

**IEM's AI Modeling: Short-term COVID-19 Projections****Date: 7/23/21**

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 7/23/21 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.**

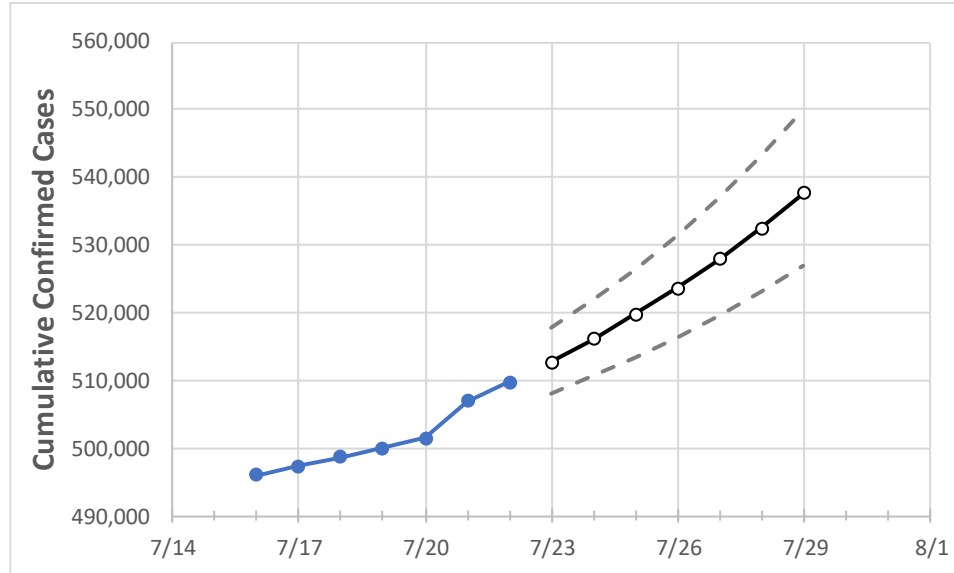
**IEM's Modeling Lead**

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:						
	7/19	7/20	7/21	7/22	7/23	7/24	7/25	7/26	7/27	7/28	7/29
Louisiana	499,932	501,494	506,882	509,716	512,740	516,065	519,724	523,599	527,857	532,505	537,629

**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:						
	7/19	7/20	7/21	7/22	7/23	7/24	7/25	7/26	7/27	7/28	7/29
Ascension Parish	13,633	13,684	14,114	14,198	14,351	14,522	14,711	14,911	15,141	15,387	15,669
Bossier Parish	14,939	14,974	15,066	15,116	15,177	15,244	15,315	15,394	15,474	15,563	15,658
Caddo Parish	27,852	27,930	28,035	28,122	28,220	28,326	28,443	28,570	28,709	28,862	29,029
Calcasieu Parish	23,727	23,743	23,910	23,981	24,047	24,118	24,194	24,278	24,363	24,456	24,556
East Baton Rouge Parish	42,921	43,093	43,795	43,988	44,310	44,663	45,056	45,481	45,950	46,462	47,036
Jefferson Parish	48,976	49,083	49,455	49,727	49,932	50,154	50,400	50,673	50,968	51,280	51,627
Lafayette Parish	25,473	25,593	25,873	25,979	26,122	26,280	26,450	26,635	26,836	27,055	27,294
Lafourche Parish	10,857	10,911	11,121	11,253	11,368	11,492	11,628	11,779	11,943	12,123	12,317
Orleans Parish	32,264	32,367	32,604	32,864	33,084	33,325	33,597	33,899	34,231	34,597	35,006
Ouachita Parish	19,548	19,591	19,777	19,908	20,002	20,103	20,218	20,342	20,477	20,627	20,793
Rapides Parish	13,198	13,222	13,412	13,471	13,561	13,659	13,769	13,892	14,027	14,174	14,341
St. Bernard Parish	4,332	4,349	4,407	4,433	4,469	4,509	4,555	4,604	4,660	4,723	4,793
St. Charles Parish	5,988	6,011	6,052	6,094	6,135	6,180	6,228	6,279	6,334	6,393	6,456
St. James Parish	2,106	2,123	2,138	2,152	2,166	2,181	2,197	2,216	2,236	2,259	2,284
St. John the Baptist Parish	4,053	4,075	4,126	4,162	4,203	4,249	4,302	4,362	4,430	4,508	4,596
St. Tammany Parish	28,032	28,157	28,428	28,664	28,903	29,162	29,443	29,750	30,086	30,450	30,844

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:											
	7/19	7/20	7/21	7/22	7/24				7/26				7/28			
Ascension Parish	13,633	13,684	14,114	14,198	14,522	(2,904)	[697]	{349}	14,911	(2,982)	[716]	{358}	15,387	(3,077)	[739]	{369}
Bossier Parish	14,939	14,974	15,066	15,116	15,244	(3,049)	[732]	{366}	15,394	(3,079)	[739]	{369}	15,563	(3,113)	[747]	{374}
Caddo Parish	27,852	27,930	28,035	28,122	28,326	(5,665)	[1,360]	{680}	28,570	(5,714)	[1,371]	{686}	28,862	(5,772)	[1,385]	{693}
Calcasieu Parish	23,727	23,743	23,910	23,981	24,118	(4,824)	[1,158]	{579}	24,278	(4,856)	[1,165]	{583}	24,456	(4,891)	[1,174]	{587}
East Baton Rouge Parish	42,921	43,093	43,795	43,988	44,663	(8,933)	[2,144]	{1,072}	45,481	(9,096)	[2,183]	{1,092}	46,462	(9,292)	[2,230]	{1,115}
Jefferson Parish	48,976	49,083	49,455	49,727	50,154	(10,031)	[2,407]	{1,204}	50,673	(10,135)	[2,432]	{1,216}	51,280	(10,256)	[2,461]	{1,231}
Lafayette Parish	25,473	25,593	25,873	25,979	26,280	(5,256)	[1,261]	{631}	26,635	(5,327)	[1,278]	{639}	27,055	(5,411)	[1,299]	{649}
Lafourche Parish	10,857	10,911	11,121	11,253	11,492	(2,298)	[552]	{276}	11,779	(2,356)	[565]	{283}	12,123	(2,425)	[582]	{291}
Orleans Parish	32,264	32,367	32,604	32,864	33,325	(6,665)	[1,600]	{800}	33,899	(6,780)	[1,627]	{814}	34,597	(6,919)	[1,661]	{830}
Ouachita Parish	19,548	19,591	19,777	19,908	20,103	(4,021)	[965]	{482}	20,342	(4,068)	[976]	{488}	20,627	(4,125)	[990]	{495}
Rapides Parish	13,198	13,222	13,412	13,471	13,659	(2,732)	[656]	{328}	13,892	(2,778)	[667]	{333}	14,174	(2,835)	[680]	{340}
St. Bernard Parish	4,332	4,349	4,407	4,433	4,509	(902)	[216]	{108}	4,604	(921)	[221]	{111}	4,723	(945)	[227]	{113}
St. Charles Parish	5,988	6,011	6,052	6,094	6,180	(1,236)	[297]	{148}	6,279	(1,256)	[301]	{151}	6,393	(1,279)	[307]	{153}
St. James Parish	2,106	2,123	2,138	2,152	2,181	(436)	[105]	{52}	2,216	(443)	[106]	{53}	2,259	(452)	[108]	{54}
St. John the Baptist Parish	4,053	4,075	4,126	4,162	4,249	(850)	[204]	{102}	4,362	(872)	[209]	{105}	4,508	(902)	[216]	{108}
St. Tammany Parish	28,032	28,157	28,428	28,664	29,162	(5,832)	[1,400]	{700}	29,750	(5,950)	[1,428]	{714}	30,450	(6,090)	[1,462]	{731}

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.