

IEM's AI Modeling: Short-term COVID-19 Projections**Date: 11/5/21**

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 11/5/21 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.

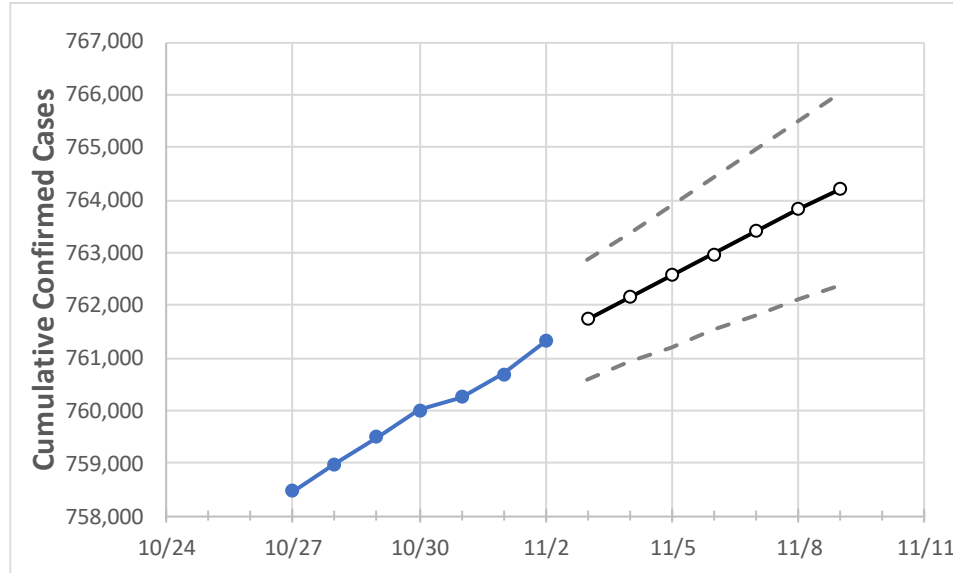
IEM's Modeling Lead

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:						
	10/30	10/31	11/1	11/2	11/3	11/4	11/5	11/6	11/7	11/8	11/9
Louisiana	760,000	760,246	760,691	761,311	761,735	762,160	762,564	762,973	763,410	763,821	764,202

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:						
	10/30	10/31	11/1	11/2	11/3	11/4	11/5	11/6	11/7	11/8	11/9
Ascension Parish	21,795	21,798	21,810	21,834	21,842	21,850	21,859	21,866	21,874	21,883	21,890
Bossier Parish	21,741	21,754	21,767	21,785	21,796	21,807	21,818	21,828	21,839	21,849	21,859
Caddo Parish	39,484	39,497	39,516	39,541	39,560	39,579	39,597	39,615	39,633	39,650	39,668
Calcasieu Parish	34,494	34,507	34,520	34,548	34,561	34,574	34,586	34,598	34,609	34,620	34,631
East Baton Rouge Parish	63,888	63,905	63,927	64,001	64,022	64,045	64,066	64,087	64,108	64,127	64,150
Jefferson Parish	69,576	69,593	69,621	69,660	69,683	69,706	69,729	69,751	69,773	69,795	69,816
Lafayette Parish	39,080	39,089	39,109	39,156	39,197	39,240	39,281	39,324	39,371	39,416	39,460
Lafourche Parish	17,927	17,935	17,944	17,979	17,992	18,005	18,019	18,033	18,048	18,062	18,077
Orleans Parish	46,860	46,867	46,892	46,916	46,938	46,960	46,981	47,002	47,023	47,043	47,063
Ouachita Parish	31,533	31,552	31,575	31,608	31,620	31,631	31,643	31,654	31,665	31,676	31,685
Rapides Parish	21,250	21,258	21,269	21,284	21,293	21,302	21,311	21,320	21,328	21,337	21,345
St. Bernard Parish	6,902	6,903	6,905	6,906	6,908	6,909	6,911	6,913	6,914	6,916	6,917
St. Charles Parish	8,888	8,890	8,894	8,896	8,899	8,902	8,905	8,908	8,911	8,914	8,917
St. James Parish	3,524	3,527	3,531	3,531	3,535	3,539	3,543	3,547	3,551	3,556	3,560
St. John the Baptist Parish	6,313	6,314	6,321	6,324	6,326	6,329	6,332	6,334	6,337	6,340	6,342
St. Tammany Parish	43,642	43,661	43,703	43,739	43,764	43,790	43,815	43,841	43,867	43,893	43,920

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:											
	10/30	10/31	11/1	11/2	11/4				11/6				11/8			
Ascension Parish	21,795	21,798	21,810	21,834	21,850	(4,370)	[1,049]	{524}	21,866	(4,373)	[1,050]	{525}	21,883	(4,377)	[1,050]	{525}
Bossier Parish	21,741	21,754	21,767	21,785	21,807	(4,361)	[1,047]	{523}	21,828	(4,366)	[1,048]	{524}	21,849	(4,370)	[1,049]	{524}
Caddo Parish	39,484	39,497	39,516	39,541	39,579	(7,916)	[1,900]	{950}	39,615	(7,923)	[1,902]	{951}	39,650	(7,930)	[1,903]	{952}
Calcasieu Parish	34,494	34,507	34,520	34,548	34,574	(6,915)	[1,660]	{830}	34,598	(6,920)	[1,661]	{830}	34,620	(6,924)	[1,662]	{831}
East Baton Rouge Parish	63,888	63,905	63,927	64,001	64,045	(12,809)	[3,074]	{1,537}	64,087	(12,817)	[3,076]	{1,538}	64,127	(12,825)	[3,078]	{1,539}
Jefferson Parish	69,576	69,593	69,621	69,660	69,706	(13,941)	[3,346]	{1,673}	69,751	(13,950)	[3,348]	{1,674}	69,795	(13,959)	[3,350]	{1,675}
Lafayette Parish	39,080	39,089	39,109	39,156	39,240	(7,848)	[1,883]	{942}	39,324	(7,865)	[1,888]	{944}	39,416	(7,883)	[1,892]	{946}
Lafourche Parish	17,927	17,935	17,944	17,979	18,005	(3,601)	[864]	{432}	18,033	(3,607)	[866]	{433}	18,062	(3,612)	[867]	{433}
Orleans Parish	46,860	46,867	46,892	46,916	46,960	(9,392)	[2,254]	{1,127}	47,002	(9,400)	[2,256]	{1,128}	47,043	(9,409)	[2,258]	{1,129}
Ouachita Parish	31,533	31,552	31,575	31,608	31,631	(6,326)	[1,518]	{759}	31,654	(6,331)	[1,519]	{760}	31,676	(6,335)	[1,520]	{760}
Rapides Parish	21,250	21,258	21,269	21,284	21,302	(4,260)	[1,022]	{511}	21,320	(4,264)	[1,023]	{512}	21,337	(4,267)	[1,024]	{512}
St. Bernard Parish	6,902	6,903	6,905	6,906	6,909	(1,382)	[332]	{166}	6,913	(1,383)	[332]	{166}	6,916	(1,383)	[332]	{166}
St. Charles Parish	8,888	8,890	8,894	8,896	8,902	(1,780)	[427]	{214}	8,908	(1,782)	[428]	{214}	8,914	(1,783)	[428]	{214}
St. James Parish	3,524	3,527	3,531	3,531	3,539	(708)	[170]	{85}	3,547	(709)	[170]	{85}	3,556	(711)	[171]	{85}
St. John the Baptist Parish	6,313	6,314	6,321	6,324	6,329	(1,266)	[304]	{152}	6,334	(1,267)	[304]	{152}	6,340	(1,268)	[304]	{152}
St. Tammany Parish	43,642	43,661	43,703	43,739	43,790	(8,758)	[2,102]	{1,051}	43,841	(8,768)	[2,104]	{1,052}	43,893	(8,779)	[2,107]	{1,053}

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.