

**IEM's AI Modeling: Short-term COVID-19 Projections****Date: 12/22/21**

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 12/22/21 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.**

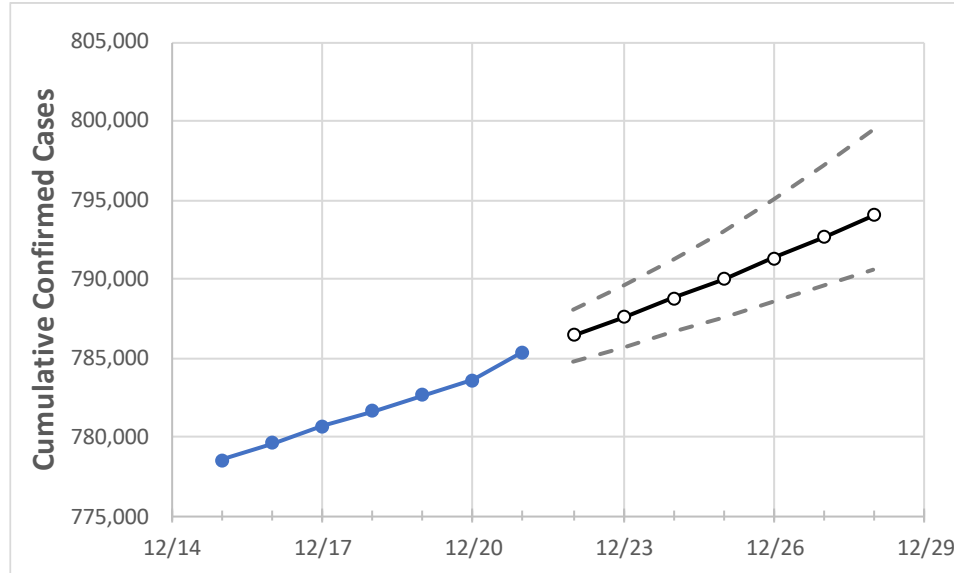
**IEM's Modeling Lead**

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:						
	12/18	12/19	12/20	12/21	12/22	12/23	12/24	12/25	12/26	12/27	12/28
Louisiana	781,647	782,625	783,604	785,333	786,428	787,577	788,790	790,000	791,299	792,637	794,029

**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:						
	12/18	12/19	12/20	12/21	12/22	12/23	12/24	12/25	12/26	12/27	12/28
Ascension Parish	22,371	22,394	22,417	22,496	22,532	22,570	22,610	22,650	22,693	22,741	22,789
Bossier Parish	22,417	22,435	22,454	22,486	22,507	22,526	22,547	22,568	22,589	22,611	22,632
Caddo Parish	40,713	40,772	40,831	40,942	41,002	41,065	41,131	41,197	41,270	41,344	41,417
Calcasieu Parish	35,331	35,366	35,400	35,468	35,503	35,540	35,576	35,615	35,654	35,697	35,739
East Baton Rouge Parish	65,316	65,376	65,437	65,637	65,719	65,798	65,890	65,982	66,076	66,179	66,279
Jefferson Parish	71,398	71,557	71,715	71,942	72,103	72,277	72,459	72,659	72,871	73,091	73,331
Lafayette Parish	40,063	40,096	40,128	40,192	40,230	40,269	40,309	40,352	40,395	40,437	40,483
Lafourche Parish	18,420	18,430	18,439	18,456	18,471	18,487	18,502	18,518	18,535	18,551	18,567
Orleans Parish	49,042	49,299	49,557	49,851	50,151	50,477	50,833	51,223	51,646	52,112	52,606
Ouachita Parish	32,638	32,660	32,681	32,740	32,766	32,794	32,820	32,847	32,875	32,904	32,933
Rapides Parish	21,770	21,783	21,797	21,855	21,875	21,894	21,914	21,936	21,957	21,981	22,003
St. Bernard Parish	7,143	7,156	7,169	7,179	7,191	7,203	7,216	7,230	7,244	7,259	7,275
St. Charles Parish	9,142	9,160	9,177	9,203	9,223	9,243	9,265	9,288	9,312	9,337	9,364
St. James Parish	3,575	3,579	3,582	3,590	3,594	3,599	3,604	3,609	3,615	3,621	3,627
St. John the Baptist Parish	6,466	6,478	6,490	6,502	6,513	6,525	6,537	6,551	6,565	6,580	6,596
St. Tammany Parish	44,993	45,047	45,102	45,181	45,241	45,304	45,366	45,429	45,499	45,570	45,641

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:											
	12/18	12/19	12/20	12/21	12/23				12/25				12/27			
Ascension Parish	22,371	22,394	22,417	22,496	22,570	(4,514)	[1,083]	{542}	22,650	(4,530)	[1,087]	{544}	22,741	(4,548)	[1,092]	{546}
Bossier Parish	22,417	22,435	22,454	22,486	22,526	(4,505)	[1,081]	{541}	22,568	(4,514)	[1,083]	{542}	22,611	(4,522)	[1,085]	{543}
Caddo Parish	40,713	40,772	40,831	40,942	41,065	(8,213)	[1,971]	{986}	41,197	(8,239)	[1,977]	{989}	41,344	(8,269)	[1,984]	{992}
Calcasieu Parish	35,331	35,366	35,400	35,468	35,540	(7,108)	[1,706]	{853}	35,615	(7,123)	[1,710]	{855}	35,697	(7,139)	[1,713]	{857}
East Baton Rouge Parish	65,316	65,376	65,437	65,637	65,798	(13,160)	[3,158]	{1,579}	65,982	(13,196)	[3,167]	{1,584}	66,179	(13,236)	[3,177]	{1,588}
Jefferson Parish	71,398	71,557	71,715	71,942	72,277	(14,455)	[3,469]	{1,735}	72,659	(14,532)	[3,488]	{1,744}	73,091	(14,618)	[3,508]	{1,754}
Lafayette Parish	40,063	40,096	40,128	40,192	40,269	(8,054)	[1,933]	{966}	40,352	(8,070)	[1,937]	{968}	40,437	(8,087)	[1,941]	{970}
Lafourche Parish	18,420	18,430	18,439	18,456	18,487	(3,697)	[887]	{444}	18,518	(3,704)	[889]	{444}	18,551	(3,710)	[890]	{445}
Orleans Parish	49,042	49,299	49,557	49,851	50,477	(10,095)	[2,423]	{1,211}	51,223	(10,245)	[2,459]	{1,229}	52,112	(10,422)	[2,501]	{1,251}
Ouachita Parish	32,638	32,660	32,681	32,740	32,794	(6,559)	[1,574]	{787}	32,847	(6,569)	[1,577]	{788}	32,904	(6,581)	[1,579]	{790}
Rapides Parish	21,770	21,783	21,797	21,855	21,894	(4,379)	[1,051]	{525}	21,936	(4,387)	[1,053]	{526}	21,981	(4,396)	[1,055]	{528}
St. Bernard Parish	7,143	7,156	7,169	7,179	7,203	(1,441)	[346]	{173}	7,230	(1,446)	[347]	{174}	7,259	(1,452)	[348]	{174}
St. Charles Parish	9,142	9,160	9,177	9,203	9,243	(1,849)	[444]	{222}	9,288	(1,858)	[446]	{223}	9,337	(1,867)	[448]	{224}
St. James Parish	3,575	3,579	3,582	3,590	3,599	(720)	[173]	{86}	3,609	(722)	[173]	{87}	3,621	(724)	[174]	{87}
St. John the Baptist Parish	6,466	6,478	6,490	6,502	6,525	(1,305)	[313]	{157}	6,551	(1,310)	[314]	{157}	6,580	(1,316)	[316]	{158}
St. Tammany Parish	44,993	45,047	45,102	45,181	45,304	(9,061)	[2,175]	{1,087}	45,429	(9,086)	[2,181]	{1,090}	45,570	(9,114)	[2,187]	{1,094}

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.