

RISKY BUSINESS TEAM

OCTOBER 2020 - DECEMBER 2020

# EVALUATION OF RISK MITIGATION BEHAVIORS AMONG SAN DIEGANS



## EVALUATION OF RISK MITIGATION BEHAVIORS

---

**PREPARED AND PRESENTED BY**

VINCENT DUONG, DANIELLA GOLDBERG, AARON HOFFER, AND ERIC WANG  
UNIVERSITY OF CALIFORNIA SAN DIEGO  
DEPARTMENT OF FAMILY MEDICINE & PUBLIC HEALTH  
HONORS PRACTICUM 2020 - 2021

# TABLE OF CONTENTS

Executive Summary .....	01
Background .....	02
Methods .....	03
Findings .....	04
Discussion & Limitations .....	08
Conclusions and Recommendations .....	09
References .....	10

---

---

# EXECUTIVE SUMMARY

The COVID-19 pandemic came swiftly and spread rapidly. Not much research had been conducted on the coronavirus. In order to increase prevention via masking, researchers sought to collect data. Via an observational study, researchers were able to gain insight on masking adherence behaviors among San Diegans. Multiple locations around San Diego county were observed for 1.5 hour time periods. These locations were anecdotally selected with hopes to find a dense population to sample. In order to collect and analyze data, the Qualtrics app was used throughout the study. Qualtrics allowed for easy integration and analysis of data. Analysis showed that 66% of people in San Diego county wore masks covering their mouths and noses. Mask adherence varied depending on the location of analysis, time of analysis, and day of analysis. There was not a significant difference in mask adherence between adults older than college age and younger than college age. Hopefully, this data will be used in order to increase awareness of proper masking wearing and prevention of COVID-19 contraction.

---

# BACKGROUND

Coronavirus has impacted nearly every aspect of life since its progression throughout every country of the world. Given the unprecedented nature of COVID-19, counties across California have developed new protocols and programming to reopen businesses and communities in a safe manner. Mask adherence is key to reopening safely and preventing outbreaks of coronavirus. COVID-19 is primarily transmitted via respiratory drops generated from sneezing, coughing, talking and breathing [1]. Masking greatly reduces those droplets from emitting from the nose and mouth. Mask adherence is especially important for asymptomatic or pre-symptomatic individuals who are unaware of their infectious status. These people account for 50% of COVID-19 transmissions. Masks are also beneficial to the wearer as masks reduce inhalation of potentially infectious droplets. San Diego county, along with other counties, rely on every community member exhibiting safe behaviors such as masking, social distancing, sanitizing, and testing in order to remain open.

The purpose of the Evaluation of Risk Mitigation Behaviors Among San Diegans study was to collect data on mask adherence in San Diego. No pre-existing study has been conducted to evaluate mask adherence within the community of San Diego county. It is key to collect data to determine which areas and demographics are faulting on mask adherence and which areas and demographics are doing successfully.

---

# METHODS

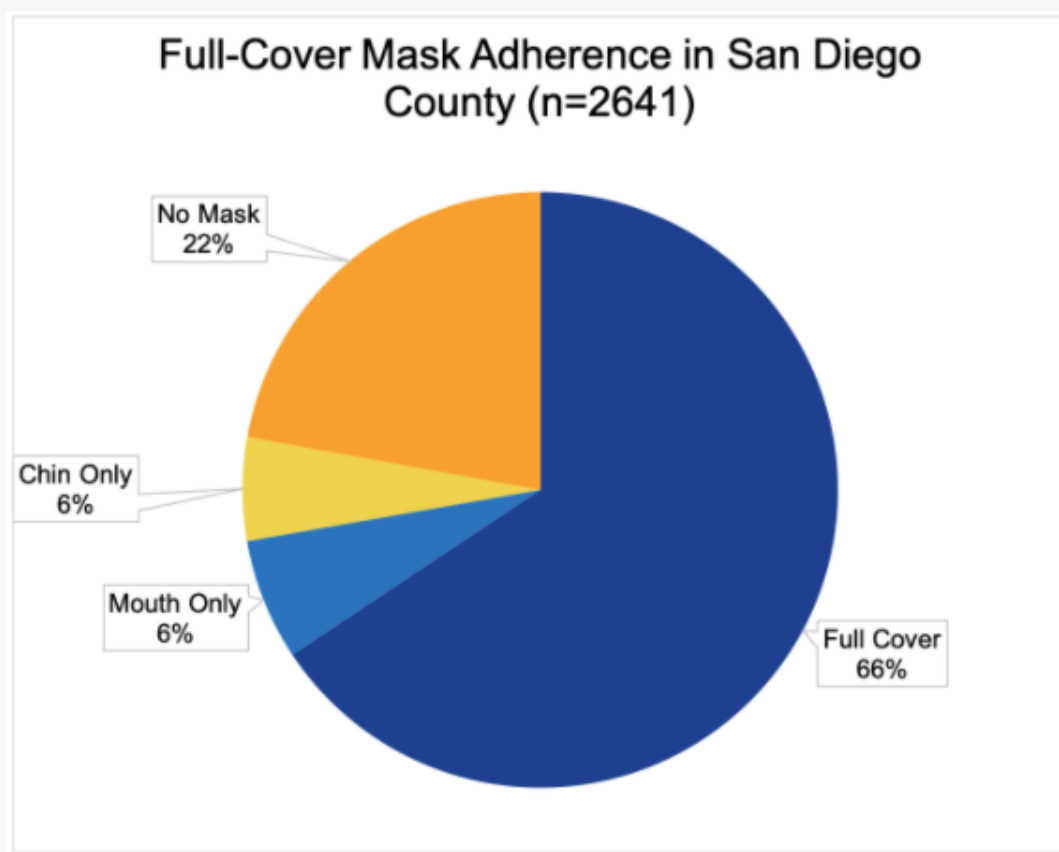
This is an observational study, surveying locations throughout San Diego County. Seven locations were surveyed on a randomized schedule, particularly during evening hours and on weekends for a duration of around one and a half hours. Locations included Fashion Valley Mall, Convoy Plaza, SDSU's Trader Joe's, Westfield UTC, Little Italy, Ocean Beach, and Pacific Beach. These locations were decided through anecdotal knowledge of areas well-frequented by the public. Study participants included every observable member of the public, excluding those who were within designated dining areas where not having a mask is permissible. Our subjects were not interviewed or approached in any way. Frequency of observation was convenience-based and dependent on the ability of the researchers to enter data. This type of sampling was chosen because there are limited resources for continual observation of participants over extended time periods.

Qualtrics was used for data collection, where one survey was entered by the researcher for each individual. The survey had four items, the first being mask type. This consisted of bandana, neck gaiter, cloth, surgical, and n95 and other respirators. The second data item was facial coverage, which consisted of full cover, no cover, mouth only, chin only, and mask present but off. The third data item was age group, which consisted of college age and under, and above college age. The final data item collected was whether the participant engaged in touching or adjusting their mask during time of observation. If the same individual was seen more than once, they were only accounted for once. Study researchers relied on visual cues in an attempt to avoid double-counting observations. Given the low volume flow of eligible subjects, avoiding double-counting was completed with high confidence. The data was then collated and analyzed in Excel and SPSS - the results of which can be found below.

# FINDINGS

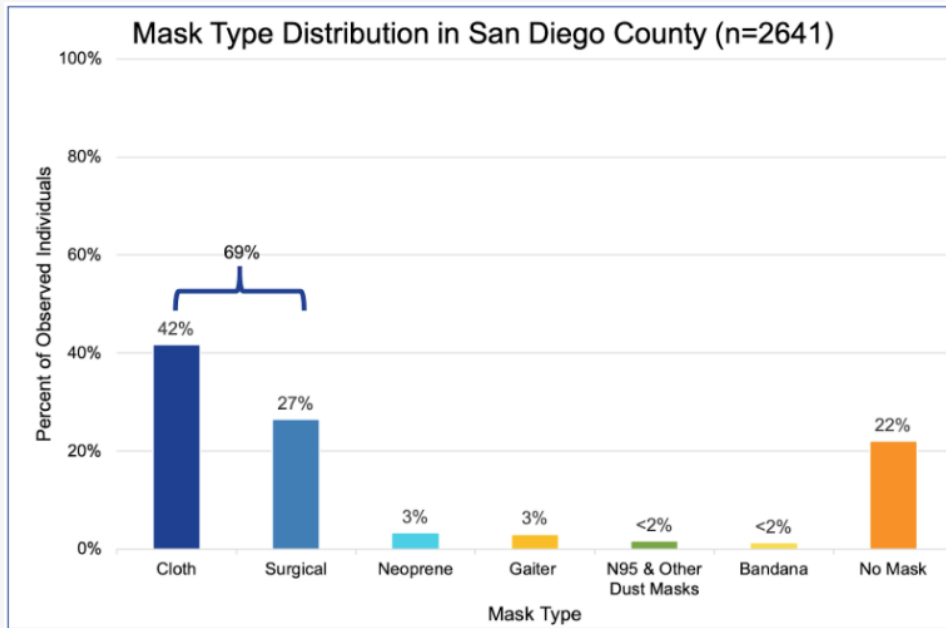
There were six main metrics taken during this observational study throughout San Diego County, including full-cover mask adherence rate, mask type distribution, mask adherence sorted by location, mask touching/adjusting at the time of observation, mask adherence by day of the week, and full-mask adherence by day of the week.

First, based on observational data, 66% of subjects (n=2641) properly wore their masks with a full cover, six percent covered their mouths only, six percent covered their chins only, and 22% percent wore no mask at all (Figure 1).



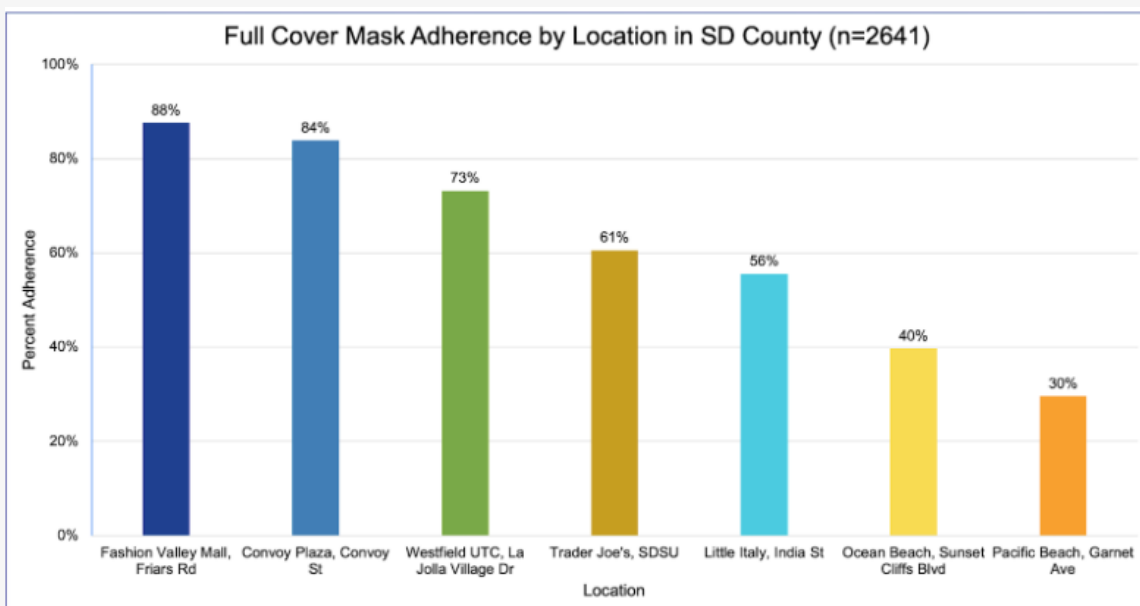
**FIGURE 01**  
MASK ADHERENCE SORTED BY FACIAL COVERAGE.

Second, in terms of distribution of mask types worn by subjects, 42% wore cloth, 27% wore surgical, and 22% wore no mask at all (Figure 2). Cloth and surgical mask types were dominant, with the other types such as gaiters, bandanas, and neoprene masks all falling under three percent.



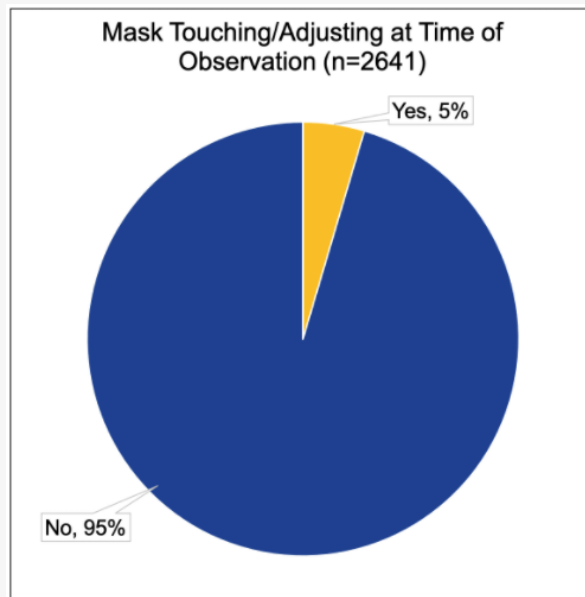
**FIGURE 02**  
DISTRIBUTION OF DIFFERENT MASK TYPES WORN THROUGHOUT SAN DIEGO.

Third, when sorting by location, mask adherence was highest at Fashion Valley Mall (88%) and Convoy Plaza (84%) (Figure 3). Compared to these said locations, subjects properly adhering to mask-wearing guidance were less of a majority at Westfield UTC shopping mall (73%), SDSU’s Trader Joe’s (61%), and Little Italy (56%). A minority of subjects properly adhered to mask-wearing guidance at Ocean Beach - Sunset Cliffs (40%) and Pacific Beach - Garnet Avenue (30%).



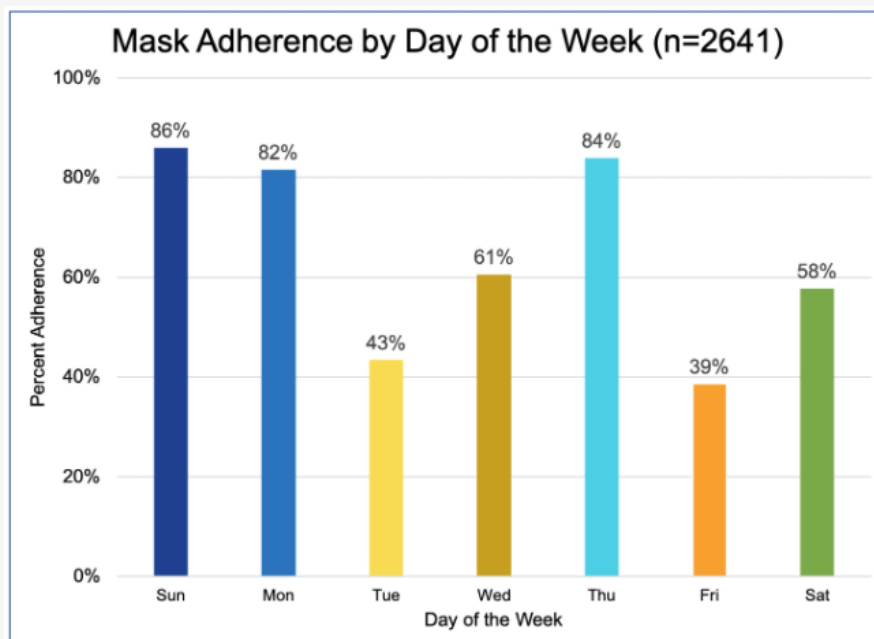
**FIGURE 03**  
MASK ADHERENCE SORTED BY FACIAL COVERAGE.

Fourth, only five percent of subjects were touching or adjusting their masks at the time of observation (Figure 4).



**FIGURE 04**  
PERCENTAGE OF SUBJECTS TOUCHING OR ADJUSTING THEIR MASKS AT THE TIME OF OBSERVATION.

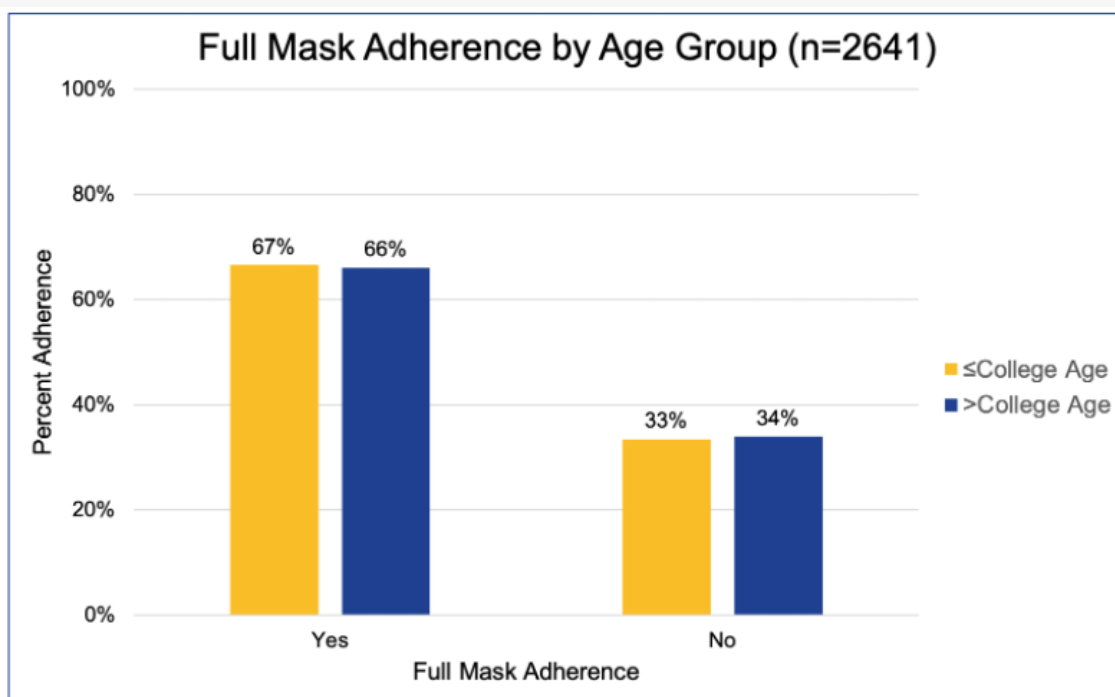
Fifth, when sorting mask adherence by days of the week, subjects adhered to mask-wearing guidance at the highest rates on Sundays (86%), Thursdays (84%), and Mondays (82%) (Figure 5). Compared to these said days, a smaller majority of subjects adhered to guidance on Wednesdays (61%) and Saturdays (58%). A minority of subjects adhered to guidance on Tuesdays (43%) and Fridays (39%).



**FIGURE 05**  
FULL-COVER MASK ADHERENCE RATES ON EACH DAY OF THE WEEK.



Sixth, when sorting full-mask adherence by age group, chi-square analysis indicates that there was no statistically significant difference between adherence rates between subjects less than or equal to college-age and greater than college age. To this end, observational data underlines similar majorities of subjects at or younger than college age (67%) and subjects older than college age (66%) fully adhered to mask-wearing guidance. On the other hand, similar minorities of subjects at or younger than college age (33%) and subjects older than college age (34%) did not properly adhere to mask-wearing guidelines.



**FIGURE 06**

FULL-COVER MASK ADHERENCE SORTED BY INDIVIDUALS AT OR YOUNGER THAN COLLEGE AGE OR OLDER THAN COLLEGE AGE.

The significance of these findings will be examined further in the discussion section.

---

# DISCUSSION

Although a majority of observed San Diegans properly wore their masks, a concerning 22% of all subjects wore no mask at all, which can be attributed to a variety of factors. First, mask adherence rates were heavily influenced by location. For example, when individuals went out to shop in hubs such as Fashion Valley Mall and Westfield UTC Mall, more than 80% of people wore full-cover masks when observed. This behavior could possibly be driven by the fact that subjects were more likely to adhere to mask guidance when moving in and out of establishments that mandate mask-wearing indoors.

As mentioned before, cloth and surgical mask types were most popular among subjects, with the other types such as gaiters, bandanas, and neoprene masks all falling under three percent (Figure 2). As a whole there did not appear to be a correlation between mask adherence rates and days of the week, although this could be attributed to adherence rates heavily depending on location (Figure 5).

# LIMITATIONS

The scope of our observation was limited by a number of factors. Study subjects were solely observed in outdoor settings, and indoor mask adherence was not accounted for. Population density data was also not accessible in determining locations of observation, and popular locations were chosen anecdotally. These two factors may diminish the power of collected data in providing a comprehensive narrative of mask adherence throughout San Diego County.

Additionally, accurately determining the age of subjects was difficult, especially with the addition of masks and in nighttime settings. It is suggested that observations take place in areas with adequate lighting.

Data collection via Qualtrics was time-consuming per entry, and made it difficult for a single researcher to accurately assess subjects in more densely populated areas. Increasing the number of data collectors per area can alleviate this, provided that subjects are not counted twice per observation.

---

# CONCLUSION AND RECOMMENDATIONS

The California state-wide mask guidance, which requires individuals to wear facial coverings when not at home, continues to be a point of contention. However, mask wearing is one of the simplest and most effective means to prevent the spread of SARS-CoV-2 [2,3]. This observational study may easily be replicated within any community to show regional mask adherence, albeit the limitations of which should be addressed in order to implement a protocol which strengthens the representativeness of the community population. Further, point-in-time data obtained via the methods utilized in this study may be compared to local case numbers to examine the efficacy of face masks in reducing the transmission of SARS-CoV-2 with greater confidence if data were collected at each location on a daily basis, during set times of day in order to provide a complementary metric for both mask adherence and case numbers--this would likely require an augmentation of research staff size.

The bivariate analysis of “above college age” and “at/below college age” groups showed nearly no difference in mask-wearing adherence (67% and 66%, respectively). Therefore, in future iterations of this observation, it is recommended that more categories for age variability be included. For example, a group representing subjects above the age of 50 may present a higher percent adherence, as older adults are known to be more susceptible to both contracting COVID-19 and presenting severe symptoms and complications from the disease (4x higher rate of hospitalization and 30x higher rate of mortality, when compared to college-aged [18-29] adults) [2]. Age determination was a particularly difficult data point to accurately assess; additional age categories would further complicate the process. In addition to appearance, it is recommended that contextual cues be utilized (setting of observation may relate to age-appropriateness, e.g. a university campus and a bar may have an inordinate number of young adults versus middle-aged and older adults).

As a recommendation to stakeholders, there was a noted absence of signage encouraging the public to wear facial coverings while among others, even while outdoors. While most businesses displayed this signage in enforcing public health recommendations while indoors, the public should be made aware that outdoor transmission of respiratory droplets is still possible [4]. Therefore, highly visible, outdoor signs reminding the public to don facial coverings is recommended.

---

# REFERENCES

1. Moghadas, S. M., Fitzpatrick, M. C., Sah, P., Pandey, A., Shoukat, A., Singer, B. H., & Galvani, A. P. (2020). The implications of silent transmission for the control of COVID-19 outbreaks. *Proceedings of the National Academy of Sciences of the United States of America*, 117(30), 17513–17515. <https://doi.org/10.1073/pnas.2008373117>
2. Older Adults and COVID-19. Centers for Disease Control and Prevention. <https://www.cdc.gov/coronavirus/2019-ncov/need-extra-precautions/older-adults.html>. Published December 13, 2020.
3. Leffler CT, Ing EB, Lykins JD, Hogan MC, Mckeown CA, Grzybowski A. Association of country-wide coronavirus mortality with demographics, testing, lockdowns, and public wearing of masks. Update August 4, 2020. 2020. doi:10.1101/2020.05.22.20109231
4. Weed M, Foad A. Rapid Scoping Review of Evidence of Outdoor Transmission of COVID-19. 2020. doi:10.1101/2020.09.04.20188417