

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

**Date: 3/26/21**

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 3/26/21 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.**

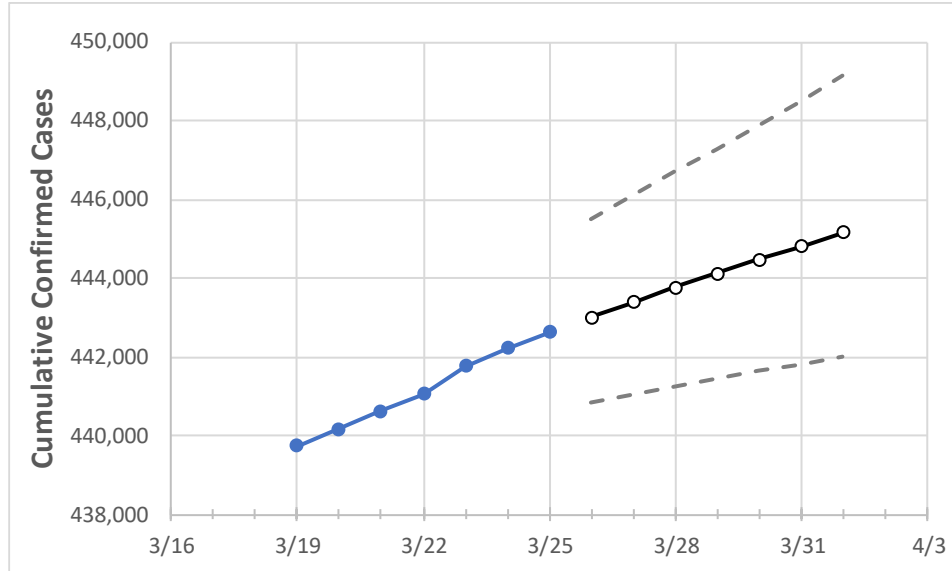
### **IEM's Modeling Lead**

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:						
	3/22	3/23	3/24	3/25	3/26	3/27	3/28	3/29	3/30	3/31	4/1
Louisiana	441,066	441,771	442,221	442,620	442,999	443,384	443,754	444,107	444,465	444,814	445,158

**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:						
	3/22	3/23	3/24	3/25	3/26	3/27	3/28	3/29	3/30	3/31	4/1
Ascension Parish	11,398	11,431	11,444	11,458	11,481	11,505	11,528	11,552	11,577	11,601	11,626
Bossier Parish	13,192	13,207	13,212	13,210	13,217	13,225	13,232	13,239	13,246	13,253	13,260
Caddo Parish	25,017	25,018	25,041	25,056	25,066	25,076	25,086	25,095	25,104	25,114	25,122
Calcasieu Parish	20,857	20,945	20,919	20,955	21,020	21,086	21,152	21,219	21,282	21,351	21,419
East Baton Rouge Parish	36,906	36,985	37,043	37,116	37,172	37,230	37,287	37,343	37,399	37,456	37,512
Jefferson Parish	44,777	44,822	44,860	44,896	44,926	44,954	44,982	45,009	45,036	45,063	45,088
Lafayette Parish	22,096	22,106	22,155	22,178	22,201	22,224	22,247	22,271	22,296	22,321	22,345
Lafourche Parish	9,313	9,331	9,335	9,338	9,342	9,346	9,350	9,353	9,357	9,361	9,364
Orleans Parish	29,061	29,091	29,108	29,113	29,127	29,142	29,155	29,168	29,180	29,192	29,203
Ouachita Parish	17,826	17,838	17,847	17,847	17,854	17,861	17,868	17,875	17,881	17,888	17,896
Rapides Parish	11,517	11,533	11,548	11,551	11,567	11,582	11,598	11,614	11,630	11,648	11,665
St. Bernard Parish	3,895	3,901	3,912	3,916	3,921	3,925	3,930	3,934	3,939	3,943	3,947
St. Charles Parish	5,247	5,251	5,273	5,268	5,276	5,283	5,291	5,298	5,306	5,314	5,321
St. James Parish	1,889	1,885	1,888	1,891	1,893	1,895	1,896	1,898	1,900	1,902	1,904
St. John the Baptist Parish	3,591	3,597	3,598	3,607	3,610	3,614	3,617	3,620	3,624	3,627	3,630
St. Tammany Parish	24,790	24,877	24,903	24,919	24,937	24,955	24,972	24,988	25,004	25,020	25,034

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:											
	3/22	3/23	3/24	3/25	3/27				3/29				3/31			
Ascension Parish	11,398	11,431	11,444	11,458	11,505	(2,301)	[552]	{276}	11,552	(2,310)	[555]	{277}	11,601	(2,320)	[557]	{278}
Bossier Parish	13,192	13,207	13,212	13,210	13,225	(2,645)	[635]	{317}	13,239	(2,648)	[635]	{318}	13,253	(2,651)	[636]	{318}
Caddo Parish	25,017	25,018	25,041	25,056	25,076	(5,015)	[1,204]	{602}	25,095	(5,019)	[1,205]	{602}	25,114	(5,023)	[1,205]	{603}
Calcasieu Parish	20,857	20,945	20,919	20,955	21,086	(4,217)	[1,012]	{506}	21,219	(4,244)	[1,019]	{509}	21,351	(4,270)	[1,025]	{512}
East Baton Rouge Parish	36,906	36,985	37,043	37,116	37,230	(7,446)	[1,787]	{894}	37,343	(7,469)	[1,792]	{896}	37,456	(7,491)	[1,798]	{899}
Jefferson Parish	44,777	44,822	44,860	44,896	44,954	(8,991)	[2,158]	{1,079}	45,009	(9,002)	[2,160]	{1,080}	45,063	(9,013)	[2,163]	{1,082}
Lafayette Parish	22,096	22,106	22,155	22,178	22,224	(4,445)	[1,067]	{533}	22,271	(4,454)	[1,069]	{534}	22,321	(4,464)	[1,071]	{536}
Lafourche Parish	9,313	9,331	9,335	9,338	9,346	(1,869)	[449]	{224}	9,353	(1,871)	[449]	{224}	9,361	(1,872)	[449]	{225}
Orleans Parish	29,061	29,091	29,108	29,113	29,142	(5,828)	[1,399]	{699}	29,168	(5,834)	[1,400]	{700}	29,192	(5,838)	[1,401]	{701}
Ouachita Parish	17,826	17,838	17,847	17,847	17,861	(3,572)	[857]	{429}	17,875	(3,575)	[858]	{429}	17,888	(3,578)	[859]	{429}
Rapides Parish	11,517	11,533	11,548	11,551	11,582	(2,316)	[556]	{278}	11,614	(2,323)	[557]	{279}	11,648	(2,330)	[559]	{280}
St. Bernard Parish	3,895	3,901	3,912	3,916	3,925	(785)	[188]	{94}	3,934	(787)	[189]	{94}	3,943	(789)	[189]	{95}
St. Charles Parish	5,247	5,251	5,273	5,268	5,283	(1,057)	[254]	{127}	5,298	(1,060)	[254]	{127}	5,314	(1,063)	[255]	{128}
St. James Parish	1,889	1,885	1,888	1,891	1,895	(379)	[91]	{45}	1,898	(380)	[91]	{46}	1,902	(380)	[91]	{46}
St. John the Baptist Parish	3,591	3,597	3,598	3,607	3,614	(723)	[173]	{87}	3,620	(724)	[174]	{87}	3,627	(725)	[174]	{87}
St. Tammany Parish	24,790	24,877	24,903	24,919	24,955	(4,991)	[1,198]	{599}	24,988	(4,998)	[1,199]	{600}	25,020	(5,004)	[1,201]	{600}

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.