Despite availability of COVID tests, there is continued inequity in testing rates

Testing Rates and the ACT-A Target

- The global ACT-A target is 1 test/1,000 population/day
- LICs and LMICs continue to test at a fraction of HICs test rates.
- As of Feb 2022 (tests/1,000 people/day):
  - High-income countries: 13.80
  - Upper middle-income countries: 0.51
  - Lower middle-income countries: 1.03
  - Low-income countries: 0.12
Adoption Issues for COVID Testing Mirror Broader Health Challenges

- Lack of funding
- Challenges in supply chain and limited availability of access to tests beyond health facilitates
- Regulatory review and approval
- Variable perceptions of importance / utility in testing among stakeholders and general population
- Restrictive eligibility / case-definition criteria for testing
- In-country governance and financing structures
- Inadequate health workforce and health system capacity
- Political will and competing priorities, especially vaccines
- Lack of accessibility to testing for individuals related to lack of testing facilities in area, travel required to get tested, high prices of tests, and lack of knowledge about where to get tested

Source: ACT-A Analysis
Timeline of WHO guidance for diagnostic testing for SARS-CoV-2

17 Jan. 2020
- First release of interim guidance on laboratory testing for SC2 (update in March 2020)

21 Dec 2020
- Released SC2 Ag-RDT implementation guide (WHO-FIND collaboration)

July 2021
- OpenWHO course “SARS-CoV-2 antigen rapid diagnostic testing”

Jan 2022
- OpenWHO course “Implementation of SARS-CoV-2 antigen-detection rapid tests”

March 2022 (ANTICIPATED–)
- Release of enabling recommendations on the use of self-tests for SC2

Release of interim guidance on Diagnostic testing for SC2
- First release of interim guidance on Antigen-detection in the diagnosis of SC2

11 Sep. 2020

25 June 2021
- Release of recommendations for national SC2 testing strategies and diagnostic capacities

06 Oct 2021
- Updated guidance on Antigen-detection in the diagnosis of SC2

Feb 2022
- External Guideline Development group reviewing evidence on use of self-tests for SC2

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WHO has released 5 infographics to facilitate access to impactful testing services.

Diagnostic testing for SARS-CoV-2 infection

WHO recommends that all suspected cases be tested for SARS-CoV-2.

Use of antigen-detection rapid diagnostic testing

WHO recommends that all suspected cases be tested for SARS-CoV-2.

Who should be tested for SARS-CoV-2?

Regardless of vaccination status or COVID-19 disease history.

When capacity is limited, who should be tested for SARS-CoV-2?

Prioritization

- Symptomatic health or care worker with an known COVID-19 contact
- Individual meeting case definition for COVID-19, needing admission to health care facility

Population Groups

- Symptomatic health or care worker identified once contact

Examples of where testing can be done:

- Health care facilities, clinics, health centers, and pharmacies
- Community-based testing sites, such as walk-through or drive-through centers, through outreach
- At home

Why is testing for SARS-CoV-2 important?

Test should be reliable, accurate, affordable, accessible and provide results rapidly.

Results of testing are important for a number of reasons:

- Enables individuals to know if they are infected
- Prevents transmission by empowering individuals to protect their families and communities
- Ensures appropriate clinical care and support to individuals
- Enables a better understanding of where the virus is circulating to inform the COVID-19 response
The WHO pipeline of tests for EUL approval

<table>
<thead>
<tr>
<th>IVD products</th>
<th>Nucleic acid</th>
<th>Antigens</th>
<th>Antibodies</th>
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<tr>
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<td>Dossier received</td>
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<td></td>
</tr>
<tr>
<td>• Screening</td>
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<td>15</td>
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<tr>
<td>• Under assessment</td>
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<tr>
<td>In renewal process</td>
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<td>3</td>
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<tr>
<td>Not Renewed</td>
<td>1*</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td><strong>EUL listed</strong></td>
<td>24 (-1)</td>
<td>5</td>
<td>1</td>
</tr>
<tr>
<td><strong>EUL not accepted</strong></td>
<td>28</td>
<td>21</td>
<td>10</td>
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</table>

*withdrawn
WHO EUL processes are being modified to account for urgent needs

- **Increasing capacity of teams** through collaborations with national regulatory agencies
- **Revised EUL procedures** are being developed in order to expedite assessment & listing times
- **Early triage of incomplete dossier** in order to focus limited resources on more promising dossiers
- **Revising scope & prioritization of EUL eligible tests**
  - i.e. stop accepting applications for IVDs not considered high priority for procurement
  - i.e. inclusion of SARS CoV-2 Ag RDT self-tests, once supporting WHO guidance is published
Now is the time for scaling diagnostics

Political engagement with diagnostics; continued focus and prioritization of funding lab systems in order to increase testing rates and enhance sequencing services

Leap forward in technology development, accessibility and affordability with a focus on increasing funding and research attention

Preparing for the next threat by strengthening health systems, workforce and governance structures thereby improving rapid development and deployment for the next pandemic threat, including the G7 100-day agenda

Focused interest on local manufacturing to support manufacturing equity, driven by the spotlight on fragile supply chains
New variants are a global concern: sequencing capacity

*HICs + China + Russia

Source: GISAID, Feb 2021 to Jan 2022
Effectiveness of Dx tools against Omicron

- **Ag-RDT**: All widely used Ag-RDTs can detect Omicron infections. However, a lower analytic sensitivity of Ag RDTs to Omicron (cultured virus) compared to earlier variants has been observed in many labs.

- **Ag-RDT**: Discrepant results on whether oral or nasal (NP/OP) swabs are better samples for the detection of Omicron.

- **Ag-RDT**: Current Ag-RDT guidance for Covid-19 testing should remain in place, including sample type – no need for change at the moment.

- **PCR**: The use of S gene target failure as a proxy marker to screen for Omicron should be interpreted with great caution, largely due to emergence of BA.2 sub-variant. Omicron surveillance should be via sequencing.
# Global Goal Unite

## Summary: analytical studies for key SARS-CoV-2 Ag-RDTs

### Independent Studies

<table>
<thead>
<tr>
<th>Manufacturer</th>
<th>Test name</th>
<th>Regulatory</th>
<th>Manufacturer claim*</th>
<th>Ref</th>
<th>Sample size</th>
<th>Delta</th>
<th>Sample size</th>
<th>Omicron</th>
<th>Impact of Omicron</th>
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<td>Panbio</td>
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<td>17</td>
<td>3.34 ( \times 10^6 ) PFU/mL</td>
<td>↓</td>
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<td></td>
<td>2</td>
<td>4</td>
<td>6.0 ( \log_{10} ) RNA cp/mL</td>
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<td>6.0 ( \log_{10} ) RNA cp/mL</td>
<td>No impact</td>
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<tr>
<td>2</td>
<td>Abbott</td>
<td>BinaxNOW</td>
<td>FDA EUA</td>
<td>3</td>
<td>30</td>
<td>( \text{Ct} = 25 )</td>
<td>32</td>
<td>( \text{Ct} = 27 )</td>
<td>↑</td>
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<tr>
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<td>SD Biosensor</td>
<td>Standard Q</td>
<td>WHO EUL</td>
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<td>3.03 ( \times 10^6 ) PFU/mL</td>
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<td>3.94 ( \times 10^6 ) PFU/mL</td>
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<td>4</td>
<td>6.0 ( \log_{10} ) RNA cp/mL</td>
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<td>6.0 ( \log_{10} ) RNA cp/mL</td>
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<td>2.73 ( \times 10^6 ) PFU/mL</td>
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<td>2019-nCoV Antigen test</td>
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<td>3.64 ( \times 10^6 ) PFU/mL</td>
<td>↑</td>
</tr>
</tbody>
</table>

* Manufacturers claim as per evidence submitted to FIND testing database Jan 2022

References: 1 Bekliz et al, 2021 (pre-print) / 2 Deerain et al., 2021 / 3 Kanjilal et al., 2021 (pre-print)
Performance with clinical specimens

Clinical sensitivity of 7 Ag RDTs on Omicron (n=18) and Delta (n=17) breakthrough infections

Nasopharyngeal specimen, first 5 days post-symptom onset;
RNA viral load, days post symptom onset and infectious virus presence did not differ significantly between the groups.

Disclaimer: list of studies are not exhaustive
Performance of Ag RDT vs PCR against Omicron

Figure. 731 consecutive walk-up subjects at a San Francisco community testing center were tested by nasal swab on 3-4 January 2022. 296 of 6731 subjects were positive for SARS-CoV-2 (test positivity rate = 40.5%, and 98.5% were shown to have infection Omicron variant. (Adapted from Schrom et al.1).

1. Schrom et al., 12 Jan 2022. Available at: medRxiv preprint. doi: https://doi.org/10.1101/2022.01.08.22268954
Differences between saliva and nasal swabs
Limited data and discordant results

**[PCR Data] Marais et al., 2021 (Groote Schuur Hospital Covid testing centre, Cape Town)**

“The current standard of care for diagnosis using swabs of the nasal or nasopharyngeal mucosa may be suboptimal for the Omicron variant.”

**[PCR vs RDTs] Adamson et al., 2022 (occupational cohorts, New York and San Francisco)**

“A subgroup (n=5) who received daily saliva PCR, nasal swab PCR, and nasal swab rapid antigen testing showed viral load peaked in saliva 1-2 days before nasal tests”

**[PCR Data] Schrom et al., 2022 (outdoor testing site, San Francisco)**

“Our data argue against replacing nasal swabs with throat swabs for diagnosis”

**[Ag RDT Data] Eckerle et al., 2022 (outpatient testing centre, HUG)**

Prospective clinical study - Preliminary results (unpublished) showed no higher sensitivity of Ag RDTs on OP (oropharyngeal) compared to NP (nasopharyngeal), as well as a lower Ct in saliva samples compared to NP and OP.
PCR testing: S gene test failure (SGTF) and Omicron sub lineages

- The Omicron variant has three sub-lineages: BA.1, BA.2* and BA.3. Overall, BA.1 is the dominant sub-lineage globally but BA.2 is increasing in particular countries.

- A minority of Omicron sequences (including all BA.2) lack the genetic deletion in the spike protein which produces S-gene test failure in some PCR tests.

- This deletion is also found in other VOCs (e.g., Alpha and subsets of Gamma and Delta).

The use of S gene target failure as a proxy marker to screen for Omicron should be interpreted with caution. Confirmation by sequencing should be made at least for a subset of samples.

- PCR-based screening assays (e.g., Single Nucleotide Polymorphism genotyping) may be useful proxy markers depending on the setting.

#GlobalGoalUnite  *BA.2 has been designated a variant under investigation in the UK, based on increasing numbers of BA.2 sequences identified both domestically and internationally.
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