

**IEM's AI Modeling: Short-term COVID-19 Projections****Date: 8/27/21**

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 8/27/21 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.**

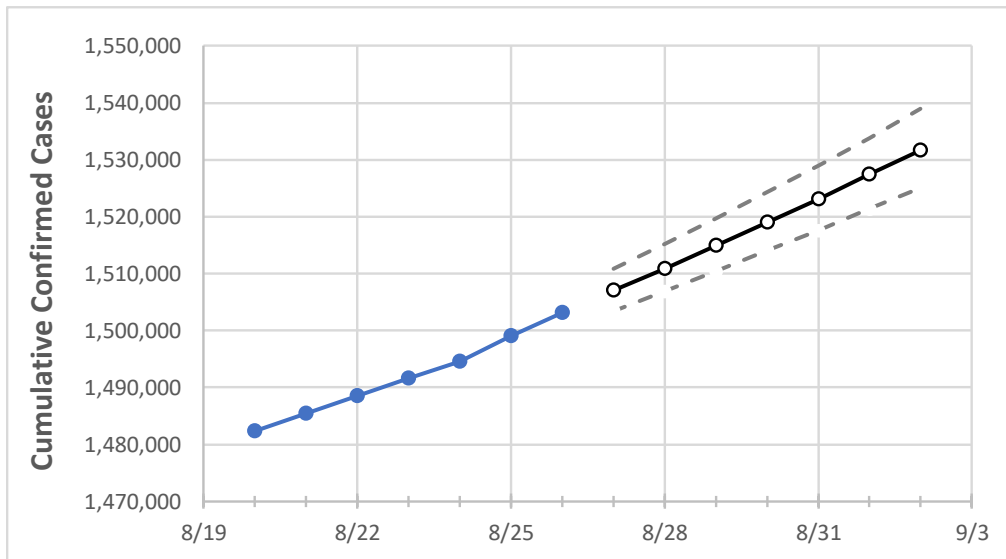
**IEM's Modeling Lead**

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.

## Illinois State Projections



	Actual Confirmed Cases On:				Projected Cases For:						
	8/23	8/24	8/25	8/26	8/27	8/28	8/29	8/30	8/31	9/1	9/2
Illinois	1,491,582	1,494,571	1,499,022	1,503,063	1,507,016	1,510,910	1,514,908	1,518,995	1,523,100	1,527,381	1,531,601

*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.*

## Illinois Counties

	Actual Confirmed Cases On:				Projected Cases For:						
	8/23	8/24	8/25	8/26	8/27	8/28	8/29	8/30	8/31	9/1	9/2
Cook	583,679	584,459	585,612	586,687	587,732	588,777	589,856	590,935	592,037	593,170	594,306
DuPage	97,864	98,022	98,245	98,462	98,651	98,839	99,029	99,218	99,413	99,610	99,808
Kane	62,439	62,536	62,651	62,761	62,879	62,998	63,119	63,242	63,366	63,496	63,628
Lake	72,281	72,421	72,584	72,782	72,941	73,108	73,267	73,440	73,610	73,786	73,961
McHenry	31,040	31,082	31,149	31,209	31,284	31,360	31,438	31,517	31,599	31,680	31,766
Will	82,020	82,191	82,418	82,588	82,767	82,951	83,132	83,315	83,507	83,696	83,888

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.

### Illinois Medical Demands by County

	Actual Confirmed Cases On:				Projected Cases (Hospitalized) [ICU] {Ventilator} For:											
	8/23	8/24	8/25	8/26	8/28				8/30				9/1			
Cook	583,679	584,459	585,612	586,687	588,777	(117,755)	[28,261]	{14,131}	590,935	(118,187)	[28,365]	{14,182}	593,170	(118,634)	[28,472]	{14,236}
DuPage	97,864	98,022	98,245	98,462	98,839	(19,768)	[4,744]	{2,372}	99,218	(19,844)	[4,762]	{2,381}	99,610	(19,922)	[4,781]	{2,391}
Kane	62,439	62,536	62,651	62,761	62,998	(12,600)	[3,024]	{1,512}	63,242	(12,648)	[3,036]	{1,518}	63,496	(12,699)	[3,048]	{1,524}
Lake	72,281	72,421	72,584	72,782	73,108	(14,622)	[3,509]	{1,755}	73,440	(14,688)	[3,525]	{1,763}	73,786	(14,757)	[3,542]	{1,771}
McHenry	31,040	31,082	31,149	31,209	31,360	(6,272)	[1,505]	{753}	31,517	(6,303)	[1,513]	{756}	31,680	(6,336)	[1,521]	{760}
Will	82,020	82,191	82,418	82,588	82,951	(16,590)	[3,982]	{1,991}	83,315	(16,663)	[3,999]	{2,000}	83,696	(16,739)	[4,017]	{2,009}

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.