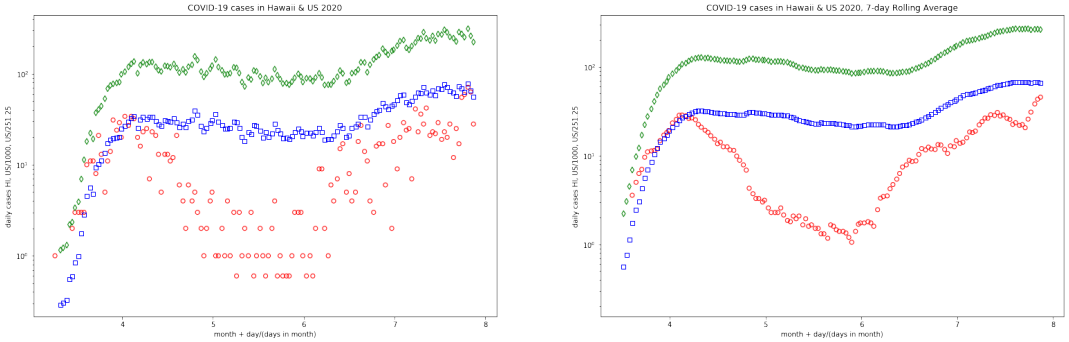
Comparing COVID-19 in Hawaii to the US and Other States

October 9, 2021

The purpose of this report is to compare COVID-19 data in Hawaii to the US and to that of other states (Alaska, California, Colorado, Georgia, Montana, and Texas). The graphs were drawn using pandas and matplotlib in Jupyter Notebook. The script for the graphs are in the katie-covid branch of the nsf-covid BitBucket repository.

1 Hawaii Compared to the United States

In Figure 1, the number of daily new cases in Hawaii is compared to the number of daily new cases in the US. Up until the beginning of April, the graphs increase at similar rates. However, Hawaii's cases quickly drop off. This can be attributed to Hawaii's Shelter in Place Order which was put in place on March 25. Fourteen days after March 25 is April 8, which is around the time Hawaii's daily cases begin to lower. The number of daily cases begins to rise again around June; the Shelter in Place Order was lifted on May 31. This figure clearly demonstrates the importance of staying at home to prevent the spread of COVID-19.

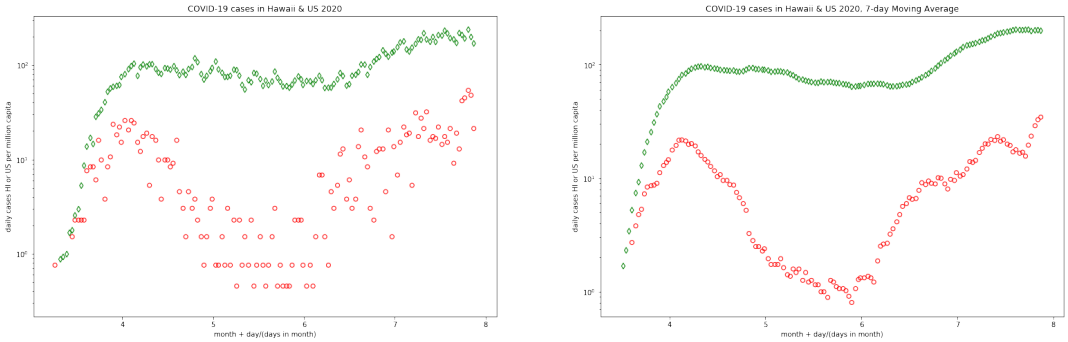


(a) Daily new cases

(b) 7-day rolling average

Figure 1: Daily new cases in Hawaii (red circles) and the US (divided by a factor of 251.25 (green diamonds) and by 1000 (blue squares)). The ratio between the population of the US (331 million) and the population of Hawaii (1.3 million) is 251.25 and used for the green diamonds. The factor of 1000 for the blue squares is arbitrary.

In Figure 2, the number of daily new cases in Hawaii is compared to the number of daily new cases in the US for each million people. Figure 2 is very similar to Figure 1, but Figure 2 depicts the number of cases per million in the US and in Hawaii instead of comparing the cases to each other's populations; this means the arbitrary number of cases in the US / 1000 data is not included. In addition, the y-axis scale of Figure 2 uses logarithm of base 10.



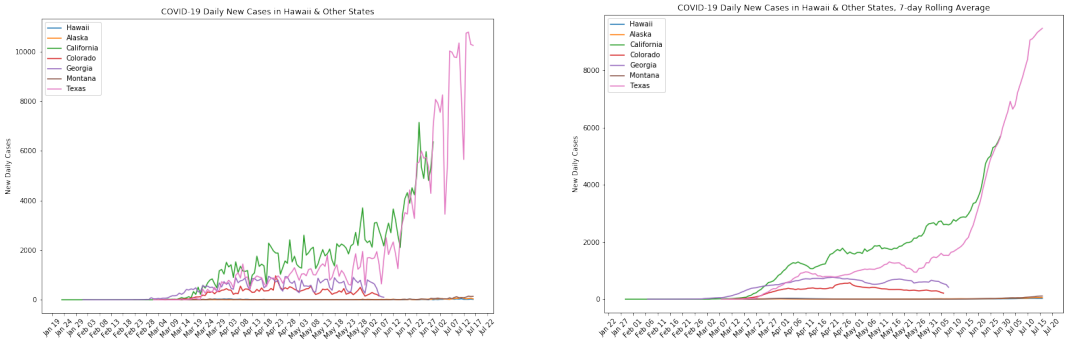
(a) Daily new cases per million people (b) 7-day rolling average

Figure 2: Daily new cases per million people in Hawaii (red circles) and the US (green diamonds)

2 Hawaii vs Other States

In this section we compare the progression of COVID-19 in Hawaii with that of other US states.

Figure 3 shows the number of daily new cases of in Hawaii, Alaska, California, Colorado, Georgia, Montana, and Texas. It can be observed that the number of new cases are increasing exponentially.

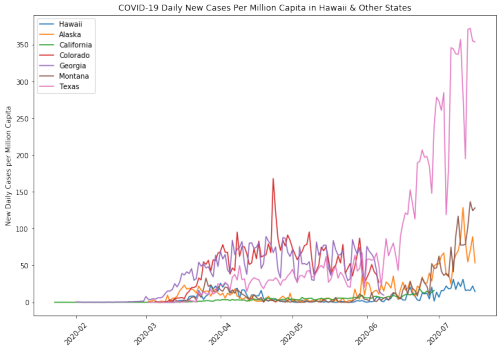


(a) Daily cases (b) 7-day rolling average

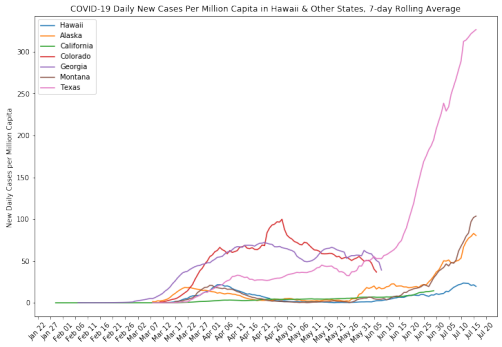
Figure 3: Daily new cases in Hawaii and other states

Figure 4 shows the number of daily new cases per million people in Hawaii and several other states: Alaska, California, Colorado, Georgia, Montana, and Texas. Figure 4b, 4c, and 4d all show the same data. In Figure 4c, Hawaii, Alaska, and Montana are shown so that the data can be seen more clearly. In addition, the start and end of each states' Shelter in Place Orders are labeled. In Figure 4d, only Hawaii is shown. The solid black lines mark the start and end of the Shelter in Place Order and the dotted red lines mark two weeks after the start and end. Figure 4d shows a significant drop in daily cases two weeks after the SIP order was put into place.

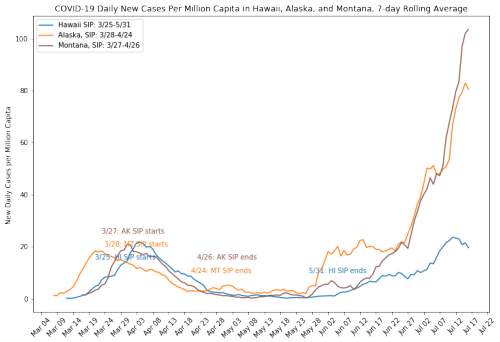
Figure 5 shows the number of daily new cases divided by the number of daily tests in Hawaii, Colorado, Montana, and Texas. The two states not shown (Alaska, California) have much higher ratios on certain days. This ratio does not make a lot of sense because results from the tests do not come out on the same day. There is no data for Georgia's daily tests, so it was not graphed. These figures do not seem to follow any particular trend which is likely caused by the fact that the test results are not released on the same day as they are administered. This means that there are very high percentages on random days, which is why California and Alaska are not pictured as it



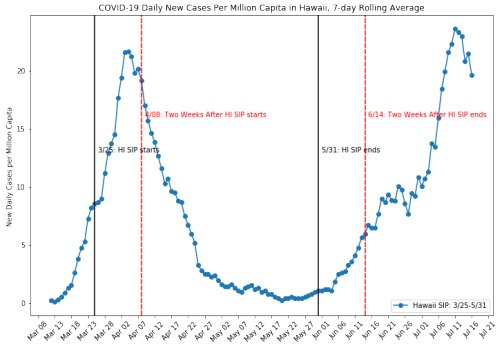
(a) Daily cases per million people



(b) 7-day rolling average



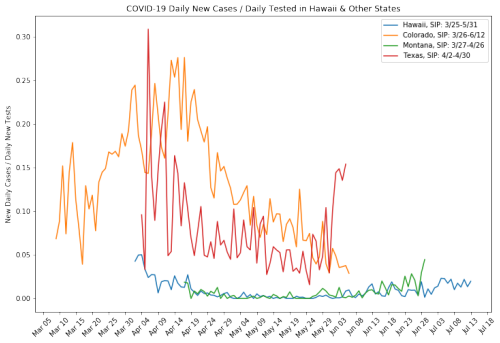
(c) 7-day rolling average (Hawaii, Alaska, Montana) and Shelter In Place order start/end times



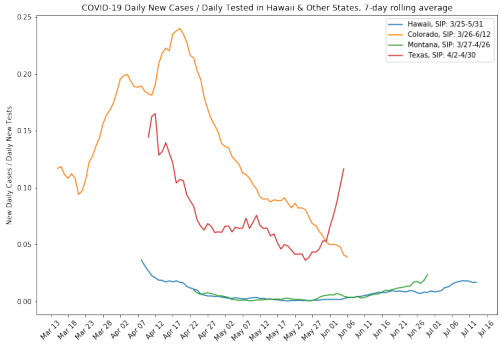
(d) 7-day rolling average in Hawaii

Figure 4: Daily new cases per million people in Hawaii and other states

would be difficult to see Hawaii.



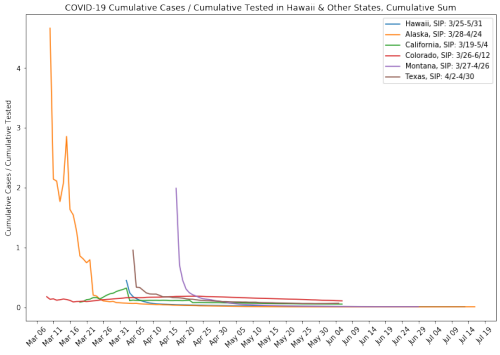
(a) Daily new cases per daily tests



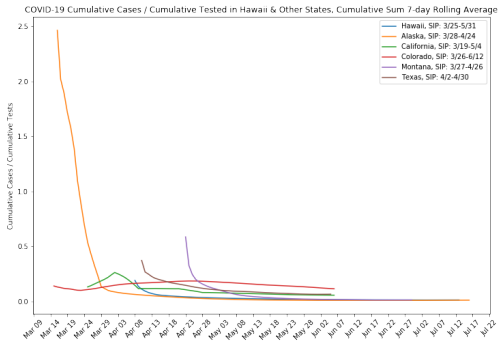
(b) 7-day rolling average

Figure 5: Daily new cases divided by daily number of tests administered in Hawaii and other states

In an effort to remedy the problem brought up by daily new cases compared to daily tests, Figure 6 shows the cumulative number of new cases divided by the cumulative number of tests. The cumulative sums helps indicate percentage of positive tests overall. As of the last data, Hawaii has 1.22% positive cases, Alaska has 1.03% positive cases, California has 5.55% positive cases, Colorado has 1.14% positive cases, Montana has 1.20% positive cases, and Texas has 6.48% positive cases.



(a) Cumulative cases divided by cumulative tests



(b) 7-day rolling average

Figure 6: Cumulative number of cases divided by cumulative number of tests administered in Hawaii and other states