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CORONAVIRUS (COVID-19) REPORT APRIL 2020

TOBACCO CONTROL IS A CRITICAL COMPONENT TO COVID-19 MANAGEMENT

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OVERVIEW

Reducing the spread of the 2019 novel coronavirus (COVID-19) is of paramount importance for public health agencies worldwide.[1] As of March 26th, California ranks third in the nation for confirmed COVID-19 cases following Washington and New York.[2] Of the confirmed 4,943 cases and 81 deaths in California, 282 have been diagnosed across the 11 counties in the Central Valley and the Foothills (see Table 1). These numbers are expected to dramatically increase over time, thus necessitating aggressive efforts to mitigate the spread of the virus or otherwise "flatten the curve".[3]

In addition to employing preventative measures such as promoting increased hand washing, eliminating large scale gatherings, and social distancing practices,[3] successful mitigation of the pandemic should include identification of at-risk populations. The most obvious and vulnerable are the elderly and those who have chronic illnesses.[4] *However, there is emerging evidence that smokers, former smokers, and people exposed to chronic secondhand smoke are also vulnerable to COVID-19.*

This report briefly summarizes the emerging literature on COVID-19 and tobacco use and secondhand smoke exposure. The literature is evolving as research on COVID-19 is rapidly emerging and disseminating; the report will be updated regularly.

MECHANISMS THROUGH WHICH TOBACCO USE AFFECTS COVID-19 SUSCEPTIBILITY AND SEVERITY

COVID-19 often presents as a mild respiratory illness but can progress to either non-life-threatening pneumonia, or in severe cases pneumonia with acute respiratory distress.[1] Because of the effects on the pulmonary system, those with weakened immune systems or impaired lung function[5] are at high risk. Our existing knowledge of the health effects of cigarette use and smoke exposure indicate an increased risk of COVID-19 through three distinct mechanisms: suppressing the immune system,[6] increasing susceptibility,[7] and increasing the likelihood that the illness will progress to the most extreme stages.[8]

PRIMARY AND SECONDARY EXPOSURE TO TOBACCO SMOKE AND NICOTINE COMPROMISES THE IMMUNE SYSTEM

Tobacco smoke and nicotine both alter the immune response of the body,[6,9] which may increase the likelihood of contracting COVID-19 and limit the body's natural defense against the illness. Current and former smokers are at greater risk of becoming ill due to the effects of second hand smoke (SHS) on the immune system.[6,10] SHS may put individuals who are at low risk for primary smoking, such as children,[11] at greater risk of contracting the virus due to effects on the immune system. This supposition is supported by the fact that children with viral pneumonia are also more likely to experience severe symptoms and require intensive interventions when they have a history of secondhand smoke exposure,[12] it is reasonable to suppose that pneumonia developed due to COVID-19 may be more severe for children exposed to secondhand smoke. Nearly 40% of children are exposed to secondhand smoke worldwide,[13] so it is essential to recognize that the families of smokers and former smokers, not just current smokers, should be considered at higher risk as well.

TOBACCO INCREASES ENZYME RECEPTORS THAT ARE DOORWAYS FOR COVID-19 TO ENTER

Beyond immunosuppression, smoking and nicotine exposure increases the susceptibility to COVID-19 by increasing the expression of the ACE2 enzyme in the respiratory system.[7] COVID-19 binds to ACE2 receptors,[14,15] and an increase in the receptors may relate to an increased likelihood of contracting the disease.[7,16] Current smokers are at greater risk of this susceptibility than former smokers and nonsmokers.[16]

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TOBACCO MAKES COVID-19 SYMPTOMS MORE SEVERE

In a study of patients admitted to the hospital due to pneumonia caused by COVID-19, it was found that current and former smokers were significantly less likely to improve over time. Instead, the disease was 14 times more likely to progress to the point where the patients required intensive respiratory assistance.[8] The connection between smoking history and adverse pneumonia treatment outcomes and/or death are well established,[17] which bolsters the observations that current or former smokers are at a far greater risk of severe respiratory outcomes once the virus is contracted.

CONCLUSION: SMOKING AND SMOKE EXPOSURES EXACERBATES COVID-19 SYMPTOMS

It is also important to recognize that smokers are at high risk of having or developing other chronic diseases, such as COPD or asthma, that would necessarily place them in a high risk group.[18] However, even without a chronic disease diagnosis, it is reasonable to conclude that the three mechanisms mentioned earlier place current and former smokers at greater risk of contracting COVID-19 and experiencing severe outcomes.

TOBACCO POLICY RECOMMENDATIONS DURING THE COVID-19 CRISIS

Based on the scientific literature, tobacco control policies are critical to keeping the public safe during the COVID-19 crisis. It is our recommendation that public health departments consider the following measures to limit the spread of COVID-19 among the smoking and non-smoking populations in the Central Valley:

1. Targeted messages about COVID-19 risk factors should include information about how current, former, and secondhand smoke exposure increases susceptibility to COVID-19 and the severity of the disease progression—even if individuals are otherwise healthy and without chronic illnesses.
2. Communities should immediately strengthen secondhand smoke exposure policies. Given the shelter-in-place order issued by Governor Newsom, it is imperative to implement prohibitions against smoking in multi-unit house where so many of our community members are sequestered. Moreover, prohibitions against smoking in public parks and store-fronts are also imperative, even with shelter-in-place orders; many community members seek safe outdoor spaces to exercise at a safe distance from others. Essential services, such as groceries, are still permitted. In this regard, children, at risk, and even typically not at-risk groups should be protected against involuntary smoke exposure that increases the likelihood that the illness will spread to these populations.
3. Resources should be allotted to provide current smokers with nicotine replacement therapies, such as nicotine patches. Former smokers are still considered a high-risk group, but they are less likely to experience severe outcomes than current smokers.[17] This would also limit the secondhand smoke exposure for families and the public.
4. Medical providers should consider increasing quarantine recommendations for current and former smokers. They should also readily stress the increased susceptibility and severity risks for patients who currently or formerly smoked.

These measures may help lessen the progression of the disease at the community level, and also increase the likelihood of positive treatment outcomes for those who do contract COVID-19. Alleviating the burden on the healthcare system at this time is essential, as is ensuring that the serious cases and deaths are reduced as much as possible.

Given that the population in the Central Valley are reported to suffer from a higher percentage of comorbidities such as heart disease,[19] asthma,[20] and diabetes[21] - all risk factors for mortality caused by COVID-19,[17] higher smoking rates that exist among the Central Valley population might exacerbate the progression of COVID-19 to a severe and lethal status, particularly since cigarettes impact the immune system.[9] Implementing preventative measures such as the reduction of secondhand smoke to reduce severe viral pneumonia among COVID-19 patients, is a forward strategy to protect those at risk from complications caused by tobacco smoke.

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FREQUENTLY ASKED QUESTIONS

1. WHAT ABOUT PEOPLE WHO USE VAPES OR SMOKE MARIJUANA? ARE THEY AT GREATER RISK TOO?

Answer. It should be assumed that anything that affects the lungs may be harmful. While no research has addressed the relationship between combustible marijuana use and COVID-19 susceptibility or severity, previous research on pulmonary infections and vaping suggest that e-cigarettes may increase susceptibility to COVID-19.[22,23] While we have no definitive answers (yet), it may be wise to limit the personal use of these products.

2. WE HAVE NO (OR FEW) CASES IN OUR COUNTY, SHOULD WE WORRY?

Answer. Proactive precautionary measures are CRUCIAL to prevent the spread of COVID-19. Because the California Central Valley has a higher smoking prevalence, and therefore higher secondhand smoke exposure rate, our counties need to take steps now to limit the spread and severity of COVID-19. Because testing for COVID-19 has been limited, we do not have an accurate picture of the spread of COVID-19, especially in our communities. As diagnostic tests for COVID-19 become more accessible, it is possible that we will see that the problem is more widespread than we've currently measured.

3. WHAT STEPS CAN WE TAKE TO LIMIT SECONDHAND EXPOSURE?

Answer. Some counties have more restrictions on secondhand smoke exposure than others, and it is recommended that restrictions increase during this time. *Although it may seem other issues should be more critical, tobacco control policies are critical to keeping the public safe during the COVID-19 crisis.*

Public health officials should advocate for more smoke-free public areas as well as increase the smoke-free boundaries around areas such as schools and parks. It is also essential that information about COVID-19 and secondhand smoke exposure is disseminated so that families can take immediate steps to protect their children and at-risk family members.

4. HOW DO I LEARN MORE ABOUT COVID-19?

Answer. The most extensive source is the World Health Organization COVID-19 database (https://www.who.int/emergencies/diseases/novel-coronavirus-2019/global-research-on-novel-coronavirus-2019-ncov). This site aggregates all the current published research on COVID-19. Google-scholar may also be useful to search for specific topic areas related to COVID-19. As of the last count, over 1700 papers have been published, so focused searches may be more useful. Also, be certain to rely on the most up to date publications. Over the last few weeks, things have been changing rapidly.

Table 1. COVID-19 cases and Tobacco Status in 11 California Counties.

COUNTY	COVID-19 Cases*(March 29th)	Smoking Prevalence** (%, 95% CI)	Sources
CALAVERAS	3 CASES	13.9 (13.5% - 14.1%)	* Dong E, Du H, Gardner L. An interactive web-based dashboard to track COVID-19 in real time. Lancet Infect Dis. March 2020. doi: 10.1016/S1473-3099(20)30120-1 **UCLA Center for Health Policy Research, Los Angeles, CA. AskCHIS Neighborhood Edition. Current smoker (18+) Comparing Central Valley Counties. Available at http://askchisne.ucla.edu. Exported on March 14, 2020
FRESNO	43 CASES	16.1 (15.4% - 16.4%)	
KERN	51 CASES	15.5 (15.1% - 15.8%)	
KINGS	2 CASES	16.5 (16.1% - 16.7%)	
MADERA	15 CASES	14.9 (14.6% - 15.2%)	
MARIPOSA	0 CASES	15.0 (14.6% - 15.3%)	
MERCED	8 CASES	15.9 (15.5% - 16.1%)	
SAN JOAQUIN	113 CASES	13.3 (12.7% - 13.6%)	
STANISLAUS	29 CASES	16.7 (16.3% - 17.0%)	
TULARE	18 CASES	13.6 (13.3% - 13.8%)	
TUOLUMNE	0 CASES	15.1 (14.7% - 15.4%)	
CA Total	**4943 CASES, 81 DEATHS**	12.4 (11.5% - 13.2%)	

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