

IEM's AI Modeling: Short-term COVID-19 Projections**Date: 10/18/21**

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 10/18/21 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.

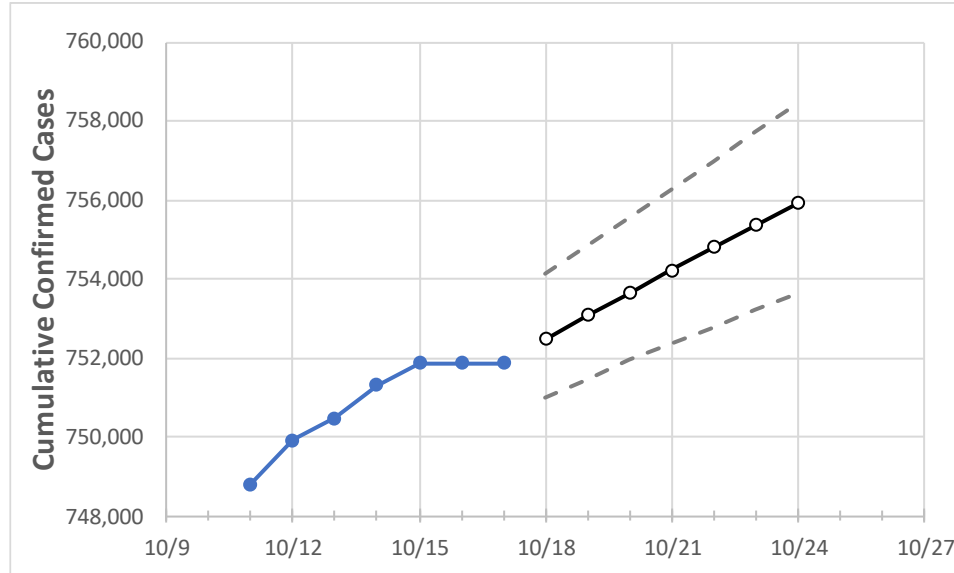
IEM's Modeling Lead

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:						
	10/14	10/15	10/16	10/17	10/18	10/19	10/20	10/21	10/22	10/23	10/24
Louisiana	751,315	751,874	751,874	751,874	752,473	753,072	753,636	754,208	754,796	755,357	755,905

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:						
	10/14	10/15	10/16	10/17	10/18	10/19	10/20	10/21	10/22	10/23	10/24
Ascension Parish	21,632	21,640	21,640	21,640	21,655	21,668	21,680	21,693	21,705	21,720	21,731
Bossier Parish	21,506	21,522	21,522	21,522	21,543	21,565	21,585	21,605	21,625	21,646	21,665
Caddo Parish	39,027	39,076	39,076	39,076	39,117	39,161	39,202	39,241	39,281	39,320	39,360
Calcasieu Parish	34,061	34,107	34,107	34,107	34,146	34,185	34,222	34,259	34,298	34,335	34,373
East Baton Rouge Parish	63,337	63,370	63,370	63,370	63,413	63,454	63,491	63,531	63,570	63,610	63,648
Jefferson Parish	69,076	69,122	69,122	69,122	69,158	69,193	69,227	69,262	69,295	69,328	69,361
Lafayette Parish	38,362	38,387	38,387	38,387	38,419	38,453	38,483	38,515	38,547	38,579	38,608
Lafourche Parish	17,749	17,754	17,754	17,754	17,766	17,779	17,790	17,802	17,813	17,825	17,836
Orleans Parish	46,382	46,408	46,408	46,408	46,440	46,471	46,502	46,533	46,564	46,593	46,623
Ouachita Parish	31,198	31,224	31,224	31,224	31,262	31,300	31,337	31,371	31,408	31,444	31,476
Rapides Parish	21,016	21,022	21,022	21,022	21,035	21,050	21,064	21,077	21,089	21,103	21,116
St. Bernard Parish	6,845	6,852	6,852	6,852	6,859	6,866	6,873	6,880	6,887	6,894	6,901
St. Charles Parish	8,806	8,811	8,811	8,811	8,817	8,823	8,830	8,836	8,842	8,848	8,855
St. James Parish	3,439	3,442	3,442	3,442	3,445	3,448	3,450	3,453	3,456	3,459	3,461
St. John the Baptist Parish	6,266	6,270	6,270	6,270	6,274	6,278	6,283	6,287	6,291	6,295	6,299
St. Tammany Parish	43,200	43,240	43,240	43,240	43,274	43,306	43,338	43,370	43,402	43,432	43,462

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:											
	10/14	10/15	10/16	10/17	10/19				10/21				10/23			
Ascension Parish	21,632	21,640	21,640	21,640	21,668	(4,334)	[1,040]	{520}	21,693	(4,339)	[1,041]	{521}	21,720	(4,344)	[1,043]	{521}
Bossier Parish	21,506	21,522	21,522	21,522	21,565	(4,313)	[1,035]	{518}	21,605	(4,321)	[1,037]	{519}	21,646	(4,329)	[1,039]	{519}
Caddo Parish	39,027	39,076	39,076	39,076	39,161	(7,832)	[1,880]	{940}	39,241	(7,848)	[1,884]	{942}	39,320	(7,864)	[1,887]	{944}
Calcasieu Parish	34,061	34,107	34,107	34,107	34,185	(6,837)	[1,641]	{820}	34,259	(6,852)	[1,644]	{822}	34,335	(6,867)	[1,648]	{824}
East Baton Rouge Parish	63,337	63,370	63,370	63,370	63,454	(12,691)	[3,046]	{1,523}	63,531	(12,706)	[3,050]	{1,525}	63,610	(12,722)	[3,053]	{1,527}
Jefferson Parish	69,076	69,122	69,122	69,122	69,193	(13,839)	[3,321]	{1,661}	69,262	(13,852)	[3,325]	{1,662}	69,328	(13,866)	[3,328]	{1,664}
Lafayette Parish	38,362	38,387	38,387	38,387	38,453	(7,691)	[1,846]	{923}	38,515	(7,703)	[1,849]	{924}	38,579	(7,716)	[1,852]	{926}
Lafourche Parish	17,749	17,754	17,754	17,754	17,779	(3,556)	[853]	{427}	17,802	(3,560)	[854]	{427}	17,825	(3,565)	[856]	{428}
Orleans Parish	46,382	46,408	46,408	46,408	46,471	(9,294)	[2,231]	{1,115}	46,533	(9,307)	[2,234]	{1,117}	46,593	(9,319)	[2,236]	{1,118}
Ouachita Parish	31,198	31,224	31,224	31,224	31,300	(6,260)	[1,502]	{751}	31,371	(6,274)	[1,506]	{753}	31,444	(6,289)	[1,509]	{755}
Rapides Parish	21,016	21,022	21,022	21,022	21,050	(4,210)	[1,010]	{505}	21,077	(4,215)	[1,012]	{506}	21,103	(4,221)	[1,013]	{506}
St. Bernard Parish	6,845	6,852	6,852	6,852	6,866	(1,373)	[330]	{165}	6,880	(1,376)	[330]	{165}	6,894	(1,379)	[331]	{165}
St. Charles Parish	8,806	8,811	8,811	8,811	8,823	(1,765)	[424]	{212}	8,836	(1,767)	[424]	{212}	8,848	(1,770)	[425]	{212}
St. James Parish	3,439	3,442	3,442	3,442	3,448	(690)	[165]	{83}	3,453	(691)	[166]	{83}	3,459	(692)	[166]	{83}
St. John the Baptist Parish	6,266	6,270	6,270	6,270	6,278	(1,256)	[301]	{151}	6,287	(1,257)	[302]	{151}	6,295	(1,259)	[302]	{151}
St. Tammany Parish	43,200	43,240	43,240	43,240	43,306	(8,661)	[2,079]	{1,039}	43,370	(8,674)	[2,082]	{1,041}	43,432	(8,686)	[2,085]	{1,042}

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.