THE PHILIPPINE - AMERICAN Academy of Science & Engineering

OUR RESPONSE TO COVID-19

AGHAM AT KAALAMAN PARA SA BAYAN!

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PAASE BULLETIN # 11

ON PAASE STRATEGIC ACTION GROUP 3: MASS TESTING & FAST-TRACKING

Addressed to: DOH and COVID-19 IATF

A 3-STEP RECOMMENDATION FOR DIAGNOSTIC TESTING USING ANTIBODY AND PCR TESTS IN LOW-RESOURCE AREAS

PAASE recommends the following algorithm for COVID-19 diagnostic testing using antibody and/or PCR tests to be used by healthcare workers in low-resource areas.

A. Challenges in COVID-19 diagnostics

The current guideline tests only those exhibiting moderate to severe symptoms. Unfortunately, this misses those with mild symptoms and infected asymptomatics who may be spreading the disease unknowingly. Frontline healthcare workers (HCW) are not getting the benefit of testing (unless they exhibit moderate to severe symptoms) as they perform their work caring for COVID-19 patients.

B. Recommendations

1. We recommend **enhanced testing** to include patients under investigation (PUI) and patients under monitoring (PUM) and all suspected to be exposed, regardless of whether or not they show symptoms. Positives must be isolated, monitored and treated. Contact tracing must follow a positive test and contacts must also be monitored. This informs a more targeted quarantine and will play a role in the government's actions post-lockdown.
2. Our healthcare workers must also be supported with **regular testing** even if they do not show symptoms, using either or both antibody and PCR tests, if possible.
3. Antibody testing can augment our currently limited testing capacity. Some antibody tests can give rapid results, are inexpensive and will help in places that have little or no access to PCR testing. **We provide step-by-step guidelines on the use and utility of antibody tests by themselves in low-resource areas and in combination with PCR.**
4. With or without testing, using PCR, antibody or both, we recommend that clinicians use disease presentation and their best judgment for patient management.

C. Rationale

1. ***Cost***
   The RT-PCR test for COVID-19 is estimated to cost up to 3,500 pesos, which includes test reagents, manpower, equipment and PPEs. The cost of rapid diagnostic tests for detection of antibodies against SARS-CoV-2 (IgM and/or IgG) is estimated to be **less than 1/5th the cost of PCR**.
2. ***Time***
   Rapid diagnostic (antibody) testing may take as little as **15 minutes** individually, while PCR testing can take from 2 to 4 hours to run (sometimes in batches, requiring waiting for other samples to be ready).
3. ***Facilities and Expertise***
   PCR testing is performed under specialized laboratory facilities by highly trained (e.g., biochemistry, molecular biology) personnel. The rapid diagnostic (antibody) tests, however, may be done in a **point-of-care setting** by a trained healthcare worker such as a physician.

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D. Summary of Guidelines

1. **Step 1:** Frontline healthcare workers and their local government units follow the decision tree according to availability of resources.
2. **Step 2:** Patients are triaged according to disease phase by their clinical presentation.
3. **Step 3:** The following are the recommended tests for each phase (using tests that have adequate specificity and sensitivity, and strictly following manufacturer's instructions)
   a. Phase 0 and 1: antibody test followed by PCR
   b. Phase 2: antibody test (confirm negative results with PCR)
   c. Phase 3: antibody test
4. If a test for viral antigens become approved for commercial use, treat it as similar to a PCR but with potentially lower specificity and sensitivity (i.e., more results that are false negatives and false positives).
5. Testing healthcare workers regularly and repeatedly can be carried out with the antibody test because their exposure is constant.

E. Limitations and Challenges of Antibody Testing

1. Accuracy of antibody tests are not fully known.
2. Accuracy may vary greatly among antibody tests.
3. Some antibody tests fail to distinguish between IgM and IgG.
4. New antibody tests are becoming available even before FDA approval.
5. Newer antibody tests may be more accurate than FDA-approved ones.

Validation is challenging for all of the above reasons; hence, we recommend:

1. DOH/FDA validate the manufacturer-provided accuracies of antibody tests being introduced, and approve/endorse only the good performers;
2. Clinicians to interpret the results vis-a-vis clinical presentation;
3. Use the tests strictly according to manufacturer's instructions to minimize results variability.

3-Step Recommendation for Diagnostic Testing

The figures below provide a guide for the steps in the process that can be used by healthcare workers. Depending on the accessibility of tests, the HCW may proceed using **Step 3a or 3b**.

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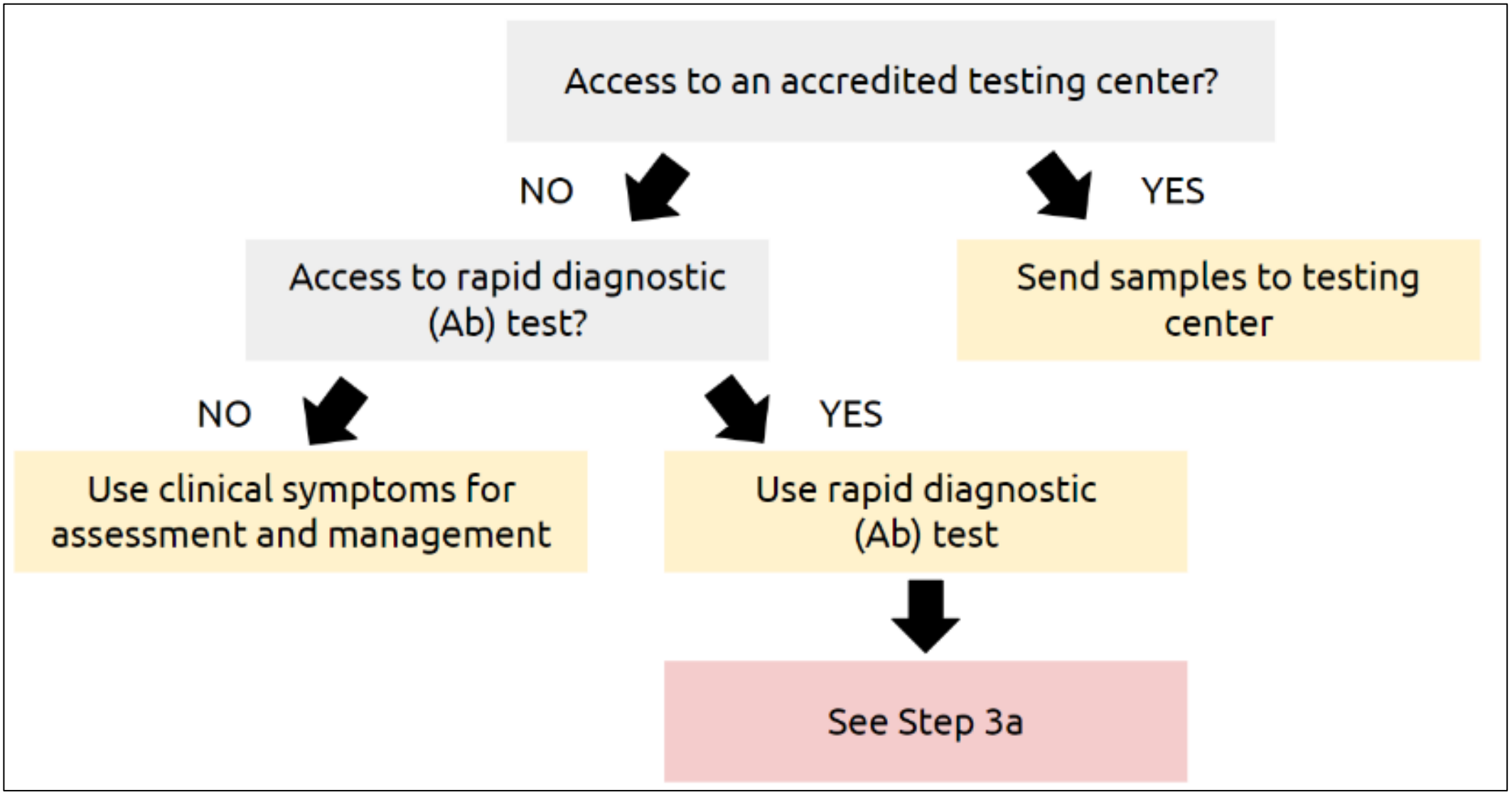
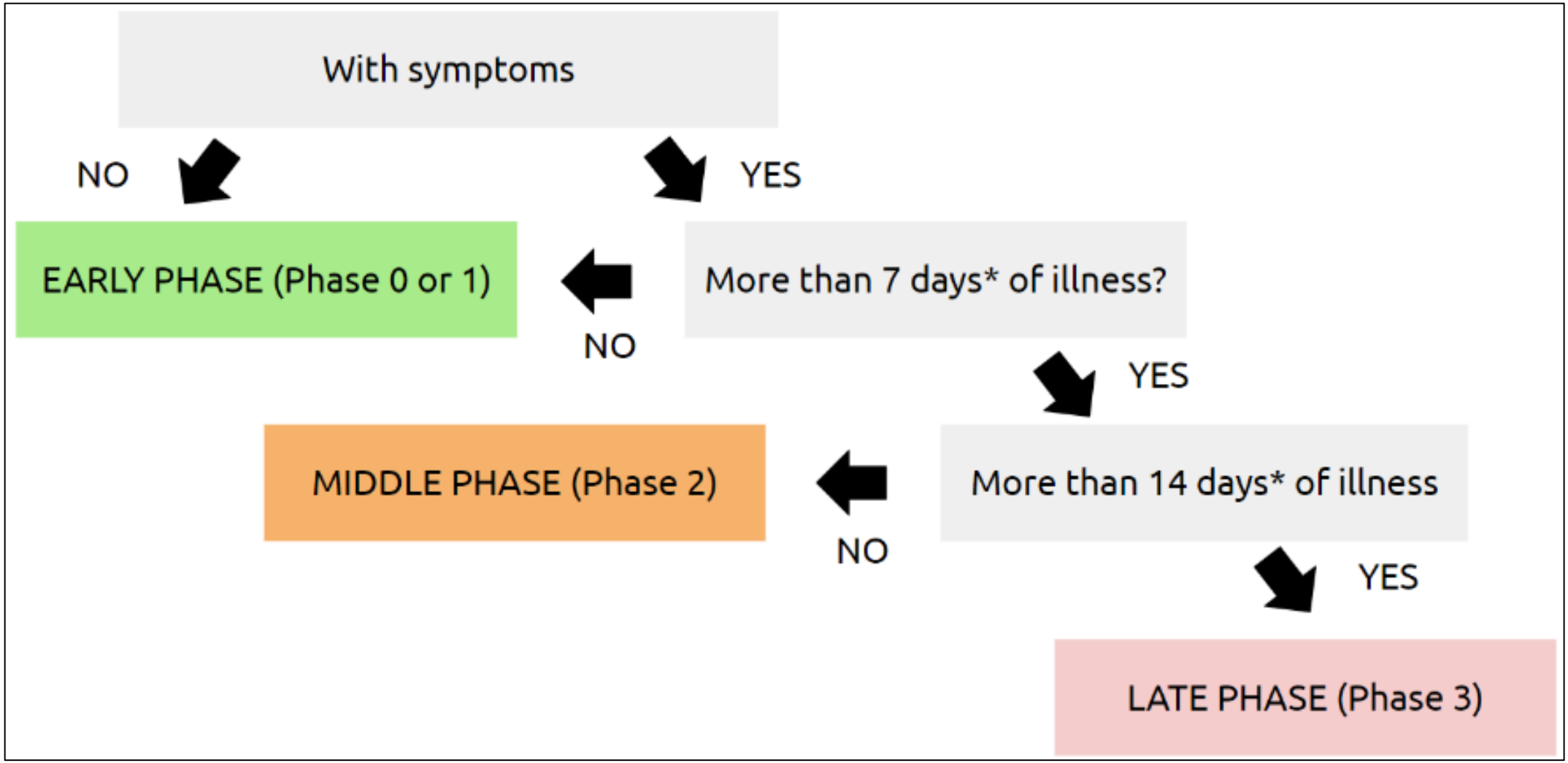
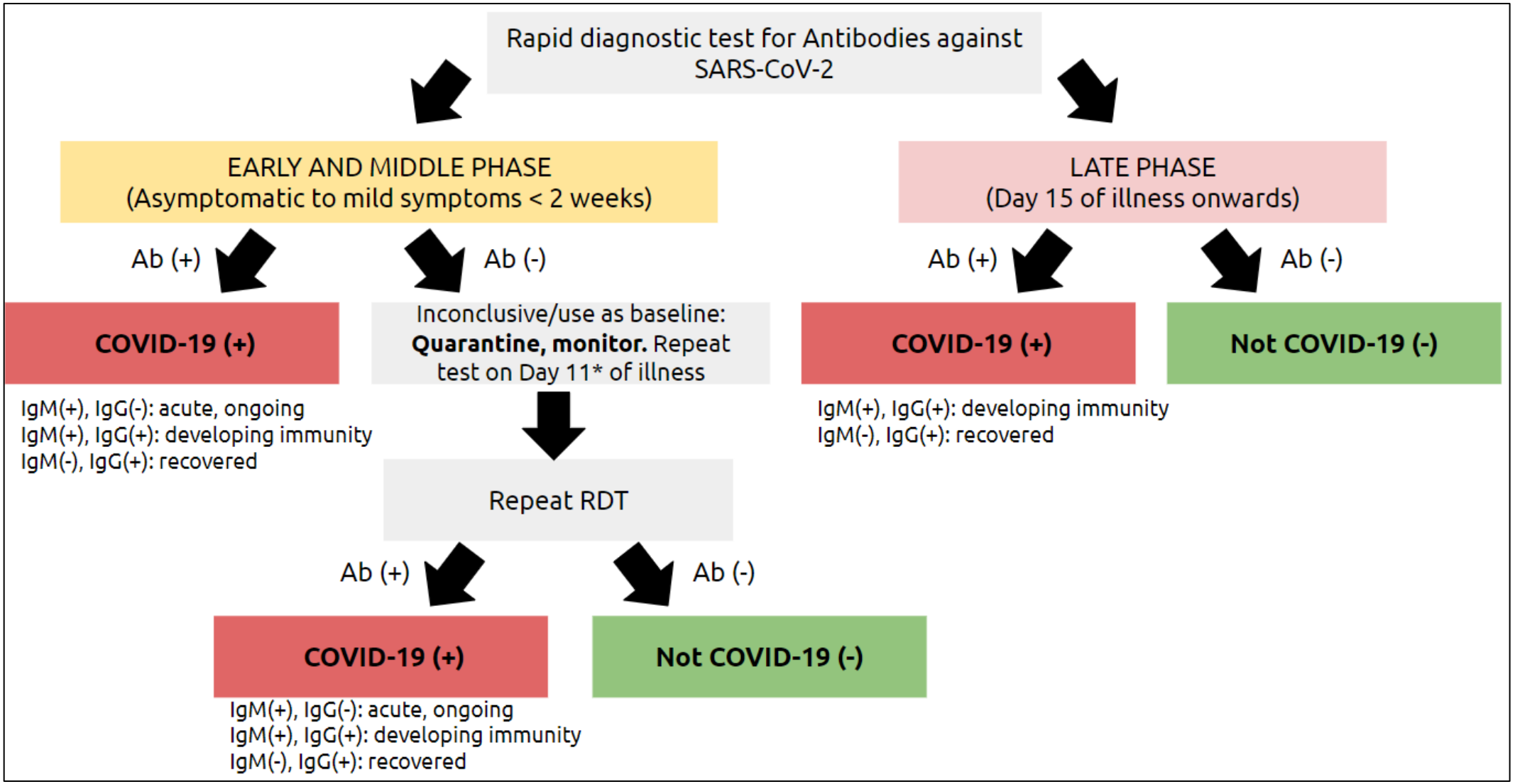
Step 1: Decision Tree for Low-Resource Situation



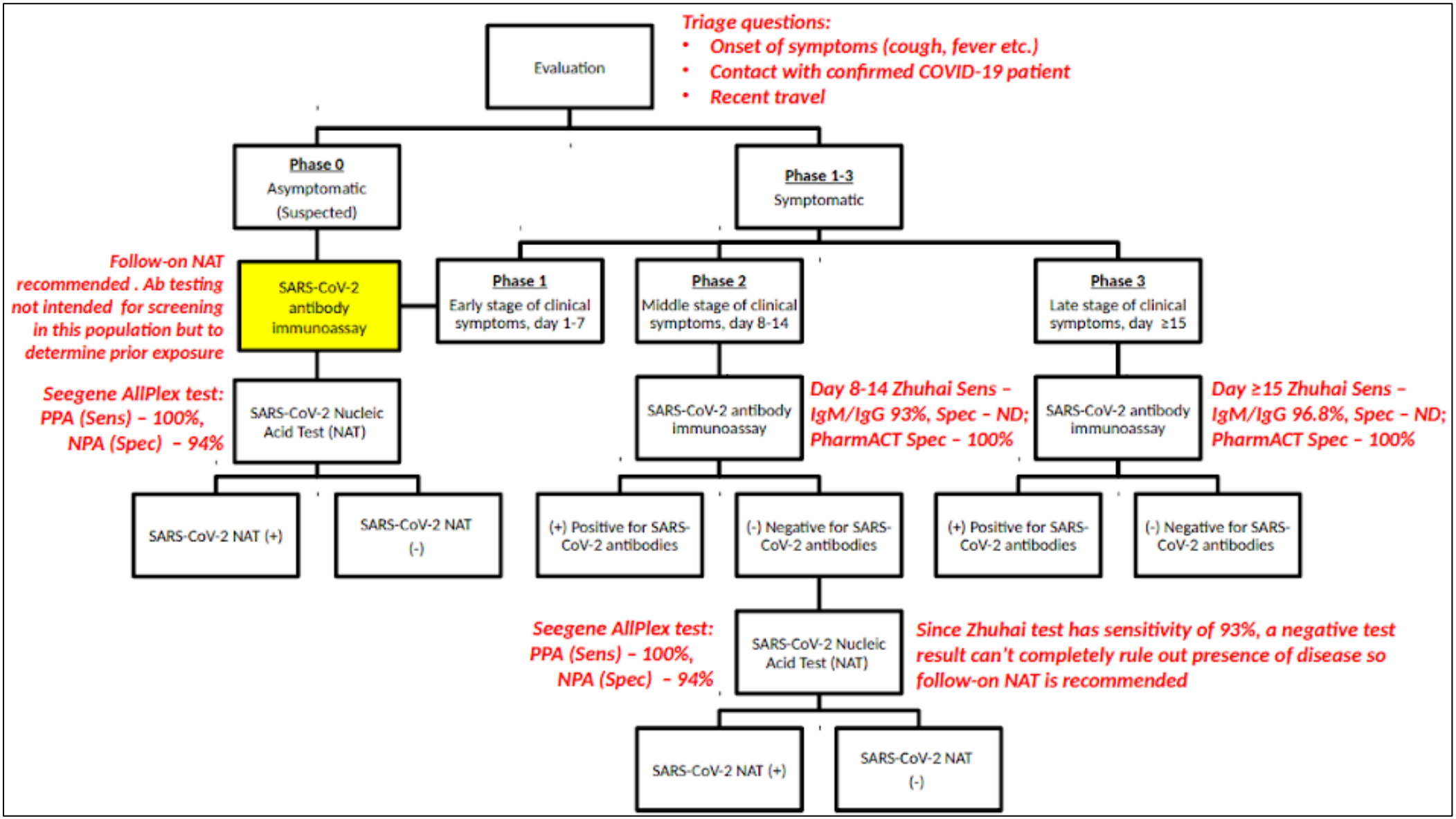
Step 2: Evaluation and Triage



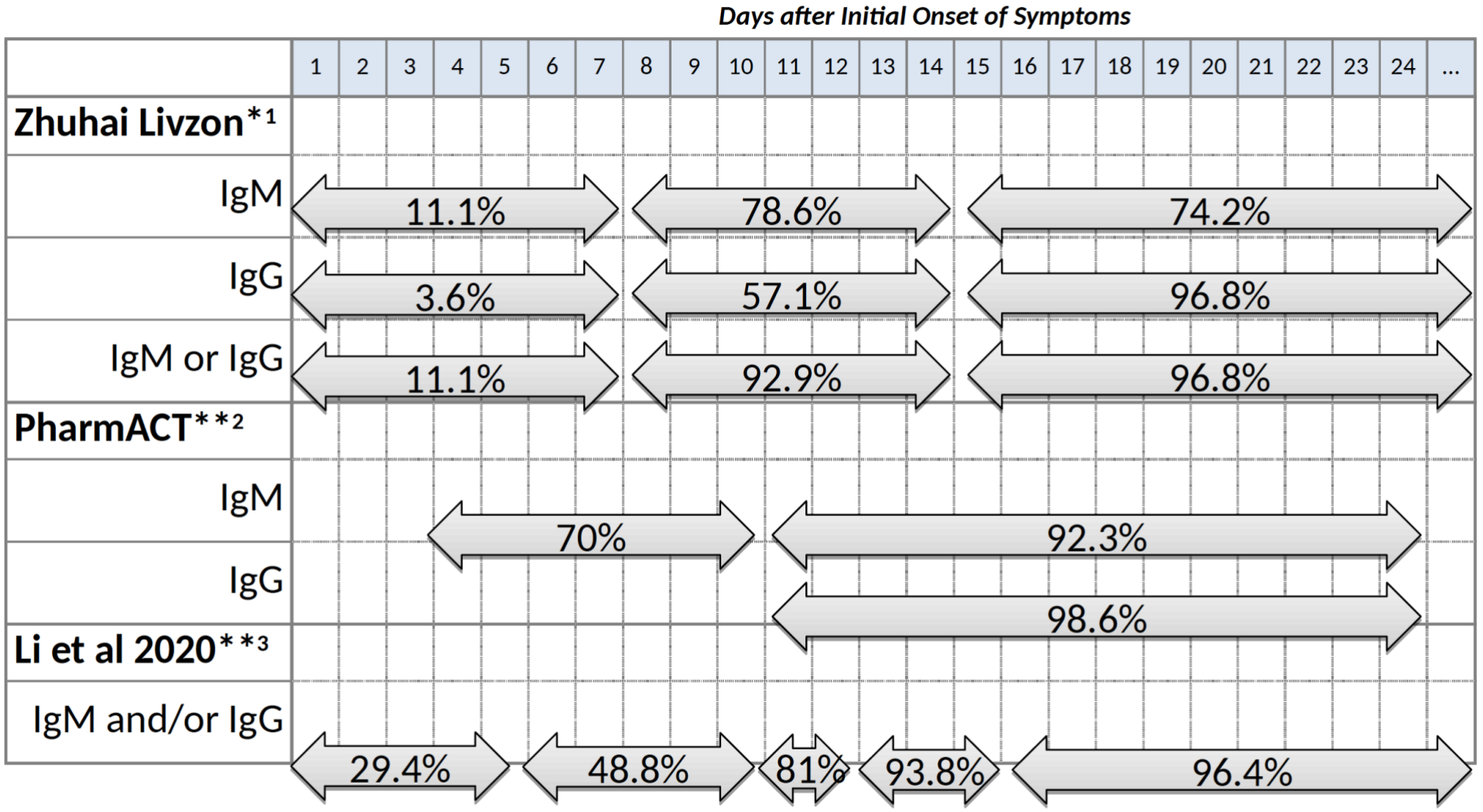
Step 3a: If only Rapid Diagnostic (Antibody) Tests are Available



Step 3b: If Both Rapid Diagnostic (Antibody) and PCR Tests are Available



Sensitivity of IgM or IgG assay in COVID-19 confirmed patients



***Philippine FDA approved Zhuhai Livzon Diagnostic Kit for IgM/IgG antibody to Coronavirus (SASRS-CoV-2) Colloidal Gold, specificity was not determined**

****Specificity of 100% for both PharmACT test and SARS-CoV-2 ELISA assay in Li et al. 2020**

Refrences: 1. https://www.medrxiv.org/content/10.1101/2020.03.13.20035428v1.full.pdf, 2. https://pharmact-health.com/en/sars-cov-2-rapid-test/, 3. https://www.medrxiv.org/content/10.1101/2020.03.06.20031856v1

Interpretation of Results

	PHASE 0 AND PHASE 1 (DAY 1-7)	PHASE 2 (DAY 7-14)	PHASE 3 (DAY>=15)
PCR ONLY (national and subnational laboratories currently)			
PCR (+)	Confirmed COVID-19: Admit, isolate and treat		
PCR (-)	Not COVID-19		Not COVID-19 or possible recovered
RDT (Aby TEST) ONLY (limited resource areas)			
Antibody (+)	Rule in COVID-19: Isolate		COVID-19 IgM(+), IgG(+): developing immunity IgM(-), IgG(+): recovered
Antibody (-)	Inconclusive: Quarantine if with symptoms; monitor, repeat test after 10 days		Rule out COVID-19
Aby TEST and PCR AVAILABLE			
Antibody (+), PCR (+)	Confirmed COVID-19: Admit, isolate and treat		
Antibody (+), PCR (-)	IgM (+), IgG (-): Exposed; Quarantine, repeat antibody test after 10 days IgM(+), IgG(+): developing immunity; Quarantine, repeat antibody test after 10 days IgM(-), IgG(+): Previous infection	IgM (+), IgG (-): Ongoing infection IgM(+), IgG(+): developing immunity IgM(-), IgG(+): Previous infection	COVID-19 IgM(+), IgG(+): developing immunity IgM(-), IgG(+): Recovered
Antibody (-), PCR (+)	Confirmed COVID-19: Admit, isolate and treat		
Antibody (-), PCR (-)	Not COVID-19		

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