

## COVID-19 Chartbook

Craig Dismuke
Chief Economist
cdismuke@viningsparks.com

Dudley Carter Economist dcarter@viningsparks.com

## U.S. COVID SITUATION



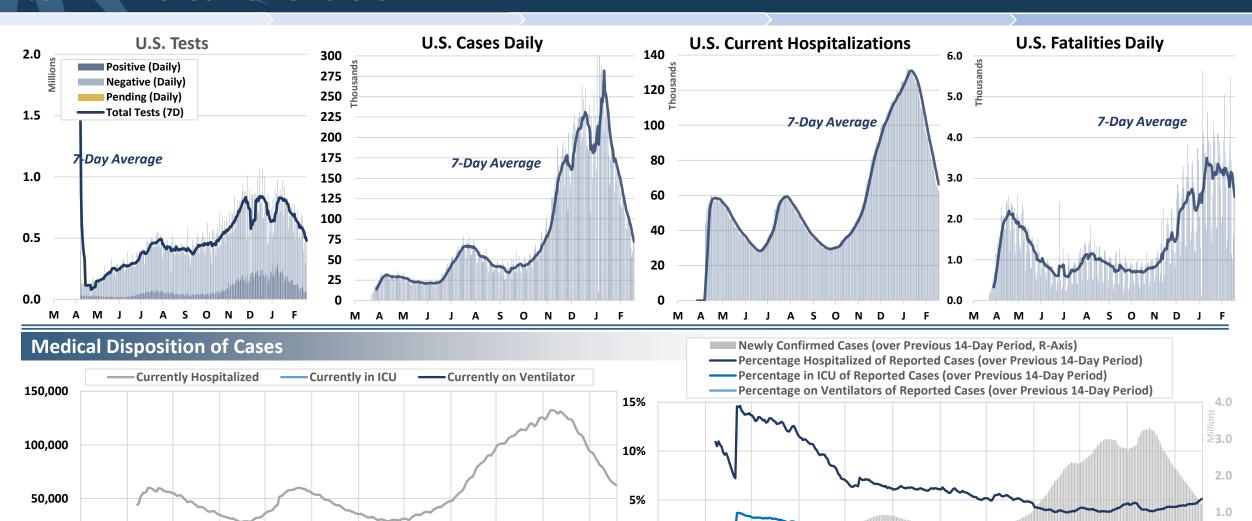
0.0

Feb

**CURRENT DISPOSITION OF CASES** 

Mar Apr May Jun Jul Aug Sep Sources: Bloomberg, Covid Tracking Project, Vining Sparks

0



Mar

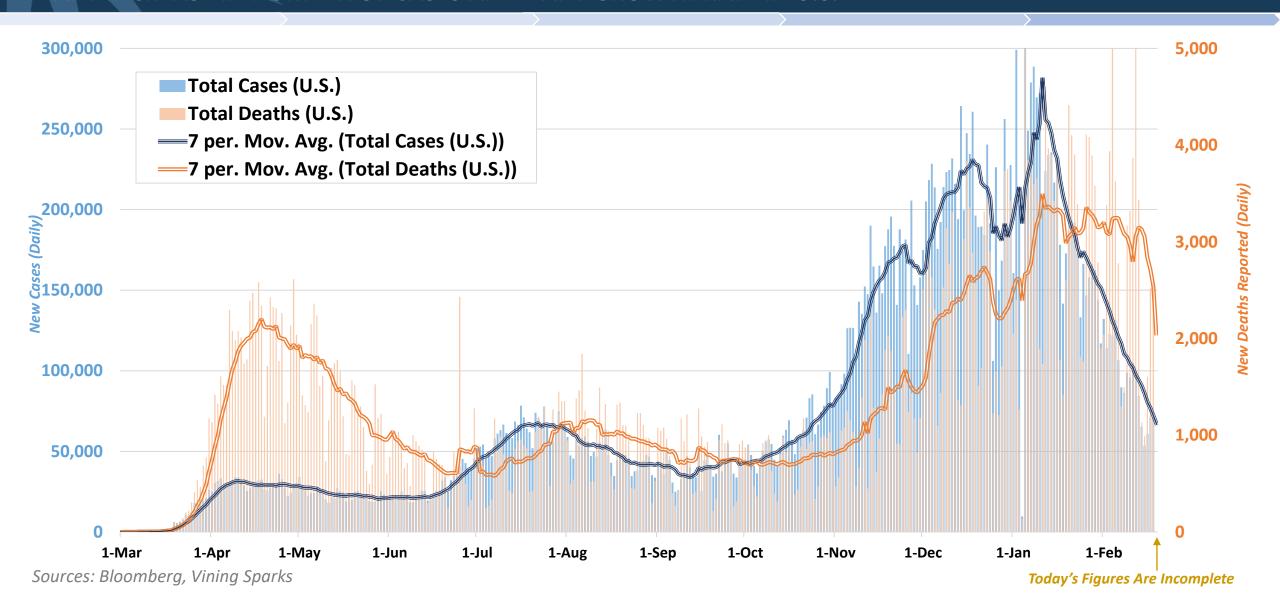
Feb

Jan

#### COVID-19 DAILY GROWTH U.S.



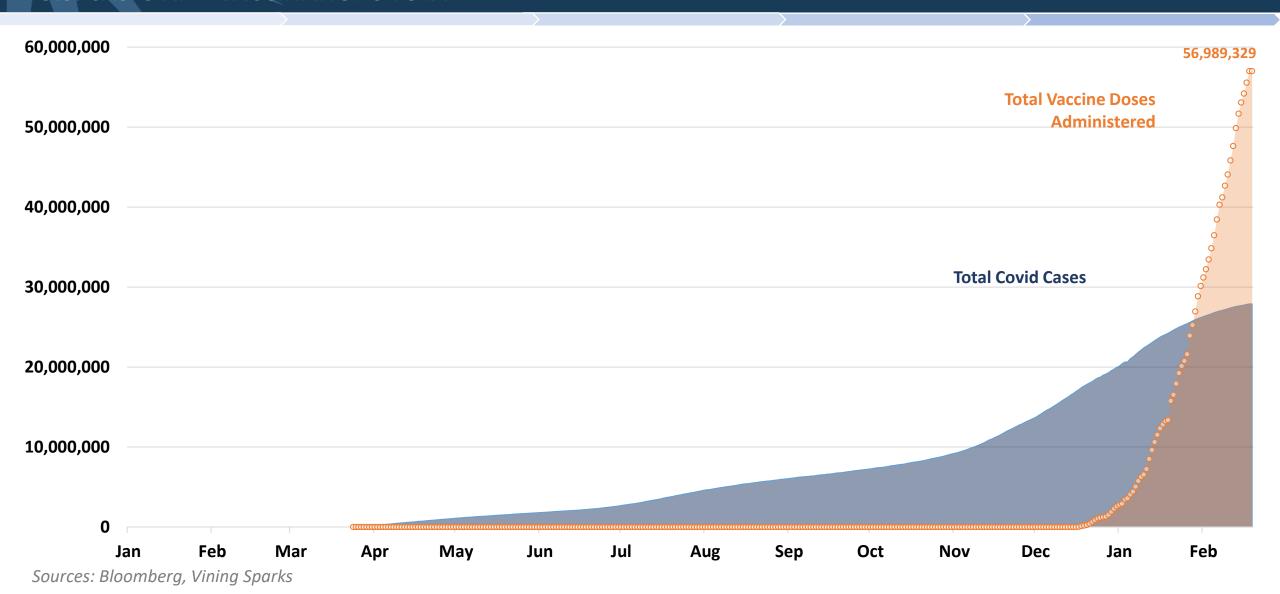
DAILY INCREASE IN NUMBER OF CASES AND DAILY GROWTH RATE IN U.S.



## CASES AND VACCINATIONS



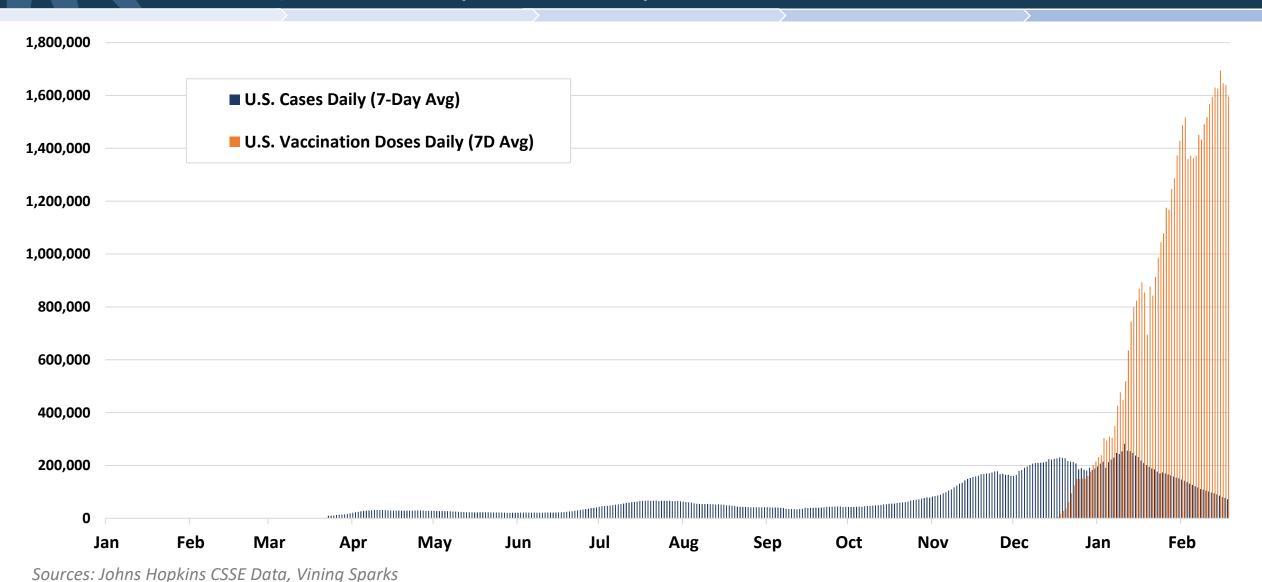
**U.S. CASES AND VACCINATIONS TOTAL** 



### CASES AND VACCINATIONS



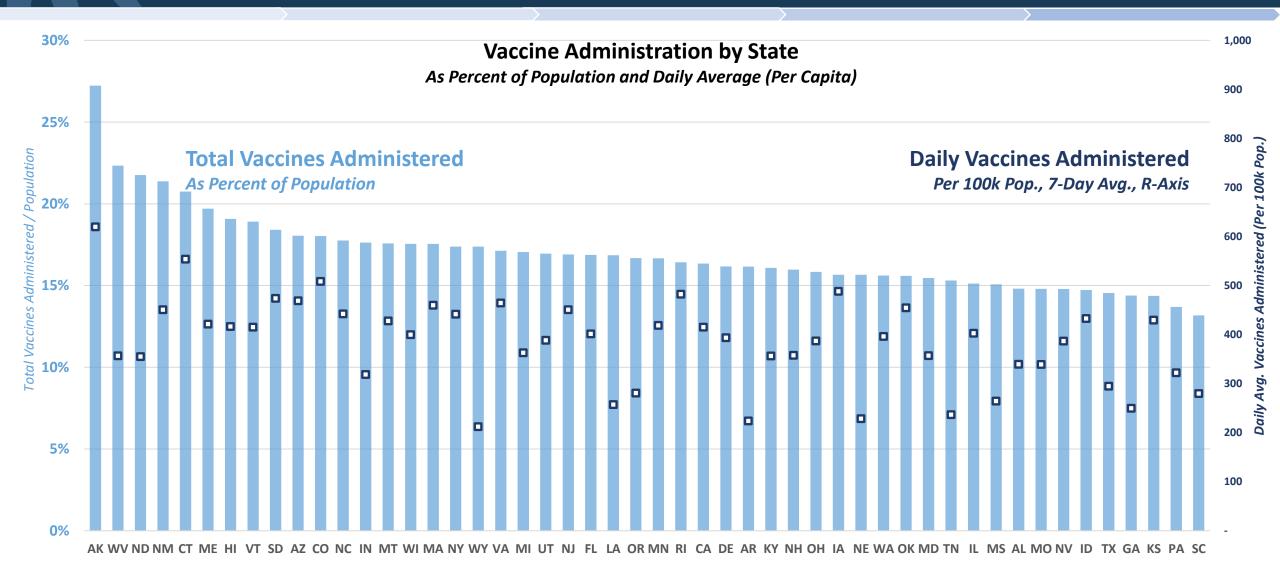
**U.S. CASES AND VACCINATIONS DAILY (7-DAY AVERAGE)** 



### VIRUS CONTAINMENT

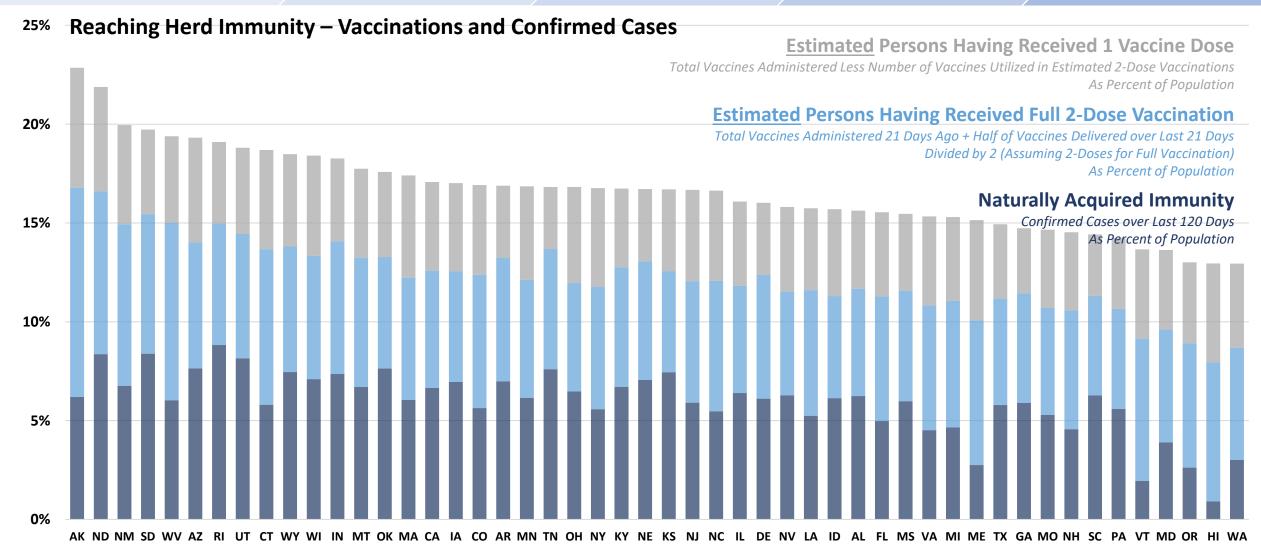


FIRST AND FOREMOST, VIRUS MUST BE CONTAINED SO THAT STIMULUS EFFORTS CAN BE EFFECTIVE



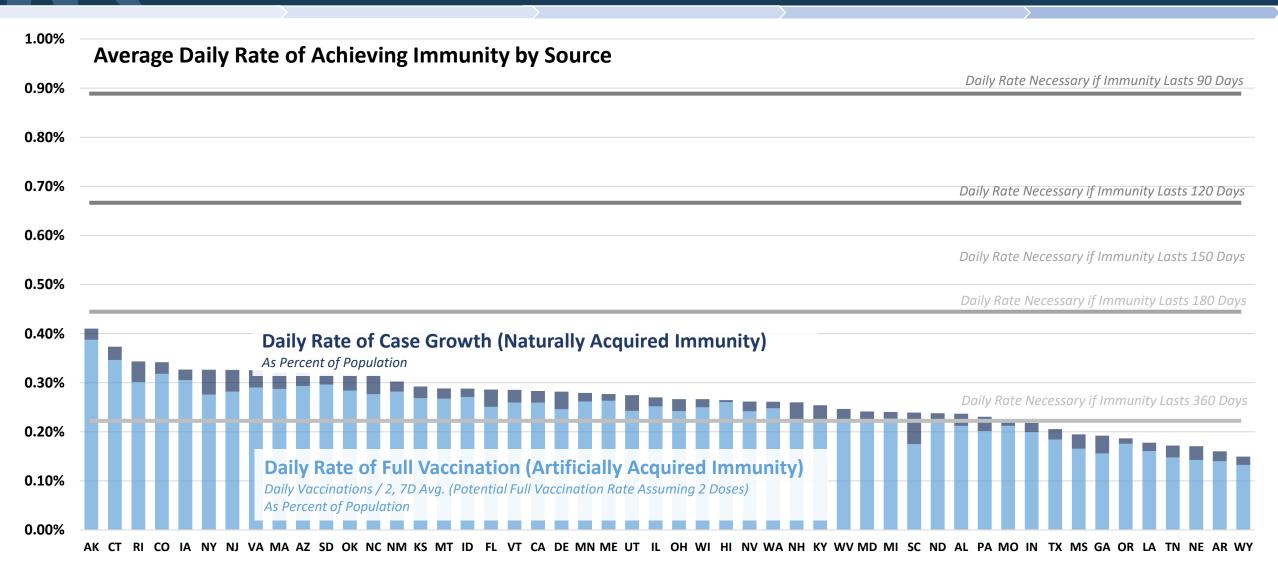
## ACHIEVING HERD IMMUNITY VINING





# ACHIEVING HERD IMMUNITY VINING INSTRUMENTS

ASSUMING HERD IMMUNITY ACHIEVED AT 80% OF POPULATION, VACCINATIONS WILL NEED TO ACCELERATE



## U.S. STATE-LEVEL DATA

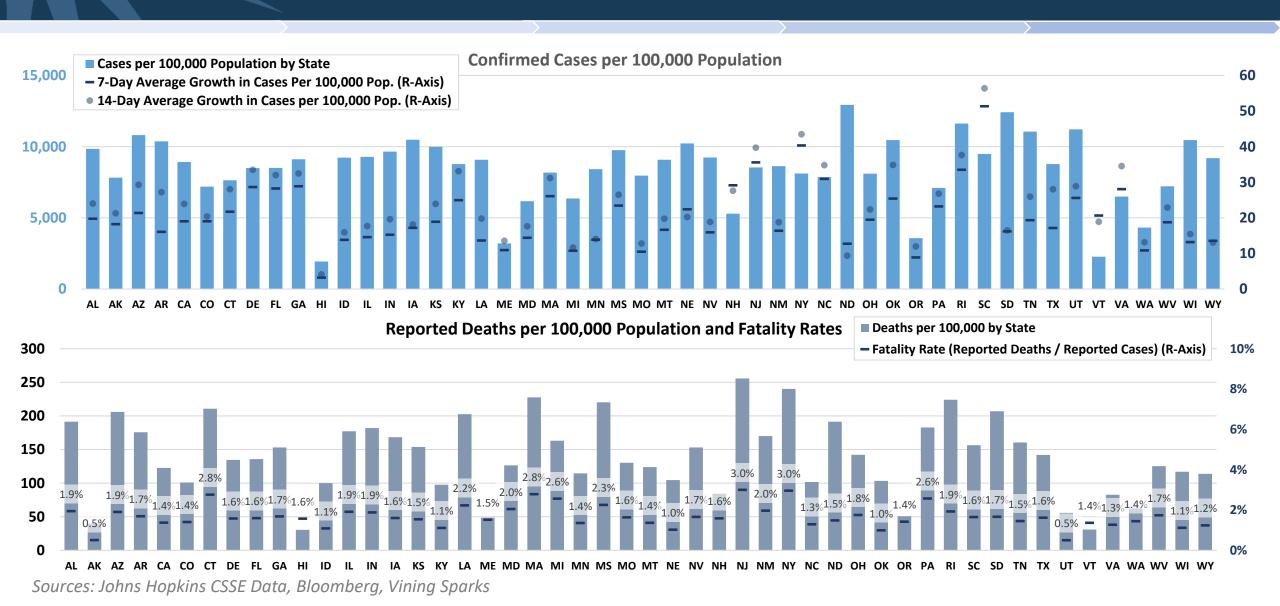


	Confirmed Cases					Hos	pitaliza	Deaths Reported					Confirmed Cases						Hospitalizations			Deaths Reported													
						Total	7D Avg	Change in									Case							Total	7D Avg	Change in								Total	Case
	Pop.	Total	New		14D	Per 100k		7D versus			Curr. Per				14D	Total Per	Fatality		Pop.	Total			14D	Per 100k		7D versus			Curr. Per				14D P	Per 100k	Fatality
	000s)	Cases		Avg	Avg	Pop.	Pop.	14D Avgs		7-Day ∆				Avg	Avg	100,000	Rate		(000s)		Cases	Avg	Avg	Pop.	Pop.	14D Avgs		7-Day ∆	_		New	Avg	Avg	Pop.	Rate
AL 2	,922		1,198		1,182	9,842	19.7	-18%	1003	(278)	20.4	9,424	78	35	/0	191.5	1.9%	IVII	1,081	98,100	200	180	214	9,078	16.6	-15.8%	109	(2)	10.1	1,337	3	2	2	123.7	1.4%
AK		57,182	214	133	156	7,821	18.2	-14.5%	37	(504)	5.1	288	-	- 1	05	39.4	0.5%	NE	1,938	198,042		434	392	10,221	22.4	10.5%	188	(42)	9.7	2,025	21	3	24	104.5	1.0%
		802,198		-	2,172	10,809	21.4 16.0	-27.0%	1823	(684) (87)	24.6 20.6	15,276	213	63	95	205.8 175.6	1.9% 1.7%	NV	3,138	289,880	488	499	592	9,237 5,299	15.9 29.1	-15.7% 5.5%	698	(181)	22.2 9.2	4,805	31	20	24	153.1	1.7%
		314,445	253	486	825	10,376	19.0	-41.1%	625 8566	(87)	20.6	5,323	10 400	16 273	337	122.6	1.7%	NH	1,366 8.882	72,399	434	398	377	-,	29.1 35.6	-10.4%	126 2327	(12)	26.2	1,150	2	47	60	84.2 255.8	3.0%
	9,368	3,512,090 417,415			9,416	8,921 7,187	19.0	-20.5% -6.6%	462	(45)	8.0	48,259 5,864	26	11	11	101.0	1.4%	NIN	2,106	758,451 181,739	3,277 407	3,160	3,525	8,539 8,628	16.4	-10.4%	284	(87)	13.5	22,721 3,580	89 18	47 11	60	170.0	2.0%
		271.903	547	772	1,183 997	7,167	21.7	-22.6%	568	(163)	16.0	7,496	20	16	20	210.7	2.8%	NIV	19.337	1,568,624			8,408	8,112	40.3	-7.3%	6434	(908)	33.3	46.436	169		141	240.1	3.0%
DE		83.852	271	282	331	8,497	28.6	-14.5%	197	(56)	20.0	1,326	10	0	10	134.4	1.6%	NC	10,601	833,423				7.862	30.9	-11.1%	1892	(293)	17.8	10.766	96	56	66	101.6	1.3%
		1,849,744			6,958	8,511	28.2	-14.5%	4367	(539)	20.0	29.474	163	130	144	135.6	1.6%	ND	765	99.034	133	97	71	12,940	12.7	36.2%	31	(8)	17.0	1.465	<i>J</i> 0	1	1	191.4	1.5%
				-	3,476	9,120	28.9	-11.0%	3117	(394)	29.1	16,403	130	99	110	153.2	1.7%	ОН	11,693	947,389			2,610	8,102	19.5	-12.7%	1516	(346)	13.0	16,611	98	31	21	142.1	1.8%
	,	27,192	60	45	58	1,933	3.2	-21.7%	39	(10)	2.8	427	1	0	1	30.3	1.6%	OK	3.981	416,476		1.011		10,462	25.4	-27.1%	705	(102)	17.7	4.112	23	22	29	103.3	1.0%
		168.639	286	252	291	9,231	13.8	-13.5%	164	(12)	9.0	1,826	9	4	5	100.0	1.1%	OR	4.242	151.713		376	508	3.577	8.9	-26.0%	220	(21)	5.2	2,149	6	8	11	50.7	1.4%
	,	1,168,684		1.836		9,284	14.6	-17.4%	1655	(299)	13.1	22.297	73	39	50	177.1	1.9%	PA	12.783	908.637		2.968		7.108	23.2	-13.3%	2124	(563)	16.6	23.381	97	62	84	182.9	2.6%
	_	652,210		-	1,325	9,655	15.2	-22.3%	966	(260)	14.3	12,281	31	23	45	181.8	1.9%	RI	1.057	122,859		354	398	11.622	33.5	-11.0%	180	(58)	17.0	2,367	15	11	11	223.9	1.9%
		331.240	729	544	573	10,470	17.2	-5.1%	252	(21)	8.0	5.321	15	14	18	168.2	1.6%	SC	5,218	495,044			2,940	9,487	51.4	-8.9%	1137	(254)	21.8	8.155	38	37	43	156.3	1.6%
KS 2	,914	291,124	31	550	697	9,991	18.9	-21.2%	300	(77)	10.3	4,482	-	22	29	153.8	1.5%	SD	893	110,871		145	147	12,420	16.2	-1.7%	92	(12)	10.3	1,847	3	2	4	206.9	1.7%
	,477	392,729	957	1,118	1,480	8,772	25.0	-24.5%	935	(207)	20.9	4,373	37	17	29	97.7	1.1%	TN	6,887	761,360	1,057	1,332	1,785	11,055	19.3	-25.4%	1250	(135)	18.2	11,057	72	23	47	160.6	1.5%
LA 4	,645	421,846	828	633	918	9,081	13.6	-31.0%	823	(229)	17.7	9,406	15	19	24	202.5	2.2%	ТХ	29,361	2,578,396	2,298	5,023	8,228	8,782	17.1	-39.0%	7874	(1,059)	26.8	41,630	134	104	196	141.8	1.6%
ME 1	,350	43,095	218	147	183	3,192	10.9	-19.5%	89	(11)	6.6	656	1	2	2	48.6	1.5%	UT	3,250	364,399	1,151	831	938	11,213	25.6	-11.4%	291	(72)	9.0	1,813	7	4	6	55.8	0.5%
MD 6	,056	373,966	986	872	1,066	6,175	14.4	-18.3%	1048	(224)	17.3	7,661	31	23	27	126.5	2.0%	VT	623	14,149	153	129	118	2,270	20.6	9.4%	42	(12)	6.7	193	2	1	1	31.0	1.4%
MA	,894	563,976	2,040	1,797	2,147	8,181	26.1	-16.3%	1029	(284)	14.9	15,686	63	47	59	227.5	2.8%	VA	8,591	557,896	2,304	2,411	2,964	6,494	28.1	-18.7%	1828	(308)	21.3	7,090	15	18	26	82.5	1.3%
MI 9	,967	633,973	1,201	1,071	1,159	6,361	10.7	-7.6%	877	(184)	8.8	16,251	91	32	36	163.1	2.6%	WA	7,694	332,007	1,200	835	1,009	4,315	10.9	-17.2%	704	-	9.2	4,803	44	18	25	62.4	1.4%
MN 5	,657	476,292	913	784	794	8,419	13.9	-1.2%	287	(33)	5.1	6,472	14	6	9	114.4	1.4%	wv	1,785	128,760	355	334	408	7,214	18.7	-18.1%	301	(63)	16.9	2,236	11	5	10	125.3	1.7%
MS 2	,967	289,532	134	695	786	9,759	23.4	-11.5%	565	(125)	19.0	6,531	7	15	22	220.1	2.3%	wı	5,833	610,055	866	767	899	10,459	13.2	-14.6%	391	(98)	6.7	6,816	18	12	17	116.9	1.1%
MO 6	,152	489,763	782	644	787	7,962	10.5	-18.1%	1281	(207)	20.8	8,011	178	39	42	130.2	1.6%	WY	582	53,531	81	79	76	9,193	13.5	3.9%	31	(10)	5.3	662	-	2	3	113.7	1.2%

Sources: Bloomberg (Reported with one-day lag due to slower reporting states), Hospitalizations from Covid Tracking Project Data, Vining Sparks

# U.S. STATE-LEVEL COVID DATA VINING

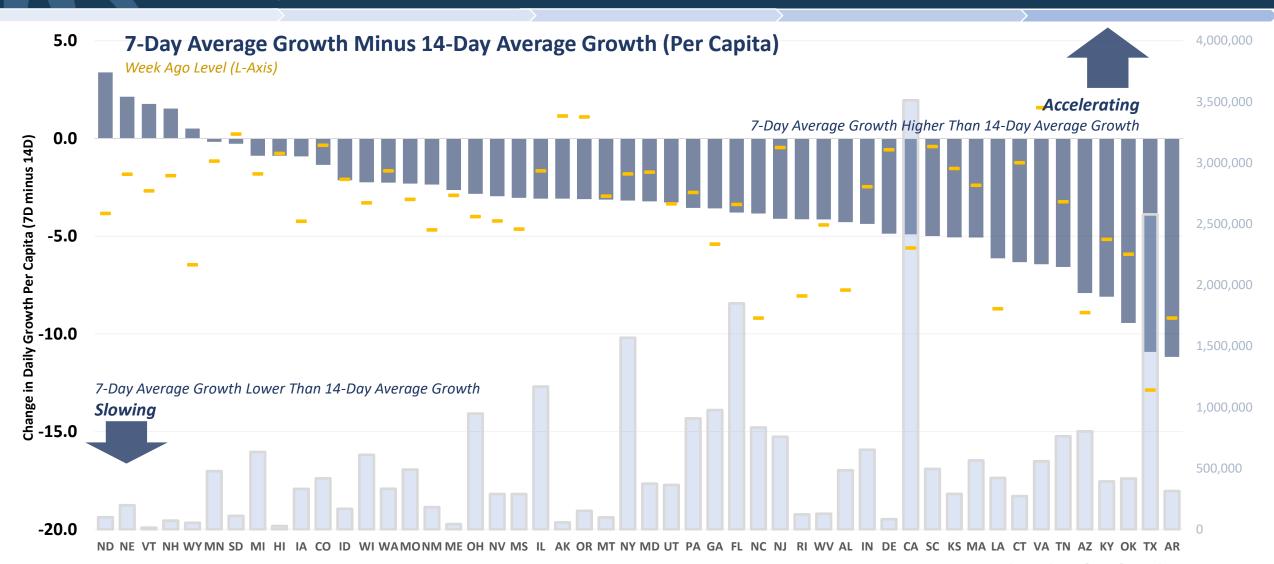




# U.S. STATE-LEVEL DATA



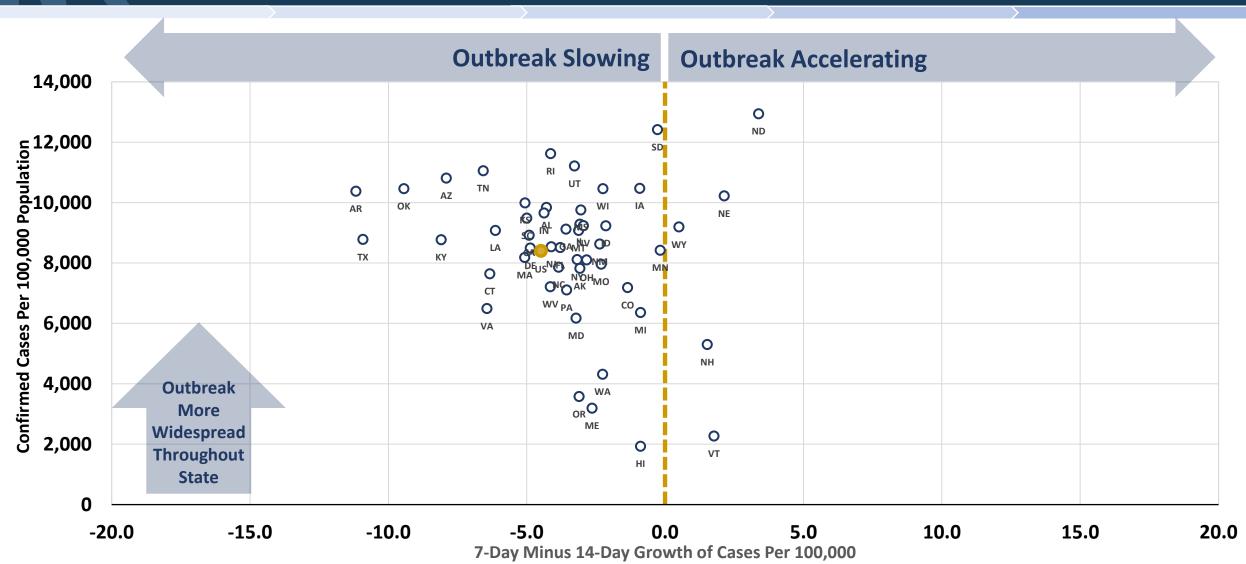
7-DAY VERSUS 14-DAY GROWTH RATES PER CAPITA: IS OUTBREAK SPREADING OR SLOWING IN EACH STATE



# U.S. STATE-LEVEL DATA



**BREADTH AND RATE OF SPREAD** 

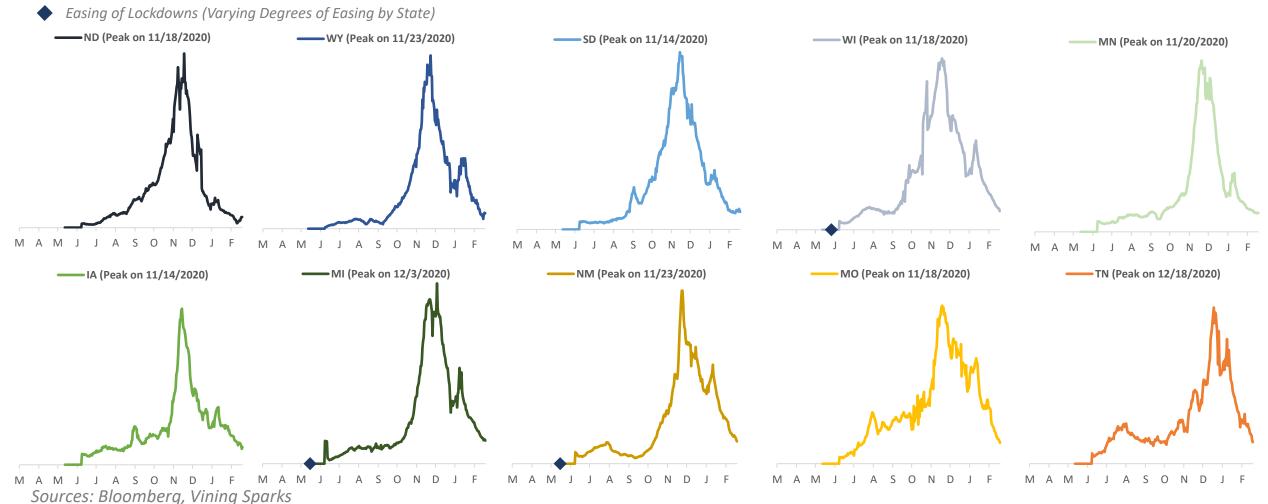




QUINTILE 1: RANKED BY SLOWEST RATES OF GROWTH (7D AVERAGE) VERSUS PEAK GROWTH (7D AVERAGE)

#### Daily Growth (7-Day Average, Scaled by State Outbreak Levels)

Statewide Lockdown Implemented (Varying Degrees of Lockdowns by State)

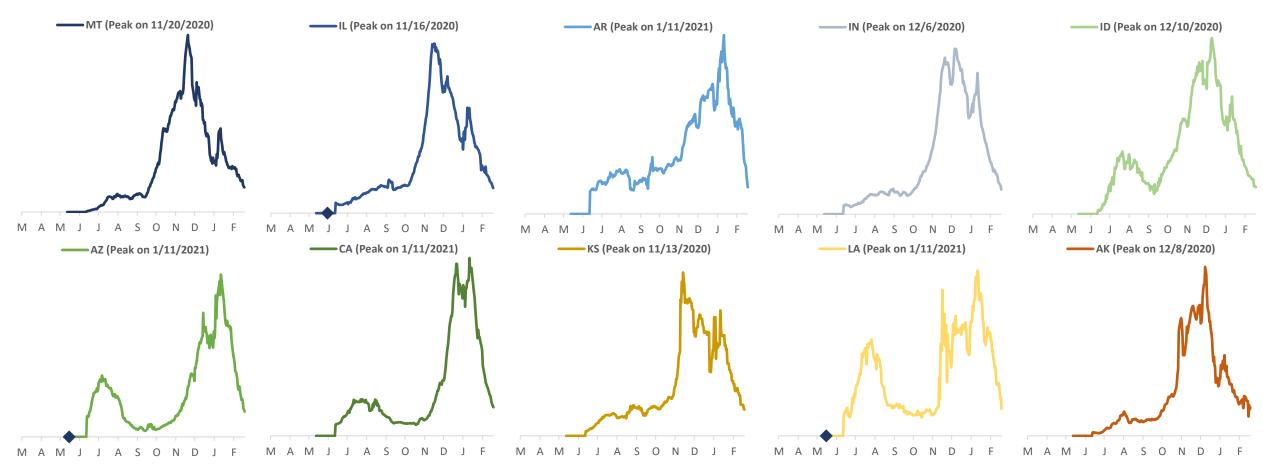




QUINTILE 2: RANKED BY SLOWEST RATES OF GROWTH (7D AVERAGE) VERSUS PEAK GROWTH (7D AVERAGE)

#### Daily Growth (7-Day Average, Scaled by State Outbreak Levels)

- Statewide Lockdown Implemented (Varying Degrees of Lockdowns by State)
- Easing of Lockdowns (Varying Degrees of Easing by State)

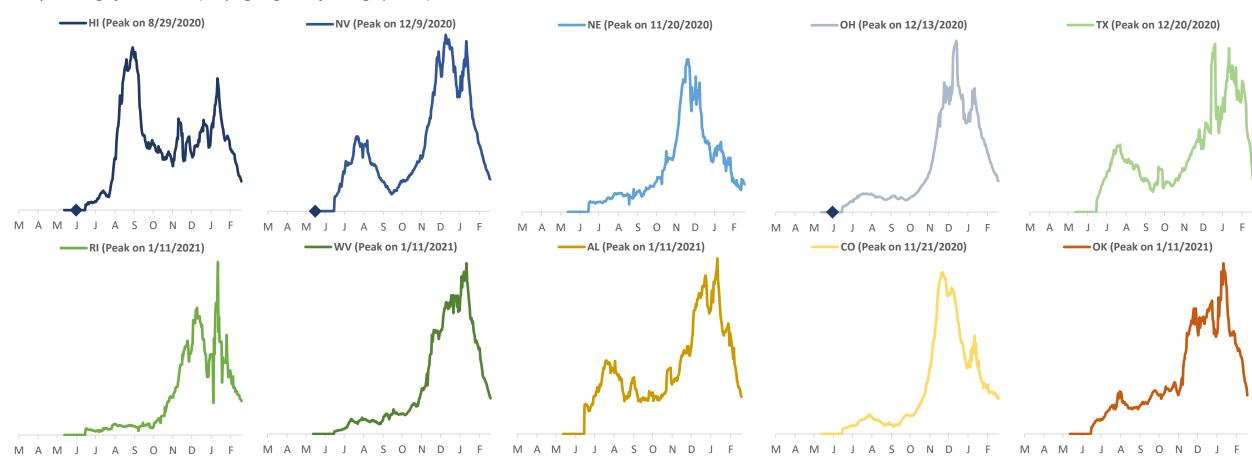




QUINTILE 3: RANKED BY SLOWEST RATES OF GROWTH (7D AVERAGE) VERSUS PEAK GROWTH (7D AVERAGE)

#### Daily Growth (7-Day Average, Scaled by State Outbreak Levels)

- Statewide Lockdown Implemented (Varying Degrees of Lockdowns by State)
- Easing of Lockdowns (Varying Degrees of Easing by State)

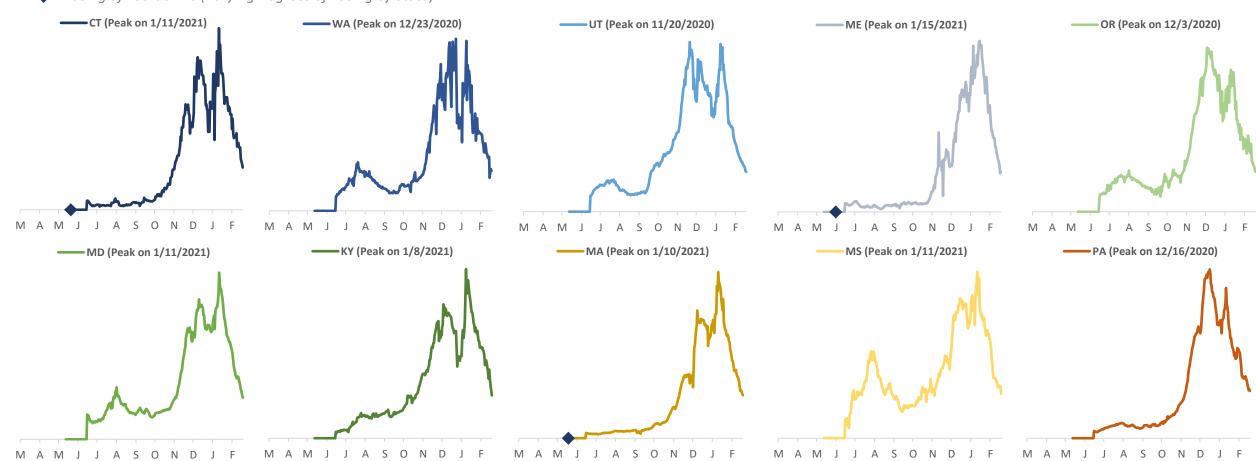




QUINTILE 4: RANKED BY SLOWEST RATES OF GROWTH (7D AVERAGE) VERSUS PEAK GROWTH (7D AVERAGE)

#### Daily Growth (7-Day Average, Scaled by State Outbreak Levels)

- Statewide Lockdown Implemented (Varying Degrees of Lockdowns by State)
- Easing of Lockdowns (Varying Degrees of Easing by State)

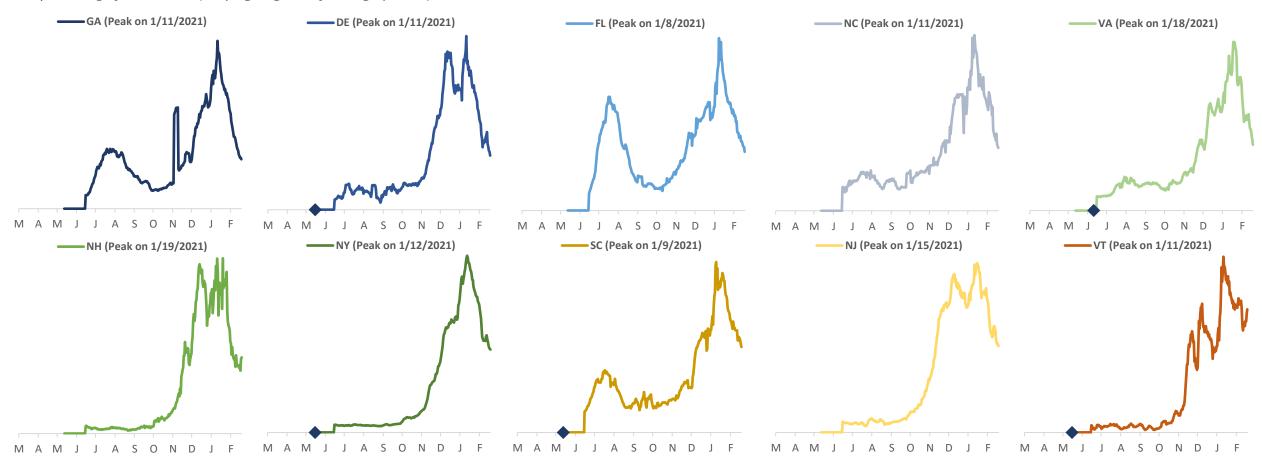




QUINTILE 5: RANKED BY SLOWEST RATES OF GROWTH (7D AVERAGE) VERSUS PEAK GROWTH (7D AVERAGE)

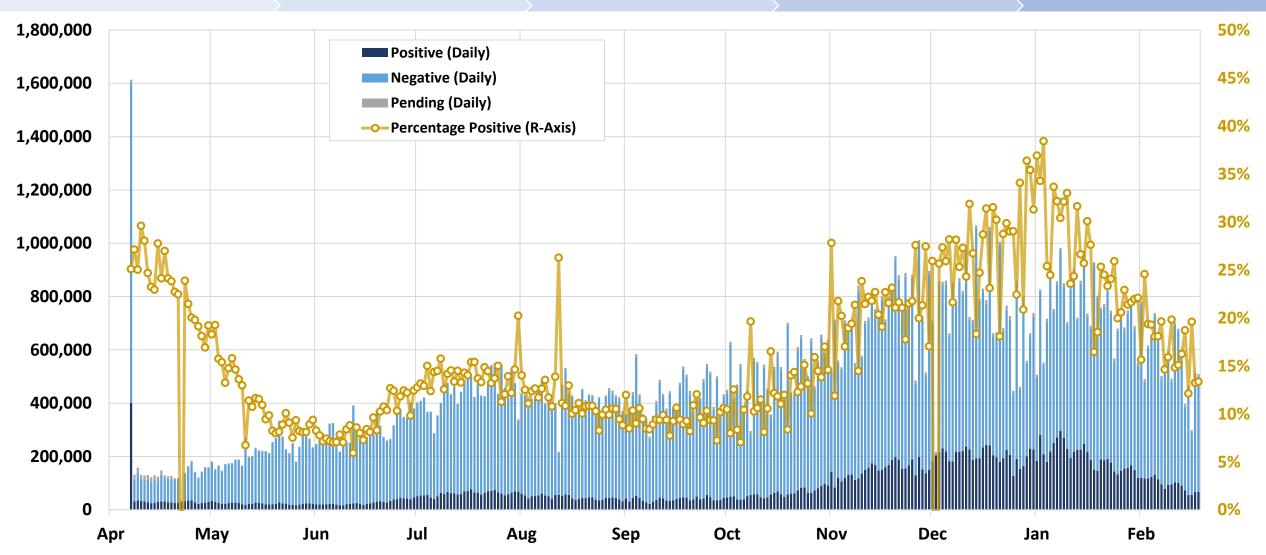
#### Daily Growth (7-Day Average, Scaled by State Outbreak Levels)

- Statewide Lockdown Implemented (Varying Degrees of Lockdowns by State)
- ◆ Easing of Lockdowns (Varying Degrees of Easing by State)



## U.S. TESTING AND RESULTS

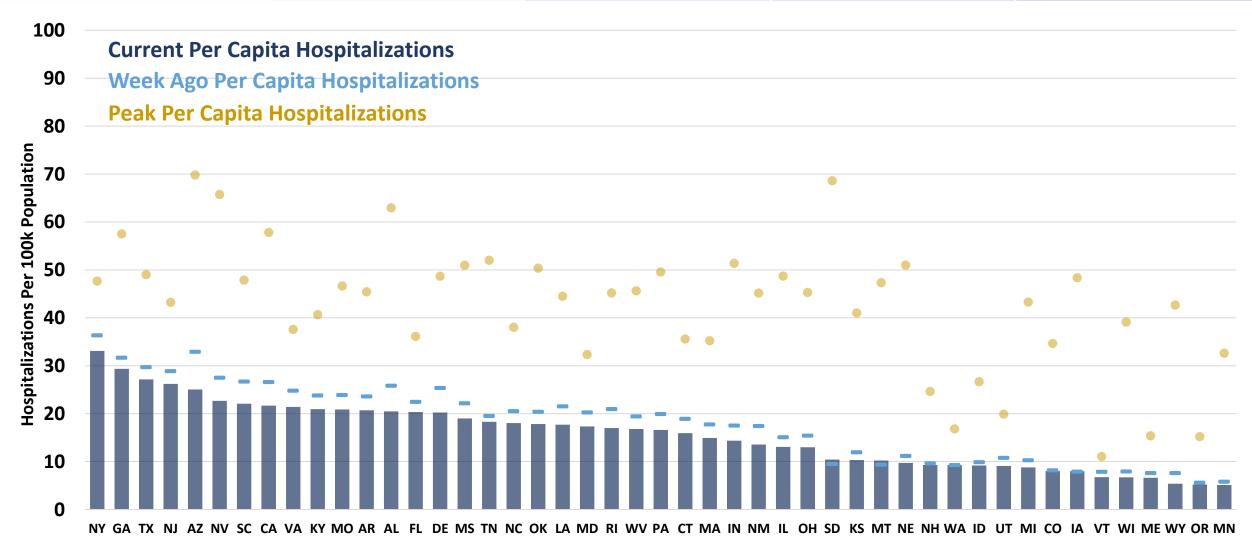




Sources: Covid Tracking Project (as Reported by State and Local Agencies), Vining Sparks

## HOSPITALIZATIONS BY STATE





#### COVID-19 CASES AND DEATHS



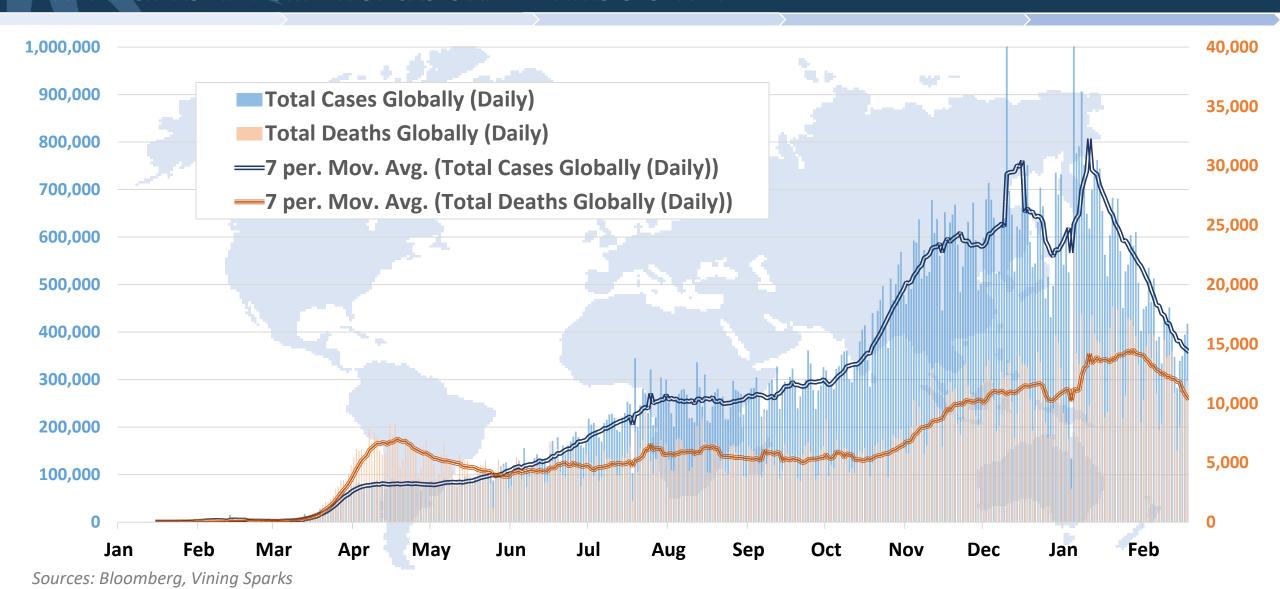
REPORTED NUMBER OF CASES AND DEATHS GLOBALLY



#### COVID-19 DAILY GROWTH



DAILY INCREASE IN NUMBER OF CASES AND DEATHS GLOBALLY



## SITUATION BY COUNTRY



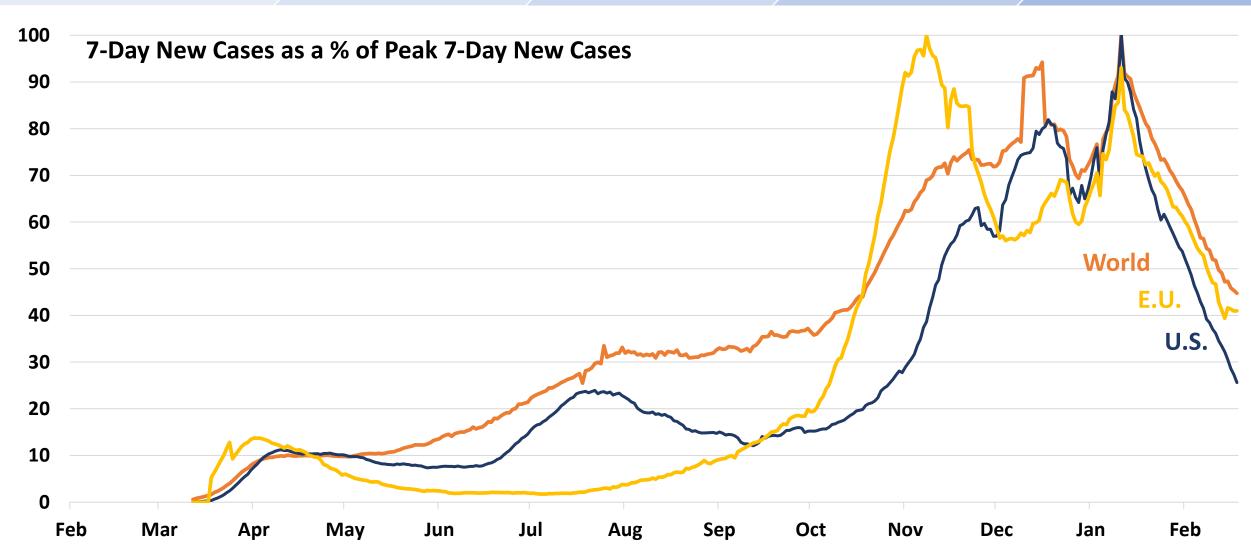
		Confirme	d Casas						
		contirme				Deaths	Reported		Case
			7D	Peak 7D			7D	Peak 7D	Fatality
	Total	New	Average	Growth	Total	New	Average	Growth	Rate
Total	110,416,763	417,995	361,067	806,936	2,443,847	11,892	10,463	14,524	2.2%
U.S.	27,896,955	71,130	72,188	281,871	493,120	2,635	2,542	3,496	1.8%
India	10,963,394	26,074	11,827	93,199	156,111	198	95	1,168	1.4%
Brazil	10,030,626	51,879	45,245	56,838	243,457	1,367	1,037	1,216	2.4%
Britain	4,095,187	12,095	12,116	66,405	119,614	455	552	1,253	2.9%
Russia	4,092,649	13,243	13,768	28,501	81,048	469	453	555	2.0%
France	3,596,156	22,518	18,599	53,741	83,542	271	370	975	2.3%
Spain	3,121,687	14,515	11,462	37,011	66,704	388	355	866	2.1%
Italy	2,765,412	13,755	11,716	35,073	94,887	347	308	814	3.4%
Turkey	2,616,600	7,241	7,453	145,044	27,821	83	91	255	1.1%
Germany	2,376,246	9,845	7,283	27,379	67,249	818	432	998	2.8%
Columbia	2,212,525	4,824	4,698	18,012	58,334	200	193	392	2.6%
Argentina	2,046,795	7,671	5,493	15,051	50,857	241	140	789	2.5%
Mexico	2,022,662	9,099	7,728	19,511	178,108	1,047	982	1,539	8.8%
Poland	1,623,218	9,074	6,255	25,611	41,823	274	201	505	2.6%
Iran	1,558,159	8,066	7,670	13,630	59,341	80	73	473	3.8%
South Africa	1,498,766	2,327	1,981	20,842	48,708	230	189	659	3.2%
Ukraine	1,340,054	6,441	4,360	14,270	26,320	174	123	236	2.0%
Indonesia	1,263,299	9,039	8,671	12,865	34,152	181	227	309	2.7%
Peru	1,261,804	7,408	6,948	8,552	44,489	252	207	747	3.5%
Czechoslovakia	1,134,957	10,930	8,329	12,955	18,913	143	138	210	1.7%
Netherlands	1,057,116	4,572	3,666	11,804	15,211	73	61	154	1.4%
Canada	842,590	3,435	2,951	9,627	21,509	70	60	186	2.6%
Portugal	792,829	1,944	2,066	12,891	15,754	105	124	291	2.0%
Chile	788,142	3,828	3,405	10,310	19,798	139	77	241	2.5%

	(	onfirme	ed Cases			Case			
			7D	Peak 7D			7D	Peak 7D	Fatality
	Total	New	Average	Growth	Total	New	Average	Growth	Rate
Belgium	746,302	2,420	1,886	19,373	21,821	28	39	333	2.9%
Israel	743,814	3,305	3,875	8,412	5,521	36	32	65	0.7%
Iraq	657,453	3,896	2,935	4,505	13,220	16	11	106	2.0%
Sweden	631,166	4,920	3,206	7,442	12,649	29	33	138	2.0%
Pakistan	568,506	1,245	1,163	6,635	12,527	39	44	123	2.2%
Phillipines	557,058	1,739	1,697	4,477	11,829	96	29	107	2.1%
Switzerland	547,775	1,219	1,040	8,237	9,880	27	21	103	1.8%
Bangladesh	542,674	391	391	3,810	8,337	15	12	45	1.5%
Morocco	480,056	477	414	5,206	8,524	7	12	80	1.8%
Austria	441,659	1,967	1,529	7,464	8,348	22	25	129	1.9%
Serbia	429,048	2,561	1,872	7,278	4,292	15	16	59	1.0%
Japan	422,718	1,518	1,327	6,453	7,361	76	71	118	1.7%
Hungary	397,116	2,853	1,735	5,685	14,145	104	84	176	3.6%
Saudi Arabia	374,029	327	330	4,418	6,450	5	4	53	1.7%
U.A.E.	365,017	3,294	3,173	3,755	1,093	18	14	14	0.3%
Lebanon	348,810	2,730	2,522	4,801	4,206	54	49	116	1.2%
Slovakia	287,752	2,555	1,992	3,260	6,350	103	92	98	2.2%
Malaysia	277,811	2,712	2,841	4,754	1,043	25	13	18	0.4%
Belarus	275,322	1,386	1,444	1,922	1,894	9	9	10	0.7%
Ecuador	269,860	1,641	1,092	2,038	15,444	50	39	597	5.7%
Georgia	267,701	365	451	4,474	3,406	9	11	46	1.3%
Croatia	239,254	365	308	3,648	5,407	24	19	79	2.3%
Bulgaria	234,428	1,086	912	3,733	9,786	42	32	140	4.2%
Azerbaijan	232,829	145	141	4,174	3,193	3	3	42	1.4%
Dom. Republic	232,780	1,043	867	1,741	3,007	17	15	24	1.3%

## GLOBAL COVID SITUATION



CASES RE-ACCELERATE AND BACK-TO-BACK HOLIDAY DIPS; NEW VARIANT TO BLAME?

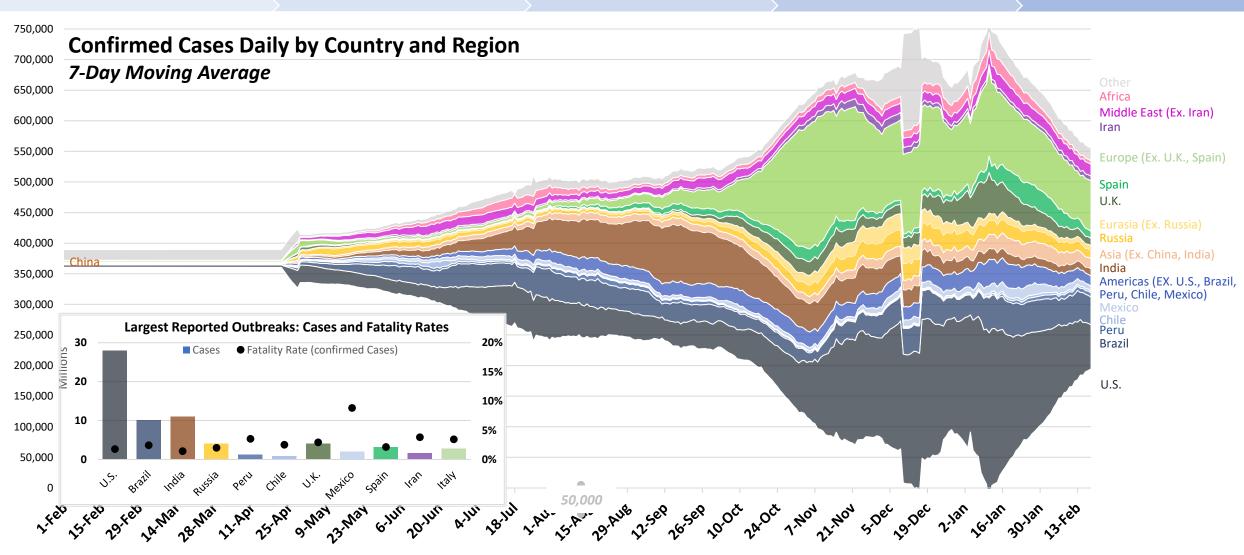


Sources: Bloomberg, Covid Tracking Project, Vining Sparks

## GLOBAL OUTBREAK



COVID OUTBREAK HAS BEEN, IS, AND WILL CONTINUE TO BE DOMINANT THEME IN ECONOMIC DISCUSSIONS

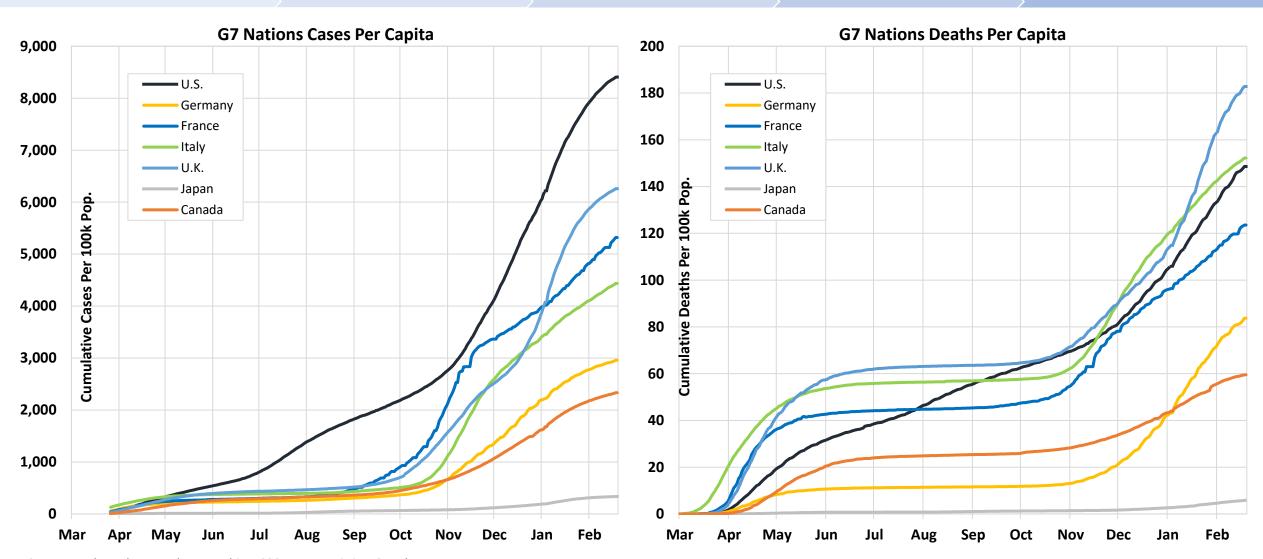


Sources: Bloomberg, Vining Sparks (\*Other includes countries not listed in top 100 outbreaks)

## G7 CASES AND DEATHS



**CUMULATIVE CASES AND DEATHS BY G7 NATION PER 100K POPULATION** 

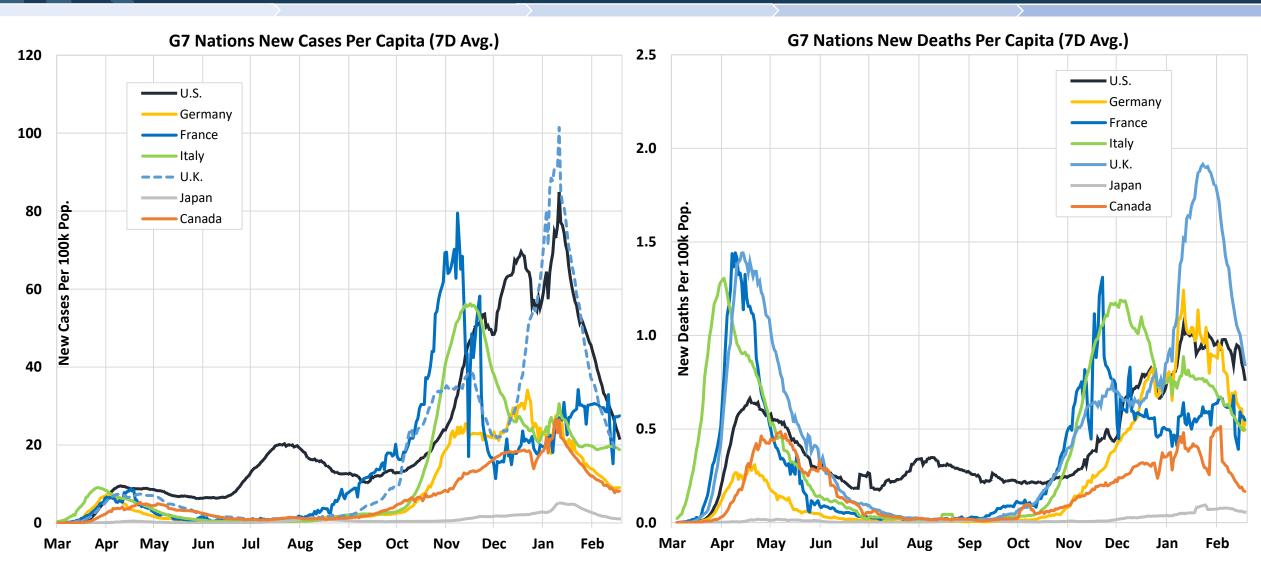


Sources: Bloomberg, Johns Hopkins CSSE Data, Vining Sparks

## G7 NEW CASES AND DEATHS VINING SPARKS



NEW CASES AND DEATHS (7-DAY AVERAGE) BY G7 NATION PER 100K POPULATION

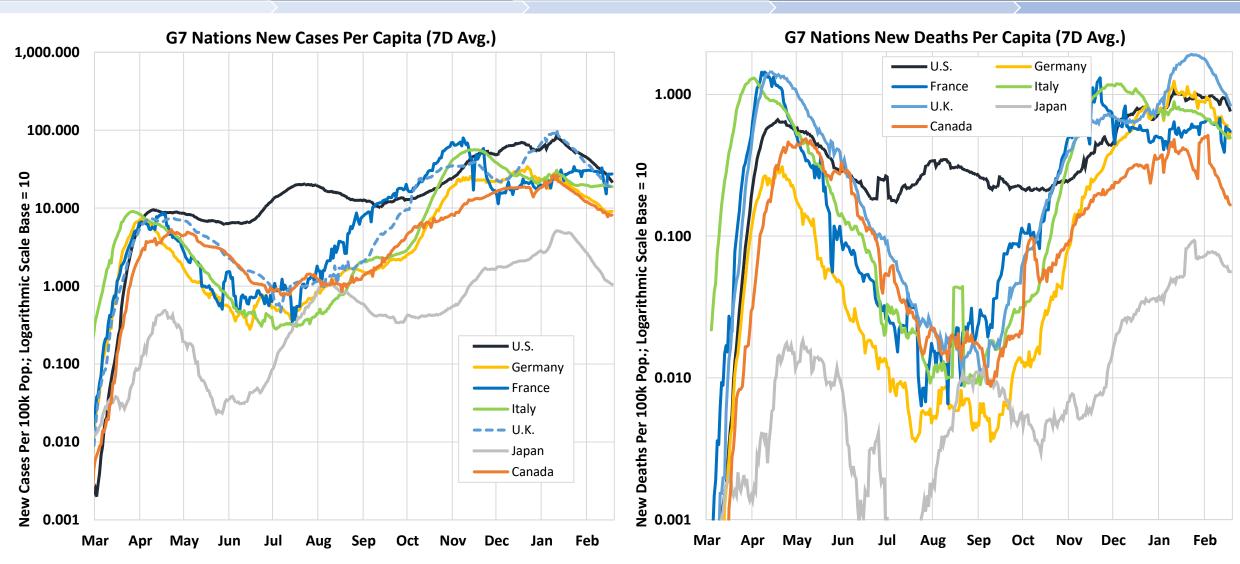


Sources: Bloomberg, Johns Hopkins CSSE Data, Vining Sparks

## G7 NEW CASES AND DEATHS VINING SPARKS



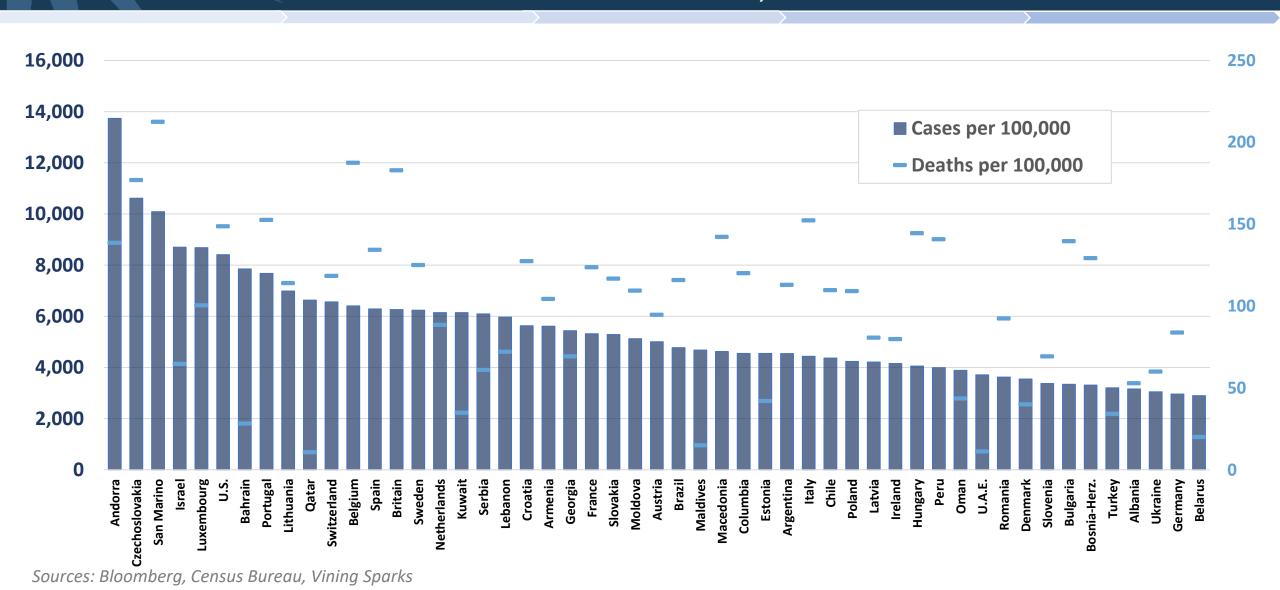
NEW CASES AND DEATHS (7-DAY AVERAGE) BY G7 NATION PER 100K POPULATION



# SITUATION BY COUNTRY



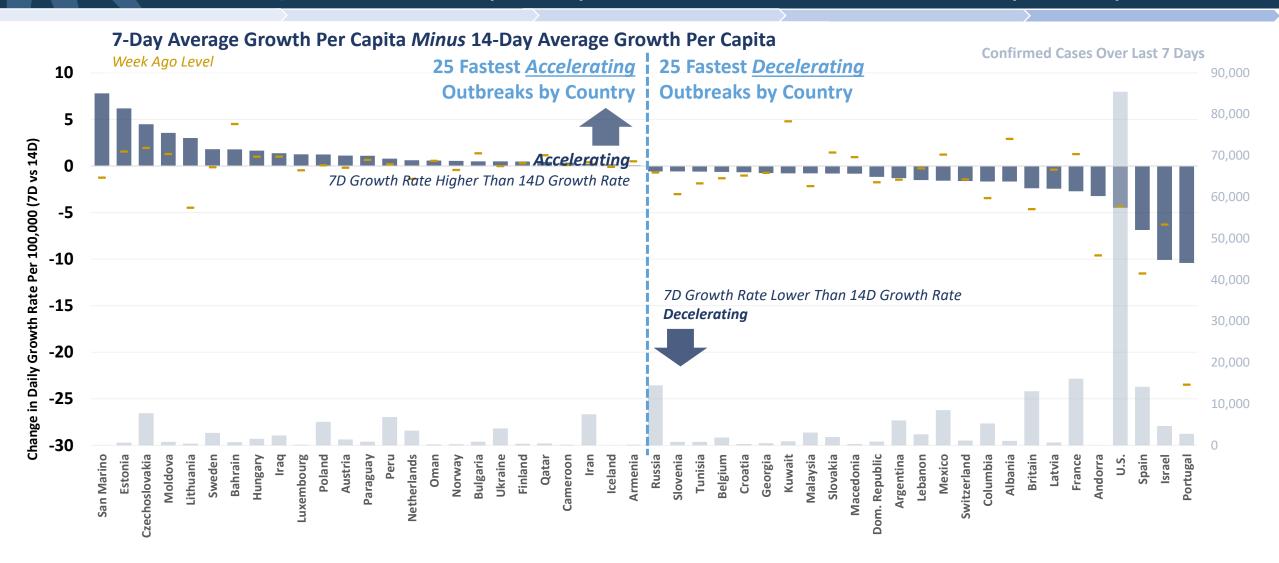
NUMBER OF CONFIRMED CASES AND REPORTED DEATHS PER 100,000 POPULATION



#### RATE OF PER CAPITA GROWTH

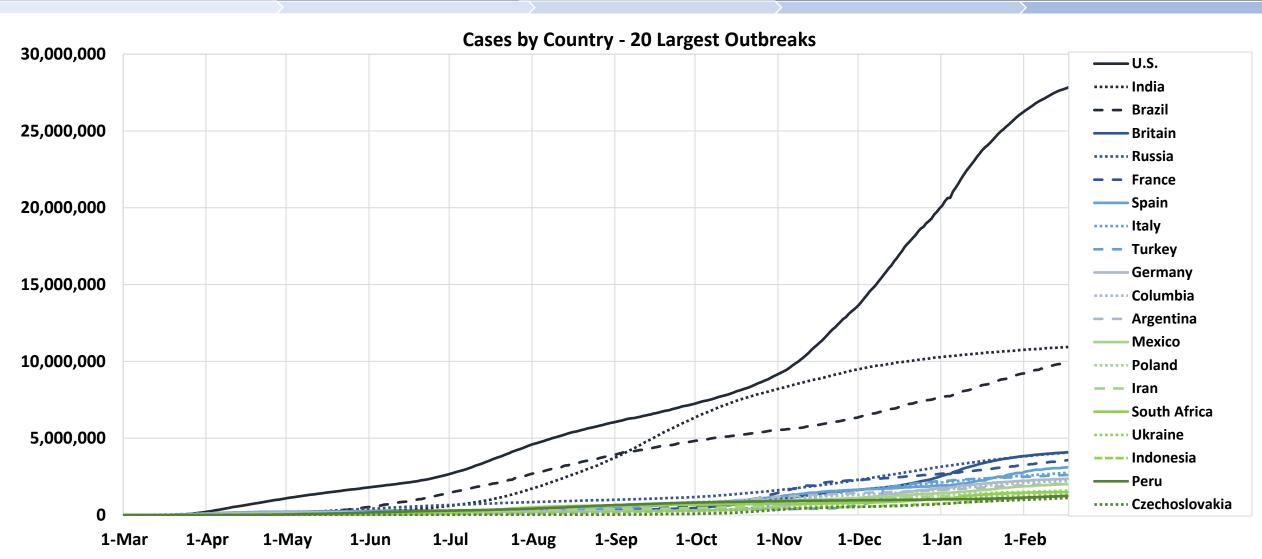


COUNTRIES BY CURRENT GROWTH RATE (7D AVG) VERSUS LONGER RUN GROWTH RATE (14D AVG)



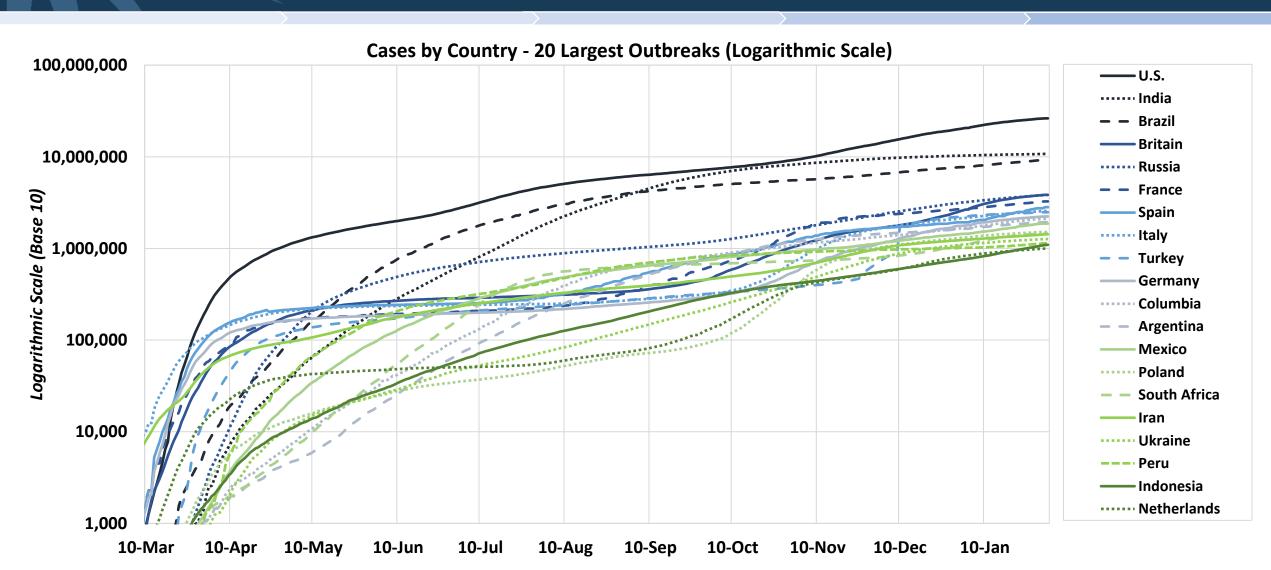
### CASE GROWTH BY COUNTRY





### CASE GROWTH BY COUNTRY

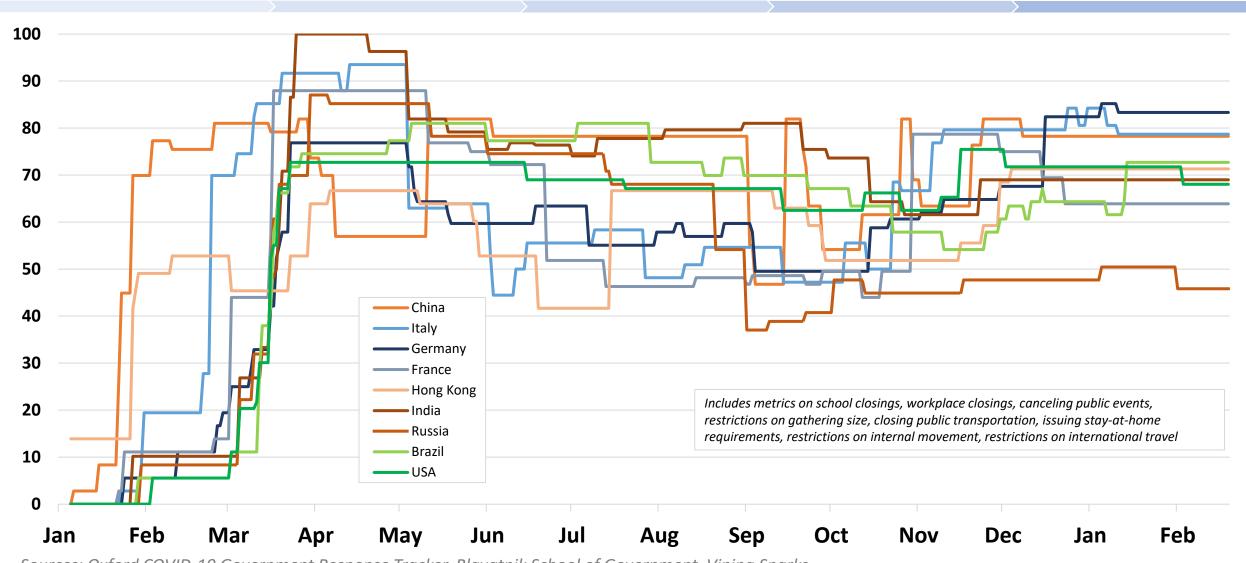




## GOVERNMENT STRINGENCY

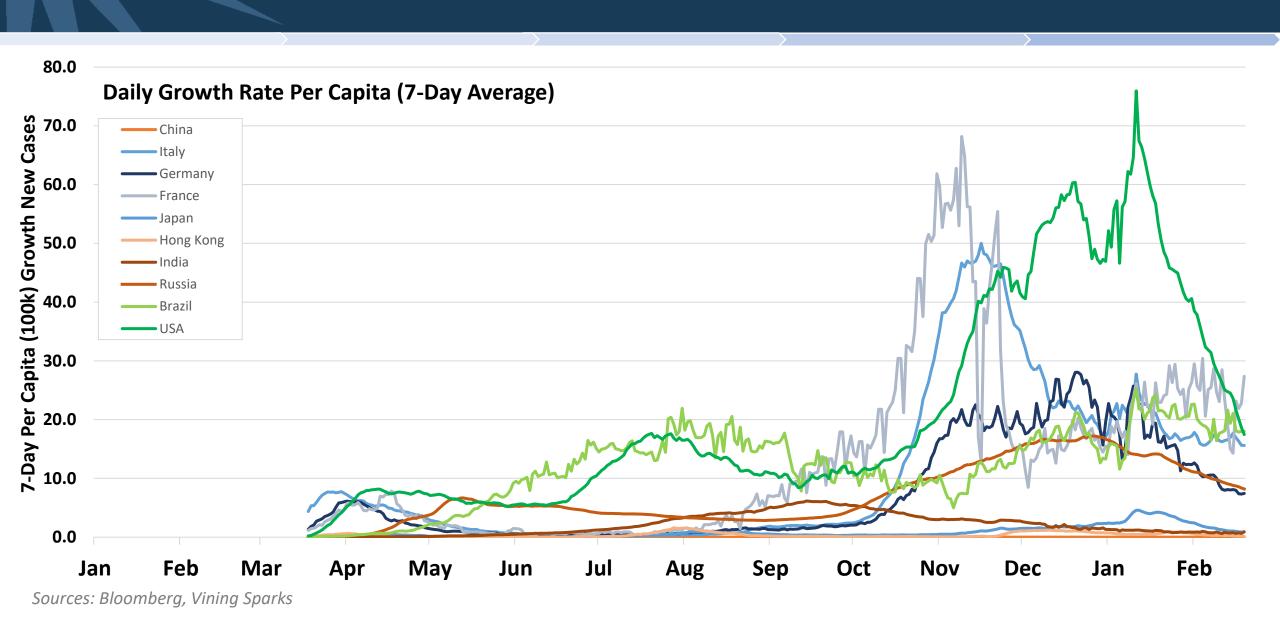


OXFORD STRINGENCY INDEX – QUANTIFYING STRINGENCY OF GOVERNMENT RESPONSES



# PER CAPITA GROWTH (7-DAY)

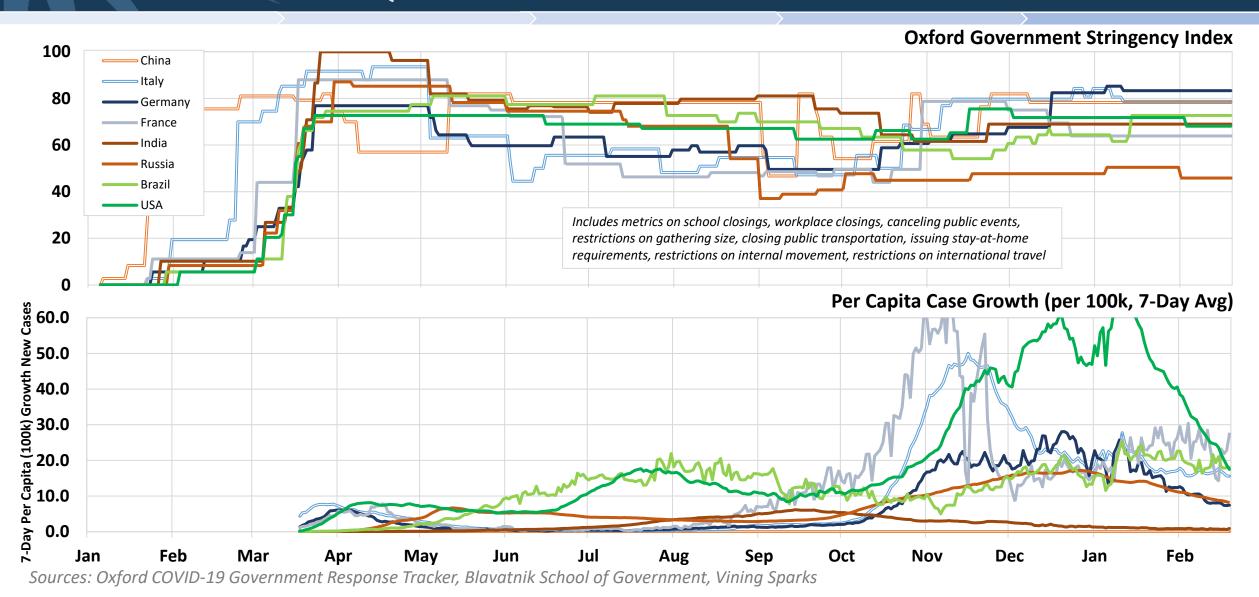




## GOVERNMENT STRINGENCY



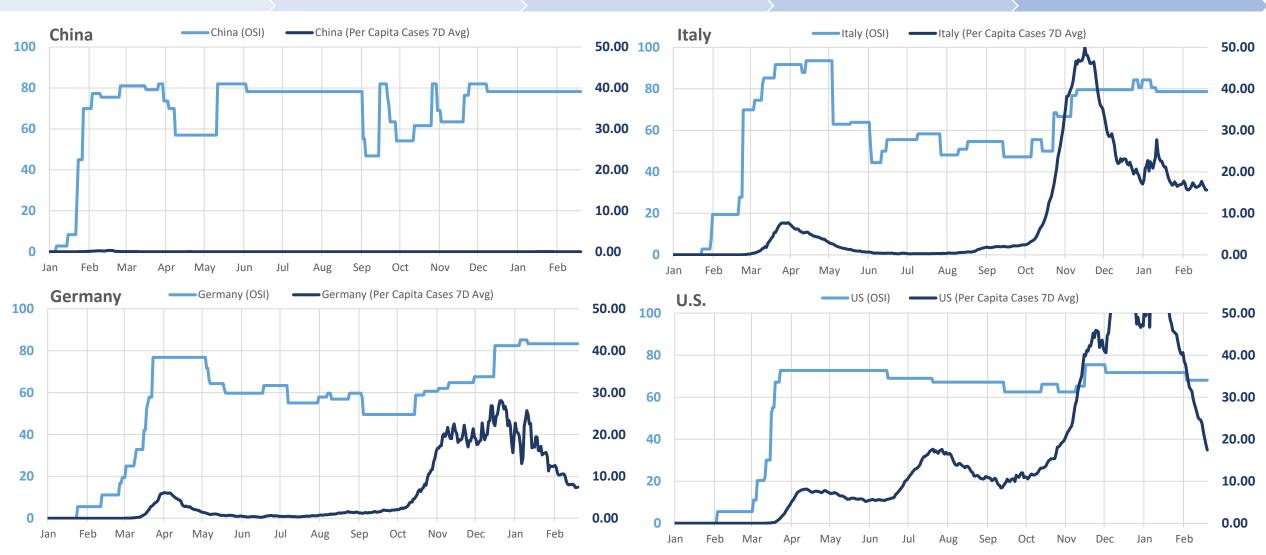
OXFORD STRINGENCY INDEX – QUANTIFYING STRINGENCY OF GOVERNMENT RESPONSES



## GOVERNMENT STRINGENCY VINING [



OXFORD STRINGENCY INDEX – QUANTIFYING STRINGENCY OF GOVERNMENT RESPONSES VS CASE GROWTH

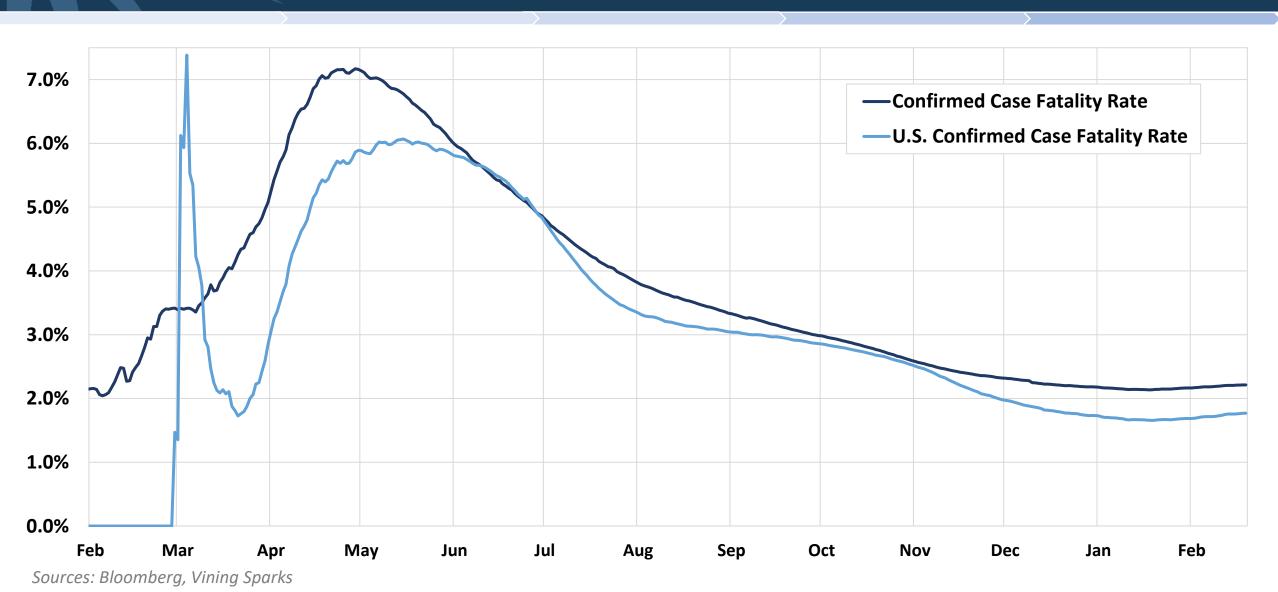


Sources: Oxford COVID-19 Government Response Tracker, Blavatnik School of Government, Vining Sparks

#### CASE FATALITY RATE

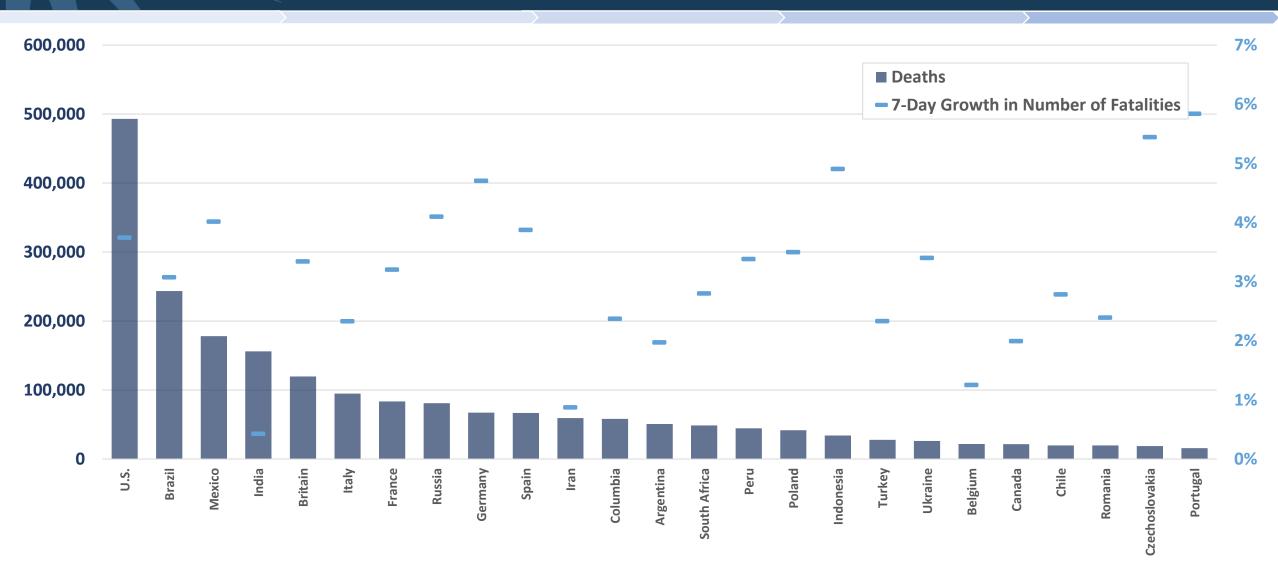


CASE FATALITY RATE OF COVID-19 HAS BEGUN TO DECLINE AS TESTING HAS INCREASED



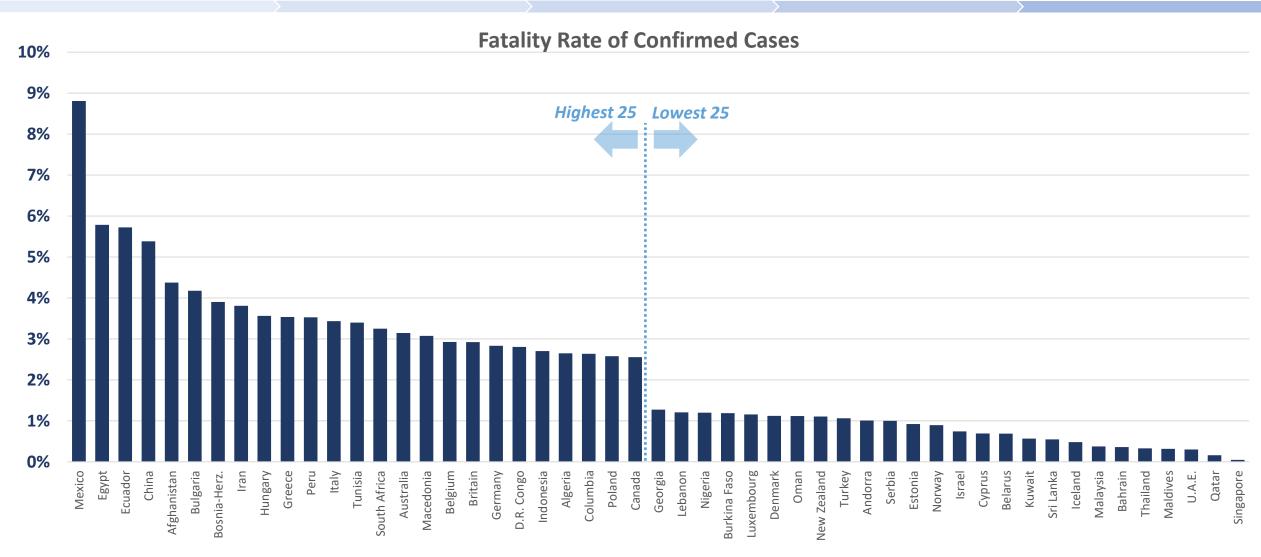
## FATALITIES BY COUNTRY





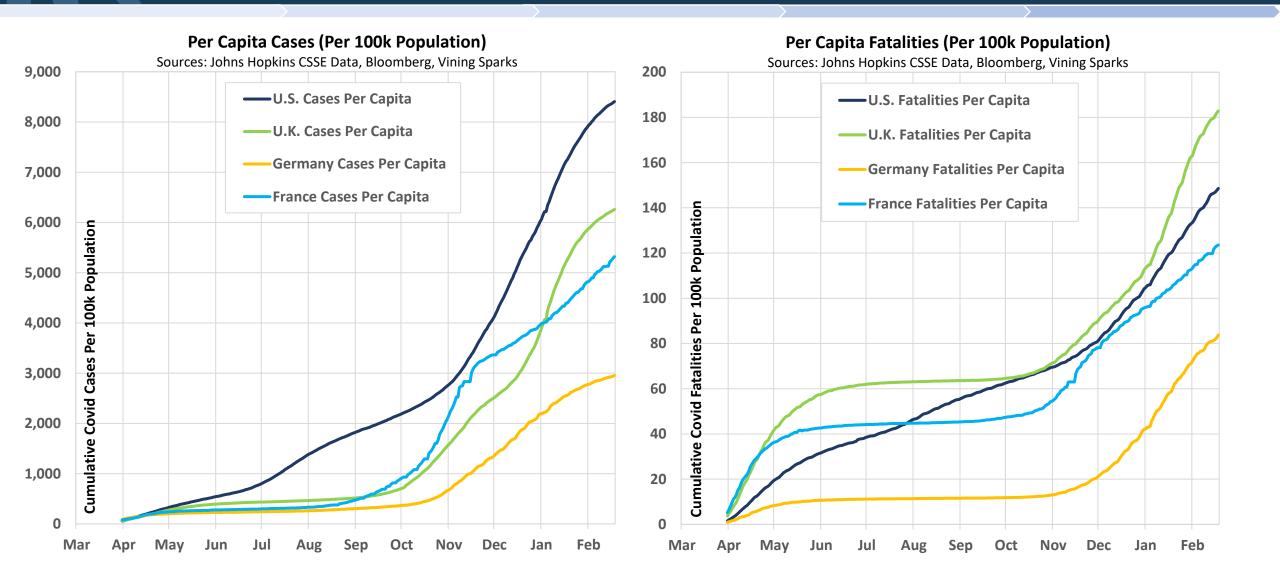
## FATALITY RATES BY COUNTRY





## PER CAPITA CASES AND FATALITIES VINING SPARKS







<sup>1</sup>According to guidance from the N.H.C. dated February 6, China will begin classifying coronavirus results into four categories: "suspected cases," "clinically diagnosed cases," "positive tests," and "confirmed cases." Only patients who test positive for the virus AND who have symptoms will be included in the count of "confirmed cases." If someone tests positive but shows no symptoms, they will be classified in the "positive tests" category and excluded from the "confirmed cases" count going forward. Link to N.H.C. Statement

<sup>2</sup> The N.H.C. begins reporting "clinically diagnosed cases," those which test positive but without the confirmation of a nucleic acid test, as "confirmed cases."

Johns Hopkins CSSE data used beginning March 18 due to lagged reporting from C.D.C. and W.H.O.

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