

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

Date: 8/9/21

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 8/9/21 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.**

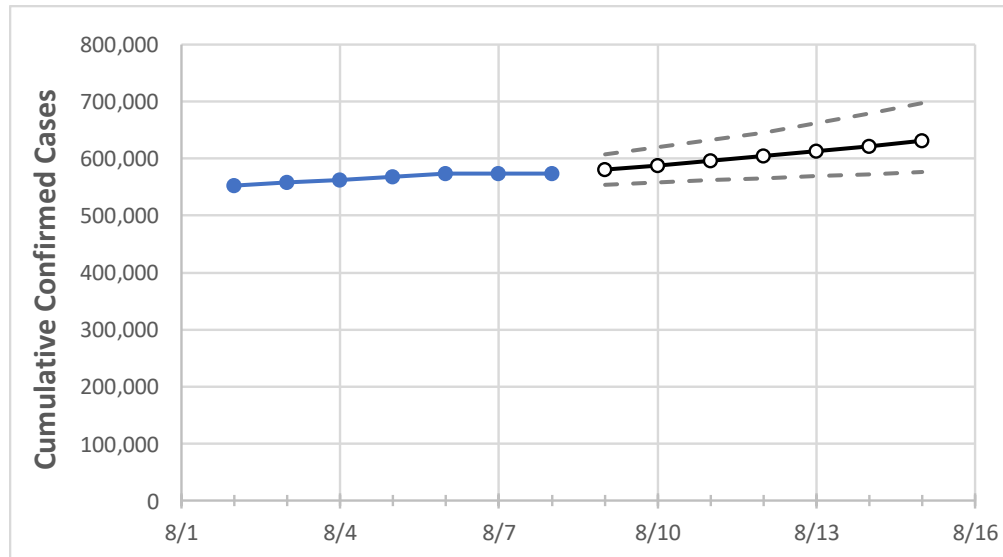
### IEM's Modeling Lead

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:						
	8/5	8/6	8/7	8/8	8/9	8/10	8/11	8/12	8/13	8/14	8/15
Louisiana	567,787	573,903	573,903	573,903	580,795	588,061	595,647	603,882	612,363	621,228	630,535

**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:						
	8/5	8/6	8/7	8/8	8/9	8/10	8/11	8/12	8/13	8/14	8/15
Ascension Parish	16,353	16,471	16,471	16,471	16,640	16,813	16,989	17,165	17,344	17,525	17,711
Bossier Parish	16,153	16,239	16,239	16,239	16,354	16,477	16,609	16,746	16,887	17,035	17,195
Caddo Parish	30,320	30,523	30,523	30,523	30,816	31,128	31,457	31,810	32,191	32,597	33,031
Calcasieu Parish	25,602	25,775	25,775	25,775	25,980	26,201	26,434	26,682	26,949	27,224	27,522
East Baton Rouge Parish	49,388	49,876	49,876	49,876	50,433	50,995	51,574	52,174	52,805	53,459	54,156
Jefferson Parish	55,670	56,220	56,220	56,220	56,904	57,635	58,405	59,228	60,076	60,972	61,896
Lafayette Parish	29,022	29,431	29,431	29,431	29,816	30,223	30,659	31,106	31,573	32,074	32,611
Lafourche Parish	13,125	13,283	13,283	13,283	13,500	13,722	13,960	14,210	14,466	14,737	15,027
Orleans Parish	37,050	37,394	37,394	37,394	37,855	38,323	38,819	39,331	39,880	40,451	41,054
Ouachita Parish	21,897	22,136	22,136	22,136	22,416	22,713	23,023	23,354	23,710	24,100	24,519
Rapides Parish	14,822	14,920	14,920	14,920	15,059	15,205	15,355	15,518	15,685	15,856	16,032
St. Bernard Parish	5,119	5,164	5,164	5,164	5,231	5,300	5,374	5,450	5,528	5,612	5,696
St. Charles Parish	7,040	7,106	7,106	7,106	7,207	7,311	7,421	7,536	7,657	7,784	7,914
St. James Parish	2,504	2,557	2,557	2,557	2,611	2,672	2,736	2,804	2,879	2,960	3,047
St. John the Baptist Parish	4,792	4,855	4,855	4,855	4,923	4,997	5,073	5,152	5,235	5,321	5,413
St. Tammany Parish	32,607	33,050	33,050	33,050	33,502	33,971	34,460	34,980	35,525	36,077	36,659

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:											
	8/5	8/6	8/7	8/8	8/10				8/12				8/14			
Ascension Parish	16,353	16,471	16,471	16,471	16,813	(3,363)	[807]	{404}	17,165	(3,433)	[824]	{412}	17,525	(3,505)	[841]	{421}
Bossier Parish	16,153	16,239	16,239	16,239	16,477	(3,295)	[791]	{395}	16,746	(3,349)	[804]	{402}	17,035	(3,407)	[818]	{409}
Caddo Parish	30,320	30,523	30,523	30,523	31,128	(6,226)	[1,494]	{747}	31,810	(6,362)	[1,527]	{763}	32,597	(6,519)	[1,565]	{782}
Calcasieu Parish	25,602	25,775	25,775	25,775	26,201	(5,240)	[1,258]	{629}	26,682	(5,336)	[1,281]	{640}	27,224	(5,445)	[1,307]	{653}
East Baton Rouge Parish	49,388	49,876	49,876	49,876	50,995	(10,199)	[2,448]	{1,224}	52,174	(10,435)	[2,504]	{1,252}	53,459	(10,692)	[2,566]	{1,283}
Jefferson Parish	55,670	56,220	56,220	56,220	57,635	(11,527)	[2,766]	{1,383}	59,228	(11,846)	[2,843]	{1,421}	60,972	(12,194)	[2,927]	{1,463}
Lafayette Parish	29,022	29,431	29,431	29,431	30,223	(6,045)	[1,451]	{725}	31,106	(6,221)	[1,493]	{747}	32,074	(6,415)	[1,540]	{770}
Lafourche Parish	13,125	13,283	13,283	13,283	13,722	(2,744)	[659]	{329}	14,210	(2,842)	[682]	{341}	14,737	(2,947)	[707]	{354}
Orleans Parish	37,050	37,394	37,394	37,394	38,323	(7,665)	[1,839]	{920}	39,331	(7,866)	[1,888]	{944}	40,451	(8,090)	[1,942]	{971}
Ouachita Parish	21,897	22,136	22,136	22,136	22,713	(4,543)	[1,090]	{545}	23,354	(4,671)	[1,121]	{561}	24,100	(4,820)	[1,157]	{578}
Rapides Parish	14,822	14,920	14,920	14,920	15,205	(3,041)	[730]	{365}	15,518	(3,104)	[745]	{372}	15,856	(3,171)	[761]	{381}
St. Bernard Parish	5,119	5,164	5,164	5,164	5,300	(1,060)	[254]	{127}	5,450	(1,090)	[262]	{131}	5,612	(1,122)	[269]	{135}
St. Charles Parish	7,040	7,106	7,106	7,106	7,311	(1,462)	[351]	{175}	7,536	(1,507)	[362]	{181}	7,784	(1,557)	[374]	{187}
St. James Parish	2,504	2,557	2,557	2,557	2,672	(534)	[128]	{64}	2,804	(561)	[135]	{67}	2,960	(592)	[142]	{71}
St. John the Baptist Parish	4,792	4,855	4,855	4,855	4,997	(999)	[240]	{120}	5,152	(1,030)	[247]	{124}	5,321	(1,064)	[255]	{128}
St. Tammany Parish	32,607	33,050	33,050	33,050	33,971	(6,794)	[1,631]	{815}	34,980	(6,996)	[1,679]	{840}	36,077	(7,215)	[1,732]	{866}

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.