

**OUR RESPONSE TO COVID-19****AGHAM AT KAALAMAN PARA SA BAYAN!****OFFICERS**

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**E-MAIL**[gpconcepcion@gmail.com](mailto:gpconcepcion@gmail.com)[paase2020manila@gmail.com](mailto:paase2020manila@gmail.com)**WEBSITE**[www.paase.org](http://www.paase.org)**PAASE BULLETIN # 4****ON PAASE STRATEGIC ACTION GROUP 3: MASS TESTING & FAST-TRACKING**

**Addressed to: COVID-19 IATF, DOH & COVID Testing Centers in RITM, LCP, Phil. Genome Center & NIMBB, UP Diliman, etc.**

**SAMPLE POOLING IN A RESOURCE-LIMITED SITUATION**

PAASE recommends the pooling of samples to save on the number of tests performed in a resource-limited and low prevalence situation.

1. *Cost & Prevalence*: The RT-PCR test for COVID-19 is estimated to cost up to 3,500 pesos, which includes test kit reagents, manpower, equipment and PPEs. The savings from sample pooling is dependent on the prevalence of positive. The pooling technique works on a population with low prevalence, but not when the prevalence is high. Maximum savings seems to be attained at a prevalence of 1% (or 1 positive sample in 100 samples pooled) or less, and no longer works with higher than 30% prevalence (30 samples positive in 100). Thus, **pooling is recommended only during mass testing where the prevalence is most likely low, particularly when we start testing anyone who is suspected to be exposed (all patients under investigation [PUIs] and patients under monitoring [PUMs]) and do not yet have symptoms**. Currently, DOH COVID-19 testings are done only for those who have symptoms due to the lack of testing capacity. Pooling is not compatible with this potentially high prevalence situation.

2. *Time Requirement*: The pooling technique takes 3 steps (first to test the master pool, second to test the mini-pools and last to test the suspected samples) whereas individual sample testing takes only 1 step (some tests like the WHO recommended COVID-19 RT-PCR test actually takes two steps...so pooling will take 6 steps when used with this). There is a balance to be struck, between doing 3 steps vs. 1, and between savings vs. none. If the run time of a test is short, for example 1 hour to test, then pooling is a good choice because it will only take 3–4 hours to do all 3 steps. If the run time is long, pooling is not recommended.

5. *10 x 10 Matrix*. The figure on page 2 illustrates the pooling technique with a 10 × 10 matrix (mini pool size = 10). It does not have to be a 10x10 matrix, the technician performing the tests/pooling can decide the optimum matrix that he/she can handle. Automated pooling can further facilitate this technique; however, it would require software to handle the equipment used in testing.

6. *Specificity & Sensitivity (S&S)*. Pooling works with any test with high S&S. It can work with the nucleic acid (RT-PCR) or the antibody (rapid) test, as long as the S&S are acceptable. When S&S are low, false negatives and false positives complicate. False negatives will spread COVID-19, and false positive patients deal with potentially difficult treatment, socially and medically.

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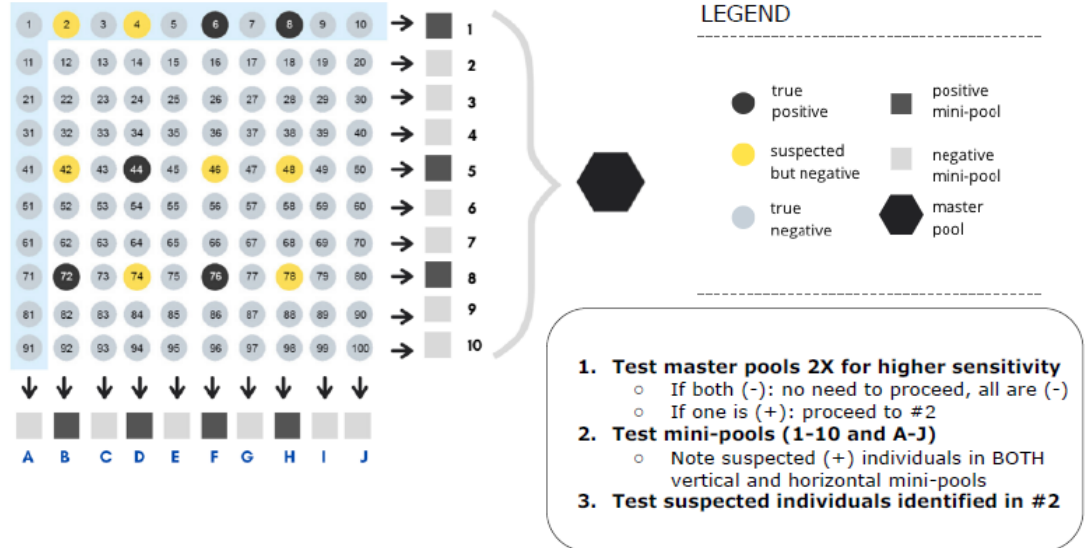
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SAMPLE SCENARIO

5-95 SCHEME (n = 10)

5 individuals are positive (black circles) in 100  
n: number of samples in a mini-pool

7. Facilities and best performed facilities already highly trained molecular Infectious testing must be appropriate and Biosafety Level. had extensive laboratory

no pooling  
**100 tests**

with pooling

2 master pool  
20 mini pools  
12 individual samples

**34 tests**  
savings: 66 tests

*Expertise.* Pooling is under laboratory set-up and by (e.g., biochemistry, biology) personnel. diseases samples performed in the designated Those who have research experience and

may already have done sample pooling are the best ones to implement and teach it to others.

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**References:**

- Bharti AR, Letendre SL, Patra KP, Vinetz JM, Smith DM. Malaria diagnosis by a polymerase chain reaction-based assay using a pooling strategy. *Am J Trop Med Hyg.* 2009; 81(5):754–757.
- Hanel R, Thurner S. Boosting test-efficiency by pooled testing strategies for SARS-CoV-2 [Preprint]. 2020. Available from: <https://arxiv.org/abs/2003.09944>
- Technion Israel Institute of Technology. Pooled Method for Accelerated Testing of COVID-19 [Internet]. 2020 [cited 2020 Mar 23]. Available from: <https://www.technion.ac.il/en/2020/03/pooling-method-for-accelerated-testing-of-covid-19/>
- Westreich DJ, Hudgens MG, Fiscus SA, Pilcher CD. Optimizing screening for acute human immunodeficiency virus infection with pooled nucleic acid amplification tests. *J Clin Microbiol.* 2008; 46(5):1785–1792.

Salvador Eugenio C. Caoili, M.D., Ph.D., Ruby Anne N. King, M.D., Ph.D., Cecile C. Dungog, M.D., Ph.D., John Carlo B. Reyes, M.D., Ph.D., Jesus N. Sarol, Jr., Ph.D., and Romulo J. de Castro, Ph.D.

E-mail: [badong@post.upm.edu](mailto:badong@post.upm.edu); [rdcastro@usa.edu.ph](mailto:rdcastro@usa.edu.ph)

Mobile: RJ de Castro (0995) 956 6505