

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

**Date: 8/6/21**

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 8/6/21 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.**

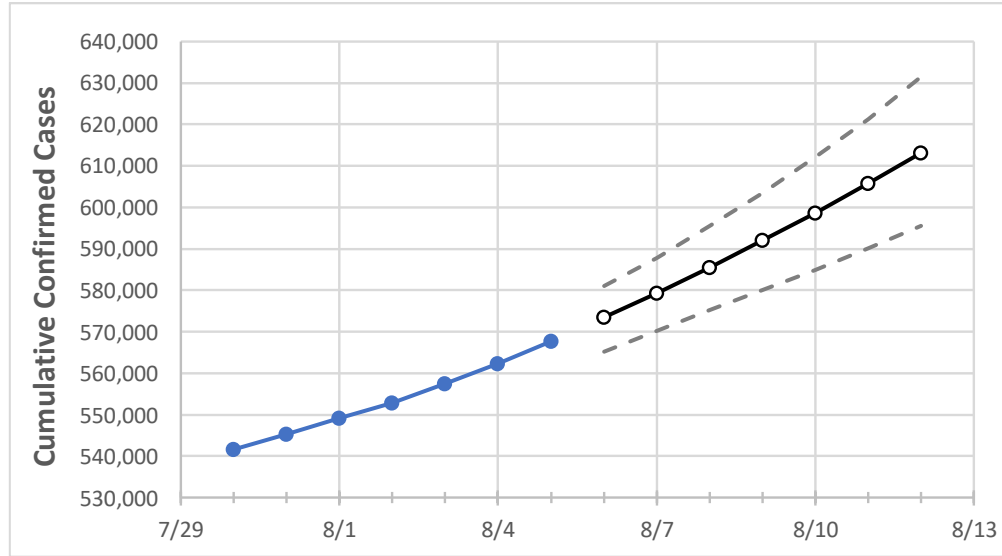
### **IEM's Modeling Lead**

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:						
	8/2	8/3	8/4	8/5	8/6	8/7	8/8	8/9	8/10	8/11	8/12
Louisiana	552,787	557,540	562,319	567,787	573,458	579,320	585,534	591,995	598,648	605,695	613,053

**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:						
	8/2	8/3	8/4	8/5	8/6	8/7	8/8	8/9	8/10	8/11	8/12
Ascension Parish	15,895	16,014	16,171	16,353	16,522	16,694	16,867	17,048	17,232	17,420	17,610
Bossier Parish	15,847	15,934	16,014	16,153	16,260	16,373	16,493	16,619	16,750	16,891	17,035
Caddo Parish	29,638	29,839	30,058	30,320	30,571	30,842	31,130	31,440	31,769	32,121	32,501
Calcasieu Parish	25,148	25,289	25,458	25,602	25,771	25,949	26,141	26,342	26,559	26,786	27,026
East Baton Rouge Parish	48,076	48,476	48,883	49,388	49,866	50,363	50,869	51,394	51,957	52,541	53,132
Jefferson Parish	54,313	54,658	55,109	55,670	56,268	56,898	57,556	58,251	58,981	59,757	60,573
Lafayette Parish	28,250	28,571	28,764	29,022	29,320	29,637	29,970	30,313	30,669	31,053	31,463
Lafourche Parish	12,499	12,781	12,951	13,125	13,313	13,518	13,738	13,958	14,191	14,440	14,706
Orleans Parish	36,027	36,328	36,668	37,050	37,431	37,827	38,235	38,655	39,091	39,544	40,013
Ouachita Parish	21,271	21,477	21,662	21,897	22,116	22,348	22,598	22,868	23,152	23,455	23,783
Rapides Parish	14,478	14,568	14,698	14,822	14,959	15,105	15,256	15,421	15,593	15,767	15,956
St. Bernard Parish	4,993	5,021	5,072	5,119	5,182	5,250	5,321	5,393	5,468	5,549	5,632
St. Charles Parish	6,803	6,859	6,968	7,040	7,134	7,232	7,337	7,443	7,556	7,676	7,801
St. James Parish	2,407	2,447	2,459	2,504	2,542	2,584	2,630	2,679	2,733	2,791	2,850
St. John the Baptist Parish	4,639	4,678	4,734	4,792	4,849	4,909	4,970	5,033	5,099	5,167	5,238
St. Tammany Parish	31,644	31,912	32,223	32,607	32,983	33,378	33,790	34,214	34,657	35,120	35,607

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:											
	8/2	8/3	8/4	8/5	8/7				8/9				8/11			
Ascension Parish	15,895	16,014	16,171	16,353	16,694	(3,339)	[801]	{401}	17,048	(3,410)	[818]	{409}	17,420	(3,484)	[836]	{418}
Bossier Parish	15,847	15,934	16,014	16,153	16,373	(3,275)	[786]	{393}	16,619	(3,324)	[798]	{399}	16,891	(3,378)	[811]	{405}
Caddo Parish	29,638	29,839	30,058	30,320	30,842	(6,168)	[1,480]	{740}	31,440	(6,288)	[1,509]	{755}	32,121	(6,424)	[1,542]	{771}
Calcasieu Parish	25,148	25,289	25,458	25,602	25,949	(5,190)	[1,246]	{623}	26,342	(5,268)	[1,264]	{632}	26,786	(5,357)	[1,286]	{643}
East Baton Rouge Parish	48,076	48,476	48,883	49,388	50,363	(10,073)	[2,417]	{1,209}	51,394	(10,279)	[2,467]	{1,233}	52,541	(10,508)	[2,522]	{1,261}
Jefferson Parish	54,313	54,658	55,109	55,670	56,898	(11,380)	[2,731]	{1,366}	58,251	(11,650)	[2,796]	{1,398}	59,757	(11,951)	[2,868]	{1,434}
Lafayette Parish	28,250	28,571	28,764	29,022	29,637	(5,927)	[1,423]	{711}	30,313	(6,063)	[1,455]	{728}	31,053	(6,211)	[1,491]	{745}
Lafourche Parish	12,499	12,781	12,951	13,125	13,518	(2,704)	[649]	{324}	13,958	(2,792)	[670]	{335}	14,440	(2,888)	[693]	{347}
Orleans Parish	36,027	36,328	36,668	37,050	37,827	(7,565)	[1,816]	{908}	38,655	(7,731)	[1,855]	{928}	39,544	(7,909)	[1,898]	{949}
Ouachita Parish	21,271	21,477	21,662	21,897	22,348	(4,470)	[1,073]	{536}	22,868	(4,574)	[1,098]	{549}	23,455	(4,691)	[1,126]	{563}
Rapides Parish	14,478	14,568	14,698	14,822	15,105	(3,021)	[725]	{363}	15,421	(3,084)	[740]	{370}	15,767	(3,153)	[757]	{378}
St. Bernard Parish	4,993	5,021	5,072	5,119	5,250	(1,050)	[252]	{126}	5,393	(1,079)	[259]	{129}	5,549	(1,110)	[266]	{133}
St. Charles Parish	6,803	6,859	6,968	7,040	7,232	(1,446)	[347]	{174}	7,443	(1,489)	[357]	{179}	7,676	(1,535)	[368]	{184}
St. James Parish	2,407	2,447	2,459	2,504	2,584	(517)	[124]	{62}	2,679	(536)	[129]	{64}	2,791	(558)	[134]	{67}
St. John the Baptist Parish	4,639	4,678	4,734	4,792	4,909	(982)	[236]	{118}	5,033	(1,007)	[242]	{121}	5,167	(1,033)	[248]	{124}
St. Tammany Parish	31,644	31,912	32,223	32,607	33,378	(6,676)	[1,602]	{801}	34,214	(6,843)	[1,642]	{821}	35,120	(7,024)	[1,686]	{843}

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.