EVIDENCE-BASED MEDICINE INFOSHEET: EPIDEMIOLOGY AND HEALTH SYSTEMS
Updated [9/6/2020]
Review completed by: [Laureen Gbordzoe, MS1]
Peer Review by: [Dr. Jason Rosenfeld]

Effectiveness of Stay-At-Home Orders and Effects of Re-Openings

Are the stay at home orders effective in reducing the transmission of SARS-CoV-2? How are business re-openings impacting the spread of SARS-CoV-2?

Key Findings

- Stay-at-home-orders
  - A model determined that unless there is almost 100% adherence to stay at home orders, SARS-CoV-2 will continue to spread in Italy.[1]
  - A less strict stay at home protocol may still be effective flattening the curve, but will increase the time necessary for these orders to be in place.[1]
  - After implementing additional stay at home measures, the percent of people leaving their homes from February 26th to April 1st decreased from around 80% to 42% in New York City, 47% in San Francisco, 52% in Seattle, and 61% in New Orleans.[2]
    - There are very early indications that this may be decreasing the number of cases in these locations.[2]
      - The average 3-day percent change in the number of cases showed an overall decline in all four cities from February 26th to April 1st.[2]
        - In New Orleans, the average 3-day percent change went from ~80% to ~60%.[2]
        - In New York, the average 3-day percent change went from ~80% to ~40%.[2]
        - In San Francisco, the average 3-day percent change went from ~80% to ~50%.[2]
        - In Seattle, the average 3-day percent change went from ~80% to ~50%.[2]

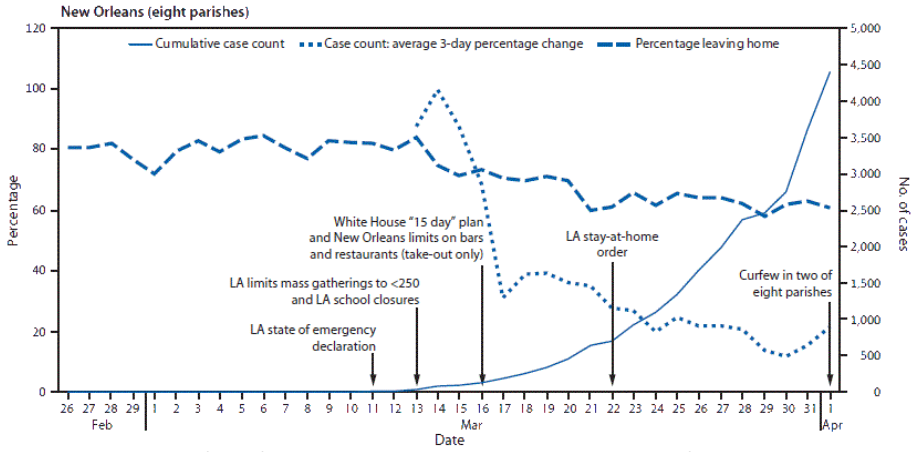

FIGURE. Selected community mitigation interventions, cumulative COVID-19 case counts, average 3-day percentage change in case counts, and percentage leaving home — four U.S. metropolitan areas, February 26–April 1, 2020[2]

- When comparing areas across America that implemented stay-at-home orders versus areas that did not, a decrease in the number of weekly confirmed cases and fatalities was found. Data was collected from March 24, 2020 through May 7, 2020.[3]
  - In the number of weekly cases, there was a 30.2% reduction after one week (1 week after the stay-at-home orders were initiated), a 40.0% reduction after 2 weeks, and a 48.6% reduction after 3 weeks.[3]
  - In the number of weekly fatalities, there was a 59.8% reduction after 3 weeks.
  - This suggests that the stay-at-home orders decreased the number of confirmed cases by 390,000 and the number of fatalities by 41,000.[3]
  - Other factors that may have influenced these numbers include other measures being put into place around the same time (banning of mass gatherings and closure of schools, non-essential businesses, and public areas). There was also an increase in the testing capacity during this time.[3]

- Re-openings
  - An overnight summer camp in Georgia had 597 people present. The campers slept in cabins with multiple people and sang/cheered. The attendees were required to have a negative COVID-19 test that was ≤ 12 days old before arriving at camp.
    - The staff was required to wear masks, but the campers were not. They did not have windows open to increase circulation.
    - One camper developed COVID-19 symptoms, was sent home, and tested positive. Test results on 344 attendees were obtained and 76% (260/344) were positive.[4]
  - Combinations of factors affect the probability of infection: social distance, % occupancy of a room, time exposed, and ventilation.[5]
    - The safe social distance is 5.2ft - 9.8ft when considering spread via aerosol transmission of large droplet particles from talking.[5]
    - Ventilation plays a key role in keeping the probability of infection low: the longer people are in a room for or the higher the % occupancy is, the higher the ventilation needs to be.[5]
      - In a Dutch nursing home where there was inadequate ventilation (only re-circulated outside air when CO_2 level fell below a certain point) 17 residents (81%) and 17 healthcare workers with masks (50%) tested positive for COVID-19 within 6 days. In the 6 other wards in the nursing home that had good ventilation, 0/95 residents and 0/106 healthcare workers tested positive.[6]

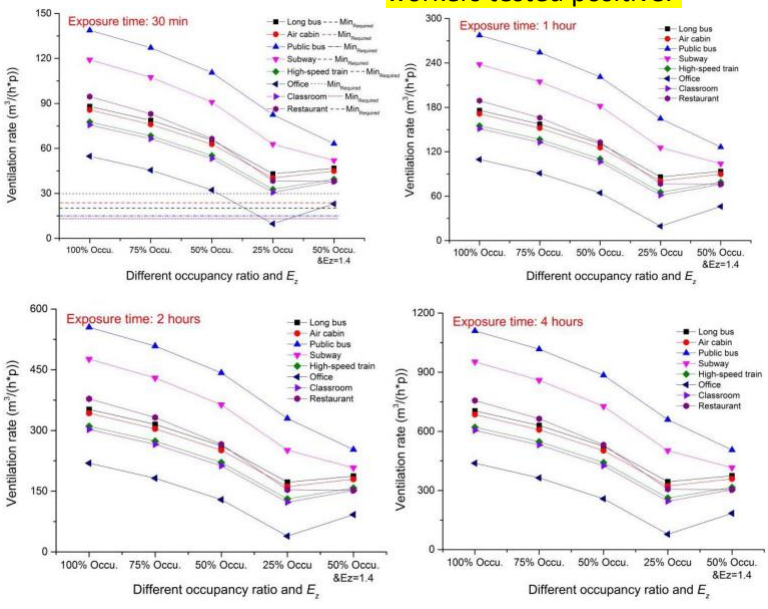

Figure. The requested ventilation rate for controlling the low infected probability.[5]

Recommendations

- Stay-at-home orders
    - Stay at home orders should be continued to be adhered to in order to increase the chance of the reduction of spread of SARS-CoV-2 and decrease the time it may take to flatten the curve.[1,2]
    - Though there are other factors that may have influenced the decreased in the number of confirmed cases and fatalities, these results suggest that the stay-at-home orders are helping in limiting the spread of COVID-19.[3]
- Re-openings
    - Social distancing and mask wearing should be done by everyone in a large group setting, even when attendees have evidence of negative COVID-19 test.[4]
    - In addition to social distancing, ventilation rates must also be adjusted as it plays a key role in decreasing the chance of infectivity. With adequate ventilation rates in conjunction with the other factors (social distance, % occupancy of a room, and exposure time), the risk for infectivity is low; therefore, the benefits of reopening can outweigh the risk of spread, if the appropriate measures are taken.[5,6]

Sources

1. Sjödin H, Wilder-Smith A, Osman S, Farooq Z, Rocklöv J. Only strict quarantine measures can curb the coronavirus disease (COVID-19) outbreak in Italy, 2020. *Eurosurveillance*. April 2020;25(13). doi:10.2807/1560-7917.es.2020.25.13.2000280.
2. Lasry A, Kidder D, Hast M, et al. Timing of Community Mitigation and Changes in Reported COVID-19 and Community Mobility — Four U.S. Metropolitan Areas, February 26–April 1, 2020. MMWR Morb Mortal Wkly Rep 2020;69:451–457. DOI: http://dx.doi.org/10.15585/mmwr.mm6915e2
3. Fowler JH, Hill SJ, Obradovich N, Levin R. The Effect of Stay-at-Home Orders on COVID-19 Cases and Fatalities in the United States. *medRxiv*. May 2020. doi:10.1101/2020.04.13.20063628. (*pre-publication*)
4. Szablewski CM, Chang KT, Brown MM, et al. SARS-CoV-2 Transmission and Infection Among Attendees of an Overnight Camp — Georgia, June 2020. MMWR Morb Mortal Wkly Rep 2020;69:1023–1025. doi: http://dx.doi.org/10.15585/mmwr.mm6931e1
5. Sun C, Zhai Z. The efficacy of social distance and ventilation effectiveness in preventing COVID-19 transmission. *Sustain Cities Soc*. 2020;62:102390. doi:10.1016/j.scs.2020.102390
6. Peter de Man, Sunita Paltansing, David S Y Ong, Norbert Vaessen, Gerard van Nielen, Johannes G M Koeleman, Outbreak of COVID-19 in a nursing home associated with aerosol transmission as a result of inadequate ventilation, *Clinical Infectious Diseases.* ciaa1270. https://doi.org/10.1093/cid/ciaa1270