The Current State of COVID-19 in Colorado

04/28/2021

Prepared by the Colorado COVID-19 Modeling Group

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Summary

- Based on data through 4/26, we estimate that transmission control is 56%.
- The effective reproductive number is 1.31 indicating rapidly increasing growth of infections.
- Approximately 1 in 86 people in Colorado are currently infectious, much higher than mid-March.
- The benefits of vaccination are clear for older Coloradans. We estimate that approximately 41% of Coloradans overall and >80% of those over age 65 are currently immune due to vaccination and/or prior infection.
- The growth in hospitalizations and infections appears to be largely due to spread of infections among those less than 65, most not yet immune. Adults age 40-64 account for the greatest number of COVID-19 hospital admissions with less than 50% of the 40-64 population estimated to be immune.
- On the current trajectory under the high vaccine scenario, new infections will be highest in the 0-19 age group and lowest in the 65+. If this trajectory is maintained, the epidemic curve will not decline to previous lower levels until after August.
- Mobility is reaching its highest levels since the start of the pandemic. Some of this increased activity is driven by vaccinated people.

Snapshot of Current SARS-CoV-2 Transmission in Colorado Based on Data Through 04/26

Effective reproduction number: 1.31. *Infections are increasing.*

Estimated prevalence of infections: Approximately 1,200 of every 100,000 Coloradans or 1 in every 86 Coloradans are currently infectious.

Estimated percent of the population immune: Approximately 41% of Coloradans are immune due to vaccination or prior infection.

Estimated percent of the population vaccinated: Approximately 43% of Coloradans have received at least one dose of a SARS-CoV-2 vaccine.

Introduction

We used our age-structured SEIRV (susceptible-exposed-infected-recovered-vaccinated) model and real-time COVID-19 hospital census, vaccination, and case data to characterize the current status of the COVID-19 epidemic in Colorado. We use estimates of the current state of the epidemic to generate projections of the potential future

course of SARS-CoV-2 infection and COVID-19 in Colorado under different scenarios of vaccine roll out, spread of variants of concern and transmission control measures. These include estimates of hospital needs, infections and deaths under these different scenarios.

The model has been parameterized to Colorado-specific data whenever possible. For example, the length of time a COVID-19 patient is assumed to spend in the hospital varies by age and over time and is based on data provided by Colorado hospitals. Links to model details are provided in the appendix at the end of this report.

The estimates presented in this report are based on hospitalization census data through 04/26 and vaccination data through 04/25.

Model Updates

Model updates implemented this week.

- **Variants of Concern.** Colorado now has a mix of variants of concern. We updated our variant of concern scenarios to incorporate data provided by CDPHE on the distribution of variants of concern in Colorado since early January. These scenarios account for different transmissibility and virulence of the different variants. Further details are provided in the Long-term Projections section.

COVID-19 Hospitalizations

Figure 1 shows the daily number of people hospitalized with COVID-19 since March 2020, when the first case of SARS-CoV-2 was reported in Colorado. COVID-19 hospitalizations are a sensitive measure of SARS-CoV-2 transmission. While many SARS-CoV-2 infections are not captured by surveillance systems, we expect that almost all COVID-19 hospitalizations are identified.

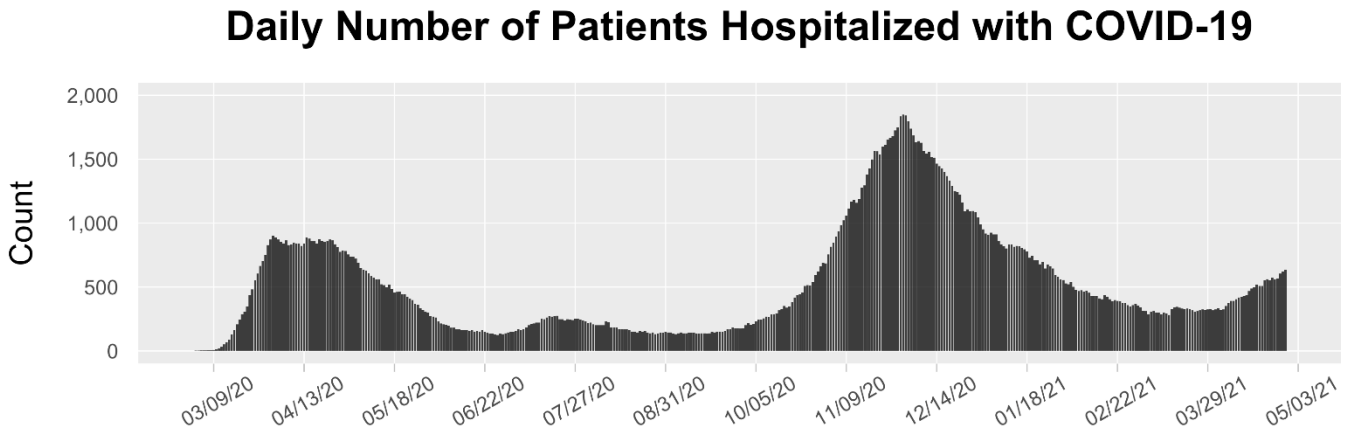

Figure 1 (above). Daily count of hospitalized COVID-19 cases through 04/26. The time series of COVID-19 hospitalizations in Colorado is based on hospitalization data provided by CDPHE through 4/07/2020 and the EMResource hospital census of COVID-19 hospitalizations starting 04/08/2020 (EMResource hospital census appeared to undercount COVID-19 hospitalizations before that date).

Transmission Control

Transmission control is an estimate of the collective impact of behaviors and policies such as mask wearing, physical distancing, case isolation, contact tracing, and moving activities outside on slowing the spread of infections from infected to susceptible individuals. When transmission control is 0%, spread of infections is uncontrolled, as in the very early days of the pandemic. When transmission control is close to 100%, the spread of the virus from an

infected person to others is rare. We estimate transmission control for each two-week period since March 2020 (Figure 2). Transmission control is estimated by aligning model output to hospitalization data using model-fitting approaches. The most recent model update allows us to estimate two values of transmission control. We can estimate the level of transmission control due to policies and behaviors (TC_{pb}). This is the level of transmission when there are no variants of concern in Colorado. We estimate TC_{pb} as 67%. We can also estimate transmission control that accounts for policies, behaviors, and variants (TC); TC corresponds to the estimates made previously. This value accounts for the proportion of total infections presumed to be caused by B.1.1.7 and B.1.427/429 variants. The difference between TC_{pb} and TC represents the consequences of the more transmissible variants versus the previously circulating strains. As described, we estimate TC as 56%. The 11 percent difference between TC_{pb} and TC reflects the impact of the present mix of circulating strains, predominantly the B.1.1.7 strain with its greater transmissibility than previously circulating strains.

Our current estimate of effective transmission control due to policy, behaviors, and variants is 56%. This estimate is for the period 03/28 to 04/13, given the lag between infection and hospitalization.

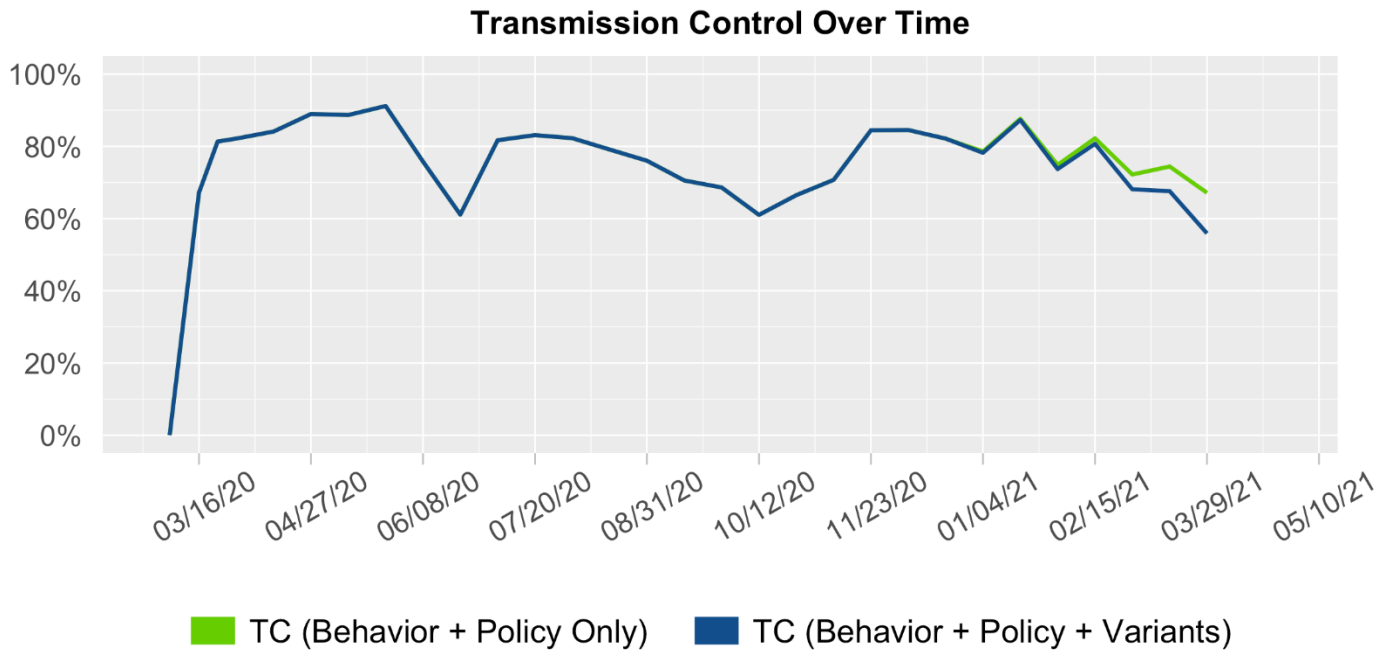

Figure 2 (above). The estimated transmission control value for each two-week period since the beginning of the epidemic due to behavior and policy only (green line) and the estimated transmission control accounting for behavior, policy, and variants (blue line). On the graph, the value is shown for the mid-point of each two-week period. Transmission control is estimated using model fitting approaches to align model output with COVID-19 hospitalizations.

Model Fit

We assess model fit by comparing the model-estimated number of hospitalizations to actual hospitalizations. Figure 3 shows the current estimated trajectory of hospitalizations, based on the most recent model-fit, compared to the daily reported number of people hospitalized with COVID-19. For reference, a line showing the estimated trajectory one-week prior is also shown. A figure showing model fit since the beginning of the pandemic is provided in the appendix.

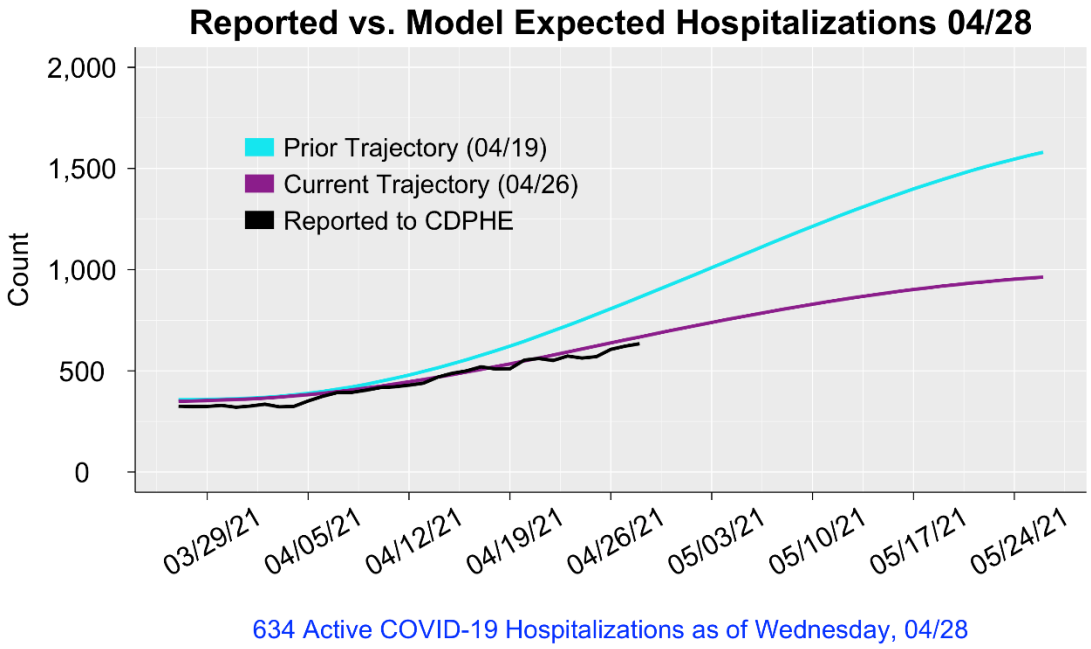

Figure 3 (above). The projected course of COVID-19 hospitalizations if Colorado were to remain on the current estimated trajectory (purple line) or on the trajectory estimated one week prior (turquoise line). Each trajectory is generated assuming Colorado rolls out vaccines on schedule, as described in the long-term projections.

The Effective Reproduction Number

The effective reproduction number (Re) is a measure of how rapidly infections are spreading or declining. When the effective reproduction number is below 1, infections are decreasing. When the effective reproduction number is above 1, infections are increasing. The effective reproduction number is estimated using our age-structured SEIRV model fit to hospitalization data.

Our current estimate of Re is 1.31. Due to the lag between infections and hospitalizations, this estimate of Re reflects the spread of infections occurring on approximately 04/13. The estimated values of the reproduction number since March 2020 are shown in Figure 4.

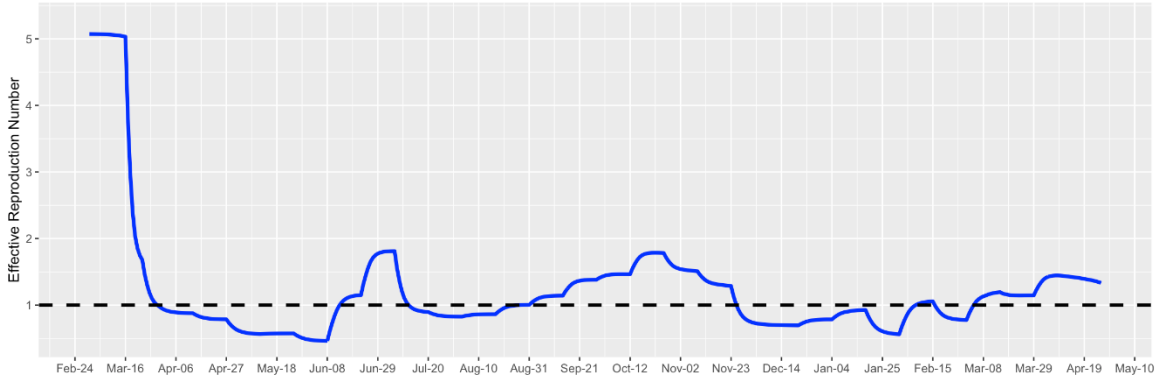

Figure 4 (above). Estimates of the effective reproduction number over time.

Infection Prevalence

Infection prevalence provides an estimate of the proportion of the population that is currently infected with SARS-CoV-2 and capable of spreading infections. At higher levels of infection prevalence, susceptible individuals are more likely to encounter infectious individuals among their contacts. Because many people experience no symptoms or mild symptoms of COVID-19, many infections are not identified by surveillance systems. The estimates we present here are intended to provide an approximation of all infections, including those not detected by the Colorado Electronic Disease Reporting System (CEDRS).

These estimates are generated using the model by assuming the most recent transmission control parameter (estimated for the period 03/28 to 04/13) remains at the currently estimated value through 04/26. These estimates are sensitive to the model assumptions, including assumptions about the probability an infected individual will be symptomatic and require hospital care, and assumptions about length of hospital stay, which vary by age.

We estimate that there are approximately 67,700 infectious individuals in Colorado at present (04/26): approximately 1,200 of every 100,000 Coloradans or 1 in every 86 people. The estimated infection prevalence since March 2020 is shown in Figure 5.

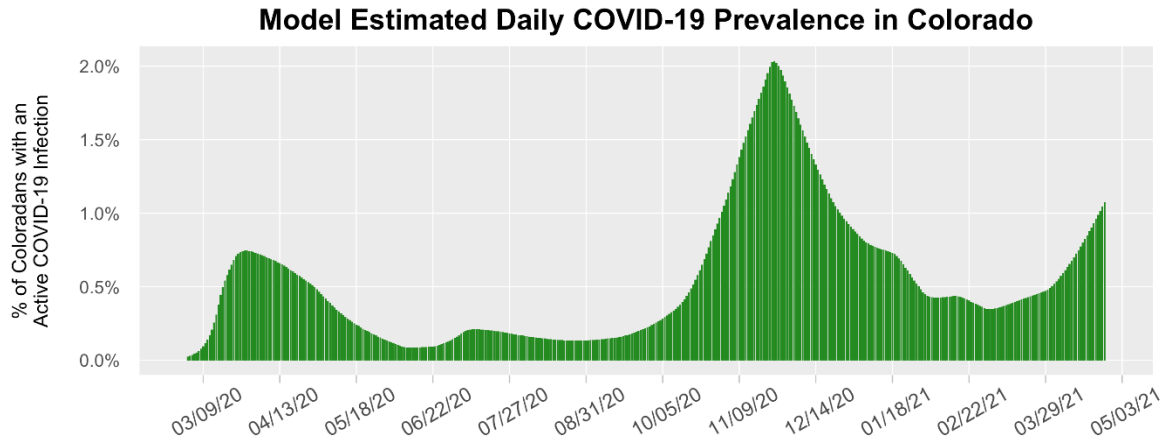

Figure 5 (above). Estimated daily number of people who are infectious and infected with SARS-CoV-2 (point prevalence). Estimate is shown per 100,000 population. The number of infectious individuals is inferred using the model and based on hospitalizations.

Case Detection

Comparing observed to model-estimated infections, **we estimate that approximately 35% of infections were detected by state surveillance systems, including both asymptomatic and symptomatic infections in the two-week period from 04/03 to 04/16** (Figure 6).

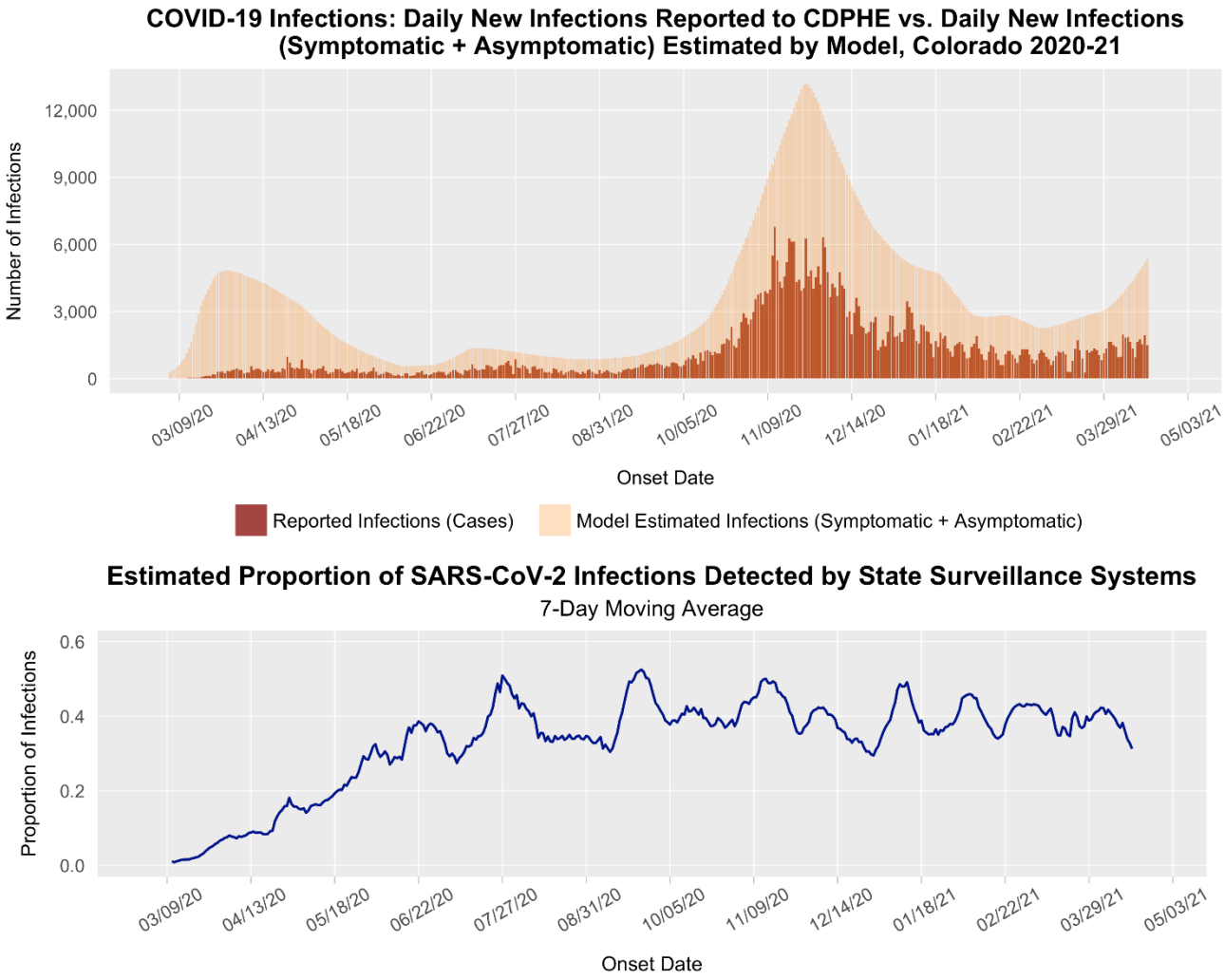

Figure 6 (above). Estimated daily number of new (incident) SARS-CoV-2 infections based on the total estimated by the SEIRV model (light orange graph) and reported cases (dark orange graph) over time shown in the top panel. Lower panel shows the 7-day moving average of the estimated proportion of SARS-COV-2 infections that are being captured by Colorado state surveillance systems, over time. The proportion detected is estimated by dividing the total number of new cases captured by state surveillance systems by the model-estimated number of new infections each day. The number of cases captured by the state surveillance systems is the number of cases reported by CDPHE, using the onset date of symptoms (if onset date is not available, onset date is imputed by CDPHE using a proxy distribution of recent onset dates). Data are shown through 04/16 to account for typical lags between symptom onset and case report.

Cases and Hospitalizations by Age

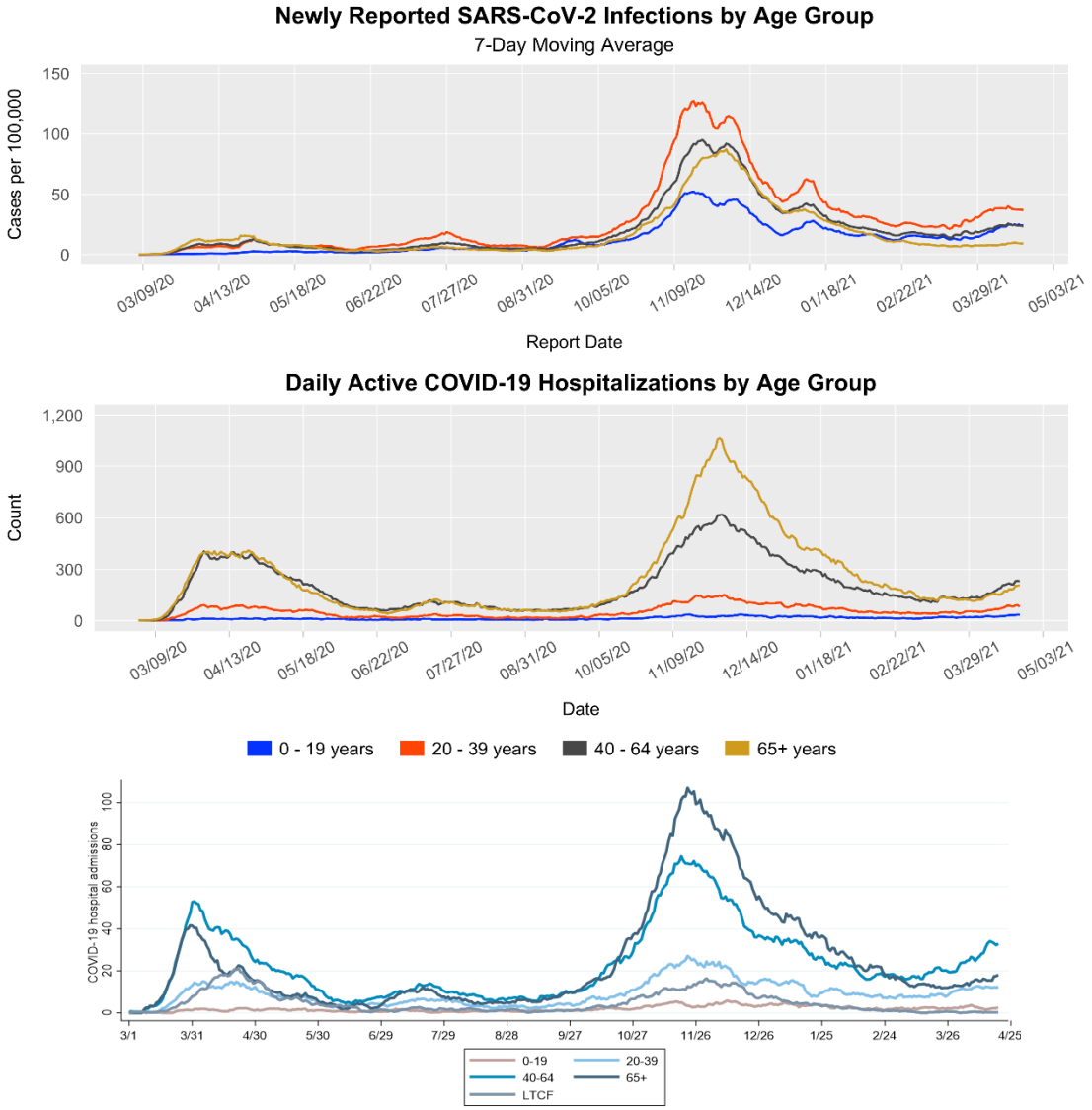

Figure 7 (above). 7-day moving average of newly reported SARS-CoV-2 infections by age group (top panel), number of people hospitalized with COVID-19 by age group (middle panel), and number of people admitted to the hospital with COVID-19 (bottom panel). Daily SARS-CoV-2 cases and hospital admissions are based on data from the Colorado Electronic Disease Reporting (CEDRS) and are shown through 04/19 to account for typical lags in reporting. The number of people hospitalized is obtained from the COvid Patient Hospitalization Surveillance (COPHS) database is shown through 04/22.

Population Immunity

People can develop immunity to SARS-CoV-2 by vaccination and by prior infection. The proportion of the population immune is an important measure because as more people develop immunity, the spread of infections slows. When many people are immune, infectious individuals are less likely to encounter individuals who are still susceptible to infection (not immune).

Figure 8 shows the proportion of the population immune from March 2020 through the present, estimated using our age-structured SEIRV model and data on vaccinations in Colorado provided by CDPHE. Figure 9 shows the proportions of this immunity by age group. This estimate of population immunity has two components. It accounts for the proportion of people estimated to be immune due to vaccination (yellow line), and the proportion of people

estimated to be immune due to either vaccination or prior infection (blue line). In the model, the two-dose vaccines are assumed be 80% effective at preventing infections 14 days after the first dose, and 90% effective one week after the second dose. Vaccination data by age are provided by CDPHE and we assume all individuals who receive first doses also received second doses on schedule. This estimate also accounts for the number of people estimated to have immunity due to prior infection. In our model, immunity from symptomatic infection is assumed to last approximately one year, and immunity from asymptomatic infection is assumed to last approximately six months. This means people who were infected early in the pandemic may no longer be immune to infection unless they have been vaccinated. We include both detected and undetected infections. Our estimates account for overlap between the vaccinated population and those with immunity due to prior infection. We note that recent studies suggest vaccinations boost immunity in those previously infected.

We estimate that approximately 2,399,000 people in Colorado, or 41% of the Colorado population, are currently immune to SARS-CoV-2 as of 04/26.

In addition, we provide an estimate of the cumulative number of infections, noting that some people who were infected early in the pandemic may no longer be immune to infection unless they have been vaccinated. **We estimate that approximately 1,562,000 people in Colorado, or 26% of the population, have been infected to date (04/26).**

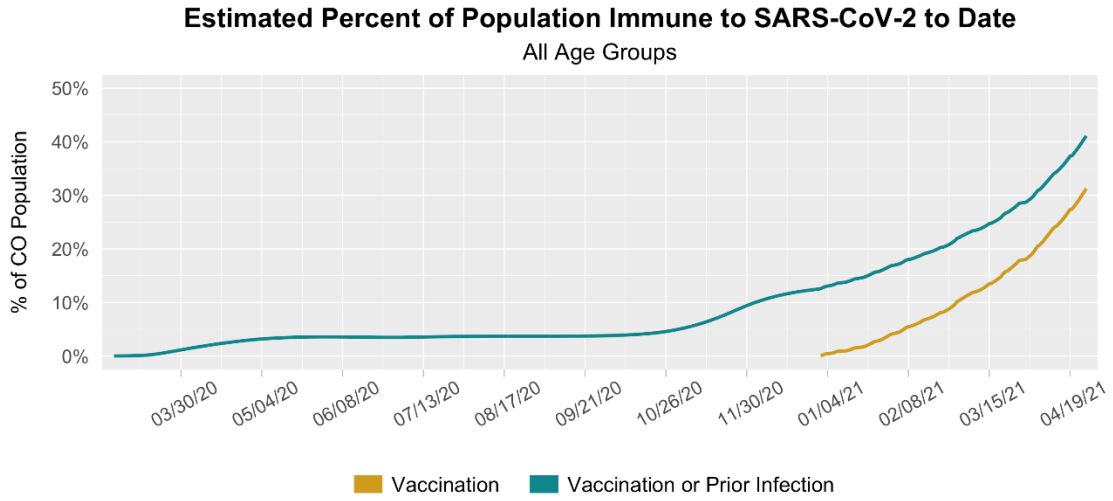

Figure 8 (above). Estimated percent of the population in Colorado assumed to be immune to SARS-CoV-2 due to infection and/or vaccination through 04/26.

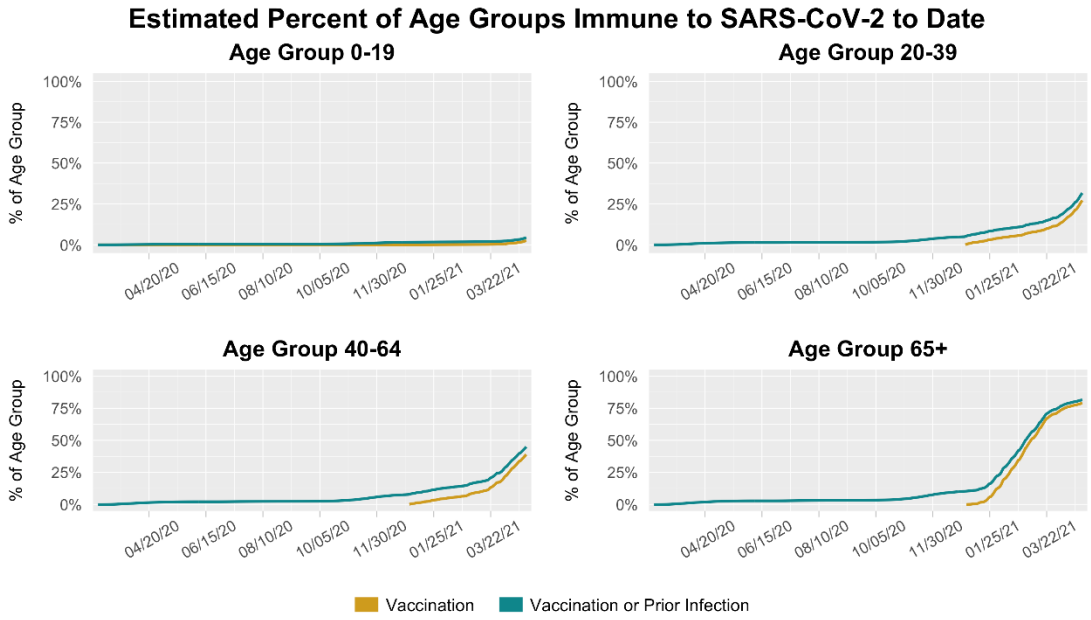

Figure 9 (above). Estimated percent of each age group in Colorado assumed to be immune to SARS-CoV-2 due to infection and/or vaccination through 04/26.

Mobility

To investigate the impact of mobility on COVID-19 transmission, we analyze time spent away from home using aggregated mobile device data. Figure 10 displays daily percentage of time spent away from home from November 1, 2019 to present for Colorado, as well as the average number of daily contacts per device. The time away from home and daily contacts are the highest they have been since March 2020; however, daily contacts remain well below pre-pandemic levels.

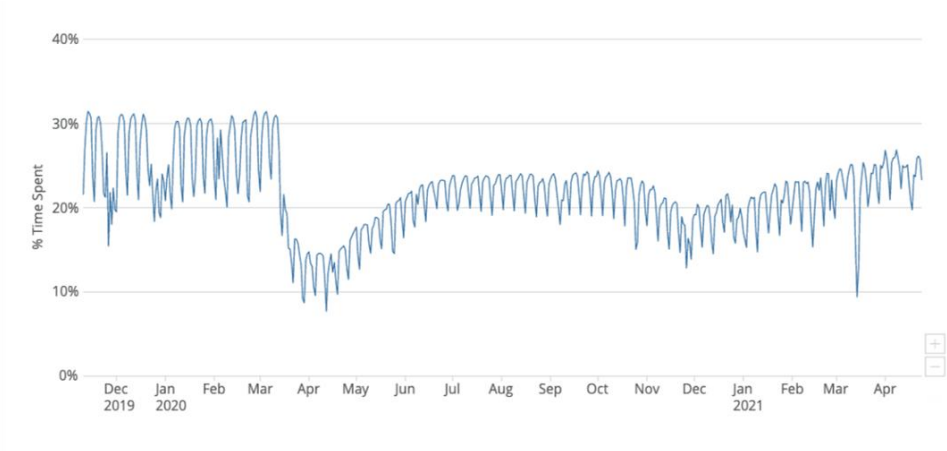

Figure 10 (above). Daily percentage of time spent not at home from December 2019 to present.

Long-Term Projections

We generated projections of future hospital demand and cumulative mortality under a range of scenarios that assess the potential impact of further reductions in transmission control, the timing of those reductions and low and high vaccine update. In these projections, we assume continued variant growth as described below.

Vaccination. We modelled two vaccine rollout scenarios. These are based on vaccination projections provided by CDPHE. In both scenarios, we assume a maximum of 94% uptake in individuals over 65. For the high vaccine uptake scenario, we assume there will be 80% uptake in all individuals aged 16 - 64. For the low vaccine uptake scenario, we assume 62% vaccine uptake in the 40 - 64 age group and 50% uptake among individuals 16 - 39. These values come from surveys on vaccine hesitancy rates in Colorado provided by CDPHE. This scenario should be considered as a "worst case" that provides a lower bound on potential vaccination rates. In both scenarios, vaccination rates are assumed to occur at current age-specific rates which remains highest in older age groups. Individuals under the age of 15 are assumed not to receive any vaccine. Once the oldest age groups are vaccinated up to the uptake threshold, vaccine is then allocated to the next oldest age group. We assume all individuals who receive a first dose of a two-dose vaccine (Pfizer or Moderna) receive a second dose on schedule. Vaccine allocation scenarios run through June 1st. Note that under the assumptions of 80% uptake among younger individuals and no vaccination of children under 15, we run out of people to vaccinate in late June. Details of the vaccination rates to date are provided in Table A2.

Variants of Concern. Since late 2020, several variants of concern (VOC) emerged in the United States. Based on recent Colorado data, we focus on the two VOC's which appear to be the major VOC's in Colorado: B.1.1.7, which emerged in the United Kingdom and was first reported in the United States in Colorado, and B.1.427/429, first reported in California. The current scientific evidence indicates that both variants are more infectious than other currently circulating variants. Additionally, infection with B.1.1.7 has been shown to increase the risk of hospitalization and death (e.g. NERVTAG 02/11/2021; Davies et. al, 2021). In the projections, we assume B.1.1.7 is 1.5 times more infectious than previously circulating variants, and B.1.427/429 is 1.2 times more infectious than currently circulating variants (US CDC, Deng et al 2021). We assume infection with the B.1.1.7 variant confers a 1.4-fold increased risk of hospitalization, a 1.4-fold increased risk of death among those hospitalized, and a 1.7-fold increased risk of death among those not hospitalized for those age 40+ (NERVTAG 02/11/2021; Davies et. al, 2021). We assume infection with the B.1.427/429 variant confers no additional risk of hospitalization or death. We model the historical distribution of B.1.1.7 and B.1.427/429 since January 2021 using data provided by CDPHE. We then assume the VOC's in Colorado follow a logistic growth curve, based on the historical data akin to what has been documented elsewhere, such that the variants comprise 75% of infections by early April and approach the maximum of 95% in early May. In the projections, we assume B.1.1.7 becomes the dominant variant, making up 95% of all circulating variants and B.1.427/429 all but disappears by May. We will update these scenarios as the science evolves and more information is available on the distribution of these variants.

Projected COVID-19 Hospital Demand and Deaths Under Different Transmission Control Scenarios.

We considered the following scenarios.

1. Remain on the current trajectory indefinitely.
2. Based on the 7% decline in TC_{pb} over the first two weeks in April, we model a further 7% drop in TC in late April. This is modeled as a 7% drop occurring on Friday, 04/30. We also model holding the current trajectory for two weeks before reducing transmission control by 7% on Friday, 05/14, and holding the current trajectory for four weeks before reducing transmission control by 7% on Friday, 05/28.
3. Each of the above scenarios is modeled using a high vaccine uptake scenario and a low vaccine uptake scenario as described above.

We implement these changes as changes in transmission control due to policies and behaviors (TC_{pb}), noting that growth in the variants will further erode TC.

Figure 11 shows estimated active hospitalizations and deaths through late July 2021, if Colorado remains on the current trajectory, for the high and low vaccine update scenario assuming continued growth of B.1.1.7 and B.1.427/429 variants. Figures 12 and 13 show the projected active hospitalizations and deaths through early July

2021 if Colorado remains on its current trajectory or experiences further declines in transmission control due to changes in policies and behaviors in April and May, for the high (figure 13) and low (figure 14) vaccine scenarios. Table 1 and Table A3 show the projected cumulative and additional deaths under these scenarios from 04/26 to 07/31. In these projections, we assume continued growth of variants of concern, as described above. Under either scenario, the level of hospitalizations is still declining into August.

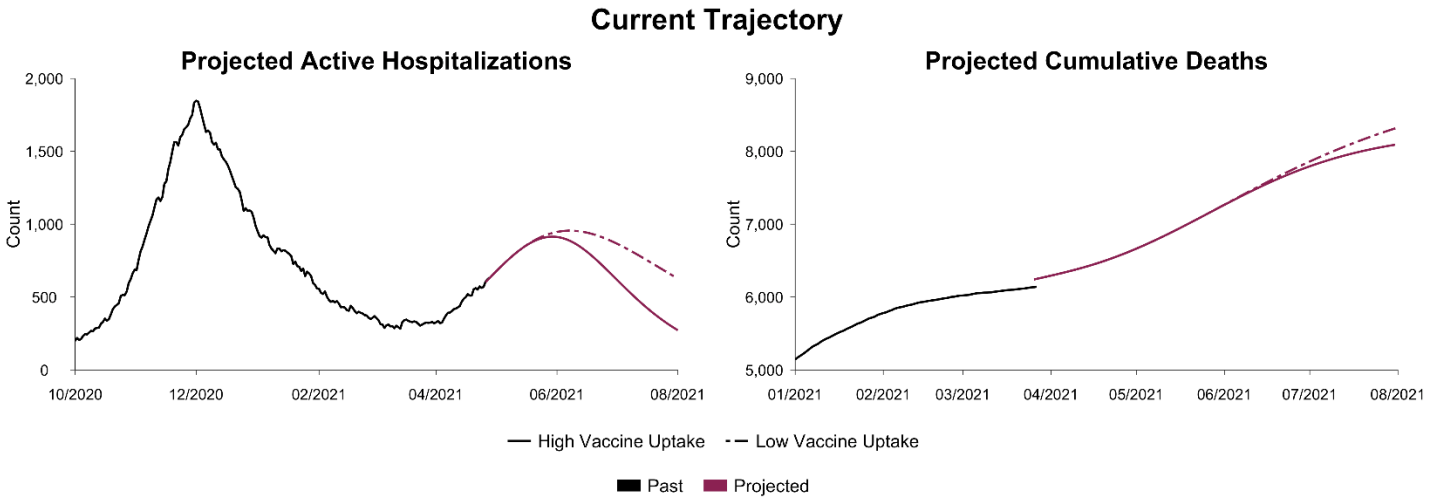

Figure 11 (above). Projected total number of patients actively hospitalized for COVID-19 through late July 2021, assuming transmission control (TC_{pb}) remains at the current level indefinitely with continued variant of concern growth. This projection considers high vaccine uptake (solid lines) and low vaccine uptake (dashed lines). Black lines indicating historical data reflect observed hospitalizations reported in EMR, to include the December peak (horizontal dashed line), and observed cumulative deaths gathered from the CEDRS line list provided by CDPHE. Observed deaths are shown through 03/27 to account for lags in reporting.

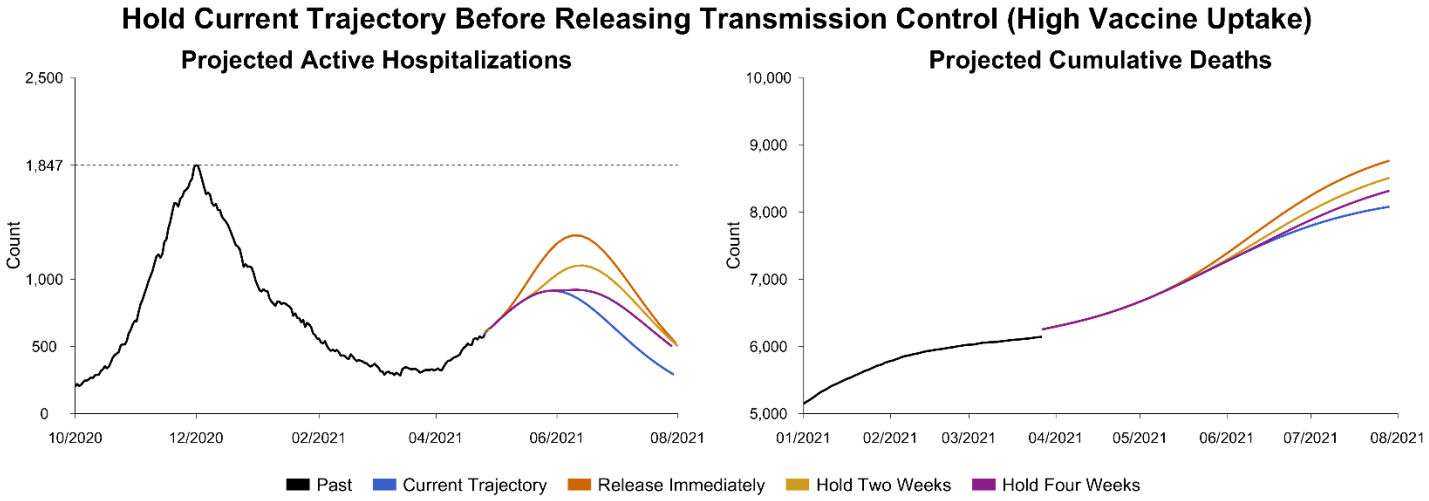

Figure 12 (above). Projected active hospitalizations and deaths through late July 2021 assuming Colorado remains on its current estimated trajectory (blue lines), experiences a 7% reduction in transmission control due to policies and behaviors (TC_{pb}) on Friday, 04/30 (orange lines), on Friday, 05/14 (yellow lines), or on Friday, 05/28 (purple lines). This projection considers high vaccine uptake (94% in those 65+, 80% in those age 15-64). Transmission control (TC_{pb}) is assumed to remain at current levels until the switch. Black lines indicating historical data reflect observed hospitalizations reported in EMR, to include the December peak (horizontal dashed line), and observed cumulative deaths gathered from the CEDRS line list provided by CDPHE. Observed deaths are shown through 03/27 to account for lags in reporting. In these scenarios, variant growth is assumed to continue.

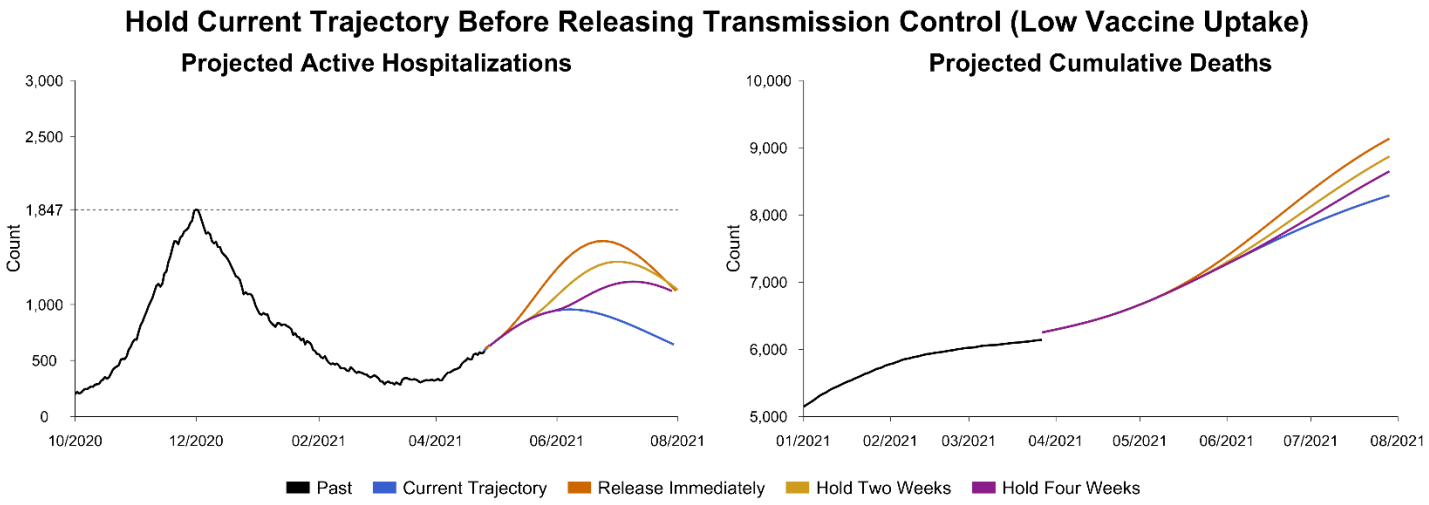

Figure 13 (above). Projected active hospitalizations and deaths through late July 2021 assuming Colorado remains on its current estimated trajectory (blue lines), experiences a 7% reduction in transmission control due to policies and behaviors (TC_{pb}) on Friday, 04/30 (orange lines), Friday, 05/14 (yellow lines), or Friday, 05/28 (purple lines). This projection considers low vaccine uptake (50% in those 15-39, 64% in those 40-64, 94% in those 65+). Transmission control (TC_{pb}) is assumed to remain at current levels until the switch. Black lines indicating historical data reflect observed hospitalizations reported in EMR, to include the December peak (horizontal dashed line), and observed cumulative deaths gathered from the CEDRS line list provided by CDPHE. Observed deaths are shown through 03/27 to account for lags in reporting. In these scenarios, variant growth is assumed to continue.

Table 1 (below). Projected deaths from 04/26 to 07/31 for different scenarios. We define additional deaths as the difference between the projected number of deaths under scenarios with additional decay in transmission control, minus the number of deaths projected on the current trajectory. Under the current level of TC, an additional 1,506 deaths are projected and further decline in TC increases that figure.

	Cumulative COVID-19 deaths 4/26 to 7/31	Additional deaths compared to current trajectory
High Vaccine Uptake		
Current trajectory	1,506	--
Hold until May 28	1,753	247
Hold until May 14	1,947	441
Hold until April 30	2,203	697
Low Vaccine Uptake		
Current trajectory	1,730	--
Hold until May 28	2,109	379
Hold until May 14	2,332	602
Hold until April 30	2,596	866

Appendix

Code, Documentation, and Prior Reports

Code for our model is available on GitHub: https://github.com/agb85/covid-19

Documentation for the model can be found at: https://agb85.github.io/covid-19/SEIR%20Documentation.pdf

Prior modeling reports and documentation can be found at: https://agb85.github.io/covid-19/

Regional modeling results can be found at: https://www.colorado-data.org/regional-epidemic-models

Model Fit

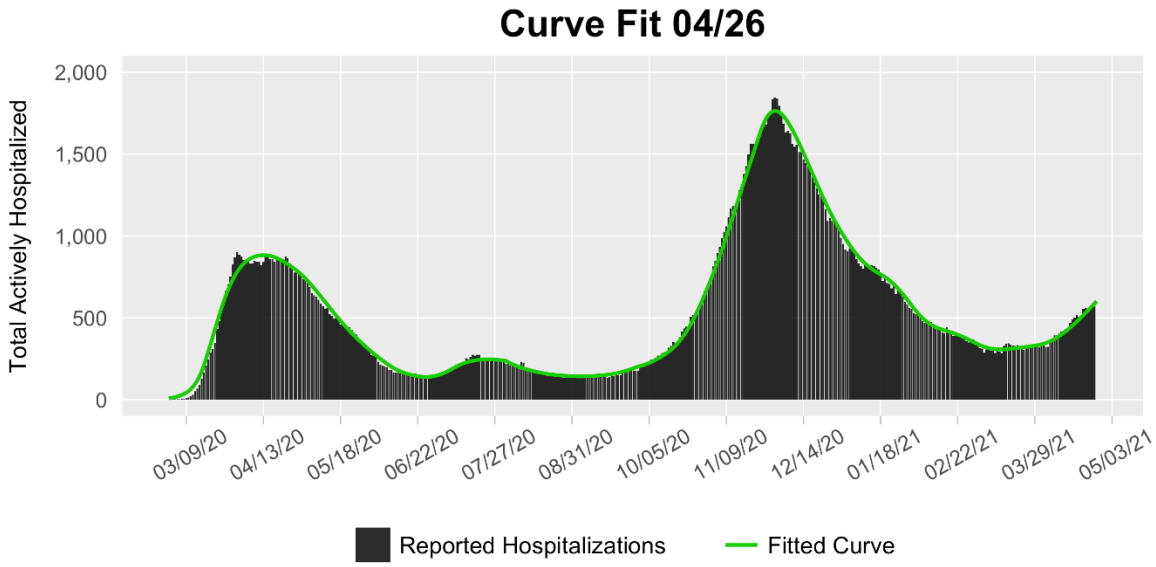

Figure A1 (above). Current model fit (green line) to the count of hospitalized COVID-19 cases (black lines) through 04/26 using the age-structured SEIRV model. Hospitalized COVID-19 cases are from CDPHE reported COVID-19 hospitalizations and EMResource (EMR) hospital census data provided by CDPHE.

Data Sources

Table A1 (below). Data used for this model is collected from a variety of sources. Potential lags in reporting can often result in an artificial decline during the most recent days in a dataset, such as with reported cases. To reconcile this, we have cleaved the source data by a set number of days depending on the degree of lag and the metric used. For example, data measured by onset date is cleaved more aggressively than data measured by report date because reported cases tend to be more up to date than the former.

Data	Description	Source	Download Date	Cleave Date	Additional Notes
Hospitalizations (whole state)	Daily COVID-19 hospitalization census (i.e. snapshot of number of patients in the state currently hospitalized with COVID-19 on a given day)	EMR (CDPHE Emergency Management Resource) Dashboard	04/26	04/26	Data is collected in real time (updated 10am MST daily) and is not cleaved.

Data	Description	Source	Download Date	Cleave Date	Additional Notes
Hospitalizations (by age group)	Daily COVID-19 hospitalization census (i.e. snapshot of number of patients in the state currently hospitalized with COVID-19 on a given day) for each age group	COPHS (COvid Patient Hospitalization Surveillance) Resource Utilization Data Output	04/26	04/22	Age groups are 0-19, 20-39, 40-64, and 65+.
Cases detected by state surveillance systems	Daily count of new COVID-19 cases (using onset date)	CEDRS (Colorado Electronic Disease Reporting System) Line List	04/26	04/16	If onset date is missing, an imputed onset date is provided by CDPHE, which is based on true onset dates for the previous two weeks, compiled into a proxy distribution and recalculated weekly.
Reported cases by age and race/ethnicity	Daily count of new COVID-19 cases by age or race/ethnicity (using report date)	CEDRS (Colorado Electronic Disease Reporting System) Line List	04/26	04/19	Age groups are 0-19, 20-39, 40-64, and 65+. Race/ethnicity categories derived from this line list are American Indian/Alaska Native, Asian/Pacific Islander, Black/African American, Hispanic (All Races), Multiple Races (Non-Hispanic), White (Non-Hispanic), and Other/Unknown.
Detected cases by age	Daily count of new COVID-19 cases by age group (using onset date)	CEDRS (Colorado Electronic Disease Reporting System) Line List	04/26	04/12	Used for fitting and estimating age-specific transmission control parameters.
Cumulative deaths	Total deaths among COVID-19 cases to date	CEDRS (Colorado Electronic Disease Reporting System) Line List	04/26	03/27	Used for generating historical and projected estimates of cumulative mortality.

Vaccination

Two vaccines became available in Colorado on December 16, 2020. We use data provided by CDPHE to estimate the number of people vaccinated by age group over time, and to project the allocation of future vaccinations.

We use known vaccination rates along with assumptions about the level of transmission control moving forward, to generate projections of the percent of the population immune due to vaccination and/or prior infection.

In regards to vaccination, we take into consideration the following:

- We assume all individuals who receive a first dose of a two-dose vaccine (Pfizer or Moderna) receive a second dose on schedule.
- In the model, we represent the efficacy of single and double doses by assuming that among individuals who receive any two-dose vaccine (Pfizer or Moderna), 80% of individuals enter the vaccinated compartment 14 days after the first dose, and an additional 10% of individuals enter the vaccinated compartment 32 days after the first dose, indicating a collective 90% of individuals achieving complete immunity through vaccination.
- In the model, we represent the efficacy of the Johnson & Johnson vaccine by assuming that 66% of individuals receiving this vaccine enter the vaccinated compartment 14 days after vaccination, and an additional 6% enter the vaccinated compartment after 28 days, indicating a collective 72% of individuals in the vaccinated compartment by 28 days after dosing.
- We assume that individuals will be vaccinated regardless of prior infection history. Any individual can receive a vaccine, although vaccination is assumed to have no effect on individuals currently infected.

Table A2 (below). Vaccination rates by age to date included in the model. These are based on data from CDPHE on vaccinations to date by age.

Dates of First Vaccine Dose Administration	0-19 Daily Vaccination Rate*	20-39 Daily Vaccination Rate*	40-64 Daily Vaccination Rate*	65+ Daily Vaccination Rate*
Pfizer/Moderna				
12/15 - 02/01	43	2,089	2,576	4,976
02/01 - 03/08	79	2,516	4,406	9,469
03/08 - 03/29	533	5,999	13,817	2,839
03/29 - 04/12	1,739	12,268	15,131	1,459
04/12 - 04/26	2,784	13,224	11,944	1,436
Johnson & Johnson				
03/01 - 03/15	24	497	1,778	456
03/15 - 03/29	165	459	707	132
03/29 - 04/12	162	2,042	1,924	221
04/12 - 04/26	64	698	647	87

*First doses administered per day for Pfizer and Moderna (assuming all people receiving first doses receive second doses on schedule).

Hospital Demand and Cumulative Mortality

Table A3 (below). Comparison of active COVID-19 hospitalizations and cumulative COVID-19 deaths between 04/26 and 07/31 under the scenarios investigated.

	Date of Peak in Active Hospitalizations	Peak Number of Active Hospitalizations Between 04/26 and 07/31*	Cumulative Infections Between 04/26 and 07/31*	Cumulative Deaths Between 04/26 and 07/31*	Deaths 0-39	Deaths 40-64	Deaths 65+
High Vaccine Uptake							
Maintain Current Trajectory	05/30/2021	914	736,000	1,506	34	504	968
Hold Trajectory Until Fri 04/30	06/11/2021	1,327	1,170,000	2,203	50	722	1,430
Hold Trajectory Until Fri 05/14	06/13/2021	1,102	1,030,000	1,947	44	636	1,267
Hold Trajectory Until Fri 05/28	06/11/2021	920	915,000	1,753	40	573	1,140
Low Vaccine Uptake							
Maintain Current Trajectory	06/08/2021	956	930,000	1,730	44	635	1,050
Hold Trajectory Until Fri 04/30	06/24/2021	1,567	1,500,000	2,596	68	956	1,572
Hold Trajectory Until Fri 05/14	07/02/2021	1,383	1,370,000	2,332	61	858	1,413
Hold Trajectory Until Fri 05/28	07/10/2021	1,204	1,240,000	2,109	55	775	1,279

*Deaths estimated from the model include deaths both inside the hospital (ICU and non-ICU) and outside the hospital. Due to lags in reporting that can take up to 28 days, the model may overestimate the number of actual deaths reported by this date.