

COVID19 Time Series Analysis, Worldwide and U.S.

Andy Hasselwander

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Source data: 2019 Novel Coronavirus COVID-19 (2019-nCoV) Data Repository by Johns Hopkins CSSE;
<https://github.com/CSSEGISandData/COVID-19>

Source code: <https://github.com/opencedar/covid19>

The visualizations in this document are heavily indebted to Edward Tufte and his use of sparklines—small, clutter-free time series lines—to show how many different panels or categories of data are changing through time; check out https://www.edwardtufte.com/bboard/q-and-a-fetch-msg?msg_id=0001OR.

Worldwide

Worldwide Summary

Sorted by total number of cases. Percent growth in total cases in the past seven days is last column.

Table 1: Worldwide Summary

Country_Region	days_100	conf	deaths	new_conf	conf_lag7	l7_rate
US	55	938154	53755	32821	732197	28%
Spain	55	223759	22902	3995	191726	16%
Italy	63	195351	26384	2357	175925	12%
France	57	161644	22648	1692	149149	8%
Germany	56	156513	5877	1514	143342	8%
United Kingdom	46	149569	20381	4929	115314	28%
Turkey	38	107773	2706	2861	82329	32%
Iran	60	89328	5650	1134	80868	12%
China	95	83909	4636	10	83787	0%
Russia	40	74588	681	5966	36793	104%
Brazil	44	59324	4057	5281	36658	60%
Canada	46	45493	2549	1437	34356	32%
Belgium	51	45325	6917	1032	37183	20%
Netherlands	51	37384	4424	655	31766	16%
Switzerland	52	28894	1599	217	27404	4%
India	43	26283	825	1753	15722	68%
Peru	40	25331	700	3683	14420	76%
Portugal	44	23392	880	595	19685	20%
Ecuador	39	22719	576	0	9022	152%
Ireland	43	18561	1063	377	14758	24%

Country_Region	days_100	conf	deaths	new_conf	conf_lag7	l7_rate
Sweden	51	18177	2192	610	13822	32%
Saudi Arabia	43	16299	136	1197	8274	96%
Israel	46	15298	199	240	13265	16%
Austria	49	15148	536	77	14671	4%
Mexico	38	13842	1305	970	6875	100%
Japan	65	13231	360	402	10296	28%
Chile	41	12858	181	552	9730	32%
Pakistan	41	12723	269	783	7638	68%
Singapore	57	12693	12	618	5992	112%
Poland	43	11273	524	381	8742	28%
Korea, South	66	10728	242	10	10653	0%
Romania	43	10635	601	218	8418	28%
United Arab Emirates	39	9813	71	532	6302	56%
Belarus	27	9590	67	817	4779	100%
Qatar	46	9358	10	833	5008	88%
Denmark	47	8643	418	235	7437	16%
Indonesia	42	8607	720	396	6248	36%
Ukraine	32	8125	201	478	5106	60%
Norway	51	7499	201	36	7036	8%
Czechia	44	7352	218	79	6606	12%
Philippines	43	7294	494	102	6087	20%
Australia	47	6694	80	17	6547	4%
Serbia	38	6630	125	0	5994	12%
Dominican Republic	36	5926	273	177	4335	36%
Malaysia	48	5742	98	51	5305	8%
Panama	38	5538	159	200	4210	32%
Colombia	38	5142	233	261	3439	48%
Bangladesh	20	4998	140	309	2144	132%
Finland	44	4475	186	80	3681	20%
South Africa	39	4361	86	141	3034	44%
Egypt	43	4319	307	227	3032	44%
Morocco	35	3897	159	139	2685	44%
Argentina	37	3780	185	173	2758	36%
Luxembourg	40	3711	85	16	3537	4%
Moldova	34	3304	94	194	2378	40%
Algeria	36	3256	419	129	2534	28%
Thailand	42	2907	51	0	2733	8%
Kuwait	43	2892	19	278	1751	64%
Kazakhstan	31	2601	25	119	1615	60%
Bahrain	47	2588	8	70	1773	44%
Greece	44	2506	130	16	2235	12%
Hungary	36	2443	262	0	1834	32%
Croatia	38	2016	54	7	1832	12%
Oman	31	1905	10	115	1180	60%
Uzbekistan	29	1862	8	58	1490	24%
Iceland	45	1790	10	1	1760	0%
Iraq	44	1763	86	55	1513	16%
Armenia	38	1677	28	81	1248	36%
Estonia	43	1635	46	30	1512	8%
Azerbaijan	31	1617	21	25	1373	16%
Cameroon	28	1518	53	88	1017	48%
Bosnia and Herzegovina	35	1486	57	65	1268	16%

Table 2: Countries by Predicted vs. Actual Lag 7 New Case Elasticity on Today's Cases

country	days_since_100	lag_7_elasticity	prediction	residual
Djibouti	18	1.00	1.05	-0.04
Bangladesh	20	1.08	1.04	0.03
Belarus	27	1.07	1.03	0.04
Nigeria	28	1.04	1.03	0.01
Cameroon	28	1.10	1.03	0.07
Uzbekistan	29	1.00	1.03	-0.03
Cuba	29	1.03	1.03	0.00
Cote d'Ivoire	30	1.01	1.03	-0.02
Afghanistan	30	1.02	1.03	0.00
Azerbaijan	31	1.01	1.03	-0.02
Kazakhstan	31	1.03	1.03	0.01
Ghana	31	1.04	1.03	0.01
Oman	31	1.04	1.03	0.01
Ukraine	32	1.03	1.02	0.01
Moldova	34	1.03	1.02	0.01
New Zealand	35	0.97	1.02	-0.05
Lithuania	35	0.97	1.02	-0.05
North Macedonia	35	0.98	1.02	-0.04
Bosnia and Herzegovina	35	0.99	1.02	-0.03
Morocco	35	1.03	1.02	0.01
Dominican Republic	36	1.02	1.02	0.00
Algeria	36	1.02	1.02	0.00
Hungary	36	1.02	1.02	0.00
Bulgaria	37	1.01	1.02	-0.01
Argentina	37	1.05	1.02	0.03
Croatia	38	0.99	1.02	-0.03
Armenia	38	1.01	1.02	-0.01
Colombia	38	1.03	1.02	0.01
Turkey	38	1.03	1.02	0.01
Panama	38	1.03	1.02	0.01
Serbia	38	1.04	1.02	0.03
Mexico	38	1.05	1.02	0.03
Slovakia	39	0.96	1.02	-0.06
Ecuador	39	1.00	1.02	-0.02
South Africa	39	1.01	1.02	-0.01
United Arab Emirates	39	1.06	1.02	0.04
Luxembourg	40	0.96	1.02	-0.05
Peru	40	1.04	1.02	0.02
Russia	40	1.05	1.02	0.04
Pakistan	41	1.02	1.02	0.01
Chile	41	1.03	1.02	0.01
Thailand	42	1.00	1.01	-0.02
Indonesia	42	1.03	1.01	0.02
Estonia	43	0.95	1.01	-0.06
Philippines	43	1.00	1.01	-0.01
Romania	43	1.02	1.01	0.00
Ireland	43	1.02	1.01	0.01
Poland	43	1.03	1.01	0.01
India	43	1.03	1.01	0.02

country	days_since_100	lag_7_elasticity	prediction	residual
Egypt	43	1.03	1.01	0.02
Kuwait	43	1.04	1.01	0.02
Saudi Arabia	43	1.05	1.01	0.03
Slovenia	44	0.97	1.01	-0.04
Greece	44	0.98	1.01	-0.03
Czechia	44	0.99	1.01	-0.02
Finland	44	1.00	1.01	-0.01
Iraq	44	1.01	1.01	-0.01
Portugal	44	1.02	1.01	0.01
Brazil	44	1.04	1.01	0.02
Iceland	45	0.96	1.01	-0.05
Israel	46	1.01	1.01	0.00
United Kingdom	46	1.02	1.01	0.01
Canada	46	1.02	1.01	0.01
Qatar	46	1.04	1.01	0.03
Bahrain	47	0.99	1.01	-0.02
Australia	47	0.99	1.01	-0.02
Denmark	47	1.01	1.01	0.00
Malaysia	48	1.00	1.01	-0.01
Austria	49	1.00	1.01	-0.01
Norway	51	1.00	1.01	-0.01
Belgium	51	1.02	1.01	0.01
Netherlands	51	1.02	1.01	0.01
Sweden	51	1.02	1.01	0.02
Switzerland	52	1.00	1.01	0.00
Spain	55	1.02	1.00	0.01
US	55	1.03	1.00	0.03
Germany	56	1.01	1.00	0.01
France	57	1.00	1.00	0.00
Singapore	57	1.06	1.00	0.05
Iran	60	1.01	1.00	0.01
Italy	63	1.02	1.00	0.02
Japan	65	1.03	1.00	0.04
Korea, South	66	0.98	1.00	-0.02
China	95	0.94	0.98	-0.05

Comparisons with averages

Table 3: Countries by Predicted vs. Actual Lag 7 New Case Elasticity on Today's Cases

country	days_since_100	lag_7_elasticity	prediction	ww_residual
Djibouti	18	1.00	1.05	-0.04
Bangladesh	20	1.08	1.04	0.03
Belarus	27	1.07	1.03	0.04
Nigeria	28	1.04	1.03	0.01
Cameroon	28	1.10	1.03	0.07
Uzbekistan	29	1.00	1.03	-0.03
Cuba	29	1.03	1.03	0.00
Cote d'Ivoire	30	1.01	1.03	-0.02
Afghanistan	30	1.02	1.03	0.00

country	days_since_100	lag_7_elasticity	prediction	ww_residual
Azerbaijan	31	1.01	1.03	-0.02
Kazakhstan	31	1.03	1.03	0.01
Ghana	31	1.04	1.03	0.01
Oman	31	1.04	1.03	0.01
Ukraine	32	1.03	1.02	0.01
Moldova	34	1.03	1.02	0.01
New Zealand	35	0.97	1.02	-0.05
Lithuania	35	0.97	1.02	-0.05
North Macedonia	35	0.98	1.02	-0.04
Bosnia and Herzegovina	35	0.99	1.02	-0.03
Morocco	35	1.03	1.02	0.01
Dominican Republic	36	1.02	1.02	0.00
Algeria	36	1.02	1.02	0.00
Hungary	36	1.02	1.02	0.00
Bulgaria	37	1.01	1.02	-0.01
Argentina	37	1.05	1.02	0.03
Croatia	38	0.99	1.02	-0.03
Armenia	38	1.01	1.02	-0.01
Colombia	38	1.03	1.02	0.01
Turkey	38	1.03	1.02	0.01
Panama	38	1.03	1.02	0.01
Serbia	38	1.04	1.02	0.03
Mexico	38	1.05	1.02	0.03
Slovakia	39	0.96	1.02	-0.06
Ecuador	39	1.00	1.02	-0.02
South Africa	39	1.01	1.02	-0.01
United Arab Emirates	39	1.06	1.02	0.04
Luxembourg	40	0.96	1.02	-0.05
Peru	40	1.04	1.02	0.02
Russia	40	1.05	1.02	0.04
Pakistan	41	1.02	1.02	0.01
Chile	41	1.03	1.02	0.01
Thailand	42	1.00	1.01	-0.02
Indonesia	42	1.03	1.01	0.02
Estonia	43	0.95	1.01	-0.06
Philippines	43	1.00	1.01	-0.01
Romania	43	1.02	1.01	0.00
Ireland	43	1.02	1.01	0.01
Poland	43	1.03	1.01	0.01
India	43	1.03	1.01	0.02
Egypt	43	1.03	1.01	0.02
Kuwait	43	1.04	1.01	0.02
Saudi Arabia	43	1.05	1.01	0.03
Slovenia	44	0.97	1.01	-0.04
Greece	44	0.98	1.01	-0.03
Czechia	44	0.99	1.01	-0.02
Finland	44	1.00	1.01	-0.01
Iraq	44	1.01	1.01	-0.01
Portugal	44	1.02	1.01	0.01
Brazil	44	1.04	1.01	0.02
Iceland	45	0.96	1.01	-0.05
Israel	46	1.01	1.01	0.00

country	days_since_100	lag_7_elasticity	prediction	ww_residual
United Kingdom	46	1.02	1.01	0.01
Canada	46	1.02	1.01	0.01
Qatar	46	1.04	1.01	0.03
Bahrain	47	0.99	1.01	-0.02
Australia	47	0.99	1.01	-0.02
Denmark	47	1.01	1.01	0.00
Malaysia	48	1.00	1.01	-0.01
Austria	49	1.00	1.01	-0.01
Norway	51	1.00	1.01	-0.01
Belgium	51	1.02	1.01	0.01
Netherlands	51	1.02	1.01	0.01
Sweden	51	1.02	1.01	0.02
Switzerland	52	1.00	1.01	0.00
Spain	55	1.02	1.00	0.01
US	55	1.03	1.00	0.03
Germany	56	1.01	1.00	0.01
France	57	1.00	1.00	0.00
Singapore	57	1.06	1.00	0.05
Iran	60	1.01	1.00	0.01
Italy	63	1.02	1.00	0.02
Japan	65	1.03	1.00	0.04
Korea, South	66	0.98	1.00	-0.02
China	95	0.94	0.98	-0.05

Forecast New Cases by Country

We estimate new cases by date, to see when countries will peak, based on the worldwide curve fit.

Table 4: Forecast Peak New Cases by Country

country	total_cases	peak_new_cases	date	population	perc_pop_infected
China	83,849	15,133	2020-02-13	1,378,665,000	0.0%
Italy	253,810	6,557	2020-03-21	60,627,498	0.4%
Thailand	3,869	188	2020-03-22	68,971,331	0.0%
Switzerland	33,445	1,321	2020-03-23	8,373,338	0.4%
Luxembourg	4,332	234	2020-03-25	582,014	0.7%
Spain	303,421	9,630	2020-03-25	46,484,062	0.7%
Austria	17,028	1,321	2020-03-26	8,736,668	0.2%
Estonia	2,169	134	2020-03-26	1,315,790	0.2%
Malaysia	7,743	235	2020-03-26	30,684,804	0.0%
Germany	193,919	6,933	2020-03-27	82,348,669	0.2%
Norway	9,298	386	2020-03-27	5,234,519	0.2%
Slovenia	1,839	70	2020-03-27	2,065,042	0.1%
Australia	7,698	497	2020-03-28	24,190,907	0.0%
Philippines	11,238	538	2020-03-31	103,663,927	0.0%
Croatia	2,883	96	2020-04-01	4,174,349	0.1%
Armenia	3,838	92	2020-04-02	2,936,146	0.1%
Iceland	2,020	99	2020-04-02	335,439	0.6%
Israel	22,235	765	2020-04-02	8,546,000	0.3%
New Zealand	1,868	89	2020-04-02	4,693,200	0.0%
Algeria	7,555	185	2020-04-03	40,551,404	0.0%
Finland	7,516	267	2020-04-04	5,495,303	0.1%

country	total_cases	peak_new_cases	date	population	perc_pop_infected
France	179,840	25,646	2020-04-04	66,721,256	0.3%
Canada	85,212	2,778	2020-04-05	36,109,487	0.2%
Bosnia and Herzegovina	2,514	90	2020-04-07	3,386,267	0.1%
Denmark	13,108	391	2020-04-07	5,728,010	0.2%
Iraq	3,265	91	2020-04-07	36,610,632	0.0%
Azerbaijan	2,951	105	2020-04-08	9,757,812	0.0%
Hungary	6,018	210	2020-04-10	9,814,023	0.1%
Ireland	33,913	1,515	2020-04-10	4,755,335	0.7%
Netherlands	58,950	1,346	2020-04-10	17,030,314	0.3%
Portugal	37,038	1,516	2020-04-10	10,325,452	0.4%
United Kingdom	237,560	8,733	2020-04-10	65,611,593	0.4%
Romania	20,024	523	2020-04-11	19,702,468	0.1%
Turkey	201,970	5,138	2020-04-11	79,821,724	0.3%
Moldova	10,242	222	2020-04-14	2,802,170	0.4%
Uzbekistan	3,303	167	2020-04-14	31,847,900	0.0%
Belgium	72,754	2,454	2020-04-15	11,331,422	0.6%
Djibouti	1,940	156	2020-04-16	929,112	0.2%
North Macedonia	2,264	107	2020-04-16	2,080,745	0.1%
Serbia	9,711	445	2020-04-16	7,058,322	0.1%
Dominican Republic	13,030	371	2020-04-17	10,397,743	0.1%
Japan	40,199	1,161	2020-04-17	126,994,511	0.0%
Morocco	11,535	281	2020-04-17	35,126,296	0.0%
Cote d'Ivoire	2,471	113	2020-04-18	23,822,714	0.0%
Cuba	3,854	63	2020-04-18	11,335,109	0.0%
Lithuania	2,068	90	2020-04-18	2,868,231	0.1%
Colombia	14,197	353	2020-04-19	48,171,392	0.0%
Ghana	4,474	208	2020-04-19	28,481,946	0.0%
India	84,653	1,893	2020-04-19	1,324,509,589	0.0%
Poland	24,080	545	2020-04-19	37,970,087	0.1%
Oman	8,276	144	2020-04-20	4,479,219	0.2%
Greece	3,569	156	2020-04-21	10,775,971	0.0%
Pakistan	34,808	1,147	2020-04-21	203,627,284	0.0%
Nigeria	7,099	208	2020-04-22	185,960,289	0.0%
Argentina	19,173	291	2020-04-23	43,590,368	0.0%
Mexico	123,592	2,132	2020-04-23	123,333,376	0.1%
Panama	14,107	345	2020-04-23	4,037,078	0.3%
South Africa	9,614	318	2020-04-23	56,203,654	0.0%
Ukraine	27,181	578	2020-04-23	45,004,645	0.1%
Bahrain	5,167	301	2020-04-24	1,425,791	0.4%
Bulgaria	3,271	137	2020-04-24	7,127,822	0.0%
Ecuador	55,578	11,536	2020-04-24	16,491,115	0.3%
Indonesia	24,923	436	2020-04-24	261,554,226	0.0%
Kazakhstan	9,812	193	2020-04-24	17,794,055	0.1%
Sweden	37,714	812	2020-04-24	9,923,085	0.4%
US	1,742,844	36,163	2020-04-24	322,941,311	0.5%
Afghanistan	4,817	112	2020-04-25	35,383,128	0.0%
Brazil	235,014	5,281	2020-04-25	206,163,058	0.1%
Chile	31,875	552	2020-04-25	18,209,068	0.2%
Kuwait	13,124	278	2020-04-25	3,956,873	0.3%
Peru	102,679	3,683	2020-04-25	30,926,032	0.3%
Qatar	37,647	833	2020-04-25	2,654,374	1.4%
Saudi Arabia	103,072	1,438	2020-05-11	32,442,572	0.3%

country	total_cases	peak_new_cases	date	population	perc_pop_infected
Singapore	122,096	1,677	2020-05-23	5,607,283	2.2%
United Arab Emirates	80,900	960	2020-05-26	9,360,980	0.9%
Belarus	175,488	2,586	2020-06-01	9,501,534	1.8%
Bangladesh	119,725	1,461	2020-06-07	157,970,840	0.1%
Cameroon	702,186	10,070	2020-07-27	23,926,539	2.9%

Forecast New Cases WW Total

WW Confirmed COVID19 Case Forecast as of 26 April 2020

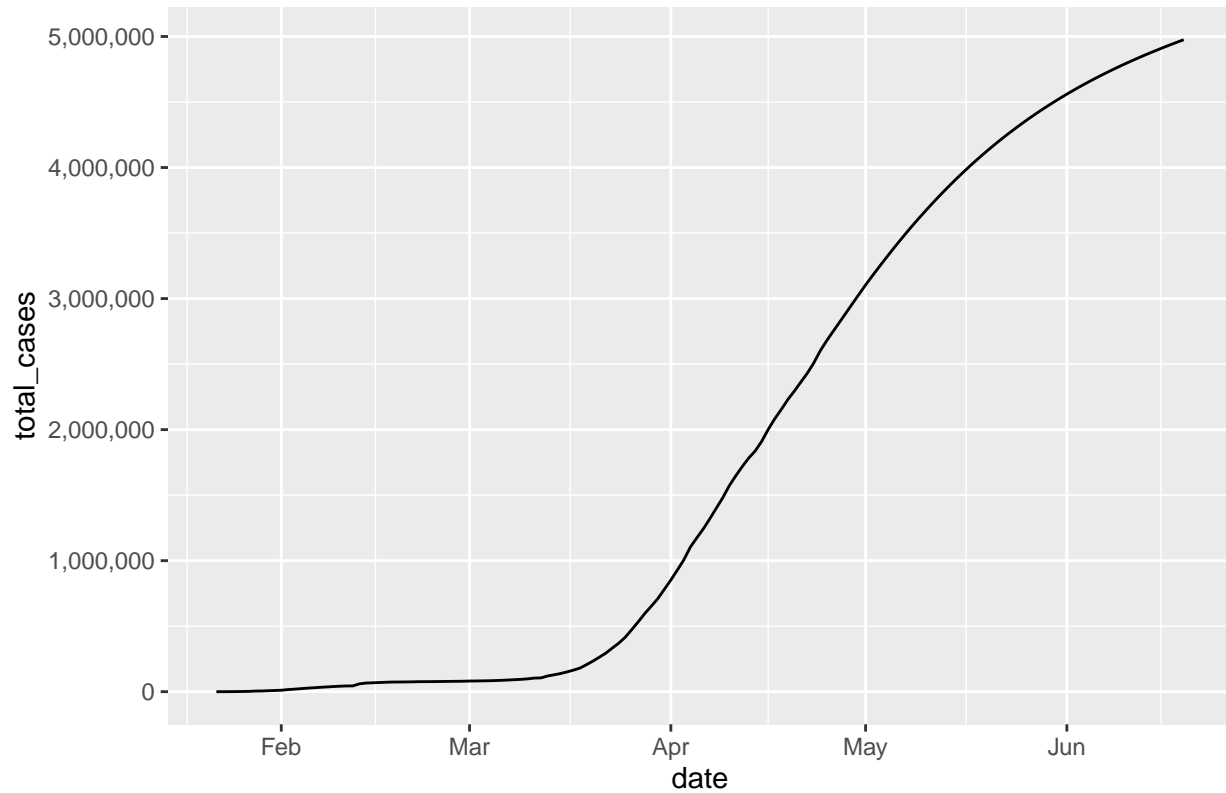
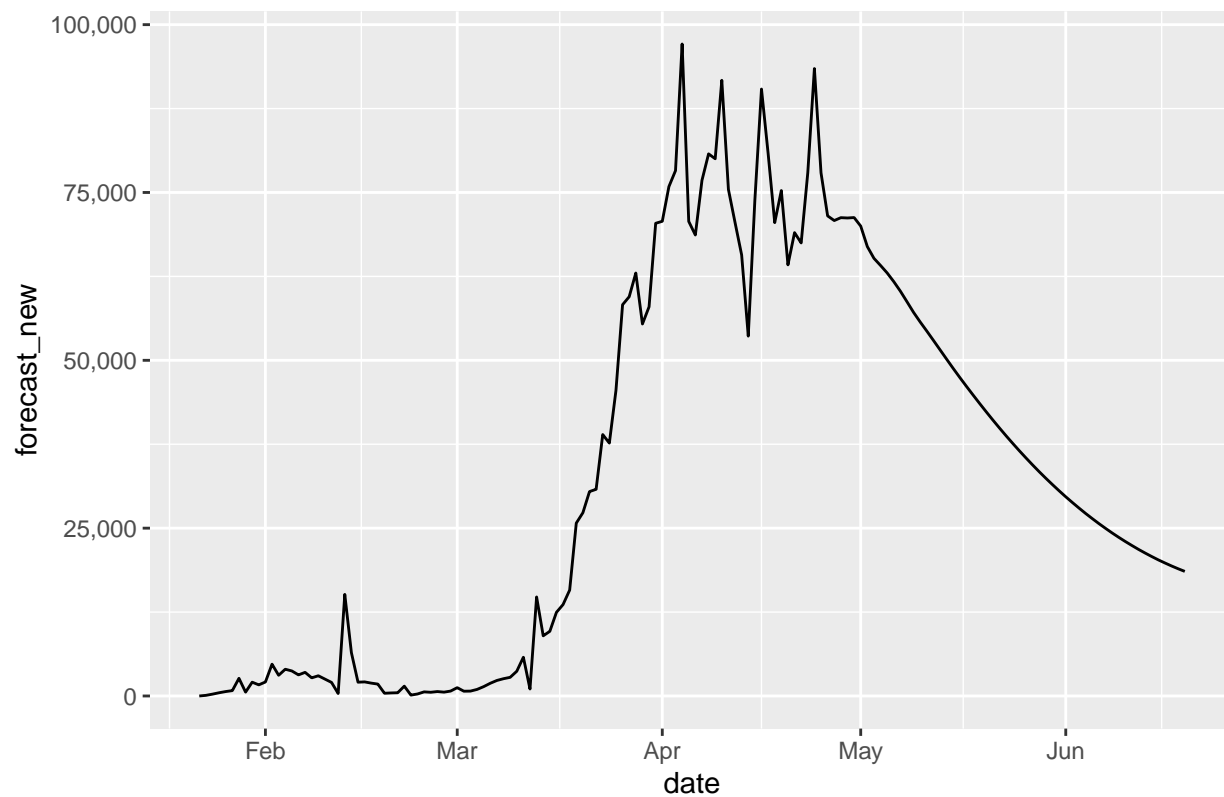


Table 5: Peak Daily New Cases Worldwide and Total on That Day

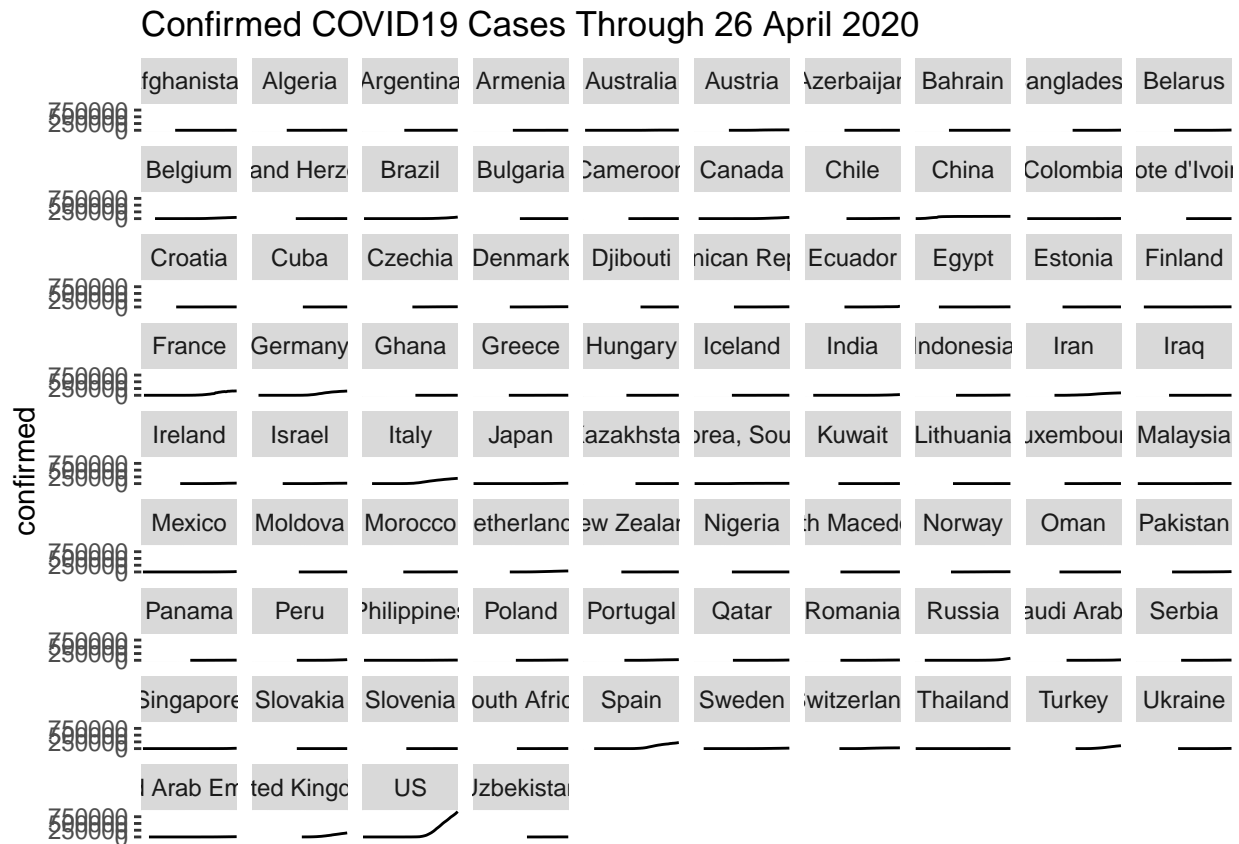
date	forecast_new	total_cases
2020-04-04	97,116	1,103,214

Worldwide New COVID19 Case Forecast as of 26 April 2020



Sparklines

Confirmed Cases



Deaths

Cumulative COVID19 Deaths Through 26 April 2020



Confirmed Growth Rate 5-Day Moving Average

5-Day MA Confirmed Growth Rate Through 26 April 2020



Death Rate

Death Rate Through 26 April 2020

