California Department of PublicHealth

Cal OES
GOVERNOR'S OFFICE OF EMERGENCY SERVICES

Data Model Book

UPDATED April 13, 2020

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Data Dictionary

Data Element	*Definition*
PEAK COVID HOSPITAL OCCUPANCY	The maximum number of COVID-infected persons hospitalized at any one time.
PEAK COVID ICU BED OCCUPANCY	The maximum number of COVID-infected persons hospitalized in the ICU at any one time.

Model details

California is using a Johns Hopkins University model led by Dr. Justin Lessler. The results are based on 1000 simulations corresponding with non-pharmaceutical interventions (NPI) similar to those implemented in California.

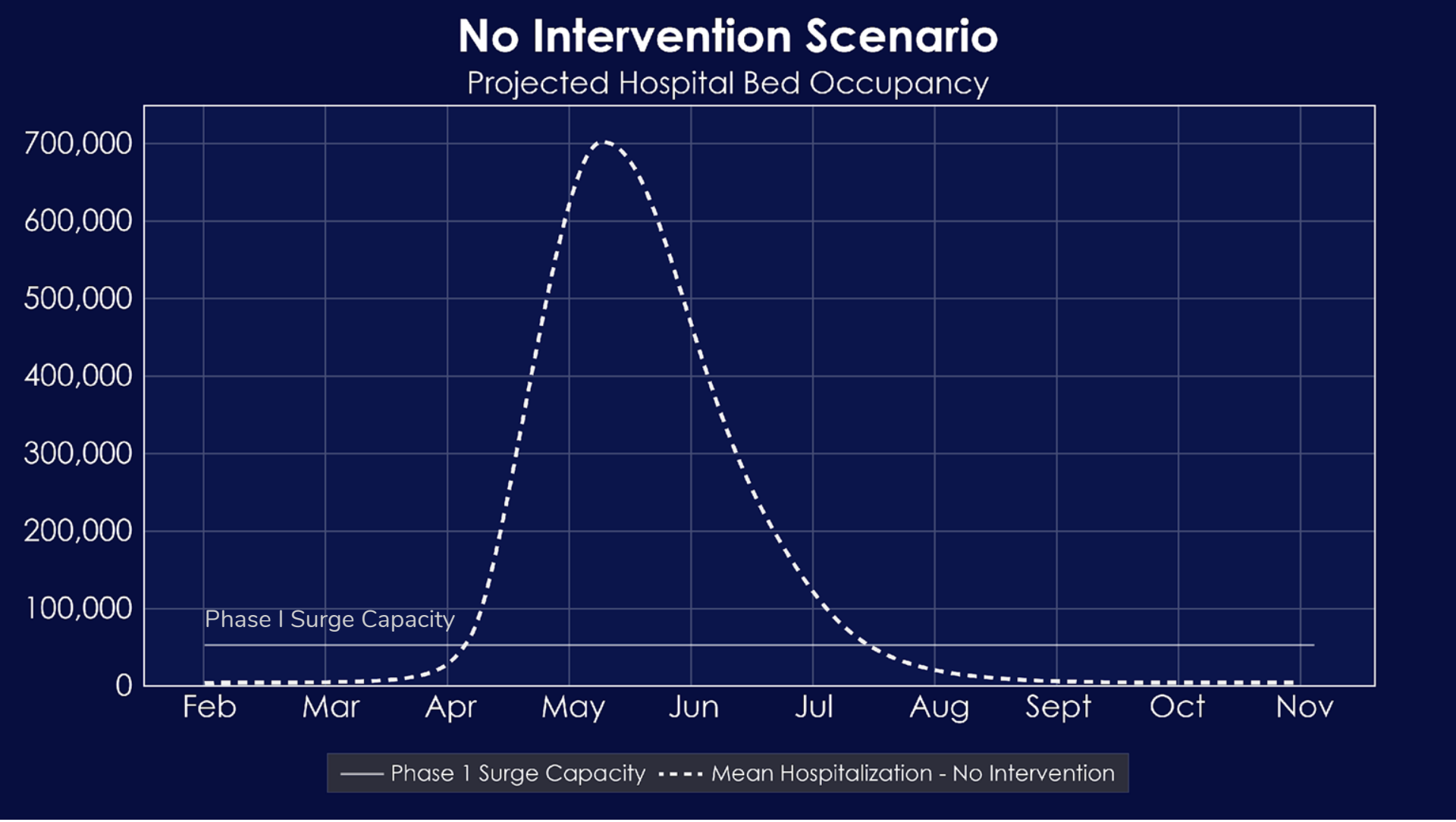
There is considerable uncertainty in the estimates of this model and all epidemiologic models at this time, driven by the unknowns in key aspects of the virus and lack of data on prevalence of infection. This assumes state mitigation interventions or NPIs starting March 20.

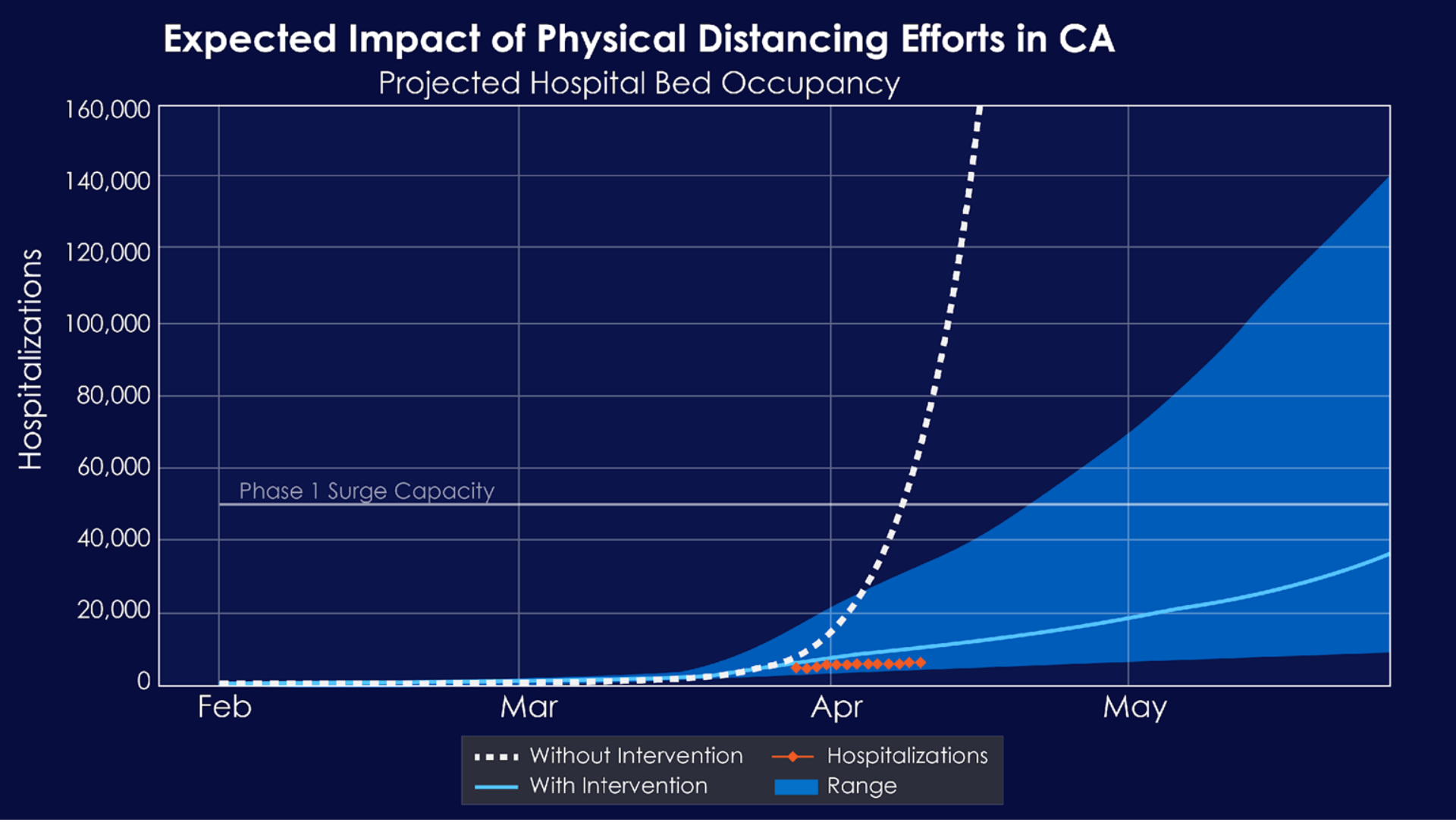
The Johns Hopkins model is open sourced and can be found at:
https://github.com/HopkinsIDD/COVIDScenarioPipeline/tree/dataseed/SEIR

The general model parameters are:

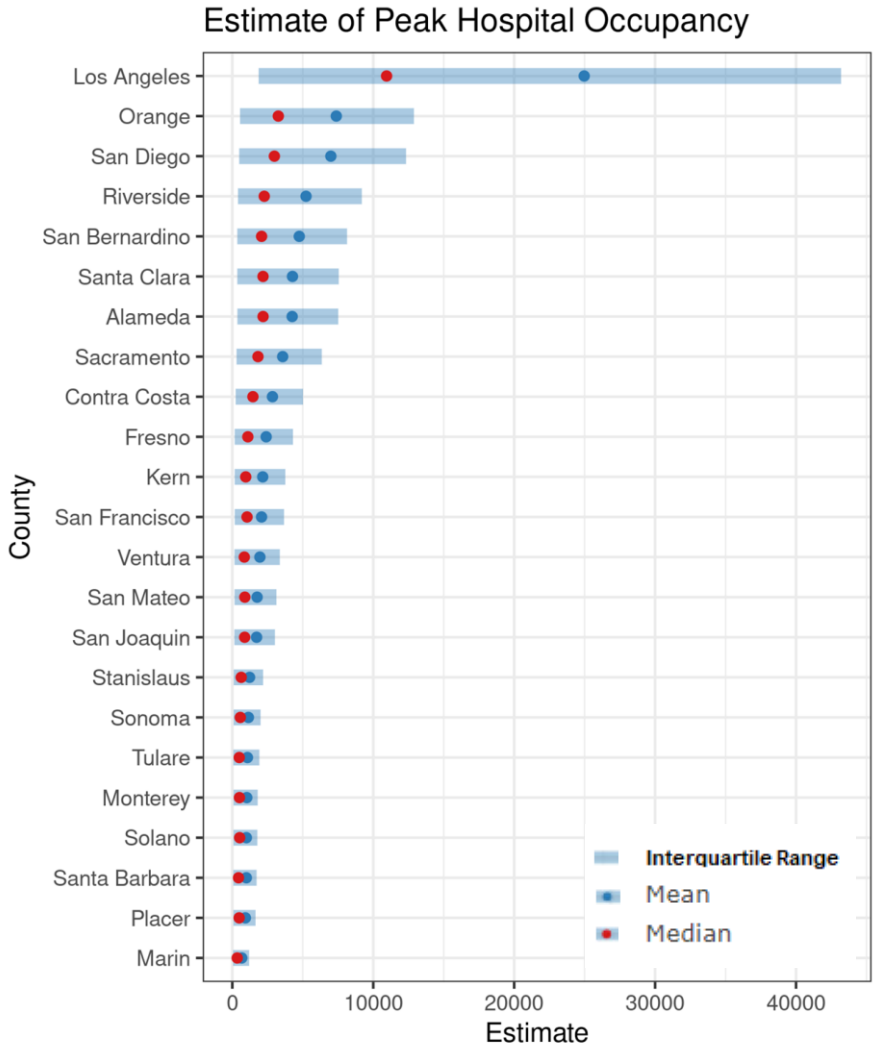
- Mean incubation period: 5.2 days
- Infectious period: ranges from 2.6 to 6 days
- Unmitigated R0: 2-3
- Infection Fatality Rate (IFR): 1%
- Hospitalized patients: 10%
- Hospitalizations admitted to the ICU: 32%
- ICU admissions that are ventilated: 15%

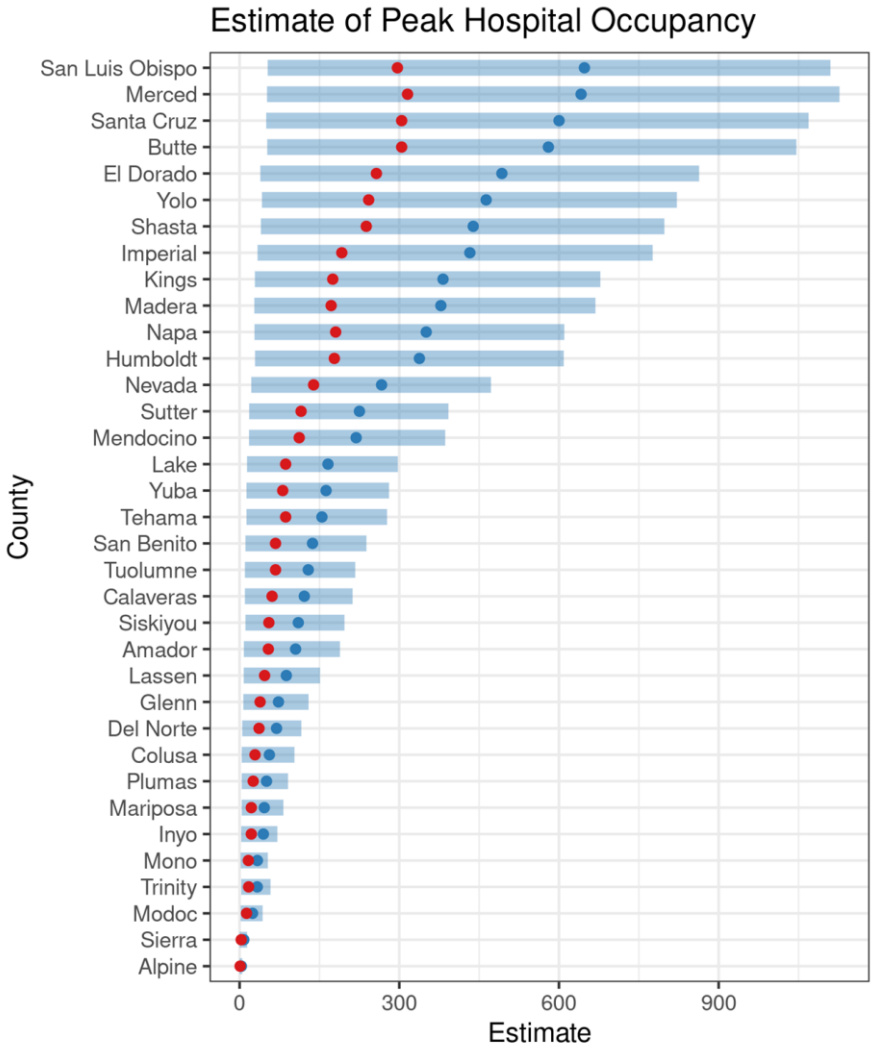
Date	Covid-19 Confirmed + Suspected Hospitalized	Modeled Median Value	Modeled - Actual Difference
3/27/2020	5,027	5,233	206
3/28/2020	4,362	5,690	1,328
3/29/2020	4,926	6,114	1,188
3/30/2020	5,279	6,524	1,245
3/31/2020	5,336	6,944	1,608
4/1/2020	5,394	7,365	1,971
4/2/2020	5,583	7,710	2,127
4/3/2020	5,512	8,036	2,524
4/4/2020	5,566	8,314	2,748
4/5/2020	5,476	8,576	3,100
4/6/2020	5,407	8,774	3,367
4/7/2020	5,792	9,039	3,247
4/8/2020	5,628	9,284	3,656
4/9/2020	5,236	9,620	4,384
4/10/2020	5,067	9,909	4,842
4/11/2020	5,234	10,324	5,090
4/12/2020	5,048	10,711	5,663


No Intervention Scenario
Projected Hospital Bed Occupancy
700,000
600,000
500,000
400,000
300,000
200,000
100,000
0
Phase I Surge Capacity
Feb
Mar
Apr
May
Jun
Jul
Aug
Sept
Oct
Nov
Phase 1 Surge Capacity
Mean Hospitalization - No Intervention


Expected Impact of Physical Distancing Efforts in CA
Projected Hospital Bed Occupancy
Hospitalizations
160,000
140,000
120,000
100,000
80,000
60,000
40,000
20,000
0
Phase 1 Surge Capacity
Feb
Mar
Apr
May
Without Intervention
With Intervention
Hospitalizations
Range

Hospital Occupancy





Hospital Occupancy cont'd

County	Mean	Median	Q25	Q75
California	92458	43828	7506	156151
Los Angeles	24969	10946	1869	43196
Orange	7379	3263	548	12888
San Diego	6991	2984	488	12327
Riverside	5231	2266	403	9190
San Bernardino	4751	2078	356	8142
Santa Clara	4269	2179	356	7553
Alameda	4247	2182	362	7517
Sacramento	3574	1820	302	6348
Contra Costa	2848	1462	239	5018
Fresno	2403	1102	168	4303
Kern	2157	953	168	3760
San Francisco	2076	1044	171	3667

Hospital Occupancy cont'd

County	Mean	Median	Q25	Q75
Ventura	1957	850	152	3370
San Mateo	1760	888	156	3131
San Joaquin	1723	876	143	3022
Stanislaus	1224	632	102	2184
Sonoma	1139	567	95	2004
Tulare	1072	492	76	1917
Monterey	1027	507	86	1800
Solano	998	522	83	1774
Santa Barbara	996	440	74	1722
Placer	927	486	79	1646
Marin	670	347	57	1190
San Luis Obispo	648	296	53	1110
Merced	642	316	52	1127

Hospital Occupancy cont'd

County	Mean	Median	Q25	Q75
Santa Cruz	600	304	50	1069
Butte	580	304	52	1046
El Dorado	493	257	39	863
Yolo	463	242	42	822
Shasta	439	238	40	798
Imperial	433	192	34	776
Kings	382	175	29	678
Madera	378	172	28	668
Napa	351	180	28	610
Humboldt	338	178	29	609
Nevada	267	139	22	472
Sutter	225	116	18	392
Mendocino	219	112	18	386

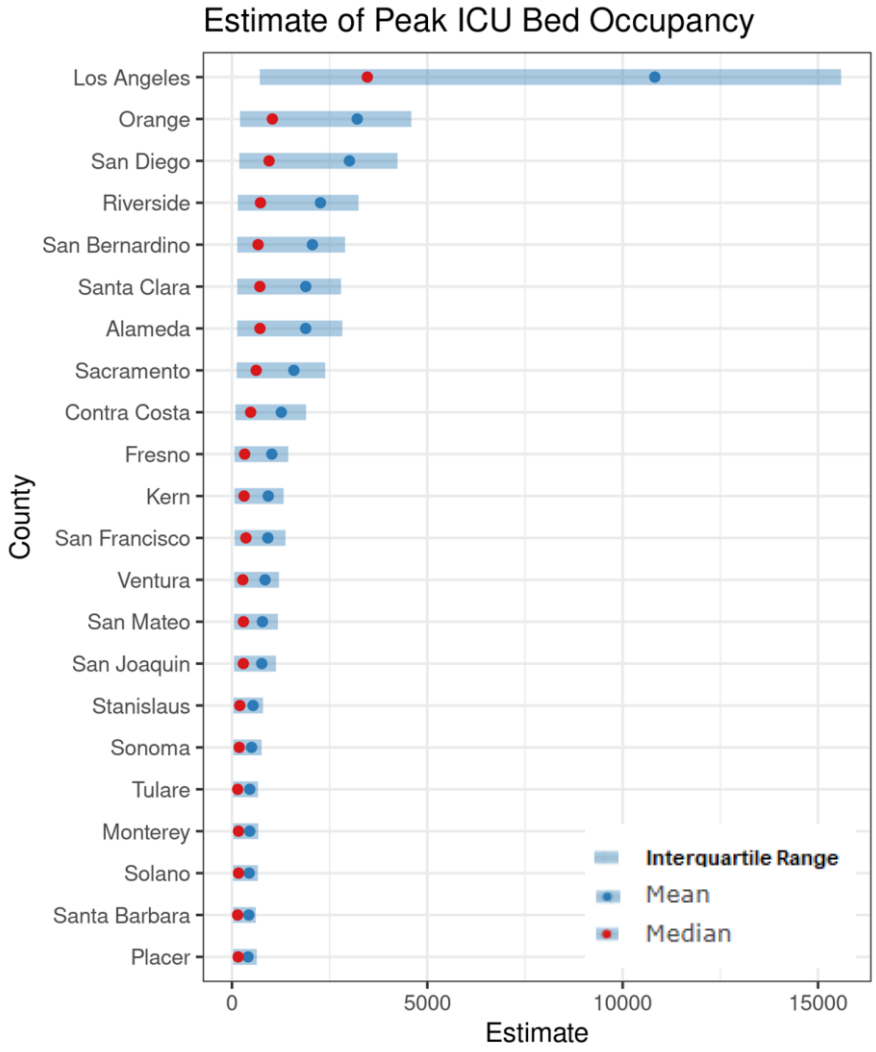
Hospital Occupancy cont'd

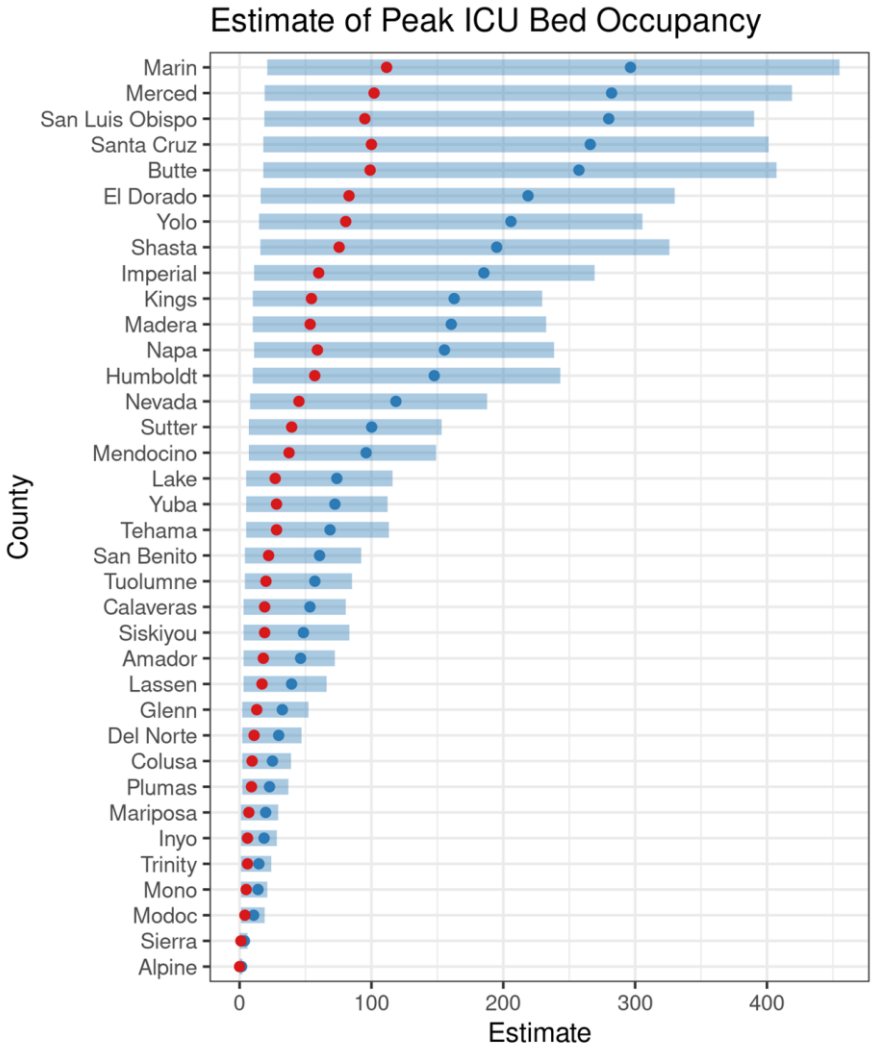
County	Mean	Median	Q25	Q75
Lake	166	86	14	297
Yuba	162	81	13	281
Tehama	155	86	13	277
San Benito	137	68	11	238
Tuolumne	129	68	10	217
Calaveras	122	61	10	212
Siskiyou	110	55	11	197
Amador	105	54	8	188
Lassen	88	47	8	151
Glenn	73	38	7	130
Del Norte	69	36	5	116
Colusa	56	29	4	103
Plumas	51	26	4	91

Hospital Occupancy cont'd

County	Mean	Median	Q25	Q75
Mariposa	46	22	4	82
Inyo	45	22	3	71
Mono	33	16	2	53
Trinity	33	17	3	58
Modoc	24	13	2	43
Sierra	8	3	0	14
Alpine	3	1	0	5

ICU Bed Occupancy





ICU Bed Occupancy cont'd

County	Mean	Median	Q25	Q75
California	40300	13764	2885	57789
Los Angeles	10822	3464	713	15590
Orange	3205	1034	206	4590
San Diego	3006	950	188	4237
Riverside	2265	728	149	3238
San Bernardino	2059	668	135	2894
Santa Clara	1888	713	134	2791
Alameda	1886	716	132	2825
Sacramento	1584	619	122	2386
Contra Costa	1262	478	90	1897
Fresno	1020	324	64	1440
Kern	928	310	63	1320
San Francisco	918	357	65	1369

ICU Bed Occupancy cont'd

County	Mean	Median	Q25	Q75
Ventura	847	276	56	1202
San Mateo	779	294	52	1176
San Joaquin	762	291	53	1125
Stanislaus	539	200	38	794
Sonoma	500	185	35	756
Tulare	455	144	29	666
Monterey	454	166	33	672
Solano	441	168	31	660
Santa Barbara	431	143	29	608
Placer	411	158	29	634
Marin	296	112	21	455
Merced	282	102	19	419
San Luis Obispo	280	95	19	390

ICU Bed Occupancy cont'd

County	Mean	Median	Q25	Q75
Santa Cruz	266	100	18	401
Butte	257	99	18	407
El Dorado	219	83	16	330
Yolo	206	80	15	306
Shasta	195	76	16	326
Imperial	185	60	11	269
Kings	163	54	10	230
Madera	161	54	10	232
Napa	155	59	11	238
Humboldt	148	57	10	243
Nevada	119	45	8	188
Sutter	100	40	7	153
Mendocino	96	38	7	149

ICU Bed Occupancy cont'd

County	Mean	Median	Q25	Q75
Lake	74	27	5	116
Yuba	72	28	5	112
Tehama	69	28	5	113
San Benito	61	22	4	92
Tuolumne	57	20	4	85
Calaveras	53	19	3	80
Siskiyou	48	19	3	83
Amador	46	18	3	72
Lassen	39	17	3	66
Glenn	32	13	2	52
Del Norte	30	11	2	47
Colusa	25	10	2	39
Plumas	23	9	2	37

ICU Bed Occupancy cont'd

County	Mean	Median	Q25	Q75
Mariposa	20	7	1	29
Inyo	19	6	1	28
Trinity	15	6	1	24
Mono	14	5	1	21
Modoc	11	4	1	19
Sierra	4	1	0	6
Alpine	1	0	0	2

Building Healthcare Surge Capacity for COVID-19

In response to the COVID-19 pandemic, California has taken an aggressive two-pronged strategy of early implementation of non-pharmaceutical interventions (NPI) and extensive healthcare system planning to meet the predicted surge in demand related to COVID-19 infections.

Based on early modeling of the outbreak, state leaders estimated the need to expand the existing healthcare delivery system to accommodate an additional 50,000 excess hospitalizations above the state licensed bed capacity by the end of April.

For the past several weeks, state leaders have partnered with hospital systems, local health jurisdictions, and local emergency medical service agencies to expand health care capacity across California. Strategies for building surge capacity have included obtaining federal assets, working with hospital partners to expand capacity within their existing infrastructure, supporting additional acute care specifically dedicated to COVID-19 patients, and creating alternate care sites in partnership with local government. In addition, many counties have partnered with local health care systems to develop their own alternate care sites.

As new testing and hospitalization data become available, it appears that the implementation of NPIs has shifted the trajectory of COVID-19 in California, with the state now predicting a peak demand for hospital beds that may be delayed until the second half of May or later. In addition, existing hospital systems have additional capacity as a result of intentional efforts such as postponing elective procedures and leveraging virtual care, as well as due to lower rates of accidents and trauma as people limit their movement. While the number of COVID-19 hospitalizations has increased, there is still significant hospital capacity in most areas of the state.

At this time, while the state's healthcare surge planning remains focused on accommodating 50,000 peak excess hospitalizations, given the developments above, the state is shifting both its approach and timeline for these efforts.

Increased Estimates of Surge Capacity at Existing Hospitals

Based on early conversations with hospital partners, the state estimated that hospitals could surge 40% above their licensed bed capacity to accommodate an estimated 30,000 additional hospitalizations. However, given the healthcare delivery systems' actions to reduce elective admissions, expand their internal capacity, and partner with local jurisdictions, it is estimated that health care delivery systems can accommodate at least 40,000 additional hospitalizations related to COVID-19.

Interventions Led to Delay in Demand for Increased Healthcare Surge Capacity

In March, California promoted a series of NPIs including cancellation of mass gatherings, school cancellations and a statewide stay-at-home order. The goal of these NPIs was to protect our most vulnerable and slow the spread of disease to prepare our

care delivery system to be able to respond to increased demand. Preliminary data on hospitalizations and deaths indicates that California is showing signs of successful mitigation, and a flattening of the epidemiologic curve that delays the likely date of peak hospitalizations.

Reduction in Need to Develop New Health Care Capacity

The state's original objective was to create capacity for an additional 20,000 patients outside the existing healthcare system by mid-April. While the state has been able to create significant additional capacity as described below, given that the existing healthcare system still has significant capacity, that the peak demand is likely to be delayed by a month or more, and new concerns about congregate living facilities, the state is shifting its focus to developing additional skilled nursing facility capacity for COVID-19 patients. The development of additional county and/or regional alternate care sites should be guided by data on local and regional health care utilization and capacity.

Health Care Surge Capacity Efforts to Date

1. Acute Care

The U.S. Navy Mercy Hospital Ship docked in the Port of Los Angeles can care for up to 250 COVID-negative (acute care or skilled nursing) patients. This ship is being used as a resource to decompress hospitals and skilled nursing facilities in the greater southern California area.

Seton Hospital is a general acute care hospital in San Mateo County that is designated as a transfer hospital to decompress hospitals in the region. It has a maximum capacity of 220 patients, and preferentially accepts low acuity COVID-19 patients.

The LA Surge Hospital is a temporary acute care transfer facility for COVID-19 patients at the site of the former St. Vincent's Hospital in Los Angeles County. It is jointly operated on behalf of the state by Kaiser Permanente, Dignity Health, and LA County Department of Health Care Services. It has a maximum capacity of 266 patients with significant (up to a third) ICU capacity.

2. State Supported Alternate Care Sites

The state has supported the deployment of Federal Medical Stations (FMS) as well as other alternate care sites in conjunction with local partners.

Strategy	**Sites**
Federal Medical Stations	• Santa Clara • Riverside

Federal Medical Stations (FMS) are deployable caches containing beds and supplies which can quickly turn an existing building into a temporary medical shelter during a national emergency. Care can be provided for 50-250 displaced people for three days before resupply is necessary. The FMS offers health and medical surge capability and capacity for short-term inpatient persons who have sub-acute medical, mental health, or other healthcare needs that cannot be accommodated or provided for in a general shelter. The FMS operates in cooperation with federal, state and local authorities.	• Los Angeles • San Mateo • Contra Costa • Shasta • Butte • Fresno • San Diego
State Supported Alternate Care Sites (state and local roles and responsibilities vary by site)	• Sleep Train Arena • Fairview Developmental Center • Porterville Developmental Center • San Carlos Hotel - US HSS • CPMC – Pacific Campus

3) Local/Regional Alternate Care Sites

In addition to the aforementioned efforts, the state continues to encourage local and regional planning for additional alternate care sites as a phased approach based on ongoing evaluation of county and regional needs over the next weeks and months.

CDPH and CalOES surveyed several counties on their planned locally developed alternate care sites. These sites are in various states of readiness and will require investment in supplies, equipment, and staffing. The state and local jurisdictions will need to balance the investment of funds in additional sites with the evolving situation and the need for expansion beyond the beds available from the existing healthcare system and state supported assets.

Growing Concern Over Outbreaks in Congregate Living Settings

Although California has been able to flatten the epidemiologic curve and reduce the number of COVID-19 cases in California, there is growing and significant concern over the number of outbreaks within congregate living settings, in particular skilled nursing facilities, where many of our most medically at-risk Californians reside. Complicating matters, healthcare workers in these facilities are being exposed and infected, which leads to a reduction in staff available to care for this population.

Given the pressing need, the state will be focusing its efforts in this next phase on supporting congregate living facilities, including identifying facilities to be COVID-19 Centers for Excellence for housing residents with confirmed cases, increasing staffing options to meet the needs of these facilities, and increasing infection control measures within these facilities.