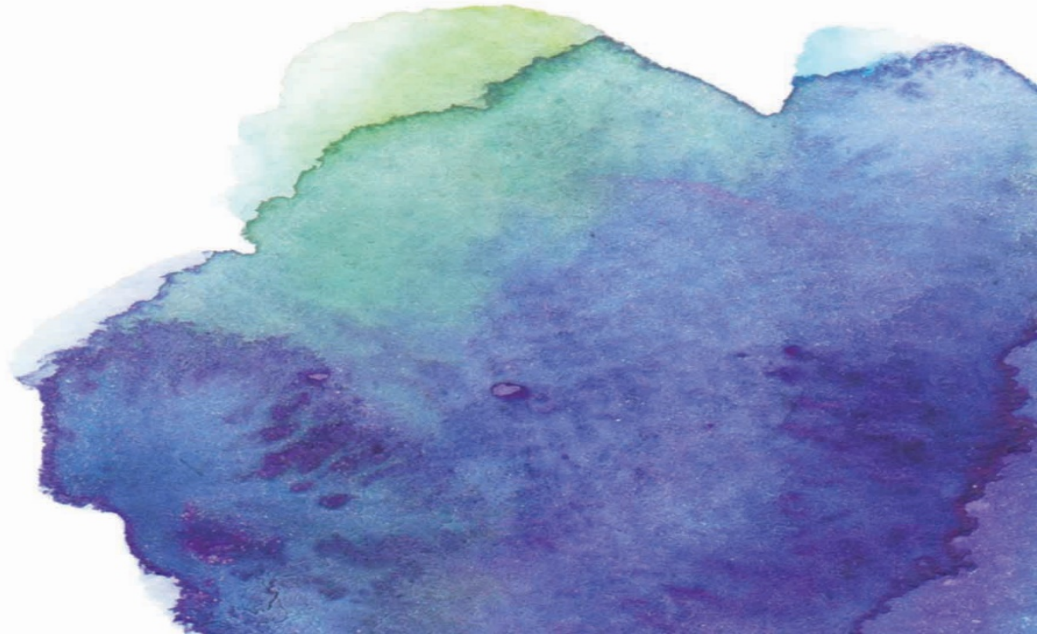
Regenstrief Institute
Better Care. Better Health.

Indiana Health Information Exchange

Leveraging Data and Information Infrastructure in Response to COVID-19

Prepared for Indiana HIMSS
Indiana's Covid Response
April 21, 2020



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Agenda

- Today we focus on how to leverage data and information assets / infrastructure to support the public health response to COVID-19. We focus on population-level data that drives decision-making.

- Comments from the panel
  - **Paul Halverson**, DrPH, FACHE -- Founding Dean & Professor, Richard Fairbanks School of Public Health; Adjunct Professor, IU School of Medicine; Affiliated Scientist, Regenstrief Institute; Senior Fellow, Tobias Leadership Center, Indiana University
  - **Nir Menachemi**, PhD, MPH – Professor & Chair of the Department of Health Policy & Management, IU Richard Fairbanks School of Public Health at IUPUI; Research Scientist, Regenstrief Institute; Joint Appointment, IU Kelley School of Business
  - **Drew Richardson** -- VP, Business Development -- Indiana Health Information Exchange
  - **Brian Dixon**, PhD, MPA, FACMI, FHIMSS -- Director of Public Health Informatics, Regenstrief Institute, Inc. and Indiana University Richard M. Fairbanks School of Public Health at IUPUI; Associate Professor, Department of Epidemiology, Indiana University Richard M. Fairbanks School of Public Health at IUPUI

- Audience Q&A – We want to hear from you!

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INDIANA UNIVERSITY SCHOOL OF MEDICINE

50 years Regenstrief Institute

ASU Arizona State University
College of Health Solutions

Paul Halverson, DrPH, FACHE

Founding Dean & Professor
Richard Fairbanks School of Public Health, IUPUI

Adjunct Professor
Indiana University School of Medicine

Affiliated Scientist
Regenstrief Institute

Senior Fellow
Tobias Leadership Center, Indiana University

Adjunct Professor
Arizona State University College of Health Solutions

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Reflections from Practice

Years of Practice and IC experience

- CDC during 9/11 and anthrax
- CDC bioterrorism/ chem/ nuclear preparedness
- CDC pandemic planning
- ADH Hurricane Katrina– 78000 displaced residents
- ADH too many tornadoes to count
- ADH mass fatalities in federal campground flood
- ADH multiple prison food borne outbreaks
- ADH H1N1

Primary challenge in EOC

- Situational Awareness

Too much data…..not enough meaningful information

- Having the right data in a format that is intuitively consumable
- Correct “at a glance” indicators (not idiot lights) and (not dense tables)
- Need to show relationships between critical data elements without requiring manual calculation or look back (i.e. ICU beds and available ventilators)
- Show trends over time and actual “now” numbers

People who didn’t get the importance of sharing data will have an epiphany when they don’t have it!

Don’t get ahead of your ski’s

- New AI apps are great but sometimes you just need a bed count
- What you can do is different than what might be needed (at least initially)

Don’t let a good epidemic pass us by….

- The critical nature of data to public health is so obvious to all of us now– there is an absolute need for advocacy to build public health informatics within a strong public health infrastructure for our state

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50 years Regenstrief Institute

Nir Menachemi, PhD, MPH

Fairbanks Endowed Chair, Professor & Department Head, Health Policy & Management
Richard Fairbanks School of Public Health, IUPUI

Joint Appointment: Indiana University Kelley School of Business

Research Scientist
Regenstrief Institute

nirmena@iu.edu

Predicting the Future is Hard

- Assumptions (really) matter
- No one-size fits all
- Uncertainty always remains
- Prediction assists decision-making

Model Assumptions

1 Rate of Infectivity

- Attack rate (% of exposed that become infected)
- Reproduction number (expected number of cases directly generated by one case)
- Doubling time (observed days until confirmed positives double)
- Expected length of outbreak

Social Distancing affects these

2 Impact on Humans

- Age-specific hospitalization rate (% infected needing hospital care, by age category)
  - ICU rate (% needing intensive care)
    - Ventilator rate (% needing vent)
- Death rate (% infected that die)

Model Assumptions

3 Hospital Capacity

- # of staffed beds (non-ICU)
- # of staffed ICU beds
- # of ventilators
- Proportion of above in use at start of outbreak

4 Population Characteristics

- # of people in population
  - Age 0-19
  - Age 20-64
  - Age 65+
- For facility-specific models
  - Inpatient market share (%)
  - Market definition (e.g., which counties) so that a population with known characteristics could be 'assigned'

What assumptions changed?

- ICU Rate increased from 50% (based on China, Italy data) to 90% (based on updated Italian data plus US and Indiana observations)
- LOS decreased (based on observed data in Indiana)

Affects resource utilization (not # of patients)

- Timing of when "week 1" started in each district
  - Originally assumed every district was the same
  - Now believe District 5 began 1-3 weeks ahead of other districts
  - Many were in "week 1" for multiple weeks
- Death rates decreased (based on Lancet publication)

Affects # of predicted patients

- Doubling time believed to have slowed (from 2-3 days to 3-4 days)

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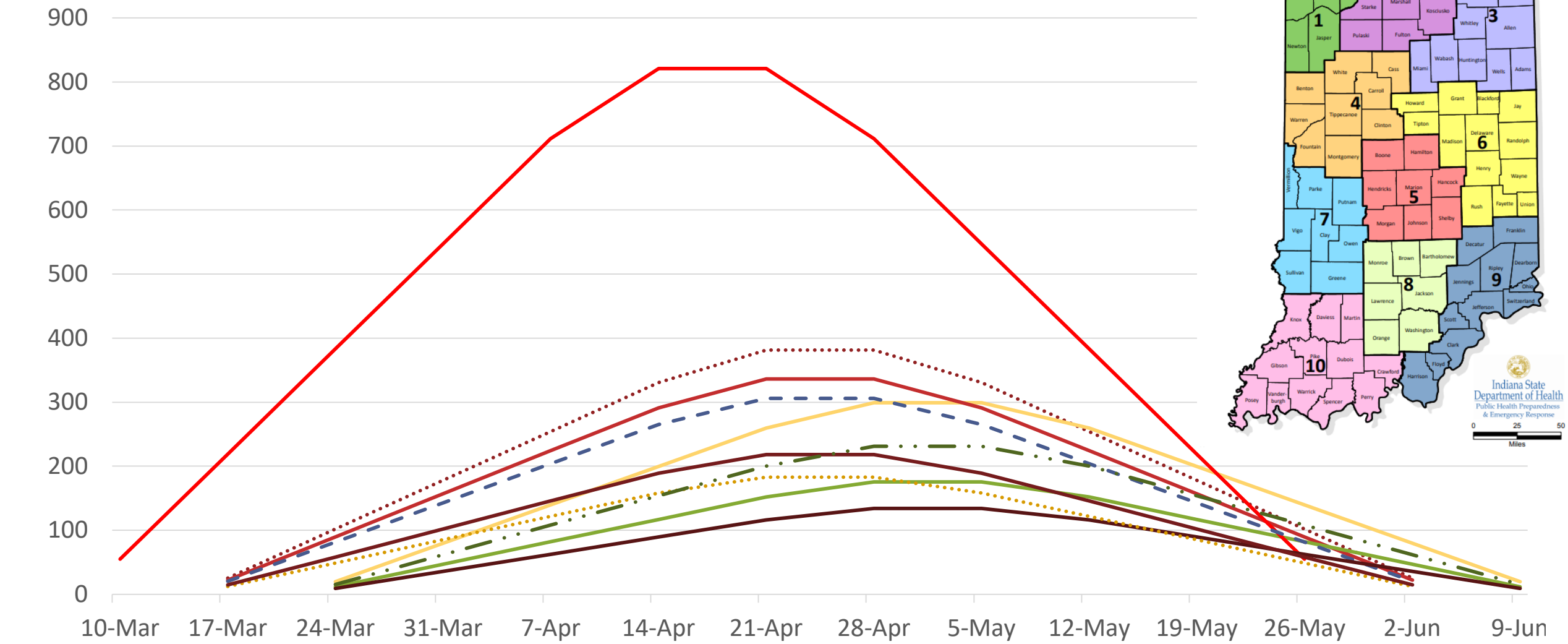
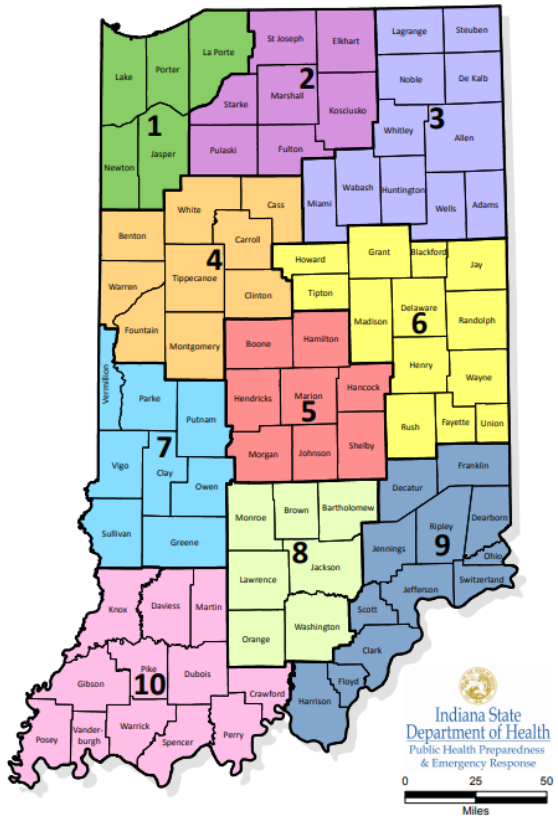
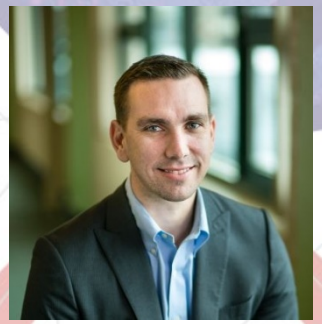
Indiana Projected COVID-19 Hospitalizations by Week





RICHARD M. FAIRBANKS SCHOOL OF PUBLIC HEALTH
IUPUI INDIANA UNIVERSITY Indianapolis



Indiana Health Information Exchange

Drew Richardson

Indiana Health Information Exchange – VP of Business Development

Drew leads IHIE's sales and project management teams. In addition, he also leads new product development for the organization. He has been coordinating IHIE's COVID response.

drichardson@ihie.org

IHIE's COVID-19 response

ADT and Clinical Data

- IHIE has been sending data to both ISDH/FSSA (https://www.coronavirus.in.gov/2393.htm) and Regenstrief (https://www.regenstrief.org/covid-dashboard/) to support their dashboarding on COVID-19. There is also a 'private' dashboard with more specific information available to epidemiologists at MCPHD/ISDH.

Communicable Disease Reporting

- COVID-19 LOINC terms are being 'tracked' in the Notifiable Condition Detector so IHIE can report all positive/negative COVID-19 testing sent to us in existing INPC lab feeds. New ICD 10 codes for COVID-19 are starting to be used by hospitals and will be reported to ISDH.

ISDH LIMSNET data into INPC

- All COVID-19 lab results are being reported to ISDH and tracked in their LIMSNET system. ISDH is now sending messages via SFTP for all COVID-19 lab results to IHIE.

IHIE's COVID-19 response

ADT/Lab interfaces from 'non-INPC hospitals' routed to IHIE

- ISDH has requested that non-INPC participating hospitals send information to IHIE to help support COVID-19 efforts. Hospitals that opt to support this ISDH request will be onboarded and their ADT/Lab information stored in the INPC (viewable in CareWeb)

Virtual Care Strategy – ADT Alerts and CMA for FQHCs

- This project will provide ADT Alerts and Care Manager access to FQHCs who are treating patients with COVID-19 outside of the hospital.

Flagging LTC Patients with COVID-19

- MPCHD/ISDH would like to focus their investigation efforts on LTC settings where COVID-19 cases are identified. Currently they cannot identify if someone is from a LTC facility based on the lab report. Therefore, both MCPHD and ISDH would like reports that identify LTC patients with positive tests using the patients' geocoded 'address' in the INPC.

Brian E. Dixon, MPA, PhD, FACMI, FHIMSS

Director of Public Health Informatics, Regenstrief Institute, Inc., and
Indiana University Richard M. Fairbanks School of Public Health at IUPUI

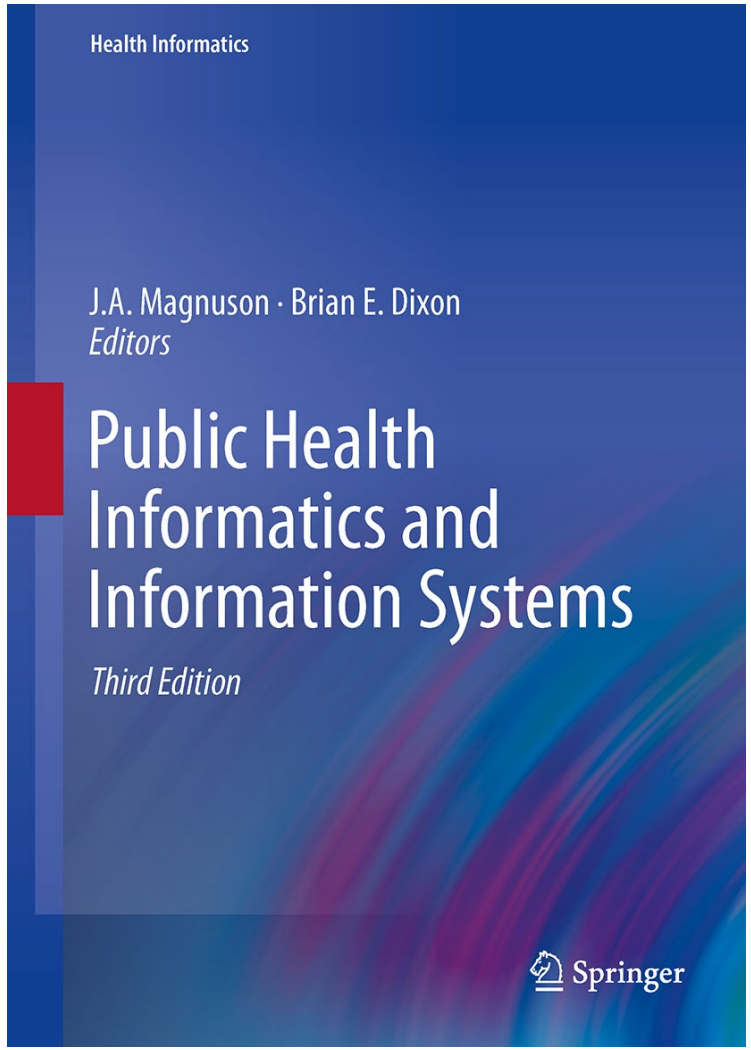
Research Scientist, Clem McDonald Center for Biomedical Informatics and
William M. Tierney Center for Health Services Research, Regenstrief Institute

Associate Professor, Department of Epidemiology, Indiana University Richard M. Fairbanks School of Public Health at IUPUI

Affiliate Scientist, VA HSR&D Center for Health Information and Communication

bedixon@regenstrief.org

PH Informatics



"Informatics brings methods, knowledge, and theories from both computer science and information science to support the field of public health."

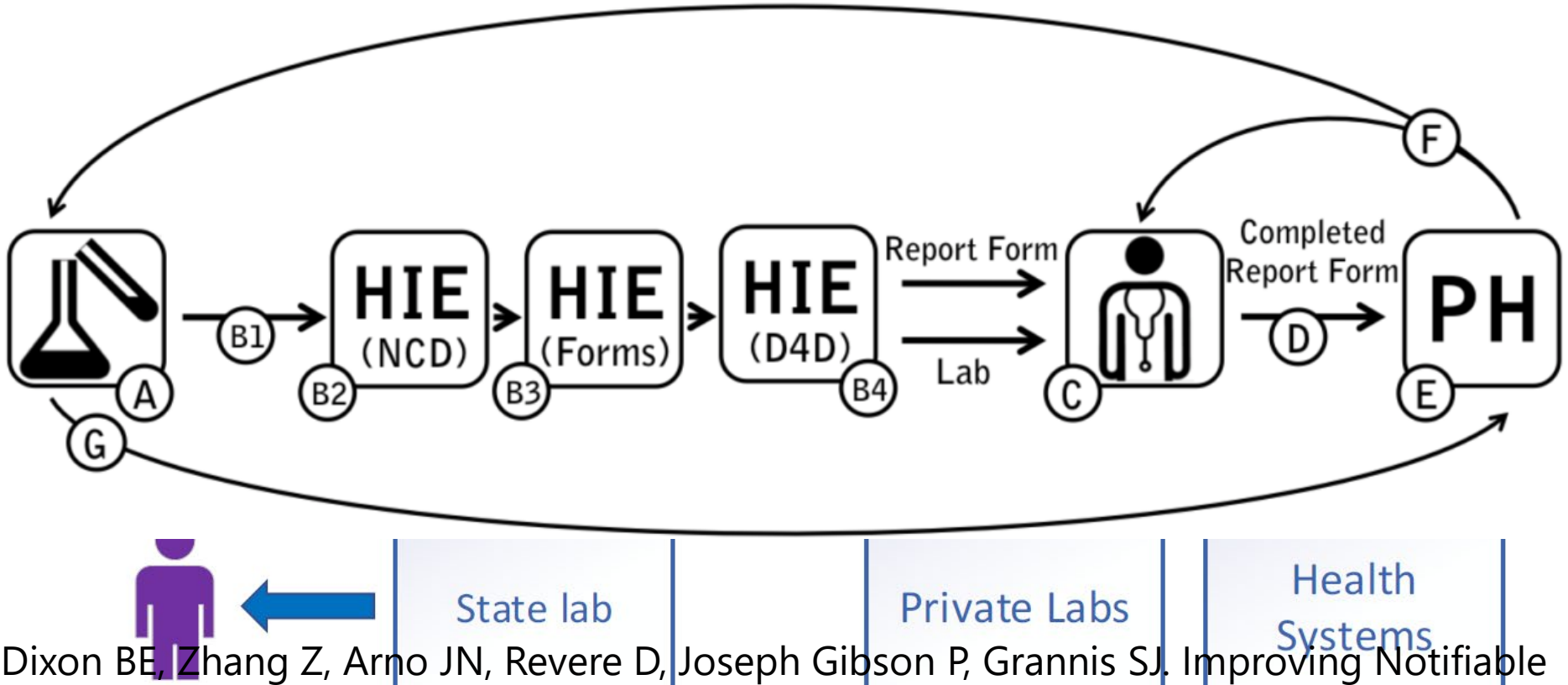
"…a discipline concerned not only with automation and computing but also the nature and use of data and information in public health processes and decision-making."

Magnuson and Dixon, 2020

John Snow…the First PH Informatician?

Leveraging HIE in Response to COVID-19 SARS-CoV-2

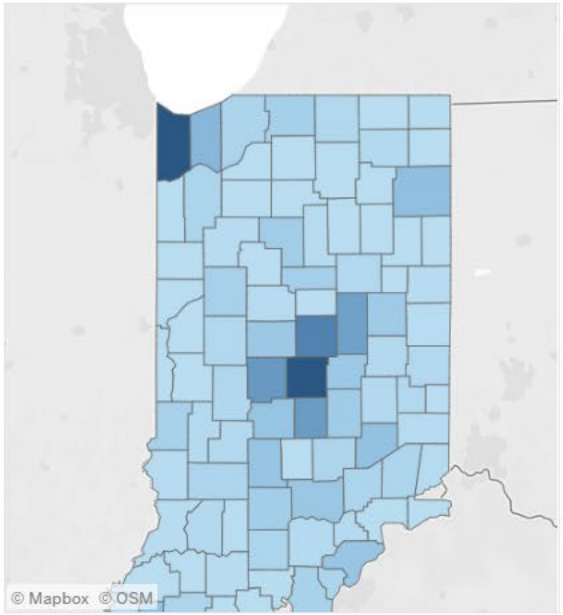
Two Approaches to Gather Data during a Disease Outbreak



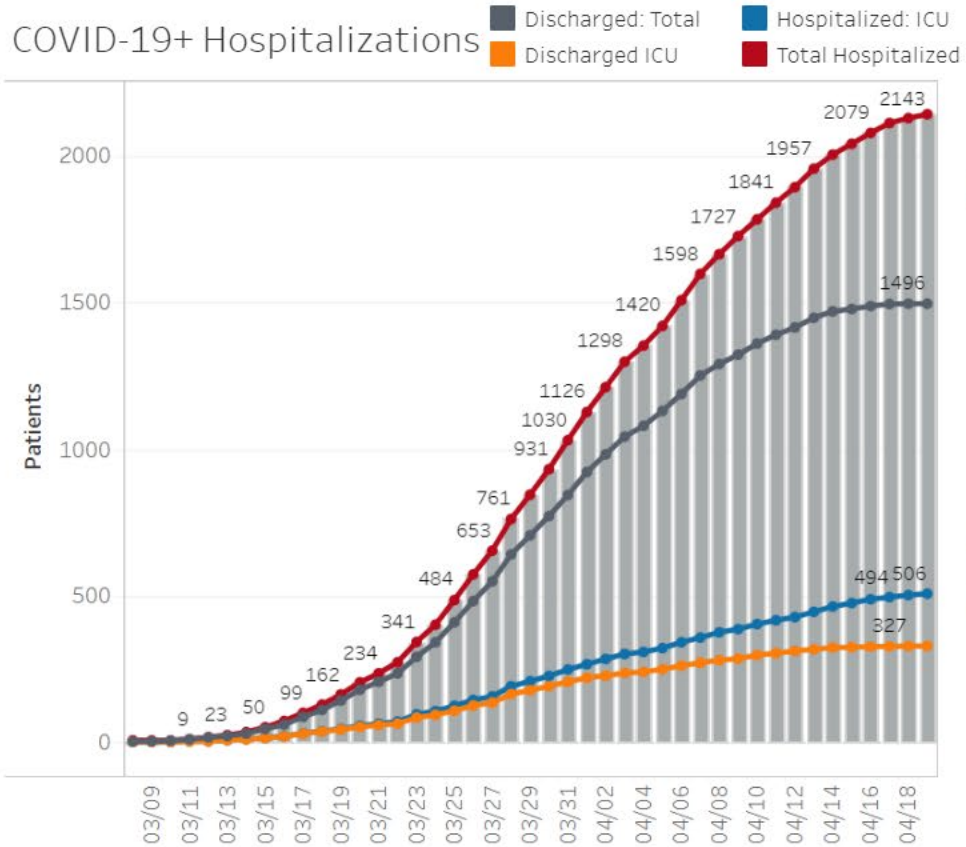
Dixon BE, Zhang Z, Arno JN, Revere D, Joseph Gibson P, Grannis SJ. Improving Notifiable Disease Case Reporting Through Electronic Information Exchange–Facilitated Decision Support: A Controlled Before-and-After Trial. Public Health Rep. 2020:0033354920914318. doi: 10.1177/0033354920914318

Map Of Patients Tested

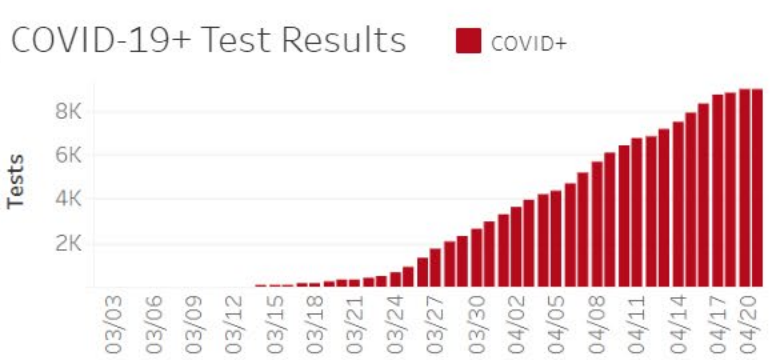
County



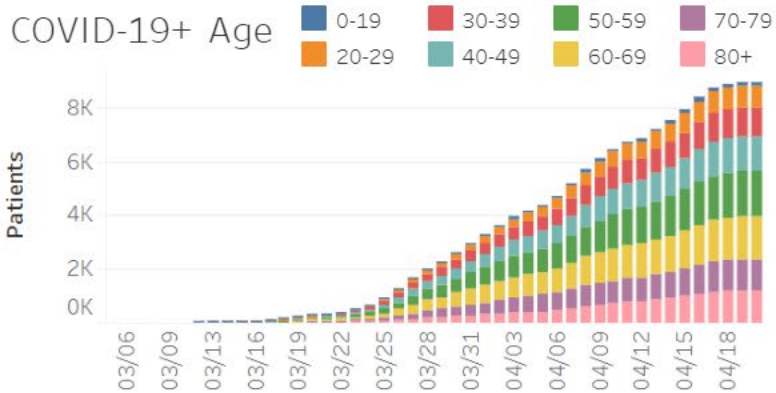
COVID-19+ Hospitalizations



COVID-19+ Test Results



COVID-19+ Age



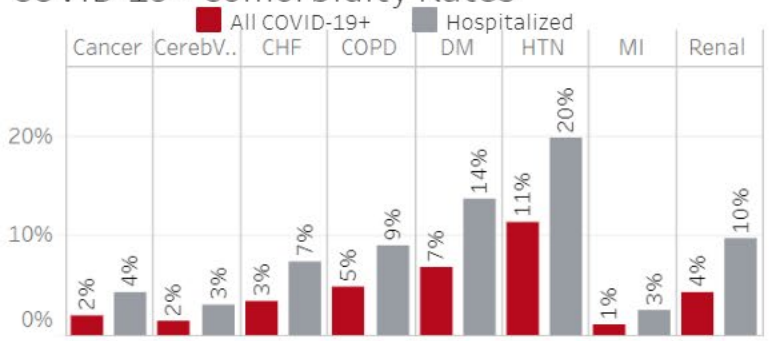
Demographics: Statewide COVID-19+

	Male	Female
Amer. Indian Alaska Native	1%	1%
Hawaiian Pacific Islander	1%	1%
Asian	2%	2%
Black or African American	9%	14%
White	28%	34%
Other or Unknown	6%	6%
Total	**45%**	**55%**

Average Hospital LOS

	0-19	20-29	30-39	40-49	50-59	60-69	70-79	80+	Total
Overall	5.6	9.1	9.3	8.5	10.3	10.4	11.2	9.0	**10.1**
ICU		13.8	8.8	10.7	11.6	11.1	13.0	9.5	**11.4**
Non-ICU	5.6	8.3	9.3	7.9	10.0	10.3	10.5	8.9	**9.7**

COVID-19+ Comorbidity Rates



* Data presented since 3/1/2020. Numbers likely to change as more data become available. To maximize patient privacy, some counts and percentages may be masked.

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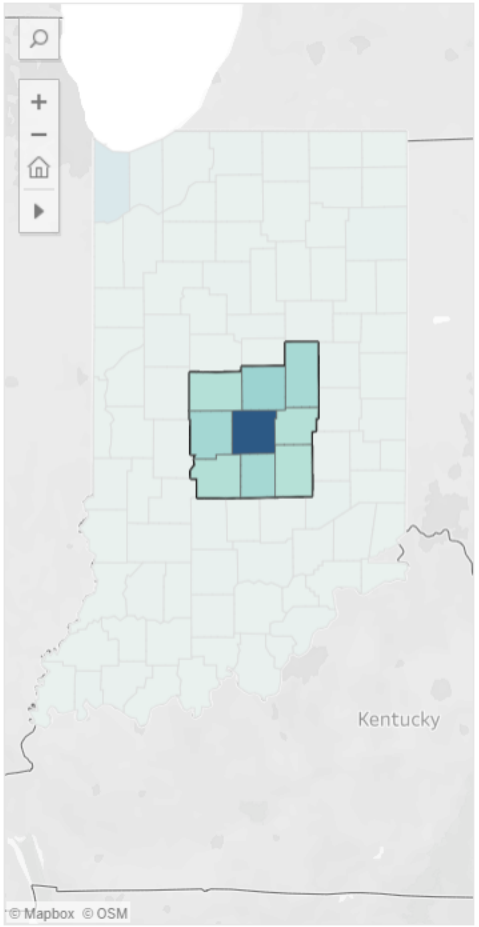
https://www.regenstrief.org/covid-dashboard/

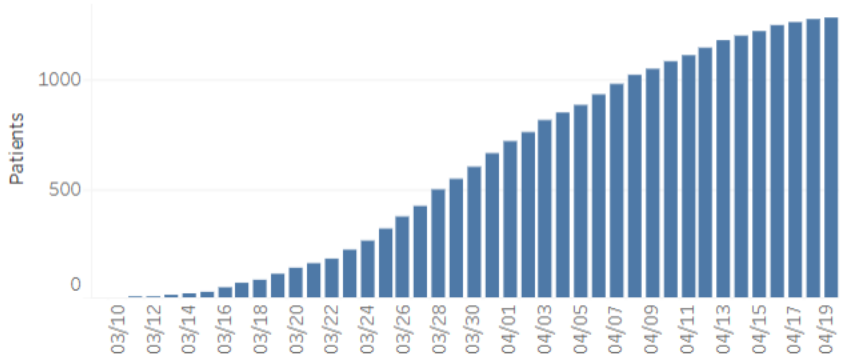
Map Of Patient Counts



Demographics

	Male	Female
Asian	48	43
Black or African American	478	693
White	1,145	1,429
Other or Unknown	141	95
Amer. Indian Alaska Native		3
Hawaiian Pacific Islander	81	104

Hospitalizations

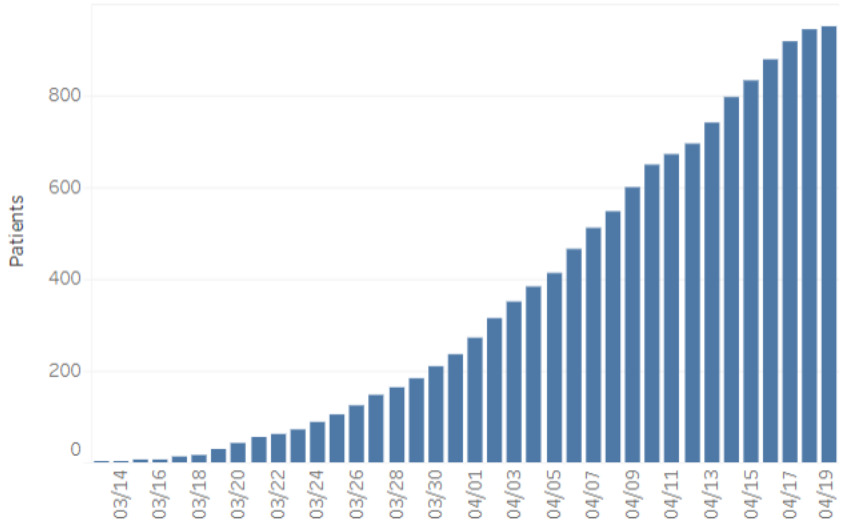


Average Hospital LOS

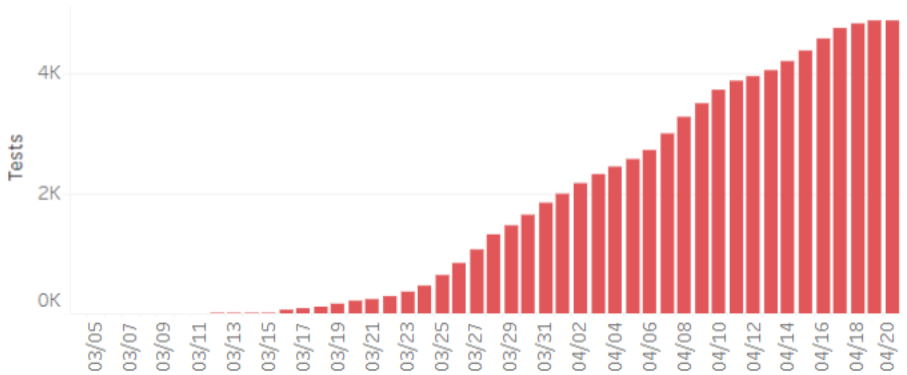
LOS Population: Not Discharged

	Age Groups								
	0-19	20-29	30-39	40-49	50-59	60-69	70-79	80+	**Total**
LOS: Overall	8.5	19.3	22.0	18.4	19.3	16.2	20.8	15.6	18.6
LOS: ICU		21.3	23.0	16.9	18.7	19.5	22.9	13.9	19.8
LOS: Non-ICU	8.5	18.6	21.9	19.1	19.5	15.5	19.7	16.1	18.2

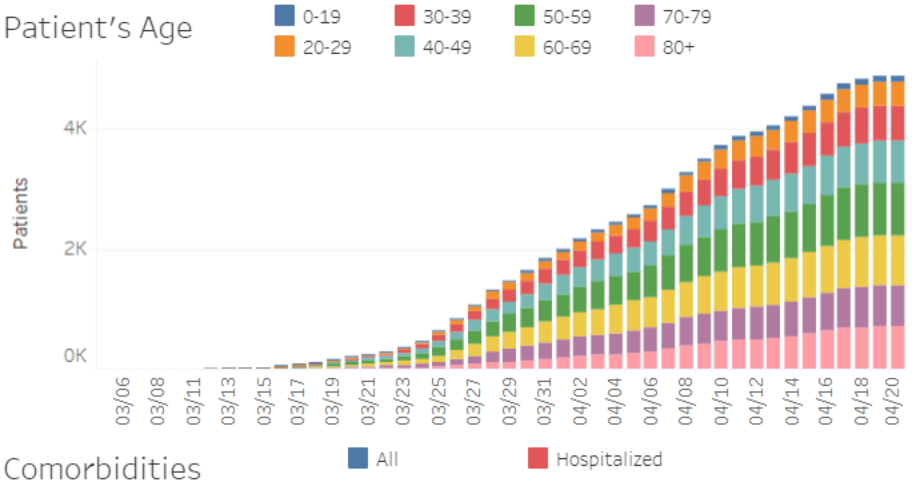
Discharge Cumulative



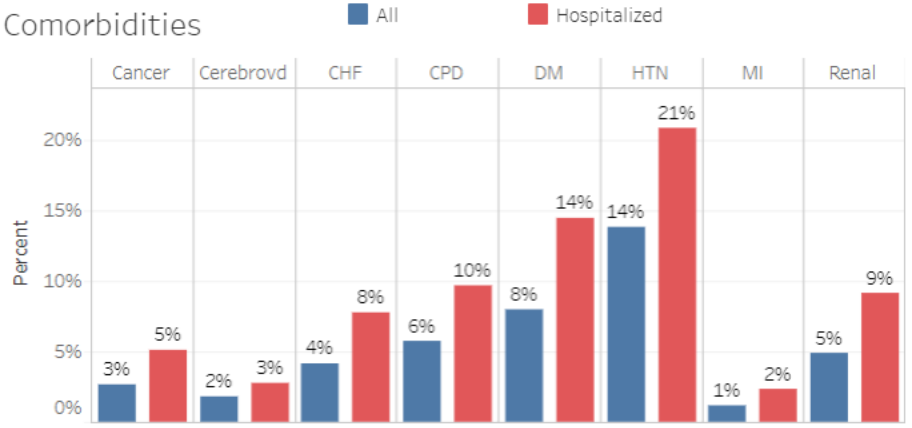
Test Results



Patient's Age



Comorbidities



Map Choice: County

Graph Options: Cumulative

Test Type: COVID-19

Test Results: Positive

Diagnoses: All

Age Groups: All

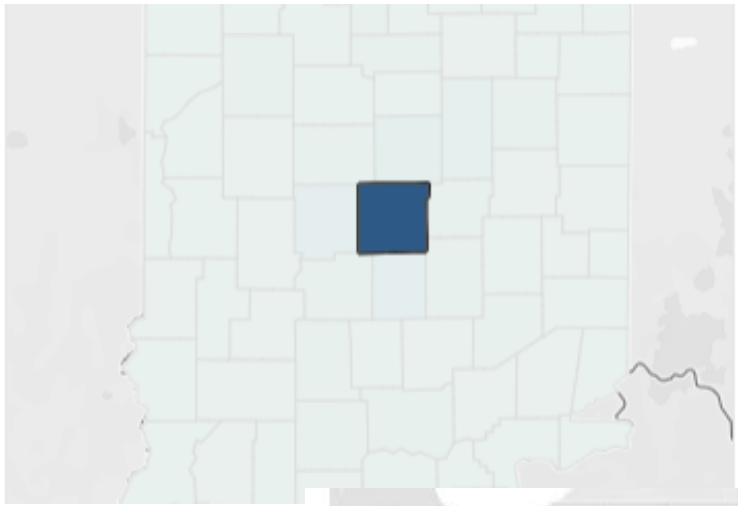
Gender: All

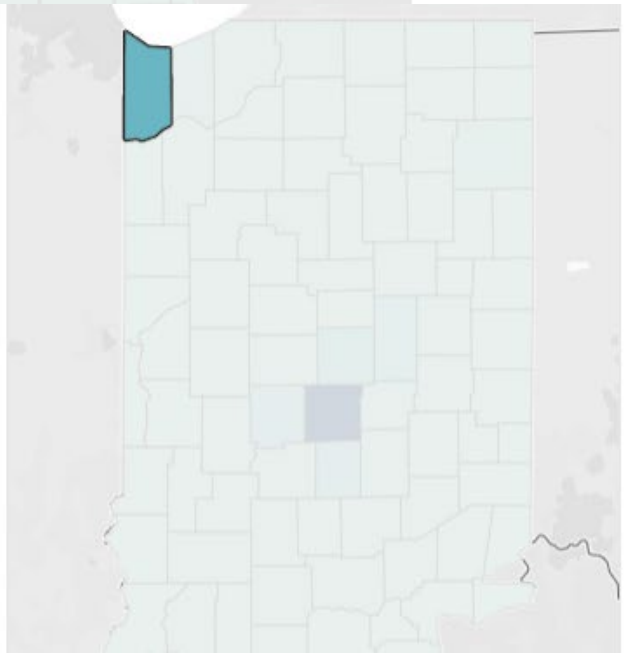
Start Date: 3/1/2020

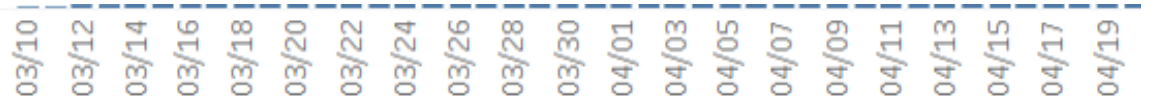
End Date: 4/20/2020

ICU: All

Detailed Analysis Hospitalizations



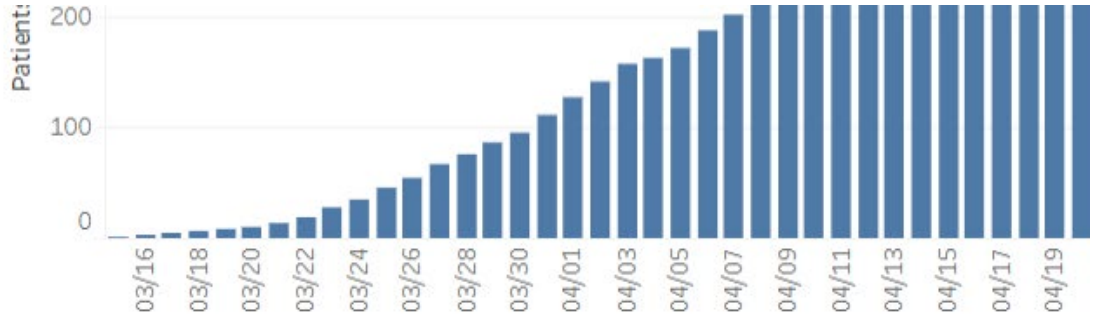




Average Hospital LOS

LOS Population: Discharged

	Age Groups								
	0-19	20-29	30-39	40-49	50-59	60-69	70-79	80+	**Total**
LOS: Overall	6.2	5.0	4.3	7.1	8.0	7.9	7.2	9.2	7.7
LOS: ICU		10.1	4.0	10.5	7.5	9.1	7.7	9.3	8.6
LOS: Non-ICU	6.2	4.3	4.3	6.6	8.2	7.4	7.1	9.2	7.4

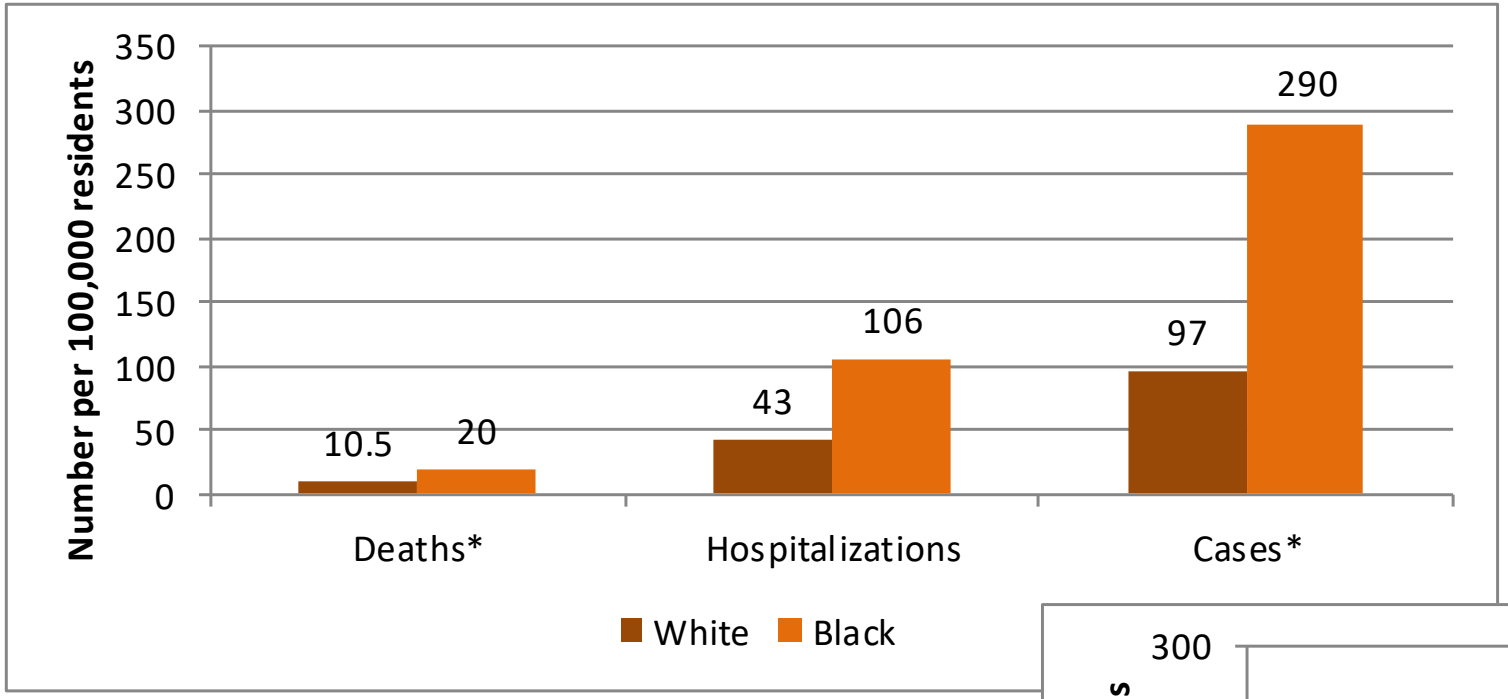


Average Hospital LOS

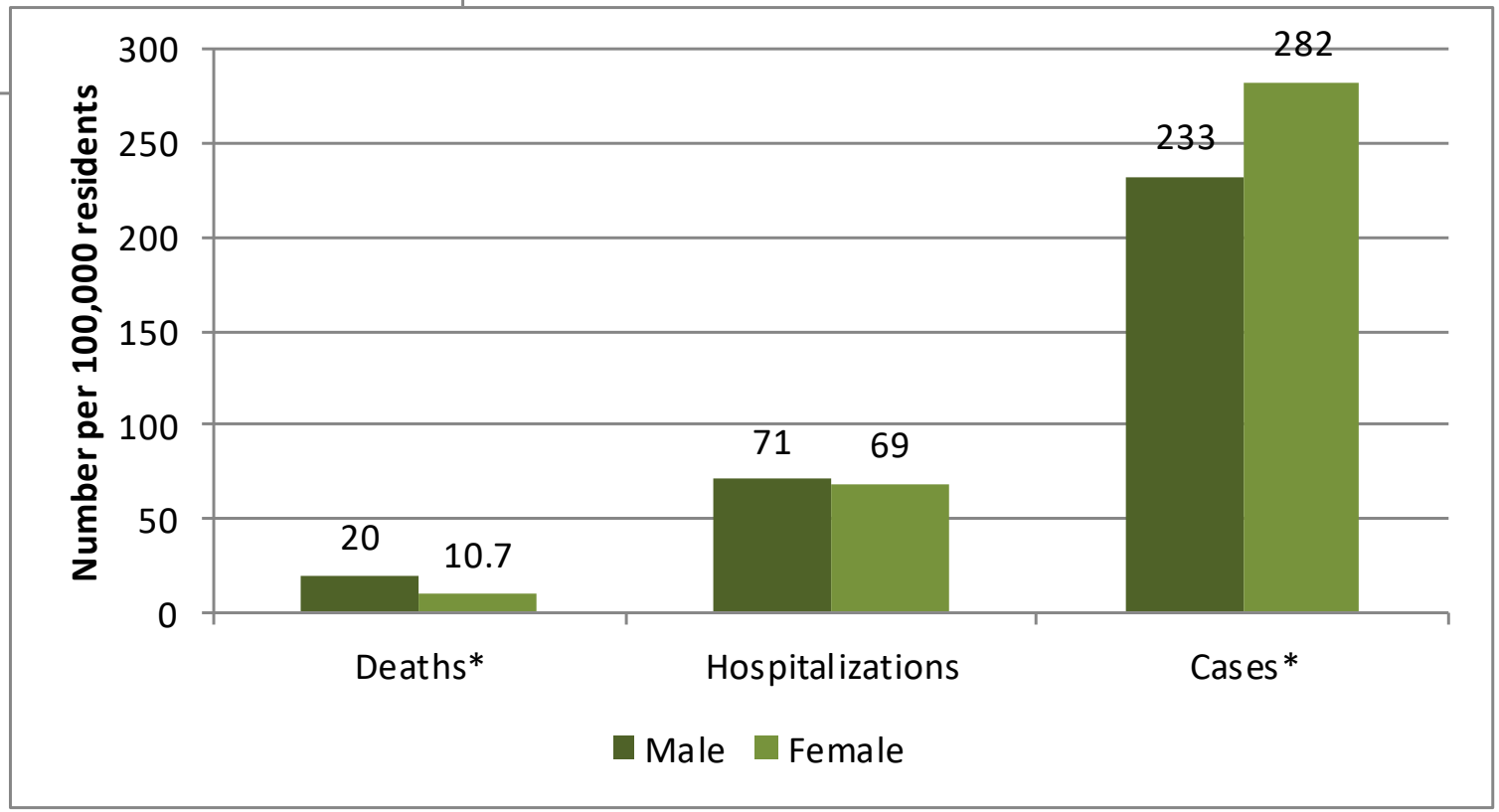
LOS Population: Discharged

	Age Groups								
	0-19	20-29	30-39	40-49	50-59	60-69	70-79	80+	**Total**
LOS: Overall	4.0	5.1	7.4	6.1	5.5	6.4	7.3	7.7	6.7
LOS: ICU		2.0		8.0	5.2	6.1	7.0	5.8	6.3
LOS: Non-ICU	4.0	5.3	7.4	5.5	5.5	6.5	7.4	8.6	6.8

Examining Health Disparities



COVID-19 deaths, hospitalizations*, and cases of illness per 100,000 Marion County residents by gender, March 1-April 16, 2020



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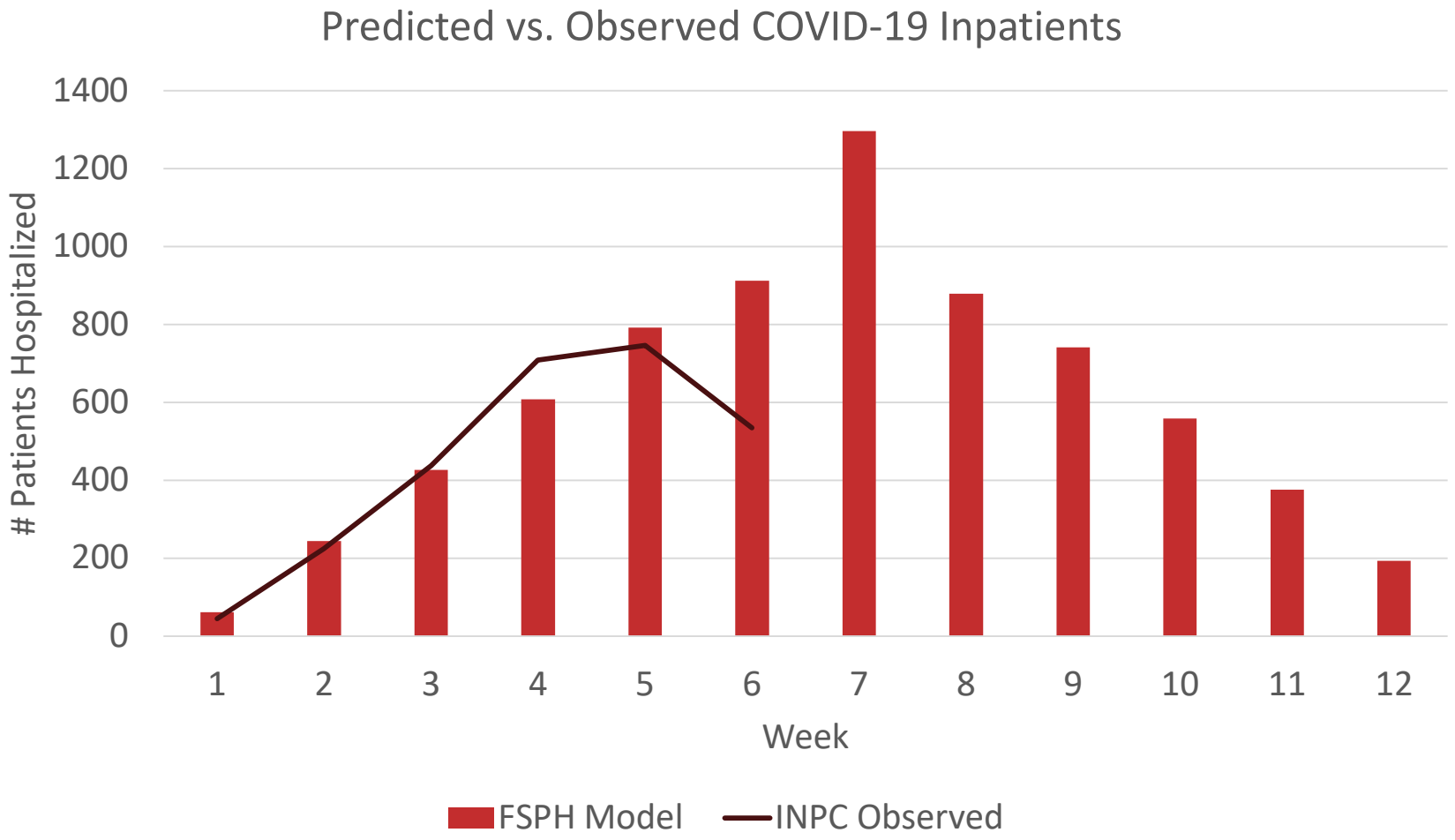
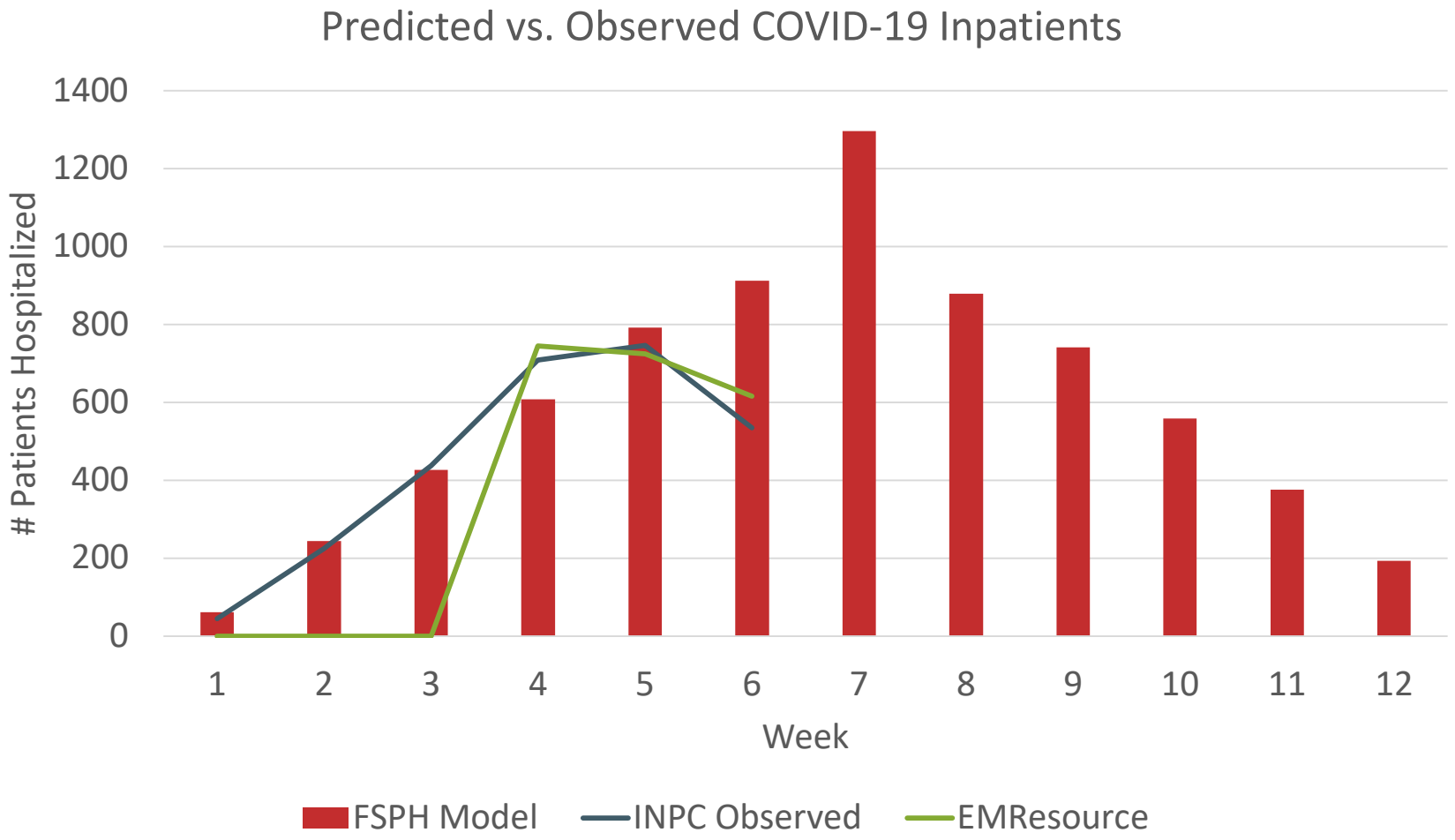


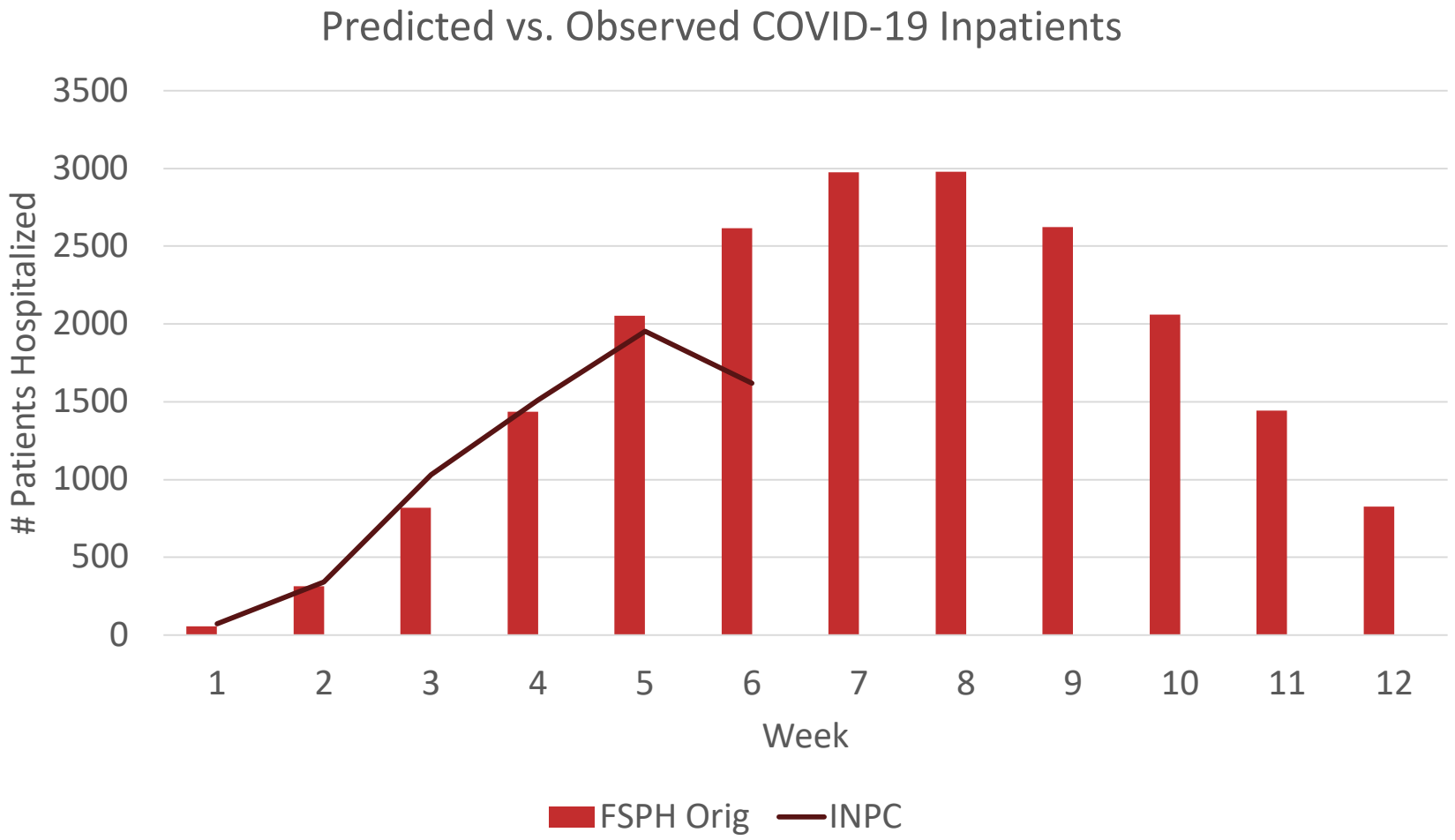
Models vs. Observed Hospitalizations District 5

Data on actual hospitalizations obtained from the Indiana Network for Patient Care (INPC), courtesy the Indiana Health Information Exchange and the Regenstrief Institute as of April 19, 2020.
Based on available information, we believe Week 1 for District 5 began around March 10, 2020.

Models vs. Observed Hospitalizations District 5

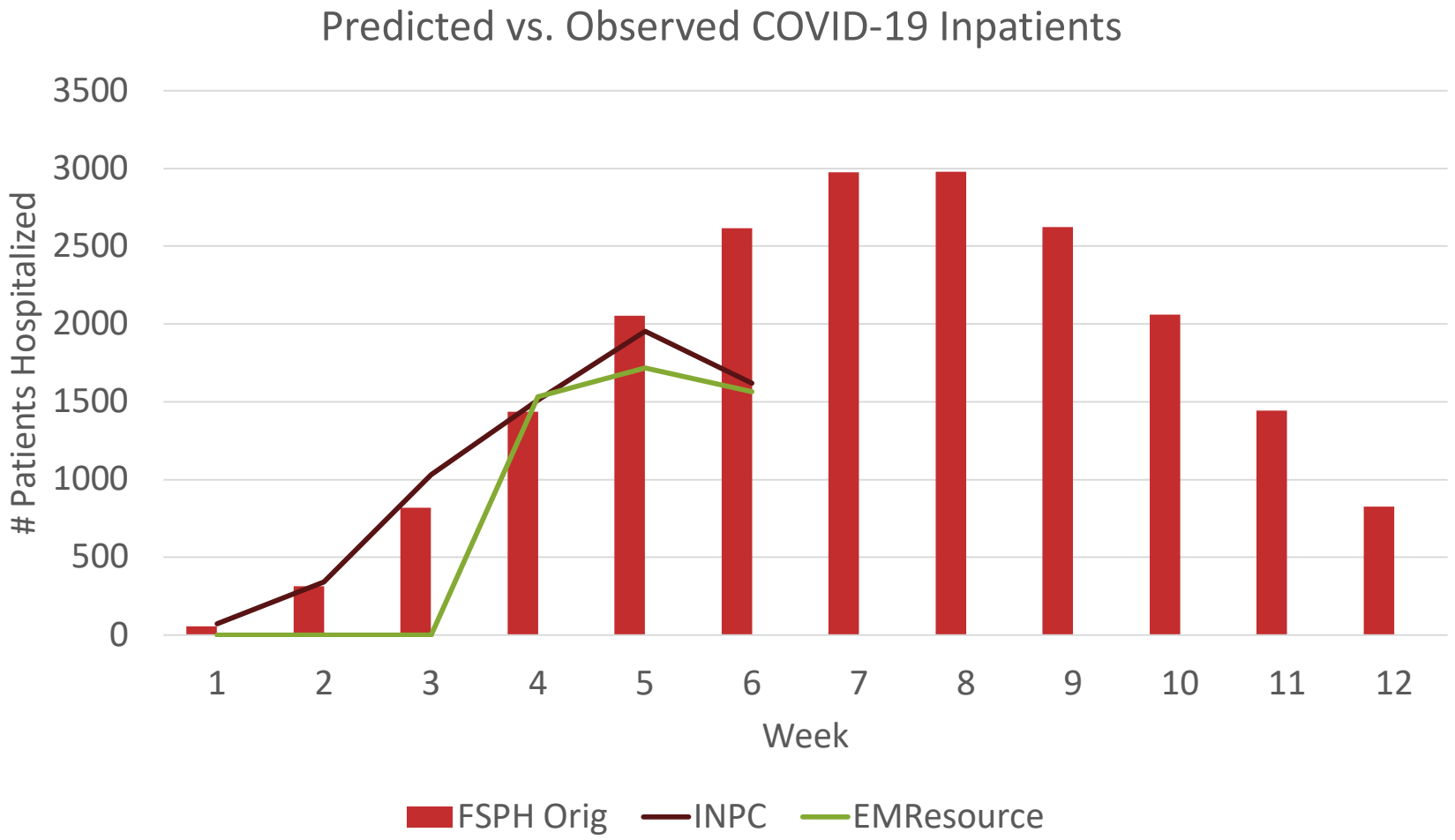


Data on actual hospitalizations obtained from the Indiana Network for Patient Care (INPC), courtesy the Indiana Health Information Exchange and the Regenstrief Institute, as well as EMResource as of April 19, 2020. EMResource did not measure COVID hospitalizations until Week 3 (week ending April 5, 2020).



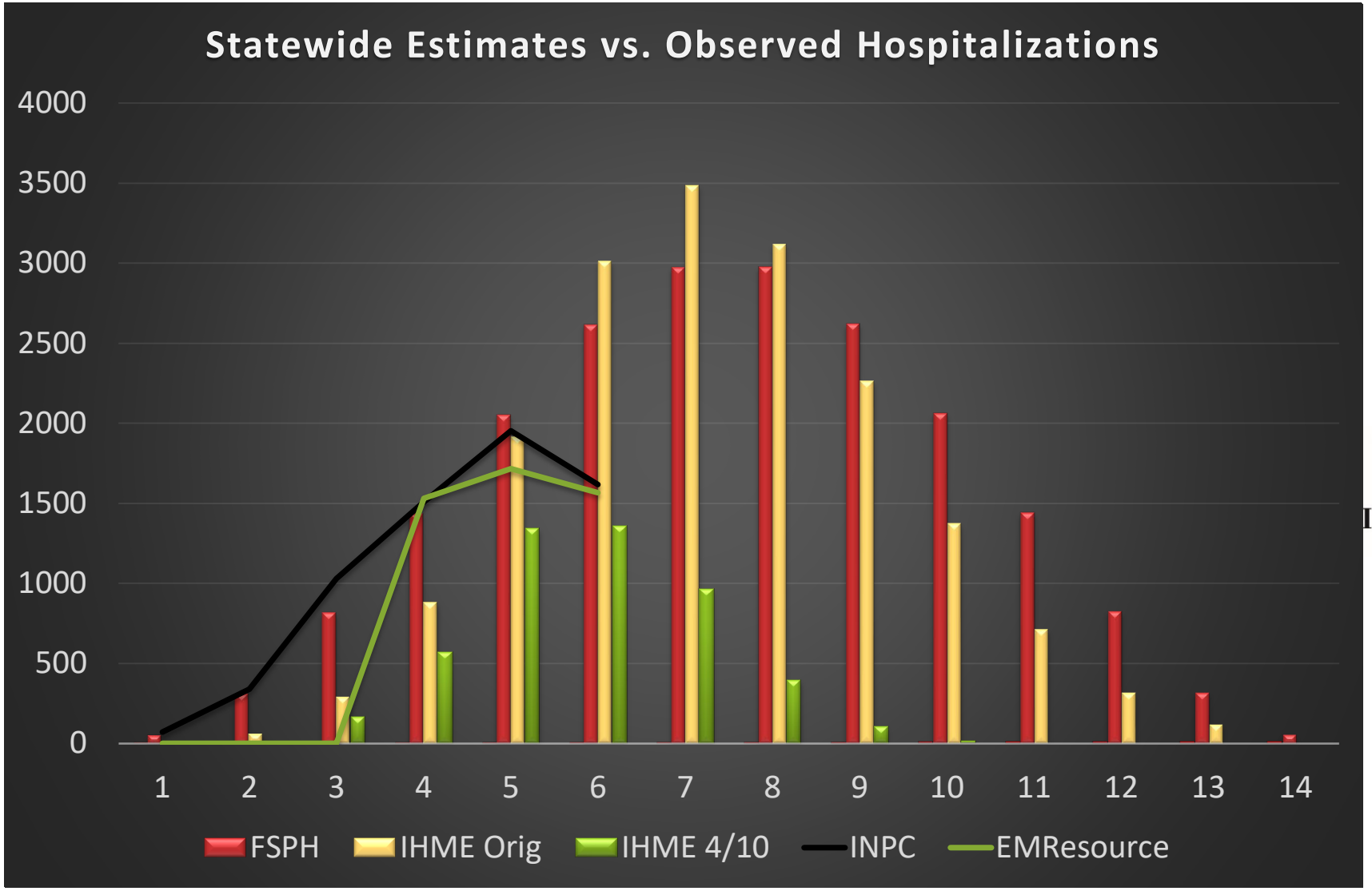
Models vs. Observed Hospitalizations Statewide

Data on actual hospitalizations obtained from the Indiana Network for Patient Care (INPC), courtesy the Indiana Health Information Exchange and the Regenstrief Institute as of April 19, 2020.
Because District 5 began around March 10, 2020 the statewide model also assumes a similar start date.



Models vs. Observed Hospitalizations Statewide

Data on actual hospitalizations obtained from the Indiana Network for Patient Care (INPC), courtesy the Indiana Health Information Exchange and the Regenstrief Institute, as well as EMResource as of April 19, 2020. EMResource did not measure COVID hospitalizations until Week 4 (week ending April 6, 2020). Because District 5 began around March 10, 2020 the statewide model also assumes a similar start date.



FSPH vs. IHME vs. Observed Hospitalizations

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INDIANA UNIVERSITY
Indianapolis

Data on actual hospitalizations obtained from the Indiana Network for Patient Care (INPC), courtesy the Indiana Health Information Exchange and the Regenstrief Institute as of April 19, 2020.
Because District 5 began around March 10, 2020 the statewide model also assumes a similar start date.

COVID-19 Symptom Tracker

- General survey of the population to capture symptoms
  - Complements RNA and/or Antibody testing efforts
- RI partnered with Microsoft to offer survey on MSN, Bing platforms
- Broader use to survey in Indiana market to complement other statewide activities
- Data from dashboard will be available publicly starting next week

Indiana Pandemic Information Collaborative

- Coalition of the willing who seeks to respond to COVID
  - Minimize duplication of efforts
  - Communicate and coordinate across organizations

- Multiple "teams" incl. Health Systems, Modeling, Dashboarding, and Data Standards/Interchange

- To join IPIC, send an email to Jennifer Williams (craigjen@regenstrief.org) and say that Brian sent you

Questions?

Discussion

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