EAST BAY GETTING TO ZERO

COVID-19 Harm Reduction:

Evidence and relative impact of prevention strategies

Updated 7/6/20 * feedback to Sophy S. Wong, MD

Relative impact	Strategy	Rationale	Evidence for reduction in transmission rates or cases
1 **60-95% reduction**	**Face coverings**	Reduces emission of respiratory droplets as the primary community benefit and reduces inhalation of respiratory droplets as a secondary benefit. Here is East Bay community guidance on face coverings using this evidence.	• Effectiveness of blocking droplets is best with non-valve N95 > surgical masks (Chu)> non-woven polypropylene (NWPP) such as from reusable grocery bags (Zhao) when static-charged > 2-layer stitched quilt cotton > store-bought cone mask > folded handkerchief > bandana (Verma) • Homemade mask recs: 2 layers NWPP + 1 inner layer of cotton (WHO, Chu); 3 layers NWPP (Songer) • Adjusted odds ratio (aOR) = 0.15 (Chu, sys. review) • Ro 2.5 to <1 if 70% people wear 60% effective masks (Howard; Tian); 64% reduction if 75% people wear 25% effective masks (Ngonghala); 95% reduction in deaths if 80% people wear masks (Kai) • Ro 2.2 to <1 if everyone wears 50% effective face masks all the time and Ro 4.0 to <1 if everyone wears 75% effective masks all the time. It's not enough if only symptomatic people wear masks. Even improbably poor face mask use (poor handling and poor design) leads to population benefit. (Stutt) • Why? Pre/asymptomatic transmission is substantial, so even with robust testing of all people with symptoms and isolation of cases and quarantine of close contacts, there will be asymptomatic spread. 88% of people with COVID-19 didn't have symptoms in a US L&D cohort (Sutton) and homeless cohort (Baggett). 56% cases in SNF outbreak with 26% mortality were presymptomatic (Arons). 40-45% people with COVID-19 remain asymptomatic (Oran). Undiagnosed cases in China in January were the source for 79% of cases even though they were 0.55 as likely to be the source as diagnosed cases (Li). • State policies mandating face masks significantly reduce COVID-19 growth rate by 0.9-2% (Lyu).
2 **53-88% reduction**	**Distance ≥1 meter** (≥2 meters better)	Respiratory droplets less likely to reach mucous membranes (eyes, nose, mouth).	• Droplets travel farthest with sneezing (to 26 ft) > coughing > singing > talking. • Adjusted odds ratio (aOR) = 0.18 (Chu, sys. review) • 88% reduction in US hospitalizations at peak with a 40% decrease in contact from baseline (Ngonghala) • 53-75% reduction in UK hospitalizations at peak when combined with case isolation (Ferguson)
3: 78% reduction	**Eye protection**	Reduces respiratory droplet contact with eyes.	• Eye protection includes goggles, visors, face shields (not sure if it includes corrective glasses). • Adjusted odds ratio (aOR) = 0.22 (Chu, sys. review)

4? ?%? **Data suggests large impact**	**Outdoor settings** (instead of indoor settings)	Increased distancing, air circulation and dilution to reduce transmission of respiratory droplets.	● Indoor transmission is 19x higher than outdoor transmission (Nishiura). ● Only 1 out of 318 outbreak clusters in China were outdoors, and that cluster with 2 cases was among a group of men having conversation. (Qian)
5 **28-45% reduction**	**Hand hygiene**	Reduces transfer of infected droplets from hands to eyes, nose, mouth.	● hand sanitizer > hand washing in real-life settings probably due to convenience and ease of sanitizer. ● Incidence rate ratio (IRR) = 0.77 for respiratory infections with hand sanitizer use compared to usual practice in RCT in preschool. Hand washing group had more respiratory infections in this RCT compared to usual practice (IRR=1.21). (Azor-Martinez) ● 45% reduction in respiratory infections with hand-washing but maintenance of hand washing intervention limited by lack of time (Ryan) ● 60% or more ethanol is recommended though 30%+ is enough to inactivate SARSCoV2 (Kratzel)
6 **14-60% reduction**	**School closures**	Reduce contacts between large numbers of children and community members	● 14% reduction in UK hospitalizations at peak (Ferguson) ● Estimated impact of school closures in Shanghai reduce Ro from 0.8 to 0.65 (19%) but reduces peak incidence by 40-60% (Zhang) ● Elementary age and younger children are less likely to get infected (3x less than adults in some studies) and when they do tend to have milder symptoms but appear to be just as infectious when they are infected.(Jones)
7 **33% reduction (53% with CT)**	**Case isolation (CI)**	Isolate cases to reduce forward transmission	● 33% reduction in UK hospitalizations at peak; 53% reduction when combined with contact tracing (Ferguson) ● Why is this so low? Likely due to presymptomatic and asymptomatic transmissions and lag time between viremia, testing, diagnosis and isolation.
8 **10-20% reduction (53% with CI)**	**Contact tracing (CT)**	Identify and quarantine close contacts of cases to reduce forward transmission	● 10% reduction in US hospitalizations at peak if 75% increase in contact tracing (Ngonghala) ● Additional 20% reduction in UK hospitalizations at peak when combined with case isolation (both together lead to a 53% reduction, Ferguson)
?	**Ventilation**	Reduce airborne transmission of exhaled respiratory droplets.	● The basic purpose is to remove exhaled indoor air and replace with diluted outdoor or cleaned air. ● Potential interventions: Open windows and doors to promote outdoor-indoor air exchange, maximize clean air exchange in mechanical ventilation systems, eliminate recirculated indoor air, in areas of air stagnation provide air-cleaning devices with effective filters (germicidal ultraviolet irradiation is active against SARS1), ensure physical distancing, make sure all people with symptoms/infection are safely in isolation (Morawska). ● WHO recommends at least 160 L/s/patient for

			natural ventilation of indoor hospital wards. ● Indoor transmission is 19x higher than outdoor transmission (Nishiura). ● Early evidence for airborne transmission of COVID-19 include RNA found by PCR in hospital air samples and studies of respiratory viruses show that short-range airborne transmission occurs (Morawska).
?	**Daily symptom screening**	Identify people with potential infection to test and isolate them to reduce forward transmission.	● Mild symptoms are important to identify; fevers occur later in infection after transmissions may have already occurred. (Gawande) ● Limitations: Infectivity for COVID-19 occurs before symptoms manifest. This intervention is highly dependent on accurate self-report. (Gawande)
?	**Sanitizing surfaces**	Reduce transmission by fomites transferred by self-inoculation to mucous membranes.	● No direct evidence has been reported on self-inoculation into mucous membranes (Morawska).
?	**Shorter contact times (<15 mins)**	Reduce total potential viral load exposure	Probability: # viral particles emitted/minute during contact x # minutes = total viral load of exposure
?	**Smaller groups vs. larger groups** **Fewer household contacts vs. more**	Reduce number of potential exposures	Probability: % prevalence of cases in a given population x # people in group = # potential exposures ● Odds of infection among pregnant women in NY were highest among those residing in neighborhoods with larger households of 3+ people per unit (OR 3.16), crowded households of >1 person per room (OR 2.27) and unemployment rates of 14% or higher (OR 2.13). (Emeruwa)