

IEM's AI Modeling: Short-term COVID-19 Projections**Date: 5/10/21**

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 5/10/21 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.

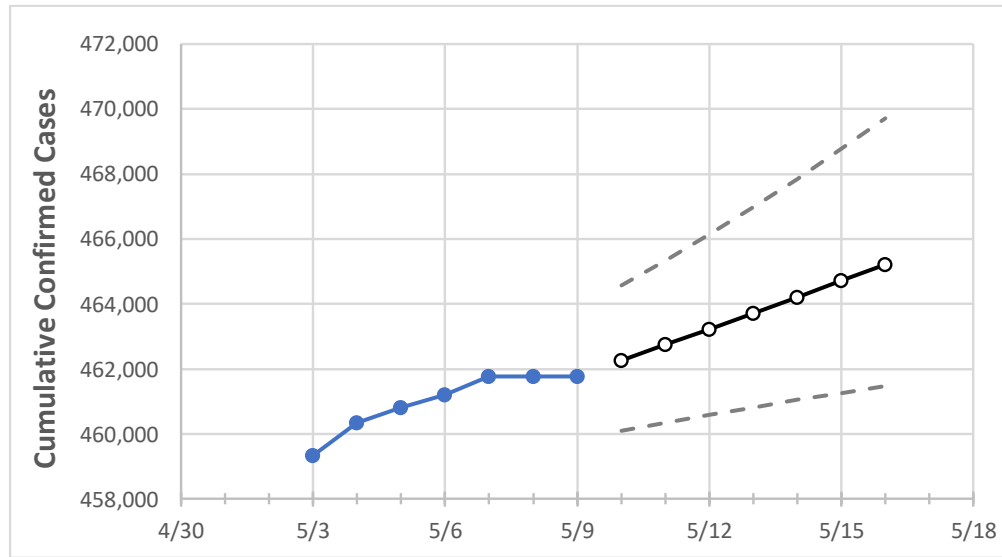
IEM's Modeling Lead

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:						
	5/6	5/7	5/8	5/9	5/10	5/11	5/12	5/13	5/14	5/15	5/16
Louisiana	461,210	461,773	461,773	461,773	462,255	462,740	463,223	463,717	464,210	464,718	465,201

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:						
	5/6	5/7	5/8	5/9	5/10	5/11	5/12	5/13	5/14	5/15	5/16
Ascension Parish	12,167	12,172	12,172	12,172	12,190	12,210	12,229	12,249	12,268	12,289	12,310
Bossier Parish	13,836	13,847	13,847	13,847	13,861	13,874	13,887	13,900	13,913	13,927	13,941
Caddo Parish	26,000	26,022	26,022	26,022	26,050	26,077	26,103	26,132	26,162	26,189	26,217
Calcasieu Parish	22,466	22,484	22,484	22,484	22,502	22,519	22,537	22,553	22,569	22,585	22,601
East Baton Rouge Parish	39,408	39,453	39,453	39,453	39,503	39,555	39,606	39,657	39,708	39,755	39,804
Jefferson Parish	46,078	46,124	46,124	46,124	46,156	46,189	46,220	46,254	46,289	46,322	46,356
Lafayette Parish	23,429	23,460	23,460	23,460	23,482	23,504	23,527	23,548	23,570	23,592	23,613
Lafourche Parish	9,588	9,594	9,594	9,594	9,608	9,623	9,639	9,654	9,671	9,689	9,708
Orleans Parish	30,002	30,025	30,025	30,025	30,049	30,073	30,097	30,121	30,146	30,172	30,197
Ouachita Parish	18,395	18,424	18,424	18,424	18,446	18,468	18,491	18,514	18,540	18,566	18,594
Rapides Parish	12,062	12,086	12,086	12,086	12,107	12,128	12,150	12,172	12,195	12,219	12,243
St. Bernard Parish	4,016	4,022	4,022	4,022	4,026	4,030	4,035	4,040	4,045	4,050	4,055
St. Charles Parish	5,402	5,405	5,405	5,405	5,409	5,414	5,418	5,423	5,427	5,432	5,437
St. James Parish	1,962	1,964	1,964	1,964	1,968	1,972	1,976	1,980	1,984	1,989	1,994
St. John the Baptist Parish	3,719	3,721	3,721	3,721	3,724	3,727	3,730	3,734	3,737	3,740	3,744
St. Tammany Parish	25,667	25,677	25,677	25,677	25,692	25,708	25,723	25,738	25,753	25,767	25,781

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:											
	5/6	5/7	5/8	5/9	5/11				5/13				5/15			
Ascension Parish	12,167	12,172	12,172	12,172	12,210	(2,442)	[586]	{293}	12,249	(2,450)	[588]	{294}	12,289	(2,458)	[590]	{295}
Bossier Parish	13,836	13,847	13,847	13,847	13,874	(2,775)	[666]	{333}	13,900	(2,780)	[667]	{334}	13,927	(2,785)	[668]	{334}
Caddo Parish	26,000	26,022	26,022	26,022	26,077	(5,215)	[1,252]	{626}	26,132	(5,226)	[1,254]	{627}	26,189	(5,238)	[1,257]	{629}
Calcasieu Parish	22,466	22,484	22,484	22,484	22,519	(4,504)	[1,081]	{540}	22,553	(4,511)	[1,083]	{541}	22,585	(4,517)	[1,084]	{542}
East Baton Rouge Parish	39,408	39,453	39,453	39,453	39,555	(7,911)	[1,899]	{949}	39,657	(7,931)	[1,904]	{952}	39,755	(7,951)	[1,908]	{954}
Jefferson Parish	46,078	46,124	46,124	46,124	46,189	(9,238)	[2,217]	{1,109}	46,254	(9,251)	[2,220]	{1,110}	46,322	(9,264)	[2,223]	{1,112}
Lafayette Parish	23,429	23,460	23,460	23,460	23,504	(4,701)	[1,128]	{564}	23,548	(4,710)	[1,130]	{565}	23,592	(4,718)	[1,132]	{566}
Lafourche Parish	9,588	9,594	9,594	9,594	9,623	(1,925)	[462]	{231}	9,654	(1,931)	[463]	{232}	9,689	(1,938)	[465]	{233}
Orleans Parish	30,002	30,025	30,025	30,025	30,073	(6,015)	[1,443]	{722}	30,121	(6,024)	[1,446]	{723}	30,172	(6,034)	[1,448]	{724}
Ouachita Parish	18,395	18,424	18,424	18,424	18,468	(3,694)	[886]	{443}	18,514	(3,703)	[889]	{444}	18,566	(3,713)	[891]	{446}
Rapides Parish	12,062	12,086	12,086	12,086	12,128	(2,426)	[582]	{291}	12,172	(2,434)	[584]	{292}	12,219	(2,444)	[586]	{293}
St. Bernard Parish	4,016	4,022	4,022	4,022	4,030	(806)	[193]	{97}	4,040	(808)	[194]	{97}	4,050	(810)	[194]	{97}
St. Charles Parish	5,402	5,405	5,405	5,405	5,414	(1,083)	[260]	{130}	5,423	(1,085)	[260]	{130}	5,432	(1,086)	[261]	{130}
St. James Parish	1,962	1,964	1,964	1,964	1,972	(394)	[95]	{47}	1,980	(396)	[95]	{48}	1,989	(398)	[95]	{48}
St. John the Baptist Parish	3,719	3,721	3,721	3,721	3,727	(745)	[179]	{89}	3,734	(747)	[179]	{90}	3,740	(748)	[180]	{90}
St. Tammany Parish	25,667	25,677	25,677	25,677	25,708	(5,142)	[1,234]	{617}	25,738	(5,148)	[1,235]	{618}	25,767	(5,153)	[1,237]	{618}

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