 May 2020, according to the United Nations Educational, Scientific and Cultural Organization (UNESCO), 65 countries plan for partial or full reopening of schools, 32 ended the academic year online and 100 countries have not announced a date for school reopening *(10)*. The International Red Cross Federation, United Nations Children's Fund (UNICEF) and WHO issued early guidance for safe operations through the prevention, early detection and control of COVID-19 in schools and other educational facilities, specifically to countries that have already confirmed the transmission of SARS-CoV-2 *(11)*.

Following school re-opening before the 2020 summer school holiday, no major rises in the COVID-19 cases were reported in 22 European Union countries *(12);* however, large school outbreaks were reported in some countries (Israel, South Africa, etc.) *(13, 14)*. Since then, sporadic cases have been reported from schools in several European Union countries and schools were closed in parts of the United Kingdom of Great Britain and Northern Ireland and Germany for example, because of increases in cases. In addition, given the higher rates of disease seen in adults, the risk to teachers and other adult staff in schools has raised questions around the potential for disease transmission in schools that warrant continued consideration.

This protocol provides guidance for investigating transmission of SARS-CoV-2 in schools and other educational institutions. The protocol should be adapted and used locally, however the use of a standardized methodology enable results to be compared. At the national level, the ability of public health and educational authorities to enact these studies can also provide more locally relevant, contextual evidence on the policies and practices implemented, and timely information on updating or scaling up public health measures in this setting.

## 1.2 Considerations before starting an investigation

A COVID-19 school transmission investigation is triggered by identification of a confirmed case in a school or educational institution. Before starting the investigation, the public health authorities should define the geographic scope of this investigation (local, regional, national) and become aware of different surveillance initiatives and available public health practices in schools and other educational institutions within their jurisdiction.

Seeking cooperation and actively involving the local education authorities, schools' management and medical staff, parents' associations and parents themselves in the investigation will be of paramount importance for the efficient and smooth implementation of the investigation.

At this stage of the pandemic, many countries have activated or set up a multisectoral response strategy, including steps and plans for safe operation of educational facilities to be undertaken when a staff member or student become sick or tests positive for SARS-CoV-2. The school transmission investigation should be planned and coordinated with the response, taking into account the COVID-19 surveillance strategy and transmission scenarios in the community, as recommended in the latest WHO guidance *(8, 15)*.

## 1.3 Objectives

The overall aim of this protocol is to rapidly and systematically collect data to gain an understanding of the transmission dynamics of SARS-CoV-2 infection among cases and contacts within schools and other educational institutions (including kindergartens, pre-schools, nurseries, boarding schools, vocational schools, etc.).

The **primary objectives** of this investigation among cases and contacts within schools and other educational institutions are to collect data to enable:

- estimates of infection rates for overall and secondary SARS-CoV-2 infections in this setting;
- estimates of the secondary clinical attack rate of SARS-CoV-2 infection in this setting;
- estimates of the fraction of asymptomatic SARS-CoV-2 infections within schools and other educational institutions;
- to describe the epidemiological and clinical characteristics of primary and secondary cases of COVID-19; and
- to identify potential risk/protective factors associated with SARS-CoV-2 infection risk.

The **secondary objectives** are:

- to estimate the incubation period of SARS-CoV-2 and the duration of infectiousness and of detectable shedding;
- to estimate the serial interval of SARS-CoV-2 infection in this setting;
- to estimate the reproduction numbers: $R_0$ and $R$ of SARS-CoV-2 in this setting; and
- to characterize the serological response following confirmed SARS-CoV-2 infection.

For the purpose of understanding transmission in the school setting and addressing the primary objectives stated above, the scope of this protocol is restricted to the school setting. That is, the protocol does not address the further transmission from school to household, or household to school. Investigation teams interested in understanding transmission dynamics in the school and household settings are encouraged to adapt the investigation using the household transmission protocol *(16)*.

**A reminder of some definitions of epidemiological terms:**

- In this context, the **secondary infection rate** is a measure of the frequency of new **infections** of SARS-CoV-2 among contacts of confirmed cases in a defined period of time, as determined by a positive SARS-CoV-2 test result. *In other words, it is the rate of contacts being infected, assessed through polymerase chain reaction (PCR)/serological assays on paired samples*.
- The **secondary clinical attack rate** is a measure of the frequency of new symptomatic **cases** of SARS-CoV-2 infection among the contacts of confirmed cases in a defined period of time, as determined by a positive SARS-CoV-2 result. *In other words, it* is *the rate of clinical manifestation of the infection in contacts.*
- The **serial interval** is defined as the period of time from the onset of symptoms in the primary case to the onset of symptoms in a contact case.
- The **basic reproduction number $R_0$** is defined as the number of infections produced, on average, by an infected individual in the early stages of the epidemic, when virtually all contacts are susceptible. Note that it can be assumed that there will be limited immunity to SARS-CoV-2.
- The **incubation period** is defined as the period of time between an exposure resulting in SARS-CoV-2 infection and the onset of the first clinical symptoms of the disease (*from infection or exposure to disease*).
- The **duration of infectiousness** is the time during which virus is shed and transmissible, regardless of clinical symptoms.
- It is currently not known how long detectable SARS-CoV-2 shedding lasts; information from this study would help to clarify the **duration of detectable shedding** among individuals with confirmed infection.

## 1.4 Coordination of the investigation