COVID-19

Weekly Science Review

May 30 – June 5 2020

This weekly science review is a snapshot of the new and emerging scientific evidence related to COVID-19 during the period specified. It is a review of important topics and articles, not a guide for policy or program implementation. The findings captured are subject to change as new information is made available. We welcome comments and feedback at **covid19-eiu@vitalstrategies.org**.

DATA INSIGHT

Eleven epidemiological fallacies in COVID-19

The COVID-19 pandemic is the largest public health crisis in more than a century and it spread across the world in a matter of weeks. Similarly, the amount of data and science around COVID-19 has risen exponentially, leading to everyday discussions among experts and laypeople about cases, deaths and where we are headed. This week we highlight 11

misconceptions about COVID-19 data and its interpretation to better inform our use of data for decision making.

Myth 1: Case trends are enough to monitor COVID-19 spread. Trends in the case counts, even those adjusted for population numbers, are not enough to fully understand the disease situation. The absolute burden of disease is also important: a 10% decline in 10,000 cases is much different than a 10% decline in 100 cases. The level of testing is also an important consideration, as case trends may artificially increase or decrease if the level of testing is changing significantly. Lastly, the number of susceptible people over time is an important consideration when using case rates. If cases per capita decline by 10% in a place where half of the people moved away in the same time period, the actual spread of disease is probably rising, not declining. To fully understand the spread of disease, additional information from other metrics should be considered.

Myth 2: Case incidence is always a good indicator of community risk. The number of new cases (incidence) in a population does not always reflect the risk of transmission in a community. The main reason is that the composition or distribution of these cases may be very different, even while the overall total is the same. There also can be **significant clustering** from "superspreader" events that drive local transmission. For example, consider the following two

hypothetical communities, A and B. Both have four new cases in a population of 20 people, so the case incidence rate is the same (one in five people). Community A however has a more demographically and geographically diverse distribution of cases than Community B, where three of four cases are located in the same long-term care facility. The risk of coming into contact with an infectious person in Community B is much lower than in Community

To accurately capture community risk, we must consider additional information on the cases and patterns of transmission, where they are located, and the current status of control measures such as isolation of cases and quarantine of contacts. This information varies by location and should be used to fine-tune public health and social measures at local levels.

To see all eleven myths, view the full data insight here.

IN-DEPTH TOPICS

Returning to work and COVID-19

Main message: Employers must consider several factors to help ensure a safe and healthy work environment as businesses reopen and employees return to the workplace during the COVID-19 pandemic. The approach should include measures to reduce the risk of transmitting disease, such as: establishing basic infection prevention measures; developing a plan to promptly identify and isolate sick people and respond when there is an exposure in the workplace; ensuring paid sick leave for all who work on the premises, including contractors and part-time staff; implementing workplace flexibility to allow for working remotely or working in staggered shift; and maximizing administrative and engineering controls. Health checks, temperature screening, and testing may be part of the

approach, but cannot replace, and may be less effective than, other measures to keep workers and clients safe.

For an in-depth look at returning to work, **view our special supplement here**.

The impacts of COVID-19 on mental health in the United States

Main message: The direct and indirect psychological impacts of the COVID-19 pandemic may be profound. As we begin to understand the effects of the pandemic on non-COVID-19 medical issues, the effects on mental health may remain the least well characterized because **attention has come late and with significant gaps.** The COVID-19 pandemic, more than other events that disrupt society, may pose significant dangers to mental health through the combined direct effects of COVID-19, the effects of measures to control the epidemic such as lockdowns or school closures, and because of the length of the disruption. Health care workers are particularly vulnerable to mental health impacts of this pandemic, however, this review focuses on the general population; the unique issues faced by the health care workforce are not addressed in this review.

Recent studies describe the magnitude of the effects of COVID-19 on the mental health of the general population. Data from an **ongoing survey conducted by the US Census Bureau and the Centers for Disease Control and Prevention** showed that in mid-May, more than one third of those surveyed reported symptoms of an anxiety disorder, a depressive disorder, or both within the past seven days. Prevalence of those symptoms was highest among women, those aged 18 through 29 years, and those with less education. **In another study, among 1,468 adults surveyed in April 2020 for symptoms of serious**

psychological distress, 13.6% reported such symptoms, compared with 3.9% in a similar survey conducted in 2018. Of those surveyed in 2020, symptoms were most common among young adults, those with a household income of less than $35,000 per year, and those who identified as Hispanic. The causes of these trends are **likely multi-factorial, including both biomedical and psychosocial elements**. There may be impacts of COVID-19 itself, such as when a loved one becomes sick or dies, especially if infection control protocols made it impossible to help care for the patient, or if **usual bereavement channels** such as funerals are not possible. Among COVID-19 patients, there may be mental health effects associated with falling ill, receiving a diagnosis, and coping with the recovery process. In addition, possible **neuropsychiatric effects of the virus itself** warrant further investigation, and COVID-19 survivors may encounter **social stigma**. Although public health and social measures such as shelter-in-place orders mitigate the spread of the virus, they can also weaken social and support networks, putting people at risk for increased anxiety and depression. Indeed, **the psychological impacts of quarantine** have been well described. Heavy consumption of pandemic-related media may exacerbate stress and anxiety, **causing negative downstream effects on health**. Job insecurity is currently a major stressor for millions of Americans. If the response to the pandemic results in a significant economic downturn, the **mental health effects may be pervasive and long-lasting.**

For people with existing mental health disorders, some resources on which patients relied have been diverted to address other medical aspects of the COVID-19 pandemic. This includes **deployment of mental health professionals to treat patients with other health needs**, the repurposing of mental health institutional space for COVID-19 patients, and the **closure of long-term treatment facilities** due to concerns about epidemic spread. Factors that may contribute to symptoms of anxiety or depression in the general population may have more significant impacts among those with pre-existing conditions. For example, the stress of managing daily activities while avoiding infection may **exacerbate existing disorders**. During epidemics, **people with mental health**

disorders may be more susceptible to infection for many reasons and across a wide spectrum of mental health disorder severity. For example, there may be increased risk of infection among institutionalized patients or among those who must physically engage with health care services to attend appointments or access medication. Among COVID-19 patients, those with mental health disorders may be at risk of worse health and mental health outcomes because of barriers to obtaining adequate, timely care.

It may take months or years to understand the full effects of the pandemic on mental health, and the situation continues to evolve. For example, there are reports from around the United States that calls to suicide hotlines have dramatically increased. However the actual effect of the pandemic on suicide rates in the U.S. is not yet clear; there can be a "pulling together" effect during or after society-disrupting events that increases social support, mitigates feelings of hopelessness or alters views on mortality. Nonetheless, and whatever the data may ultimately show, it must be considered that COVID-19 itself and the measures necessary to combat the pandemic may have serious harmful effects on mental health. Comprehensive approaches that address many aspects of societal health should be adopted to the extent possible. There are a range of efforts to address mental health issues during the pandemic, including the expansion of telepsychiatry, gathering of available evidence to make recommendations for mitigating the consequences of quarantine, calls for multidisciplinary research into contributing factors, and provision of mental health care resources through a variety of organizations.

Addiction and recovery during COVID-19

Main message: In the United States and many other countries, the COVID-19 pandemic has been superimposed onto an ongoing epidemic of substance use disorder and overdose. The

COVID-19 pandemic has the potential to aggravate drug and alcohol use while undermining some of the more effective service and treatment strategies. Fortunately, regulators have made it possible for providers to innovate and improve medication treatment access in the face of the twin crises of overdose and COVID-19. Some of these measures may be worth continuing indefinitely.

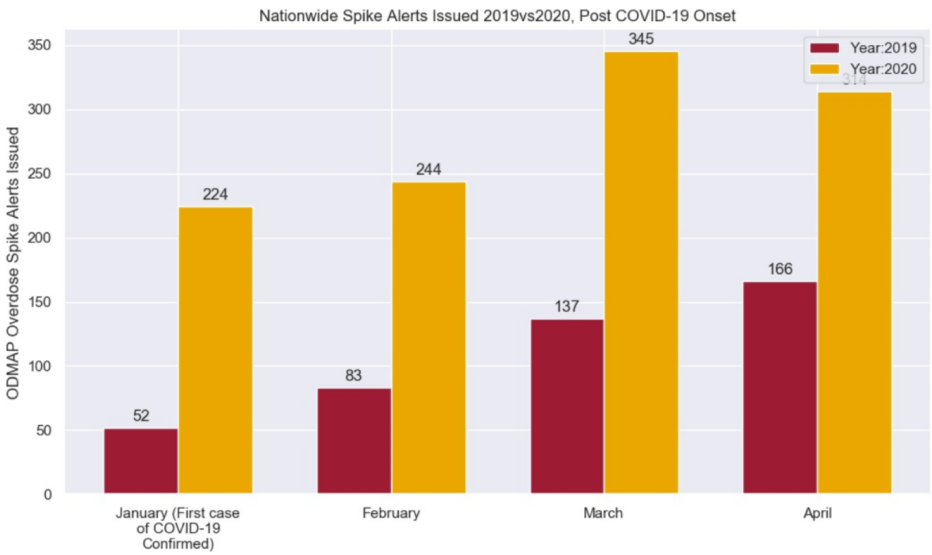
Health officials in many countries have expressed concern about how the COVID-19 pandemic will affect already epidemic levels of addiction. Poor outcomes related to both addiction and COVID-19 disproportionately affect vulnerable and marginalized communities; both exacerbate existing inequalities and both can carry social stigma. Substance use disorders can contribute to immune disruption, impulsivity, and risk taking, all of which could increase the risk for COVID-19. Early reports suggested that heavy alcohol use might independently increase the risk of infection or severe and fatal COVID-19 illness. But **in a large population study** this association wasn't significant once the investigators controlled for the effect of age, gender and other lifestyle factors. Early in the pandemic, there were also widespread rumors that alcohol use might be protective. These were discredited and **WHO recommended moderating or restricting** access to alcohol as part of the COVID-19 response. Some countries and localities restricted alcohol sales, while others **declared the alcohol trade essential** and may have paradoxically expanded access and even excessive use. Similarly, a number of meta-analyses conclude that tobacco smoking is associated with increased COVID-19 severity, even though some individual studies had reported a null or protective effect, posing a challenge to developing clear policies.

It is clear that many of the established risk factors for severe COVID-19—chronic lung disease, diabetes, and coronary heart disease—are also **common among people with substance abuse disorders**. Opioid use suppresses respiratory function, even in otherwise healthy people. When coupled with preexisting pulmonary conditions and respiratory compromise from COVID-19, patients with opioid use disorder may be at grave risk if they become infected. Furthermore, people with

drug and alcohol use disorder who become ill with COVID-19 **may seek treatment late or not at all**—particularly given the stigma experienced by this group in seeking medical care, the sometimes compulsive feature of addiction, the social isolation of drug use, and fear of facing symptoms of withdrawal. As a result, addiction can complicate management of COVID-19.

At the same time, there is concern, and accumulating evidence, that the COVID-19 pandemic has compounded the crisis of substance use disorder and overdose. Fear and stress associated with realized or potential illness, uncertainty and social disruption, or job loss and economic hardship can be expected to increase drug and alcohol use on a massive scale. Indeed, **local media reports** from across the US and worldwide tend to confirm this fear, suggesting that alcohol and drug use are on the rise and that overdoses are increasingly common. According to the **Overdose Detection Mapping Application Program**, the number of spike alerts—indicating a greater than expected number of overdose events in a particular county and state—was almost 200% higher in the first months of 2020 compared to the same time period in prior years (see Figure 1).

Figure 1: National ODMAP Submissions January-april 2019 and 2020 Comparison



Weekly Research Highlights

Physical distancing, face masks, and eye protection to prevent person-to-person transmission of SARS-CoV-2 and COVID-19: a systematic review and meta-analysis

(Lancet, 1 June)

Main message: This review evaluated non-pharmaceutical interventions (NPIs) aimed at reducing the transmission of betacoronaviruses that have caused epidemics (viruses causing SARS, MERS and COVID-19). Physical distancing of at least 1 meter (~3 feet), and, even more so, 2 meters (~6 ft), use of respirators/face masks, and eye protection were each associated with a significant reduction in person-to-person transmission in the health care and community setting. This is the first study of its type to offer quantitative risk reduction through use of NPIs. These findings may be used to guide contextualized recommendations as the scientific and public health community await additional guidance on optimum use of these measures from randomized trials.

- The review examined the findings of 172 studies from 16 countries including more than 25,000 cases of SARS, MERS and COVID-19 and transmission in both the health care and non-health care setting.
- Physical distancing of 1 meter significantly reduced the odds of transmission for all three viruses (aOR: 0.18). Distancing of 2 meters (~6 feet) further reduced transmission. Medical or surgical facemasks likely resulted in a large reduction in transmission (aOR: 0.15) and N95 respirators conferred additional protection. Cloth masks with 12-16 layers likely offer some protection. Eye protection, generally not promoted for use in the community, likely offered reduction in transmission (aOR: 0.34).
- None of the studies included in the review were randomized, and they may have been subject to types of bias that cannot

be adjusted for in a systematic review.

A randomized trial of hydroxychloroquine as post-exposure prophylaxis for COVID-19

(NEJM, 3 June)

Main message: In a well-conducted randomized controlled trial, 821 asymptomatic adults were provided hydroxychloroquine or placebo within four days of exposure to a household or occupational contact with confirmed COVID-19 illness. A total of 107 (13%) developed an illness compatible with COVID-19 or tested positive for the SARS-CoV-2 virus 14 days later. There was no difference in the incidence of probable or laboratory confirmed COVID-19 among the participants who received hydroxychloroquine compared to those who did not.

- Healthy North American adults were recruited through traditional and social media outreach and enrolled on the basis of self-reported high (>10 minutes at less than 6 feet wearing neither a face mask nor eye shield, 719 participants) or moderate-risk (> 10 minutes at less than 6 feet while wearing a face mask but no eye shield, 102 participants) exposure to a laboratory confirmed COVID-19 case patient. These included 545 health care workers and 245 household contacts.
- Participants were randomized to receive hydroxychloroquine at a dose of 800 mg once, followed by 600 mg in six to eight hours, then 600 mg daily for four additional days (n=414) or a placebo (n=407) from a mail-order pharmacy and asked to complete follow-up surveys to assess self-reported adherence, illness symptoms, adverse effects and care-seeking for 14 days. Since COVID-19 testing was not uniformly available at the time, the study outcome was suspected or laboratory-confirmed COVID-19 based on US standard case definitions at the time.

- Almost 90% of individuals in both groups completed the day 14 survey. There was no difference in the primary outcome between the hydroxychloroquine and placebo groups. Two participants were hospitalized (one in each study group) and no deaths or cardiac arrhythmias occurred. The incidence of reported side effects was higher in the hydroxychloroquine-treated group, but no serious adverse reactions occurred.
- Hydroxychloroquine did not prevent symptomatic COVID-19 illness in this study, even when initiated early (within the incubation period of the virus). Because of the poor availability of testing at the time, the study did not attempt to measure an impact on asymptomatic infection. Randomized trials are ongoing to assess the drug's efficacy for pre-exposure prophylaxis or for treatment of symptomatic COVID-19 illness.

Impact of COVID-19 Pandemic on Emergency Department Visits – United States, January 1, 2019 to May 30, 2020

(MMWR, Early Release 3 June)

Main message: There was a steep decline in the number of emergency department (ED) visits in the US during the COVID-19 pandemic as compared to the same four-week interval the year prior. The most significant declines were seen among children under 14 years of age, females, and persons living in the northeast. The number of visits related to infectious diseases was proportionately higher during the early pandemic compared to same weeks in the year prior.

- The researchers assessed trends in ED visits by analyzing data from the National Syndromic Surveillance Program (NSSP) which captures approximately 73% of all ED visits in the US from 47 states and paid special attention to the 4

week period of March 29 – April 25, 2020 compared to March 31 – April 27, 2019.

- Overall, visits during the period in 2020 decreased by 42% and fell to a mean of 1.2 million per week from 2.1 million per week. The greatest increase was seen for visits for infectious disease, COVID-19, pneumonia, and other respiratory complaints. The biggest drop was seen in abdominal complaints and musculoskeletal pain, and hypertension. There was also a decrease in persons presenting for evaluation of heart attacks, however there was an increase in persons presenting with cardiac arrest or serious heart arrhythmias, both known to be possible complications of heart attacks. This indicates the possibility that some persons were delaying care for conditions that are associated with high mortality.
- Study limitations include the fact that participating hospitals differ from year to year, making it more difficult to make direct comparisons, and the fact that the surveillance system may miss some relevant visits because of variation in the use of diagnostic codes, or missing diagnostic codes.

COVID-19 Monitoring and Response Among US Air Force Basic Military Trainees – Texas, March-April 2020

(MMWR, Early Release 2 June)

Main message: Even in congregate settings, strict adherence to nonpharmaceutical interventions (NPIs) has the potential to limit transmission of COVID-19. At a US Air Force base in Texas which conducts Basic Military Training (BMT), symptom screening, timely testing and isolation, physical distancing, and limits on gatherings allowed for continuation of essential training activities for thousands of airmen while limiting symptomatic cases.

- From March 1 to April 18, 2020 various NPIs were implemented at the base in sequence to keep up with evolving knowledge about the COVID-19 pandemic and included symptom screening and symptom-based testing, physical distancing, head-to-toe congregate sleeping arrangements, quarantine upon arrival to the base, monitored reentry after recovery for the ill, limitations on family and friend visitation, reduction in training time period, exclusion of trainees from high transmission areas, and universal masking.
- More than 10,000 trainees were housed and trained at the base during the period of interest in a staggered fashion, with 6,505 already on the base on March 1. Overall, 345 met criteria for testing, and five tested positive by PCR for SARS-CoV-2. Three of the trainees testing positive were known contacts of the first identified case, who is thought to have contracted SARS-CoV-2 during transit to the base. Seven trainees tested positive for other respiratory viruses.
- Limitations include the fact that no testing was done on asymptomatic persons at the base, and the burden of asymptomatic disease among young, mostly male persons in their late teens to early 20s is not known. The available resources for, adherence to, and enforcement of NPIs on a military base may not be generalizable to other congregate settings.

Evidence for Limited Early Spread of COVID-19 Within the United States, January-February 2020

(MMWR, Early Release 29 May)

Main message: Using epidemiological evidence, the researchers looked back to identify SARS-CoV-2 transmission in the US prior to what was previously thought to be the first community acquired case on Feb 26. They showed that community transmission likely occurred in late January with

the first known non-travel-associated case identified in a woman who became ill on January 31 and died on February 6th in California. Viral genetic analyses from this and other early cases suggest early importation of several cases followed by low-level ongoing transmission within the US. Ease of human mobility, worldwide connectedness, and the global nature of life in the 21st century emphasize the need for public health preparedness, and rapid, organized response to mitigate harmful outcomes when infections emerge and spread. Continued use of epidemiological investigative methods will be needed to monitor and respond to the current pandemic.

- By looking at syndromic surveillance, phylogenetic analysis, virus surveillance, and retrospective case investigation, the researchers provide insight into the timing and nature of early transmission of SARS-CoV-2 in the US unrelated to travel.
- They identified a single strain of virus that circulated between January 18 and February 9 imported from China, followed by several strains from Europe. Three patients in California were retrospectively diagnosed with COVID-19 (two from post-mortem retrospective case investigation, one from virus surveillance), confirming that the virus was already circulating by early February.
- Additional investigation may yet identify even earlier cases. The authors' retrospective technique cannot provide the same level of detail and information that would have been available if widespread testing was initiated as soon as the virus was identified.

Suggested citation: Cash-Goldwasser S, Kardooni S, Kachur SP, Cobb L, Bradford E and Shahpar C. Weekly COVID-19 Science Review May 30 – June 5 2020. Resolve to Save Lives. 2020 June 9. Available from **https://preventepidemics.org/coronavirus/weekly-science-review/**