

Analysis of the IHME COVID 19 Forecasting Model – July 28th Update

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Outline

- ❖ One revision to IHME model since July 21st
- ❖ A look at projected death through August 4th
- ❖ A look at infections
- ❖ Trend in death totals
- ❖ Distribution of daily deaths compared to the March 26th model
 - ❖ Focus on the 8 persons per million switch point
 - ❖ 90th percentile for governments taking action
- ❖ Cumulative deaths compared to the March 26th model



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Introduction

- The COVID 19 virus is having a major effect on the economy with an unemployment rate of about 11%
- Since the middle of March, more than 52 million U.S. workers filed for unemployment due to the shut down a significant share of the economy
- The Institute for Health Metrics and Evaluation (IHME) at the University of Washington is playing a large role in the formation of policy
 - The data used in this analysis is sourced from <http://www.healthdata.org/covid>
- It is important to document and understand the ex-post performance of the model and the periodic revisions that are made to that model
- Actual Deaths are from <https://covidtracking.com/>
- This is an update of the July 21st discussion



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The IHME Modeling Approach

- Revised the death model
- Use a spline function to log cumulative deaths versus log cumulative cases
- Death predictions made based on cases over time
- Unsmoothed daily deaths and the predicted daily deaths used to fit a spline
- Sample standard deviation developed using 1,000 draws from the residuals
- Provide estimates based upon what is expected to happen, mandates easing, and estimates with 95% wearing masks
- Expected to happen assumes easing occurs until a threshold of a daily death rate of 8 per million
- Paper is still in the peer review process



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Projected August 4th Deaths from the March 26th, July 6th, July 14th, and July 22nd Models

	3/26	7/6	7/14	7/22		3/26	7/6	7/14	7/22
Alabama	1,732	1,572	1,501	1,675	Hawaii	390	18	21	26
Alaska	129	14	22	19	Idaho	84	106	144	145
Arizona	1,613	3,137	3,261	3,844	Illinois	2,360	7,809	7,606	7,623
Arkansas	762	437	429	458	Indiana	940	2,806	2,848	2,963
California	4,306	9,109	10,509	9,723	Iowa	138	787	852	887
Colorado	2,151	1,781	1,818	1,865	Kansas	687	366	331	334
Connecticut	378	4,479	4,389	4,459	Kentucky	605	719	776	757
Delaware	827	556	530	530	Louisiana	1,897	3,752	3,893	3,882
Florida	6,766	6,293	6,864	6,830	Maine	3,013	117	124	125
Georgia	2,777	3,301	3,495	3,770	Maryland	1,171	3,477	3,602	3,584



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Projected August 4th Deaths from the March 26th, July 6th, July 14th, and July 22nd Models

	3/26	7/6	7/14	7/22		3/26	7/6	7/14	7/22
Massachusetts	1,782	9,201	8,859	8,837	New Mexico	514	650	698	656
Michigan	2,862	6,481	6,664	6,583	New York	15,546	31,727	33,209	33,087
Minnesota	2,146	1,726	1,636	1,658	North Carolina	1,721	1,706	1,799	1,940
Mississippi	2,292	1,557	1,720	1,665	North Dakota	171	89	117	105
Missouri	1,055	1,326	1,282	1,259	Ohio	1,203	3,725	3,494	3,395
Montana	282	22	47	22	Oklahoma	1,149	466	521	537
Nebraska	424	386	290	308	Oregon	469	271	312	319
Nevada	568	693	928	816	Pennsylvania	1,579	7,647	7,376	7,296
New Hampshire	351	470	416	411	Rhode Island	306	1,101	1,006	1,024
New Jersey	2,096	15,943	16,450	16,301	South Carolina	1,043	1,420	1,563	1,449



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Projected August 4th Deaths from the March 26th, July 6th, July 14th, and July 22nd Models

	3/26	7/6	7/14	7/22		3/26	7/6	7/14	7/22
South Dakota	204	143	137	141	Virginia	2,053	2,446	2,402	2,201
Tennessee	1,067	1,003	1,125	1,105	Washington	1,670	1,559	1,641	1,626
Texas	4,150	4,504	6,530	6,214	West Virginia	543	106	104	106
Utah	502	247	365	336	Wisconsin	1,309	995	880	893
Vermont	95	58	56	57	Wyoming	132	18	21	21
United States	82,141	148,934	155,263	154,511					



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IHME Model Prediction Changes from July 22nd

- The model revision released on July 22nd increased the cumulative expected death in 32 states from the July 6th model
 - Increases in Alabama, Alaska, Arkansas, Arizona, California, Colorado, Connecticut, Florida, Georgia, Hawaii, Idaho, Indiana, Iowa, Kentucky, Louisiana, Maine, Maryland, Michigan, Mississippi, Nevada, New Jersey, New Mexico, New York, North Dakota, Oklahoma, Oregon, South Carolina, Tennessee, Texas, Utah, Washington, Wyoming
- The model revision released on July 22nd has higher cumulative expected death in 28 states and lower cumulative expected death in 22 states compared to the original model
 - Increases in Arizona, California, Connecticut, Florida, Georgia, Idaho, Illinois, Indiana, Iowa, Kentucky, Louisiana, Maryland, Massachusetts, Michigan, Missouri, Nevada, New Hampshire, New Jersey, New Mexico, New York, North Carolina, Ohio, Pennsylvania, Rhode Island, South Carolina, Tennessee, Texas, Virginia



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COVID-19 Cases Percent of Population

	7/6	7/28		7/6	7/28		7/6	7/28
Alabama	0.93%	1.68%	Hawaii	0.08%	0.12%	Massachusetts	1.60%	1.69%
Alaska	0.16%	0.37%	Idaho	0.48%	1.05%	Michigan	0.74%	0.88%
Arizona	1.44%	2.28%	Illinois	1.18%	1.38%	Minnesota	0.69%	0.93%
Arkansas	0.81%	1.33%	Indiana	0.72%	0.95%	Mississippi	1.08%	1.82%
California	0.72%	1.19%	Iowa	1.02%	1.36%	Missouri	0.42%	0.75%
Colorado	0.60%	0.77%	Kansas	0.58%	0.91%	Montana	0.12%	0.33%
Connecticut	1.32%	1.38%	Kentucky	0.39%	0.63%	Nebraska	1.04%	1.29%
Delaware	1.27%	1.49%	Louisiana	1.47%	2.39%	Nevada	0.77%	1.46%
Florida	1.00%	2.06%	Maine	0.26%	0.29%	New Hampshire	0.44%	0.48%
Georgia	0.95%	1.65%	Maryland	1.16%	1.41%	New Jersey	2.00%	2.10%

Data from <https://www.worldometers.info/coronavirus/country/us/> July 28, 2020



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COVID-19 Cases Percent of Population

	7/6	7/28		7/6	7/28
New Mexico	0.65%	0.93%	South Dakota	0.81%	0.96%
New York	2.18%	2.27%	Tennessee	0.78%	1.45%
North Carolina	0.73%	1.11%	Texas	0.76%	1.41%
North Dakota	0.51%	0.81%	Utah	0.81%	1.21%
Ohio	0.50%	0.74%	Vermont	0.20%	0.23%
Oklahoma	0.44%	0.85%	Virginia	0.78%	1.02%
Oregon	0.25%	0.41%	Washington	0.50%	0.72%
Pennsylvania	0.75%	0.89%	West Virginia	0.20%	0.34%
Rhode Island	1.62%	1.77%	Wisconsin	0.56%	0.86%
South Carolina	0.92%	1.63%	Wyoming	0.30%	0.45%

Data from <https://www.worldometers.info/coronavirus/country/us/> July 28, 2020



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COVID-19 Case Summary

- The U.S. infection rate was 0.93% as of July 6th
- The U.S. infection rate is 1.07% as of July 14th
- The U.S. infection rate is 1.21% as of July 21st
- The U.S. infection rate is 1.35% as of July 28th
- The state range of infection rates is 2.36% for Louisiana (change from New York) to 0.12% for Hawaii
- Twenty-six states have had an infection rate greater than 1% (up from twenty-three)
- Twenty-four states have had an infection rate of less than 1%



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Trend Analysis in Daily Death since June

	6/1 – 6/29	6/29 – 7/28		6/1 – 6/29	6/29 – 7/28		6/1 – 6/29	6/29 – 7/28
Alabama	0.01	0.54	Hawaii	0.01	0.01	Massachusetts	-1.81	-0.19
Alaska	0.01	0.01	Idaho	0.00	0.14	Michigan	-0.34	-0.29
Arizona	0.41	1.54	Illinois	-2.53	-0.36	Minnesota	-0.61	-0.10
Arkansas	0.13	0.09	Indiana	-0.59	-0.05	Mississippi	-0.03	0.19
California	0.03	1.58	Iowa	-0.35	0.11	Missouri	-0.05	0.17
Colorado	-0.30	-0.09	Kansas	-0.07	0.11	Montana	0.00	0.04
Connecticut	-0.52	0.00	Kentucky	-0.09	0.04	Nebraska	0.00	0.01
Delaware	-0.11	0.27	Louisiana	-0.39	0.70	Nevada	-0.07	0.21
Florida	-0.05	3.30	Maine	-0.04	-0.01	New Hampshire	-0.10	-0.01
Georgia	-0.57	1.12	Maryland	-0.51	-0.11	New Jersey	7.32	-1.24



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Trend Analysis in Daily Death since June

	6/1 – 6/29	6/29 – 7/28		6/1 – 6/29	6/29 – 7/28
New Mexico	-0.12	0.12	South Dakota	0.02	-0.01
New York	-1.78	-0.06	Tennessee	-0.02	0.31
North Carolina	-0.19	0.31	Texas	0.33	9.17
North Dakota	-0.06	0.04	Utah	-0.01	0.07
Ohio	-0.89	0.19	Vermont	0.00	0.00
Oklahoma	0.00	0.15	Virginia	0.03	-0.56
Oregon	0.00	0.07	Washington	0.03	-0.01
Pennsylvania	-1.51	-0.62	West Virginia	-0.03	0.03
Rhode Island	-0.14	-0.18	Wisconsin	-0.11	0.08
South Carolina	0.02	1.28	Wyoming	-0.01	0.00



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Trend Analysis Summary

- The U.S. has experienced a **5.69 decrease** per day from June 1 – June 29 and **18.17 increase** per day from June 29 – July 27.
- From the June 1 to June 29 period to the June 29 to July 27 period, seven states have seen a lowering in the trend of death
 - Arkansas, New Hampshire, New Jersey, Rhode Island, South Dakota, Virginia, Washington
- Since June 29, 16 States have had a decrease in daily death of greater than 0.01 per day (down from 32)
- Since June 29, 31 States have had an increase in daily death of greater than 0.01 per day (up from 12)
- Since June 29, 3 States have had a 0.00 increase/decrease in death per day



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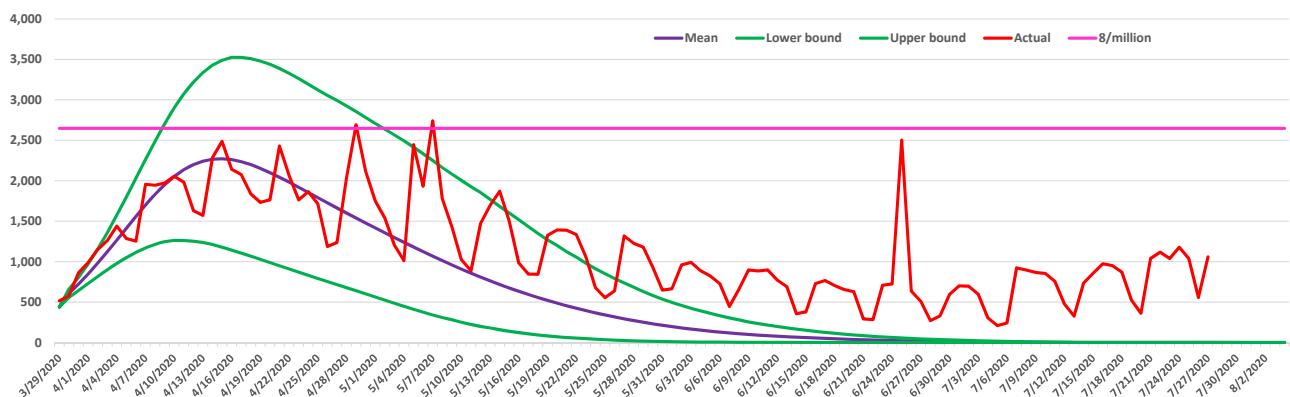
COVID-19 U.S. and Sweden Case Summary

- Using the Worldometers.info <https://www.worldometers.info/coronavirus/> website:
 - The U.S. infection rate is 1.35% as of July 28th
 - The Sweden infection rate is 0.79% as of July 28th
 - The U.S. death rate is 0.046% as of July 28th
 - The Sweden death rate is 0.057% as of July 28th



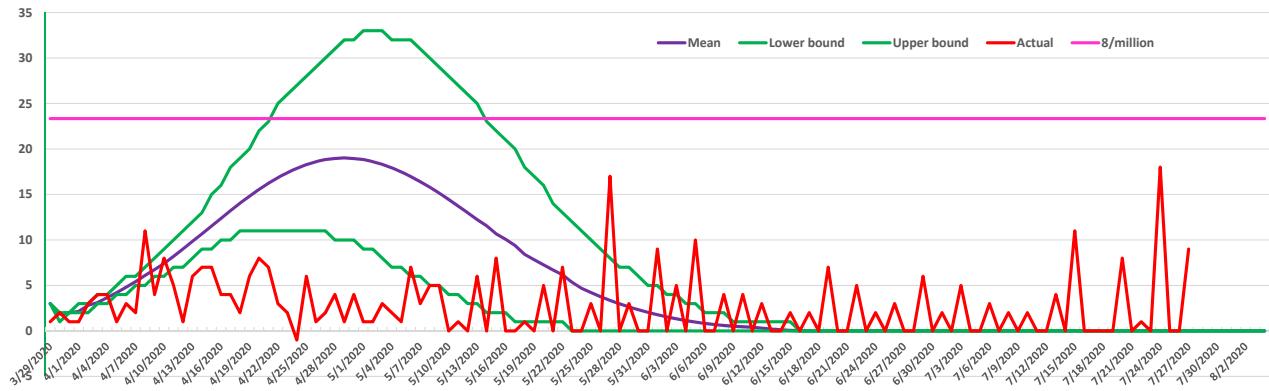
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U.S. COVID 19 Daily Death Projections March 26



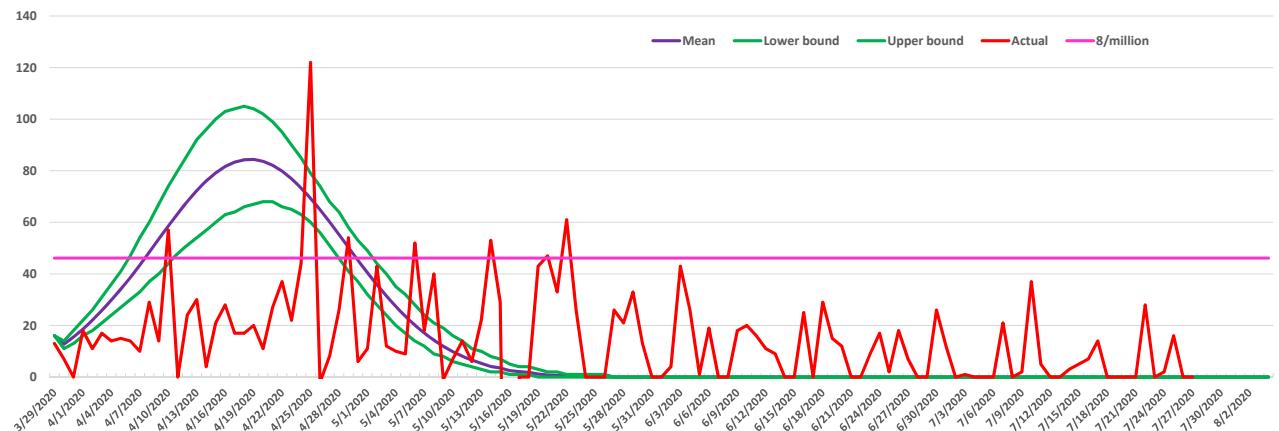
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Kansas COVID 19 Daily Death Projections March 26



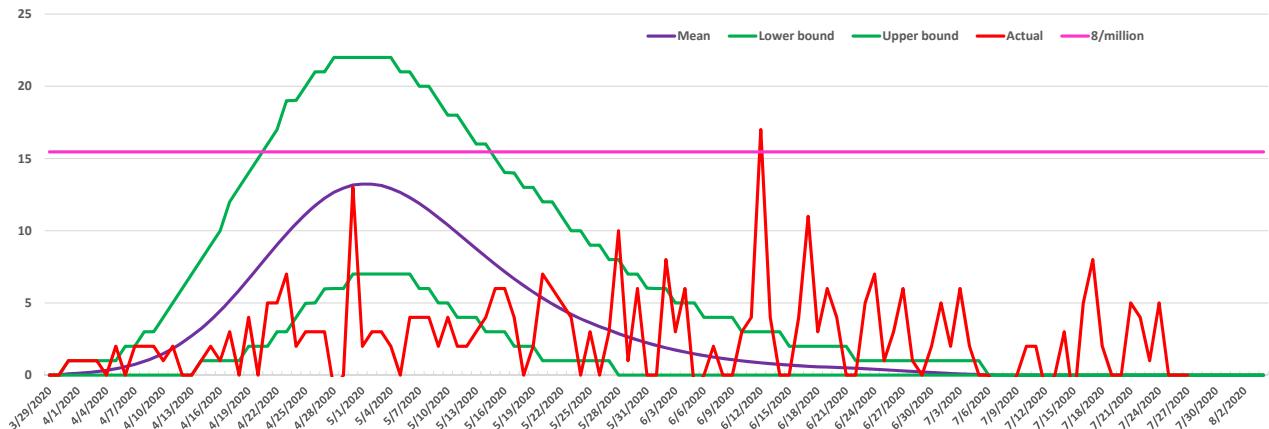
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Colorado COVID 19 Daily Death Projections March 26



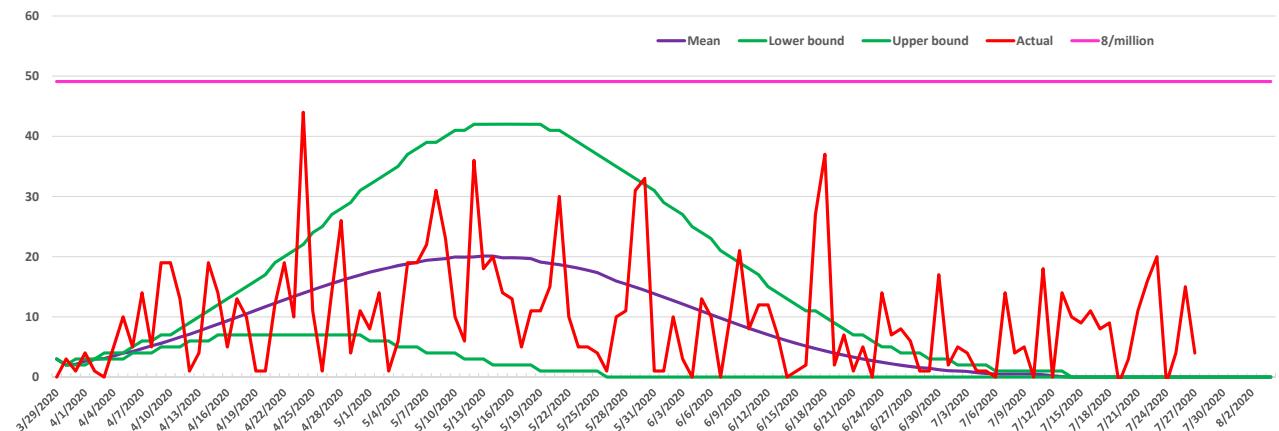
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Nebraska COVID 19 Daily Death Projections March 26



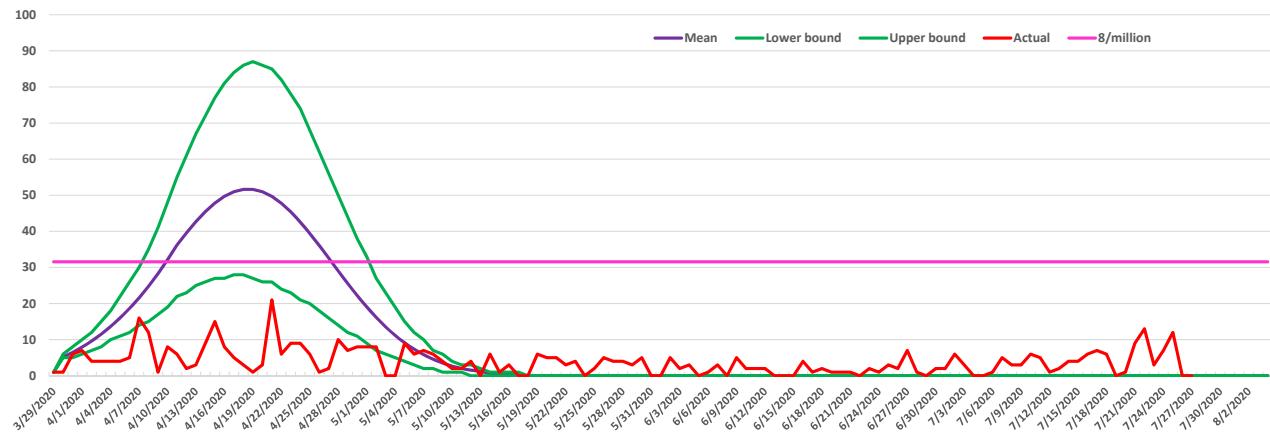
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Missouri COVID 19 Daily Death Projections March 26



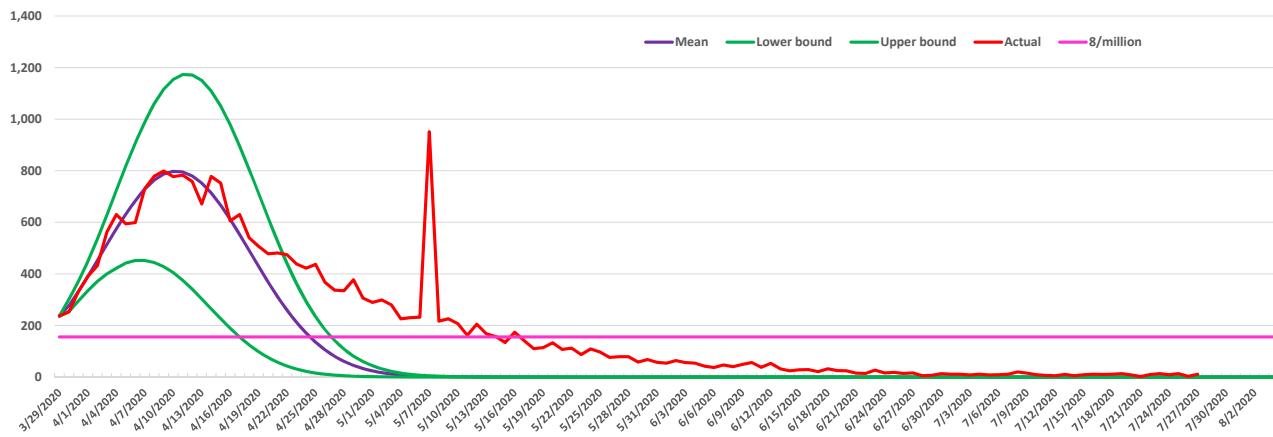
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Oklahoma COVID 19 Daily Death Projections March 26



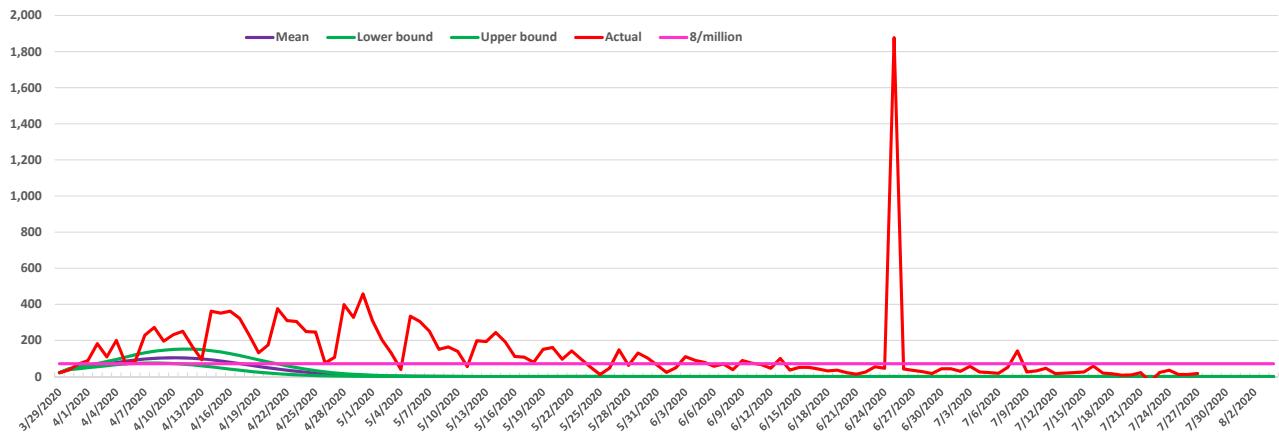
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New York COVID 19 Daily Death Projections March 26



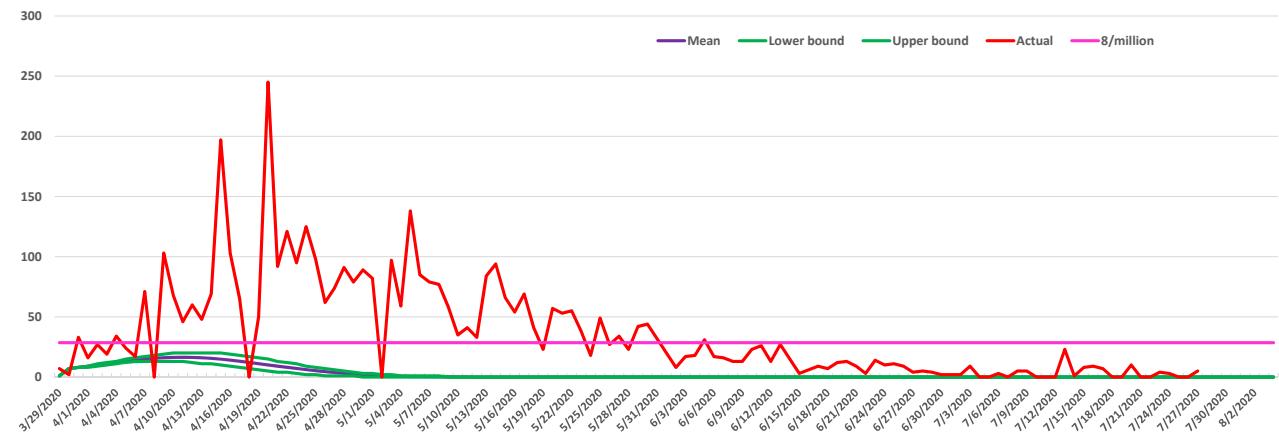
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New Jersey COVID 19 Daily Death Projections March 26



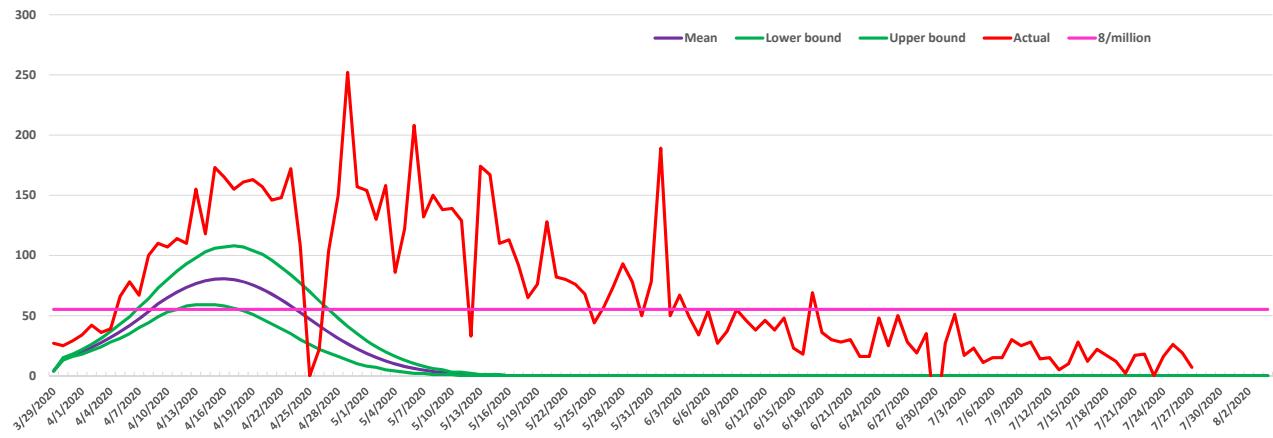
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Connecticut COVID 19 Daily Death Projections March 26



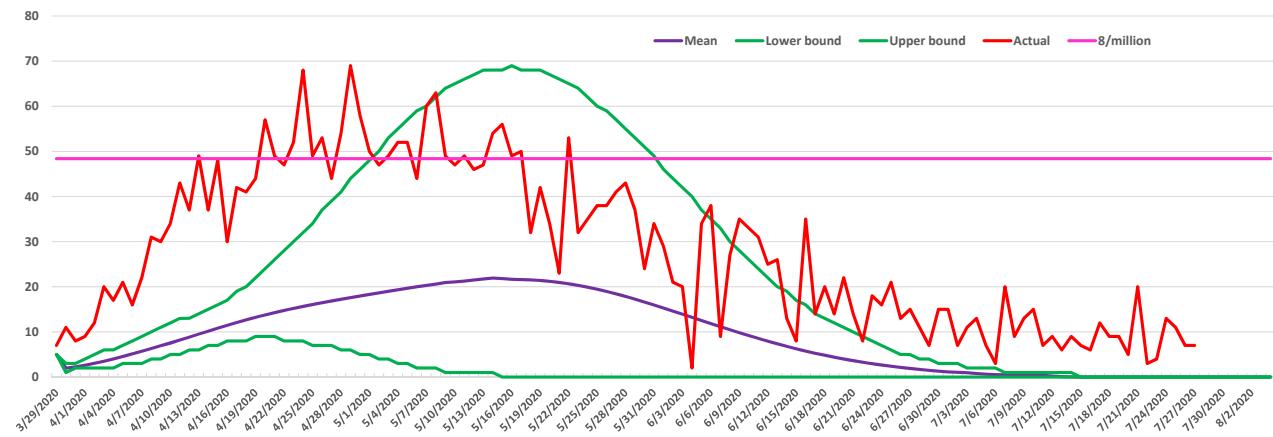
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Massachusetts COVID 19 Daily Death Projections March 26



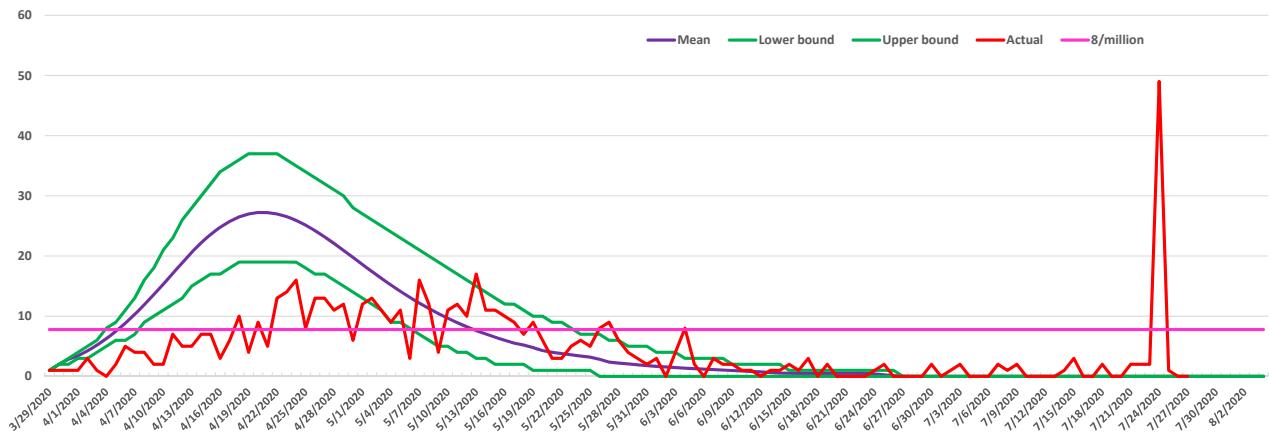
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Maryland COVID 19 Daily Death Projections March 26



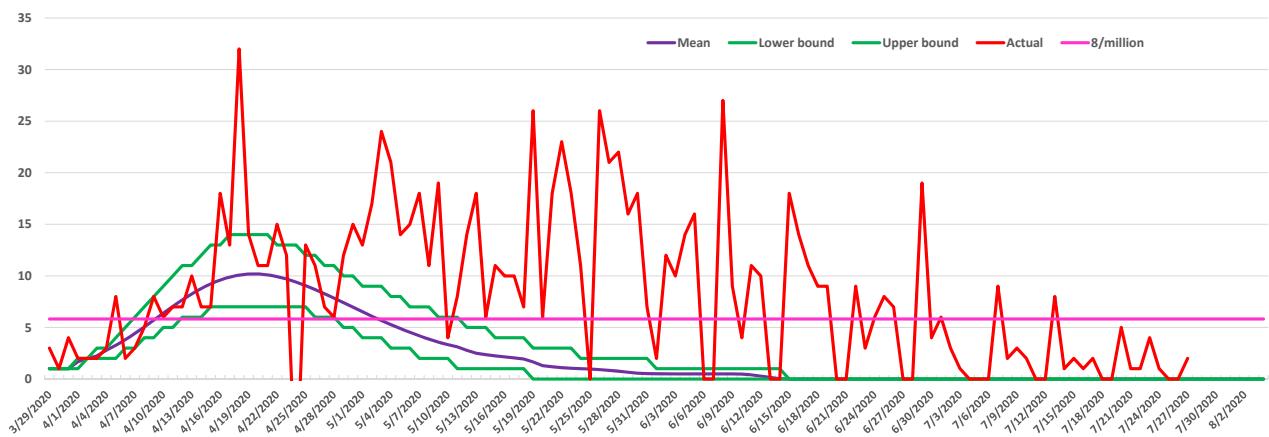
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Delaware COVID 19 Daily Death Projections March 26



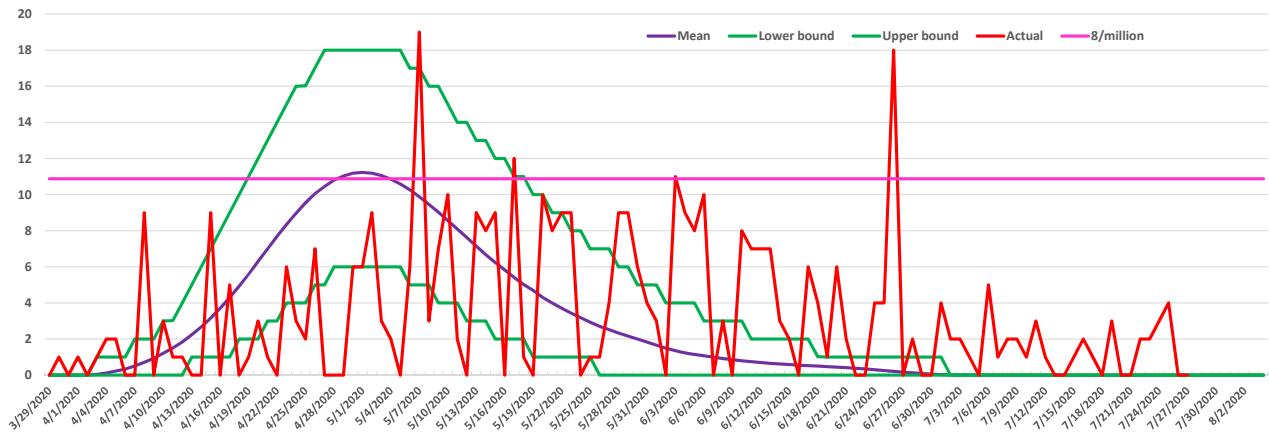
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Rhode Island COVID 19 Daily Death Projections March 26



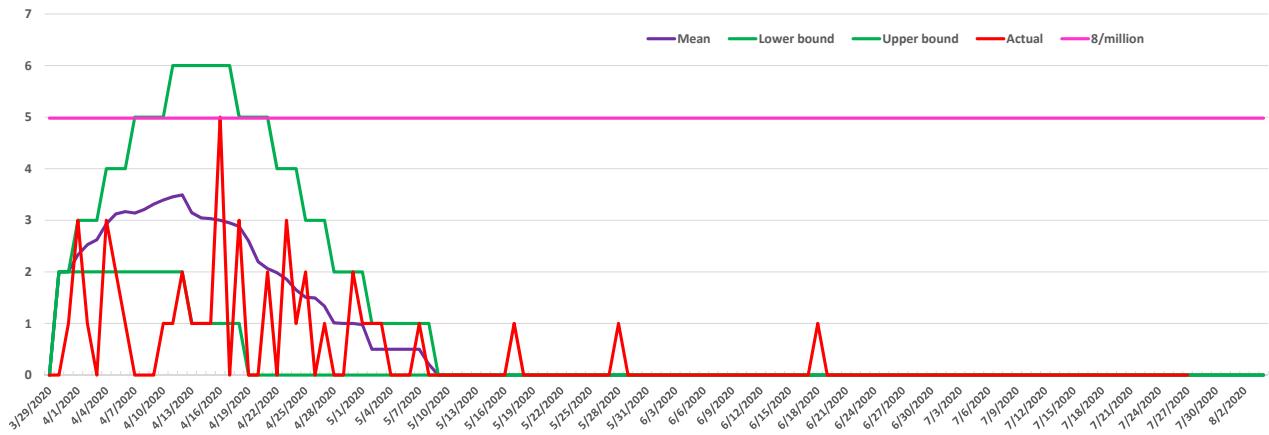
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New Hampshire COVID 19 Daily Death Projections March 26



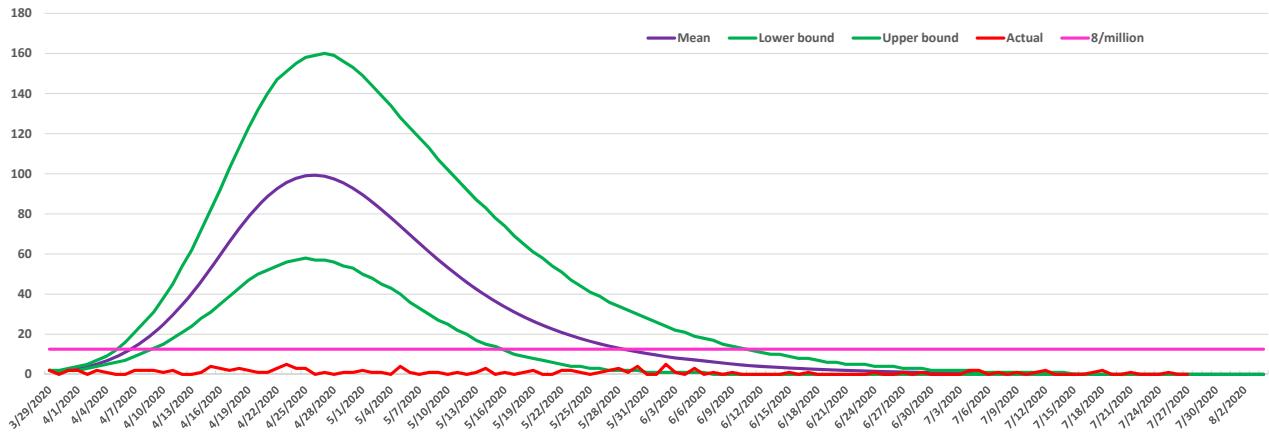
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Vermont COVID 19 Daily Death Projections March 26



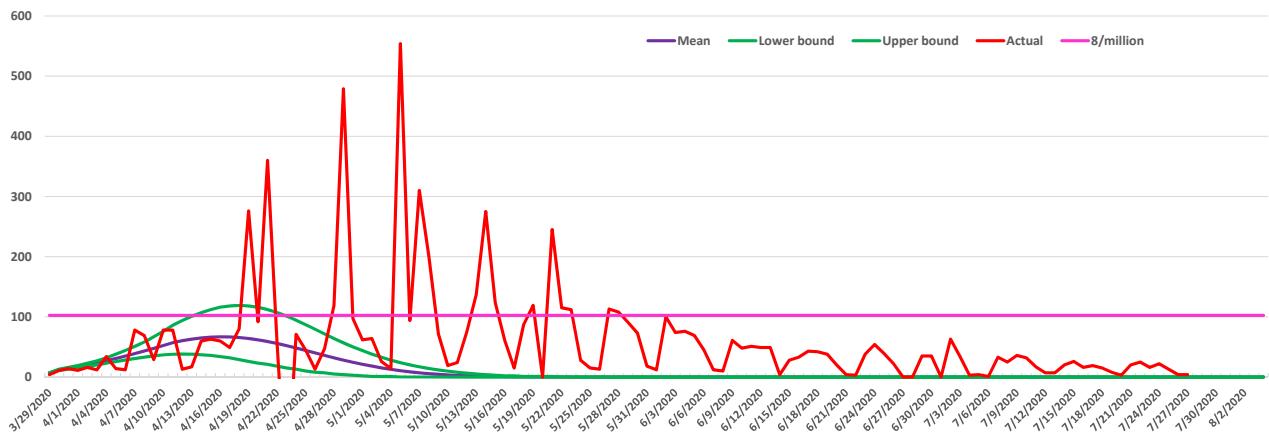
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Maine COVID 19 Daily Death Projections March 26



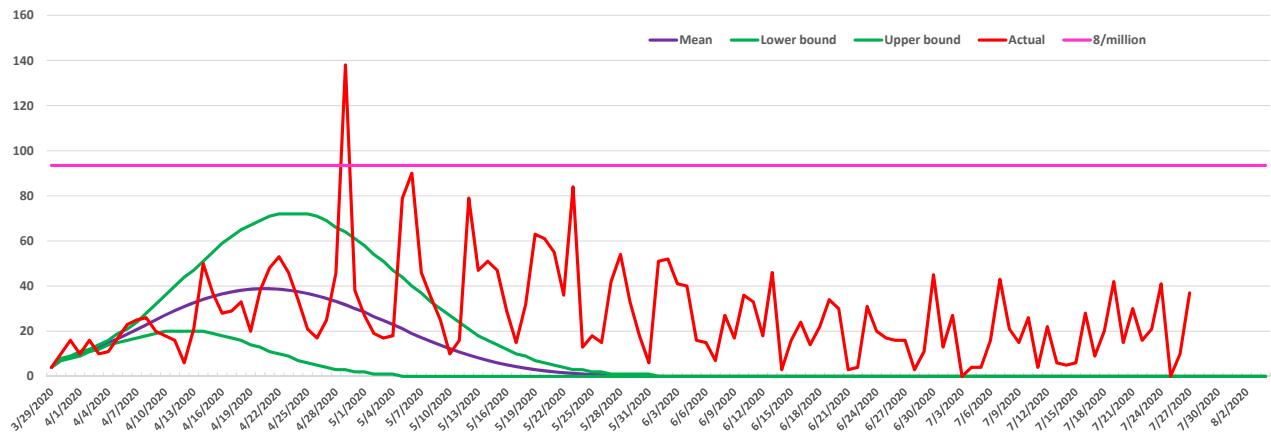
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Pennsylvania COVID 19 Daily Death Projections March 26



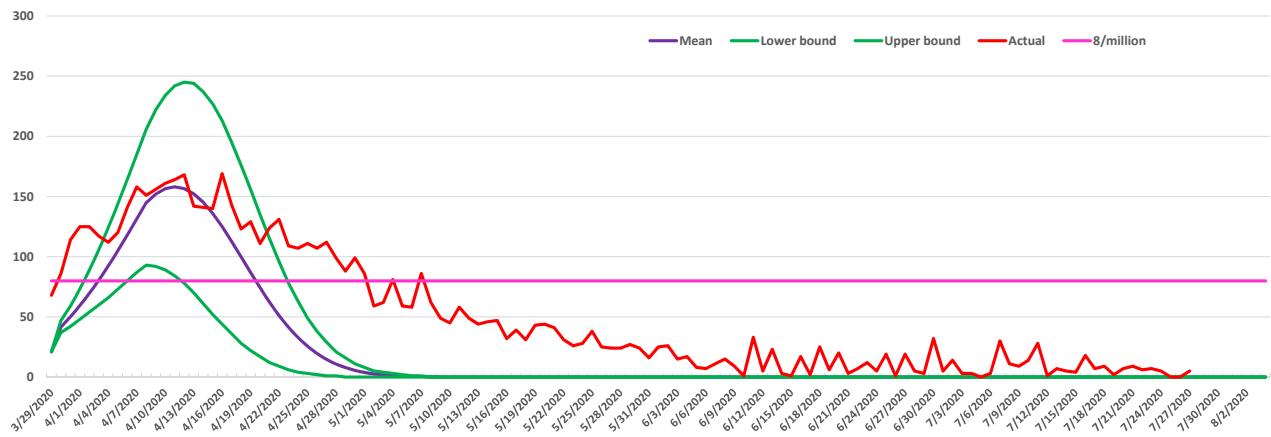
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Ohio COVID 19 Daily Death Projections March 26



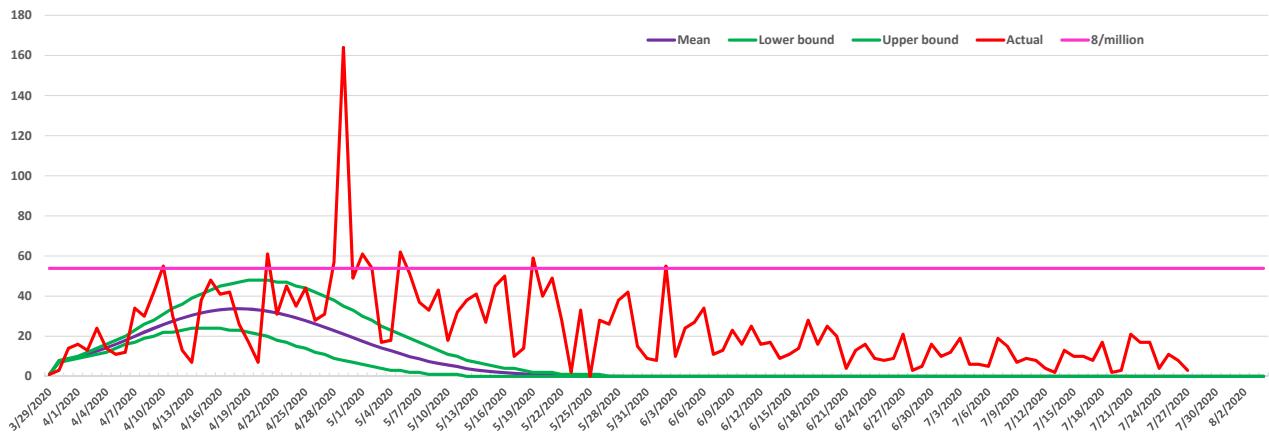
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Michigan COVID 19 Daily Death Projections March 26



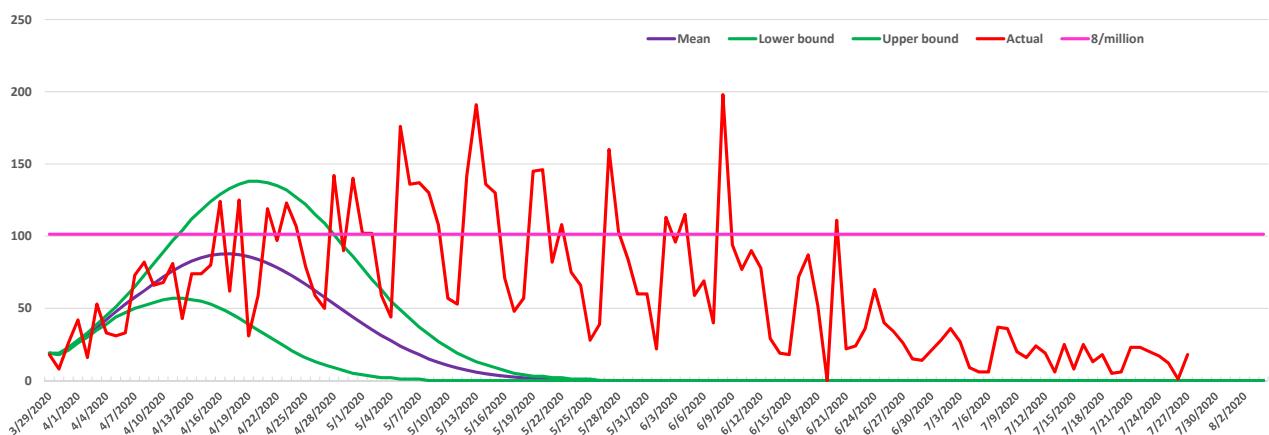
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Indiana COVID 19 Daily Death Projections March 26



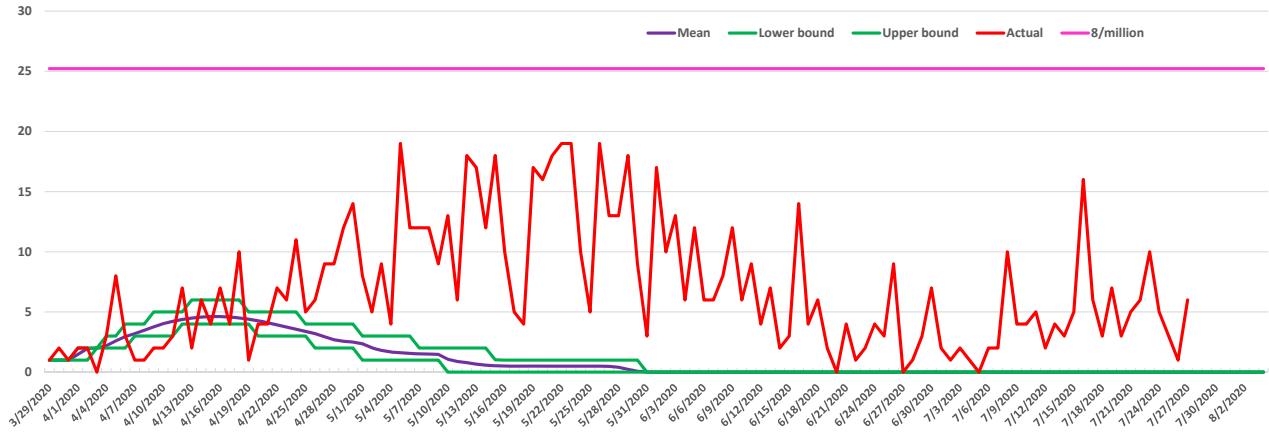
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Illinois COVID 19 Daily Death Projections March 26



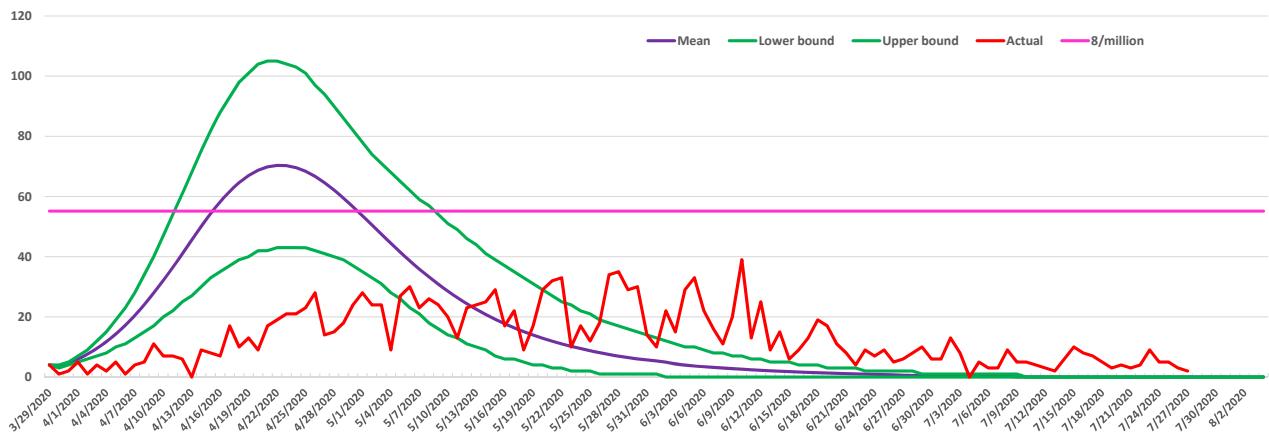
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Iowa COVID 19 Daily Death Projections March 26



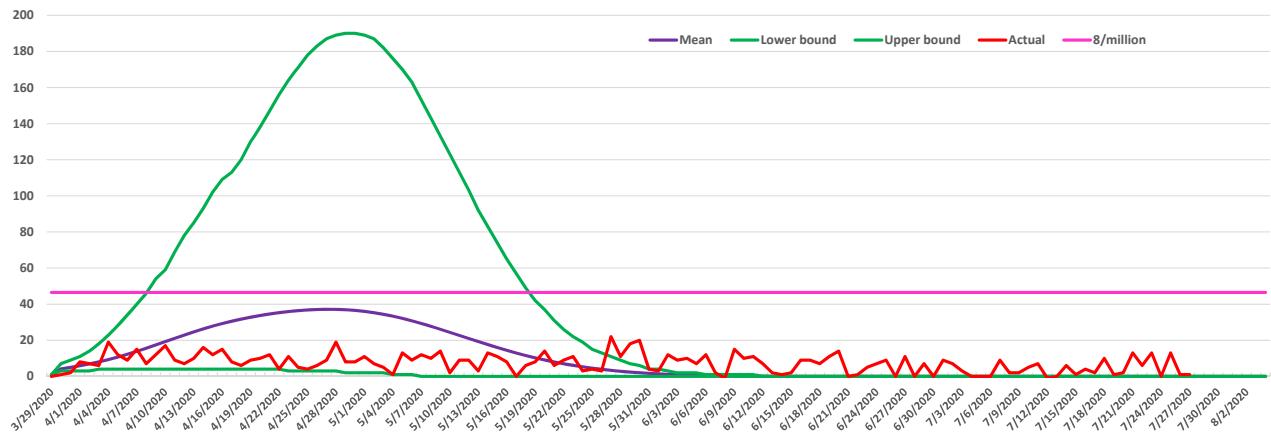
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Minnesota COVID 19 Daily Death Projections March 26



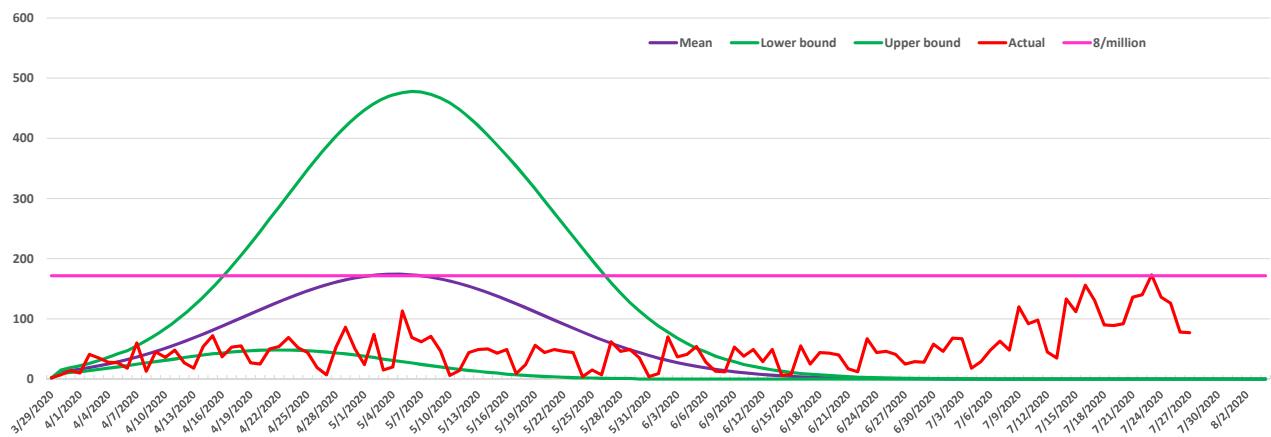
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Wisconsin COVID 19 Daily Death Projections March 26



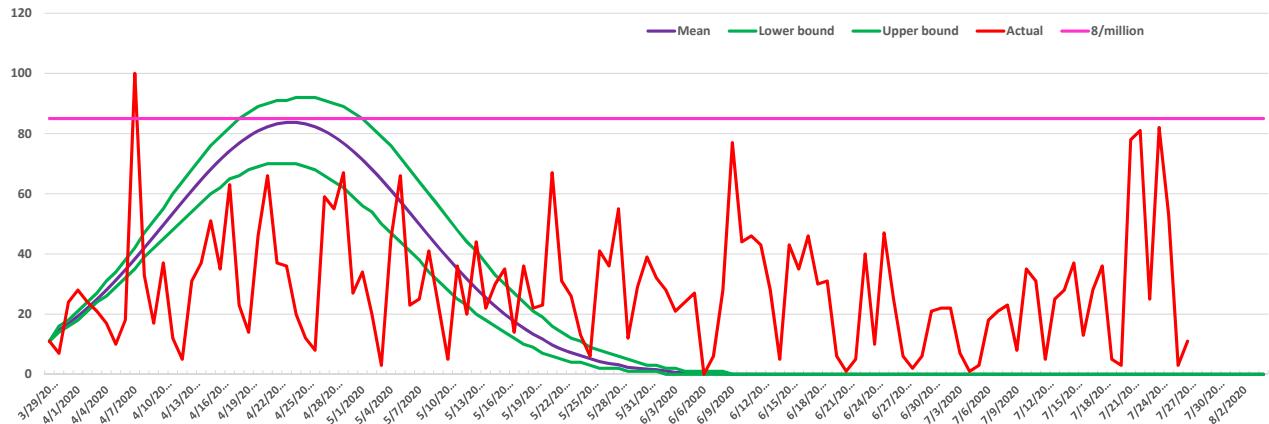
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Florida COVID 19 Daily Death Projections March 26



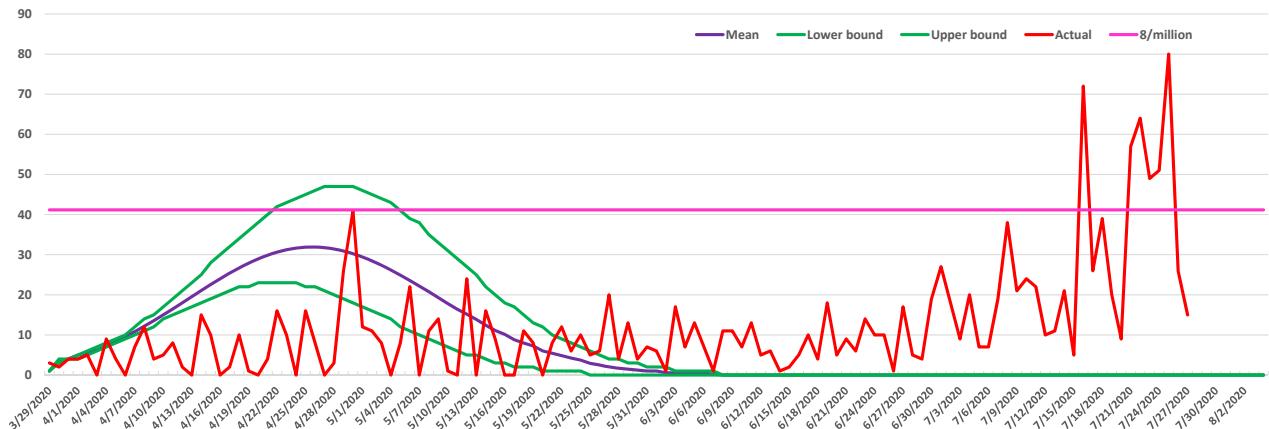
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Georgia COVID 19 Daily Death Projections March 26



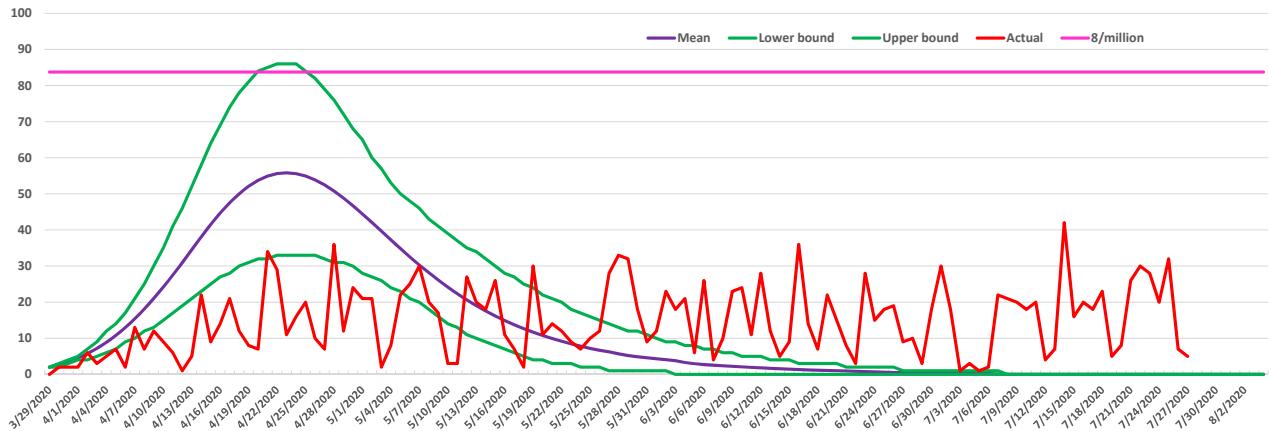
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South Carolina COVID 19 Daily Death Projections March 26



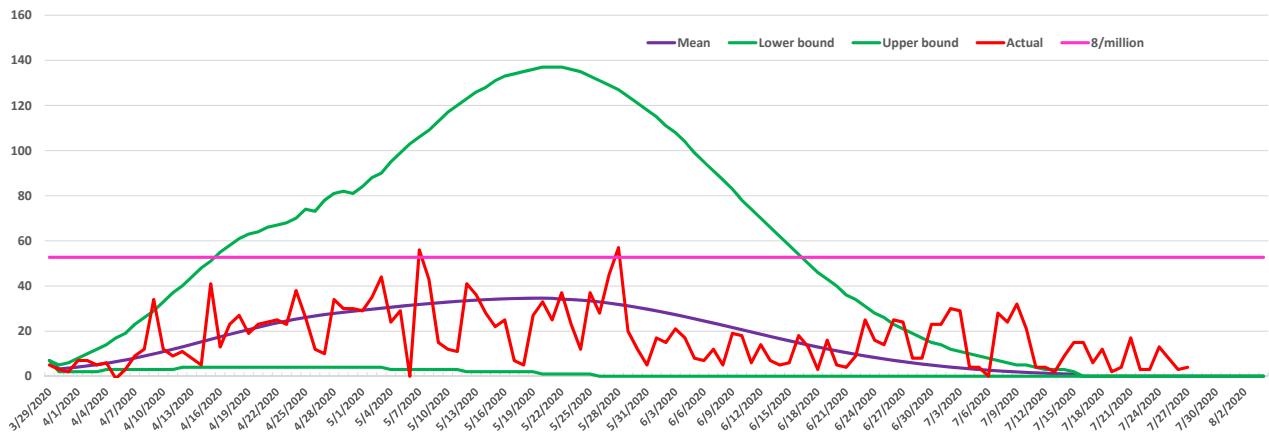
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North Carolina COVID 19 Daily Death Projections March 26



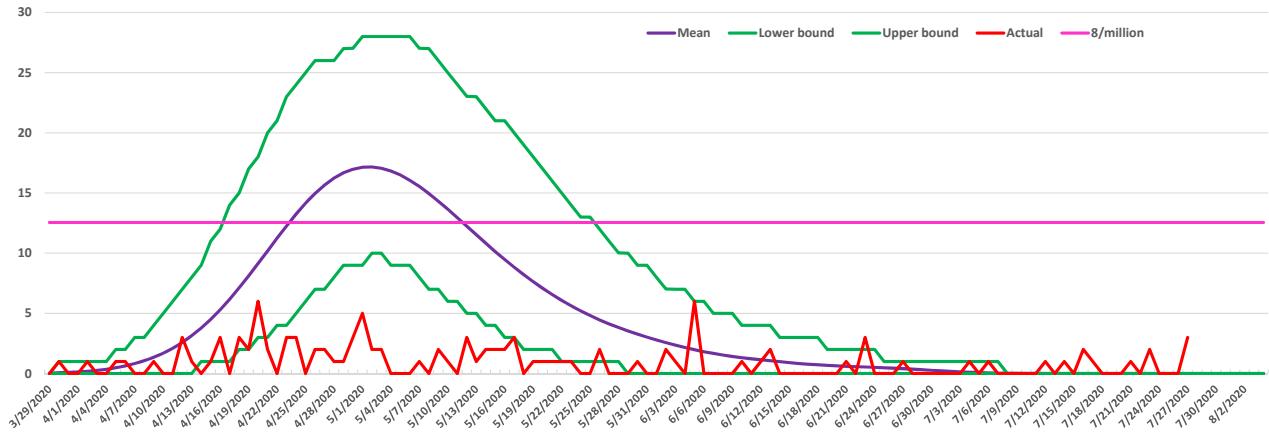
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Virginia COVID 19 Daily Death Projections March 26



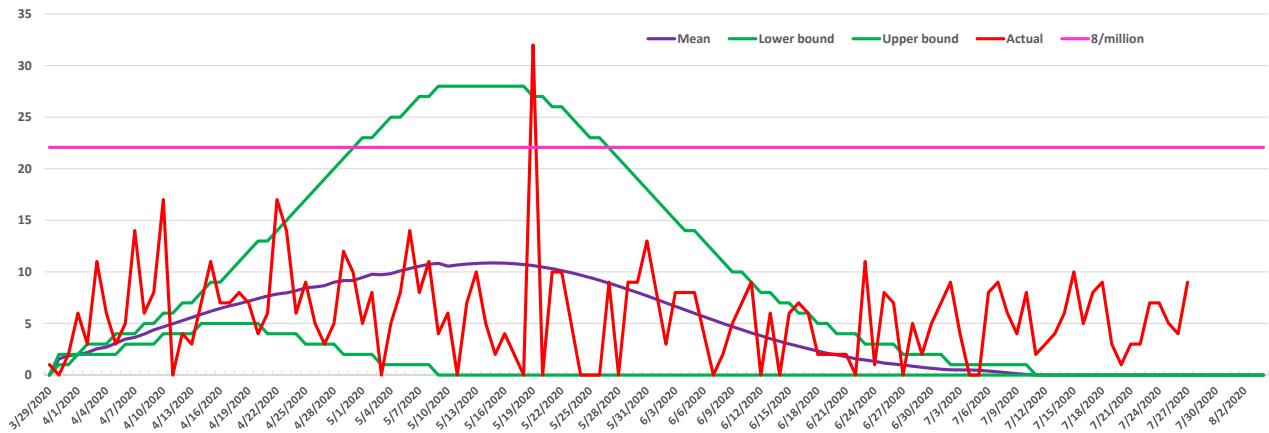
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West Virginia COVID 19 Daily Death Projections March 26



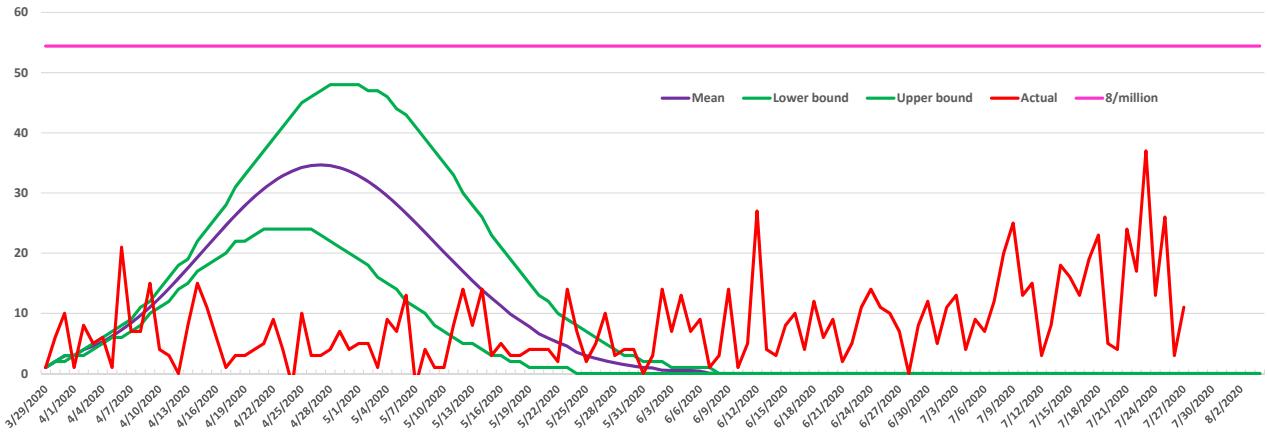
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Kentucky COVID 19 Daily Death Projections March 26



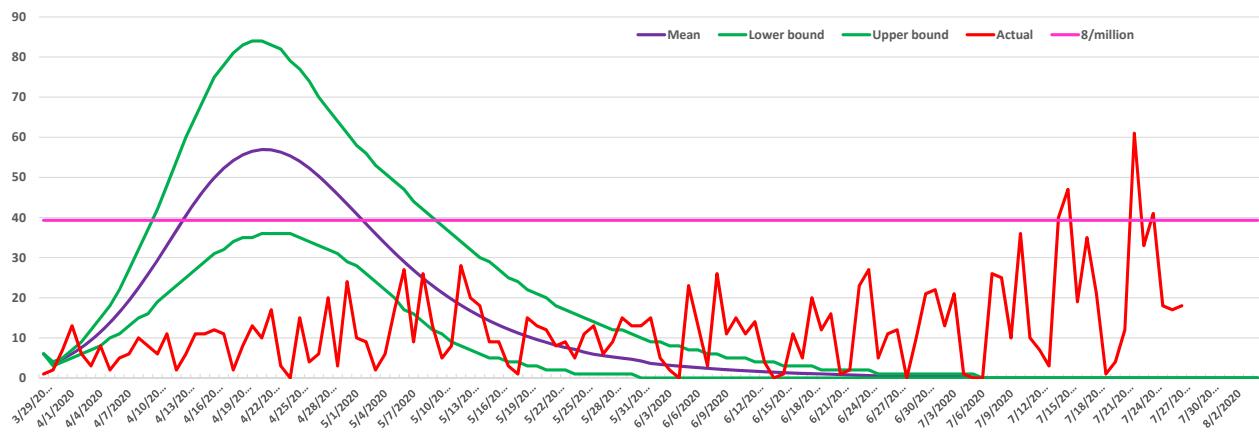
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Tennessee COVID 19 Daily Death Projections March 26



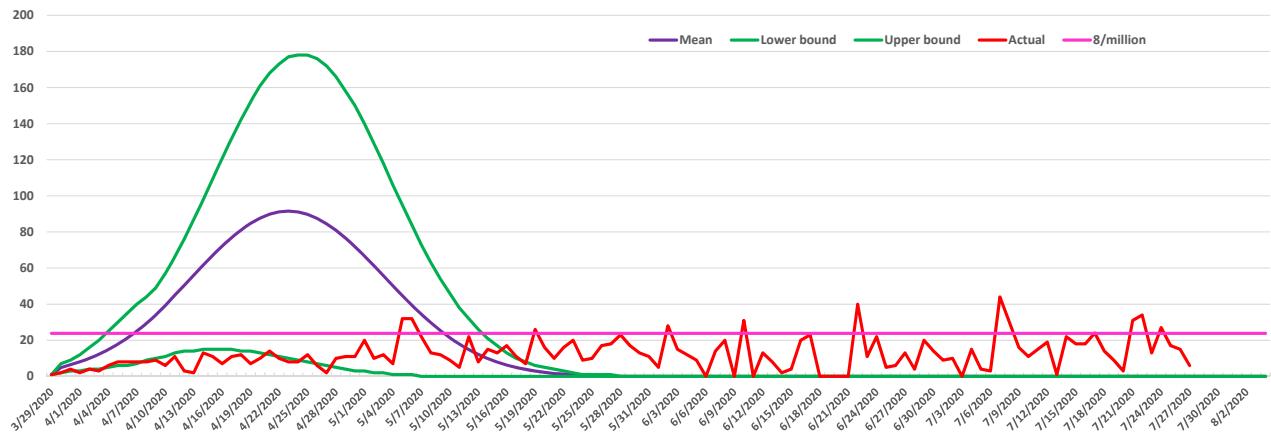
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Alabama COVID 19 Daily Death Projections March 26



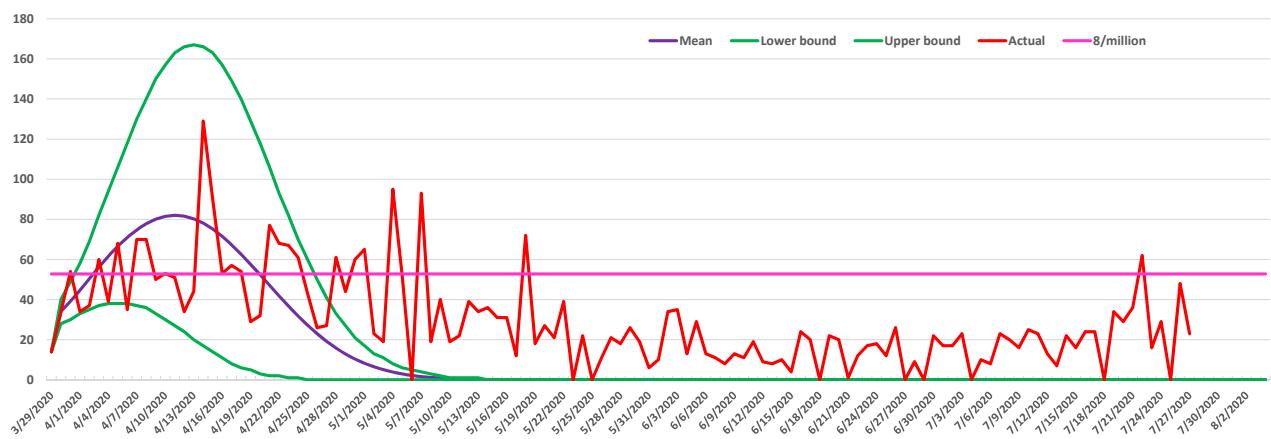
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Mississippi COVID 19 Daily Death Projections March 26



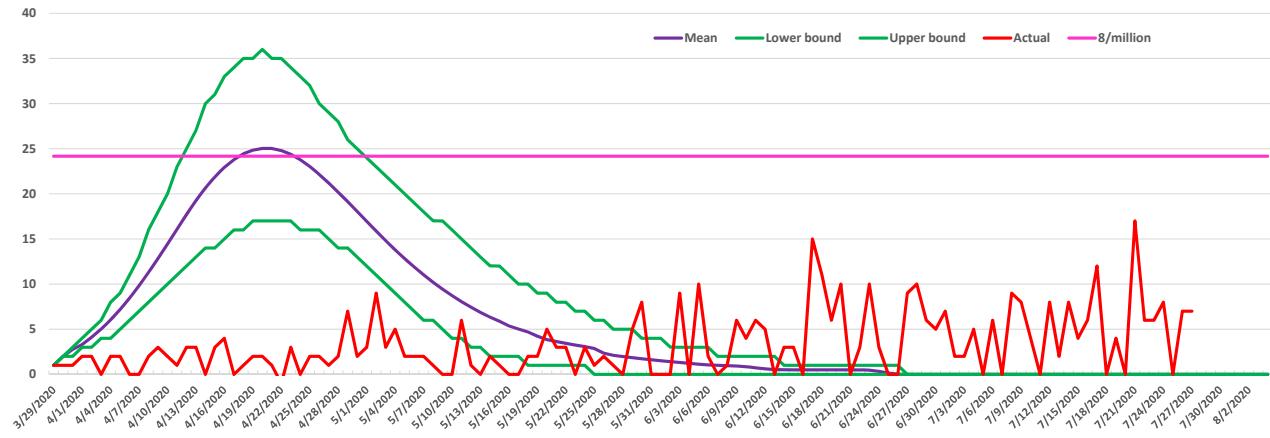
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Louisiana COVID 19 Daily Death Projections March 26



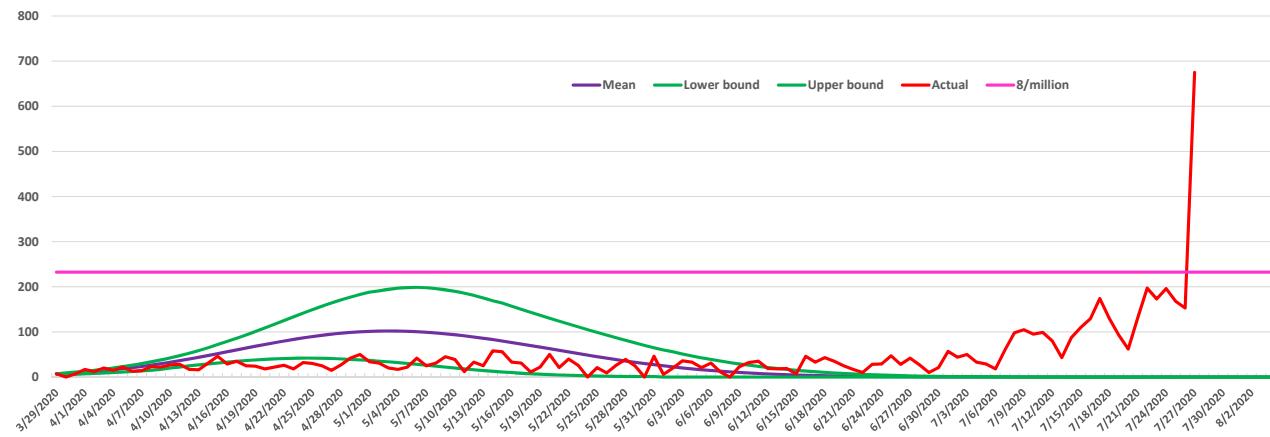
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Arkansas COVID 19 Daily Death Projections March 26



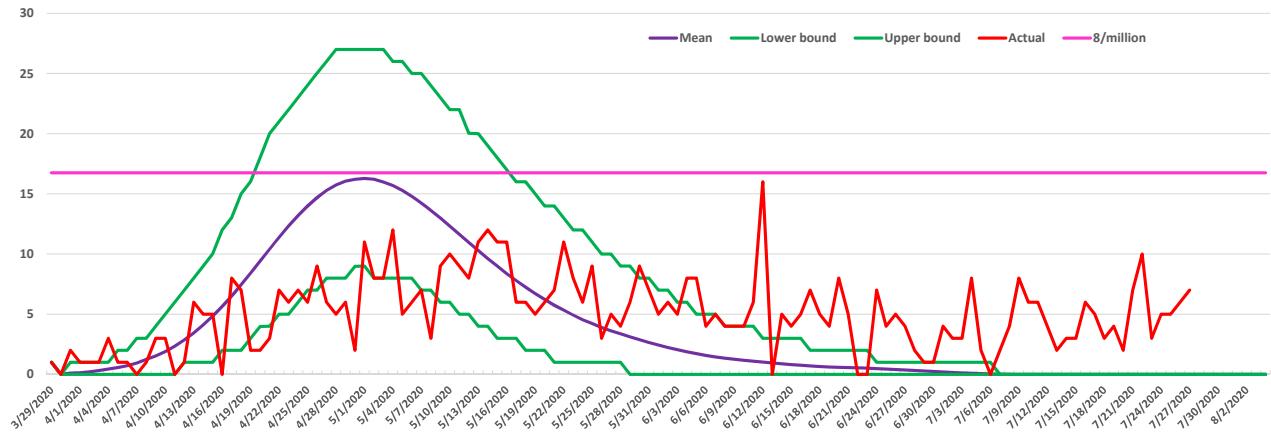
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Texas COVID 19 Daily Death Projections March 26



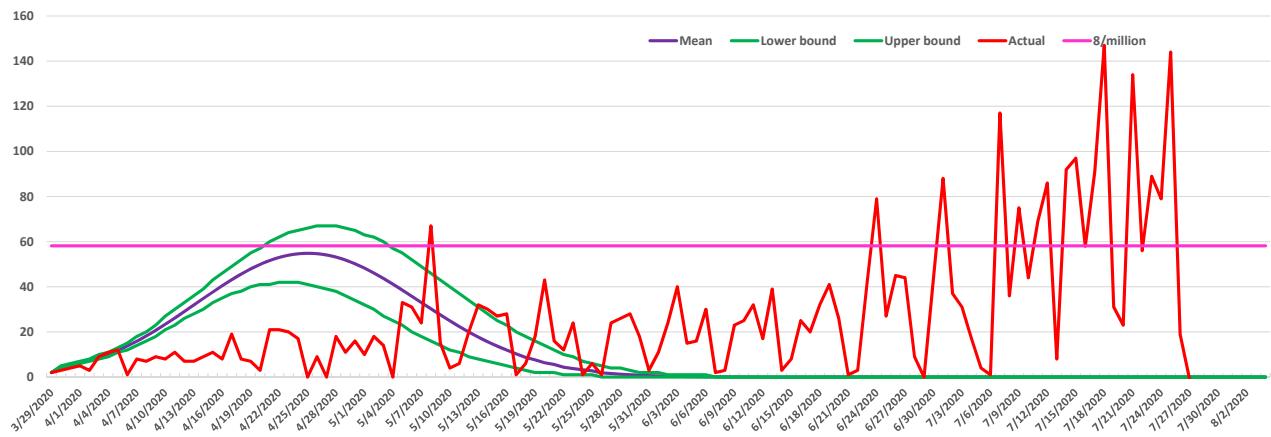
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New Mexico COVID 19 Daily Death Projections March 26



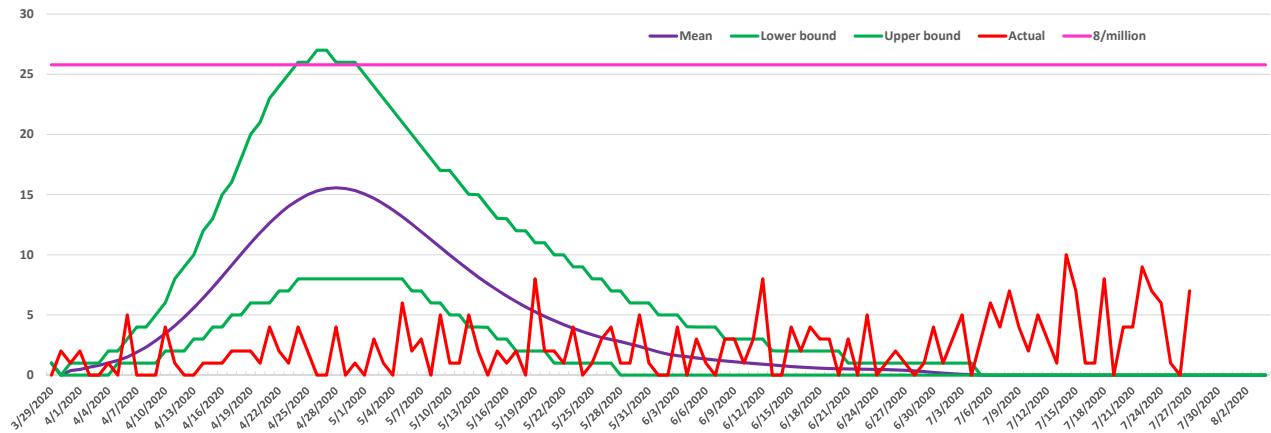
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Arizona COVID 19 Daily Death Projections March 26



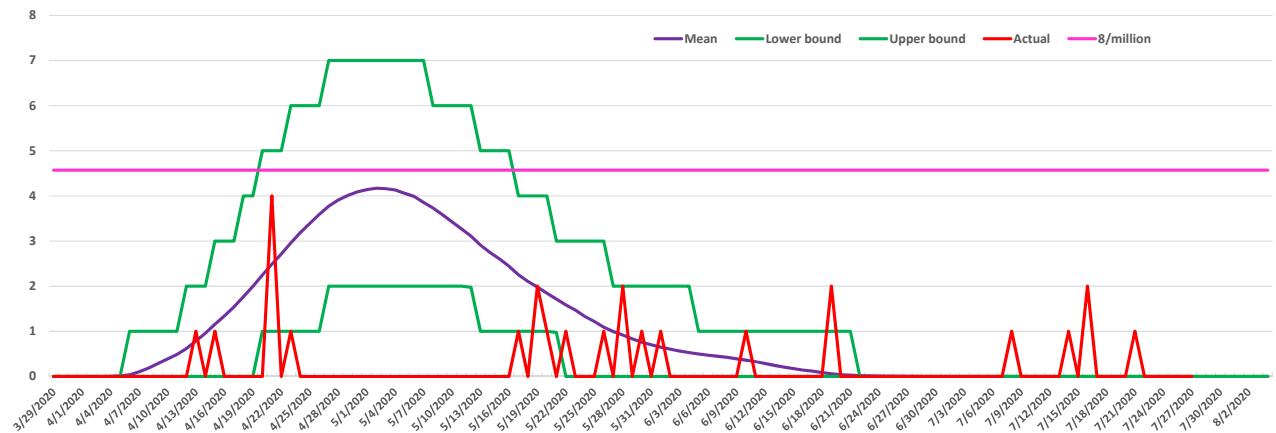
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Utah COVID 19 Daily Death Projections March 26



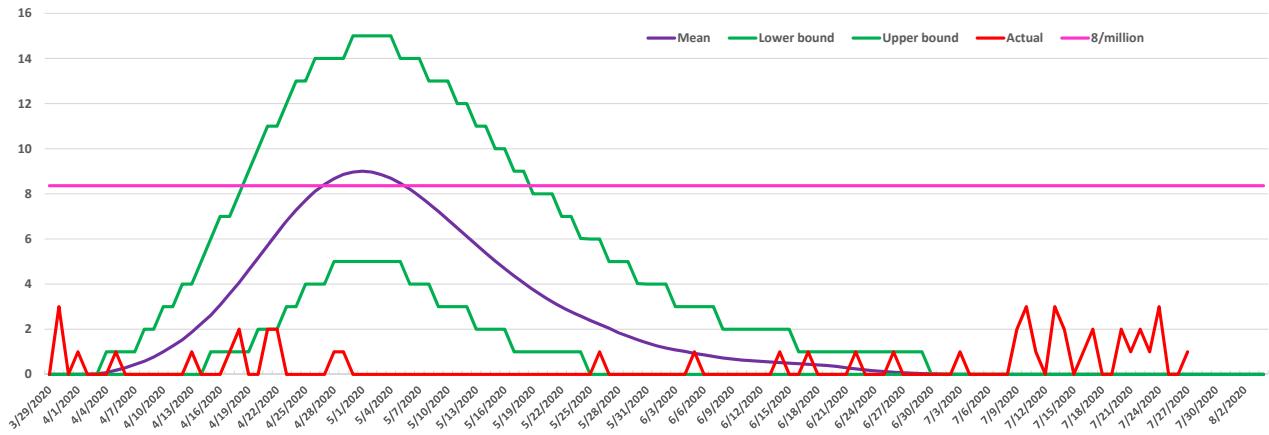
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Wyoming COVID 19 Daily Death Projections March 26



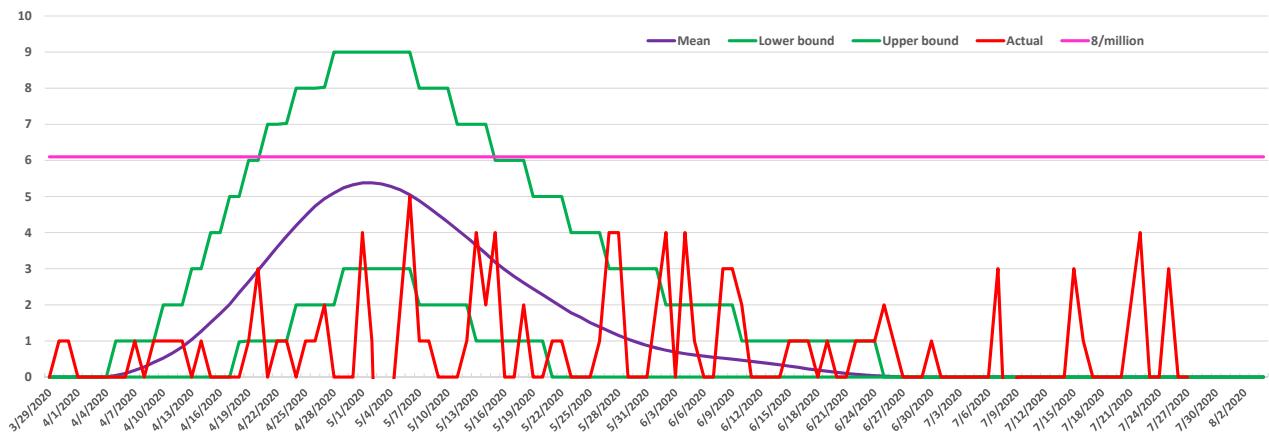
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Montana COVID 19 Daily Death Projections March 26



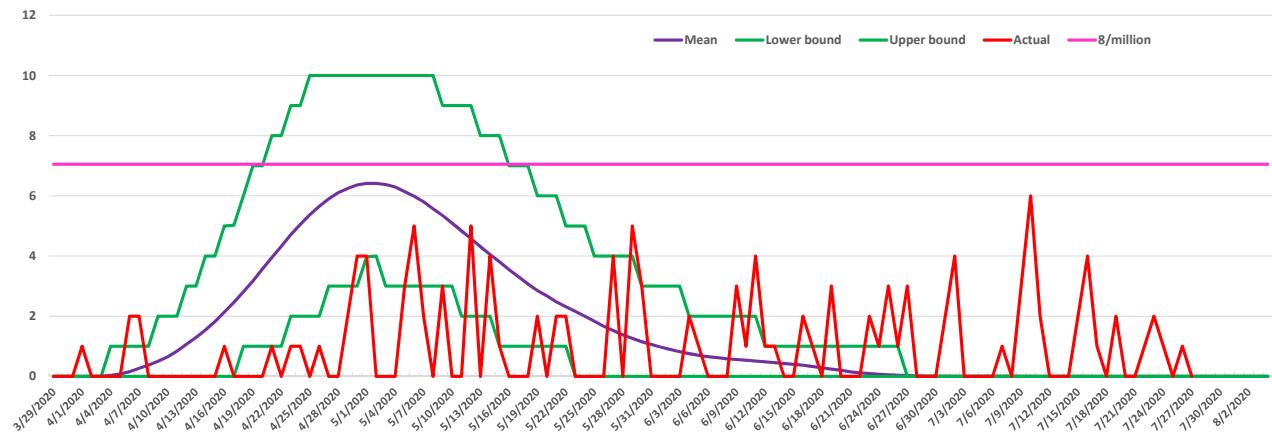
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North Dakota COVID 19 Daily Death Projections March 26



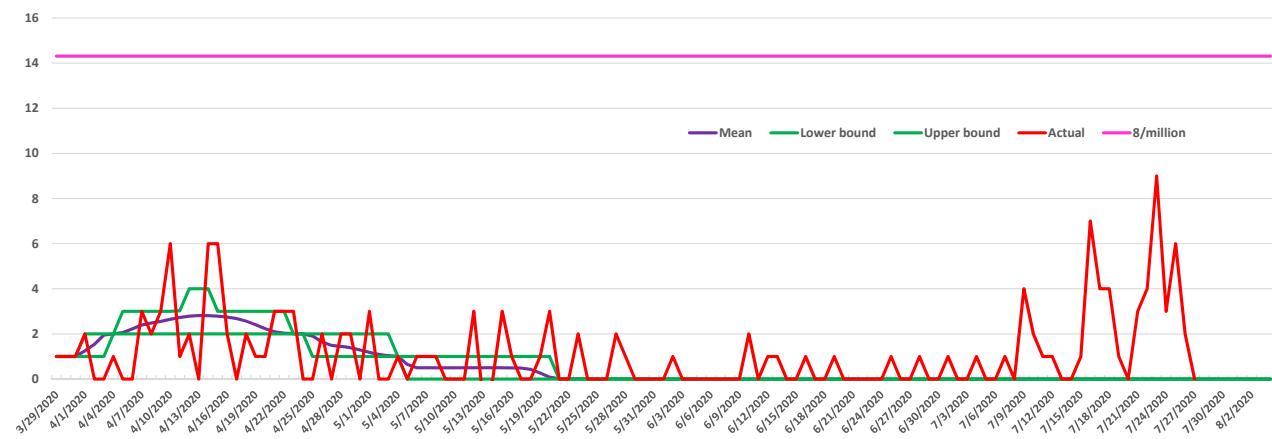
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South Dakota COVID 19 Daily Death Projections March 26



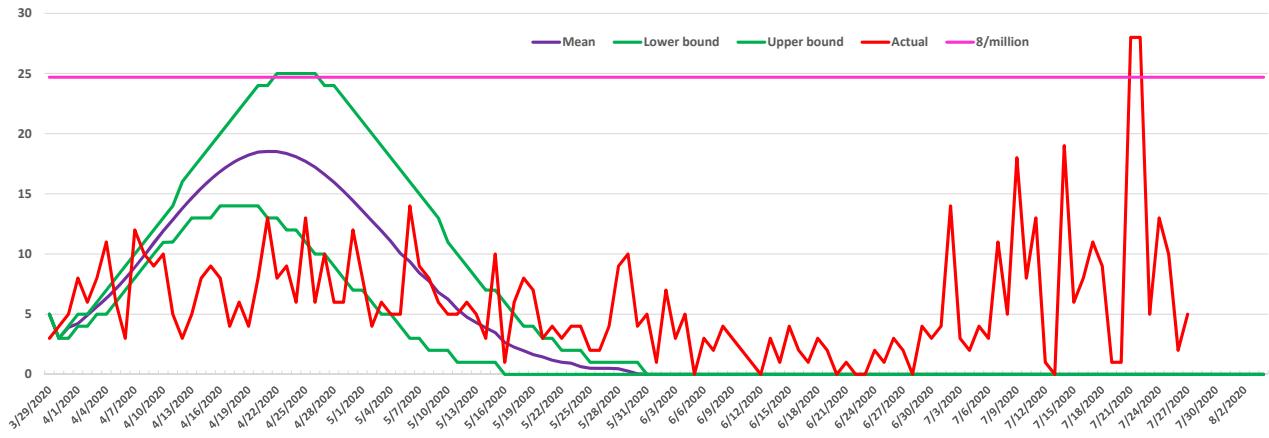
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Idaho COVID 19 Daily Death Projections March 26



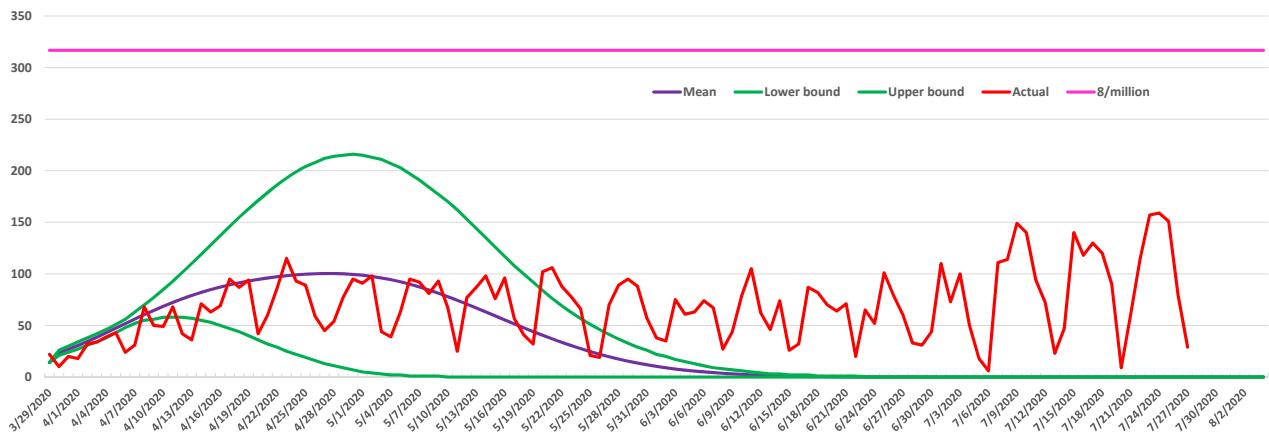
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Nevada COVID 19 Daily Death Projections March 26



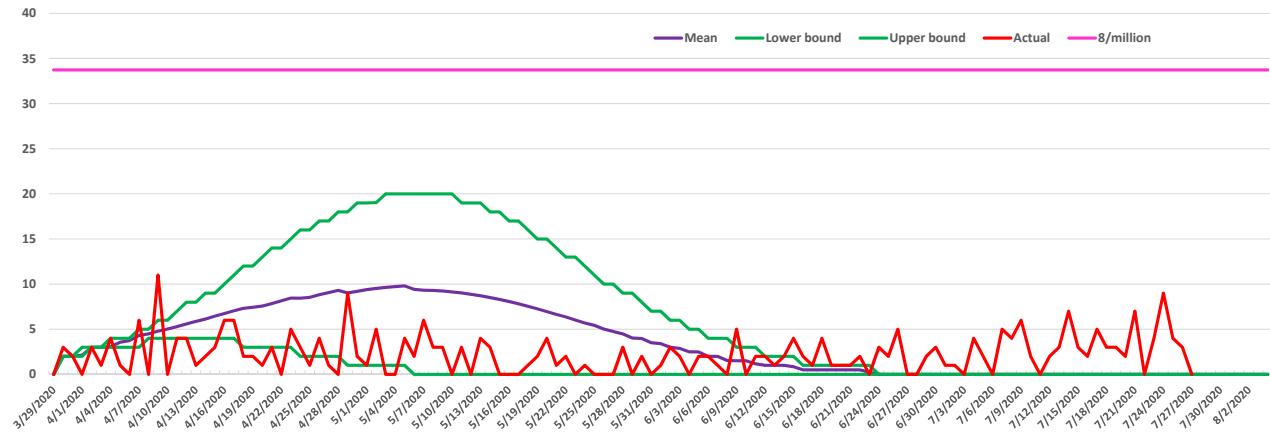
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California COVID 19 Daily Death Projections March 26



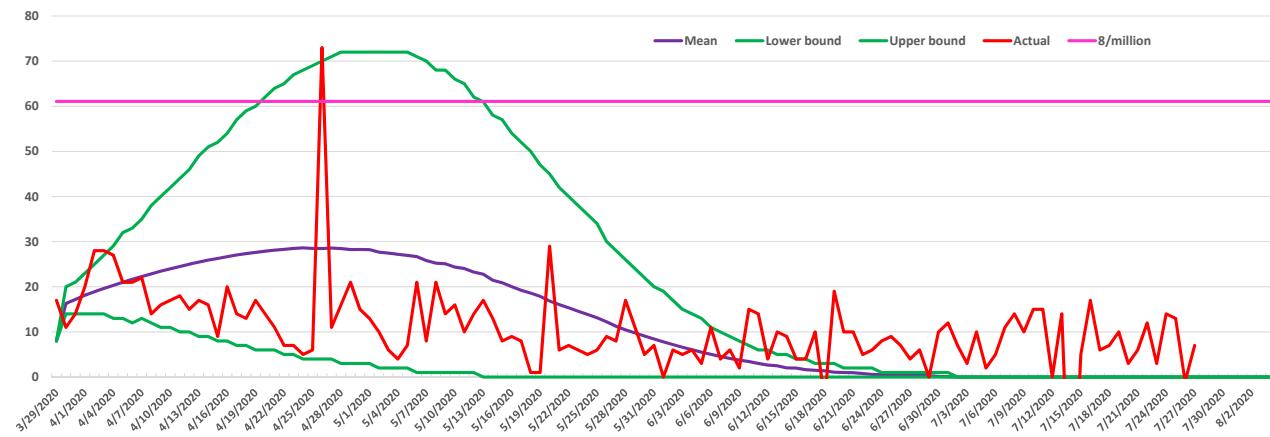
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Oregon COVID 19 Daily Death Projections March 26



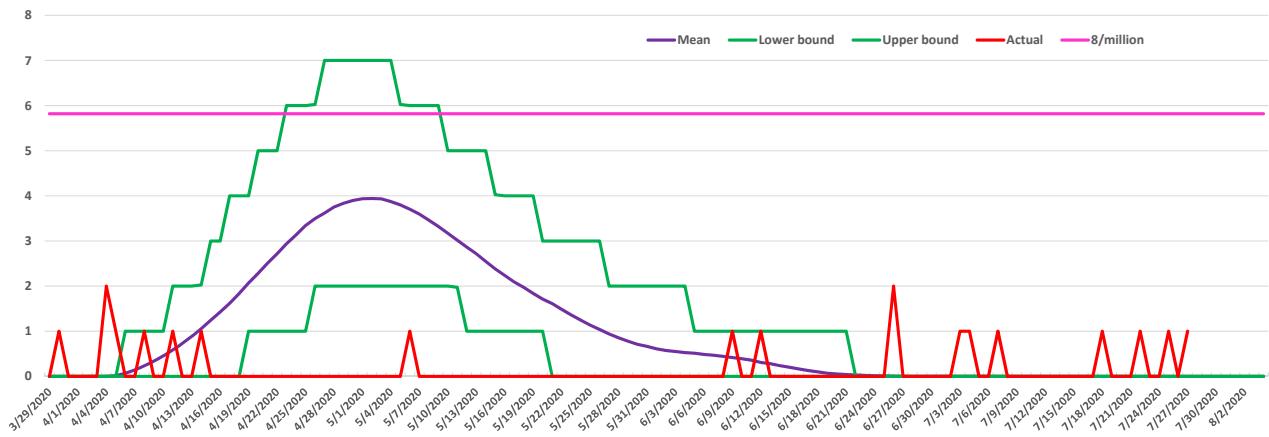
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Washington COVID 19 Daily Death Projections March 26



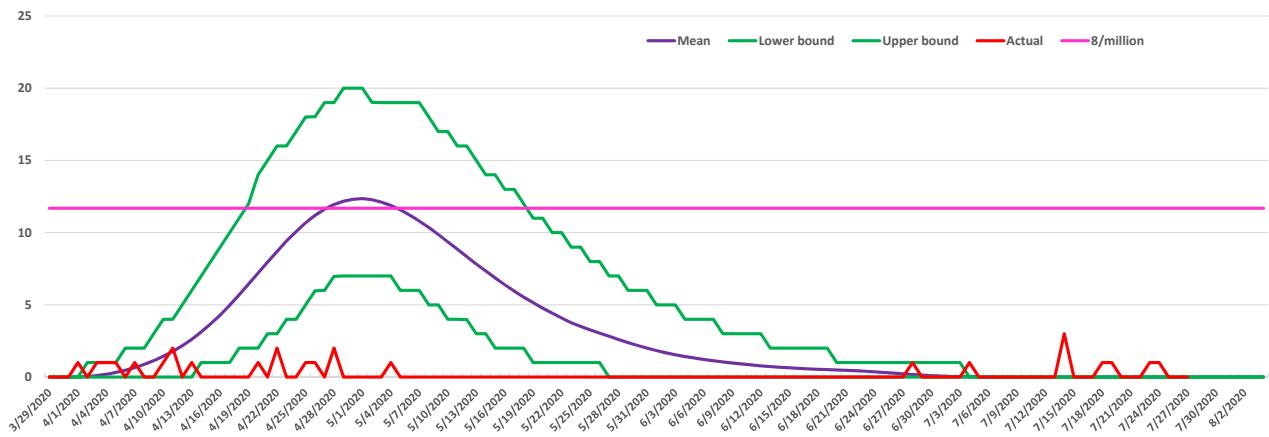
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Alaska COVID 19 Daily Death Projections March 26



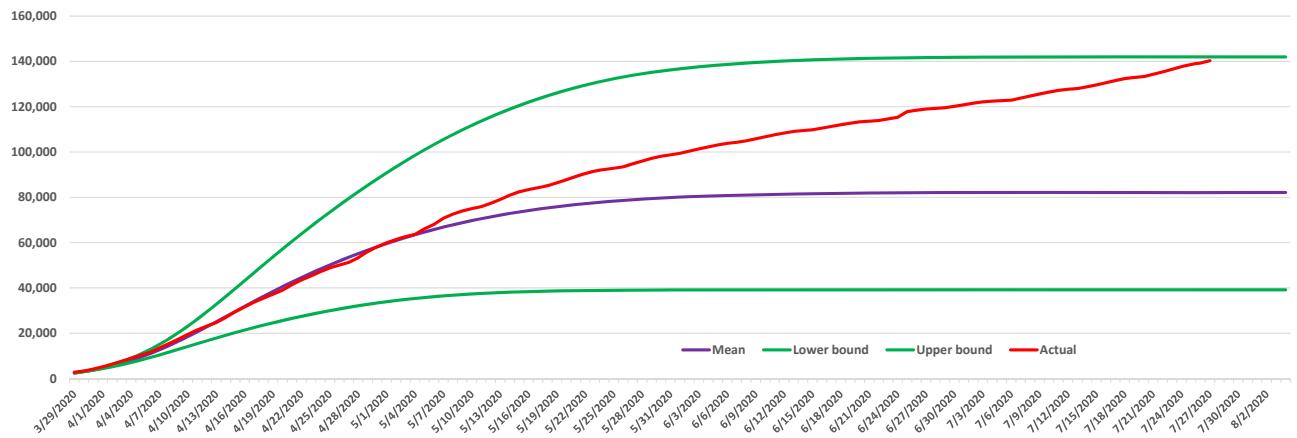
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Hawaii COVID 19 Daily Death Projections March 26



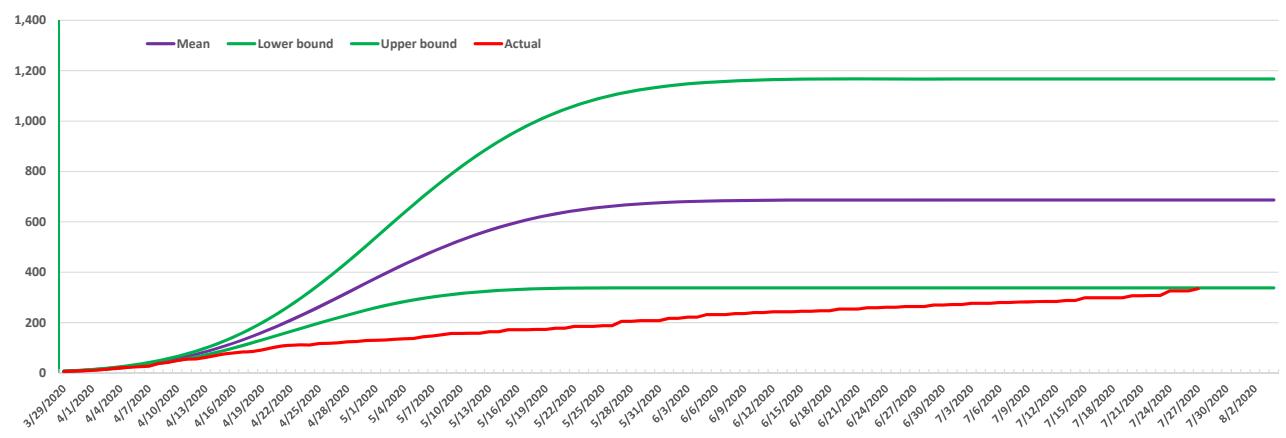
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U.S. COVID 19 Cumulative Death Projections



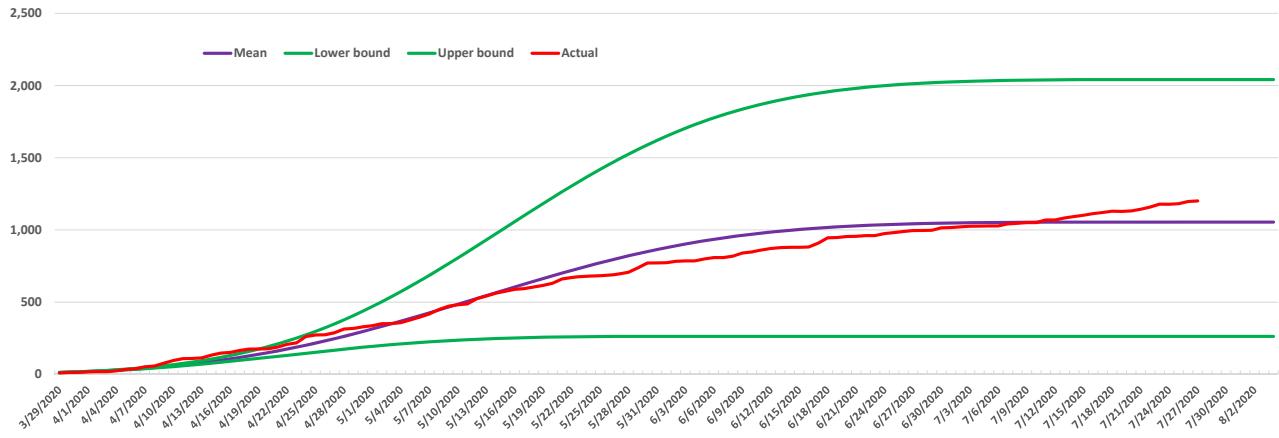
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Kansas COVID 19 Cumulative Death Projections



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Missouri COVID 19 Cumulative Death Projections March 26



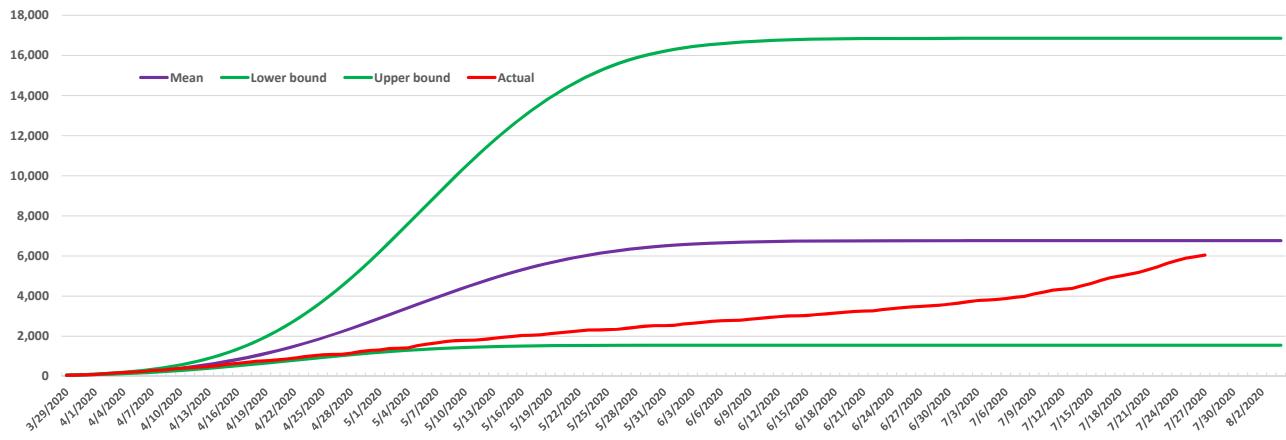
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New York COVID 19 Cumulative Death Projections



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Florida COVID 19 Cumulative Death Projections March 26



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Cumulative Death Projections

- Comparing July 28th cumulative deaths with the original IMHE projections
- Seventeen states are above the mean and above the 95% confidence interval
 - Arizona, California, Connecticut, Georgia, Idaho, Illinois, Indiana, Iowa, Louisiana, Maryland, Massachusetts, Michigan, New Jersey, New York, Ohio, Pennsylvania, Rhode Island
- Nine states are above the mean but within the 95% confidence interval
 - Kentucky, Missouri, New Mexico, Nevada, New Hampshire, North Carolina, South Carolina, Texas, Virginia
- Fourteen states are below the mean but within the 95% confidence interval
 - Alabama, Delaware, Florida, Minnesota, Mississippi, Nebraska, North Dakota, Oregon, South Dakota, Tennessee, Utah, Vermont, Washington, Wisconsin
- Ten states are below the mean and below the 95% confidence interval
 - Alaska, Arkansas, Colorado, Hawaii, Kansas, Maine, Montana, Oklahoma, West Virginia, Wyoming



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Concluding Thoughts

- The distribution of death by age group for COVID 19 continues to be similar to the distribution of death from all causes
- The U.S. COVID-19 infection rate is 1.35% of the population
- Since June 29th the trend in daily death has increased by 18.47 deaths per day
- Using IHME's metric of 8 deaths per million as a indicator for reduced economic activity, only five states are above that metric during the last week; Alabama, Arizona, Mississippi, Nevada, and South Carolina
- Nineteen states have had a decreasing trend for daily deaths, twenty-eight have experienced an increasing trend
- The U.S. Cumulative Death Total through July 28th is above the mean but within the 95% confidence band



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Kansas COVID Deaths by Age Group

Age Group	Number of Deaths	Percent of COVID Deaths	2018 Mortality Rates
15-24	1	0.3%	1.2%
25-34	3	0.9%	1.8%
35-44 years	6	1.8%	2.5%
45-54 years	18	5.4%	4.8%
55-64 years	45	13.4%	12.8%
65-74 years	69	20.6%	18.2%
75-84 years	76	22.7%	23.4%
85+ years	117	34.9%	34.2%
Total	335	100%	97.6%

<https://www.coronavirus.kdheks.gov/160/COVID-19-in-Kansas>, July 28, 2020

https://www.kdheks.gov/phi/AS_Tables/AS_2018_Tables_and_Figures/general_mortality/Table_E4.pdf, July 28, 2020



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U.S. COVID Deaths by Age Group

Age Group	Number of Deaths	Percent of COVID Deaths	2017 Mortality Rates
15-24 years	190	0.1%	0.2%
25-34 years	935	0.7%	1.1%
35-44 years	2,411	1.9%	2.1%
45-54 years	6,566	5.0%	6.0%
55-64 years	15,880	12.3%	13.2%
65-74 years	27,167	20.9%	18.9%
75-84 years	34,399	26.4%	23.4%
85+ years	42,666	32.8%	31.2%
Total	121,374	99.97%	98.87%

<https://data.cdc.gov/NCHS/Provisional-COVID-19-Death-Counts-by-Sex-Age-and-S/9bhg-hcku>, July 28, 2020



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Kansas COVID and General Mortality by Age Group

Age Group	COVID Deaths	COVID Deaths per 1000	2018 Mortality Rate per 1000
Under 1 year	0	0.00	6.3
1-24 years	1	0.00	1.2
25-34 years	3	0.01	1.3
35-44 years	6	0.02	1.9
45-54 years	18	0.05	3.9
55-64 years	45	0.12	9.3
65-74 years	69	0.26	18.9
75-84 years	76	0.57	47.5
85+ years	117	1.79	142.1

<https://www.coronavirus.kdheks.gov/160/COVID-19-in-Kansas>, July 28, 2020

https://www.kdheks.gov/phi/AS_Tables/AS_2018_Tables_and_Figures/general_mortality/, July 28, 2020



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U.S. COVID and General Mortality by Age Group

Age Group	COVID Deaths	COVID Deaths per 1000	2018 Mortality Rate per 1000
Under 1 year	11	0.00	5.67
1-14 years	25	0.00	0.17
15-24 years	190	0.00	0.74
25-34 years	935	0.02	1.33
35-44 years	2,411	0.06	1.95
45-54 years	6,566	0.15	4.02
55-64 years	15,880	0.38	8.86
65-74 years	27,167	0.92	17.91
75-84 years	34,399	2.34	44.73
85+ years	42,666	6.60	135.74

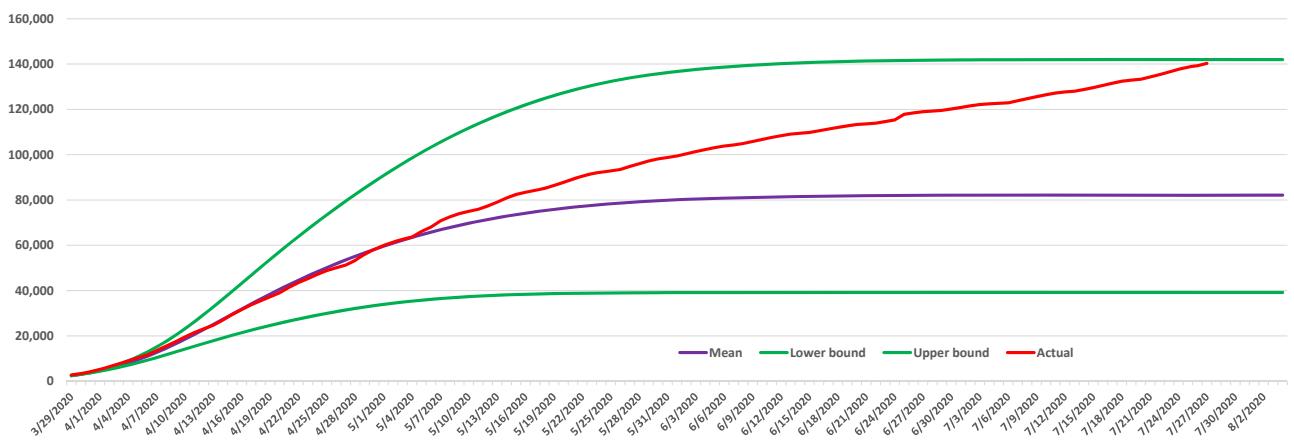
<https://data.cdc.gov/NCHS/Provisional-COVID-19-Death-Counts-by-Sex-Age-and-S/9bhg-hcku>, July 28, 2020



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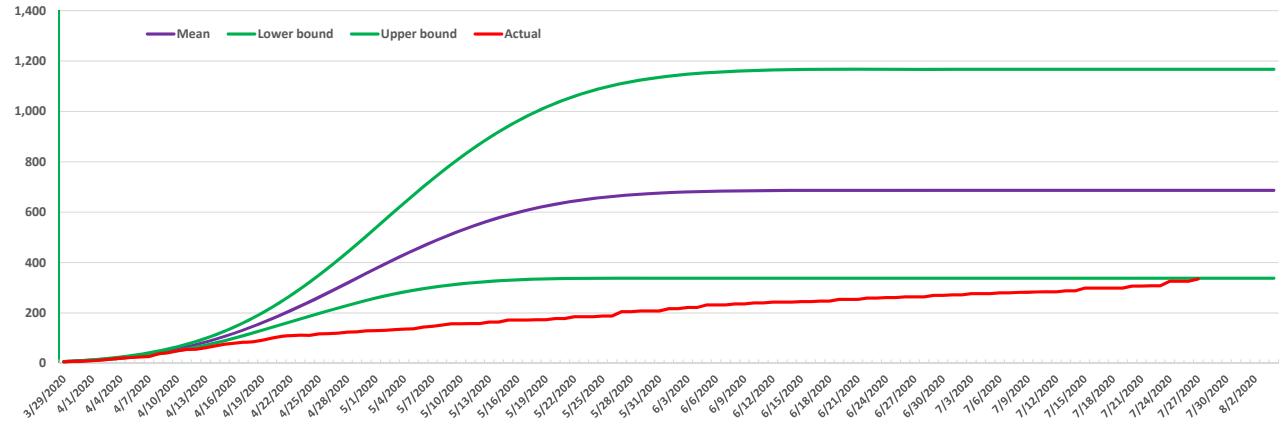
U.S. COVID 19 Cumulative Death Projections



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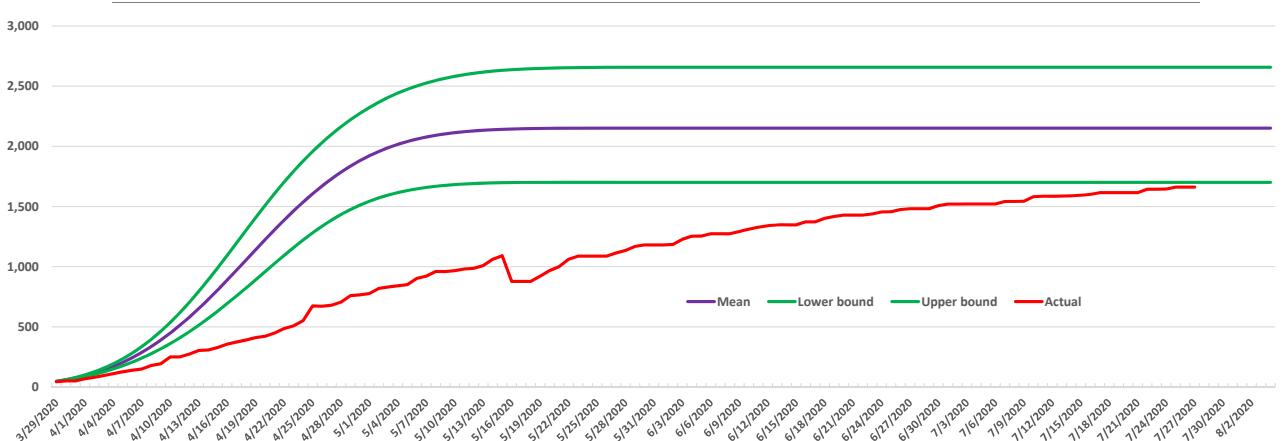
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Kansas COVID 19 Cumulative Death Projections



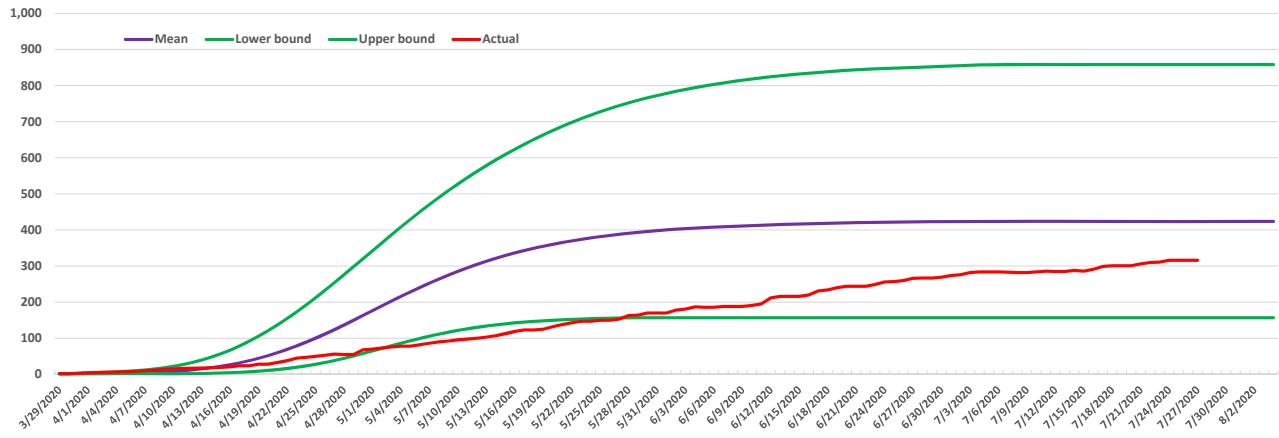
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Colorado COVID 19 Cumulative Death Projections March 26



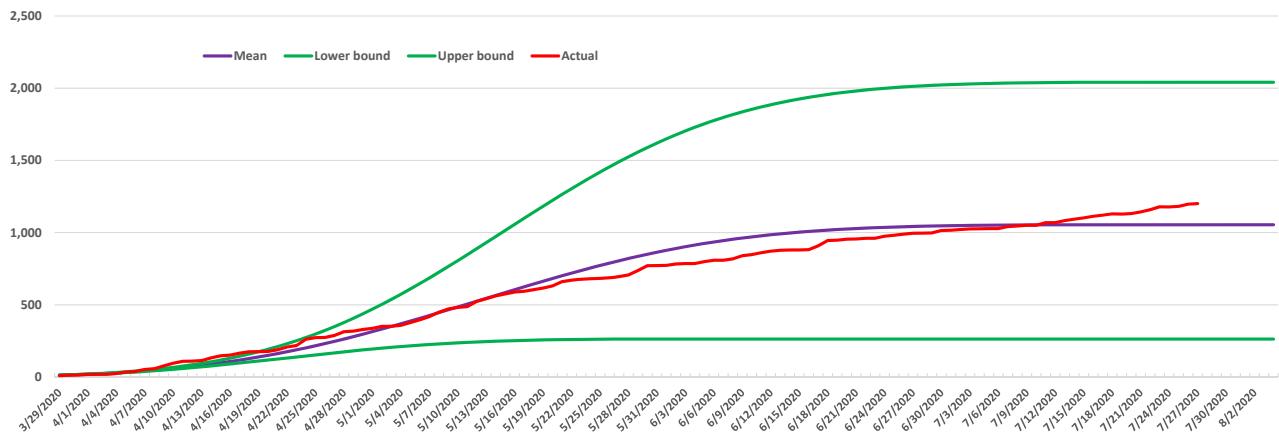
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Nebraska COVID 19 Daily Death Projections March 26



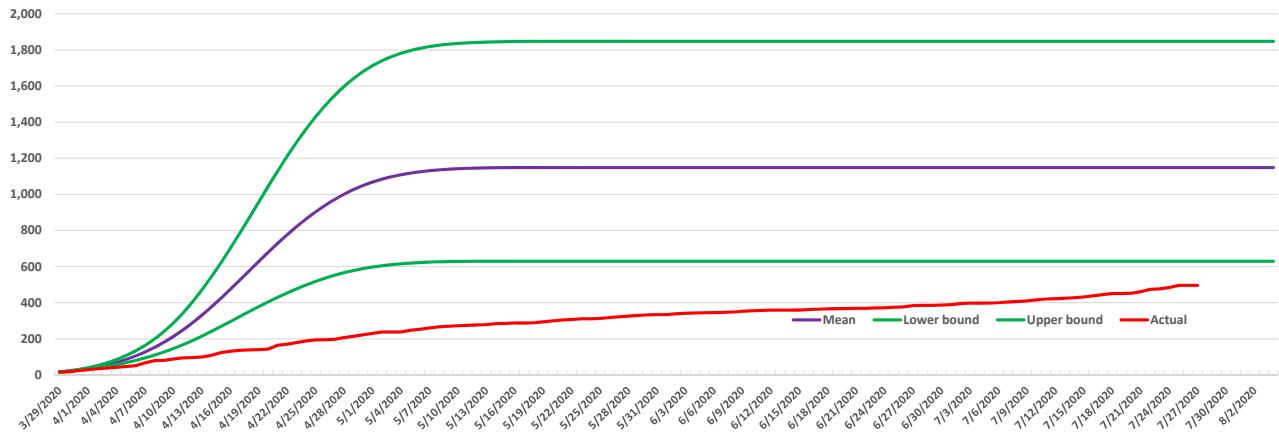
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Missouri COVID 19 Cumulative Death Projections March 26



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Oklahoma COVID 19 Daily Death Projections March 26



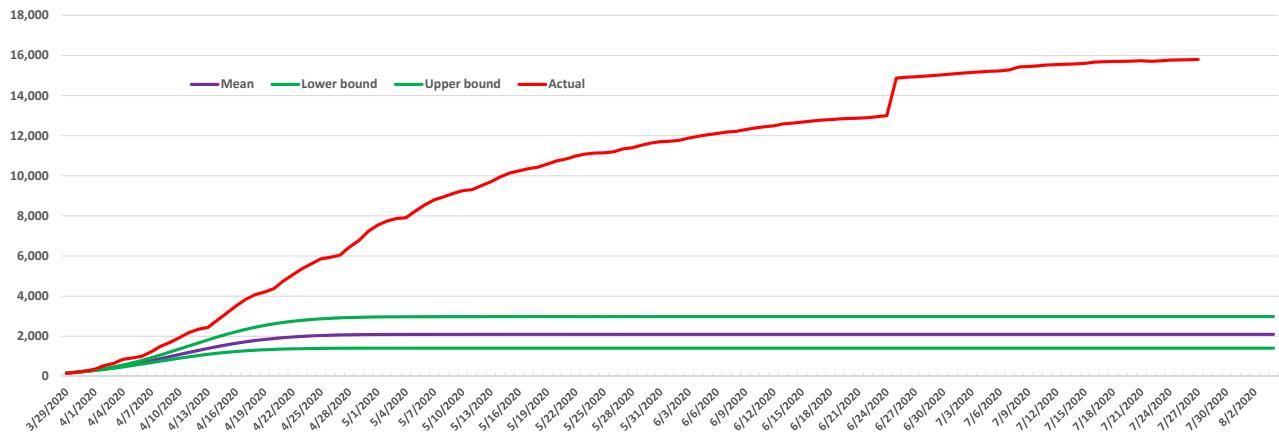
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New York COVID 19 Cumulative Death Projections



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New Jersey COVID 19 Cumulative Death Projections



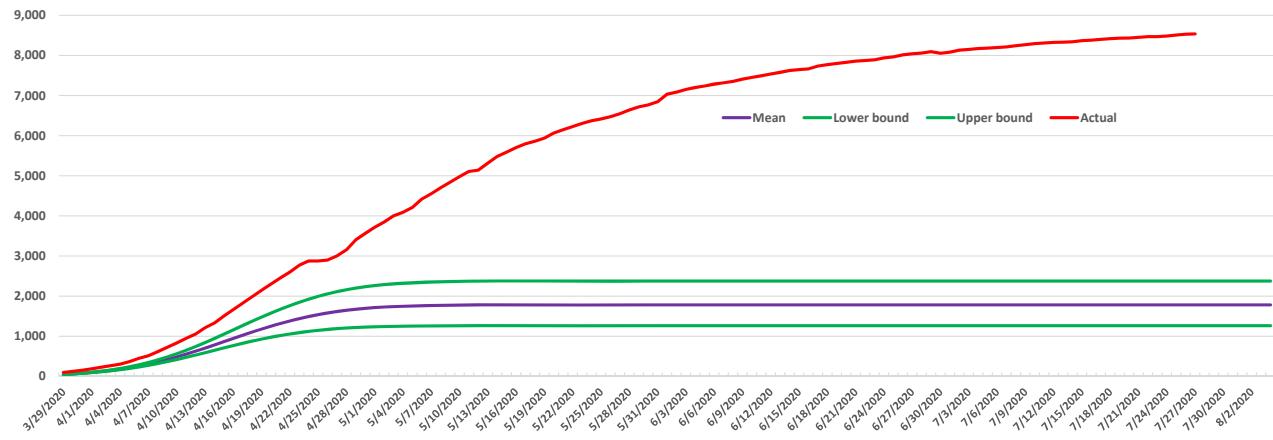
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Connecticut COVID 19 Cumulative Death Projections



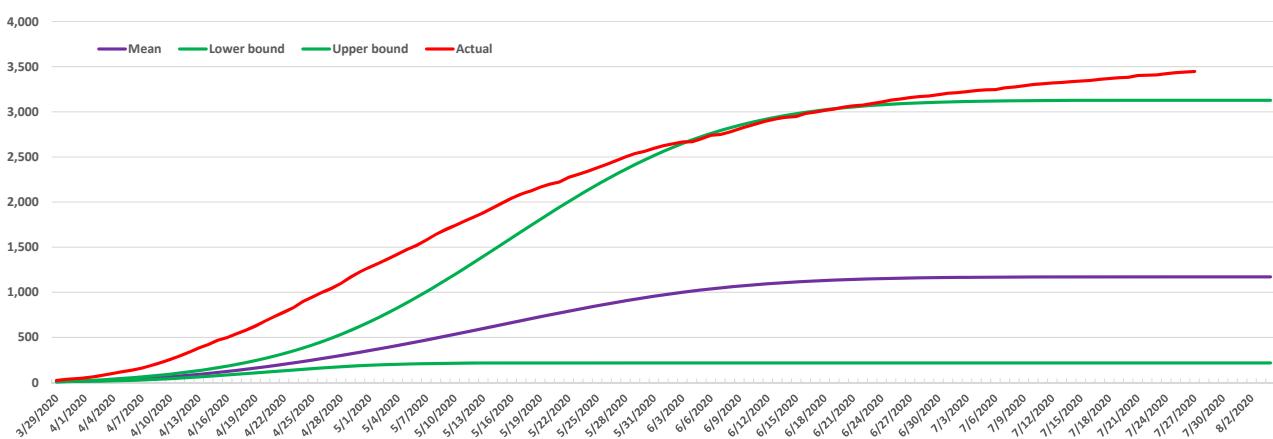
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Massachusetts COVID 19 Cumulative Death Projections



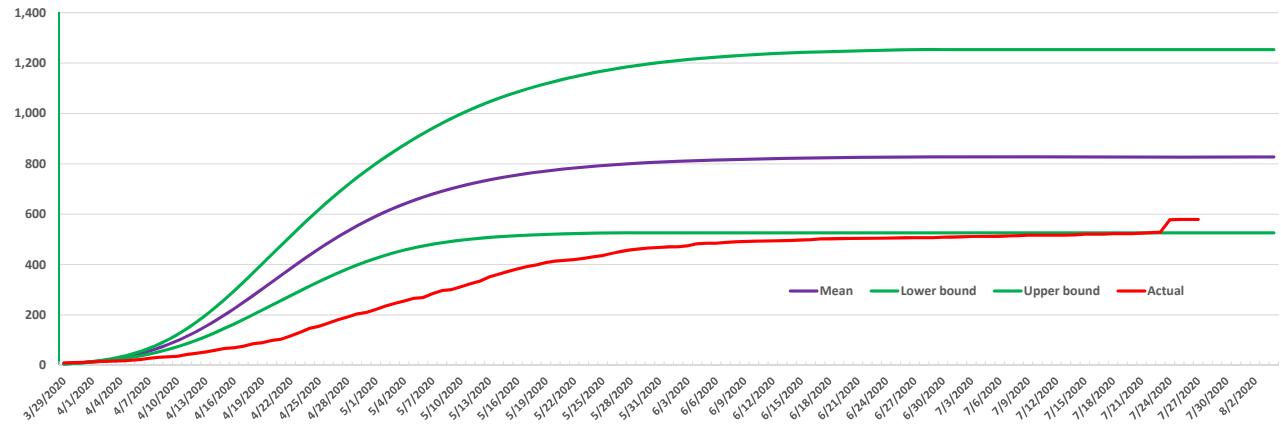
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Maryland COVID 19 Daily Death Projections March 26



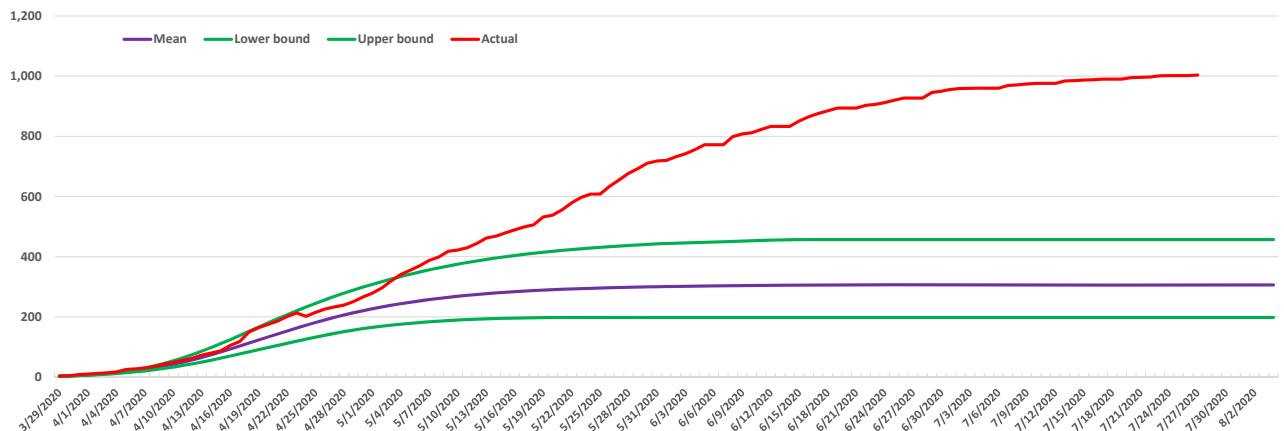
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Delaware COVID 19 Cumulative Death Projections



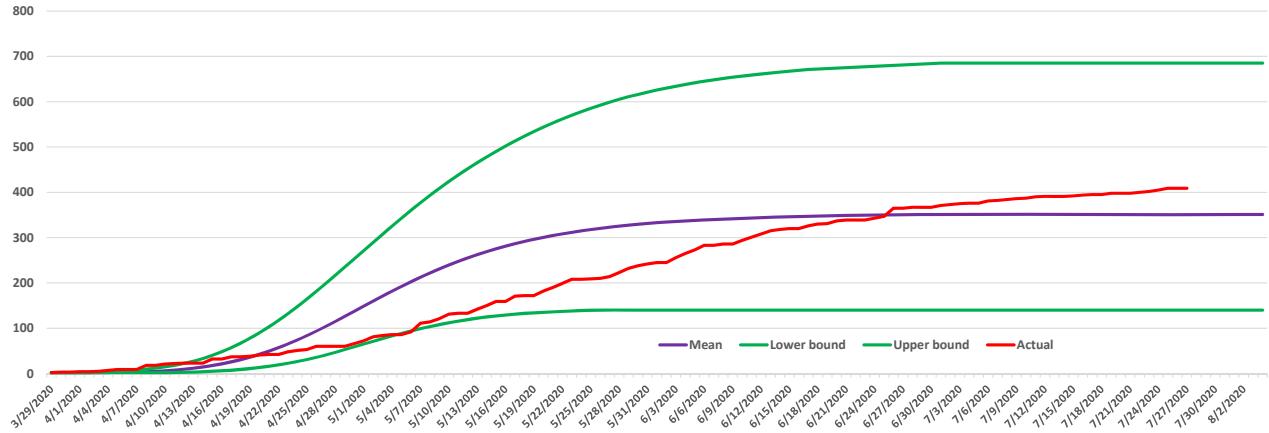
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Rhode Island COVID 19 Cumulative Death Projections March 26



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New Hampshire COVID 19 Cumulative Death Projections



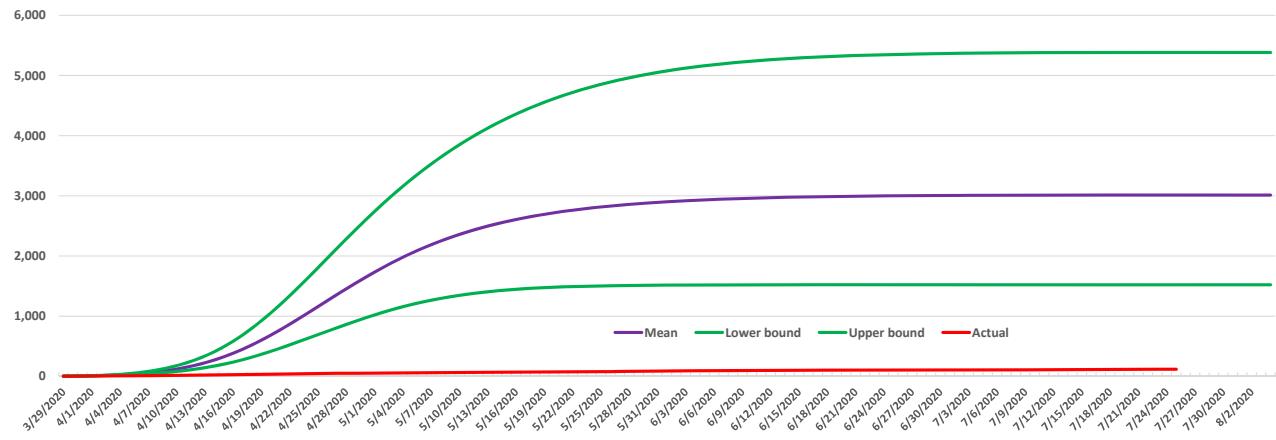
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Vermont COVID 19 Cumulative Death Projections March 26



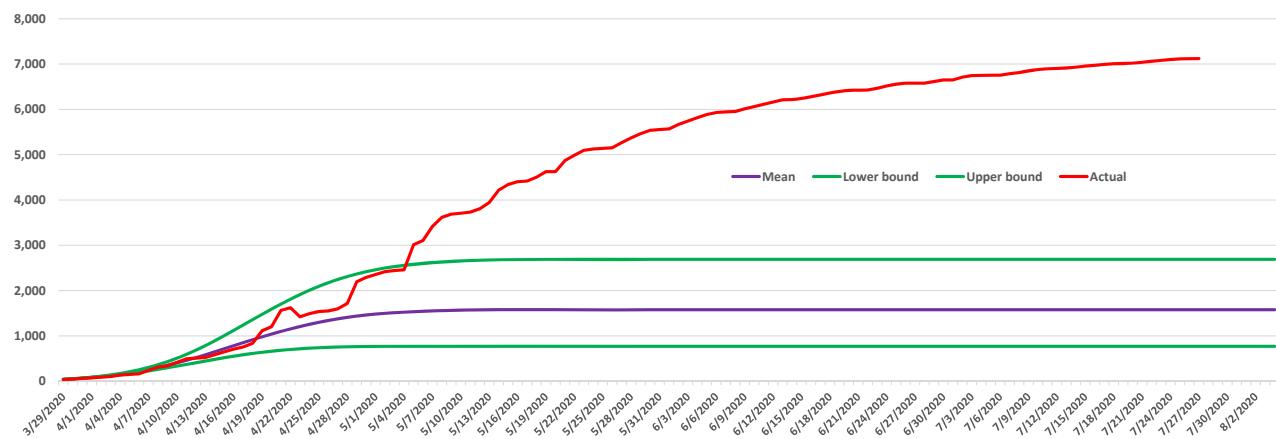
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Maine COVID 19 Cumulative Death Projections



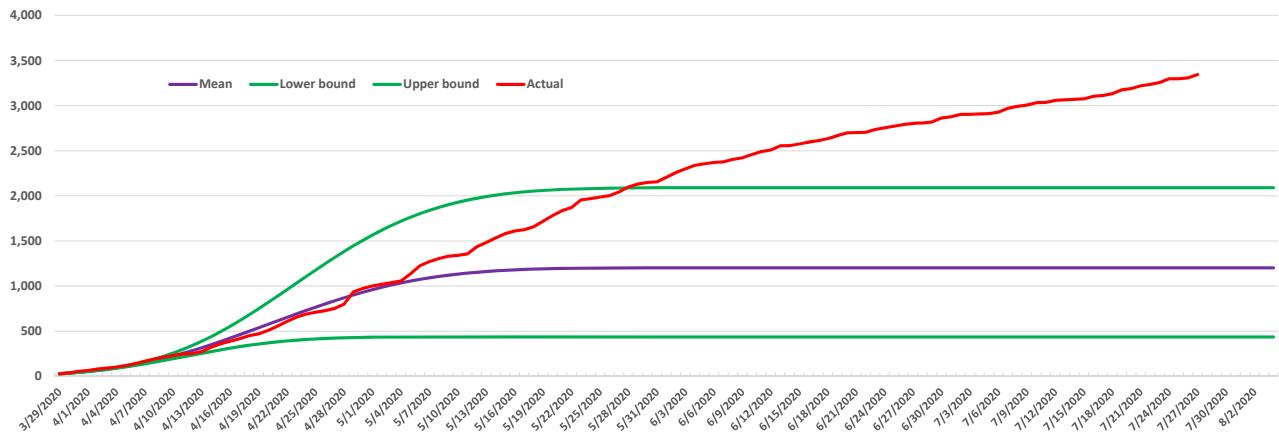
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Pennsylvania COVID 19 Cumulative Death Projections



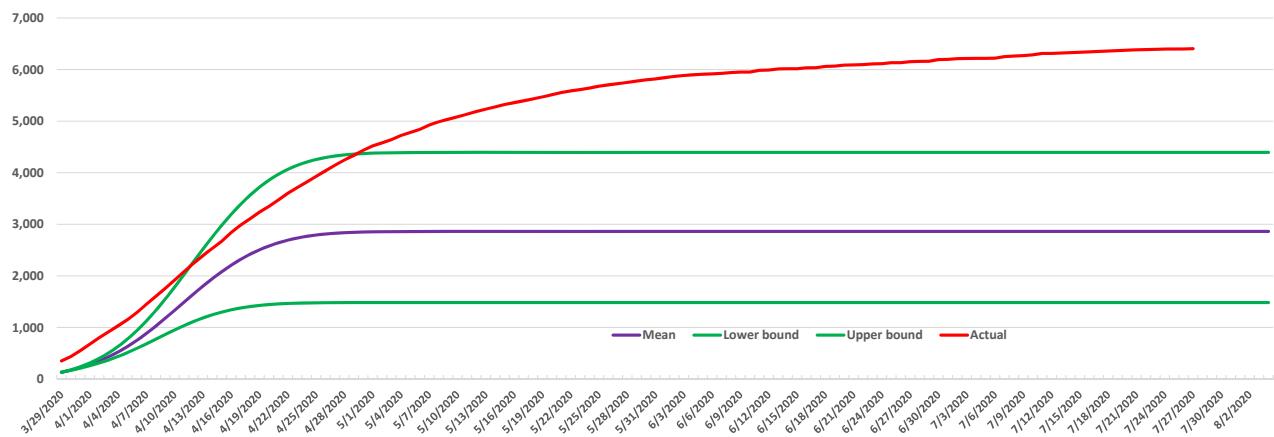
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Ohio COVID 19 Cumulative Death Projections March 26



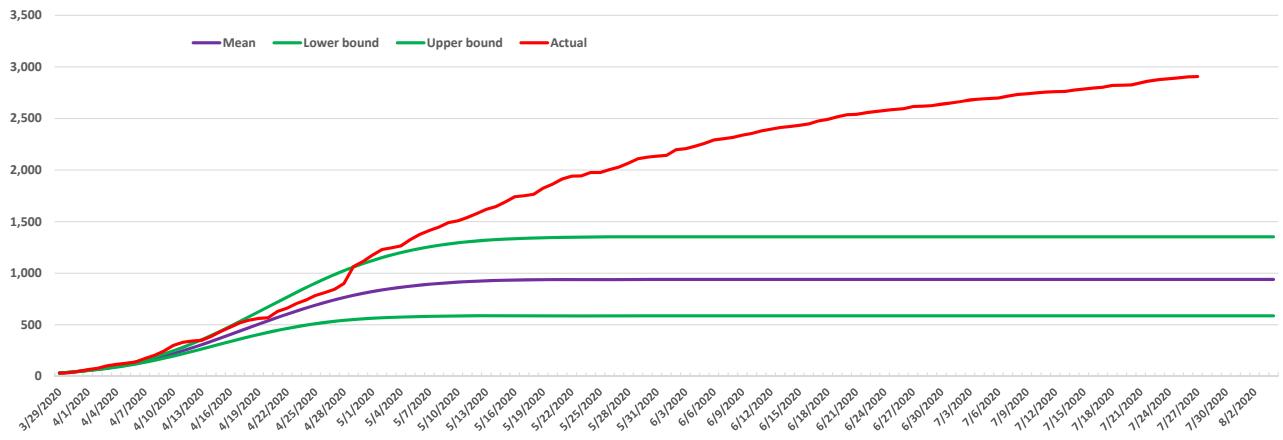
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Michigan COVID 19 Cumulative Death Projections



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Indiana COVID 19 Cumulative Death Projections March 26



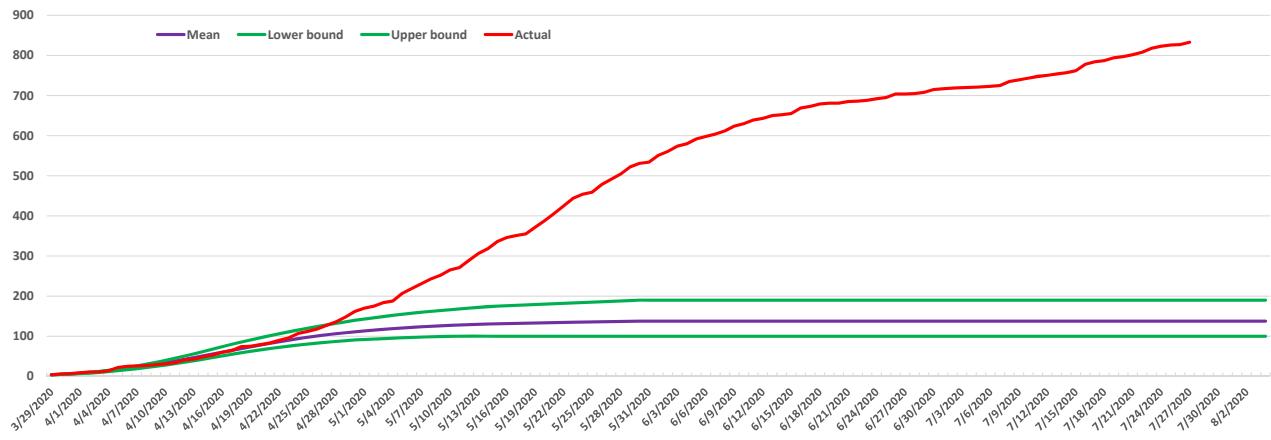
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Illinois COVID 19 Cumulative Death Projections March 26



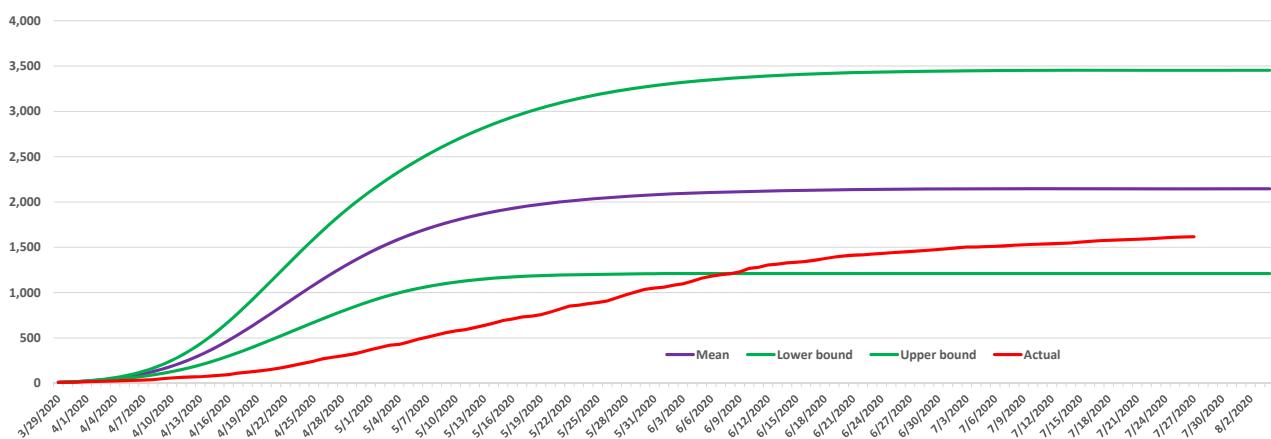
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Iowa COVID 19 Daily Death Projections March 26



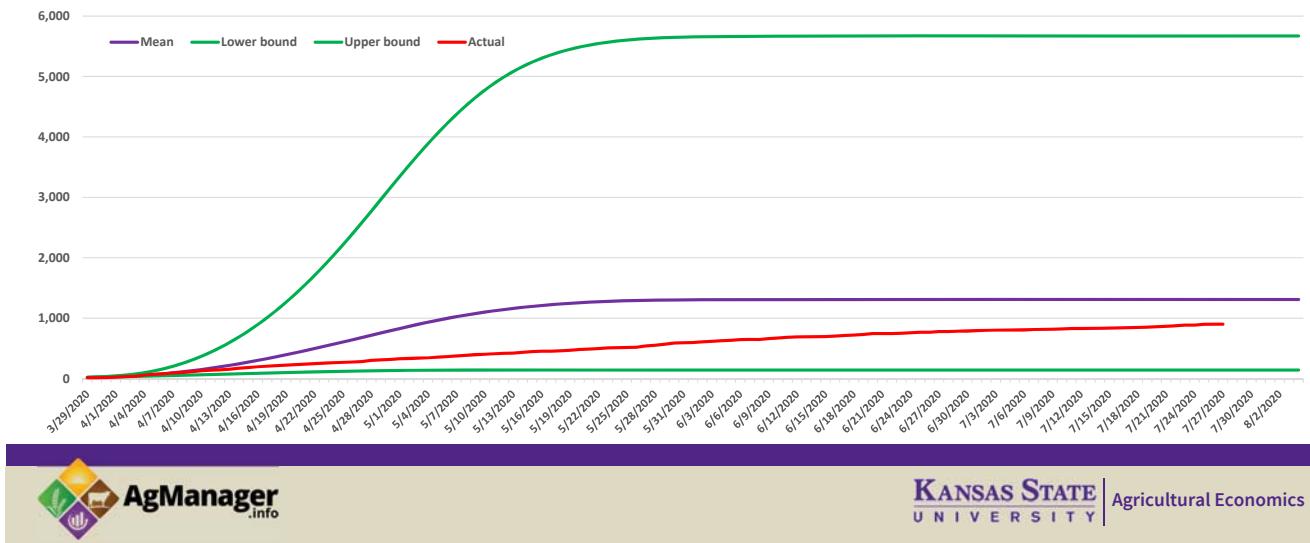
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Minnesota COVID 19 Cumulative Death Projections



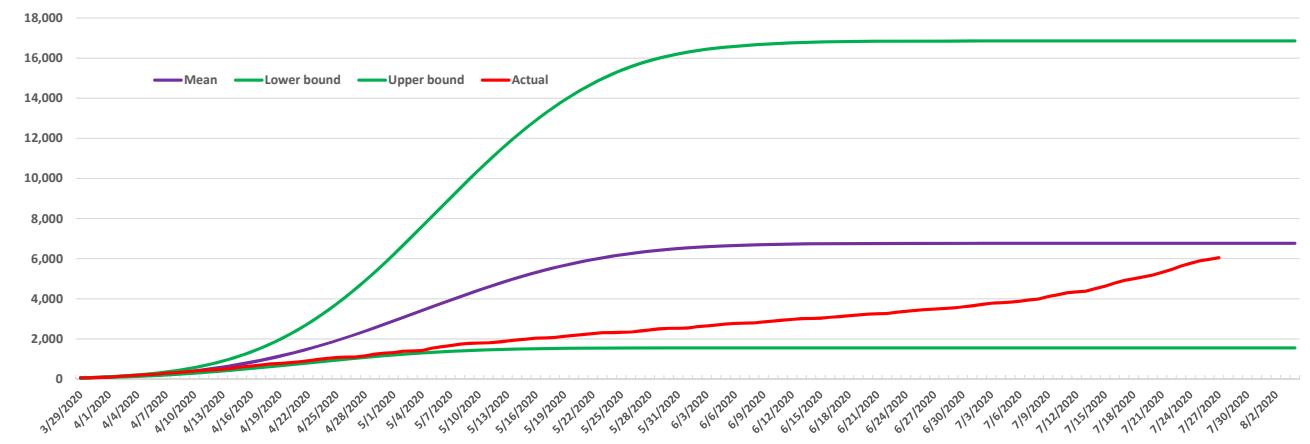
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Wisconsin COVID 19 Cumulative Death Projections



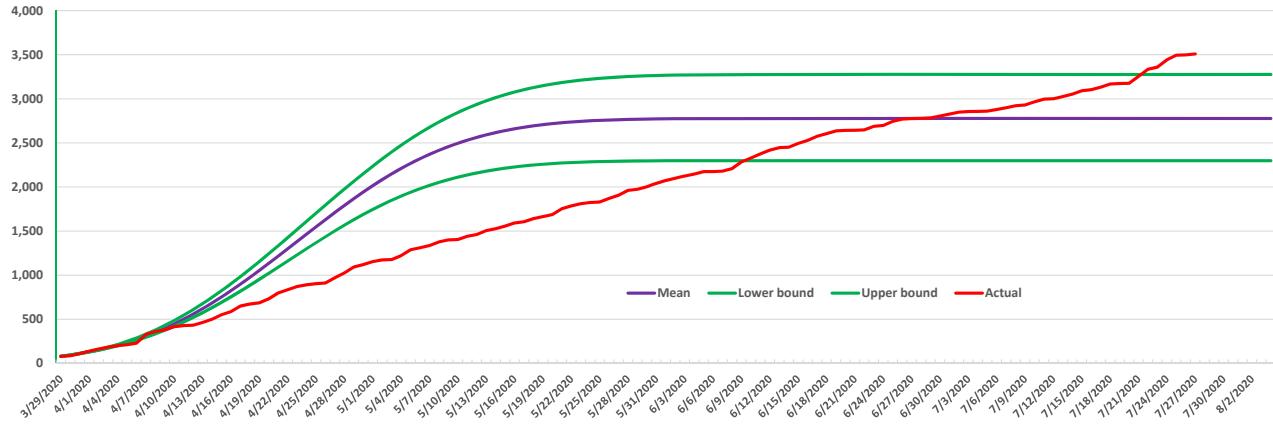
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Florida COVID 19 Cumulative Death Projections March 26



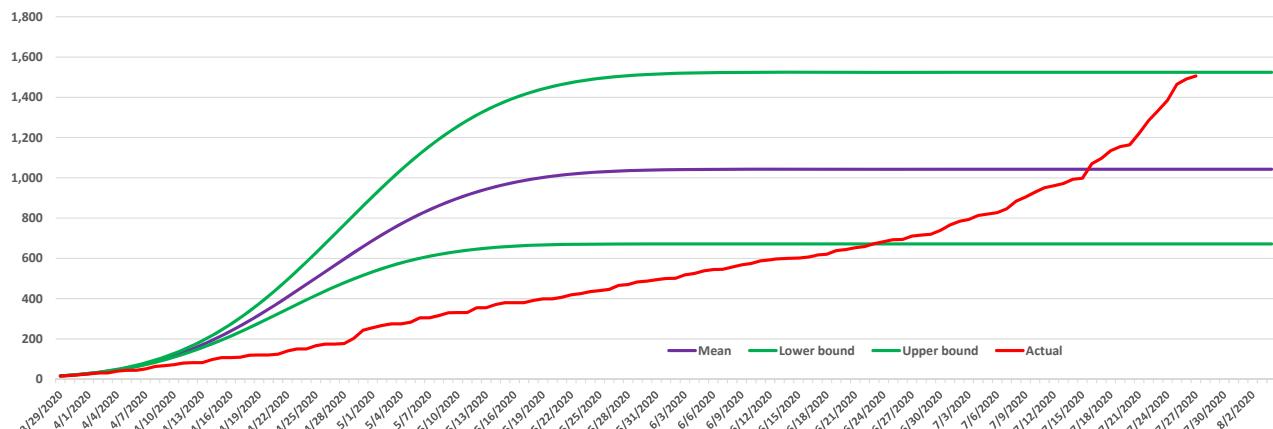
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Georgia COVID 19 Cumulative Death Projections



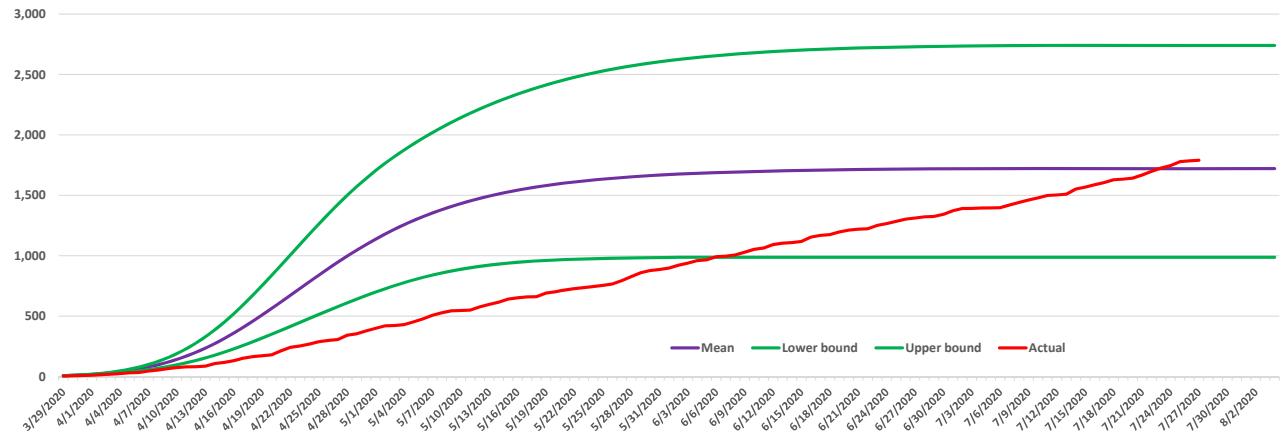
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South Carolina COVID 19 Cumulative Death Projections



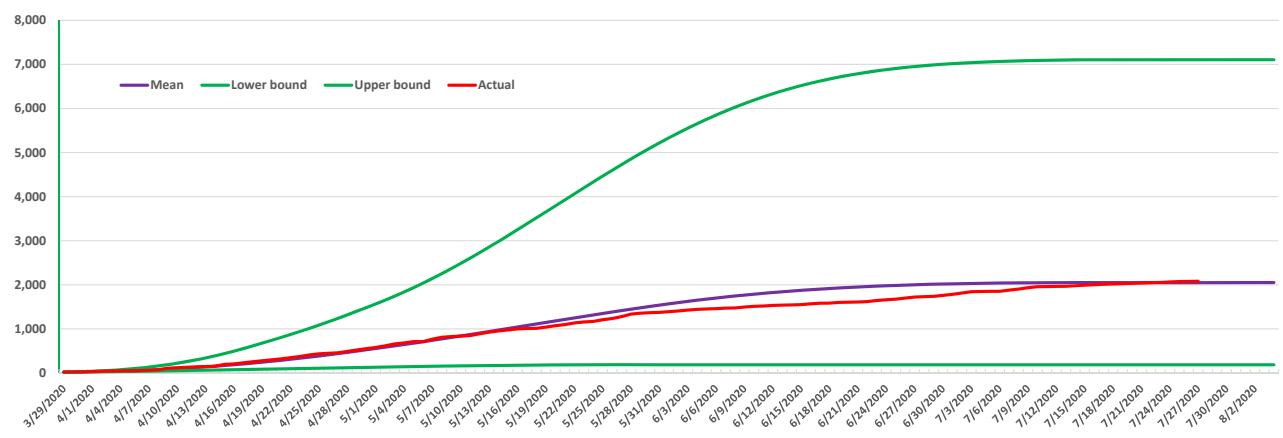
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North Carolina COVID 19 Cumulative Death Projections



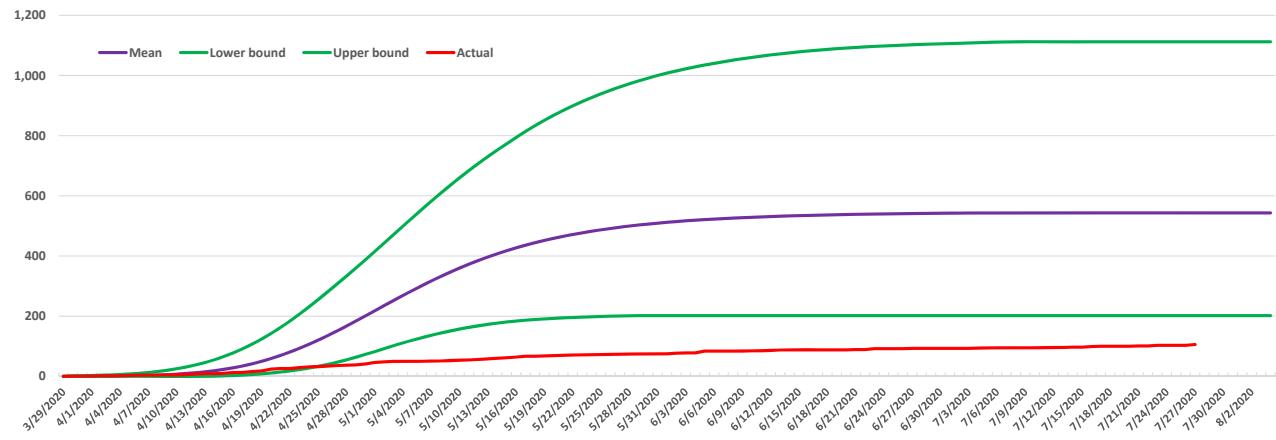
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Virginia COVID 19 Cumulative Death Projections



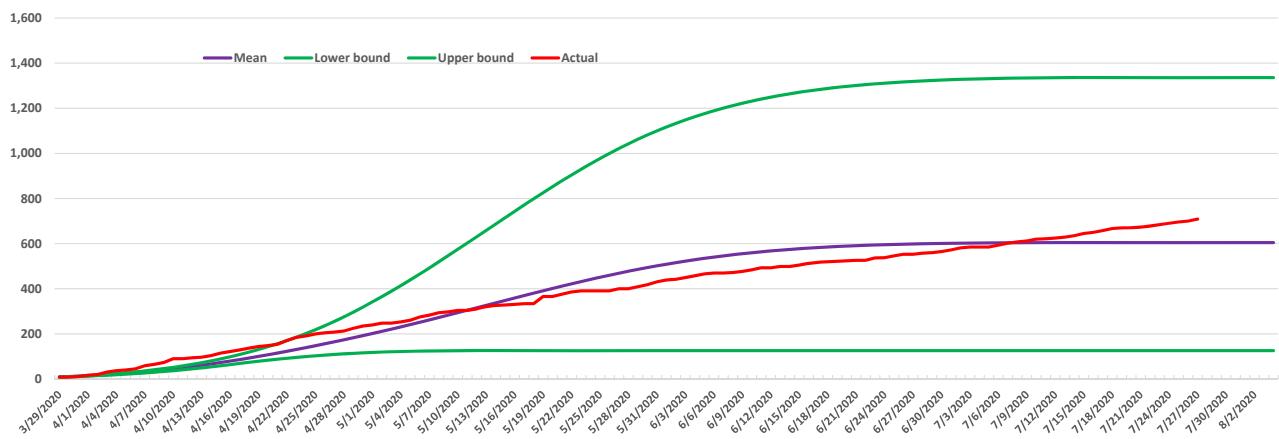
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West Virginia COVID 19 Cumulative Death Projections



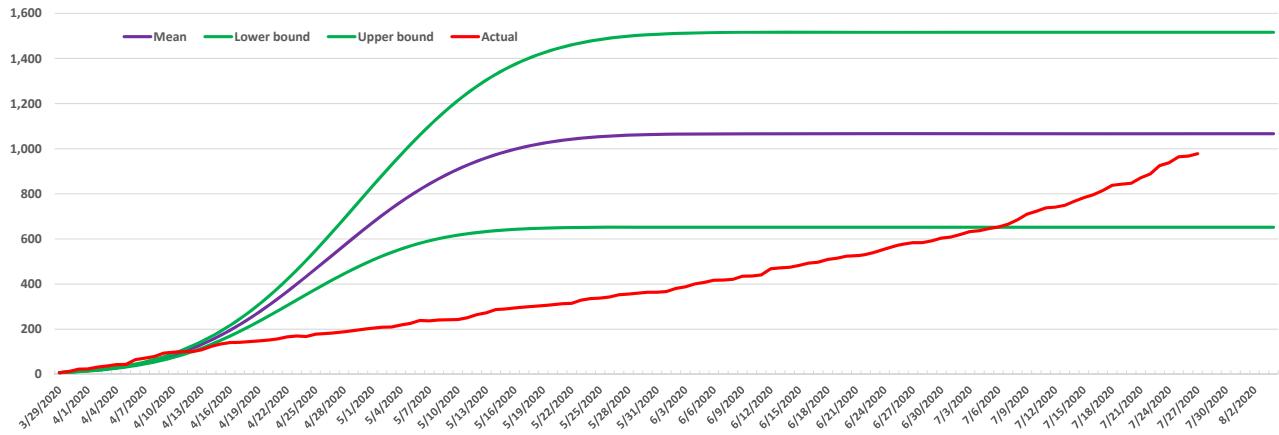
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Kentucky COVID 19 Cumulative Death Projections March 26



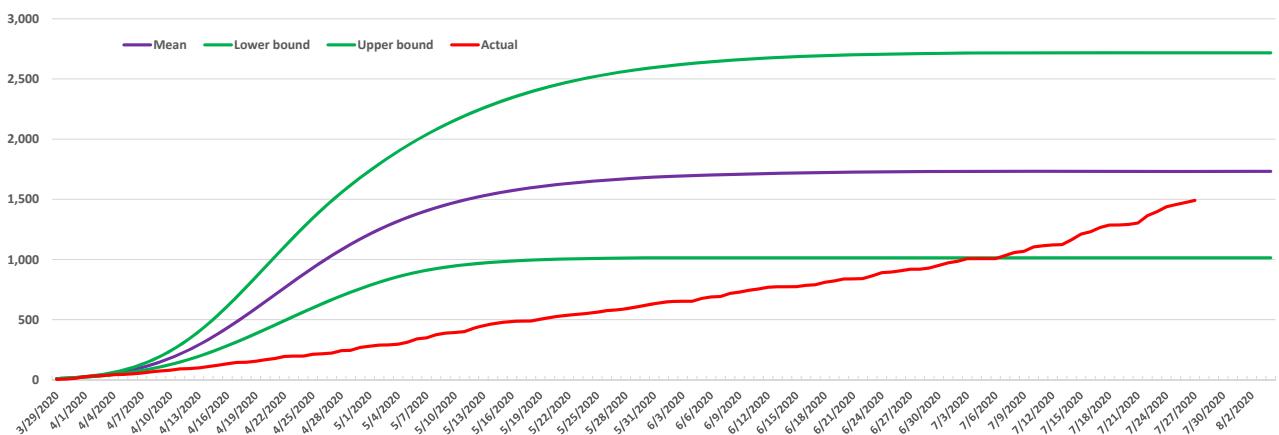
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Tennessee COVID 19 Cumulative Death Projections March 26



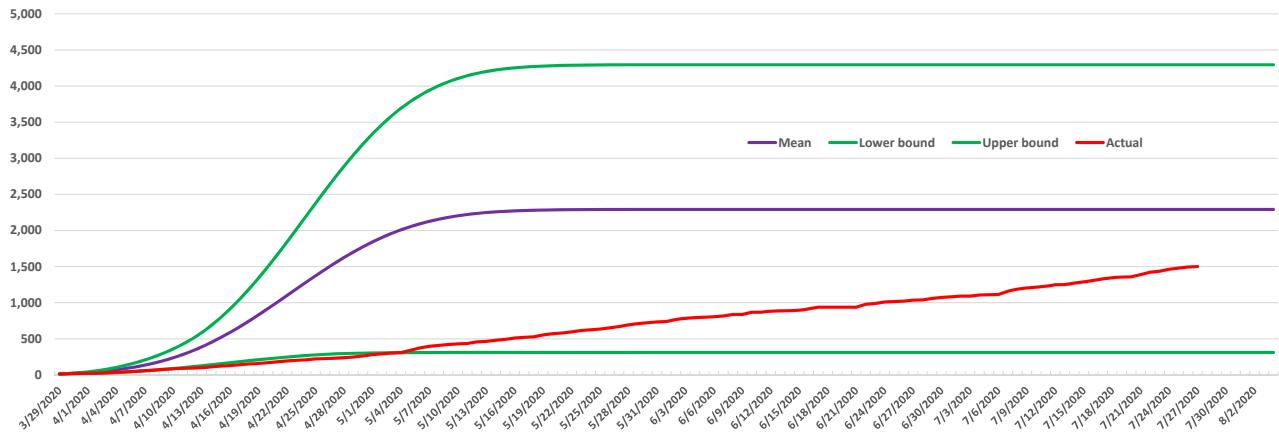
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Alabama COVID 19 Cumulative Death Projections March 26



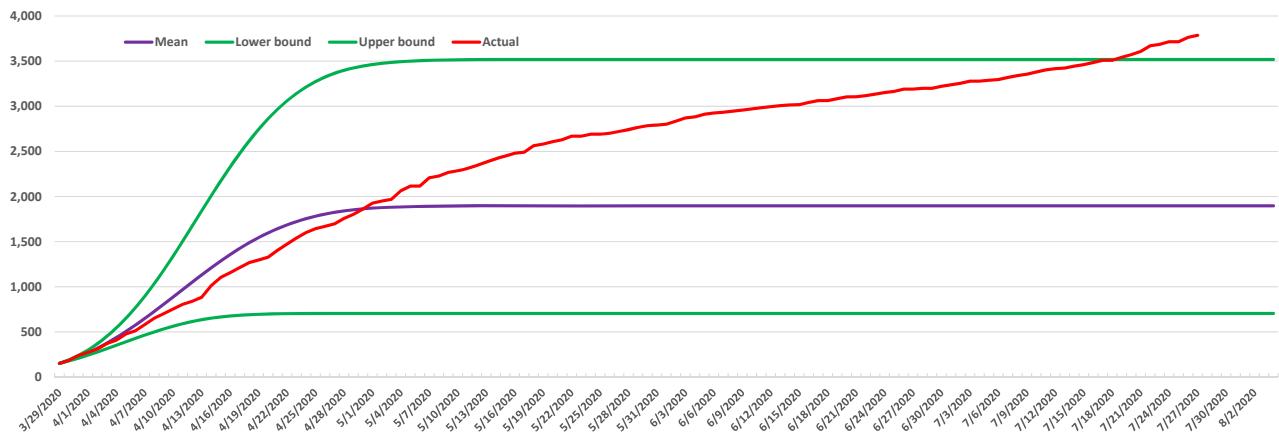
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Mississippi COVID 19 Daily Death Projections March 26



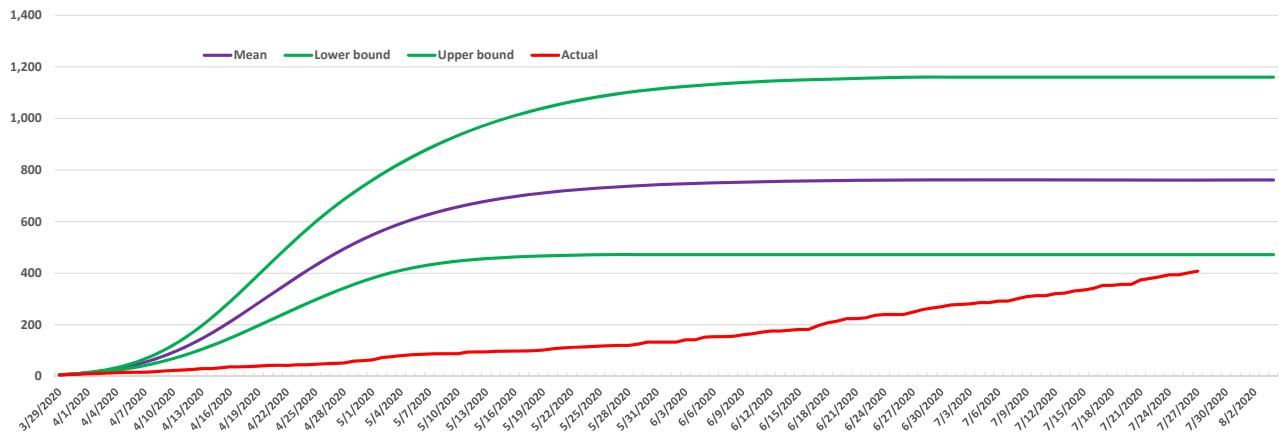
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Louisiana COVID 19 Daily Death Projections March 26



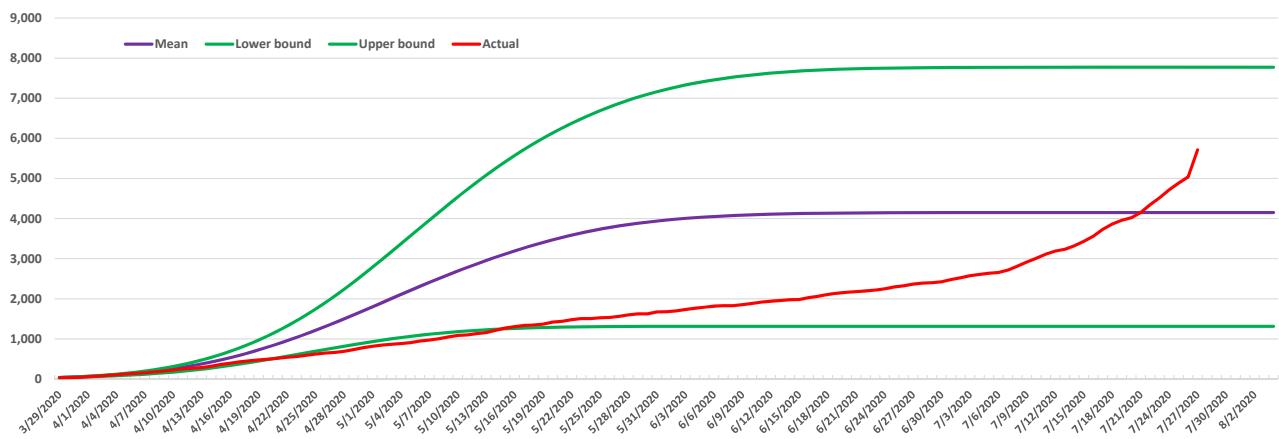
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Arkansas COVID 19 Cumulative Death Projections March 26



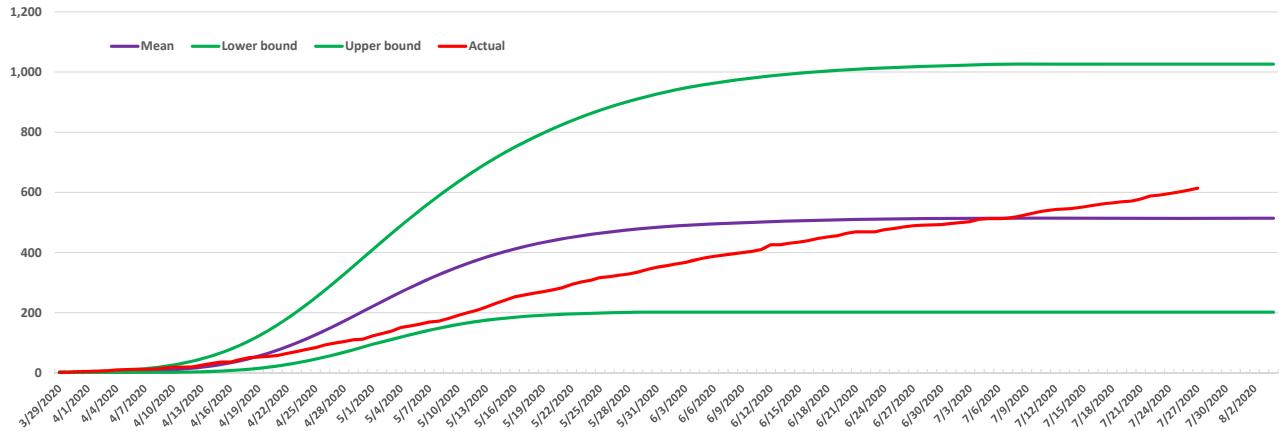
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Texas COVID 19 Daily Death Projections March 26



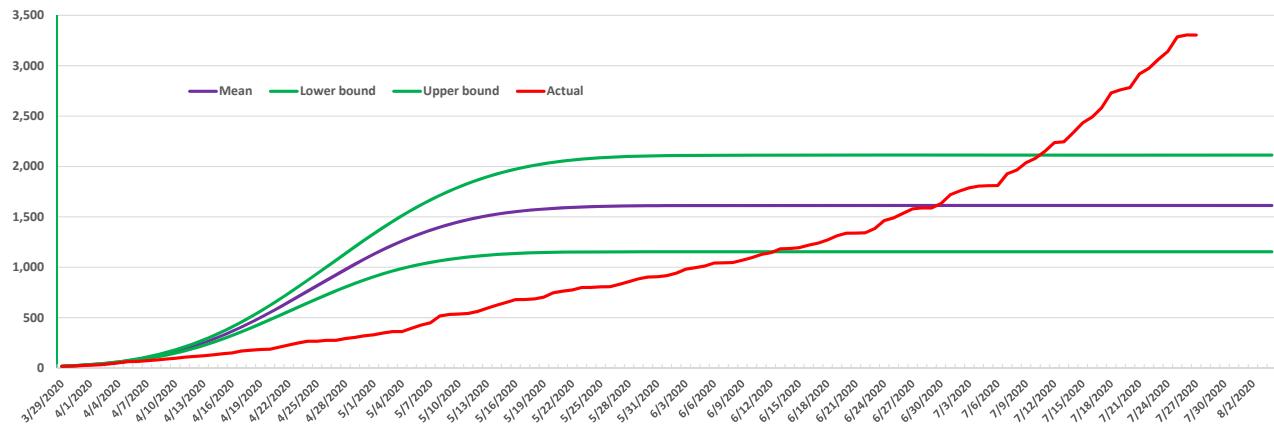
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New Mexico COVID 19 Daily Death Projections March 26



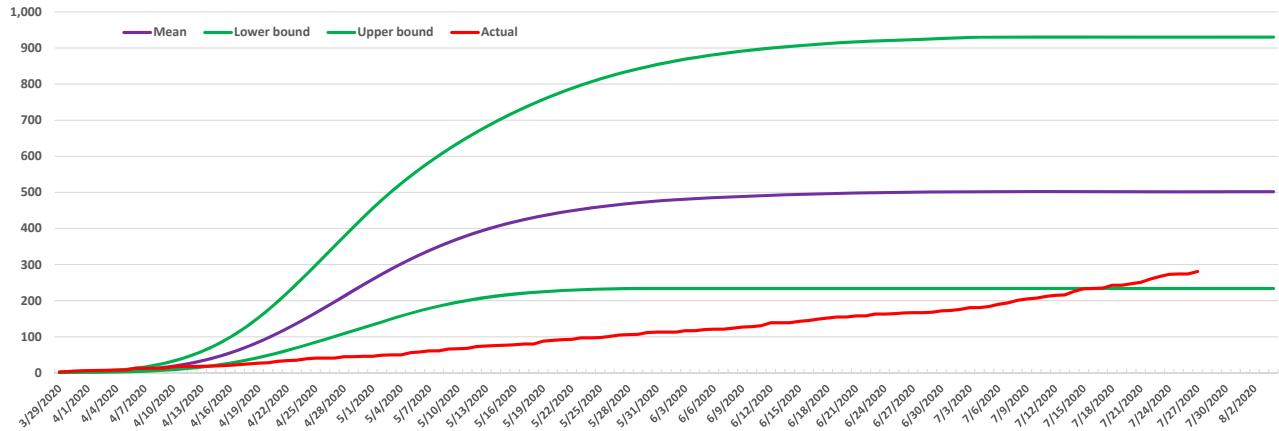
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Arizona COVID 19 Cumulative Death Projections



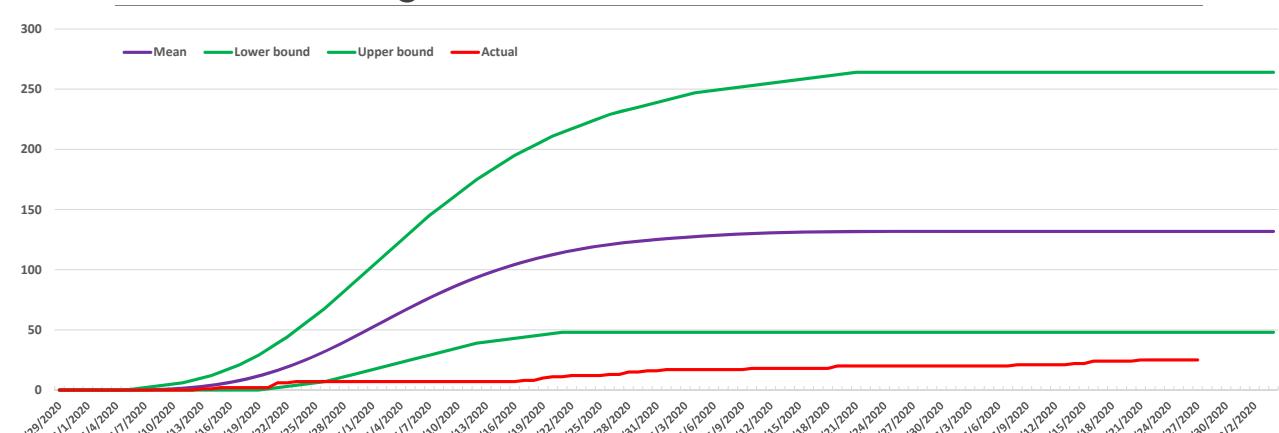
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Utah COVID 19 Daily Death Projections March 26



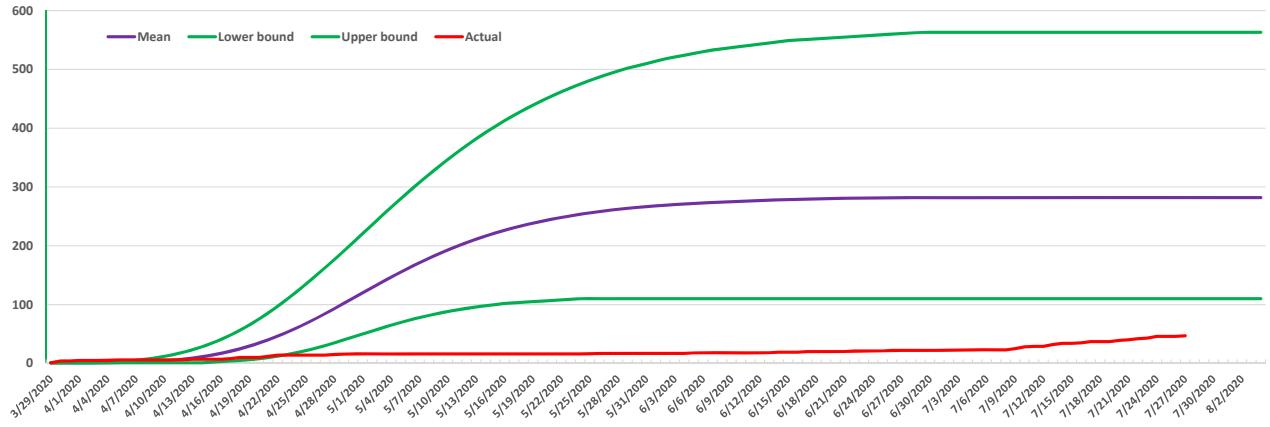
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Wyoming COVID 19 Cumulative Death Projections March 26



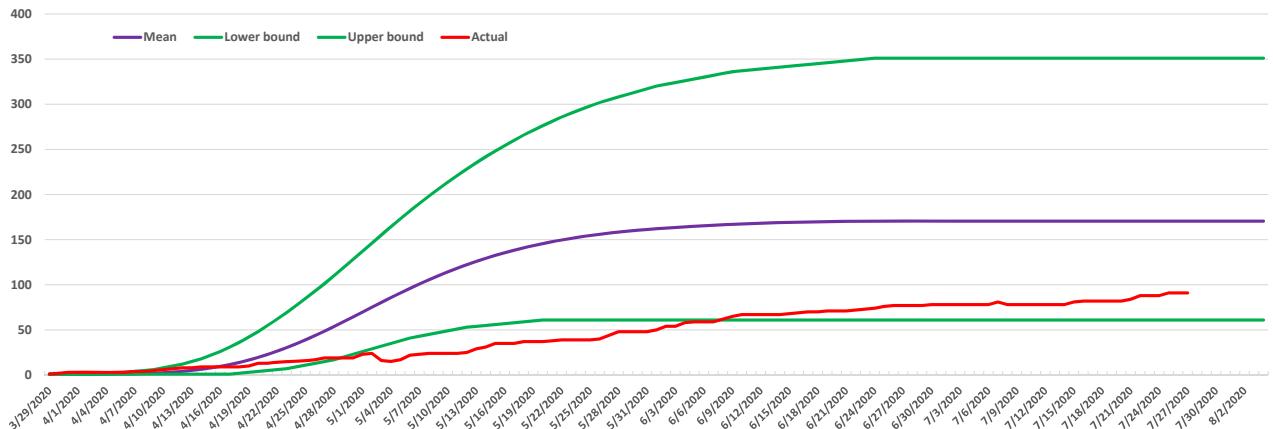
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Montana COVID 19 Cumulative Death Projections



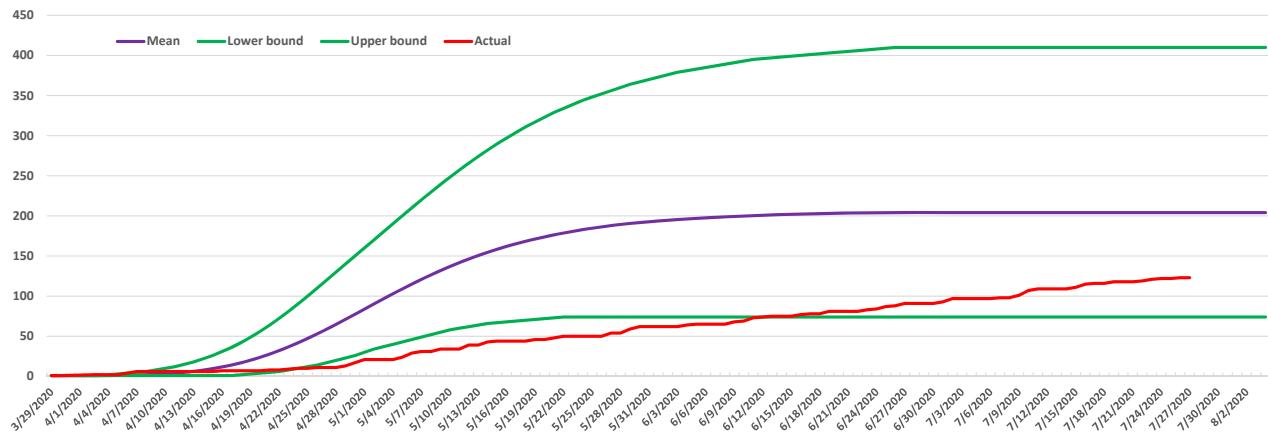
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North Dakota COVID 19 Cumulative Death Projections March 26



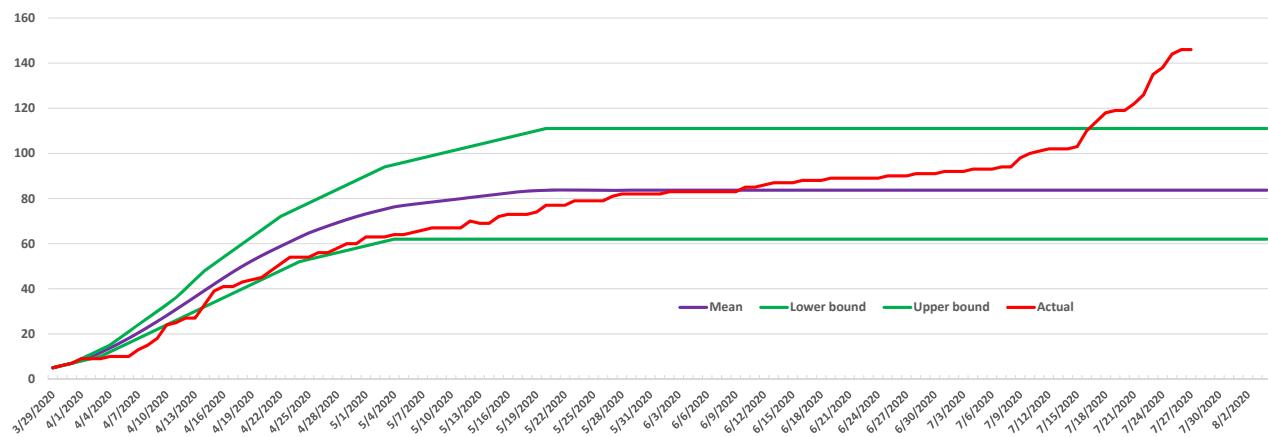
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South Dakota COVID 19 Daily Death Projections March 26



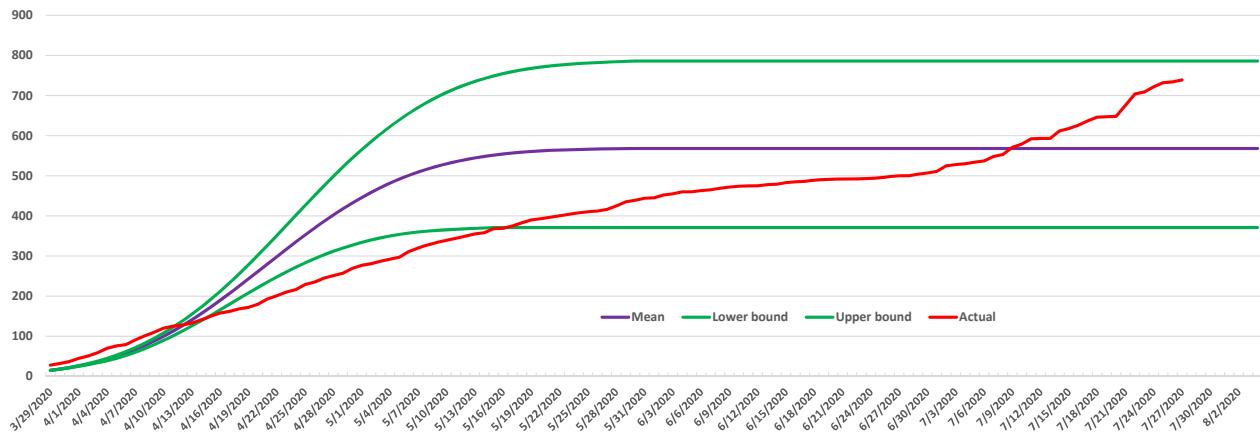
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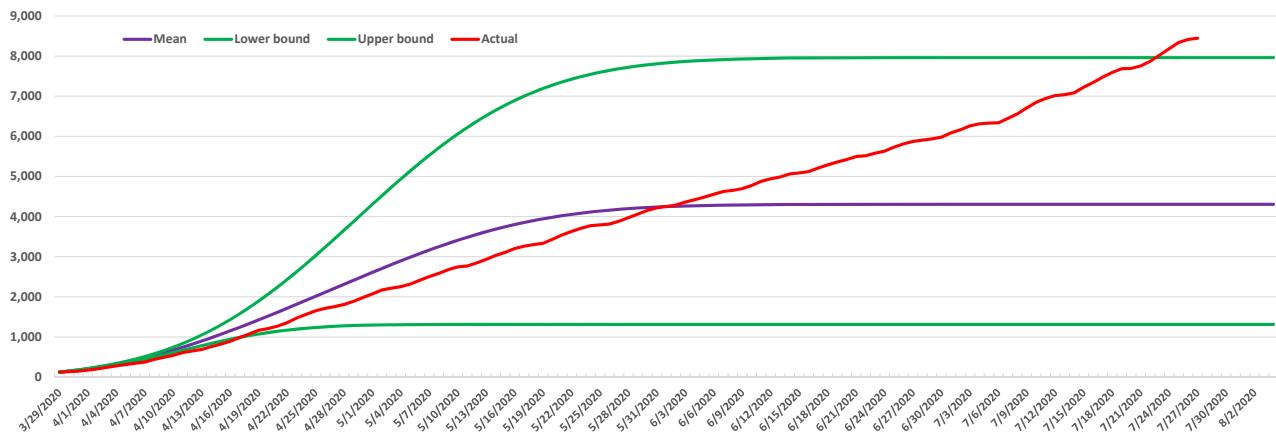
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Nevada COVID 19 Cumulative Death Projections



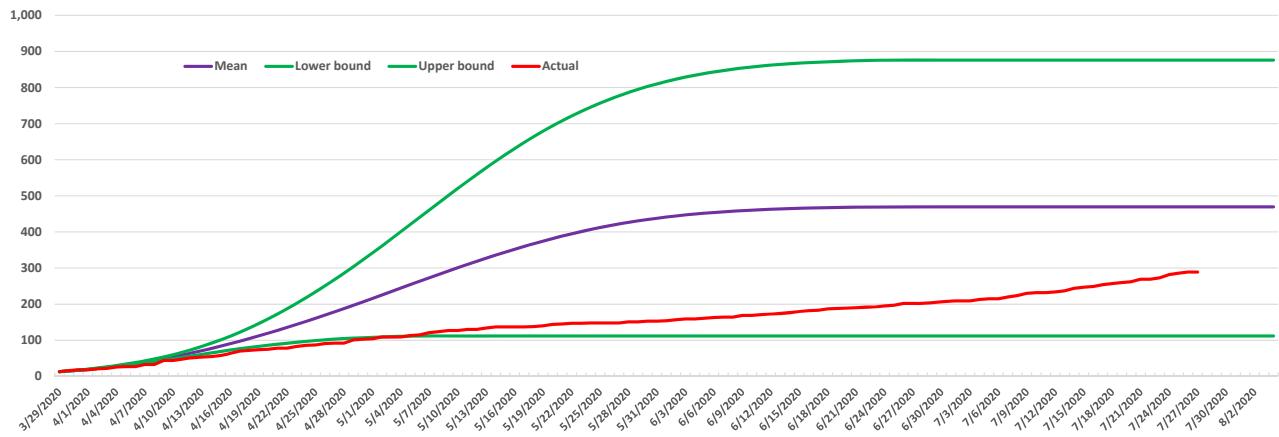
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California COVID 19 Cumulative Death Projections March 26



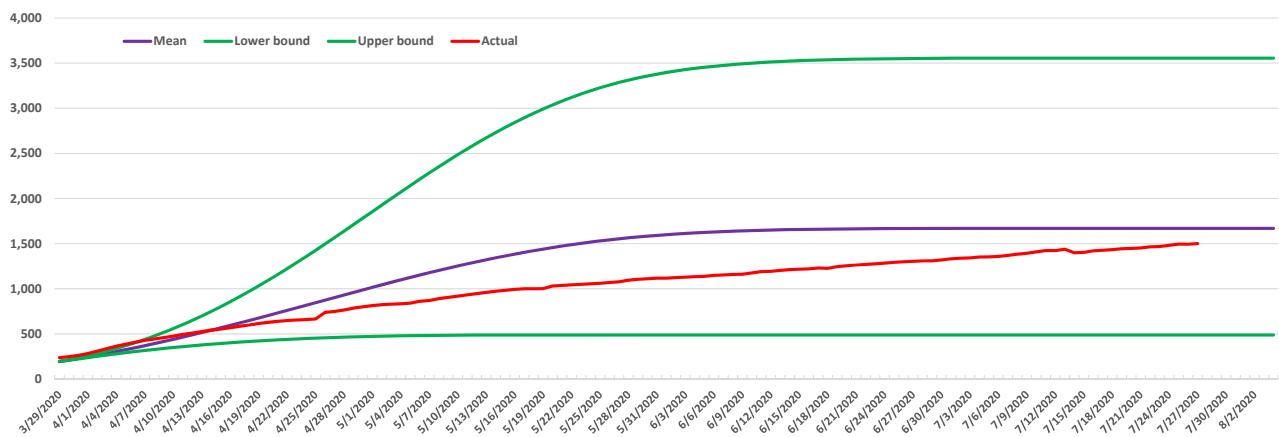
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Oregon COVID 19 Cumulative Death Projections March 26



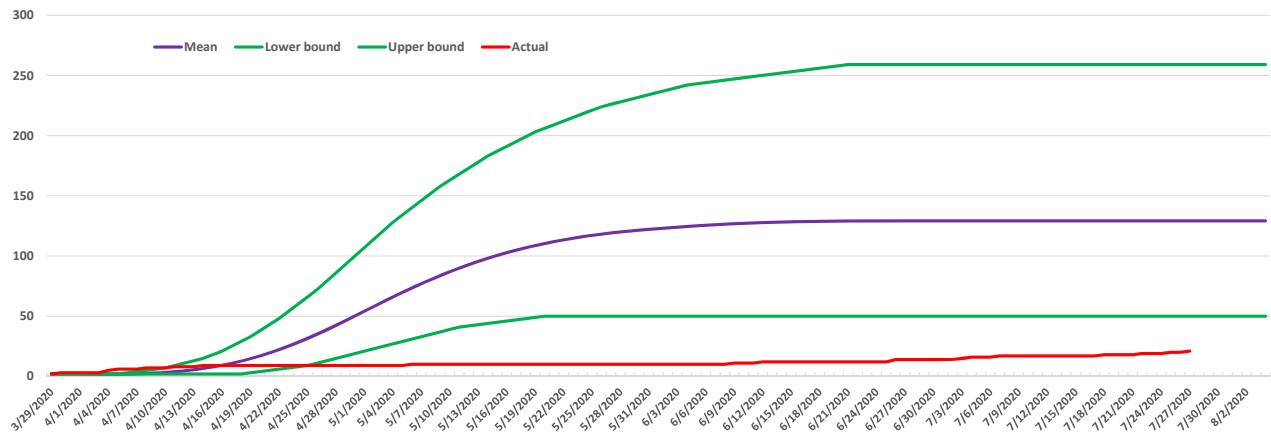
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Washington COVID 19 Cumulative Death Projections March 26



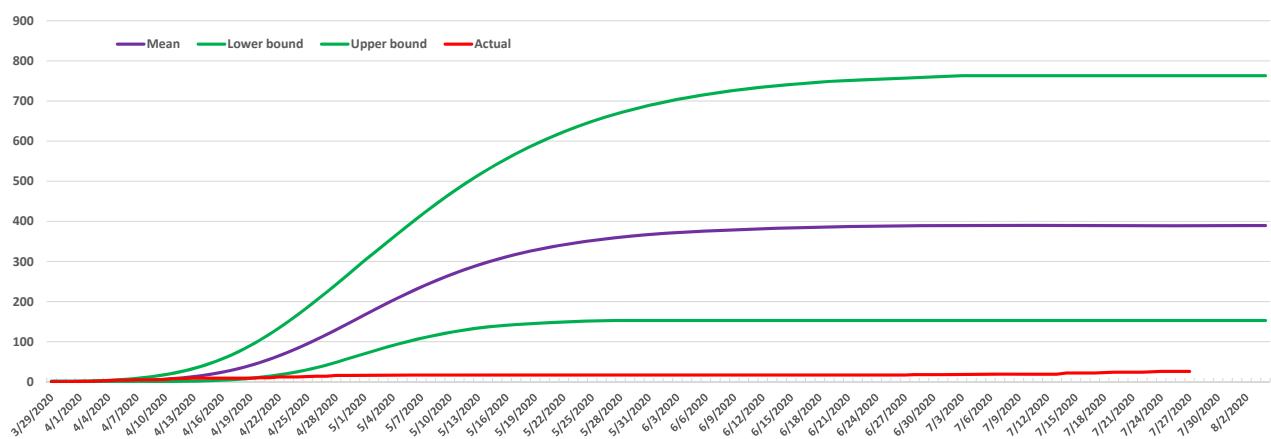
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Alaska COVID 19 Cumulative Death Projections March 26



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Hawaii COVID 19 Daily Death Projections March 26



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