

## IEM's AI Modeling: Short-term COVID-19 Projections

Date: 7/7/21

Leveraging over 15 years of support to HHS for medical consequence modeling and our proprietary artificial intelligence (AI) models, IEM believes that our Coronavirus model outputs can be used to assist localities and their medical facilities to better prepare for an increase in hospitalizations, to better plan for and locate drive-through testing facilities, and to determine where increased levels of transmission may be occurring.

**We have been refining our AI model over the past month and are confident in its ability to provide accurate 7-day projections that can be used for operational and logistical planning.**

### AI-based Model Background

IEM is currently using an AI model to fit data from various sources and project new cases of COVID-19. We do not assume the average number of secondary infections (R-value) stays the same over time. IEM's AI model finds the best R-value over time to evaluate how it changes over the course of the outbreak. The IEM modeling team is running ~11 million simulations to fit each state's data and using the best fit for the R-value to project new cases over the next 7 days. The AI models are executed on a daily basis to evaluate the changing dynamics of the COVID-19 pandemic. Our projections have typically been within 10%, and are often within 5%, of actual confirmed cases.

The projections shown in this document are based on data pulled in as of 7/7/21 9 a.m.

**Please provide any feedback or send any questions that you might have to us. We are continually updating and improving the model, so your feedback is critical.**

**Also, if you have more current or refined data for your State, Commonwealth or Territory that you would like IEM to factor in, please let us know.**

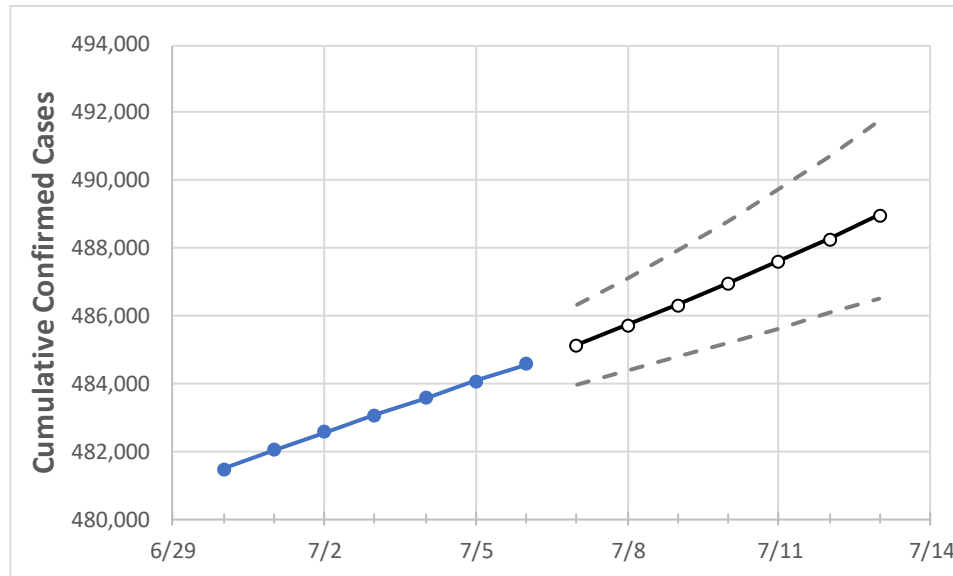
### IEM's Modeling Lead

Dr. Prasith "Sid" Baccam is a **Computational Epidemiologist expert** at IEM with more than **20 years of experience in medical consequence modeling and simulation of disease outbreaks** and medical consequences following hypothetical attacks with biological agents or emerging infectious diseases. He develops key simulation models and decision support tools at IEM, specializing in public health, disaster response, and medical countermeasures (MCM) to enhance data-driven decision making and improve modeling assumptions.

Upon receiving his **Ph.D. in Applied Mathematics and Immunobiology** at Iowa State University, Dr. Baccam worked as a Postdoctoral Research Associate at Los Alamos National Laboratory where he focused on researching viral and immunological modeling. After his stint at Los Alamos, Dr. Baccam has served as Task Lead in multiple public health projects have allowed him to develop expertise as a mathematical biologist and a leader on high-performance modeling and simulation teams.

He has worked with state and local public health officials as well as Federal agencies, including **HHS**, the Centers for Disease Control and Prevention (**CDC**), and the Department of Homeland Security (**DHS**). Dr. Baccam has published numerous papers on public health response models and implications on policy and has been invited to participate in workshops and symposiums held by the Institute of Medicine (now the National Academy of Health). His modeling results have been briefed to the **Executive Office of the President** and informed two presidential policy actions.

## Louisiana State Projections



	Actual Confirmed Cases On:				Projected Cases For:						
	7/3	7/4	7/5	7/6	7/7	7/8	7/9	7/10	7/11	7/12	7/13
Louisiana	483,064	483,569	484,073	484,577	485,140	485,716	486,316	486,952	487,599	488,273	488,983

**Note:** The State's projection shows a "best estimate" curve (the solid line with circles) and the dotted lines are the upper and lower estimates around that best estimate. Our projections have typically been within 10%, and are often within 5%, of actual confirmed cases.

## Louisiana Parishes

	Actual Confirmed Cases On:				Projected Cases For:						
	7/3	7/4	7/5	7/6	7/7	7/8	7/9	7/10	7/11	7/12	7/13
Ascension Parish	12,978	12,990	13,001	13,013	13,029	13,046	13,064	13,082	13,100	13,119	13,138
Bossier Parish	14,502	14,516	14,530	14,544	14,558	14,572	14,587	14,603	14,620	14,637	14,655
Caddo Parish	27,299	27,314	27,328	27,343	27,355	27,366	27,378	27,390	27,401	27,411	27,422
Calcasieu Parish	23,306	23,320	23,334	23,348	23,362	23,376	23,390	23,404	23,418	23,431	23,445
East Baton Rouge Parish	41,326	41,367	41,408	41,449	41,501	41,553	41,606	41,663	41,721	41,782	41,843
Jefferson Parish	47,704	47,741	47,779	47,816	47,859	47,904	47,952	48,003	48,056	48,112	48,170
Lafayette Parish	24,666	24,693	24,721	24,748	24,780	24,813	24,847	24,883	24,920	24,958	24,998
Lafourche Parish	10,271	10,288	10,304	10,321	10,341	10,360	10,379	10,399	10,421	10,442	10,464
Orleans Parish	31,168	31,197	31,226	31,255	31,288	31,323	31,360	31,399	31,440	31,484	31,530
Ouachita Parish	19,130	19,142	19,154	19,166	19,178	19,190	19,201	19,213	19,225	19,237	19,249
Rapides Parish	12,773	12,781	12,789	12,797	12,806	12,814	12,823	12,831	12,840	12,848	12,857
St. Bernard Parish	4,157	4,161	4,165	4,169	4,173	4,177	4,182	4,187	4,192	4,197	4,202
St. Charles Parish	5,678	5,687	5,695	5,704	5,716	5,729	5,744	5,759	5,776	5,794	5,813
St. James Parish	2,048	2,049	2,049	2,049	2,050	2,052	2,053	2,054	2,056	2,057	2,059
St. John the Baptist Parish	3,900	3,903	3,905	3,907	3,910	3,913	3,916	3,919	3,922	3,925	3,928
St. Tammany Parish	26,586	26,623	26,661	26,698	26,743	26,792	26,844	26,899	26,957	27,018	27,085

Some recipients of our daily COVID-19 short-term (7 day) projections have requested projections of demand for: hospital bed, intensive care unit (ICU) beds, and mechanical ventilation. We realize that different states and localities will have different characteristics for hospital demand of COVID-19 cases, and we are presenting the best assumptions we could find for those medical demands based on scientific literature and health data reporting. Specifically:

- **Beds:** For hospitalization, we use a range of 10% and 20% of cases require hospitalization based on CDC's report ([MMWR, March 18, 2020](#)) and state reports of COVID-19 cases.
- **ICU:** The CDC report found that 24% of hospitalized cases require ICU care.
- **Ventilators:** Based on clinical data from China and state reports, we assume that 50% of ICU cases require a ventilator.

If you have other estimates for these assumptions, please share them with us as we work to refine our modeling, assumptions, and data on a daily basis.

The medical demands shown in the table assume 20% of **cumulative** confirmed cases require hospitalization. To get the medical demand for the assumption that 10% of confirmed cases require hospitalization, simply divide the demand by 2.

### Louisiana Medical Demands by County

	Actual Confirmed Cases On:				Projected Cases (Hospitalized) [ICU] {Ventilator} For:							
	7/3	7/4	7/5	7/6	7/8		7/10		7/12			
Ascension Parish	12,978	12,990	13,001	13,013	13,046	(2,609) [626] {313}	13,082	(2,616) [628] {314}	13,119	(2,624) [630] {315}		
Bossier Parish	14,502	14,516	14,530	14,544	14,572	(2,914) [699] {350}	14,603	(2,921) [701] {350}	14,637	(2,927) [703] {351}		
Caddo Parish	27,299	27,314	27,328	27,343	27,366	(5,473) [1,314] {657}	27,390	(5,478) [1,315] {657}	27,411	(5,482) [1,316] {658}		
Calcasieu Parish	23,306	23,320	23,334	23,348	23,376	(4,675) [1,122] {561}	23,404	(4,681) [1,123] {562}	23,431	(4,686) [1,125] {562}		
East Baton Rouge Parish	41,326	41,367	41,408	41,449	41,553	(8,311) [1,995] {997}	41,663	(8,333) [2,000] {1,000}	41,782	(8,356) [2,006] {1,003}		
Jefferson Parish	47,704	47,741	47,779	47,816	47,904	(9,581) [2,299] {1,150}	48,003	(9,601) [2,304] {1,152}	48,112	(9,622) [2,309] {1,155}		
Lafayette Parish	24,666	24,693	24,721	24,748	24,813	(4,963) [1,191] {596}	24,883	(4,977) [1,194] {597}	24,958	(4,992) [1,198] {599}		
Lafourche Parish	10,271	10,288	10,304	10,321	10,360	(2,072) [497] {249}	10,399	(2,080) [499] {250}	10,442	(2,088) [501] {251}		
Orleans Parish	31,168	31,197	31,226	31,255	31,323	(6,265) [1,503] {752}	31,399	(6,280) [1,507] {754}	31,484	(6,297) [1,511] {756}		
Ouachita Parish	19,130	19,142	19,154	19,166	19,190	(3,838) [921] {461}	19,213	(3,843) [922] {461}	19,237	(3,847) [923] {462}		
Rapides Parish	12,773	12,781	12,789	12,797	12,814	(2,563) [615] {308}	12,831	(2,566) [616] {308}	12,848	(2,570) [617] {308}		
St. Bernard Parish	4,157	4,161	4,165	4,169	4,177	(835) [201] {100}	4,187	(837) [201] {100}	4,197	(839) [201] {101}		
St. Charles Parish	5,678	5,687	5,695	5,704	5,729	(1,146) [275] {138}	5,759	(1,152) [276] {138}	5,794	(1,159) [278] {139}		
St. James Parish	2,048	2,049	2,049	2,049	2,052	(410) [98] {49}	2,054	(411) [99] {49}	2,057	(411) [99] {49}		
St. John the Baptist Parish	3,900	3,903	3,905	3,907	3,913	(783) [188] {94}	3,919	(784) [188] {94}	3,925	(785) [188] {94}		
St. Tammany Parish	26,586	26,623	26,661	26,698	26,792	(5,358) [1,286] {643}	26,899	(5,380) [1,291] {646}	27,018	(5,404) [1,297] {648}		

For additional information from IEM, please contact Bryan Koon, Vice President of Emergency Management and Homeland Security at [bryan.koon@iem.com](mailto:bryan.koon@iem.com) or 850-519-7966 or Stephanie Tennyson at [stephanie.tennyson@iem.com](mailto:stephanie.tennyson@iem.com) or 202-309-4257.