

**IEM's AI Modeling: Short-term COVID-19 Projections****Date: 4/26/21**

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 4/26/21 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.**

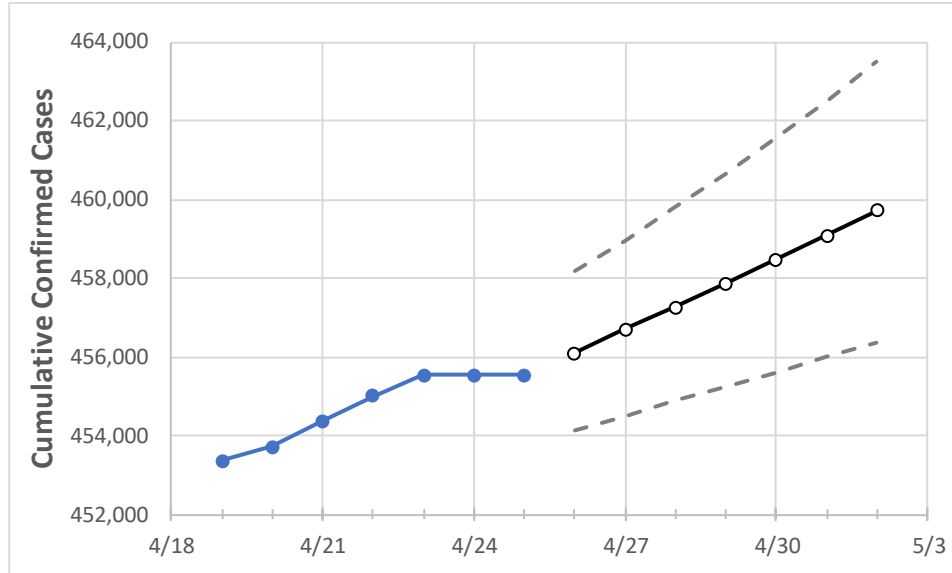
**IEM's Modeling Lead**

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:						
	4/22	4/23	4/24	4/25	4/26	4/27	4/28	4/29	4/30	5/1	5/2
Louisiana	455,000	455,541	455,541	455,541	456,104	456,689	457,264	457,869	458,464	459,084	459,707

**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:						
	4/22	4/23	4/24	4/25	4/26	4/27	4/28	4/29	4/30	5/1	5/2
Ascension Parish	11,916	11,939	11,939	11,939	11,956	11,974	11,992	12,009	12,028	12,046	12,066
Bossier Parish	13,607	13,645	13,645	13,645	13,671	13,697	13,726	13,756	13,787	13,819	13,853
Caddo Parish	25,622	25,634	25,634	25,634	25,667	25,701	25,736	25,772	25,809	25,848	25,888
Calcasieu Parish	22,138	22,167	22,167	22,167	22,200	22,232	22,265	22,297	22,329	22,360	22,391
East Baton Rouge Parish	38,648	38,740	38,740	38,740	38,817	38,894	38,973	39,058	39,140	39,227	39,310
Jefferson Parish	45,665	45,695	45,695	45,695	45,729	45,764	45,800	45,837	45,875	45,912	45,951
Lafayette Parish	22,955	22,975	22,975	22,975	23,015	23,056	23,097	23,141	23,188	23,235	23,284
Lafourche Parish	9,464	9,474	9,474	9,474	9,482	9,489	9,497	9,505	9,514	9,523	9,531
Orleans Parish	29,701	29,721	29,721	29,721	29,740	29,760	29,780	29,799	29,819	29,838	29,858
Ouachita Parish	18,153	18,175	18,175	18,175	18,197	18,220	18,243	18,267	18,292	18,318	18,347
Rapides Parish	11,857	11,881	11,881	11,881	11,899	11,917	11,936	11,956	11,976	11,998	12,019
St. Bernard Parish	3,980	3,984	3,984	3,984	3,986	3,987	3,989	3,991	3,992	3,994	3,995
St. Charles Parish	5,355	5,353	5,353	5,353	5,357	5,361	5,365	5,369	5,373	5,378	5,382
St. James Parish	1,938	1,937	1,937	1,937	1,939	1,941	1,942	1,944	1,946	1,947	1,949
St. John the Baptist Parish	3,667	3,680	3,680	3,680	3,686	3,692	3,699	3,706	3,713	3,721	3,729
St. Tammany Parish	25,415	25,439	25,439	25,439	25,464	25,489	25,516	25,543	25,571	25,599	25,629

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:											
	4/22	4/23	4/24	4/25	4/27				4/29				5/1			
Ascension Parish	11,916	11,939	11,939	11,939	11,974	(2,395)	[575]	{287}	12,009	(2,402)	[576]	{288}	12,046	(2,409)	[578]	{289}
Bossier Parish	13,607	13,645	13,645	13,645	13,697	(2,739)	[657]	{329}	13,756	(2,751)	[660]	{330}	13,819	(2,764)	[663]	{332}
Caddo Parish	25,622	25,634	25,634	25,634	25,701	(5,140)	[1,234]	{617}	25,772	(5,154)	[1,237]	{619}	25,848	(5,170)	[1,241]	{620}
Calcasieu Parish	22,138	22,167	22,167	22,167	22,232	(4,446)	[1,067]	{534}	22,297	(4,459)	[1,070]	{535}	22,360	(4,472)	[1,073]	{537}
East Baton Rouge Parish	38,648	38,740	38,740	38,740	38,894	(7,779)	[1,867]	{933}	39,058	(7,812)	[1,875]	{937}	39,227	(7,845)	[1,883]	{941}
Jefferson Parish	45,665	45,695	45,695	45,695	45,764	(9,153)	[2,197]	{1,098}	45,837	(9,167)	[2,200]	{1,100}	45,912	(9,182)	[2,204]	{1,102}
Lafayette Parish	22,955	22,975	22,975	22,975	23,056	(4,611)	[1,107]	{553}	23,141	(4,628)	[1,111]	{555}	23,235	(4,647)	[1,115]	{558}
Lafourche Parish	9,464	9,474	9,474	9,474	9,489	(1,898)	[455]	{228}	9,505	(1,901)	[456]	{228}	9,523	(1,905)	[457]	{229}
Orleans Parish	29,701	29,721	29,721	29,721	29,760	(5,952)	[1,428]	{714}	29,799	(5,960)	[1,430]	{715}	29,838	(5,968)	[1,432]	{716}
Ouachita Parish	18,153	18,175	18,175	18,175	18,220	(3,644)	[875]	{437}	18,267	(3,653)	[877]	{438}	18,318	(3,664)	[879]	{440}
Rapides Parish	11,857	11,881	11,881	11,881	11,917	(2,383)	[572]	{286}	11,956	(2,391)	[574]	{287}	11,998	(2,400)	[576]	{288}
St. Bernard Parish	3,980	3,984	3,984	3,984	3,987	(797)	[191]	{96}	3,991	(798)	[192]	{96}	3,994	(799)	[192]	{96}
St. Charles Parish	5,355	5,353	5,353	5,353	5,361	(1,072)	[257]	{129}	5,369	(1,074)	[258]	{129}	5,378	(1,076)	[258]	{129}
St. James Parish	1,938	1,937	1,937	1,937	1,941	(388)	[93]	{47}	1,944	(389)	[93]	{47}	1,947	(389)	[93]	{47}
St. John the Baptist Parish	3,667	3,680	3,680	3,680	3,692	(738)	[177]	{89}	3,706	(741)	[178]	{89}	3,721	(744)	[179]	{89}
St. Tammany Parish	25,415	25,439	25,439	25,439	25,489	(5,098)	[1,223]	{612}	25,543	(5,109)	[1,226]	{613}	25,599	(5,120)	[1,229]	{614}

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.