State- and County-Level COVID-19 Public Health Orders in California: Constructing a Dataset and Describing Their Timing, Content, and Stricture

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June 7, 2021

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Abstract

Without vaccines, non-pharmaceutical interventions have been the most widely used approach to controlling the spread of COVID-19 epidemics. Various jurisdictions have implemented public health orders as a means of reducing effective contacts and controlling their local epidemics. Multiple studies have examined the effectiveness of various orders (e.g. use of face masks) for epidemic control. However, orders occur at different timings across jurisdictions and some orders on the same topic are stricter than others. We constructed a county-level longitudinal data set of more than 2,200 public health orders issues by California and its 58 counties pertaining to its 40 million residents. First, we describe methods used to construct the dataset that enables the characterization of the evolution over time of California state- and county-level public health orders dealing with COVID-19 from January 1, 2020 through May 15, 2021. Public health orders are both an interesting and important outcome in their own right and also a key input into analyses looking at how such orders may impact COVID-19 epidemics. To construct the dataset, we developed and executed a search strategy to identify COVID-19 public health orders over this time period for all relevant jurisdictions. We characterized each identified public health order in terms of the timing of when it was announced, went into effect and (potentially) expired. We also adapted an existing schema to describe the topic(s) each public health order dealt with and the level of stricture each imposed, applying it to all identified orders. Finally, as an initial assessment, we examined the patterns of public health orders within and across counties, focusing on the timing of orders, the rate of increase and decrease in stricture, and on variation and convergence of orders within regions.

Public Availability

We are making the dataset publicly available as part of our commitment to open data and combating the COVID-19 pandemic (http:// sc-cosmo.org). We intend to update the dataset at least monthly. We are hopeful that others will use our methodological approach to characterize county-level or even city-level public health orders over time across additional states and would be happy to discuss this further via email (jeremygf@stanford.edu). A description of the contents and linkages of released files are provided in Appendix Table 1.

Public Health Order Searches

We developed and executed a search strategy to identify COVID-19 public health orders over the analytic time period applied to all California counties and the state itself. We identified website(s) for each county on which public health orders were released and supplemented this with web searches for press releases and media that combined county name, terms relating to COVID-19, and terms relating to public health orders and the topics they dealt with [1-59] (see also Appendix Tables 2 and 3). Search terms used in Google included combinations of each county's name and any of the following: declares emergency; bans gatherings; closes March; reopens April; reopens May; reopens June; Stage 2; Stage 3; recloses July; face coverings.

We recorded URLs and the date that each document was accessed, also archiving documents whenever possible. As some counties maintain only their most recent public health order on their websites (e.g., Solano County), we used the Wayback Machine to examine the orders contained on each such website at all points in time at which orders were added or changed [60]. In addition to gathering county public health orders, we also searched for and compiled the timing and topics of state-level public health guidance that applied to some or all of counties (e.g., all counties in the state, counties on a watch list, etc.) as this sometimes, explicitly or implicitly, substituted for or superseded county orders. Finally, when we encountered them, we separately noted instances where other county ordinances and orders may have related to COVID-19 but were not explicitly public health orders; we used this last category of information for narrative purposes only, excluding it from our dataset and analyses described below as we could not be sure that our search strategy would systematically identifying them in an equivalent way across time and counties.

Characteristic Extraction

All public health orders and guidance had the following characteristics: 1) county(s) to which they pertained; 2) date of announcement; 3) date of effect; and 4) date of expiry[1] (which could be either an explicit date or ongoing).

Classification of Public Health Order Topics

We began the schema for order classification using topics found in the COVID-19 US State Policy Database [61]. To these, we added 5 topics to reflect more thoroughly the actions found in the California county public health orders: moratorium on gatherings; quarantine for residents; and lab reporting & contact tracing; characterization of social bubbling; and details of private events. With the introduction of vaccines to California in December 2020, we split appropriate measures into those for vaccinated and unvaccinated individuals. The complete list of topics and their general definition are provided in Appendix Table 4. Based on full textual review by a study investigator, we classified each identified public health order as to whether it pertained to each of the 16 main topics (e.g., face masks, gathering size, etc.). In the event of ambiguity of whether an order dealt with a given topic, a second study investigator reviewed the text and discussion to reach consensus was used to reach a final determination. A

[1] Expiry dates were mainly used by counties in the beginning of the COVID-19 epidemic and were typically overwritten by additional orders before their expiration.

composite category of current level of county closure was added to the list which combined initial closures, reopenings, and reclosures (see below for further detail).

Classification of Stricture on Each Public Health Order Topic

The primary focus of the classification of stricture was to gauge how public health orders relating to specific topics became more or less strict within each county over time. For example, instead of attempting to rank whether closure of indoor dining in a given county was more or less strict than closure of nail salons in another county, we focused on how the set of business types that were closed in a given county widened or narrowed over time. For certain topic areas (e.g., state of emergency), stricture was binary – whether an order about it existed at a given point in time or not. For others, stricture had ordinality (e.g., the increasing number of people allowed at gatherings or events). In addition to applying a within-county numeric scale, specific free text information was extracted to capture the details of how the order's stricture on a given topic was determined. Lists of scales and their definitions are provided in Appendix Table 5. Based upon the scales we used, a study investigator classified the strictness of each order for each category it pertained to. Again, in the event of ambiguity, a second study investigator reviewed and discussed the particular example until consensus was reached. Since public health orders dealt with closures, reopenings, and reclosures, we constructed a combined variable on current strictness of closure/openness (which essentially added closure, reopening, and reclosure with a floor of 0 for completely open to account for differences in the ordinal scales we used). The main determinant of this variable's value became the state-level tiered system upon the system's rollout on August 31st with the exception that counties could opt to remain more strictly closed than the state system required [62].

The use of expiration dates issued with each order varies by order topic. Topics related to opening and closing, for example, physical distancing, stay at home, reopening, reclosing, and social bubbles tended to have expiration dates issued with orders. In many cases the orders were superseded by new orders prior to the expiration dates, but expiration dates are honored for these orders if they were not superseded. These expirations explain the numerous changes to closure and stay at home levels in January, despite the low number of orders for the month. Lab and contact tracing, mask restrictions, and quarantine restrictions tended to not have expiration dates published with the orders and are therefore only modified in the data if they have a new order that specifically increases or decreases the stricture of the previous order.

Descriptive Analysis of Public Health Orders and Their Topics and Stricture

We identified and characterized 2,286 state- and county-level public health orders related to COVID-19 that were issued and became effective between January 1, 2020 and May 15, 2021. Of those, 2,107 dealt with the key topics of physical distancing, stay at home, gatherings for unvaccinated individuals, gatherings for fully vaccinated individuals, private events for unvaccinated individuals, private events for fully vaccinated individuals, quarantine instructions for unvaccinated residents, quarantine instructions for fully vaccinated residents, quarantine instructions for unvaccinated visitors, quarantine instructions for fully vaccinated visitors,

reopening, reclosing, lab and contact tracing, mask restrictions, social bubbles for unvaccinated households, and social bubbles for fully vaccinated households[2,3,4].

Counts of orders: For the date ranges reviewed, we determined the number of COVID-19 public health orders promulgated. The months with the largest numbers of orders corresponded to rises in detected case rates.

Table 1: Number of orders by month

Month	**Number of distinct orders**
January	3
February	5
March	273
April	154
May	239
June	221
July	223
August	98
September	74
October	120
November	207
December	118
January	32
February	41
March	93
April	131
May	75

Counts of topics covered by orders: For the date ranges reviewed, we determined the number of order-topics (i.e., each time any COVID-19 public health order dealt with a given topic). Like counts of orders, we treated the topics covered by state guidance and orders in two ways: including them as a county orders when relevant or excluding them. We also calculated the percent of each specific order type as a function of total orders. Since some orders dealt with

[2] The topic of social bubbles, i.e., the number of individuals that your household can interact with, was introduced for the November 30th data release based on new orders being issued on this topic.

[3] The topics of quarantine for fully vaccinated residents, quarantine for fully vaccinated visitors, and social bubbles for vaccinated households were introduced for the May 3rd data release based on new orders being issued on these topics. The original topics changed to quarantine instructions for unvaccinated individuals and households. The values for social bubbles for unvaccinated households were expanded to reflect guidance that allowed an additional fully vaccinated household to join social bubbles - more details on the values can be found in Appendix Table 5.

[4] The topics of private events for unvaccinated and for fully vaccinated individuals were introduced with the June 7th data release based on new orders being issued on these topics. Additionally, the original topic of gatherings became gatherings for unvaccinated individuals and a new topic of gatherings for fully vaccinated individuals was introduced with the June 7th data release.

multiple topics in a single order, the percentages sum to greater than one. A large fraction of orders dealt with which venues would be open or closed and/or the levels of their closure/openness.

Table 2: Number of orders by topic and percent of orders by topic

Topic	**Number of orders**	**Percent of orders related to topic**
Gatherings for unvaccinated individuals	130	6.2%
Gatherings for fully vaccinated individuals	70	3.3%
Private events for unvaccinated individuals	70	3.3%
Private events for fully vaccinated individuals	70	3.3%
Physical distancing	239	11.3%
Stay at home	353	16.8%
Quarantine for unvaccinated residents	234	11.1%
Quarantine for fully vaccinated residents	40	1.9%
Quarantine for unvaccinated visitors	46	2.2%
Quarantine for fully vaccinated visitors	29	1.4%
Reopening	836	39.7%
Reclosing	201	9.5%
Lab and contact tracing	89	4.2%
Mask restrictions for unvaccinated individuals	387	18.8%
Mask restrictions for vaccinated individuals	68	3.3%
Social bubbles for unvaccinated households	455	21.6%
Social bubbles for fully vaccinated households	99	4.7%

Counts of orders by county: For the date ranges reviewed, we determined the number of COVID-19 public health orders promulgated by each county and examined the distribution of these counts across counties. Since state guidance and orders could substitute for or supersede county orders, we generated county-level counts and other descriptive statistics in two ways, including relevant state orders as a county order when it applied and excluding state orders in counts if they did not apply.

Table 3: Number of orders by county by month

County	**Mar**	**Apr**	**May**	**Jun**	**Jul**	**Aug**	**Sep**	**Oct**	**Nov**	**Dec**	**Jan**	**Feb**	**Mar**	**Apr**	**May**
Alameda	7	4	2	3	6	2	2	5	5	2	1	2	2	2	1
Alpine	6	1	2	5	1	1	0	1	4	1	0	1	2	3	1
Amador	7	2	7	3	1	4	2	1	3	2	2	0	1	2	1
Butte	3	1	4	3	2	1	2	2	4	3	0	1	2	2	1
Calaveras	3	1	4	3	1	2	1	2	5	2	1	0	1	2	1
Colusa	1	0	4	2	3	2	1	2	5	1	2	0	3	1	1
Contra Costa	7	2	4	4	8	1	4	3	6	3	1	1	2	3	1
Del Norte	6	2	3	6	3	1	0	1	4	1	1	1	0	1	2
El Dorado	4	2	3	3	1	1	1	1	5	3	0	0	1	4	1

Fresno	2	1	5	4	5	1	2	1	4	1	0	1	1	3	1
Glenn	4	0	2	5	4	2	1	2	4	1	0	0	1	2	1
Humboldt	3	1	3	4	1	2	1	3	3	2	1	2	2	3	1
Imperial	2	1	4	5	6	2	1	3	2	2	0	1	3	3	1
Inyo	4	3	6	3	2	2	1	2	2	2	1	0	0	2	2
Kern	3	3	2	4	3	1	1	2	4	1	0	0	1	2	1
Kings	4	1	3	4	6	1	1	2	4	3	0	0	1	2	1
Lake	9	7	5	4	2	1	0	2	3	1	1	0	1	3	1
Lassen	2	3	5	3	1	1	1	1	3	1	1	0	2	2	1
Los Angeles	9	3	6	6	8	1	2	7	4	3	2	3	2	5	2
Madera	3	2	2	5	5	1	1	1	2	2	0	0	1	2	2
Marin	8	2	6	5	5	2	1	3	3	3	0	1	1	3	1
Mariposa	4	3	3	3	1	3	2	1	4	3	1	0	1	2	1
Mendocino	5	4	4	3	5	4	2	3	4	3	1	0	3	5	2
Merced	3	5	2	3	7	2	1	2	3	1	0	1	1	3	1
Modoc	3	0	3	3	4	2	0	1	5	1	1	0	3	3	1
Mono	5	3	6	4	6	2	1	2	1	4	3	0	2	4	2
Monterey	2	3	4	4	4	1	1	1	1	3	0	0	1	3	2
Napa	5	2	3	7	5	1	0	1	3	2	0	0	2	2	1
Nevada	4	5	4	3	3	1	1	1	4	2	0	1	2	2	1
Orange	4	3	4	4	6	1	1	1	5	2	0	0	3	1	1
Placer	6	3	4	3	2	1	1	2	5	3	0	1	1	2	2
Plumas	1	1	5	4	1	1	0	2	5	2	1	1	1	2	1
Riverside	10	9	5	4	5	1	1	2	2	1	0	0	1	2	1
Sacramento	3	1	3	4	4	4	3	2	4	2	2	2	5	3	1
San Benito	4	2	3	3	4	1	1	2	4	1	0	0	1	2	1
San Bernardino	6	5	4	1	5	1	1	1	2	1	0	1	2	3	1
San Diego	7	5	4	4	7	3	1	1	3	3	1	3	1	2	2
San Francisco	10	3	5	5	6	2	5	6	4	7	2	2	2	2	2
San Joaquin	8	4	5	4	5	1	2	1	4	1	0	1	0	2	1
San Luis Obispo	7	5	4	3	4	1	1	3	4	1	0	1	2	2	1
San Mateo	10	6	8	5	2	3	1	5	3	1	1	1	1	2	3
Santa Barbara	3	5	4	5	7	3	4	3	3	4	3	2	5	3	1
Santa Clara	8	3	1	3	7	2	1	3	4	3	1	3	2	1	1
Santa Cruz	6	3	3	5	5	2	2	2	4	1	1	0	2	2	2
Shasta	1	0	4	3	1	1	1	3	3	2	0	2	0	2	1
Sierra	3	1	5	4	1	4	1	2	2	1	0	1	1	3	1
Siskiyou	3	3	3	3	1	2	0	2	5	1	0	0	2	3	1
Solano	5	2	4	5	5	1	2	1	4	2	0	0	1	1	1
Sonoma	7	5	6	5	4	2	1	1	1	2	0	0	1	2	1
Stanislaus	4	3	6	3	4	1	1	2	4	2	0	0	2	1	1
Sutter	2	1	3	2	4	1	1	2	4	3	0	0	1	2	2

Tehama	2	0	3	3	1	2	1	2	2	2	0	0	1	1	2
Trinity	6	1	7	3	1	1	0	2	5	1	0	2	1	1	2
Tulare	6	3	6	4	4	1	1	1	2	1	0	0	1	2	1
Tuolumne	4	3	5	4	2	2	2	1	4	2	0	0	2	1	1
Ventura	4	3	5	5	5	3	1	2	4	1	0	0	1	2	1
Yolo	3	3	6	4	7	1	2	2	3	3	0	2	4	2	1
Yuba	2	1	3	2	4	1	1	2	4	3	0	0	1	1	2

Daily rates of public health order/topic stricture by county: We employed graphical analysis to characterize the timing and relative degree of stricture of each county's orders related to each of the 16 topics. Additionally, we employed graphical analysis to characterize the relative degree of stricture within California regions. One particularly interesting feature that varies across counties is the use of face masking orders and the use of closure orders in the late spring and summer. In many counties, closure order strictness increased prior to masking order strictness. However, once masking order strictness increased, some counties appear to have moved to re-open while others maintained or increased closure strictness. The use of different order types as substitutes for one another or as complements is an important area for further research.

Discussion and Conclusions

Prior to vaccines, non-pharmaceutical interventions were the most widely used approach to controlling the spread of COVID-19 epidemics. Various jurisdictions implemented public health orders as a means of reducing effective contacts and controlling their local epidemics. While multiple studies have examined the effectiveness of various orders (e.g. use of face masks) for epidemic control [63-69], a complete picture of the magnitude and mechanisms of effectiveness of orders and regulation will likely require geographical and temporal variation in the contents of orders and their strictness. Current data sets tend to report on orders and regulations on a national and/or state level with current county-level efforts not necessarily standardized in their review and curation nor in their characterization of the topics and level of strictness contained in each order [70-72].

We constructed a county-level longitudinal data set of public health orders issues by California and its 58 counties pertaining to its 40 million residents. We observe both spatial and temporal patterns in the timing and strictness of orders on a variety of topics across counties and over time. We have made the dataset publicly available as part of our commitment to open data and combating the COVID-19 pandemic (http://sc-cosmo.org).

There are many potential uses of the data set we have constructed and released. It can be used in a variety of quasi-experimental designs to estimate the effects of such orders on epidemic health outcomes and on non-health outcomes (e.g., unemployment), potentially refining or extending prior studies in this area. It can be used to examine mechanisms like behavioral responses to such orders and compliance using either surveys such as those whose results are made available by Facebook or measured behavioral responses like those made available by Google's Mobility Trends [73-74].

The approach we have employed for California is not exclusively applicable to California, and our hope is that other researchers in other jurisdictions may build up similar data sets and make them publicly available, leveraging the methods and approach we have taken. We are eager to assist in such efforts to the extent possible.

In conclusion, our data set provides an open source and useful contribution to analyses of important issues related to the COVID-19 pandemic. Its methods may be used more broadly to characterize policy responses. Illustrating its utility, a descriptive examination of public health orders at the county-level in California that accounts for the timing of the orders, the topics the orders address, and their level of strictness highlights intriguing patterns like the use of masking orders as a complement to other types of closures in some jurisdictions, presumably attempting to further reduce COVID-19 incidence, and as a substitute to other types of closure in other jurisdictions, presumably attempt to maintain COVID-19 at low incidence while mitigating the effects of health orders on the local economy. Further analyses of such phenomena are highly relevant and urgently needed as the pandemic continues.

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Appendix

State- and County-Level COVID-19 Public Health Orders in California: Constructing a Dataset and Describing Their Timing, Content, and Stricture

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February 23, 2021

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Appendix Table 1: Details of released data files

PH_Orders_long	Contains the main data that is the result of scraping the web for all county public health orders and state public health directives. Based on review of the full text, the orders are each coded as to which category(s) (e.g., masking, closures) they pertain to and the ordinal relative level of stricture they represent. The file contains the following columns: county, dt_PHO, order_value, order_type. The variable county refers to one of 58 of California's counties (without the trailing string "County"). The variable order_type refers to the category of restriction referred to in a public health order. The variable order_value refers to the level of stricture for a particular order type in a particular county. The variable dt_PHO refers to the date that the county was at a particular level of stricture for a particular order type. This data set does not directly show when the county put out each of its order but changes in levels of order_value for order type on consecutive days show when there was an order(s) propagated.
PH_Orders_order_type	Contains slightly longer textual descriptions of the order types. It can be joined with PH_Orders_long using the order_type column.
PH_Orders_order_value	Contains the meanings of the scales for order values in within each order type. It can be joined with PH_Orders_order_type using the order_type column or with the PH_Orders_long using the order_type and order_value columns.
PH_Orders_region	Contains groupings of counties into regions based on CDPH groupings for "Economic Regions". Can be found at: calcat.covid19.ca.gov/cacovidmodels/
PH_Orders_statewide	Contains information when state-wide public health orders came into effect. It essentially shows which order type the state-wide

	order pertains to and the date on which it went into effect. It also documents the order value that was mandated. Note several important things. First, when the state produced tiers, the value for some counties could differ from others depending on the tiers they were in (hence in the order_value column for the statewide file we see a set of values that correspond to the state-mandated levels for each tier). Second, counties could opt to remain stricter than the state's order level and hence county values may be greater than these values. This is relevant both for simple state-wide orders and for tiered orders.
PH_Orders_linklist	Contains url for each of the public health orders included in the dataset, by county and date of order.

Appendix Table 2. Websites accessed for searches of public health orders (main governmental sites)

County Name	County Public Health Website
State of California	https://www.cdph.ca.gov/Programs/CID/DCDC/Pages/Guidance.aspx
Los Angeles	http://publichealth.lacounty.gov/media/Coronavirus/
San Diego	https://www.sandiegocounty.gov/content/sdc/hhsa/programs/phs/community_epidemiology/dc/2019-nCoV/health-order.html
Orange	https://occovid19.ochealthinfo.com/article/oc-health-officers-orders-recommendations
Riverside	https://www.rivcoph.org/Public-Health-Order-History
San Bernardino	https://sbcovid19.com/resources/#health-officer-orders
Santa Clara	https://www.sccgov.org/sites/covid19/Pages/public-health-orders.aspx
Alameda	https://covid-19.acgov.org/sip.page
Sacramento	https://www.saccounty.net/COVID-19/Pages/PublicHealthOrder_FAQs_Docs.aspx
Contra Costa	https://www.coronavirus.cchealth.org/health-orders
Fresno	https://www.co.fresno.ca.us/departments/public-health/covid-19/covid-19-orders
Kern	https://kernpublichealth.com/healthofficerorders/
San Francisco	https://www.sfdph.org/dph/alerts/coronavirus-healthorders.asp
Ventura	https://www.venturacountyrecovers.org/public-health-orders/
San Mateo	https://www.smchealth.org/coronavirus-health-officer-updates
San Joaquin	http://www.sjcphs.org/coronavirus.aspx
Stanislaus	http://schsa.org/corona-virus/ph-order/
Sonoma	https://socoemergency.org/emergency/novel-coronavirus/coronavirus-health-orders-guidance-archive/
Tulare	https://covid19.tularecounty.ca.gov/tulare-county-emergency-order-for-prevention-of-covid19-transmission/
Solano	https://www.solanocounty.com/depts/ph/covid_19_health_order.asp
Santa Barbara	https://publichealthsbc.org/health-officer-orders/
Monterey	https://www.co.monterey.ca.us/government/departments-a-h/health/diseases/2019-novel-coronavirus-2019-ncov/health-officer-shelter-in-place-order
Placer	https://www.placer.ca.gov/coronavirus/news
San Luis Obispo	https://www.emergencyslo.org/en/covid-status.aspx?_mid_=448
Merced	https://reopenmercedcounty.com/orders/
Santa Cruz	http://santacruzhealth.org/HSAHome/HSADivisions/PublicHealth/CommunicableDiseaseControl/Coronavirushome/PublicInformation.aspx
Marin	https://coronavirus.marinhhs.org/updates?field_categories_target_id=17
Yolo	https://www.yolocounty.org/health-human-services/adults/communicable-disease-investigation-and-control/novel-coronavirus-2019/shelter-in-place#:~:text=To%20strengthen%20this%20effort%20and,term%20used%20in%20emergency%20preparedness.
Butte	http://www.buttecounty.net/ph/Home/News
El Dorado	https://edcgov.us/Government/hhsa/Pages/EDCCOVID-19-Orders-Directives.aspx
Imperial	http://www.icphd.org/health-information-and-resources/healthy-facts/covid-19/guidance-and-resources/state-&-county-orders/
Shasta	https://www.co.shasta.ca.us/covid-19/news
Madera	https://www.maderacounty.com/government/public-health/corona-virus-covid-19/covid-revised
Kings	https://www.countyofkings.com/departments/health-welfare/public-health/coronavirus-disease-2019-covid-19/-fsiteid-1
Napa	https://www.countyofnapa.org/2739/Coronavirus

Humboldt	https://humboldtgov.org/2725/Local-Orders
Nevada	https://www.mynevadacounty.com/2924/Coronavirus
Sutter	https://www.suttercounty.org/doc/government/depts/cao/em/coronavirus
Mendocino	https://www.mendocinocounty.org/community/novel-coronavirus/health-order
Yuba	https://www.yuba.org/coronavirus/HealthOrders.php
Tehama	https://www.tehamacohealthservices.net/order-of-the-tehama-county-health-officer/
Lake	http://health.co.lake.ca.us/Coronavirus/press.htm
San Benito	https://hhsa.cosb.us/public-health/covid-19/
Tuolumne	https://www.tuolumnecounty.ca.gov/1290/Health-Officer-Orders
Calaveras	https://covid19.calaverasgov.us/#gsc.tab=0
Siskiyou	https://www.co.siskiyou.ca.us/publichealth/page/public-health-order-siskiyou-county-public-health-officer-posted-3162020
Amador	https://www.amadorgov.org/services/public-health/covid-19/emergency-declarations-and-health-officer-orders
Lassen	https://lassencares.org/local-press-releases
Glenn	https://www.countyofglenn.net/dept/health-human-services/public-health/covid-19
Del Norte	http://www.co.del-norte.ca.us/departments/health-human-services/public-health/health-safety-alerts
Colusa	http://www.countyofcolusa.org/771/COVID19
Plumas	https://www.plumascounty.us/2669/Novel-Coronavirus-2019-COVID-19
Inyo	https://www.inyocounty.us/covid-19/orders-directives
Mariposa	https://www.mariposacounty.org/2445/Health-Officer-Orders-and-Press-Releases
Mono	https://coronavirus.monocounty.ca.gov/pages/directives
Trinity	https://www.trinitycounty.org/covid-19/public-health-advisories
Modoc	https://modochealthservices.org/corona-virus
Sierra	https://sierracounty.ca.gov/596/Press-Releases
Alpine	http://alpinecountyca.gov/Index.aspx?NID=516

Appendix Table 3. Additional websites accessed for county and state public health orders

The list of each public health order accessed and its URL link are now provided as a CSV file with the public data releases. For more information on the structure of the file, see Appendix Table 1.

Appendix Table 4: List of topics covered with definition

Topic	Description
State of Emergency	Binary variable for if state of emergency declared
Moratorium on Gatherings (pre-vaccination)	Ordinal variable of 1-10 signifying the stricture of moratoriums on organized or public gatherings. (Restrictions on household gatherings are covered with the "Social bubbles" variable.) Note - restrictions on gatherings were initially rolled into reopening orders, therefore this variable was set to missing once a county reached an initial reopening level of 5.
Moratorium on Gatherings for unvaccinated individuals	Ordinal variable of 1-10 signifying the stricture of organized or public gatherings. This variable was reintroduced in the June 7th release to account for new orders around the widespread reopening in the spring of 2021 and adjusted to apply to only unvaccinated individuals.
Moratorium on Gatherings for fully vaccinated individuals	Ordinal variable of 1-10 signifying the stricture of organized or public gatherings for fully vaccinated individuals. This variable was introduced in the June 7th release.
Private Event Restrictions for unvaccinated individuals	Ordinal variable of 3-9 signifying the stricture of organized private events for unvaccinated individuals. This variable was introduced in the June 7th release.
Private Event Restrictions for fully vaccinated individuals	Ordinal variable of 3-9 signifying the stricture of organized private events for fully vaccinated individuals. This variable was introduced in the June 7th release.
Physical Distance Closures	Ordinal variable of 1-10 signifying the stricture of physical distance closures
Stay at Home orders	Ordinal variable with values of 3, 4, 8, and 10 signifying the stricture of stay-at-home orders
Quarantine for unvaccinated residents	Ordinal variable of 1-10 signifying the stricture of quarantine for residents (Previous to the May 3rd release, this variable applied to all individuals.)
Quarantine for fully vaccinated residents	Value of 0 signifying the CDC-linked guidance that fully vaccinated individuals do not need to quarantine. This variable was added in the May 3rd data release and all orders from previous months were reviewed and backcoded to reflect this new variable.
Quarantine for unvaccinated out-of-state visitors	Ordinal variable of 1-8 signifying the stricture of quarantine for out-of-state visitors. (Previous to the May 3rd release, this variable applied to all individuals.)

Quarantine for fully vaccinated out-of-state visitors	Value of 0 signifying the CDC-linked guidance that fully vaccinated individuals do not need to quarantine. This variable was added in the May 3rd data release and all orders from previous months were reviewed and backcoded to reflect this new variable.
Reopening	Ordinal variable of -1 to -9 signifying the stricture of reopening variables, with -1 being the lowest level of reopening and -9 being the most reopening
Second closures	Ordinal variable of 1-10 signifying the stricture of second closures
Overall closure	Prior to the introduction of the state tier system, a composite variable of physical distance closures, reopening, and second closures. Beginning on 31 August this variable represented the tier assigned by the state.
Lab reporting and Contact tracing	Ordinal variable of 1-9 signifying the stricture of lab reporting and contact tracing requirements
Face masks for unvaccinated individuals	Ordinal variable of 1-10 signifying the stricture of face mask orders. For the June 7th release this variable was updated to only apply to unvaccinated individuals.
Face masks for fully vaccinated individuals	Ordinal variable of 1-10 signifying the stricture of face mask orders for fully vaccinated individuals. This variable was introduced in the June 7th release.
Social bubbles for unvaccinated households	Ordinal variable of 2-9 signifying the number of individuals and external households a household can interact with. This variable was added in the November 30th data release and all orders from previous months were reviewed and backcoded to reflect this new variable. For the May 3rd release, this variable was updated to only apply to unvaccinated households and updated with .5 options for each value to reflect orders that allowed extended/larger social bubbles with vaccinated households. So if the value of social bubble is 3 for unvaccinated individuals/households but 1 household of unvaccinated is also allowed to join that size gathering, the value for this order become a 2.5.
Social bubbles for fully vaccinated households	Value of 1 based on CDC guidance on how vaccinated households can socialize. This variable was added in the May 3rd data release and all orders from previous months were reviewed and backcoded to reflect this new variable.
Alcohol and Firearms	Binary variable signifying if the order related to alcohol or firearms

Housing	Binary variable signifying if the order related to housing
Unemployment programs	Binary variable signifying if the order related to unemployment programs
Food security	Binary variable signifying if the order related to food security
Healthcare delivery	Binary variable signifying if the order related to healthcare delivery
Racial disparities	Binary variable signifying if the order related to racial disparities
Incarcerated individuals	Binary variable signifying if the order related to incarcerated individuals
Substance use disorder policies	Binary variable signifying if the order related to substance use disorder policies

Appendix Table 5. Descriptions of value definitions for each ordinal public health order category

Topic	Value	Description
Moratorium on Gatherings for unvaccinated individuals	1	Gatherings of 1000 people or more
Moratorium on Gatherings for unvaccinated individuals	5	Gatherings of 500 or more
Moratorium on Gatherings for unvaccinated individuals	6	Gatherings of 250 or more
Moratorium on Gatherings for unvaccinated individuals	7	Gatherings of 100 or more
Moratorium on Gatherings for unvaccinated individuals	8	Gatherings of 50 or more
Moratorium on Gatherings for unvaccinated individuals	9	Gatherings of 25 or more
Moratorium on Gatherings for unvaccinated individuals	10	Gatherings of 10 or more
Moratorium on Gatherings for fully vaccinated individuals	1	Gatherings of 1000 people or more
Moratorium on Gatherings for fully vaccinated individuals	5	Gatherings of 500 or more
Moratorium on Gatherings for fully vaccinated individuals	6	Gatherings of 250 or more

Moratorium on Gatherings for fully vaccinated individuals	7	Gatherings of 100 or more
Moratorium on Gatherings for fully vaccinated individuals	8	Gatherings of 50 or more
Moratorium on Gatherings for fully vaccinated individuals	9	Gatherings of 25 or more
Moratorium on Gatherings for fully vaccinated individuals	10	Gatherings of 10 or more
Private Events for unvaccinated individuals	3	Outdoor capacity 400 people, Indoor capacity 200 people
Private Events for unvaccinated individuals	4	Outdoor capacity 300 people, Indoor capacity 150 people
Private Events for unvaccinated individuals	5	Outdoor capacity 200 people, with or without indoor capacity 100 people
Private Events for unvaccinated individuals	6	Outdoor capacity 100 people
Private Events for unvaccinated individuals	7	Outdoor capacity 50 people
Private Events for unvaccinated individuals	9	Only outdoors, capacity 25 people
Private Events for fully vaccinated individuals	3	Outdoor capacity 400 people, Indoor capacity 200 people
Private Events for fully vaccinated individuals	4	Outdoor capacity 300 people, Indoor capacity 150 people
Private Events for fully vaccinated individuals	5	Outdoor capacity 200 people, with or without indoor capacity 100 people

Private Events for fully vaccinated individuals	6	Outdoor capacity 100 people
Private Events for fully vaccinated individuals	7	Outdoor capacity 50 people
Private Events for fully vaccinated individuals	9	Only outdoors, capacity 25 people
Stay at Home	3	Applies to those >75 yo or >70 yo with co-morbitities
Stay at Home	4	Stay at home from 10 pm - 5 am
Stay at Home	8	Exemption for religious gatherings
Stay at Home	10	All except essential workers must stay at home
Quarantine for unvaccinated residents	1	People with symptoms urged to self-isolate
Quarantine for unvaccinated residents	2	People should not return to work until 24 hours symptom-free
Quarantine for unvaccinated residents	3	If you have symptoms, isolate for 7 days or until 3 days fever-free
Quarantine for unvaccinated residents	4	If you are positive, isolate for 10 days and at least 1 day fever-free
Quarantine for unvaccinated residents	5	If you have been exposed, you must quarantine for 14 days
Quarantine for unvaccinated residents	6	Stay home if sick, quarantine for 14 days if exposed
Quarantine for unvaccinated residents	7	If you have been exposed, quarantine for 14 days; sick must isolate for 7 days from beg of symptoms and 3 days fever-free
Quarantine for unvaccinated residents	8	If you have had any exposure to an individual with a positive test, quarantine for 14 days; positive tests must isolate for 10 days; symptomatic must isolate for at least 10 days from beg of symptoms and 1 day fever-free
Quarantine for unvaccinated residents	9	If you have had any exposure to an individual with a positive test, quarantine for 14 days; positive tests must isolate for 10 days; symptomatic must isolate for at least 10 days from beg of symptoms and 3 days fever-free

Quarantine for unvaccinated residents	10	Failure to comply with isolation can result in fine/misdemeanor
Quarantine for vaccinated residents	0	Fully vaccinated do not need to quarantine following exposure if asymptomatic
Quarantine for unvaccinated out-of-state visitors	1	Exclude from events anyone from out-of-state with symptoms
Quarantine for unvaccinated out-of-state visitors	2	Exclude from events anyone who traveled from China
Quarantine for unvaccinated out-of-state visitors	3	Exclude from events anyone with symptoms who traveled from European or US hotspots
Quarantine for unvaccinated out-of-state visitors	5	Require 14-day quarantine anyone who traveled from hotspots out of county
Quarantine for unvaccinated out-of-state visitors	6	No people may disembark from a cruise ship in which anyone has been diagnosed with Covid without permission
Quarantine for unvaccinated out-of-state visitors	7	Require 14-day quarantine for travelers coming from certain states
Quarantine for unvaccinated out-of-state visitors	8	Require 14-day quarantine anyone coming from out of state
Quarantine for out-of-state fully vaccinated visitors	0	Fully vaccinated do not need to quarantine following exposure if asymptomatic
Lab reporting and Contact tracing	1	Mandate reporting of positive tests
Lab reporting and Contact tracing	2	Mandate reporting of all lab results
Lab reporting and Contact tracing	3	Allows those who "meet criteria" but without a doctor's order to be tested by the County/ requires testing for all decedents
Lab reporting and Contact tracing	4	Require healthcare facilities to test any symptomatic, exposed or at-risk persons
Lab reporting and Contact tracing	5	Funds provided for contact tracing
Lab reporting and Contact tracing	6	Public awareness for contact tracing provided

Lab reporting and Contact tracing	7	Businesses must req reporting of pos tests by personnel and then must participate in contact tracing OR facilities must report all febrile resp infections
Lab reporting and Contact tracing	8	Residents and personnel of Residential Facilities must submit to testing
Lab reporting and Contact tracing	9	Business forced to test all employees to remain open
Face masks for unvaccinated individuals	1	Face coverings suggested for essential businesses
Face masks for unvaccinated individuals	2	Allow businesses to require face coverings
Face masks for unvaccinated individuals	3	Face coverings required for those in public facing essential businesses
Face masks for unvaccinated individuals	4	Face coverings required for those in public facing essential businesses and those who visit
Face masks for unvaccinated individuals	5	Masks also required for those in nursing homes plus residents when not in their rooms
Face masks for unvaccinated individuals	6	Masks required when using public outdoor spaces, visiting businesses, riding public transportation, for those over 12 yo
Face masks for unvaccinated individuals	7	Masks required for all people in public places
Face masks for unvaccinated individuals	8	Mask mandate for anyone leaving their homes with possible contact with non-household members, includes exercise when one could come within 30 feet of others
Face masks for unvaccinated individuals	9	Masks required for all individuals when in public spaces, potentially enforceable.
Face masks for unvaccinated individuals	10	Mask mandate for all public places, specifically enforced with fines, charges
Face masks for fully vaccinated individuals	4	Fully vaccinated people only need to wear masks indoors or if in crowds outdoors
Closures	1	Lowest closure, e.g., gathering restrictions or wineries closed (Yellow tier post 8/31)

Closures	2	Select recreation areas closed, e.g., beaches on weekends (Orange tier post 8/31)
Closures	3	Indoor dining closed (Red tier post 8/31)
Closures	4	Nail and hair salons closed (Purple tier post 9/22)
Closures	5	Indoor malls closed (Purple tier from 8/31 to 9/22)
Closures	6	Places of worship closed (Stricter than purple tier post 8/31)
Closures	7	Strict closures, e.g., schools closed
Closures	8	Strict closures, e.g., day camps closed
Closures	9	Hotels closed
Closures	10	Strictest closure, e.g., all businesses and recreation areas closed
Social bubbles for unvaccinated households	1.2	Gatherings may be indoor or outdoor w capacity 100 ppl, fully vaccinated may gather indoors w/o masks
Social bubbles for unvaccinated households	1.3	Gatherings may be indoor or outdoor w capacity 50 ppl, fully vaccinated may gather indoors w/o masks
Social bubbles for unvaccinated households	1.4	Gatherings may be indoor or outdoor w capacity 25 ppl, fully vaccinated may gather indoors w/o masks
Social bubbles for unvaccinated households	1.5	Corresponds to value of 2, but with additional fully vaccinated household
Social bubbles for unvaccinated households	2	Gatherings of greater than 3 households are not allowed, must be outside in purple tier
Social bubbles for unvaccinated households	2.5	Corresponds to value of 3, but with additional fully vaccinated household
Social bubbles for unvaccinated households	3	Gatherings of greater than 3 households are not allowed, must be outside for all
Social bubbles for unvaccinated households	4	Gatherings can only include 3 households, must be outside, must report ill participants
Social bubbles for unvaccinated households	5	Gatherings can include 3 households, only 25 people
Social bubbles for unvaccinated households	6	Gatherings must be outside & limited to 3 hhds & 25 ppl; "meal" gatherings should be limited to 3 hhds & 6 ppl
Social bubbles for unvaccinated households	6.5	Corresponds to a value of 7, but with additional fully vaccinated household

Social bubbles for unvaccinated households	7	Gatherings shall be outside & limited to 3 hhds & 16 people
Social bubbles for unvaccinated households	8	Households may not interact with other households between 10pm and 5am
Social bubbles for unvaccinated households	9	No gatherings of households allowed
Social bubbles for vaccinated households	1	Fully vaccinated individuals can visit with other fully vaccinated individuals indoors without wearing masks or physical distancing