

**IEM's AI Modeling: Short-term COVID-19 Projections****Date: 12/23/20**

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 12/23/20 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.**

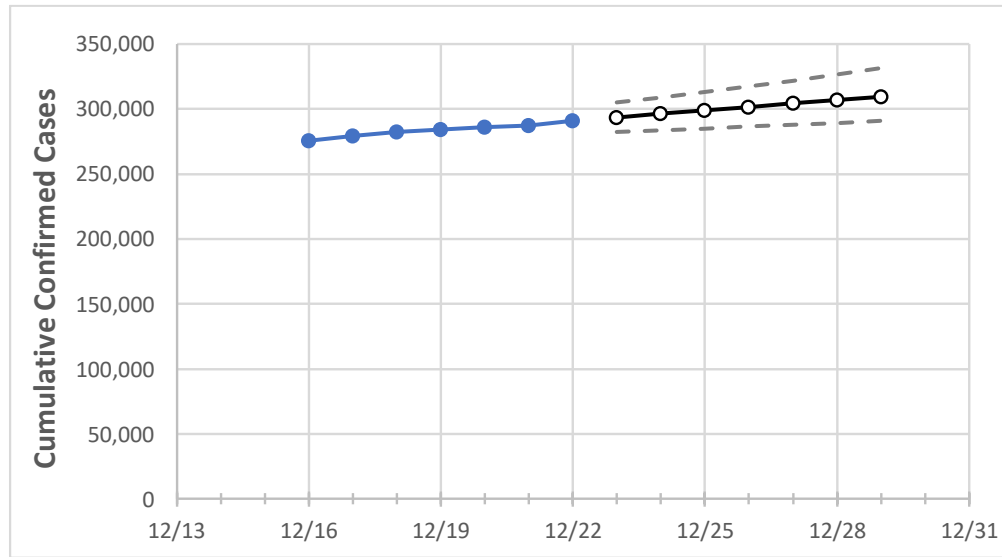
**IEM's Modeling Lead**

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:						
	12/19	12/20	12/21	12/22	12/23	12/24	12/25	12/26	12/27	12/28	12/29
Louisiana	284,290	286,145	287,261	290,960	293,628	296,248	298,878	301,551	304,221	306,871	309,525

**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 20%, and are often within 10%, of actual confirmed cases.

## Louisiana Parishes

	Actual Confirmed Cases On:				Projected Cases For:						
	12/19	12/20	12/21	12/22	12/23	12/24	12/25	12/26	12/27	12/28	12/29
Ascension Parish	7,094	7,140	7,160	7,231	7,282	7,329	7,378	7,429	7,479	7,524	7,575
Bossier Parish	7,896	7,991	8,026	8,112	8,192	8,274	8,353	8,436	8,519	8,600	8,685
Caddo Parish	16,035	16,160	16,240	16,402	16,522	16,646	16,771	16,896	17,019	17,146	17,274
Calcasieu Parish	12,481	12,562	12,586	12,812	12,929	13,047	13,169	13,290	13,415	13,539	13,671
East Baton Rouge Parish	23,563	23,698	23,775	24,026	24,213	24,408	24,609	24,813	25,006	25,214	25,416
Jefferson Parish	28,238	28,431	28,613	28,902	29,157	29,413	29,675	29,936	30,205	30,478	30,745
Lafayette Parish	15,130	15,219	15,272	15,569	15,726	15,903	16,076	16,258	16,434	16,612	16,797
Lafourche Parish	5,685	5,731	5,742	5,840	5,888	5,938	5,987	6,036	6,086	6,138	6,190
Orleans Parish	18,813	18,944	19,030	19,217	19,366	19,516	19,668	19,823	19,983	20,137	20,296
Ouachita Parish	12,535	12,626	12,670	12,802	12,933	13,066	13,199	13,333	13,471	13,608	13,745
Rapides Parish	7,436	7,476	7,487	7,624	7,683	7,739	7,797	7,855	7,916	7,974	8,031
St. Bernard Parish	2,111	2,121	2,136	2,174	2,189	2,205	2,220	2,235	2,252	2,268	2,285
St. Charles Parish	3,251	3,277	3,297	3,324	3,358	3,390	3,425	3,459	3,491	3,527	3,561
St. James Parish	1,200	1,204	1,208	1,221	1,230	1,238	1,247	1,256	1,264	1,273	1,281
St. John the Baptist Parish	2,367	2,388	2,403	2,431	2,456	2,482	2,508	2,534	2,561	2,590	2,620
St. Tammany Parish	13,351	13,443	13,551	13,701	13,861	14,018	14,176	14,343	14,511	14,675	14,843

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:											
	12/19	12/20	12/21	12/22	12/24				12/26				12/28			
Ascension Parish	7,094	7,140	7,160	7,231	7,329	(1,466)	[352]	{176}	7,429	(1,486)	[357]	{178}	7,524	(1,505)	[361]	{181}
Bossier Parish	7,896	7,991	8,026	8,112	8,274	(1,655)	[397]	{199}	8,436	(1,687)	[405]	{202}	8,600	(1,720)	[413]	{206}
Caddo Parish	16,035	16,160	16,240	16,402	16,646	(3,329)	[799]	{400}	16,896	(3,379)	[811]	{405}	17,146	(3,429)	[823]	{412}
Calcasieu Parish	12,481	12,562	12,586	12,812	13,047	(2,609)	[626]	{313}	13,290	(2,658)	[638]	{319}	13,539	(2,708)	[650]	{325}
East Baton Rouge Parish	23,563	23,698	23,775	24,026	24,408	(4,882)	[1,172]	{586}	24,813	(4,963)	[1,191]	{596}	25,214	(5,043)	[1,210]	{605}
Jefferson Parish	28,238	28,431	28,613	28,902	29,413	(5,883)	[1,412]	{706}	29,936	(5,987)	[1,437]	{718}	30,478	(6,096)	[1,463]	{731}
Lafayette Parish	15,130	15,219	15,272	15,569	15,903	(3,181)	[763]	{382}	16,258	(3,252)	[780]	{390}	16,612	(3,322)	[797]	{399}
Lafourche Parish	5,685	5,731	5,742	5,840	5,938	(1,188)	[285]	{143}	6,036	(1,207)	[290]	{145}	6,138	(1,228)	[295]	{147}
Orleans Parish	18,813	18,944	19,030	19,217	19,516	(3,903)	[937]	{468}	19,823	(3,965)	[951]	{476}	20,137	(4,027)	[967]	{483}
Ouachita Parish	12,535	12,626	12,670	12,802	13,066	(2,613)	[627]	{314}	13,333	(2,667)	[640]	{320}	13,608	(2,722)	[653]	{327}
Rapides Parish	7,436	7,476	7,487	7,624	7,739	(1,548)	[371]	{186}	7,855	(1,571)	[377]	{189}	7,974	(1,595)	[383]	{191}
St. Bernard Parish	2,111	2,121	2,136	2,174	2,205	(441)	[106]	{53}	2,235	(447)	[107]	{54}	2,268	(454)	[109]	{54}
St. Charles Parish	3,251	3,277	3,297	3,324	3,390	(678)	[163]	{81}	3,459	(692)	[166]	{83}	3,527	(705)	[169]	{85}
St. James Parish	1,200	1,204	1,208	1,221	1,238	(248)	[59]	{30}	1,256	(251)	[60]	{30}	1,273	(255)	[61]	{31}
St. John the Baptist Parish	2,367	2,388	2,403	2,431	2,482	(496)	[119]	{60}	2,534	(507)	[122]	{61}	2,590	(518)	[124]	{62}
St. Tammany Parish	13,351	13,443	13,551	13,701	14,018	(2,804)	[673]	{336}	14,343	(2,869)	[688]	{344}	14,675	(2,935)	[704]	{352}

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.