

# School Sampling Preparation Guide

**COVID-19: Monitoring Impacts on Learning Outcomes  
(MILO)**

**11 February 2021**

The ACER Centre for Global Education Monitoring supports the monitoring of educational outcomes worldwide, holding the view that the systematic and strategic collection of data on education outcomes, and factors related to those outcomes, is required to inform high quality policy aimed at improving educational progress for all learners.





# Acknowledgments

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# Glossary

ACER	Australian Council for Educational Research
ENR	Enrolment
MOS	Measure of Size
NC	National Centre
NPM	National Project Manager
COVID-19: MILO	COVID-19: Monitoring Impacts on Learning Outcomes
UIS	UNESCO Institute for Statistics



# COVID-19: MILO Sampling Preparation Guide

## Introduction

The COVID-19 MILO survey will measure learning outcomes in six countries, in order to analyse the long term impact of COVID-19 on learning and to evaluate the effectiveness of distance learning mechanisms utilised during school closures. In addition, this study will develop the capacity of countries to monitor learning after the crisis.

The *COVID-19 MILO School Sampling Preparation Guide* is designed to support National Project Managers (NPMs) through the process of aligning their national target population definition to the sampling framework, considering the sample design best suited to their country, and preparing the national sampling frames.

A series of sampling forms have been created to support NPMs as they work through the sampling preparation process. These sampling forms are described throughout this manual and provide illustrative examples of how to perform the various steps.

This guide is intended for the members of the NC team responsible for the sampling activities within their respective countries. For further details on roles and responsibilities please refer the *COVID-19 MILO Sampling Framework*.

## Sampling Preparation Process

The main steps required to prepare for national sampling are summarised in the table below:

Step	Description	Supporting Resources
1	Describe the national target population	Sample Form 1: National Target Population
2	Describe national coverage and exclusions	Sample Form 2: Coverage and Exclusions
3	Determine stratification variables	Sample Form 3: Stratification
4	Prepare a sampling frame	Sampling Frame Example

It is important that as you work through the sampling preparation process, key stakeholders within the country are consulted about sample design decisions with respect to this assessment.

Please note that the space provided on the forms should not limit responses. It is useful to include more information rather than less. The space will expand with more content.

# COVID-19 MILO Sampling Framework

Sampling for this project is guided by the *COVID-19 MILO Sampling Framework*, which outlines the regional target population definition and a set of 12 sampling standards<sup>1</sup>. The standards aim to achieve precise estimates of student learning outcomes, enabling high quality, consistent data across the participating countries, and over time.

The sampling framework represents a commitment by countries to aim for high standards of participation and therefore careful planning will be required to ensure that these standards are achieved. During the sampling preparation phase, NPMs should regularly refer to these standards. Where standards are not achieved, the results will be annotated within international reporting to help readers evaluate the quality of outcomes.

## The Target Population

The target population for COVID-19 MILO is as follows:

All students enrolled in the grade that represents the end of primary education.

All students enrolled in the target grade in each participating country are included in the target population. This includes students from schools across all educational sub-systems and types within a country.

### Sampling Form 1: National Target Population

The purpose of **Sampling Form 1** is to define the national target population and detail contextual information related to the participating country's education system and any previous national sample based studies that have occurred.

The national target population must align with and comprehensively address the requirements of the project target population definition. Every effort should be made to ensure complete coverage when defining the national target population.

The following provides an example of Sampling Form 1, using a model country (Country ABC) as a reference, to illustrate the type and level of information

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<sup>1</sup> Refer the *COVID-19 MILO Sampling Framework* to view the sampling standards.



needed to complete the form. Further detail about the information required for completing Sampling Form 1 is below.

Question 1 asks the name of the grade level that is intended to be used as the target population for the survey. If the nation is appending the MILO survey to an existing national assessment, this may or may not be equivalent to the final year of primary school.

When responding to Question 4, if available, please provide an estimate of:

- The total enrolment for the target grade across the nation
- The number of schools
- Average class sizes
- The number of regions or states where eligible students are enrolled
- A brief description of the breakdown of the education system in the country relevant to the target grade that could be relevant for the survey, for example, the proportion of public/private schools, languages spoken

Please reference the source(s) used to obtain the above data in Question 5.

Question 6 requests details of existing national or large scale assessments of the target grade, and in the absence of this, assessments targeting students in the grade lower or higher. Included in the response should be any details available of the sample design such as:

- The school and student sample sizes;
- How the sample is clustered (for example, whole classes, or randomly chosen students within a grade irrespective of class);
- Stratification variables (for example, if students are sampled from all regions of the country, or from private and government funded schools);
- Intraclass correlation and design effect data.

Question 7 relates to the start and end date of the school year in which the testing period will occur (i.e. 2021). Then detail the actual testing period in Question 8.

For the MILO survey, the assessment is available in either English or French. Nominate in Question 9 whether the survey will be administered in English or French.

Figure 1: Sampling Form 1 Example

COVID-19 MILO	National Target Population				
<b>Sampling Form 1</b>					
COVID-19 MILO Participant:	Country ABC				
National Project Manager:	Mr John Citizen				
Date form completed:	1 February 2021				
<b>1 State the name of the grade you intend to use for the target population for the COVID-19 MILO survey.</b>	Grade 6				
<b>2 State the name of the grade in your country that corresponds to the final year of primary school.</b>	Grade 6				
<b>3 State the name of the grade which has previously been used to report against SDG 4.1.1(b).</b>	Grade 6				
<b>4 Briefly describe the size and distribution of the target population, that is eligible for COVID-19 MILO.</b>	There are approximately 6200 primary schools in Country ABC. Schools are either public schools (75%) which are government run or private schools (25%) which are independent and self-governing. Schools are spread across 6 provinces in the following proportions: Province 1 (33%), Province 2 (25%), Province 3 (18%), Province 4 (7%), Province 5 (10%) and Province 6 (7%). There are approximately 32,000 students in Grade 6 across the country and the average number of students in each class is 25-30.				
<b>5 Provide any references or links to documentation used to estimate the eligible population.</b>	Numbers were obtained from our national school database.				
<b>6 Please describe any national or other assessments that occur at the target grade level or in adjacent grade levels. Please provide a brief description of any sample designs for these assessments including school and student sample sizes, clustering and stratification, and any estimated intraclass correlation or sample design effects. This will assist us to develop the sample design for your country for this study.</b>	There is no national assessment at Grade 6 however there are assessments in Grade 5. There are not sample assessments, all students in Grade 5 would take part. In other sample assessments we do two-stage sampling where schools are selected from all provinces and one class of students selected at the relevant grade level in each school. In our last sample assessment of Grade 5 students, the sample size was 150 schools, 3000 students, explicitly stratified by province and implicitly stratified by sector, location and SEIFA. The target cluster size was 30.				
<b>7 Please specify the start and end dates of the school year.</b>	<table border="0"> <tr> <td>Start of School Year (DD-MMM-YYYY)</td> <td>End of School Year (DD-MMM-YYYY)</td> </tr> <tr> <td>25-Jan-21</td> <td>24-Dec-21</td> </tr> </table>	Start of School Year (DD-MMM-YYYY)	End of School Year (DD-MMM-YYYY)	25-Jan-21	24-Dec-21
Start of School Year (DD-MMM-YYYY)	End of School Year (DD-MMM-YYYY)				
25-Jan-21	24-Dec-21				
<b>8 Please specify the start and end date of the expected testing period.</b>	<table border="0"> <tr> <td>Start of Testing Period (DD-MMM-YYYY)</td> <td>End of Testing Period (DD-MMM-YYYY)</td> </tr> <tr> <td>01-Apr-21</td> <td>30-Apr-21</td> </tr> </table>	Start of Testing Period (DD-MMM-YYYY)	End of Testing Period (DD-MMM-YYYY)	01-Apr-21	30-Apr-21
Start of Testing Period (DD-MMM-YYYY)	End of Testing Period (DD-MMM-YYYY)				
01-Apr-21	30-Apr-21				
<b>9 Indicate the language(s) in which the survey will be administered.</b>	English				

# Coverage and Exclusions

The aim of COVID-19: MILO is to provide complete coverage of the national target population. However a small number of exclusions at school or student level are sometimes necessary, and in rare cases there may be reductions in coverage (for example a region recently affected by a major flood). For each participant, exclusions and reductions in coverage will be documented and quantified and will form part of the regional reporting.

A 5% threshold has been adopted as the upper limit for the exclusion of members of the survey population, either as a result of excluding schools or excluding individual students within schools. The objective is to minimise exclusions as much as possible.

The following outlines conditions under which reduced coverage and exclusions might occur.

## Reduced Coverage

In rare cases it might be necessary to reduce coverage to less than the full national target population due to political, operational or administrative reasons. For example, particular schools or geographic regions might be removed from the target population in the event of a natural disaster or political unrest.

## Exclusions

Exclusions can occur at a school or student level. School level exclusions refer to whole schools being excluded from the sample while student level exclusions, refer to specific students within sampled schools being excluded.

### School level exclusions

Schools are generally excluded from the survey for practical reasons, such as increased survey costs or difficult survey conditions. Examples of school-level exclusions include:

- very remote locations (inaccessibility)
- very small schools (for example, less than 5 students in the target grade)
- international schools (offering a curriculum other than the prescribed national curriculum)
- schools catering exclusively to students who are considered student-level exclusions

### Student level exclusions

The aim of COVID-19: MILO is to be as inclusive of as many students as possible, however, some students from sampled schools may be unable to access

the assessment and will therefore need to be excluded. The international student-level exclusion categories are defined below:

- Students with functional disabilities—these are students who have physical disabilities in such a way that they cannot take the COVID-19: MILO test. Functionally disabled students are those with a moderate to severe permanent disability. Students with functional disabilities who are able to perform the assessment should be accommodated in the test situation, within reason, rather than excluded.
- Students with intellectual disabilities—these are students who have a cognitive, behavioural or emotional disability confirmed by qualified staff, such that they are unable to take the COVID-19: MILO test. These are students who are cognitively, behaviourally or emotionally unable to follow even the general instructions of the test. Students should not be excluded solely because of poor academic performance or normal disciplinary problems. It should be noted that students with dyslexia, or other such learning disabilities, should be accommodated in the test situation, within reason, rather than excluded.
- Students with insufficient assessment language experience—these are students who are unable to read or speak the language(s) of the test and would be unable to overcome the language barrier in the test. Such students meet **ALL** the following three criteria:
  - they are not native speakers of the assessment language(s),
  - they have limited proficiency in the assessment language(s), and
  - they have received less than one year of instruction in the assessment language(s).

## Implications of Reduced Coverage and Exclusions

Any exclusions and reductions in coverage need to be well-documented and quantified during the sampling preparation process.

Significant reduced coverage and exclusions from the national target population mean that the survey results will no longer be nationally representative.

Therefore, the objective is to minimise the total number of exclusions. A 5% threshold has been adopted as the upper limit for combined exclusions from the survey population.

If the total of the school and student exclusions exceeds 5% of the national target population, this will be annotated in the final reports.

## Sampling Form 2: Coverage and Exclusions

The purpose of **Sampling Form 2** is to list the school and student level exclusions from the national target population.

Sampling Form 2 lists the school and student level exclusions from the national target population.

Student level exclusions may not be known in advance. But to avoid having outcomes annotated due to excessive exclusions, it is necessary to at least estimate these in advance of sampling, for example, by applying a rate calculated from a previous survey. If you expect extremely few or no such exclusions, note this on the form.

Below is an example of a completed Sampling Form 2.

Figure 2: Sampling Form 2 Example

COVID-19 MILO													
Sampling Form 2	Coverage and Exclusions												
COVID-19 MILO Participant:	Country ABC												
National Project Manager:	Mr John Citizen												
Date form completed:	1 February 2021												
Total enrolment in the target grade	[a] 32,512												
1 School-level exclusions													
<table border="1"> <thead> <tr> <th>Description of exclusions</th> <th># of students</th> </tr> </thead> <tbody> <tr> <td>Schools affected by natural disaster</td> <td>206</td> </tr> <tr> <td>Very remote schools</td> <td>105</td> </tr> <tr> <td></td> <td></td> </tr> <tr> <td></td> <td></td> </tr> <tr> <td><b>TOTAL</b></td> <td><b>311</b></td> </tr> </tbody> </table>	Description of exclusions	# of students	Schools affected by natural disaster	206	Very remote schools	105					<b>TOTAL</b>	<b>311</b>	[b]
Description of exclusions	# of students												
Schools affected by natural disaster	206												
Very remote schools	105												
<b>TOTAL</b>	<b>311</b>												
2 Percentage of school-level exclusions	1.0%												
3 Estimated student-level exclusions (if applicable)													
<table border="1"> <thead> <tr> <th>Description of exclusions</th> <th># of students</th> </tr> </thead> <tbody> <tr> <td>Students with special needs</td> <td>57</td> </tr> <tr> <td></td> <td></td> </tr> <tr> <td></td> <td></td> </tr> <tr> <td><b>TOTAL</b></td> <td><b>57</b></td> </tr> </tbody> </table>	Description of exclusions	# of students	Students with special needs	57					<b>TOTAL</b>	<b>57</b>	[c]		
Description of exclusions	# of students												
Students with special needs	57												
<b>TOTAL</b>	<b>57</b>												
4 Expected percentage of student-level exclusions	0.2%												
5 Expected percentage of reduced coverage and exclusions:	[d] 1.1%												

# Stratification

## Overview

Stratification is a process of organising the sampling frame to improve the efficiency of the sample design, resulting in more precise and reliable survey estimates, and ensuring proportional representation of specific groups within the national target population. Stratification can lead to improved reliability of estimates, provided that the variables are related to the major survey outcomes and national objectives.

## Explicit and Implicit Stratification

Stratification variables can be based on a range of contextual variables. There are two types of stratification, explicit stratification and implicit stratification.

Explicit stratification involves partitioning the sampling frame into mutually exclusive parts according to certain variables, from which separate, independent samples are drawn. Explicit stratification allows different sample designs to be applied to individual explicit strata.

Implicit stratification involves sorting the sample frame by the implicit stratification variables and then systematically sampling from the sorted list. The purpose of implicit stratification is to ensure a proportional sample allocation across all implicit strata and to improve the reliability of survey estimates.

## Stratification Guidelines

Stratification variables are identified by the NC and determined following consultation with ACER. The following guidelines should be applied when identifying stratification variables:

- selection of two to four stratification variables is usually adequate
- data must exist for each stratification variable with a valid entry for each school within the national target population
- avoid defining very small strata, as this is unlikely to improve the overall level of sampling precision
- variables should be related to key characteristics of the COVID-19: MILO survey outcomes.

Examples of stratification variables include:

- Geographic region (state, province, district);
- Sector (public, private);
- Urbanisation (urban, rural);
- Gender (male, female);
- Socio-economic status (low, medium or high income areas);

- School type (primary, middle school);
- School program (academic, vocational).

### Sampling Form 3: Stratification

The purpose of **Sampling Form 3** is to outline the stratification variables that will be used for COVID-19: MILO.

The first task when completing Sampling Form 3 is to list, in order of importance, each of the proposed stratification variables. Determination of final explicit and implicit stratification variables will be finalised during discussions between the NC and ACER following submission of the form.

Provide any further details about the proposed stratification variables that you believe may be of relevance to the sample design or that you wish to discuss with ACER in the section below the table.

The second task is to describe national interests with respect to additional local objectives. Following formal approval, this description may be used to formulate a design to meet those additional objectives.

This section provides an example of Sampling Form 3.





NCs plan these tasks well ahead of schedule. If you perceive any difficulties in being able to access a suitable database of schools, please discuss this with ACER early in the planning process.

The sampling frame should provide complete coverage of the defined target population, without containing incorrect entries, duplicate entries or entries that do not belong to the defined target population.

## **Sampling Frame Template**

The sampling frame will be prepared using Microsoft Excel. A template has been provided to assist to construct their national sampling frame. The template includes a school frame template and a school exclusions template, as well as, variable formatting instructions.

The sampling frame template contains the following fields for each school entry:

- a unique National School Identifier (ID)
- school contact information
- stratification variables
- measure of school size

## **National School ID**

The unique National School ID is the identification code used for each school within the participating country. Most countries have a National School ID and will use this to complete the sampling frame. A unique National School ID is essential to uniquely identifying schools during sampling.

## **School contact information**

School contact information will be used after the sample is drawn as part of the school liaison process to facilitate identification and location of the sampled schools as well as to communication with the sampled schools. School contact information may include the following:

- School name
- Street address
- Phone number
- Email address

School contact information is not required for sampling, therefore for data protection purposes the NC may choose to provide ACER with a reduced version of the sampling frame in which this information is omitted.

## **Stratification variables**

Stratification variables must be provided each with a value for each school consistent with those outlined in Sampling Form 3. Each school in the sampling frame should only belong to one category of each stratification variable. For example, a school can be classified as urban or rural, not both.

## **Measure of school size**

A suitable measure of size (MOS) is an essential component of the school sampling frame since school selection probabilities are based on these values. The most suitable MOS is the enrolment (ENR) of students in the target grade within each school. In cases where target grade ENR is not available, other measures of size can be used, for example, the total school enrolment. The same MOS should be used for each school. Where none of these MOS figures are available an alternative sampling plan will be determined in consultation with ACER.

Up-to-date and accurate enrolment data can greatly improve the precision of the sample, however it is understood that even the most up-to-date figures may vary from the actual number of eligible students at the school when this information is collected. The actual number of eligible students will be recorded as part of the within-school sampling process and where this number varies significantly from the estimate these schools will be flagged for follow up checking.

Figure 4: School Sampling Frame Example

National School ID	School Name	Address	Town	State	Postcode	Phone	Email	Target Grade ENR	Total School ENR	Sector	Location	SEIFA
ABC0001	Broad River School	Roseda-Tinamba Road	BROAD RIVER	VIC	3001	(03) 66431970	principal@broadriverschool.edu.au	36	216	Public	Urban	Medium
ABC0002	Broad River College	Shaw Drive	BROAD RIVER	VIC	3001	(03) 53497051	admin@broadrivercollege.edu.au	13	78	Private	Urban	Medium
ABC0004	Eastview Institute	Sale-Heyfield Road	EASTVIEW	QLD	4251	(07) 33151895	principal@eastviewinstitute.vic.edu.au	48	288	Private	Rural	Low
ABC0005	Eastview Secondary School	Railway Avenue	EASTVIEW	QLD	4251	(07) 37552187	principal@eastviewsecondaryschool.vic.edu.au	11	66	Private	Rural	Low
ABC0006	Elk Grove High School	Carlisle Street	ELK GROVE	SA	5418	(08) 53927516	principal@elkgrovehighschool.vic.edu.au	21	126	Public	Urban	High
ABC0007	Forest Lake School	Crofts Road	FOREST LAKE	QLD	4115	(03) 53900706	principal@forestlakeschool.vic.edu.au	56	336	Public	Urban	Medium
ABC0008	Golden Sierra School	Bourke Crescent	TARRANTYURK	NT	0868	(08) 53257345	principal@goldensierrasahool.vic.edu.au	31	186	Private	Urban	Medium
ABC0009	Greenville College	Armstrong Street	GREENVILLE	WA	6173	(08) 53210385	principal@greenvillecollege.vic.edu.au	15	90	Public	Urban	Low
ABC0010	Greenville Grammar School	Acheron Road	GREENVILLE	WA	6173	(08) 53961569	principal@greenvillegrammarschool.vic.edu.au	60	360	Private	Urban	Low
ABC0011	Hawking Institute	Redesdale Rd	SEDGWICK	NSW	2222	(02) 53515816	principal@hawkinginstitute.vic.edu.au	71	426	Public	Urban	Medium
ABC0013	Mountain Oak Institute	Cherokee Road	MOUNTAIN OAK	NSW	2132	(02) 53721165	principal@mountainoakinstitute.vic.edu.au	90	540	Private	Rural	Medium
ABC0014	Northride School for Girls	Romawi Road	NORTHRIDE	ACT	2603	(02) 53526260	principal@northrideschoolforgirls.vic.edu.au	76	456	Public	Urban	High
ABC0015	Oakland School	Corio Street	OAKLAND	WA	6339	(08) 53529664	principal@oaklandschool.vic.edu.au	30	180	Private	Urban	High
ABC0016	Pine Hill Academy	Edmundsons Road	PINE HILL	NSW	2558	(02) 53919983	principal@pinehillacademy.vic.edu.au	15	90	Public	Rural	Low
ABC0017	Riverdale School for Boys	Yarra Street	RIVERDALE	TAS	7541	(03) 53365677	principal@riverdaleschoolforboys.vic.edu.au	79	474	Public	Urban	Medium
ABC0018	Riverdale Secondary School	Swanston Street	RIVERDALE	TAS	7541	(03) 53456367	principal@riverdalesecundaryschool.vic.edu.au	24	144	Public	Urban	Medium

## School exclusions

Schools excluded in accordance with Sampling Form 2, should be identified on the sampling frame and removed prior to sampling. These schools and their enrolment sizes should be recorded on the School Exclusions sheet attached to the Sampling Frame Template, along with their reason for exclusion. The sampling frame should not contain excluded schools.

**Figure 5: School Exclusions Example**

National School ID	School Name	Target Grade ENR	School ENR	Reason for Exclusion
ABC0003	Glenn Russel Special School	21	147	Special education school
ABC0012	Metcalfe High School	3	21	Very remote school

## Sample Frame Submission

Once the sampling frame has been prepared, the Excel file should be uploaded to the secure online data transfer service (MyCloud). Once the sampling frame has been submitted, ACER will review the data provided. Before finalising the sampling frame an iterative consultation process will again be conducted between the NC and ACER to address any queries and clarifications.

## Next Steps

Following the preparation of the sample frame, the school sample will be selected.