PCP Medical Directors, Public Health Officers (blind cc), PHC Medical Directors and Executives:

As you begin what promises to be another busy week, here are nine updates and clinical pearls that we hope you will find useful. Please reach out for any questions, suggestions and objections!

1. **Effect of Shelter-in-Place orders on the homeless**, has varied by county. Some counties have considered services that directly and indirectly support the homeless to be essential, and are adapting these services to prevent community transmission. For example some are opening new homeless shelters for individuals with influenza-like-illness, with the beds widely spread with other measures to reduce transmission of infection. On the other hand, some counties have considered maintenance of public restrooms to be non-essential and closed these, causing a sudden shortage of facilities for homeless individuals to urinate and defecate. We urge counties to be on the lookout for unintended consequences from the Shelter-in-Place order on their local county's homeless population.

2. **Coronavirus testing without swabs.** A nasal saline wash can be used to obtain specimens for Coronavirus testing if the appropriate swabs are unavailable. A [study comparing virus detection](https://jamanetwork.com/journals/jama/fullarticle/2764304) found that the sensitivity of nasopharyngeal swabs (74%) is better than nasal washes (49%), so nasopharyngeal swabs are preferable when available. Santa Rosa Community Health Center tested it out, and here is what they describe:
   a. Obtaining a nasal aspirate in a baby is pretty straightforward either with bulb suction or 3 cc syringe attached to butterfly needle with needle cut off leaving about 3 cm tubing.
   b. Older children and adults are trickier for aspirate because of the need for a much longer catheter and having to have the patient supine - not practical for drive in clinics. Here is the basic technique: tilt head back, insert saline then quickly tilt head forward and collect in dry container.
   c. Quest instructed them to place specimen in sterile urine cup and freeze.

3. **Estimates of false negative rate of nasopharyngeal swabs tested via PCR range from 18% to 37%**. A [Singaporean study](https://jamanetwork.com/journals/jama/fullarticle/2764304) published in JAMA network comprehensively describing the first 18 Coronavirus cases identified in Singapore performed a series of nasopharyngeal PCR tests for SARS-CoV2 infected patients. 18% of the results taken during the time of documented infection...
Another study of 205 patients diagnosed with COVID from China (also published in JAMA network) analyzed multiple specimens obtained from the same patients from different locations in the body. The highest rate of positive test is broncho-alveolar lavage (93%), followed by sputum (72%). Nasal swabs were positive 63% of the time; pharyngeal swabs were commonly used, but only 32% were positive. Interestingly, they found positive stool samples (29%) and blood samples (1%) as well. They could not conclude how much extra-pulmonary spread of COVID is contributing to spread of the infection— for example, does oral ingestion of coronavirus cause a gastroenteritis? Since SARS-CoV2 antibody testing is not yet available we don’t yet have any good data on the specificity or false positivity rate for the current coronavirus RNA detection tests.

4. Sore throat more common?: The Singaporean study above noted a significantly higher rate of Sore throat (61%) among those diagnosed, compared to a rate of 14% quoted by the WHO in their summary of the outbreak in mainland China. This may impact triage protocols which tend to still use the original three symptoms identified in the original outbreak in mainland China.

5. In a study of critically ill patients in Washington state, 33% were found to have cardiomyopathy of unclear cause. In one of the first US studies of the clinical disease pattern of COVID in the U.S. This study of 21 critically ill patients, all had Adult Respiratory Distress Syndrome, but instead of the multi-system failure noted in Chinese series of critically ill patients, 33% of patients were diagnosed with cardiomyopathy of unclear cause. One additional finding in Washington: the two most common co-morbid risk factors were congestive heart failure and chronic kidney disease, perhaps reflecting the different diagnostic criteria and disease trajectories in the U.S. compared to China.

6. Running out of masks? What are effectiveness of different options of trying to sterilize used masks?

There are experimental models that have addressed this question. In one study from Taiwan, three types of masks were sterilized in different ways and their effectiveness at blocking particles was evaluated: N95 masks from 3M, Gauze surgical masks, and spunlace non-woven masks (a type of disposable face mask). Looking just at the re-sterilized N95 masks: Sterilization by heat (either in an autoclave or in a rice cooker) had no detectable impact on blocking droplet size, while sterilization by ethanol, isopropyl alcohol and bleach are led to significant declines in filtration ability. Only studied single re-sterilization was studied, so it is unclear how more than one heat sterilization will affect the integrity of N95 masks. A different study by the same group showed gamma radiation caused declines in filtration ability but that “expired” N95 performed well (no link available). (Special thanks to Dr. Mills Matheson for researching this issue.)

7. Defining “close contact:” The operational definition of a close contact used by Marin County Public Health provides an easy-to-operationalize definition: a close contact is someone spending
one hour within 6 feet of another person, or having any direct contact with the secretions of the other person. We know COVID can still be transmitted by individuals who are not close contacts (hence the universal social isolation measures, but the chance is less).

8. **Who should PCPs test for coronavirus?** The answer to this changes as the epidemic progresses in any particular community, as testing is more or less available and as the sensitivity of the tests changes. These are not neat categories that are mutually exclusive both within a county and between counties with different disease transmission pattern. **We recommend that primary care providers formulate their testing criteria in close consultation with their own local health departments.** From a review of different recommendations in different situations, here are some general principles to consider, for each level of community transmission:

   a. **Little or no community transmission of COVID:** Test based on risk of exposure. When there is very little COVID in a community, and especially if there is widespread testing that is highly accurate (neither really true currently for COVID), one could conceivable use testing to contain the epidemic, by testing widely among those with suspicious symptoms (including any with higher risk exposure situations, like recent travel) and close contacts of those with symptoms. Any positive results would then use contact tracing and quarantine to slow the spread.

   b. **Low level community transmission:** Surveillance. In counties with suspected community transmission of unclear extent, more widespread testing of those with respiratory symptoms helps show what the community transmission is like in the early phases of the disease. If a county tests 50 people with no positive test results, or 100 tests with 1 or 2 positive results, then probably most respiratory infections in that community are not yet COVID. This information helps employers and health care professionals make informed recommendations on treatment and isolation of sick staff and sick patients, for example. In future weeks, as the epidemic winds down, surveillance data will be helpful for making decisions on how to lift the "stay at home" orders. Some counties at this stage are also recommending testing for individuals with higher risk of complications from COVID: older individuals or those with cardiac or pulmonary disease. The idea here is that these individuals are more likely to become sicker in the near future, so can be watched more closely. The only problem with this is that the test
results take 6-7 days to come back in the outpatient setting, by which time if they were going to get worse, they would probably already be in the hospital or intensive care unit. Rapid testing is really needed for this population, both for prognosis, and for doing any clinical trials for medications for those with early disease. Counties have a faster turnaround for tests, compared to commercial laboratories.

c. **Moderately extensive community transmission** (e.g. 5-10% of all respiratory infections due to COVID)  
With relatively few tests available seems these counties are often prioritizing those who are ill who are not under a stay at home order: healthcare workers, EMS, police, fire: who might potentially spread COVID to each other and to the public they interact with. This could also include grocery store checkout clerks, pharmacy staff, Lyft drivers, caretakers for elderly patients, etc. The strategy could also be extended to close contacts to the above group, for example a sick child whose mother works at a Long term Care facility, because if the child is positive for COVID, the mother should go into a 14 day self-quarantine/self-isolation. The idea is that they would stay home longer and self-isolate better if we know they have COVID than if we don't think they have COVID. In addition, if sufficient tests are available, testing can be used to determine when a given patient with COVID is no longer infectious, and thus able to be released from quarantine.

d. **Counties with widespread community transmission (Like New York City).** These counties prioritize testing those hospitalized with symptoms compatible with COVID, to move them to specialized COVID treatment facilities, ensure greater vigilance by health care workers caring for them, and to conserve masks and other PPE on a community level. (Of note, testing of hospitalized patients with a clinical picture consistent with COVID and no other infectious etiology identified, is recommended in all levels of community transmission.)

**Testing priorities when “Order to Stay at Home Except for Essential Services” is in place:** If a person with an influenza-like or COVID-like illness would be staying at home anyway, they can just be extra careful about contacts, both within the home and outside the home, wearing a mask and carefully washing hands when leaving the house (only for emergencies). In the context of widespread community transmission, there is little benefit to testing ill but stable individuals who are relatively isolated at home. By the same rationale, a history of travel, contacts with COVID etc. becomes a poor criteria for
testing. Many patients may just “want to know,” so education is needed to explain that tests are reserved for higher risk and higher need patients. They would be counselled to stay at home in self-isolation.

Impact of high false negative rate of current tests. If the rate of COVID in all patients with respiratory infections is 10% and the sensitivity of the test is 63%, then 100 tests will show about 6 true positives, 4 false negatives, and 90 true negatives. If those 4 false negatives are told to go back to work, "It's just a cold" then they will proceed to infect many other people.

In New York City, extrapolating a symptom based syndromic surveillance system for influenza-like illness that has been in existence for more than 10 years, an estimated 80% of influenza-like illness is currently likely due to COVID, although few of those with such symptoms are getting tested. In this scenario, testing 100 people with respiratory symptoms, there will show 28 false negatives, 52 true positives, and 20 true negatives. A negative test is more likely to be COVID than not. This, combined with prolonged viral shedding documented in those who recover, and documented asymptomatic carriers that shed virus for days, is what leads New York and California to the "stay at home" orders as the only way to slow down the epidemic. They assume anyone may be infectious and that any public surface may be contaminated with COVID.

9. Telephone screening and visit protocols will also vary with the community transmission pattern and as more information on the clinical presentation of COVID in the United States becomes available. Here are some ideas and resources to consider as you develop your own templates:

a. COVID Templates and protocols can divided into 4 categories, based on the minimum training/licensure needed to use them:

i. Office staff screening questions: generally a few yes or no questions used to decide on the disposition of an incoming phone call. These can also be put on a website. Here is an example from Parkview Health.

ii. Health education: ranges from general information on COVID (symptoms, prevention methods) to answers to specific questions about the disease itself. This does not include assessment of a particular patient or situation, nor advice on action for a specific patient or situation.

iii. Nurse triage and advice: Usually a structured assessment and algorithmic advice for a specific patient or situation. See below for an example.
iv. Clinician phone/video visits: More complex integration of community epidemiology and the individual clinical situation, combined with a deeper understanding of the probability of varying clinical presentations, the sensitivity of testing options, and the efficacy of treatment options. Templates will systematically gather the information needed for this decision making.

b. While a clinician can perform all four of these categories, and nurses can perform the first three, others in the office have a narrower scope of activities.

c. The current Coronavirus protocols used by PHC’s nurse triage service are available on-line. They are updated frequently, but are national in scope, so do not reflect regional differences based on local disease prevalence. They include sections on Health Education and Nurse triage and advice.

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