



# TRENDS-in-MEDICINE

## BULLETIN: UPDATE ON CORONAVIRUS 5/22

May 22, 2020  
by Lynne Peterson

### Be careful, be safe, and be well.

Outside of China, the first big flare of Covid-19, the disease caused by the SARS-CoV-2 virus, was in Europe, but, with the notable exception of the U.K. that appears to be mostly getting under control, and countries are very gradually re-opening. Then, the U.S. became the hot spot, but the U.S. now is on the downside of the coronavirus peak, and all U.S. states have started re-opening. Unfortunately, the virus is now flaring in two other disparate areas of the world: Brazil, which now has the most cases after the U.S. (330,890), and Russia, which is a close No. 3 (with 326,448).

There continue to be predictions that there will be a second wave in the U.S. in the fall, likely coinciding with the annual flu season. That likely means, the virus will cycle around the globe until there is a cure or a vaccine. President Trump said, “We’re going to put out the fires, but we’re not closing our country.”

**Worldwide**, more than 5.1 million people have been infected with the coronavirus. In the **United States**, total cases have passed the 1.6 million mark. As of May 21, the virus has killed 338,121 people worldwide, with the U.S. continuing to account for 28% of those (95,972) (See Charts 1A-D on Pages 8 and 9)

Among the **countries** we are monitoring – looking over the past 15 days, not at just one point in time:

- On what has been described as a key metric, **additional new cases per day**, there continues to be a steady level hovering around 90,000/day worldwide. However, this measure is affected by testing volume since with more testing, more cases will be found. Spain has definitely tapered down to ~500/day and Italy to ~650/day. The U.K. is still at ~2,500/day. The U.S. has flattened at ~23,000/day. But think of it this way: The U.S. has 5-times the population of the U.K. but almost 10 times the daily cases. (See Chart 5A on Page 12)
- The rate of **cases per capita** – This was initially a good way to compare what is going on in different countries, but it also is affected by testing. The rate is highest in Spain at 0.50%, followed by the U.S. at 0.48% and Italy and the U.K. (both at 0.38%). This compares to a 0.07% rate worldwide. What is interesting is that Germany (0.22%) is lower than Sweden (0.32%). (See Charts 2A-B on Page 9)
- Looking at **fatality rates** may be a better comparator:
  - In relation to reported cases, the worldwide rate is 6.5%. All of Europe except Germany (4.6%) is higher than that (12%-15.5%). The U.S. has been holding pretty steady at 6.0% lately. For the BRIC countries, Russia is incredibly low at 1.0%, India at 3.0%, China unchanged at 5.5%, and Brazil at 6.5%. Russia’s rate may spike as it gets longer into its outbreak.

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- Deaths per 100,000 people is a better way to compare countries because it isn't a function of testing. On this measure, only Germany has a lower rate (10) than the U.S. (29). The rate in Spain (59) is more than double the U.S. rate, and Italy and the U.K. are nearly double at 54. Interestingly, Sweden (39) obviously paid a price for its lack of formal lockdown. (See Charts 3A-B on Page 10)

## The world

- **WHO.** In a letter to Tedros Ghebreyesus, PhD, head of the World Health Organization, President Trump warned, "If the WHO does not commit to major substantive improvements within the next 30 days, I will make my temporary freeze of United States funding to the WHO permanent and reconsider our membership." WHO said an independent review of the global coronavirus response could begin as soon as possible, using funds from China.
- **BRIC.** China continues to report nearly flat cases and deaths (if those data are believable), but the other BRIC countries – Brazil, Russia, and India – are still in the upward trajectory. In fact, until today Russia had the second most cases in the world (after the U.S.), but it was overtaken today by Brazil, putting Russia in the No. 3 spot. What is a little unbelievable is the fatality rate in Russia; with 326,448 cases, the country claimed only 3,249 deaths. Brazil, with nearly as many cases (310,087), had six times as many deaths (20,047).
- **China** – Shanghai Disneyland opened, and it was sold out way in advance of the opening. Pictures show half empty rides and social distancing. No word yet on any coronavirus spread there.
- **Japan** – The government added India and 10 other countries to its travel ban, including Argentina, El Salvador, Pakistan, and South Africa. The U.S., all of Europe, and China were already on the incoming travel ban list.
- **U.K.** – The U.K. is the hardest hit country in Europe, with the highest total number of both cases and deaths – but the U.K.'s per capita death rate is still a hair lower than Spain or Italy.

## United States

- **U.S. fatality rate.** The first predictions from the University of Washington's Institute for Health Metrics and Evaluation (IHME) were that the U.S. fatality rate could be 100,000-250,000. That has been steadily adjusted, first down in steps to 60,000. Then, steadily up to 134,475 by August 4, 2020. On May 18, that was raised yet again and is now at 143,357 through August 2020.

With the fatality count now at 94,729 and rising daily by ~1,200, it seems likely that the 134,475 total will be met or exceeded by August 1 (70 days from now), even if the daily death total tapers down significantly.

U.S. fatalities are clustered in two ways:

- **Nursing homes and long-term care facilities.** One-third of *all* coronavirus deaths have been in nursing homes and long-term care facilities! There has been a lot of publicity about nursing home deaths in New York and New Jersey, and Gov. Andrew Cuomo has gotten a lot of criticism for his order early in the coronavirus outbreak that nursing homes had to accept Covid-19-positive patients. But consider Ohio where 70% of the coronavirus deaths (1,247 of the state's 1,781 deaths) were in nursing homes and long-term care facilities. Lockdowns that keep friends and family from visiting have not prevented these disasters.
  - **Northeast region.** The six states in the Northeast regional coronavirus alliance – New York, New Jersey, Connecticut, Massachusetts, Delaware, and Rhode Island – together account for 47% of all U.S. deaths (44,529). New York alone represents 24% of the deaths. That is not only making Americans unwilling to visit New York, but it is making other states (and their residents) nervous about having people from the northeast alliance come to their states.
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- **Hospitalizations.** Amb. Deborah Brix, MD, the White House Coronavirus Response Coordinator, said new Covid-19 hospitalizations dropped by half over the last month, from 42,558 to 21,274.
  - **Businesses.** Johns Hopkins Bloomberg School of Public Health released a toolkit to help business owners (large and small) who are considering re-opening/expanding their operations to determine their establishments' risk of transmission of the coronavirus and how to reduce it. The toolkit offers a 4-stage process for business owners to use to calculate and understand their risk, and it offers examples of mitigation measures to increase the safety of employees and customers.
  - **Churches.** President Trump announced that the Centers for Disease Control and Prevention (CDC) is issuing new guidelines declaring houses of worship as “essential places that provide essential services,” and he urged governors “to do the right thing and allow these essential places to open this week. If they don’t do it, I’ll over-ride the governors.” What is the President’s authority to over-ride a governor on this? Experts said he doesn’t have any, but the Department of Justice could go to court and try to get a judge’s order supporting the opening of churches.
  - **Contact tracing.** Johns Hopkins is offering a free course to train people to be contact tracers.
  - **Cruises.** Carnival Cruise Line intends to start cruising out of North America starting August 1, and the company said there is overwhelming demand. Apparently, Covid-19 has not frightened people away from cruising. The CDC has been working with the cruise lines to help the 10,000 crew members stranded at sea on ships to return home, saying they would disembark in U.S. waters and return home if the cruise line verified that they complied with CDC requirements.
  - **Economic situation.** Total unemployment is continuing to rise, with more than 38.6 million claims filed over the last 9 weeks, which is 23.7% of the March U.S. labor force.
  - **Healthcare workers.** At least three states – New York, North Carolina, and Pennsylvania – have or are enacting legislation that provides civil liability protections to healthcare workers on the front lines of Covid-19. And Sen. Ben Sasse (R-NE) introduced legislation – the Facilitating Innovation to Fight Coronavirus Act – that could protect radiologists and other healthcare providers from “a plague of lawsuits” by limiting malpractice lawsuits against doctors and nurses testing or treating Covid-19 patients.
  - **Pets.** Experts have now confirmed that cats and dogs can get coronavirus and can transmit it within their species. What is still not known is whether they can transmit it to people. Current advice is not to let your cat or dog run wild or socialize with other cats and dogs outside of the family – and don’t kiss your pet.
  - **Schools**
    - Colleges are still struggling with decisions about the fall semester. The University of California system canceled all on-campus classes for fall, but most other colleges and universities are resuming campus classes this fall, though many are looking to shorten the semester so that it ends before any potential second coronavirus wave starts.
    - Elementary schools and high schools also plan to resume in the fall, though they are still trying to figure out how to do that safely – how to disinfect bathrooms, provide social distancing. One idea is putting students on staggered schedules or days. Another is clear shields around each child’s desktop. But figuring out social distancing during recess and in bathrooms is more difficult. Will kids get detention for taking off their mask? Is that level of social distancing really necessary or feasible for children? President Trump suggested school should return as normal, but with older teachers, especially those with underlying health issues, to stay out of the classroom.
  - **Travel**
    - To put the drop in air travel in perspective, consider these numbers:
      - ✓ On March 1, 2020, TSA screened 2,280,522 travelers, which was down just a little from the same day last year (2,301,439).
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- ✓ On May 21, 2020, TSA screened 318,449 people (the most in the last two months). That compares to 2,673,635 the same day last year, an 88% reduction.

### U.S. states and cities

Covid-19 cases have peaked in New York and New Jersey – the two states with the highest number of Covid-19 cases. The top area *testing* positive right now is the Maryland, Virginia-Washington DC region. That is also the hot spot for more than 10% of tests turning out positive. The other hot spots are Chicago, Baltimore, and Minneapolis. Chicago and the DC, though hot, are at peak; Minneapolis is still increasing. Even though DC, Chicago, and Los Angeles remain on lockdown, there are ongoing cases, and the CDC is working to understand where the new cases are coming from and what to do to prevent them in the future.

Yet, all 50 states have, at least to some extent, lifted restrictions. Alaska lifted all restrictions completely. What re-opening means varies state-to-state. The common themes are:

- Continuing the no visitation rule for nursing homes.
  - Restricting inside seating in restaurants, but capacity restrictions vary.
  - No large gatherings or fans at sporting events.
  - Elective surgeries resumed.
  - Masks should be used in public, but that is voluntary in most states. In New York, masks are mandatory in public.
  - Barbershops and hair salons are gradually opening in most states.
  - Beaches will be open this weekend in many states, including Florida, Maryland, Texas, Massachusetts, New Jersey, and New York, but beaches remain closed in New York City and much of California.
- So far, there haven't been any coronavirus catastrophes related to the re-opening of **Florida, Georgia, and Texas**. Want to see what is happening in **your own community**? Try this link  
<https://policylab.chop.edu/covid-lab-mapping-covid-19-your-community>
- **California** – The governor said people could use some beaches, so long as they are on the wet sand, not the dry sand. Walking is okay, but not sitting or swimming.
- **Michigan** – Gov. Gretchen Whitmer extended her blanket stay-at-home order once again, this time to June 12 and the state of emergency until June 19. Michigan Attorney General Dana Nessel called President Trump “a petulant child” for not wearing a mask – as the law requires – the entire time he was in a Ford Motor Company plant on a recent visit. She also threatened to punish Ford.
- **New York** – Gov. Andrew Cuomo:
- Lifted the ban on gatherings of ≤10 people, provided they follow other social distance guidelines.
  - Expressed concern about international flights landing at New York airports from China, South Korea, the U.K., Italy, and elsewhere in Europe, saying federal screening is not sufficient.
- **Texas**
- A cellphone data study is predicting a surge in Covid-19 cases in Houston in June – along with spikes in Crawford County IA, Colfax County NE, Richmond VA, and parts of Oklahoma.
  - The Texas Restaurant Association estimates that ~12% of Texas restaurants have permanently closed due to the coronavirus.
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## Treatments

### ■ Gilead Sciences' [remdesivir](#)

- Distribution of this direct-acting antiviral (an RNA polymerase inhibitor) is now the issue. The company said it is giving 40% of the supply to the U.S. (607,000 doses), with 1.5 million doses being distributed internationally. That means supply definitely is not meeting demand.
- Anthony Fauci, MD, director of the National Institute of Allergy and Infectious Diseases (NIAID), who initially called the positive trial results “really quite important” has repeatedly said since then that the benefits of this drug are “modest.”
- Japan's Ministry of Health, Labour, and Welfare approved remdesivir to treat Covid-19 patients with severe symptoms. It may be the fastest MHLW approval yet, taking just 3 days.

### ■ [Hydroxychloroquine \(HCQ\)](#). President Trump revealed that he has been taking HCQ for about two weeks. He said his White House doctor agreed with his request for the drug – which occurred after the President's valet tested Covid-19-positive – and wrote the prescription. The President did not say whether he was also taking zinc. At least 18 other White House staffers and Secret Service agents have also tested positive for the virus.

### ■ [AbbVie's Kaletra \(lopinavir + ritonavir\)](#) – It looked like this HIV drug was tried and failed, but researchers in Hong Kong tested a triplet – Kaletra + interferon beta-1b + ribavirin – in 127 patients with mild-to-moderate Covid-19, and they reported in *The Lancet* that the combination shortened the duration of viral shedding better than Kaletra alone. They are recommending a larger trial.

### ■ Among *other therapies* to add to the long list of drugs in development to treat Covid-19 are:

- **Mallinckrodt's INOmax (inhaled [nitric oxide](#))** is being tested in an investigator-initiated study at Massachusetts General Hospital as a treatment for pulmonary complications in patients with Covid-19. Mallinckrodt is providing the drug and some funding.
- **Sorrento Therapeutics' [STI-1499](#)**. The company claims this antibody can provide 100% inhibition of Covid-19 – and could be available months before a vaccine. Co-founder/CEO Henry Ji, PhD, actually called it a “cure...a solution that works 100%.” Dr. Ji predicted that the antibody could also be used as a preventive. Sorrento also has partnered with Mount Sinai on development of a cocktail of three different antibodies for use as a prophylactic treatment for people returning to work or who have been exposed to Covid-19.
- **Androgen deprivation therapy ([ADT](#))**. Yes, a prostate cancer therapy. There is some research suggesting that ADT protects men from contracting Covid-19. A 4,532-man Italian study, published in *Annals of Oncology*, found that men being treated with ADT for prostate cancer were less likely to get Covid-19, but if they did get the virus, the disease was less severe. The study found that men had a 1.8-fold increased risk of Covid-19 infection vs. the general male population, but men on ADT had a much lower risk. Only 4 of 5,273 men on ADT developed Covid-19, and none of them died. Among 37,161 men with prostate cancer not taking ADT, 114 developed Covid-19, and 18 died. The researchers hope someone will do a clinical trial of using transient ADT in men infected with Covid-19.
- **Regeneron Pharmaceuticals**. The company is working on an antibody cocktail, based on the same platform the company used to develop REGN-EB3 for Ebola.
- **Vir Biotechnology's S309**. This antibody, first identified in a blood sample from a patient who recovered from SARS in 2003, is in a rapid development program and could start human trials soon. In a report, published in *Nature*, S309 was effective against both SARS-1 and SARS-CoV-2 by engaging with a section of the spike protein. Combining it with other, weaker, antibodies may enhance the activity, but researchers think it will work by itself.

## Vaccines

There is a lot of coronavirus noise in the news, but the real focus now is on a vaccine because it is really the only way “normal” life and travel can resume. President Trump announced the formation of Operation Warp Speed, aimed at speeding both development of an affordable vaccine and its distribution, with availability by January 2021. Two people were chosen to head Operation Warp Speed:

- Moncef Slaoui, PhD, who was on the board of directors for Moderna Therapeutics until he took on this job. He is also the former head of GlaxoSmithKline’s vaccine division. *Does this give Moderna an unfair advantage?*
- Gen. Gustave Perna, the commanding 4-star general of the U.S. Army Materiel Command. His choice makes sense because President Trump said ramping up supplies and getting them distributed around the country will be a key aim, with “every plane, truck, and soldier to help distribute [the vaccine] as soon as possible.”

Operation Warp Speed is starting with a focus on 14 vaccines, down from an initial pool of >100. President Trump said the federal government will invest in manufacturing all of the final vaccine candidates before they are approved.

WHO said that at least 8 vaccines are already in human trials. The vaccines selected for Operation Warp Speed weren’t named, but likely include:

- **AstraZeneca’ AZD-1222** – This is Oxford University’s vaccine (ChAdOx1 nCoV-19), with AstraZeneca as a partner. A >1,000-patient Phase I/II safety, immunogenicity, and efficacy study is expected to have results soon, but AstraZeneca is moving ahead with plans for the next stage. Indeed, recruitment has already begun for a 10,260-patient Phase II/III trial, testing two doses. A substudy will include children age 5-12 and adults age ≥56.
    - AstraZeneca is getting \$1.2 billion from the U.S. government (through the Biomedical Advanced Research and Development Authority, BARDA) for development and production. The U.K. government is also investing in the vaccine and will help speed up completion of a vaccine manufacturing center, but the U.K. government expects its citizens to get first access to the vaccine when and if it is proven effective.
    - A study in rhesus monkeys, available as a [preprint at \*bioRxiv.org\*](#), found that this vaccine elicited a “robust” humoral and cell-mediated response in mice. In rhesus macaques treated with the vaccine, no pneumonia was observed. And there was no evidence of immune-enhanced disease in vaccinated animals given a viral challenge, suggesting it is safe.
  - **Pfizer and BioNTech’s BNT-162**
    - A Phase I trial of this mRNA vaccine began in early May, and results are expected in mid- to late-June.
    - Four different variations of the vaccine are in initial testing, and the most successful variation will move to an ~8,000-patient Phase II trial.
    - Pfizer has been looking at farming out production of some of its standard drugs in order to be able to handle manufacturing of this vaccine and to have the ability to deliver millions of doses by the end of the year.
  - **Moderna Therapeutics’ mRNA-1273** currently has the lead in vaccine development – and the support of the NIAID – but AstraZeneca/Oxford is quickly catching up.
    - Moderna signed a deal with Lonza Group aimed at having manufacturing capacity for 1 billion doses/year.
    - The company reported positive *interim* results from a Phase I safety study in healthy volunteers. However, there are a couple of issues:
      - ✓ Three doses were tested, but it was a small trial, with only 15 participants in each dose cohort.
      - ✓ No children or elderly were dosed.
      - ✓ The vaccine was given in two intramuscular injections in the upper arm, ~28 days apart.
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- ✓ At Day 43 (two weeks after the second dose)
    - With 25 µg, the levels of binding antibodies were at levels generally seen in blood samples from people who recovered from Covid-19.
    - With 100 µg, antibody levels were “significantly” higher.
    - With 250 µg, the data are not yet available.
  - ✓ Neutralizing antibodies, which are important for protection against Covid-19, were reported in at least 8 participants (4 on 25 µg and 4 on 100 µg), *but that is far from all the patients (8 of 30)*.
  - ✓ The company said the vaccine was generally safe and well tolerated, but three patients in the 250 µg dose group developed Grade 3 systemic symptoms after the second dose. That raises questions about the viability of the 250 µg dose.
  - ✓ *Remember, the company said that it is likely that seniors will need a higher dose, maybe even 3-fold higher, but will the vaccine work at all for seniors at 25 µg or 100 µg?*
  - ✓ A 600-patient Phase II trial is already underway, and the company said it expects to begin a Phase III trial in July.
- Other vaccines that could wind up on the Operation Warp Speed short list include:
- **CureVac**
  - **Inovio Pharmaceuticals’ INO-4800**
  - **Johnson & Johnson** – We don’t hear much about this vaccine, but President Trump keeps making vague references to J&J, so maybe it deserves more attention.
  - **Novavax**
  - **Sanofi**

**There are several questions/issues with all potential vaccines:**

1. More than one vaccine will be needed if worldwide demand is going to be met.
  2. Can any of the companies make a profit on a vaccine?
  3. Will there be enough supply, even with multiple vaccines?
  4. Will a vaccine be effective worldwide, or will there be slight but significant differences in the SARS-CoV-2 virus that require different vaccines in different parts of the world?
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#1A Worldwide Covid-19 Statistics – Daily Cases									
Country	May 7			May 8			May 9		
	Cases	Deaths	Fatality rate	Cases	Deaths	Fatality rate	Cases	Deaths	Fatality rate
Worldwide	3,912,163	270,426	7.0%	3,938,064	276,863	7.0%	4,024,973	279,321	6.9%
<b>U.S.</b>	<b>1,257,023</b>	<b>75,662</b>	<b>6.0%</b>	<b>1,283,908</b>	<b>77,179</b>	<b>6.0%</b>	<b>1,309,541</b>	<b>78,794</b>	<b>6.0%</b>
Spain	221,450	26,070	11.8%	222,857	26,299	11.8%	223,578	26,478	11.8%
Italy	215,858	29,958	13.9%	217,185	30,201	13.9%	218,268	30,395	13.9%
France	174,791	25,987	14.9%	176,202	26,233	14.9%	176,782	26,313	14.9%
U.K.	206,715	30,615	14.8%	212,629	31,316	14.7%	216,525	31,662	14.6%
Germany	169,430	7,392	4.4%	170,588	7,510	4.4%	171,324	7,549	4.4%
Sweden	24,623	3,040	12.3%	25,265	3,175	12.6%	25,921	3,220	12.4%
China	83,973	4,637	5.5%	83,976	4,637	5.5%	83,990	4,637	5.5%

<https://coronavirus.jhu.edu/map.html>

[www.worldometers.info/coronavirus/country/uk/](http://www.worldometers.info/coronavirus/country/uk/)

[www.statista.com/statistics/1102203/cumulative-coronavirus-cases-in-sweden/](http://www.statista.com/statistics/1102203/cumulative-coronavirus-cases-in-sweden/)

#1B Worldwide Covid-19 Statistics – Daily Cases												
Country	May 10			May 11			May 12			May 13		
	Cases	Deaths	Fatality rate	Cases	Deaths	Fatality rate	Cases	Deaths	Fatality rate	Cases	Deaths	Fatality rate
Worldwide	4,101,482	282,700	6.9%	4,175,284	285,971	6.8%	4,262,051	291,961	6.9%	4,347,018	297,197	6.8%
<b>U.S.</b>	<b>1,329,225</b>	<b>79,525</b>	<b>6.0%</b>	<b>1,347,388</b>	<b>80,397</b>	<b>6.0%</b>	<b>1,369,574</b>	<b>82,373</b>	<b>6.0%</b>	<b>1,390,406</b>	<b>N/A</b>	<b>N/A</b>
Spain	224,350	26,621	11.9%	227,436	26,744	11.8%	228,030	26,920	11.8%	228,691	27,104	11.9%
Italy	219,070	30,560	13.9%	219,814	30,739	14.0%	221,216	30,911	14.0%	222,104	31,106	14.0%
France	177,094	26,383	14.9%	177,547	26,646	15.0%	178,349	26,994	15.1%	178,184	27,077	15.2%
U.K.	220,449	31,930	14.5%	224,332	32,141	14.3%	227,741	32,769	14.4%	230,985	33,264	14.4%
Germany	171,879	7,569	4.4%	172,576	7,661	4.4%	173,171	7,738	4.5%	174,098	7,861	4.5%
Sweden	26,322	3,225	12.3%	26,670	3,256	12.2%	--	--	--	27,909	3,460	12.4%
<b>China</b>	<b>83,994</b>	<b>4,637</b>	<b>5.5%</b>	<b>84,011</b>	<b>4,637</b>	<b>5.5%</b>	<b>84,018</b>	<b>4,637</b>	<b>5.5%</b>	<b>84,024</b>	<b>4,637</b>	<b>5.5%</b>
India	67,161	2,212	3.3%	70,768	2,294	3.2%	74,292	2,415	3.3%	78,055	2,551	3.3%
Mexico	35,022	3,465	9.9%	36,327	3,573	9.8%	38,324	2,926	7.6%	40,186	4,220	10.5%
Russia	209,688	1,915	0.9%	221,344	2,009	0.9%	232,243	2,116	0.9%	242,710	2,122	8.8%
Brazil	--	--	--	--	--	--	178,214	12,461	7.0%	190,137	13,240	7.0%

#1C Worldwide Covid-19 Statistics – Daily Cases												
Country	May 14			May 15			May 16			May 17		
	Cases	Deaths	Fatality rate	Cases	Deaths	Fatality rate	Cases	Deaths	Fatality rate	Cases	Deaths	Fatality rate
Worldwide	4,440,989	302,376	6.8%	4,542,347	307,486	6.8%	4,630,273	311,452	6.7%	4,713,769	315,187	6.7%
<b>U.S.</b>	<b>1,417,512</b>	<b>85,886</b>	<b>6.1%</b>	<b>1,442,819</b>	<b>87,530</b>	<b>6.1%</b>	<b>1,467,283</b>	<b>88,754</b>	<b>6.0%</b>	<b>1,486,757</b>	<b>89,562</b>	<b>6.0%</b>
Spain	229,540	27,321	11.9%	230,183	27,459	11.9%	230,698	27,563	11.9%	230,698	27,563	11.9%
Italy	223,096	31,368	14.1%	223,885	31,610	14.1%	224,760	31,763	14.1%	225,435	31,908	14.2%
France	178,994	27,428	15.3%	179,630	27,532	15.3%	179,630	27,532	15.3%	179,693	28,025	15.6%
U.K.	234,440	33,693	15.8%	238,004	34,078	14.3%	241,461	34,546	14.3%	244,995	34,716	14.2%
Germany	174,478	7,884	4.5%	175,233	7,897	4.5%	175,752	7,938	4.5%	176,369	7,962	4.5%
Sweden	28,582	3,529	12.3%	29,207	3,646	12.5%	29,677	3,674	12.4%	30,143	3,679	12.2%
<b>China</b>	<b>84,029</b>	<b>4,637</b>	<b>5.5%</b>	<b>84,031</b>	<b>4,637</b>	<b>5.5%</b>	<b>84,038</b>	<b>4,637</b>	<b>5.5%</b>	<b>84,054</b>	<b>4,638</b>	<b>5.5%</b>
India	81,997	2,649	3.2%	85,874	2,753	3.2%	90,648	2,871	3.2%	95,698	3,025	3.2%
Mexico	43,595	4,477	10.3%	45,032	4,767	10.6%	45,032	4,767	10.6%	49,219	5,177	10.5%
Russia	252,245	2,305	0.9%	262,843	2,418	0.9%	272,043	2,537	0.9%	281,752	2,631	0.9%
Brazil	202,918	13,993	6.9%	218,223	14,962	6.9%	233,142	15,633	6.7%	241,080	16,118	6.7%



## #1D Worldwide Covid-19 Statistics – Daily Cases

Country	May 18			May 19			May 20			May 21		
	Cases	Deaths	Fatality rate	Cases	Deaths	Fatality rate	Cases	Deaths	Fatality rate	Cases	Deaths	Fatality rate
Worldwide	4,804,167	318,527	6.6%	4,897,567	323,286	6.6%	4,995,712	328,095	6.6%	5,102,424	332,924	6.5%
<b>U.S.</b>	<b>1,508,088</b>	<b>90,347</b>	<b>6.0%</b>	<b>1,528,568</b>	<b>91,921</b>	<b>6.0%</b>	<b>1,551,853</b>	<b>93,431</b>	<b>6.0%</b>	<b>1,577,147</b>	<b>94,702</b>	<b>6.0%</b>
Spain	231,606	27,709	12.0%	232,037	27,778	12.0%	232,555	27,888	12.0%	233,037	27,940	12.0%
Italy	225,886	32,007	14.2%	226,699	32,169	14.2%	227,364	32,330	14.2%	228,006	32,486	14.2%
France	180,051	28,111	15.6%	180,933	28,242	15.5%	181,700	28,135	15.5%	181,951	28,218	15.5%
U.K.	247,709	34,876	14.1%	250,138	35,422	14.2%	249,619	35,786	14.3%	252,246	36,124	14.3%
Germany	176,551	8,003	4.5%	177,778	8,081	4.5%	178,473	8,144	4.6%	179,021	8,203	4.6%
Sweden	30,377	3,698	12.2%	30,799	3,743	12.2%	31,523	3,831	12.2%	32,172	3,871	12.0%
<b>China</b>	<b>84,063</b>	<b>4,638</b>	<b>5.5%</b>	<b>84,063</b>	<b>4,638</b>	<b>5.5%</b>	<b>84,063</b>	<b>4,638</b>	<b>5.5%</b>	<b>84,063</b>	<b>4,638</b>	<b>5.5%</b>
India	100,328	3,156	3.5%	106,475	3,302	3.1%	112,028	3,434	3.1%	118,226	3,584	3.0%
Mexico	51,633	5,332	10.3%	54,346	5,666	10.4%	56,594	6,090	10.6%	59,567	6,510	10.9%
Russia	290,678	2,722	0.9%	299,941	2,837	0.9%	308,705	2,972	1.0%	317,554	3,099	1.0%
Brazil	255,368	16,853	6.6%	271,885	17,983	6.6%	291,579	18,859	6.5%	310,087	20,047	6.5%

## #2A Worldwide Per Capita Case Rate

Country	Population	May 7	May 8	May 9	May 10	May 11	May 12	May 13
Worldwide	7,577 million	0.05%	0.05%	0.05%	0.5%	0.06%	0.06%	0.06%
<b>U.S.</b>	<b>330 million</b>	<b>0.38%</b>	<b>0.39%</b>	<b>0.40%</b>	<b>0.40%</b>	<b>0.41%</b>	<b>0.42%</b>	<b>0.42%</b>
Spain	47 million	0.47%	0.49%	0.48%	0.48%	0.48%	0.49%	0.49%
Italy	60 million	0.36%	0.36%	0.36%	0.37%	0.37%	0.37%	0.37%
France	67 million	0.26%	0.26%	0.26%	0.26%	0.26%	0.27%	0.27%
U.K.	67 million	0.31%	0.32%	0.32%	0.33%	0.33%	0.34%	0.34%
Germany	83 million	0.20%	0.21%	0.21%	0.21%	0.21%	0.21%	0.21%
Sweden	10 million	0.25%	0.25%	0.26%	0.26%	0.27%	—	0.28%
<b>China</b>	<b>1,386 million</b>	<b>0.006%</b>	<b>0.006%</b>	<b>0.006%</b>	<b>0.006%</b>	<b>0.006%</b>	<b>0.006%</b>	<b>0.006%</b>
India	1,353 million	—	—	—	—	0.005%	0.005%	0.006%
Mexico	126 million	—	—	—	—	0.03%	0.03%	0.06%
Russia	145 million	—	—	—	—	0.15%	0.16%	0.17%
Brazil	210 million	—	—	—	—	—	0.08%	0.09%

## #2B Worldwide Per Capita Case Rate

Country	Population	May 14	May 15	May 16	May 17	May 18	May 19	May 20	May 21
Worldwide	7,577 million	0.06%	0.06%	0.06%	0.06%	0.06%	0.06%	0.06%	0.07%
<b>U.S.</b>	<b>330 million</b>	<b>0.43%</b>	<b>0.44%</b>	<b>0.44%</b>	<b>0.45%</b>	<b>0.46%</b>	<b>0.46%</b>	<b>0.47%</b>	<b>0.48%</b>
Spain	47 million	0.49%	0.49%	0.49%	0.49%	0.49%	0.49%	0.49%	0.50%
Italy	60 million	0.37%	0.37%	0.37%	0.38%	0.38%	0.38%	0.38%	0.38%
France	67 million	0.27%	0.27%	0.27%	0.27%	0.27%	0.27%	0.27%	0.27%
U.K.	67 million	0.35%	0.36%	0.36%	0.37%	0.37%	0.37%	0.37%	0.38%
Germany	83 million	0.21%	0.21%	0.21%	0.21%	0.21%	0.21%	0.22%	0.22%
Sweden	10 million	0.29%	0.29%	0.30%	0.30%	0.30%	0.31%	0.32%	0.32%
<b>China</b>	<b>1,386 million</b>	<b>0.006%</b>	<b>0.006%</b>	<b>0.006%</b>	<b>0.006%</b>	<b>0.006%</b>	<b>0.006%</b>	<b>0.006%</b>	<b>0.006%</b>
India	1,353 million	0.006%	0.006%	0.007%	0.007%	0.007%	0.008%	0.008%	0.009%
Mexico	126 million	0.03%	0.04%	0.04%	0.04%	0.04%	0.04%	0.04%	0.05%
Russia	145 million	0.17%	0.20%	0.19%	0.19%	0.20%	0.21%	0.21%	0.22%
Brazil	210 million	0.11%	0.12%	0.13%	0.11%	0.12%	0.13%	0.13%	0.15%

#3A Worldwide Per Capita *Fatality* Rate: Deaths per 100,000 People

Country	Population	May 7	May 8	May 9	May 10	May 11	May 12	May 13
Worldwide	7,577 million	3.6	3.7	3.7	3.7	3.8	3.9	3.9
<b>U.S.</b>	<b>330 million</b>	<b>23</b>	<b>23</b>	<b>24</b>	<b>24</b>	<b>24</b>	<b>25</b>	<b>26</b>
Spain	47 million	55	56	56	57	57	57	58
Italy	60 million	50	50	51	51	51	52	52
France	67 million	39	39	39	39	40	40	40
U.K.	67 million	46	47	47	48	48	49	50
Germany	83 million	9	9	9	9	9	9	9
Sweden	10 million	30	32	32	32	33	34	35
<b>China</b>	<b>1,386 million</b>	<b>0.33</b>	<b>0.33</b>	<b>0.33</b>	<b>0.33</b>	<b>0.33</b>	<b>0.33</b>	<b>0.33</b>
India	1,353 million	--	--	--	0.16	0.17	0.18	0.19
Mexico	126 million	--	--	--	0.3	0.3	0.3	0.3
Russia	145 million	--	--	--	1.3	1.4	1.5	1.5
Brazil	210 million	--	--	--	--	--	6	6

#3B Worldwide Per Capita *Fatality* Rate: Deaths per 100,000 People

Country	Population	May 14	May 15	May 16	May 17	May 18	May 19	May 20	May 21
Worldwide	7,577 million	4.0	4.1	4.1	4.2	4.2	4.3	4.3	4.4
<b>U.S.</b>	<b>330 million</b>	<b>26</b>	<b>27</b>	<b>27</b>	<b>27</b>	<b>27</b>	<b>28</b>	<b>28</b>	<b>29</b>
Spain	47 million	58	58	59	59	59	59	59	59
Italy	60 million	52	53	53	53	53	54	54	54
France	67 million	41	41	41	42	42	42	42	42
U.K.	67 million	50	51	52	52	52	53	53	54
Germany	83 million	9	10	10	10	10	10	10	10
Sweden	10 million	35	36	37	37	37	37	38	39
<b>China</b>	<b>1,386 million</b>	<b>0.33</b>	<b>0.33</b>	<b>0.33</b>	<b>0.33</b>	<b>0.33</b>	<b>0.33</b>	<b>0.33</b>	<b>0.33</b>
India	1,353 million	0.20	0.20	0.21	0.22	0.23	0.24	0.25	0.26
Mexico	126 million	0.4	0.4	0.4	0.4	0.4	0.4	0.5	0.5
Russia	145 million	1.6	1.7	1.7	1.8	1.9	2	2	2
Brazil	210 million	7	7	7	8	8	9	9	10

## #4A U.S. Covid-19 Statistics – Daily Cases

State	May 7			May 8			May 9		
	Cases	Deaths	Fatality rate	Cases	Deaths	Fatality rate	Cases	Deaths	Fatality rate
California	60,614	2,504	4.1%	62,512	2,585	3.9%	64,561	2,678	4.1%
<b>Florida</b>	<b>38,828</b>	<b>1,667</b>	<b>4.3%</b>	<b>39,199</b>	<b>1,738</b>	<b>4.4%</b>	<b>40,001</b>	<b>1,785</b>	<b>4.5%</b>
Georgia	31,499	1,336	4.2%	32,106	1,377	4.3%	35,532	1,400	3.9%
Illinois	70,873	3,111	4.4%	73,760	3,241	4.4%	76,085	3,349	4.4%
Louisiana	30,652	2,208	7.2%	30,855	2,227	7.2%	31,417	2,267	7.2%
Massachusetts	73,721	4,552	6.2%	75,333	4,702	6.2%	76,743	4,840	6.3%
Michigan	45,646	4,343	9.5%	46,326	4,393	9.5%	46,756	4,526	9.7%
New Jersey	133,635	8,801	6.6%	135,454	8,952	6.6%	137,085	9,116	6.6%
<b>New York</b>	<b>327,649</b>	<b>20,828</b>	<b>6.4%</b>	<b>330,407</b>	<b>21,045</b>	<b>6.4%</b>	<b>333,122</b>	<b>21,271</b>	<b>6.4%</b>
<b>Texas</b>	<b>35,590</b>	<b>973</b>	<b>2.7%</b>	<b>36,609</b>	<b>1,004</b>	<b>2.7%</b>	<b>37,860</b>	<b>1,049</b>	<b>2.8%</b>
Washington	17,003	870	5.1%	17,246	891	5.2%	17,365	905	5.2%

Source: <https://covidtracking.com/data/>

## #4B U.S. Covid-19 Statistics – Daily Cases

Country	May 10			May 11			May 12			May 13		
	Cases	Deaths	Fatality rate	Cases	Deaths	Fatality rate	Cases	Deaths	Fatality rate	Cases	Deaths	Fatality rate
California	66,680	2,745	4.1%	67,939	2,770	4.1%	69,382	2,847	4.1%	71,141	2,934	4.1%
<b>Florida</b>	<b>40,596</b>	<b>1,791</b>	<b>4.4%</b>	<b>40,982</b>	<b>1,805</b>	<b>4.4%</b>	<b>41,923</b>	<b>1,849</b>	<b>4.4%</b>	<b>42,402</b>	<b>1,898</b>	<b>4.5%</b>
Georgia	33,441	1,405	4.2%	33,927	1,441	4.2%	34,635	1,461	4.2%	35,332	1,505	4.3%
Illinois	77,741	3,406	4.4%	79,007	3,459	4.4%	83,021	3,601	4.3%	84,698	3,792	4.5%
Louisiana	31,600	2,286	7.2%	31,815	2,308	7.3%	32,050	2,347	7.3%	32,662	2,381	7.3%
Massachusetts	77,793	4,979	6.4%	78,462	5,108	6.5%	79,332	5,141	6.5%	80,497	5,315	6.6%
Michigan	47,138	4,551	9.7%	47,552	4,584	9.6%	48,021	4,674	9.7%	48,391	4,714	9.7%
New Jersey	138,532	9,255	6.7%	139,945	9,310	6.7%	140,743	9,508	6.8%	141,560	9,702	6.9%
<b>New York</b>	<b>335,395</b>	<b>21,478</b>	<b>6.4%</b>	<b>337,055</b>	<b>21,640</b>	<b>6.4%</b>	<b>338,485</b>	<b>21,845</b>	<b>6.5%</b>	<b>340,661</b>	<b>22,013</b>	<b>6.5%</b>
Texas	38,869	1,088	2.8%	39,869	1,100	2.8%	41,048	1,133	2.8%	42,403	1,158	2.7%
Washington	17,416	921	5.3%	17,697	931	5.3%	17,933	945	5.3%	18,200	962	5.3%

## #4C U.S. Covid-19 Statistics – Daily Cases

Country	May 14			May 15			May 16			May 17		
	Cases	Deaths	Fatality rate	Cases	Deaths	Fatality rate	Cases	Deaths	Fatality rate	Cases	Deaths	Fatality rate
California	73,164	3,032	4.1%	74,936	3,108	4.1%	76,793	3,204	4.2%	78,889	3,261	4.1%
<b>Florida</b>	<b>43,210</b>	<b>1,948</b>	<b>4.5%</b>	<b>43,210</b>	<b>1,991</b>	<b>4.6%</b>	<b>44,811</b>	<b>2,040</b>	<b>4.6%</b>	<b>45,588</b>	<b>2,049</b>	<b>4.5%</b>
Georgia	35,858	1,527	4.3%	36,681	1,557	4.2%	37,147	1,592	4.3%	37,701	1,606	4.3%
Illinois	87,937	3,928	4.5%	90,369	4,058	4.5%	92,457	4,129	4.5%	94,191	4,177	4.4%
Louisiana	33,489	2,417	7.2%	33,837	2,448	7.2%	34,117	2,479	7.3%	34,432	2,491	7.2%
Massachusetts	82,182	5,482	6.7%	83,421	5,592	6.7%	84,933	5,705	6.7%	86,010	5,797	6.7%
Michigan	49,592	4,787	9.7%	50,079	4,825	9.6%	50,504	4,880	9.7%	51,142	4,891	9.6%
New Jersey	142,704	9,946	7.0%	143,905	10,138	7.0%	145,089	10,249	7.1%	146,334	10,356	7.1%
<b>New York</b>	<b>343,051</b>	<b>22,170</b>	<b>6.5%</b>	<b>345,813</b>	<b>22,304</b>	<b>6.4%</b>	<b>348,232</b>	<b>22,478</b>	<b>6.5%</b>	<b>350,121</b>	<b>22,619</b>	<b>6.5%</b>
Texas	43,851	1,216	2.8%	45,198	1,272	2.8%	46,999	1,305	2.8%	47,784	1,336	2.8%
Washington	18,425	975	5.3%	18,555	983	5.3%	18,585	992	5.3%	18,590	1,000	5.4%

## #4D U.S. Covid-19 Statistics – Daily Cases

Country	May 18			May 19			May 20			May 21		
	Cases	Deaths	Fatality rate	Cases	Deaths	Fatality rate	Cases	Deaths	Fatality rate	Cases	Deaths	Fatality rate
California	80,430	3,302	4.1%	81,795	3,334	4.1%	84,057	3,436	4.1%	86,197	3,542	4.1%
<b>Florida</b>	<b>46,442</b>	<b>2,073</b>	<b>4.5%</b>	<b>46,944</b>	<b>2,129</b>	<b>4.5%</b>	<b>47,471</b>	<b>2,173</b>	<b>4.6%</b>	<b>48,675</b>	<b>2,222</b>	<b>4.6%</b>
Georgia	38,081	1,642	4.3%	38,721	1,664	4.3%	39,647	1,687	4.3%	40,405	1,754	4.3%
Illinois	96,485	4,234	4.4%	98,030	4,379	4.5%	100,418	4,525	4.5%	102,686	4,607	4.5%
Louisiana	34,709	2,563	7.4%	35,038	2,581	7.4%	35,316	2,608	7.4%	36,504	2,629	7.2%
Massachusetts	86,010	5,797	6.7%	87,925	5,938	6.8%	88,970	6,066	6.8%	90,084	6,148	6.8%
Michigan	51,915	4,915	9.5%	52,350	5,017	9.6%	53,009	5,060	9.5%	53,510	5,219	9.8%
New Jersey	148,039	10,435	7.0%	149,013	10,586	7.1%	150,399	10,747	7.1%	151,472	10,843	7.2%
<b>New York</b>	<b>351,371</b>	<b>22,729</b>	<b>6.5%</b>	<b>352,845</b>	<b>22,843</b>	<b>6.5%</b>	<b>354,370</b>	<b>22,976</b>	<b>6.5%</b>	<b>356,458</b>	<b>23,083</b>	<b>6.5%</b>
Texas	48,693	1,347	2.8%	49,912	1,369	2.7%	51,323	1,419	2.8%	51,323	1,419	2.8%
Washington	18,433	1,001	5.4%	18,611	1,002	5.4%	18,811	1,031	5.5%	18,971	1,037	5.5%

## The most important chart

#5A Watching for When the Coronavirus Curve Flattens - *MAY 2020 - World and U.S. (Additional CASES each day, not total cases)															
Location	May 7	May 8	May 9	May 10	May 11	May 12	May 13	May 14	May 15	May 16	May 17	May 18	May 19	May 20	May 21
Worldwide	143,013	25,901	86,909	76,509	73,802	86,767	84,967	93,971	101,358	87,926	83,496	90,398	93,400	98,145	106,712
China	3	3	14	4	17	7	6	5	2	7	16	9	0	0	0
Spain	2,173	1,407	721	772	3,86	594	661	849	643	515	0	908	431	518	482
Italy	1,401	1,327	1,083	802	744	1,402	888	992	789	875	675	451	813	665	642
U.K.	4,356	5,914	3,896	3,924	3,883	3,409	3,244	3,455	3,564	3,457	3,534	2,714	2,429	N/A	2,627
<b>U.S.</b>	<b>28,414</b>	<b>26,885</b>	<b>25,633</b>	<b>19,684</b>	<b>18,163</b>	<b>22,186</b>	<b>20,832</b>	<b>27,106</b>	<b>30,307</b>	<b>24,464</b>	<b>19,474</b>	<b>21,331</b>	<b>20,480</b>	<b>23,285</b>	<b>25,294</b>
California	1,799	1,440	1,898	1,168	1,259	1,443	1,759	2,023	1,772	1,857	2,046	1,591	1,365	2,262	2,140
Florida	826	381	373	595	386	941	479	808	0	1,601	777	854	502	527	1,204
Georgia	444	667	426	909	486	708	697	526	823	466	554	380	640	926	758
Illinois	2,641	2,887	2,325	1,656	1,266	4,014	1,677	3,239	2,432	2,088	1,734	2,294	1,545	2,388	2,268
Louisiana	253	203	562	183	215	235	612	827	348	246	215	277	329	278	1,188
Massachusetts	1,696	1,612	1,410	1,050	669	870	1,165	1,685	1,239	1,521	1,077	0	1,915	1,045	1,014
Michigan	592	680	430	382	414	469	370	1,201	487	425	638	773	435	659	501
New Jersey	1,745	1,819	1,631	1,447	1,413	798	817	1,144	1,201	1,184	1,245	1,705	974	1,386	1,073
<b>New York</b>	<b>3,671</b>	<b>2,758</b>	<b>2,715</b>	<b>2,273</b>	<b>1,660</b>	<b>1,430</b>	<b>2,176</b>	<b>2,390</b>	<b>2,762</b>	<b>2,419</b>	<b>1,889</b>	<b>1,250</b>	<b>1,474</b>	<b>1,525</b>	<b>2,088</b>
Texas	968	1,219	1,251	1,009	1,000	1,179	2,355	1,448	1,347	1,801	785	909	1,219	1,411	0
Washington	243	243	119	51	281	236	267	225	130	30	5	0	21	200	160

\* This is the metric to watch to find when the curve flattens or spikes occur

#5B Watching for When the Coronavirus Curve Flattens - MAY 2020 - World and U.S. (Additional DEATHS each day, not total deaths)															
Location	May 7	May 8	May 9	May 10	May 11	May 12	May 13	May 14	May 15	May 16	May 17	May 18	May 19	May 20	May 21
Worldwide	–	6,437	2,458	3,379	3,271	5,990	5,236	5,179	5,110	3,966	3,735	3,340	4,759	4,809	4,829
China	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0
Spain	–	229	179	143	123	186	184	217	138	104	0	137	69	110	52
Italy	–	243	194	165	179	172	95	262	248	163	145	89	162	161	156
U.K.	–	701	346	268	211	628	495	429	385	468	170	170	546	364	338
<b>U.S.</b>	<b>2,231</b>	<b>1,517</b>	<b>1,615</b>	<b>731</b>	<b>872</b>	<b>1,976</b>	<b>N/A</b>	<b>N/A</b>	<b>1,644</b>	<b>1,224</b>	<b>808</b>	<b>785</b>	<b>1,574</b>	<b>1,510</b>	<b>1,271</b>
California	86	92	81	160	25	77	87	98	76	96	57	41	32	102	106
Florida	62	71	47	6	14	44	49	50	43	49	9	24	46	44	49
Georgia	25	41	23	5	36	20	44	22	30	35	14	36	22	23	67
Illinois	137	130	108	57	53	42	191	136	130	71	48	57	145	146	82
Louisiana	93	19	40	19	22	39	34	72	18	27	27	72	18	27	19
Massachusetts	132	150	138	139	129	33	174	167	110	113	92	0	141	128	82
Michigan	93	50	133	25	33	90	40	73	38	55	11	24	102	43	159
New Jersey	252	151	164	139	55	198	194	244	192	111	107	79	151	161	96
<b>New York</b>	<b>951</b>	<b>217</b>	<b>226</b>	<b>207</b>	<b>162</b>	<b>205</b>	<b>168</b>	<b>157</b>	<b>134</b>	<b>174</b>	<b>141</b>	<b>100</b>	<b>114</b>	<b>133</b>	<b>107</b>
Texas	25	31	45	39	12	33	25	58	56	33	31	11	22	50	0
Washington	8	21	14	16	10	14	17	13	8	9	8	1	1	29	6