



TRENDS-in-MEDICINE

BULLETIN: UPDATE ON CORONAVIRUS 4/1

April 1, 2020
by Lynne Peterson

Be careful, be safe, and be well.

The SARS-CoV-2 virus and the disease it causes, Covid-19, not only dominate the news, they also dominate the everyday lives of many Americans. Here are the latest news highlights. The estimate now is that 100,000-240,000 Americans will die from Covid-19 if mitigation efforts are strong. If they aren't, the estimate is for 2.2 million Covid-19 deaths in the U.S.

Our charts are on Pages 8-9. Watch the chart on *additional* cases per day to track the U.S. curve. When looking at the charts on Covid-19-positive patients and deaths around the world and across the U.S., note that you can now compare the numbers at 3 weekly points, March 18, March 25, and April 1. Some of the trends that pop out when you do that include:

- Patients **testing positive** has steadily increased everywhere.
- The **fatality rate** has gradually but steadily increased. It is now 5.0% worldwide, 2.2% in the U.S., and 11.9% in Italy. In the U.S., the state fatality rates have steadily increased in some but not all states. New York stands out with an increase from 0.05% to 2.3%.

Tidbits

■ The world

- **China** – The accuracy of the coronavirus numbers in China has always been viewed with some suspicion, but the suspicion is growing into outright disbelief – and blame.
- **Iran** – If the country's numbers can be trusted, the coronavirus reached the apex there.
- **Italy** – Some experts think Italy has reached its apex, but another day or two may be needed to confirm the trend. Italy's current fatality rate is 11.9%, but officials there are now suggesting that maybe all of them didn't die from coronavirus but died from other comorbidities. On the other hand, there are suggestions that Italy is undercounting deaths. Vice President Mike Pence said the U.S. coronavirus outbreak is "**most comparable**" to Italy.

■ U.S.

- The FDA issued a warning about **fraudulent coronavirus tests** and treatments.
- At least 93 of the sailors on the aircraft carrier **USS Theodore Roosevelt**, which is docked in Guam, have tested positive for Covid-19. After a letter from the commander of the ship to the Acting Secretary of the Navy Thomas Modly went public, the navy announced it plans to remove nearly 3,000 of the ~5,000 sailors on the ship. However, a crew has to be left onboard because of the nuclear weapons and fuel. The navy has been looking for hotel space in Guam. Where did the ship get infected? It could have been during a port stop in Vietnam on March 5, or it is possible one of the sailors who boarded in San Diego already had the virus.

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- As of March 31, 1.1 million tests had been performed around the country, and 100,000 are being done daily, but that will continue to grow.
- ~17,000 National Guard members have been activated around the country.
- The Surgeon General asked the Centers for Disease Control and Prevention (CDC) to reconsider whether face masks (other than N95 masks) are helpful in preventing Covid-19.

President Trump

- Extended the stay-at-home recommendation until April 30, warning that the next couple of weeks are going to be very difficult.
 - ✓ Deborah Birx, MD, director of the White House Task Force on Coronavirus, presented the findings that led to this decision – showing two possible U.S. death curves from Covid-19, one without a mitigation extension and another with an extension. Without the extension, the prediction is for 2.2 million deaths, with it, the prediction is **100,000-240,000 deaths**. Both are horrible. She said the peak should be in about two weeks. New York Governor Andrew Cuomo said he doesn't expect it until the end of April.
 - ✓ Anthony Fauci, MD, director of the National Institute of Allergy and Infectious Diseases (NIAID), said, “We are really convinced mitigation is going to do the trick for us. You have an increase in new cases at a certain rate...When that levels off, the next effect is less hospitalizations, and the next effect is less intensive care, and the next step is less deaths...Less new cases [leads the way]...We are seeing a little inkling of this now in New York...In the next several days to a week, we will continue to see things go up...We can't be discouraged by that...because the mitigation is working...Our goal is to get the New York/ New Jersey hotspot around the curve...and to prevent the clusters of areas that have not yet spiked from getting that spike...and the answer to that is mitigation.”
 - *On the other side of the curve, will people be able to attend ballgames or political conventions this summer?* Dr. Fauci said, “If we get to the part of the curve where it is down to essentially no new cases, it makes sense that we can relax social distancing. The one thing we hope we will have in place is a much more robust system to identify [Covid-19-positive people]...The ultimate solution to a virus that might keep coming back is a vaccine...We may have cycling with another season...but the ultimate game changer will be a vaccine.” He said the vaccine is still on target for 1-1.5 years from now.

Dr. Fauci added, “The 15 days of mitigation we have clearly have had an effect...Now is not the time to take your foot off the brake, but just to put it down on the accelerator.”
 - President Trump suggested that if there is a Phase IV economic stimulus bill, it should:
 - ✓ Be focused on infrastructure repairs (roads, bridges, tunnels). He said the money for this can be borrowed long-term at low interest.
 - ✓ Restore the income tax deductions for restaurant meals and entertainment.
 - ✓ House Speaker Nancy Pelosi (D-CA) said she would like to see the tax deductions for state and local income taxes restored. President Trump did not discuss that.
 - He said he would like to build two more brand new medical ships like the USNS Mercy and USNS Comfort. The Mercy and Comfort will *not* be used for delivering babies.
 - *Asked if he is considering limiting domestic airline flights*, he said it is under discussion but would not be nationwide if it happens, “We are thinking of doing that...[but] to start airlines over is very tough...We are looking at it...Once you do, you really are clamping down an industry that is desperately needed.”
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- *Asked about stimulus payments of immigrants with no social security number*, he said, “Undocumented...meaning they came in illegally...It is tough. It is a very sad question...but they came illegally, and we have a lot of citizens who won’t have jobs.”

U.S. states and cities

- Statewide stay-at-home advisories have now been issued by all but 12 states. The end dates vary, with the longest June 10 (Maryland).

■ Florida

- Gov. Ron DeSantis finally issued a statewide **stay-at-home order** for at least 30 days, effective at the end of the day April 2. The governor suggested that it would be a good time to fix roads because people aren’t driving very much, but that was before the stay-at-home order, so it is not clear whether road repair will be ruled an essential service and allowed to happen.
- Holland America’s **MS Zaandam** cruise ship, with 4 dead and >200 Covid-19-positive passengers and crew among the 1,391 aboard, and its sister ship the MS Rotterdam (with 1,445 aboard) – which took some of the supposedly healthy passengers off the Zaandam, will both be allowed to dock in Fort Lauderdale after being refused entry by several other countries. The British and Canadian governments are arranging for the repatriation of their citizens on the ship, but it is unclear whether Gov. DeSantis will allow anyone to disembark. He has said he wants everyone quarantined for 14 days. But medical personnel will be allowed onto the ships.

- **Georgia – Schools** closed for the rest of the calendar year, not just this semester.

- **Louisiana** – The governor said the state could run out of **ventilators** by this week and out of beds a few days later.

■ New York

- The state is not expected to reach its apex of Covid-19 cases until the end of April, according to Gov. Andrew Cuomo.
- Gov. Cuomo’s brother, Chris, has Covid-19 and is isolated in his basement. He was reported to have a fever and chills.
- Gov. Cuomo predicted that the U.S. – and the world – are not going back to normal after Covid-19. He said, “I don’t think we get back to normal. We get to a new normal.” He also predicted “something like this will happen again.”
- New York City Mayor Bill de Blasio said the city needs 3.3 million N95 masks and 400 ventilators by Sunday, April 5.

- **Ohio** – Gov. Mike DeWine predicted his state will have 62,000 cases/day at the peak.

Monitoring

PRA Health Sciences, a contract research organization (CRO), has developed a mobile app aimed at tracking Covid-19 patients’ physical and psychological symptoms.

Medical supplies

- The FDA authorized use of CPAP and BiPAP machines as an *emergency* alternative to a ventilator. However the American Society of Anesthesiologists has advised against use of CPAP/BiPAP machines for Covid-19 patients over concern the devices could pump viruses into the air, potentially spreading the virus.
 - Resilinc and Premier – in collaboration with Stanford Medicine – are launching The Exchange at Resilinc, a healthcare exchange designed to help hospitals access supplies and ease shortages during the Covid-19 pandemic.
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■ A new survey March 16-20, 2020, of 1,591 hospitals across 40 states (32% of all U.S. hospitals) by Premier, a healthcare improvement company, found that 42% had at least one confirmed Covid-19 case being treated at the facility. The survey looked at the surge capacity needed for personal protective equipment (PPE) and other supplies in hospitals related to the spread of Covid-19 across the country and found that hospitals should prepare for a 3- to 17-fold surge in supply demand, depending on the item. The predicted surge demand is:

- 17-fold for N95 respirators. This was the top concern of survey respondents. The average respondent had 23 days of N95 inventory on hand, but respondents with active Covid-19 patients had an average of only three days' N95 inventory.
- 8.6-fold for face shields.
- 6-fold for swabs.
- 5-fold for isolation gowns.
- 3.3-fold for surgical masks.

Premier president Michael Alkire said, "Our data shows that many providers believed they were well equipped, only to see their stocks depleted in a matter of days as they started requiring increased use of PPE across a broader population of healthcare workers." He also noted that backorders for surgical masks, isolation gowns, thermometers, and disinfecting wipes are surging and quickly surpassing demand for N95s, adding, "This is an early warning signal of product shortages that may be on the horizon and need to be planned around."

Drug shortages

■ **Ventilators.** A Vizient report found 13 drugs in three classes that are crucial to the use of ventilators are running low, based on surging demand and reduced fill rates. Drugs facing possible shortages include sedatives and anesthetics such as lorazepam, ketamine, and etomidate; analgesics such as fentanyl, morphine, and hydromorphone; and neuromuscular blockers such as rocuronium, cisatracurium, succinylcholine chloride, or vecuronium.

■ **Hospitals and acute care facilities.** Premier reported that its data on purchasing patterns and current fill rates show that 15 drugs essential for the care of Covid-19 patients are currently in – or very near – shortage. Those shortages are most common in **hospitals** and most acute in New York. The data came from a survey of 377 hospitals and health systems in 42 states as well as ~100 long-term care, home infusion, and retail pharmacies in 38 states.

Shortages were most pervasive in the acute care setting, where 70% of respondents reported at least one shortage of a Covid-19 drug. In the non-acute setting, 48% of respondents reported at least one shortage.

- Antimalarial drugs were the most commonly reported shortage (70% of hospital respondents), followed by bronchodilators (65%), antibiotics (40%), antivirals (38%), and sedatives (35%).

Premier Analysis of Covid-19 Drugs In or Close to Shortage				
Drug	Indication	% order increase in March	Current fill rate	% order increase in New York in March
Azithromycin	Antibiotic	170%	60%	263%
Cefazolin	Antibiotic	0%	86%	N/A
Cefepime	Antibiotic	75%	83%	N/A
Chloroquine	Antimalarial	3,000%	19%	N/A
Hydroxychloroquine	Antimalarial	260%	35%	N/A
Acyclovir	Antiviral	100%	86%	N/A
Ribavirin	Antiviral	200%	50%	N/A
Valacyclovir	Antiviral	20%	87%	N/A
Albuterol	Bronchodilator	53%	80%	1,870%
Cisatracurium	Neuromuscular blocker	253%	51%	786%
Rocuronium	Neuromuscular blocker	84%	80%	N/A
Fentanyl	Sedative	100%	61%	533%
Midazolam	Sedative	70%	79%	4,100%
Propofol	Sedative	60%	82%	123%
Norepinephrine	Vasopressor	50%	67%	53%

- Reported shortages were higher in hotspots like New York, where 77% of hospitals with Covid-19 cases reported shortages of antimalarials as well as antivirals (54%) and sedatives (39%).

Premier president Alkire said, “Increased demand for these products will clearly put pressure on manufacturers’ safety stocks, creating shortages that could worsen with time unless we take fast action now. For commodity products, we can tap adjacent industries to begin production. But drug manufacturing is highly regulated, and it typically takes years and substantial investment to build additional capacity and gain FDA approval. Even if the FDA expedited approvals, inspections, and other actions, drug manufacturing cannot be stood up overnight. Moreover, there are also secondary concerns about where replacement ingredients will be sourced, as many of these drugs rely on active pharmaceutical ingredients (API) from overseas.”

Premier’s recommendations:

- A dynamic national allocation process.
- Streamlining the process for accessing drugs from the Strategic National Stockpile (SNS).
- The Drug Enforcement Administration (DEA) temporarily increasing the threshold for allocating controlled substances.
- Federal assistance in leveraging air transport of drugs/products from overseas.
- Allow health systems to temporarily transfer drugs freely between hospitals/pharmacies without having to obtain licensure.
- FDA creation of a centralized data repository of inventory levels for critical medications.
- Ramping up domestic manufacturing, with FDA expediting approvals for this.
- Create incentives for manufacturers to enter the marketplace through committed volume and/or co-investment.
- The FDA should use authority under the CARES Act to require API manufacturers to begin reporting supply disruptions immediately. The FDA should also require manufacturers to disclose their exact API sources and the locations of finished dosage drugs.
- Consider providing 0% interest loans to manufacturers to accommodate surge demand.

Testing

The list of available/approved/cleared Covid-19 tests continues to grow. Most of the tests are laboratory or point-of-care tests for diagnosing Covid-19. The rapid 5-15 minute Abbott test is starting to be used and even FDA Commissioner Stephen Hahn, MD, called it a game changer.

However, what is needed next is a serologic (ELISA) test that can detect who has been exposed to SARS-CoV-2 and developed antibodies – and therefore can’t get sick and can’t transmit the virus. Those are the people whose blood may be therapeutic and who could go back to work immediately.

Dr. Birx said she has tasked researchers at the major universities in the country to develop a simple Elisa test, saying, “It is easy to do. In a day or two they could screen an entire hospital. I call on every university in every state to develop Elisas. You can buy antigens and controls online. Get to work to test healthcare communities in your state...Our universities can do that by Friday [April 3]. I put that challenge out to them. We are not waiting. We are asking for help now. It could happen this month if the universities help us.” She said this was done with HIV, and it is exactly the same concept and process for SARS-CoV-2.

Among the newest diagnostics tests to be cleared for use are:

- **AusDiagnostics' multiplex PCR assay**, which can detect influenza, respiratory syncytial virus, and SARS-CoV-2, was granted a CE Mark for use in Europe.
- **Avellino Labs' AvellinoCoV2 test**, which detects SARS-CoV-2 nucleic acid using oropharyngeal and nasopharyngeal swab samples, was granted emergency use authorization (EUA) by the FDA. The test can only be performed by Avellino's CLIA laboratory.
- **BGI Genomics/BGI Americas' BGI Real-Time Fluorescent RT-PCR Kit**, which can detect SARS-CoV-2 from bronchoalveolar lavage fluid and throat swabs in 3 hours, was granted EUA by the FDA.
- **Luminex's NxTAG CoV Extended Panel**, a multiplex panel that can detect SARS-CoV-2 from nasopharyngeal swab samples, was granted EUA by the FDA.
- **NeuMoDx Molecular's SARS-CoV-2 Test Strip**, which can deliver results in around 80 minutes and runs on the NeuMoDx 288 and NeuMoDx 96 molecular systems, was granted EUA by the FDA.
- **Novacyt/Primerdesign's Genesig Real-Time PCR assay**, which can deliver results within 2 hours, was granted EUA by the FDA.
- **Rendu Biotechnology's SARS-CoV-2 nucleic acid detection kit**, which can deliver results within 90 minutes, was given emergency approval by China's National Medical Products Administration.

Among the tests still in development are:

- ✓ **Cue Health** got a \$13 million grant from the U.S. Biomedical Advanced Research and Development Authority (BARDA) to create, validate, and gain approval for a fast and portable SARS-CoV-2 point-of-care test.
- ✓ **GenMark Diagnostics** got a grant for up to \$749,000 from BARDA to develop and seek EUA for a diagnostic panel that combines a new SARS-CoV-2 viral target with the company's ePlex Respiratory Pathogen panel.

Transmission

- **Temperature.** A case study of Covid-19 patients in China who had ground glass opacities on CT scan, published in *JAMA Network Open*, found that 8 had acquired the disease in a men-only bathhouse after the first infected patient visited. The researcher said the finding suggests that the virus may be transmitted even in high temperature and high-humidity environments.
 - **Distance.** A study by an MIT researcher suggests that the coronavirus can travel much farther than 6 feet, raising questions about the efficacy of the 6-foot guidance for social distancing. The researcher said the data on respiratory disease transmission is based on very old data, and her studies found that pathogen droplets of all sizes can travel 22-27 feet. Asked about this, NIAID's Dr. Fauci said, "This could be terribly misleading...If you do [a very big] ahchoo!, you might get 27 feet. If you see someone do that, get out of the way...I was disturbed by that report because it is misleading. That is a very, very, very robust ahchoo."
 - **Toilets.** There hasn't been a lot of detailed discussion about this, but the coronavirus can be transmitted through stool. A doctor pointed out that this means people have to think differently about having a bowel movement – not using the hand with which you hold the toilet paper and wipe to pull up your underwear/pants or turn on the water faucet until after that hand is washed.
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Treatment

The drugs currently getting the most attention as a treatment for Covid-19 are **hydroxychloroquine** (HCQ) and **chloroquine** (with or without other medications, usually azithromycin). New developments with these include:

- A 62-patient Chinese study in preprint found:
 - ✓ Compared to control, there were significant improvements at Day 5 in time to clinical recovery (TTCR), cough (2.0 days vs. 3.1 days), and fever (2.2 days vs. 3.2 days).
 - ✓ Pneumonia was improved in 80.6% of HCQ patients vs. 54.8% of control.
 - ✓ All four patients who progressed to severe illness were in the control group.
- The White House reportedly is working on a platform using Oracle software to track patient outcomes with off-label drugs used to treat Covid-19 patients (mostly hydroxychloroquine, at least to start).
- India's Directorate General of Foreign Trade cut off **exports** of hydroxychloroquine.
- New York has treated ~1,100 patients with HCQ, and Henry Ford Health System (along with 4 other Michigan sites) has treated another 800.

Other drugs currently getting attention as treatments for Covid-19 include:

- Antibody-rich blood products taken from blood donated by people recovered from Covid-19.
- Antiviral – e.g., **Gilead Sciences' remdesivir**. Data on two patients given this drug was reported. The first patient developed **ALT elevation 3xULN** and a rash, and remdesivir was discontinued on Day 4. The next day the patient became asymptomatic, and he was discharged on Day 14. The second patient was given a loading dose of remdesivir in the ICU on illness Day 15, followed by 9 days of maintenance treatment. He recovered completely and was discharged on Day 30.
- Convalescent plasma.
- Hyperimmune globulin – **GigaGen** is working on this.
- IL-6 receptor inhibitors.
- Monoclonal antibodies – e.g., **Brii Biosciences**, Tsinghua University, and 3rd People's Hospital of Shenzhen which are collaborating on developing fully human neutralizing monoclonal antibodies against Covid-19.

FDA. To speed development of potentially safe and effective treatments of Covid-19, the FDA set up a **new program** – the Coronavirus Treatment Acceleration Program (CTAP) – which uses all the tools the Agency has to help get therapies to patients quickly.

Health and Human Services Secretary Alex Azar said, "As part of this new program, the FDA is cutting red tape, redeploying staff, and working day and night to review requests from companies, scientists, and doctors who are working toward therapies." FDA staff in the Center for Drug Evaluation and Research (CDER) and the Center for Biologics Evaluation and Research (CBER) are providing regulatory advice, guidance, and technical assistance as quickly as possible. And the FDA is triaging requests from developers and scientists working on new drugs and biologics.

Other drugs worth watching include:

- **Fujifilm/Toyama Chemical's Avigan (favipiravir)** – The company started a Phase III trial in Japan of this antiviral flu drug, an RNA polymerase inhibitor, to see if it shortens Covid-19 recovery time.

- **NeuroRx and Relief Therapeutics' aviptadil** – The FDA gave the green light for the start of a Phase II trial of this erectile dysfunction drug to treat acute respiratory distress in Covid-19 patients.
- **Roche's Activase (alteplase, tPA)** – An article, published in the *Journal of Trauma and Acute Care Surgery*, suggests that this stroke drug might be useful in Covid-19-associated acute respiratory distress syndrome (ARDS), particularly in patients who need a ventilator but can't get one. Their reasoning: "The risk of adverse events...is far outweighed by the certainty of death in patients meeting the eligibility criteria for this treatment." A 12-patient compassionate-use study is planned.
- **Vitamin C** – A meta-analysis of 8 studies, published in the *Journal of Intensive Care*, found that giving vitamin C to ICU patients on a ventilator reduced the length of time on the ventilator by 14% vs. control. The patients with the most benefit from vitamin C were those on the ventilator the longest. A person in good health maintains a normal plasma vitamin C level with an intake of ~0.1g/day. Critically ill ventilator patients may need much higher doses – grams/day.

Vaccines

Numerous labs and companies are working on a vaccine for Covid-19. There was news about two:

- **Sanofi**, which is using Translate Bio's mRNA platform, to find a vaccine.
- **VBI Vaccines** is collaborating with the National Research Council of Canada to develop a pan-coronavirus vaccine for SARS-CoV, SARS-CoV-2, and MERS.

Worldwide Covid-19 Statistics												
Country	As of March 18			As of March 25 (1 week)			As of March 30			As of April 1 (2 weeks)		
	Cases	Deaths	Fatality rate	Cases	Deaths	Fatality rate	Cases	Deaths	Fatality rate	Cases	Deaths	Fatality rate
Worldwide	217,242	8,704	4.0%	470,973	21,287	4.5%	786,228	37,820	4.8%	932,605	46,809	5.0%
U.S.	9,249	145	1.6%	68,960	1,041	1.5%	164,603	3,170	1.9%	213,372	4,757	2.2%
Italy	35,713	2,978	8.3%	74,386	7,503	10.1%	101,739	11,591	11.4%	110,574	13,155	11.9%
Spain	13,176	638	4.8%	49,515	3,647	7.4%	87,956	7,716	8.8%	104,118	9,387	9.0%
China	81,137	3,130	3.9%	81,667	3,285	4.0%	82,240	3,309	4.0%	83,261	3,316	4.0%
Germany	12,327	28	0.2%	37,323	206	0.6%	66,885	645	1.0%	77,872	920	1.2%
France	n/a	n/a	n/a	n/a	n/a	n/a	45,170	3,030	6.7%	57,749	4,043	9.5%
Iran	17,061	1,135	6.7%	27,017	2,077	7.7%	41,495	2,757	6.6%	47,593	3,036	6.4%
U.K.	>2,600	104	4.0%	9,640	466	4.8%	22,454	1,411	6.3%	29,865	2,357	7.9%

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

U.S. Covid-19 Statistics												
State	As of March 18			As of March 25			As of March 30			As of April 1		
	Cases	Deaths	Fatality rate	Cases	Deaths	Fatality rate	Cases	Deaths	Fatality rate	Cases	Deaths	Fatality rate
New York *	2,382	12	0.05%	30,811	285	0.9%	66,497	1,218	1.8%	83,712	1,941	2.3%
New Jersey	427	5	1.2%	4,402	62	1.2%	16,636	198	1.2%	22,255	355	3.2%
Washington	1,012	52	5.1%	2,469	123	5.0%	4,896	195	4.0%	5,634	224	4.0%
California	611	13	2.1%	2,102	40	1.9%	7,398	146	2.0%	8,155	171	2.1%
Michigan	80	0	0	2,294	43	1.3%	6,498	184	2.8%	9,334	337	3.6%
Illinois	289	1	0.3%	1,884	19	1.0%	5,057	73	1.4%	6,980	141	2.0%
Florida	314	7	2.2%	1,682	22	1.3%	5,704	71	1.2%	6,955	87	1.3%
Louisiana	240	6	2.5%	1,795	65	3.3%	4,025	185	4.6%	6,424	273	4.2%
Massachusetts	256	0	0	1,838	15	0.7%	5,752	56	1.0%	7,738	133	1.7%

Source: <https://covidtracking.com/data/> * New York state dropped from ~58% of U.S. cases on March 25 to 39% on April 1

Watching for When the Coronavirus Curve Flattens (Additional cases each day, not total cases) *									
Location	March 23	March 24	March 25	March 26	March 27	March 28	March 30	March 31	April 1
Worldwide	45,321	36,289	53,391	60,711	58,910	75,022	120,612	70,690	75,687
U.S.	13,056	7,328	14,912	16,545	15,212	23,969	39,917	23,569	25,200
China	107	77	76	115	115	164	179	39	7
Spain	6,368	4,749	9,630	8,271	6,499	8,950	14,721	7,967	8,195
Italy	4,789	5,249	5,210	6,203	5,909	5,974	7,267	4,053	4,782
Iran	1,411	1,762	2,206	2,389	2,926	3,076	6,087	3,110	2,898
New York	6,521	6,976	5,146	6,447	7,377	7,683	14,179	9,298	7,917

* This is the metric that Dr. Deborah Birx, director of the White House Task Force on Coronavirus, said to watch.

Death Toll Increases (Additional deaths, not total deaths)									
Location	March 23	March 24	March 25	March 26	March 27	March 28	March 30	March 31	April 1
Worldwide	1,940	2,040	2,664	3,217	2,889	3,914	6,963	4,178	4,811
China	107	7	4	6	5	8	5	0	7
Italy	601	743	683	712	919	889	1,568	837	727
Spain	539	497	839	718	575	1,042	1,734	748	923
U.S.	193	93	328	248	255	648	978	703	884
New York	43	53	75	100	134	209	490	332	441

Unanswered questions (Items will remain on this list until answered.)

- ? Can Covid-19 patients be organ donors?
- ? People who get mild Covid-19 and recover continue to shed virus for at least 8 days *after* symptoms resolve. Is that virus capable of infecting other people? Should those people be quarantined longer?
- ? What do we know about Covid-19 patients who are put on a ventilator and **recover**? Is it a *functional* recovery?
- ? Are there long-term effects from getting Covid-19, even mild Covid-19? Will there be long-lasting lung abnormalities or pulmonary fibrosis?
- ? Can people get Covid-19 more than once? There are still conflicting reports on this.
- ? What more can be done to protect nursing home residents?