

IEM's AI Modeling: Short-term COVID-19 Projections**Date: 10/22/21**

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 10/22/21 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.

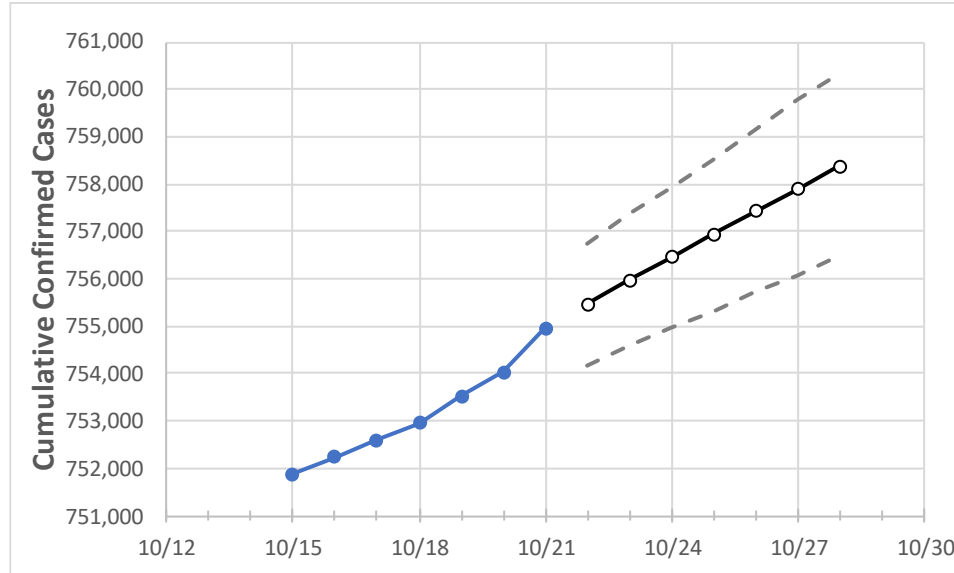
IEM's Modeling Lead

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:						
	10/18	10/19	10/20	10/21	10/22	10/23	10/24	10/25	10/26	10/27	10/28
Louisiana	752,951	753,532	754,027	754,950	755,475	755,965	756,458	756,933	757,434	757,898	758,369

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:						
	10/18	10/19	10/20	10/21	10/22	10/23	10/24	10/25	10/26	10/27	10/28
Ascension Parish	21,660	21,676	21,688	21,700	21,710	21,722	21,732	21,743	21,754	21,764	21,776
Bossier Parish	21,558	21,571	21,578	21,613	21,630	21,647	21,663	21,680	21,696	21,712	21,727
Caddo Parish	39,143	39,171	39,194	39,227	39,260	39,290	39,320	39,350	39,378	39,407	39,436
Calcasieu Parish	34,170	34,222	34,252	34,290	34,322	34,356	34,389	34,421	34,452	34,484	34,515
East Baton Rouge Parish	63,446	63,520	63,559	63,606	63,646	63,683	63,720	63,758	63,795	63,831	63,867
Jefferson Parish	69,187	69,218	69,255	69,295	69,325	69,355	69,384	69,411	69,441	69,469	69,496
Lafayette Parish	38,453	38,522	38,538	38,623	38,656	38,690	38,722	38,757	38,788	38,822	38,856
Lafourche Parish	17,779	17,784	17,791	17,810	17,821	17,831	17,841	17,851	17,860	17,871	17,881
Orleans Parish	46,484	46,508	46,542	46,574	46,602	46,629	46,655	46,682	46,707	46,733	46,758
Ouachita Parish	31,272	31,312	31,341	31,374	31,404	31,432	31,460	31,488	31,515	31,540	31,565
Rapides Parish	21,042	21,063	21,085	21,110	21,123	21,137	21,149	21,161	21,174	21,186	21,197
St. Bernard Parish	6,859	6,861	6,868	6,872	6,877	6,882	6,887	6,892	6,897	6,901	6,906
St. Charles Parish	8,832	8,834	8,836	8,845	8,851	8,857	8,863	8,869	8,875	8,882	8,888
St. James Parish	3,448	3,450	3,455	3,484	3,489	3,494	3,498	3,503	3,508	3,514	3,519
St. John the Baptist Parish	6,278	6,279	6,282	6,285	6,288	6,291	6,295	6,298	6,301	6,304	6,307
St. Tammany Parish	43,296	43,315	43,342	43,370	43,394	43,418	43,440	43,463	43,486	43,507	43,528

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:											
	10/18	10/19	10/20	10/21	10/23				10/25				10/27			
Ascension Parish	21,660	21,676	21,688	21,700	21,722	(4,344)	[1,043]	{521}	21,743	(4,349)	[1,044]	{522}	21,764	(4,353)	[1,045]	{522}
Bossier Parish	21,558	21,571	21,578	21,613	21,647	(4,329)	[1,039]	{520}	21,680	(4,336)	[1,041]	{520}	21,712	(4,342)	[1,042]	{521}
Caddo Parish	39,143	39,171	39,194	39,227	39,290	(7,858)	[1,886]	{943}	39,350	(7,870)	[1,889]	{944}	39,407	(7,881)	[1,892]	{946}
Calcasieu Parish	34,170	34,222	34,252	34,290	34,356	(6,871)	[1,649]	{825}	34,421	(6,884)	[1,652]	{826}	34,484	(6,897)	[1,655]	{828}
East Baton Rouge Parish	63,446	63,520	63,559	63,606	63,683	(12,737)	[3,057]	{1,528}	63,758	(12,752)	[3,060]	{1,530}	63,831	(12,766)	[3,064]	{1,532}
Jefferson Parish	69,187	69,218	69,255	69,295	69,355	(13,871)	[3,329]	{1,665}	69,411	(13,882)	[3,332]	{1,666}	69,469	(13,894)	[3,335]	{1,667}
Lafayette Parish	38,453	38,522	38,538	38,623	38,690	(7,738)	[1,857]	{929}	38,757	(7,751)	[1,860]	{930}	38,822	(7,764)	[1,863]	{932}
Lafourche Parish	17,779	17,784	17,791	17,810	17,831	(3,566)	[856]	{428}	17,851	(3,570)	[857]	{428}	17,871	(3,574)	[858]	{429}
Orleans Parish	46,484	46,508	46,542	46,574	46,629	(9,326)	[2,238]	{1,119}	46,682	(9,336)	[2,241]	{1,120}	46,733	(9,347)	[2,243]	{1,122}
Ouachita Parish	31,272	31,312	31,341	31,374	31,432	(6,286)	[1,509]	{754}	31,488	(6,298)	[1,511]	{756}	31,540	(6,308)	[1,514]	{757}
Rapides Parish	21,042	21,063	21,085	21,110	21,137	(4,227)	[1,015]	{507}	21,161	(4,232)	[1,016]	{508}	21,186	(4,237)	[1,017]	{508}
St. Bernard Parish	6,859	6,861	6,868	6,872	6,882	(1,376)	[330]	{165}	6,892	(1,378)	[331]	{165}	6,901	(1,380)	[331]	{166}
St. Charles Parish	8,832	8,834	8,836	8,845	8,857	(1,771)	[425]	{213}	8,869	(1,774)	[426]	{213}	8,882	(1,776)	[426]	{213}
St. James Parish	3,448	3,450	3,455	3,484	3,494	(699)	[168]	{84}	3,503	(701)	[168]	{84}	3,514	(703)	[169]	{84}
St. John the Baptist Parish	6,278	6,279	6,282	6,285	6,291	(1,258)	[302]	{151}	6,298	(1,260)	[302]	{151}	6,304	(1,261)	[303]	{151}
St. Tammany Parish	43,296	43,315	43,342	43,370	43,418	(8,684)	[2,084]	{1,042}	43,463	(8,693)	[2,086]	{1,043}	43,507	(8,701)	[2,088]	{1,044}

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.