

IEM's AI Modeling: Short-term COVID-19 Projections**Date: 3/18/22**

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 3/18/22 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.

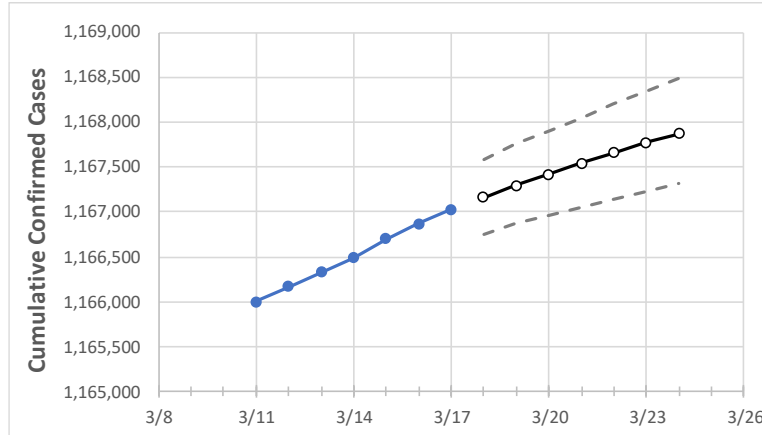
IEM's Modeling Lead

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:						
	3/14	3/15	3/16	3/17	3/18	3/19	3/20	3/21	3/22	3/23	3/24
Louisiana	1,166,487	1,166,698	1,166,866	1,167,026	1,167,165	1,167,293	1,167,420	1,167,540	1,167,656	1,167,775	1,167,876

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:						
	3/14	3/15	3/16	3/17	3/18	3/19	3/20	3/21	3/22	3/23	3/24
Ascension Parish	33,076	33,082	33,085	33,087	33,089	33,092	33,093	33,095	33,097	33,099	33,101
Bossier Parish	35,268	35,285	35,287	35,288	35,292	35,297	35,301	35,305	35,308	35,312	35,315
Caddo Parish	63,258	63,268	63,276	63,278	63,282	63,287	63,291	63,294	63,298	63,301	63,304
Calcasieu Parish	51,676	51,682	51,688	51,704	51,710	51,715	51,720	51,725	51,729	51,734	51,738
East Baton Rouge Parish	105,219	105,244	105,256	105,273	105,286	105,297	105,308	105,319	105,330	105,340	105,350
Jefferson Parish	108,146	108,161	108,175	108,188	108,200	108,212	108,223	108,234	108,245	108,255	108,265
Lafayette Parish	59,235	59,246	59,249	59,258	59,264	59,270	59,275	59,280	59,285	59,290	59,294
Lafourche Parish	26,168	26,173	26,174	26,175	26,177	26,179	26,181	26,183	26,184	26,186	26,188
Orleans Parish	83,326	83,375	83,417	83,444	83,482	83,517	83,553	83,590	83,627	83,663	83,699
Ouachita Parish	47,239	47,242	47,251	47,258	47,263	47,267	47,271	47,274	47,278	47,282	47,285
Rapides Parish	30,859	30,865	30,866	30,873	30,876	30,879	30,881	30,884	30,886	30,889	30,891
St. Bernard Parish	10,685	10,689	10,691	10,693	10,694	10,695	10,696	10,697	10,699	10,699	10,700
St. Charles Parish	13,143	13,143	13,146	13,148	13,149	13,149	13,150	13,151	13,152	13,152	13,153
St. James Parish	5,455	5,455	5,455	5,455	5,455	5,455	5,456	5,456	5,456	5,456	5,456
St. John the Baptist Parish	10,011	10,012	10,012	10,012	10,013	10,014	10,015	10,016	10,017	10,018	10,019
St. Tammany Parish	68,084	68,091	68,101	68,105	68,111	68,116	68,121	68,126	68,130	68,135	68,139

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:											
	3/14	3/15	3/16	3/17	3/19				3/21				3/23			
Ascension Parish	33,076	33,082	33,085	33,087	33,092	(6,618)	[1,588]	{794}	33,095	(6,619)	[1,589]	{794}	33,099	(6,620)	[1,589]	{794}
Bossier Parish	35,268	35,285	35,287	35,288	35,297	(7,059)	[1,694]	{847}	35,305	(7,061)	[1,695]	{847}	35,312	(7,062)	[1,695]	{847}
Caddo Parish	63,258	63,268	63,276	63,278	63,287	(12,657)	[3,038]	{1,519}	63,294	(12,659)	[3,038]	{1,519}	63,301	(12,660)	[3,038]	{1,519}
Calcasieu Parish	51,676	51,682	51,688	51,704	51,715	(10,343)	[2,482]	{1,241}	51,725	(10,345)	[2,483]	{1,241}	51,734	(10,347)	[2,483]	{1,242}
East Baton Rouge Parish	105,219	105,244	105,256	105,273	105,297	(21,059)	[5,054]	{2,527}	105,319	(21,064)	[5,055]	{2,528}	105,340	(21,068)	[5,056]	{2,528}
Jefferson Parish	108,146	108,161	108,175	108,188	108,212	(21,642)	[5,194]	{2,597}	108,234	(21,647)	[5,195]	{2,598}	108,255	(21,651)	[5,196]	{2,598}
Lafayette Parish	59,235	59,246	59,249	59,258	59,270	(11,854)	[2,845]	{1,422}	59,280	(11,856)	[2,845]	{1,423}	59,290	(11,858)	[2,846]	{1,423}
Lafourche Parish	26,168	26,173	26,174	26,175	26,179	(5,236)	[1,257]	{628}	26,183	(5,237)	[1,257]	{628}	26,186	(5,237)	[1,257]	{628}
Orleans Parish	83,326	83,375	83,417	83,444	83,517	(16,703)	[4,009]	{2,004}	83,590	(16,718)	[4,012]	{2,006}	83,663	(16,733)	[4,016]	{2,008}
Ouachita Parish	47,239	47,242	47,251	47,258	47,267	(9,453)	[2,269]	{1,134}	47,274	(9,455)	[2,269]	{1,135}	47,282	(9,456)	[2,270]	{1,135}
Rapides Parish	30,859	30,865	30,866	30,873	30,879	(6,176)	[1,482]	{741}	30,884	(6,177)	[1,482]	{741}	30,889	(6,178)	[1,483]	{741}
St. Bernard Parish	10,685	10,689	10,691	10,693	10,695	(2,139)	[513]	{257}	10,697	(2,139)	[513]	{257}	10,699	(2,140)	[514]	{257}
St. Charles Parish	13,143	13,143	13,146	13,148	13,149	(2,630)	[631]	{316}	13,151	(2,630)	[631]	{316}	13,152	(2,630)	[631]	{316}
St. James Parish	5,455	5,455	5,455	5,455	5,455	(1,091)	[262]	{131}	5,456	(1,091)	[262]	{131}	5,456	(1,091)	[262]	{131}
St. John the Baptist Parish	10,011	10,012	10,012	10,012	10,014	(2,003)	[481]	{240}	10,016	(2,003)	[481]	{240}	10,018	(2,004)	[481]	{240}
St. Tammany Parish	68,084	68,091	68,101	68,105	68,116	(13,623)	[3,270]	{1,635}	68,126	(13,625)	[3,270]	{1,635}	68,135	(13,627)	[3,270]	{1,635}

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.