# SARS-CoV-2 Antigen Rapid Diagnostic Test Training Workshop – Trainers Guide

## Introduction

Preparation is essential to the success of the SARS-CoV-2 Antigen Rapid Diagnostic Test User Training Workshop. This guide describes the activities that must be carried out in advance of and during the workshop to ensure that the workshop achieves the expected outcomes.

The SARS-CoV-2 Antigen Rapid Diagnostic Test User Training Workshop is intended for health care and laboratory workers who will be collecting samples and performing testing at clinical facilities using the SARS-CoV-2 Antigen Rapid Diagnostic Test (RDT). The objective of the workshop is to ensure that health care and laboratory workers are equipped with the theoretical and practical knowledge to safely and accurately collect samples, conduct SARS-CoV-2 Antigen RDT testing, interpret and record results, and understand the implications of results for patient management. The workshop concludes with a competency assessment for training participants.

For optimal learning experience and management of the workshop, it is recommended that the number of participants not exceed 10 (five participants per instructor). This number is small enough for all participants to be fully engaged, yet large enough for a variety of experiences and viewpoints to be represented.

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These materials have drawn from the examples of other long-standing disease control programmes that utilize RDTs. Therefore, WHO and FIND gratefully acknowledge the authors of and contributors to the following documents:

* Malaria rapid diagnostic tests: an implementation guide (The essentials for RDT implementation). Geneva: Foundation for Innovative New Diagnostics; 2013 (<https://www.finddx.org/wp-content/uploads/2016/03/FIND-2013_Malaria_RDT_Implementation_Guide.pdf>).
* HIV rapid test training package: trainer materials. Geneva: World Health Organization (<https://www.who.int/diagnostics_laboratory/documents/guidance/rt_training/en>
* SPII program-quality assurance cycle for reliable and accurate HIV results. A training program to ensure the accuracy of HIV test results. Atlanta: Centers for Disease Control and Prevention.

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## Facilities and equipment

### Training classrooms

For optimal learning experience and ease of managing logistics throughout the workshop, two rooms should be made available; however, it is acknowledged that COVID-19 restrictions may require lectures and discussions to be conducted virtually, with only practical sessions held face to face:

* Room A: for lectures, discussions and viewing of video content
* Room B: for hands-on practical exercises and proficiency (competency) testing.

The workshop can be held in any well-lit, ventilated, distraction-free classroom with 1) tables and chairs, and 2) conveniently located outlets for a computer and projection monitor. To facilitate discussion and interaction among participants, tables should be arranged in a semi-circle, or classroom-style, giving all participants an unobstructed view of the projection monitor. Avoid overcrowding. It is important to consider social distancing requirements when preparing the training venue and limit the training to smaller groups. Bottled water and glasses should be made available on each table. Facilities must be available for participants to clean their hands (with soap and water or an alcohol-based hand rub). Refer to local guidelines for measures that must be in place for workshops of this nature.

### Classroom equipment (Room A)

The classroom should have:

* two flip charts with easel
* laptop computer
* projector compatible with computer
* extension cord
* wastebasket
* markers
* masking tape for posting flip chart
* note pads (one per participant)
* pens and pencils (one per participant).

### Demonstration and practical: materials, supplies, and kits (Room B)

Make arrangements well in advance of the workshop to procure or secure the necessary materials, supplies and kits. Do not forget to arrange for transport of these items to the workshop site. Any unused supplies should be held for future workshops.

The following items are required for the practical training (see Annex 1):

* new (unopened) sterile swabs for each participant to perform three sample collections (these may be sold separately and must be compatible with the test kit, or they will be included in the standard test kit contents);
* personal protective equipment (PPE), including gloves, gowns, eye protection or face-shields, respirators (N95 or FFP2) (various sizes), and medical masks;
* pens for marking or labelling;
* household bleach (3–5%), ethanol (70%) and paper towels to clean the workstation and hands;
* soap for hand-washing or alcohol-based hand gel;
* sufficient test kits for each participant to perform three (practice) tests and up to two competency (proficiency) tests;
* at least two leak-proof biohazard bags for containing or moving biohazard waste;
* at least two waste bins for biohazard bags;
* two spray bottles (one for bleach, the other for ethanol) per workstation (maximum five people per workstation);
* measuring devices (2) for making bleach and alcohol solutions;
* timers (5);
* proficiency test materials (positive and negative controls)[[1]](#footnote-2), which are either included in the SARS-CoV-2 Antigen RDT test kit or sold separately;
* SARS-CoV-2 Antigen RDT Logbooks (2);
* Thermometers
* Reading glasses (to be used by participants who may have difficulty in reading the test lines)

### Print and electronic materials needed for training

The workshop trainer is responsible for making sure that the appropriate materials are available for each participant at the start of the workshop:

* attendance register
* name badges
* user training slide presentations listed in table below:

|  |  |
| --- | --- |
| 01-Introduction | 06-Sample collection |
| 02-Overview of SARS-CoV-2 testing | 07-Preparation for testing: Supplies |
| 03-SARS-CoV-2 testing strategies | 08-Performing the SARS-CoV-2 Antigen RDT |
| 04-Quality testing using RDTs | 09-Using SARS-CoV-2 RDT data |
| 05-Safety for SARS-CoV-2 testing | 10-Assuring quality results |

* printouts: SARS-CoV-2 Antigen RDT Competency Assessment (one per participant)
* printouts: SARS-CoV-2 Antigen RDT Result Recording Sheet (one per participant)
* printouts: SARS-CoV-2 Antigen RDT Reading Sheet (one per participant).

Certificates – At the end of the workshop, each participant who has met the criteria for successful completion will receive a Certificate of Successful Completion of SARS-CoV-2 Antigen RDT Training Workshop. Prior to the workshop, you will need to:

* identify appropriate individual(s) who will sign the certificate
* verify spelling of the names of the participants
* print the certificates.

### Scope and duration of workshop

It is important to have an understanding of the participants’ baseline knowledge and skillsets so that the appropriate modules can be selected and time allotments tailored to the greatest needs. The content included in the training materials is designed to meet the needs of health worker cadres from laboratory technicians to community health workers. Trainers are encouraged to adjust the time allotted for particular modules of instruction or exercises based on the identified needs (see below). The theoretical and practical sessions of this workshop are designed to be delivered in approximately five hours. However, the training duration will vary depending on the number of participants, the number of facilitators and how much time is dedicated to the practical sessions:

|  |  |
| --- | --- |
| **Topic** | **Allotted Time** |
| Welcome and introduction (Module 01)  | 15 minutes |
| Preparing for testing (Modules 02–07)  | 60 minutes |
| Testing (Module 08) | 15 minutes |
| Practical demonstration  | 60 minutes |
| Tester practice  | 45 minutes |
| Monitoring performance (Modules 09–10)  | 20 minutes |
| Competency assessments  | 60 minutes |
| Thank you and close | 5 minutes |

### Customizing the training

The SARS-CoV-2 Antigen Rapid Diagnostic Test User Training can be customized in two ways:

1. The content of the PowerPoint presentations can be customized to reflect the guidelines and practices in the users’ country. The slides that can be adapted to the context are marked with the symbol below. Any adaptations must be made prior to training in consultation with the Ministry of Health (MoH), and the symbol should be removed from the final presentations. The country algorithm for SARS-CoV-2 testing needs to be inserted in Module 3: SARS-CoV-2 testing strategies (Slide 13). In addition, supplementary materials such as sample request forms, reporting forms, logbooks and Monitoring & Evaluation tools can be added to the training package as required.

Adapt according to the guidelines in your country



1. The theoretical and practical session content of this workshop should be customized to the needs of the participants. For example, if participants have previously been trained on sample collection, it may not be necessary to include this content in the training. This may significantly reduce the length of the workshop and also ensure that the training is relevant to the participants. If possible, laboratory and health care workers should be trained separately, as the proposed theoretical and practical content may differ for these groups. If separate training is not feasible, the suggestion is to provide a comprehensive theoretical training, and then to revise the practical sessions and competency assessments as required. The proposed workshop content for laboratory and health care workers is marked with a tick below. Content for use only in Training of Trainer workshops is marked with a cross:

|  |  |  |
| --- | --- | --- |
| **Topic** | **Laboratory workers** | **Health care workers** |
| **01-Introduction** |
| Slides 1–4 | ✔️ | ✔️ |
| Slide 5 | ✘ | ✘ |
| Slide 6 | ✔️ | ✔️ |
| Slide 7 | ✘ | ✘ |
| Slides 8–12 | ✔️ | ✔️ |
| **02-Overview of SARS-CoV-2 testing** |
| Slides 1–8 | ✔️ | ✔️ |
| **03-COVID-19 testing strategies** |
| Slides 1–13 |  | ✔️ |
| **04-Quality testing using RDTs** |
| Slides 1–14 | ✔️ | ✔️ |
| **05-Safety for COVID-19 testing** |
| Slides 1–5 | ✔️ | ✔️ |
| Slides 6–7 | ✔️ |  |
| Slides 8–21 | ✔️ | ✔️ |
| Slide 22 | ✔️ |  |
| Slide 23  | ✔️ | ✔️ |
| Slide 24 |  | ✔️ |
| Slide 25 | ✔️ | ✔️ |
| **06-Sample collection** |
| Slides 1–13 |  | ✔️ |
| Slides 14–17 | ✔️ | ✔️ |
| **07-Preparation for testing: Supplies** |
| Slides 1–10 | ✔️ | ✔️ |
| Slides 11–12 | ✔️ |  |
| Slide 13 | ✔️ | ✔️ |
| Slides 14–20 | ✔️ |  |
| **08-Performing the SARS-CoV-2 Antigen RDT** |
| Slides 1–23 | ✔️ | ✔️ |
| **09-Using SARS-CoV-2** **RDT data** |
| Slides 1–9 | ✔️ | ✔️ |
| Slides 10–11 |  | ✔️ |
| Slides 12–14 | ✔️ | ✔️ |
| Slide 15  | ✘ | ✘ |
| Slides 16–17 | ✔️ | ✔️ |
| Slides 18–20  | ✘ | ✘ |
| Slides 21–22 | ✔️ | ✔️ |
| Slide 23 | ✘ | ✘ |
| **10-Assuring quality results** |
| Slides 1–8 | ✔️ | ✔️ |
| Slide 9 | ✔️ |  |
| Slides 10–14 | ✘ | ✘ |
| Slides 15–16 | ✔️ |  |
| Slides 17–21 | ✔️ | ✔️ |
| **11-Training end-users** |
| Slides 1–33 | ✘ | ✘ |

### Performing the practical demonstration

The objective of the practical demonstration is to familiarize the participants with:

* biosafety for sample collection and testing, including risk assessment
* nasopharyngeal sample collection
* preparation of disinfectants
* recording room temperature
* performing the SARS-CoV-2 Antigen RDT(s)
* interpreting SARS-CoV-2 Antigen RDT test results
* recording results in the SARS-CoV-2 Antigen RDT Logbook
* managing COVID-19 patients in their setting.
1. To perform the practical demonstration of SARS-CoV-2 Antigen RDT testing, ensure that the room for the practical exercises is set up in advance. Ideally, separate workstations for sample collection and testing should be set up in the front of the room with sufficient space so that participants can see the demonstration, while maintaining social distancing. The room should be well-lit and ventilated.
2. The workstations for performing sample collection and testing should be set up as they would be at the testing site (see Fig. 1). Waste disposal and disinfectants must be available for the demonstration.
3. For the demonstration of sample collection, use the opportunity to instruct participants on the donning and doffing of PPE. The demonstration (+/- video) and subsequent practical training **must** be conducted wearing PPE and adhering to all safety guidelines.
4. Ensure that the proficiency test materials are available for the demonstration of the SARS-CoV-2 Antigen testing and competency assessments. See “Module 10: Assuring quality results” for instructions on how to prepare the quality control materials for the demonstration and competency assessments. The proficiency test materials are potentially biohazardous.
5. As with the sample collection demonstration, the practical training **must** be conducted wearing PPE and adhering to all safety guidelines.
6. Record the sample details on the SARS-CoV-2 Antigen RDT Result Recording Sheet. If possible, demonstrate the SARS-CoV-2 Antigen RDT using one positive and one negative control.[[2]](#footnote-3)
7. Using the “Instructions for Use” for guidance, systematically perform the SARS-CoV-2 Antigen RDT, clearly explaining each step of the process.
8. Emphasize the safety considerations with each step.
9. During the incubation step (typically 15 minutes), explain the workstation setup, make-up of disinfectants and waste disposal.
10. After the SARS-CoV-2 Antigen RDT has been completed, record the result on the SARS-CoV-2 Antigen RDT Result Recording Sheet and train the participants on the procedure for recording the results in the SARS-CoV-2 Antigen RDT Logbook.
11. Using the SARS-CoV-2 Antigen RDT Reading Sheet, instruct participants on interpreting the test results and discuss the management of COVID-19 positive and negative patients in their setting.
12. Instruct participants on the procedures for disinfecting their workstation and doffing their PPE.

NOTE: If a nasopharyngeal swab was collected from one of the trainers or participants because no positive and negative controls were available and the sample tests positive, appropriate care must be taken and case management procedures followed.

**Fig. 1. Suggested workstation setup for SARS-CoV-2 Antigen RDT testing**



1. For the user practice session, assign participants to their workstations. Have them don the PPE provided and perform the nasopharyngeal sample collection as instructed. Each participant should perform the procedure twice. The trainer/facilitator should support each participant until they show competency in performing the procedure.
2. After sample collection, have the participants perform the SARS-CoV-2 Antigen RDTs using the swab they collected. If positive and negative swabs are available, these may be used. If reconstituted controls are available, these may be used, but it is important to observe the participant performing the test procedure with the swab.
3. Each participant should perform the test procedure three times. The trainer/facilitator should support each participant until they show competency in performing the procedure.
4. Remember that the proficiency test materials are potentially biohazardous. The user practice **must** be conducted wearing PPE and adhering to all safety guidelines. One trainer should not oversee more than five participants during the user practice.
5. Emphasize that participants must follow the SARS-CoV-2 Antigen RDT “Instructions for Use” for guidance. Participants **must not** try to remember the procedure.
6. During the incubation step (typically 15 minutes), re-emphasize the workstation setup, make-up of disinfectants, recording of room temperature and waste disposal.
7. After the SARS-CoV-2 Antigen RDT has been completed, have the participants record their result on the SARS-CoV-2 Antigen RDT Result Recording Sheet and in the SARS-CoV-2 Antigen RDT Logbook.
8. Using the SARS-CoV-2 Antigen RDT Reading Sheet, have the participants interpret the test results and discuss the management of COVID-19 patients in their setting.
9. Conclude the user practice session by having the participants disinfect their workstation and doff their PPE.

NOTE: If the participants used nasopharyngeal swabs collected from other participants because no positive and negative controls were available and a sample tests positive, appropriate care must be taken and case management procedures followed.

### Performing the competency assessment

The objective of the competency assessment is to determine whether participants have understood the content of the training, can safely and accurately perform the nasopharyngeal sample collection and SARS-CoV-2 Antigen RDT, and can interpret the test results. Detailed instructions for performing the competency assessment are available on the SARS-CoV-2 Antigen RDT Competency Assessment worksheet. The competency assessment may need to be updated based on the SARS-CoV-2 Antigen RDT in use and adapted to the personnel being trained (e.g., laboratory staff may not be required to perform specimen collection). In brief:

1. Observe the participant performing nasopharyngeal sample collection. Use the Competency Assessment Form to record whether the sample collection is performed correctly.
2. Observe the participant performing the SARS-CoV-2 Antigen RDT using two blinded samples (one positive and one negative). Use the Competency Assessment Form to record whether the test is performed correctly. If no positive and negative controls are available, the participants can perform the SARS-CoV-2 Antigen RDT testing on the nasopharyngeal swab that they collected. It is important to observe the participant performing the test procedure with the swab.
3. Provide the participant with the theoretical questions sheet and have them record their answers to the five multiple-choice questions.
4. Record whether they have answered the theoretical questions correctly.
5. Provide the participant with the SARS-CoV-2 Antigen RDT Reading Sheet and record their interpretation of the test results.
6. Using the SARS-CoV-2 Antigen RDT Reading Sheet, determine whether the participant understands the management of COVID-19 patients in their setting.
7. Score the competency assessment.

### Certificate

1. If participants pass the competency assessment, they can conduct nasopharyngeal sample collection and SARS-CoV-2 Antigen RDT testing at their testing site.
2. Participants who pass the competency assessment receive the Certificate of Successful Completion (SARS-CoV-2 Antigen RDT). Relevant national authorities may alternatively wish to offer a Certificate of Competency.
3. If participants do not pass the competency assessment, they must be re-trained, and the competency assessment must be repeated.
4. After the training, participants’ performance should be monitored in the field. Once participants pass the competency assessment and start testing patient samples routinely, a system should be put in place to monitor their performance. This is covered in Module 09: Using SARS-CoV-2 RDT data and Module 10: Assuring quality results.

### Supplementary documentation and tools

* SARS-CoV-2 Antigen Rapid Diagnostic Test – Competency Assessment
* SARS-CoV-2 Antigen Rapid Diagnostic Test – Result Recording Sheet
* SARS-CoV-2 Antigen Rapid Diagnostic Test – Reading Sheet
* SARS-CoV-2 Antigen Rapid Diagnostic Test – Frequently Asked Questions
* SARS-CoV-2 Antigen Rapid Diagnostic Test – Logbook (Microsoft Excel)
* SARS-CoV-2 Antigen Rapid Diagnostic Test – Testing Facility Supervision Checklist
* SARS-CoV-2 Antigen Rapid Diagnostic Test – Testing Facility Readiness Checklist
* SARS-CoV-2 Antigen Rapid Diagnostic Test – Checklist of Training Materials
* Job Aid: How to Do a SARS-CoV-2 Antigen Rapid Diagnostic Test
* How-to Guide – Putting on PPE / Taking off PPE
* SARS-CoV-2 Training Certificate Template
* SARS-CoV-2 Antigen Rapid Diagnostic Test Training Workshop – Training Evaluation Form

### Additional reading and resources

The following resources provide more information on SARS-CoV-2 diagnostics. Trainers are encouraged to familiarize themselves with the guidelines that pertain to using SARS-CoV-2 Antigen RDTs and diagnostics at clinical facilities:

* Antigen-detection in the diagnosis of SARS-CoV-2 infection using rapid immunoassays. Interim guidance. Geneva: World Health Organization; 2020 (<https://www.who.int/publications/i/item/antigen-detection-in-the-diagnosis-of-sars-cov-2infection-using-rapid-immunoassays>).
* Country & technical guidance - Coronavirus disease (COVID-19) [website]. Geneva: World Health Organization; 2020 (<https://www.who.int/emergencies/diseases/novel-coronavirus-2019/technical-guidance>).
* Diagnostic testing for SARS-CoV-2. Interim guidance. Geneva: World Health Organization; 2020 (<https://www.who.int/publications/i/item/diagnostic-testing-for-sars-cov-2>).
* Coronavirus disease (COVID-19) pandemic – Emergency Use Listing Procedure (EUL) open for in vitro diagnostics [website]. Geneva: World Health Organization; 2020 (<https://www.who.int/diagnostics_laboratory/EUL/en/>).
* Post-market surveillance for in vitro diagnostics (IVDs) [website]. Geneva: World Health Organization (<https://www.who.int/diagnostics_laboratory/postmarket/en/>).
* WHO clinical care for severe acute respiratory infection toolkit. Interim guidance. Geneva: World Health Organization; 2020 (<https://www.who.int/publications/i/item/clinical-care-of-severe-acute-respiratory-infections-tool-kit>).
	+ Page 12: Screening and triage
	+ Pages 28 & 30: Decision making algorithms
	+ Pages 40 to 43: Safety
	+ Pages 59 & 60: Sample collection
	+ Pages 64 & 65: Sample transport
* Coronavirus disease 2019 (COVID-19) – Guidance documents. Atlanta: Centers for Disease Control and Prevention; 2020 (<https://www.cdc.gov/coronavirus/2019-ncov/communication/guidance-list.html?Sort=Date%3A%3Adesc>).
* Pai N, Wilkinson S, Deli-Houssein R, Vijh R, Vadnais C, Behlim T, et al. Barriers to implementation of rapid and point-of-care tests for human immunodeficiency virus infection: findings from a systematic review (1996–2014). Point of Care. 2015;14:81–87. doi:10.1097/POC.0000000000000056.
* Video guide for STANDARD Q COVID-19 Ag test: <https://www.youtube.com/watch?v=M-9cx3raYtY>
* PANBIO™ COVID-19 AgRAPID Test device: [https://www.globalpointofcare.abbott/en/product-details/panbio-covid-19-ag-antigen-test.html#](https://www.globalpointofcare.abbott/en/product-details/panbio-covid-19-ag-antigen-test.html)

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### Annex 1. SARS-CoV-2 Antigen Rapid Diagnostic Test – Checklist of training materials

### Classroom equipment (Room A)

|  |  |  |
| --- | --- | --- |
| Items | Quantity | Check |
| Flip charts with easel | 2 | ◻️ |
| Laptop computer | 1 | ◻️ |
| Projector compatible with computer | 1 | ◻️ |
| Extension cord | 1 | ◻️ |
| Wastebasket | 1 | ◻️ |
| Markers | 3 | ◻️ |
| Masking tape for posting flip chart | 1 | ◻️ |
| Note pads | 1 per participant | ◻️ |
| Pens and pencils  | 1 per participant | ◻️ |

### Demonstration and practical (Room B)

| Items | Quantity | Check |
| --- | --- | --- |
| New (unopened) sterile swabs | 3 per participant | ◻️ |
| Personal protective equipment (PPE) including: |
| Gloves (various sizes) | 5 pairs per participant | ◻️ |
| Gowns | 1 per participant | ◻️ |
| Eye protection or face-shields | 1 per participant | ◻️ |
| Respirators (N95 or FFP2) | 1 per participant | ◻️ |
| Pens for marking or labelling | 1 per participant | ◻️ |
| Disinfectants and handwash: |
| Household bleach (3–5%) | 1 bottle (1L) | ◻️ |
| Ethanol (70%) | 1 bottle (1L) | ◻️ |
| Soap for hand-washing or alcohol-based hand gel  | 1 bottle (500mL) | ◻️ |
| Paper towels to clean the workstation and hands | 1 roll | ◻️ |
| SARS-CoV-2 Antigen RDTs | 5 per participant1 | ◻️ |
| Leak-proof biohazard bags for containing or moving biohazard waste | 1 per 5 participants | ◻️ |
| Waste bins for biohazard bags  | 1 per 5 participants | ◻️ |
| Two spray bottles (one for bleach, the other for ethanol) | 2 | ◻️ |
| Measuring devices for making bleach and alcohol solutions | 2 | ◻️ |
| Timers | 1 per 5 participants | ◻️ |
| Proficiency test materials (positive and negative controls) | 5 per participant1 | ◻️ |
| SARS-CoV-2 Antigen RDT Logbooks  | 1 per 5 participants | ◻️ |
| Thermometer  | 1 | ◻️ |

1 Include at least one spare per participant in the event of an accident or re-training. If no positive and negative controls are available, collect nasopharyngeal swabs for demonstrating the SARS-CoV-2 Antigen RDT testing and conducting the competency assessments.

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1. See Module 10 for instructions on how to prepare the proficiency test materials. [↑](#footnote-ref-2)
2. If no positive and negative controls are available, collect a nasopharyngeal swab from one of the trainers or participants and use this sample to demonstrate the SARS-CoV-2 Antigen RDT. [↑](#footnote-ref-3)