AMEND
CHANGING CORRECTIONAL CULTURE

Clinical Guidelines for COVID-19 in Correctional Settings

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Please visit https://amend.us/covid for additional information and to ensure that you are referencing our most up-to-date recommendations.

Amend at UCSF is a health-focused correctional culture change program led by experts in medicine (geriatrics, infectious diseases, family medicine), public health, and correctional health and policy.

What is included in these guidelines?

1. What is the epidemiology of COVID-19?
2. How is COVID-19 spread?
3. What is the COVID-19 incubation period?
4. Who is at highest risk for acquiring COVID-19?
5. Which symptoms are common among patients with COVID-19?
6. Who should be considered a COVID-19 suspect?
7. Who should be tested for COVID-19?
7. Which diagnostic tests should I order for a patient suspected of having COVID-19 and how do I interpret the results?
8. How do I collect specimens for COVID-19 testing?
9. How is COVID-19 treated?
10. How does severe COVID-19 present?
11. Which patients are at highest risk of severe COVID-19?
12. Are there preventive therapies for individuals exposed to COVID-19?

What is not included in these guidelines?

Most notably, these guidelines do not include detailed recommendations on operational planning, medical ethics, and infection control strategies (including housing and depopulation approaches, isolation of cases and suspects, quarantining of exposed patients, cohorting, and the use and re-use of personal protective equipment). The Centers for Disease Control and Prevention addresses many of these topics in its page outlining COVID-19 guidance for correctional and detention facilities.[1]

1. What is the epidemiology of COVID-19?

SARS-CoV-2, the coronavirus that causes the disease named COVID-19, is present in every state of the United States and nearly every country around the world.

- The Department of Public Health in your county is likely the best source of updated information on the number of cases in the community surrounding your facility
- The *New York Times* maintains an updated list of cases per county in California: https://www.nytimes.com/interactive/2020/us/california-coronavirus-cases.html#county
- Worldwide case numbers and deaths from the global pandemic can be found here: https://coronavirus.jhu.edu/map.html

2. How is COVID-19 spread?

COVID-19 is transmitted from person-to-person when infectious particles come into contact with mucous membranes. This most commonly happens when aerosolized secretions from the respiratory tract (e.g. droplets of saliva, mucous, or phlegm) are inhaled through a host's mouth or nares. Fomites (inanimate objects covered in infectious material) can also transmit infection through indirect contact (e.g. via touch, utensils, etc) with mucous membranes. SARS-CoV-2 may also be able to enter through contact with the eyes, and the virus has also been identified in stool but it is uncertain if this is a viable source of transmission.

- SARS-CoV-2 is found in large particle respiratory droplets meaning that an individual generally needs to be within 6ft of a source patient to be infected via direct contact although transmission beyond 6ft may be possible.
- SARS-CoV-2 has been shown to be viable in fomites for different periods of time depending on the surface: plastic and stainless steel (72hrs), cardboard (24hrs), copper (4hrs)[2]
- Transmission can occur form a source patient who is entirely asymptomatic or pre-symptomatic (generally in the 48hrs prior to symptom onset when high quantities of the virus have been found in droplets). It is still uncertain what proportion of transmissions occur from asymptomatic and pre-symptomatic patients. One modeling study of the early stages of the epidemic, estimated that more than half of all infections originated from patients who had mild enough illness that they were never sick enough to have been tested and another modeling study estimated that 44% of transmission occurred during the presymptomatic stage.[3,4]
- Aerosole generating procedures (AGPs) can heighten the risk of transmission by aerosolizing smaller respiratory secretions that may remain aerosolized for up to an hour and have the potential to spread beyond 6ft. These conditions include, but are not limited to:
    - Mechanical ventilation and non-invasive ventilation (e.g. CPAP and BiPAP)
    - High-flow nasal cannula (but not use of routine nasal cannula, face mask, or non-rebreather)
    - Tracheostomy
    - Administration of nebulized medications (but not inhalers)
    - Open suction
    - Intubation

3. What is the COVID-19 incubation period?

The median incubation period from exposure to symptomatic COVID-19 is 5.1 days. Among those developing symptoms, 97.5% will do so by 11.5 days and >99% by 14 days.[5]

4. Who is at highest risk for acquiring COVID-19?

Given widespread community transmission of COVID-19, all correctional residents should be considered at risk for acquiring COVID-19 even if there have been no cases identified within a facility. Certain individuals, however, will be at higher risk for acquisition related to the proximity, duration, and nature of exposure to an infected individual or individuals. Extrapolating from community settings and data on other respiratory viruses, the following are correction-specific exposures associated with a higher risk of acquisition (ranked in descending order).

a. Cellmate of a patient with COVID-19
b. Inmate worker/volunteer caring for a patient with COVID-19 without personal protective equipment (PPE)
c. Other close contact of patient with COVID-19 (this is sometimes defined as <6ft for at least 10 minutes but there is no specific rationale for the 10 minute cutoff)
d. Resident transferring from a facility with sustained COVID-19 transmission in the last 14 days
e. Resident sharing common spaces (e.g. yard, shower, dining area) with a patient or employee with COVID-19

5. Which symptoms are common among patients with COVID-19?

The following are symptoms described among patients in a few case series[6,7] of *hospitalized* patients in China.

- Fever: >80% (yet nearly 50% were afebrile at the time of admission)
- Cough: 45-80% (dry > productive)

- Shortness of breath: 20-50%
- Myalgias (10-50%):
- URI symptoms: <15% (sore throat, rhinorrhea, HA)
- GI symptoms: <10% (nausea/vomiting), <25% (diarrhea)

A study of 393 hospitalized patients in New York City demonstrated a similar clinical presentation with slightly higher rates of nausea/vomiting (19%) and diarrhea (24%).[8]

Given that some patients can be entirely asymptomatic despite infection, the range of symptoms in outpatients is exceedingly broad but often falls along the spectrum between mild URIs and the more severe symptoms seen in hospitalized patients. Cases without cough or dyspnea, however, have been described, including presentations where GI symptoms were the presenting complaint, fever was the only complaint, or a loss of the sense of smell (anosmia) or taste (dysgeusia) was the presenting feature.

6. Who should be considered a COVID-19 suspect?

Symptomatic COVID-19 should be suspected in the following scenarios:

- Patients with any of the following new and unexplained symptoms:
  - Fever (subjective or objective)
  - Cough
  - Shortness of breath
  - Loss of the sense of smell (anosmia) or taste disturbance (dysgeusia)
- Patients with any of the following new and unexplained symptoms are at lower risk of having COVID-19 but should still be considered suspects, particularly if they have had exposures to others with COVID-19:
  - URI symptoms (rhinorrhea, sore throat, headache)
  - GI symptoms (nausea, vomiting, diarrhea)
  - Conjunctivitis

Note: the standard of care is to immediately isolate all COVID-19 suspects, implement appropriate PPE measures per institutional policy, and limit direct contact with staff and residents to medical necessity. If testing or PPE are severely limited, deprioritizing testing and isolation for those with conjunctivitis and URI or GI symptoms could be considered if there is little suspected local COVID-19 transmission as these clinical presentations are less common.

7. Who should be tested for COVID-19?

Symptomatic patients: All COVID-19 suspects should be tested for infection. In a scenario of limited testing, then the following patients should be prioritized:

- Those at high-risk of severe COVID-19 (section 11)
- Those at high-risk of transmitting COVID-19 to others (e.g. patients who cannot be isolated from other residents or who require frequent close contact with staff)
- Patients with clinical presentations that are most consistent with COVID-19 (sections 5 & 7) who may need transfer to a higher level of care

Asymptomatic patients: In certain scenarios, widespread testing of asymptomatic patients is also indicated. As bottlenecks improve in testing capacity, the standard of care in the community is shifting to testing all hospitalized patients, even if asymptomatic (and particularly those undergoing aerosol generating procedures or being admitted to high risk locations). The community standard of care is also to now test all residents (irrespective of symptoms) of congregate settings (such as nursing homes and homeless shelters) if a wider outbreak is suspected.

- Widespread testing of all potentially exposed patients (even if asymptomatic) is indicated in the setting of a wider institutional outbreak

8. Which diagnostic tests should I order for a patient suspected of having COVID-19 and how do I interpret the results?

Recommended tests:

- COVID-19 PCR (aka RNA) by nasopharyngeal (NP) and oropharyngeal (OP) sampling with a single swab: While testing currently has multiple bottlenecks, this is the test of choice and can be performed at commercial laboratories (e.g. Quest, LabCorp, ARUP), local DPHs, and select medical centers. The specificity is >98% and the sensitivity, as extrapolated from PCR tests for other viral respiratory infections, is estimated to be 75-80%. Viral shedding is highest around the onset of symptoms and thus the sensitivity may be >80% if testing is done within the first 5 days of symptoms, particularly with proper sample collection (section 8) which involves rotating the swab in the nasopharynx for 10 seconds. Addition of an oropharyngeal (OP) swab can marginally increase the sensitivity (+5-10%). To conserve testing supplies while achieving the highest sensitivity, it is recommended to use a single swab to obtain the OP and then NP sample.
- COVID-19 PCR from other respiratory sites: Emerging data suggest that mid-turbinate or anterior nares swabs (including self-collected swabs) from a variety of different swabs may have comparable test performance as NP swabs. Additional data and coordination with the laboratory performing the test should elucidate which alternatives may be appropriate.

Additional tests for patients at high-risk of complications or with signs and symptoms suggestive of lower respiratory tract disease:

- Chest x-ray: among hospitalized patients, the CXR was abnormal in 60%, classically with patchy bilateral findings (unilateral in only 14-25%) and no nodules or effusions[9]
- Influenza testing (preferably PCR) or multiplex PCR panel of respiratory pathogens by NP swab: While COVID-19 has been described in the presence of other viral respiratory pathogens, the finding of another respiratory pathogen combined with a negative COVID-19 test would have a high negative predictive value for COVID-19 but would not fully rule it out. The utility of influenza testing, however, is now limited as there has been a substantial decline in seasonal flu since the end of March. Of note, COVID-19 should not cross-react with other coronaviruses on most commercially available multiplex PCR panels.

Note: to conserve testing supplies, some laboratories may be able to run COVID-19, influenza, and respiratory viral panel tests from a single NP+OP swab

Note: consider blood cultures and sputum in higher acuity patients

Tests to consider to assess the likelihood of COVID-19 if you are unable to perform COVID-19 testing or if there are long delays in obtaining results

- CBC: among hospitalized patients, leukopenia (17-45%) and lymphopenia (33-85%) suggested COVID-19
- CRP: elevated in 81-86% of hospitalized patients
- Procalcitonin: >0.5 in 5-10% of hospitalized patients (higher in more severe cases, possibly due to bacterial co-infection)

Tests not currently recommended for the diagnosis of COVID-19:

- COVID-19 serologies: these tests will be valuable in determining the epidemiologic characteristics of transmission, potentially improving the sensitivity of case detection if combined with PCR, and may help inform when a person is no longer contagious; serologies do not presently have a large role in clinical practice for the following reasons[10]:
    - Many patients do not demonstrate a measurable serologic response until 10-14 days after exposure to COVID-19, limiting its utility in diagnosing infection as a single test
    - Many serologic tests currently being marketed for COVID-19 will cross-react with other coronaviruses and have not undergone the usual FDA review of test performance; additional data will be needed to validate results
    - The degree to which a positive serology result offers protection from reinfection is not yet understood (nor is the expected duration of any such protection)

9. How do I collect specimens for COVID-19 testing?

- PPE: Given the proximity to the patient and the potential for sample collection to provoke coughing or sneezing, specimens should be collected while wearing gloves, gown, eye protection (face shield or goggles), and an N95 respirator.
- Procedure for recommended NP + OP sampling: First, swab the posterior oropharynx near the tonsils. Then, insert the same swab into one nostril parallel to the palate. If the swab is narrow (i.e. the type normally used for NP samples), gently rotate the swab inward until resistance is met at the level of the turbinates; rotate against the nasopharyngeal wall (approximately 10 sec) to absorb secretions. If the swab is thick (i.e. the type normally used for OP collection), rotate for 10 sec while against the external opening of the nasal turbinates.

Note: video of proper specimen collection can be found here:
https://www.nejm.org/doi/full/10.1056/NEJMvcm2010260?query=RP

10. How is COVID-19 treated?

While certain medications show the potential to have modest benefit, at this point the treatment of COVID-19 is largely supportive. *Key treatment considerations are below*:

- Oxygen: use if needed to maintain O2 saturation at or above 92%
  Note: the use of routine nasal cannula, face tent, or non-rebreather is preferred to high-flow nasal cannula as the latter has the potential to aerosolize respiratory droplets

- Analgesia and antipyretics: consider acetaminophen and/or NSAIDs if needed
  Note: there have been theoretical concerns about the use of NSAIDs for fever or pain in COVID-19, however clinical data have not demonstrated an increased risk of adverse outcomes and the World Health Organization has clarified that it does not recommend against NSAID use in patients with COVID-19

- Bronchodilators: if bronchodilators are needed (i.e. reactive airway disease or wheezing and respiratory distress), nebulized medications should be avoided given the potential to aerosolize the virus; metered-dose inhalers (MDIs) are preferred and older clinical data suggest equivalence between MDIs and nebulized medications in patients who are able to use them
  Note: there are now national supply chain issues with MDIs; recommend limiting use to patients with moderate/severe reactive airways disease

- Incentive spirometer: maintain airway patency if patient able to participate

- IV fluids: IVFs are not needed for most patients but dehydration and sepsis can occur in patients with severe disease, co-morbidities, inability to take oral hydration, or substantial GI losses

- Corticosteroids: many patients in China received steroids for severe COVID-19, however the clinic benefit of steroids is not clear and there is data for other respiratory pathogens suggesting prolonged viral shedding in patients receiving steroids; currently steroids are not recommended and most US providers are not using them unless clinically indicated for another reason

- Other immunomodulating therapies: there is interest in therapies to dampen the robust inflammatory response that can happen in patients with severe COVID-19; potential medications include tocilizumab (IL-6 pathway inhibitor) and anakinra (anti-IL-1) and these medications should currently be limited to clinical trials.

- Antivirals:
  - Hydroxychloroquine with or without azithromycin: Hydroxychloroquine demonstrates potent *in* vitro *activity* but carries the risk of QTc prolongation (particularly if given with other QTc prolonging agents such as azithromycin) and hemolytic anemia (mediated by G6PD deficiency). The current clinical data are limited to very small RCTs (with 30 and 62 patients, most with mild disease)[11,12], as-yet unpublished retrospective case control trials which showed no clinical benefit (and a potential for worse outcomes), and single arm studies with no control group.[13,14] At present,

hydroxychloroquine (with or without azithromycin) cannot be recommended for COVID-19 outside of a clinical trial.

- Lopinavir/ritonavir (Kaletra): showed no improvement in clinical outcomes or the duration of viral shedding in a placebo controlled trial of patients with severe COVID-19[15]
  Note: the patients in the above trial where started on study drug after a median of 13 days of symptoms, so it is uncertain if there may be clinical benefit if started sooner after symptom onset
- Remdesivir: experimental IV therapy (not FDA approved) that showed no efficacy against Ebola but does have potent *in vitro* activity against SARS-CoV-2; is currently only available as part of a phase II clinical trial or through a compassionate use protocol for children and pregnant women

11. How does severe COVID-19 present?

Severe disease occurs in <10% of patients. Among patients hospitalized with COVID-19, serious illness developed after a number of days of progressive symptoms: dyspnea (median 7d after symptom onset), sepsis (9d), ARDS (12d), ICU admission (12d), and mechanical ventilation (15d).[16]

12. Which patients are at highest risk of severe COVID-19?

The CDC defines the following adults as high-risk for severe COVID-19: older adults (particularly >65), residents of a nursing home or long-term care facilities, pregnant women, and individuals with high-risk medical conditions (chronic lung disease including moderate to severe asthma, serious heart conditions, cancer undergoing treatment, morbid obesity, poorly controlled diabetes, renal failure, cirrhosis, cigarette use, HIV infection, organ transplantation, and prolonged use of corticosteroids and other immunosuppressants).[17] Severe COVID-19, however, has been described in adults of all ages, including those with no known risk factors.

One study of hospitalized patients with laboratory-confirmed COVID-19 in China looked at proportions who met and did not meet a primary composite outcome (defined as death, ICU admission, or needing mechanical ventilation) by risk group[7]. Among the 1099 patients as a whole, the primary composite outcome was met in 67/1099 patients (6.1%). The following subgroups were at increased risk for the composite outcome:

- Age >65: 20.9%
- Cerebrovascular disease 26.7%
- Coronary artery disease: 22.2%
- COPD: 58.3%
- Current or former smoker: 13.9%
- DM: 22.2

13. Are there preventive therapies for individuals exposed to COVID-19?

There are currently no medications approved (or widely being used) for the prevention of COVID-19 but multiple clinical trials are now in the works for chemoprophylaxis. Two vaccines have also entered phase I clinical trials.

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Amend at UCSF fundamentally transforms culture inside prisons and jails to reduce their debilitating health effects. We provide a multi-year immersive program drawing on public health-oriented correctional practices from Norway and elsewhere to inspire changes in correctional cultures and create environments that can improve the health of people living and working in American correctional facilities.

Amend is currently focused on providing resources, expertise, and support to correctional systems confronting the global COVID-19 pandemic.

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***Appendix*. Algorithm for the Evaluation and Treatment of Suspected and Confirmed Cases of COVID-19 in Correctional Settings** *(a single-page version is available at https://amend.us/covid)*