July 17, 2020

To: Distribution

From: Pandemic Working Group

Re: **COVID-19: Suburban Spread ~ Vector Control ~ VOCs ~ Canine II**

The Spread in the Suburbs. As reported by the LATimes today, the coronavirus is now spreading faster in sister suburbs than in Los Angeles County. This marks a dramatic shift from just two months ago, when LA County was at 281 cases per 100,000 followed by Riverside (256), San Bernardino (222) and Orange (165) counties. That lineup has been flipped on its head with San Bernardino now at 408, Orange at 399, Riverside at 391 and LA at 372. Even while LA has experienced a surge, these three other counties have outstripped it. Interestingly, the suburban counties opened many businesses before LA and rescinded mask-wearing orders which, according to UC Irvine's Dr. Shruti Gohil sends a "psychological message to the community . . . I don't have to be as judicious with my activity and social distancing and masking and hygiene." As a consequence of the surge, hospitalization rates in both Orange and Riverside Counties have tripled in the last two months, and the rate in San Bernardino County has quadrupled. Also, ICU beds are now at 100% capacity in Riverside. By contrast, counties that kept mask-wearing orders without interruption reported smaller increases in hospitalization, with LA County up only 29% and San Diego county up 23% for the same period. Despite these statistics, Orange County executive officer Frank Kim was quoted yesterday as saying that he did not think OC's case rate was out of line with its neighbors. This is true, but it kind of misses the point, wouldn't you say? Above (from LATimes), most visitors to Downtown Disney seem to have taken the mask recommendation to heart.

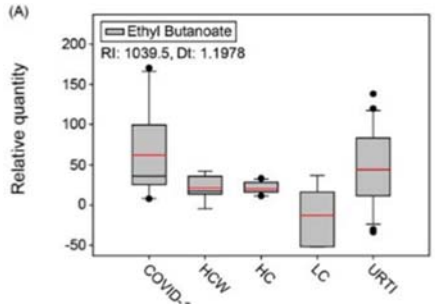
Vector Control Amid Pandemic. From Kelly Willmott - As reported by AP and Kaiser Health News, faced with demands from the pandemic, years of budget cuts and staffing shortfalls, State and County public health departments fear that there will be an increase in mosquito-borne diseases. Typically, about 200 people are killed annually from mosquito borne disease in the U.S., but these low numbers are due to vigorous efforts by public health departments to monitor and combat mosquito populations, in some cases using AMVAC's FEMA-approved products. By contrast, in many countries, hundreds of thousands are sickened and die from these diseases annually.

However, this level of vector-borne disease control in the US is at risk. While California, Florida and other places have dedicated mosquito control departments, over half of public health departments combat mosquitoes as part of their normal duties in addition to responding to a once-

in-a-generation pandemic. Further, the public health labs that test mosquitoes for the presence of West Nile, dengue, Zika or Eastern Equine Encephalitis are also used by local governments to test humans for COVID-19. At the same time, with tax shortfalls hitting state and local governments, mosquito districts are expecting further budget cuts. And, while infectious disease experts stress a lower risk of coronavirus from small outdoor gatherings, some worry of an increased risk of mosquito-borne diseases, as people spend more time outdoors.

Dr. Rosanne Connelly (who is also the wife of long-time and recently retired AMVAC employee Peter Connelly), leads a CDC team that runs testing of mosquitoes as well as of human blood samples (for mosquito-borne diseases) in multiple states. Today, her team at CDC published a joint advisory with EPA to recommend the continuation of mosquito surveillance and control during public health emergencies, using integrated pest management comprising both physical controls and chemicals such as larvicides and adulticides.

How VOCs May Help. Here is a crazy story – in a good sense. Many of you have a Facebook profile or, at least, when you turn your head sideways, a facial profile. But did you know that you have a VOC profile? That's right, when you exhale, you breathe out certain volatile organic compounds that can be measured. According to a study entitled "Breath-borne VOC Biomarkers for COVID-19" dated June 20, 2020 (see www.medrxiv.org), researchers have found that COVID patients emit distinctive VOC profiles. In the study, researchers compared VOC profiles (of ethyl-butanoate, acetone, isopropanol, butyraldehyde and acetaldehyde) among uninfected persons (HC), lung cancer patients (LC), persons with upper respiratory infections (URTI) and COVID-19 patients. This is a block graph of the relative ethyl-butanoate quantities among the four categories. Why is this useful? Well, as reported by NBCNews, a Finnish company, Deep Sensing Algorithms Inc., has developed a breathalyzer that, within two minutes, can read the VOC profile of the user and, ideally, identify whether that person has the coronavirus. That's right, no line, no swab, no waiting – just breathe into a tube and wait 120 seconds. This is a photo of the device from their website. Over the next month, scientists are conducting trials to confirm that VOC profiles of infected patients, symptomatic or not, can be consistently identified. This is a promising technology that could radically advance infection testing.



Man's Best Friend, Revisited. However, this is not the end of the story. As you may recall, last May we reported that researchers in the UK were training dogs to identify persons infected with coronavirus by smell. As explained by Dr. Robert M. Glattner in Forbes.com, the biologic basis for this canine olfactory power lies in – you guessed it – the VOC profile. Specific pathogens, like coronavirus, cause human tissue to generate a certain VOC signature which bears a distinctive, albeit extremely faint, odor. With a sense of smell 10,000 times greater than ours, dogs can be trained to recognize that

signature. In fact, as reported today by the Telegraph (above is their photo), United Arab Emirates is deploying these dogs in airports and claims a 92% accuracy rate for detecting COVID infections. In short, the very thing being measured by the Deep Sensing Algorithms breathalyzer is being sniffed out by dogs. Remember, you heard it here first. Have a great weekend. - TD

If you have any questions or comments on this advisory, please contact either kellyw@amvac.com or timd@amvac.com.