

Building Sustainability for AI Use Cases in Medical and Public Health Preparedness and Response

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KEY

FFRDC

Focus Area

About MITRE | Our Organization

CORPORATE

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Public Sector



Center for Advanced Aviation
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(CAASD)

Center for Enterprise
Modernization
(CEM)

Center for Transforming Health-CMS Alliance to Modernize Healthcare
(Health FFRDC)

Homeland Security Systems
Engineering & Development
Institute (HSSEDI)

National Cybersecurity
FFRDC (NCF)

MITRE
National Security
Sector



National Security Engineering
Center (NSEC)

Joint &
Services

Air Force

Intelligence

National
Security

MITRE
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Innovation Centers

Supporting FFRDC Work

Industry, State, and Local Govt,
International Organizations

Broader Federal Science &
Technology Sponsors

MITRE
ENGENUITY™

Accelerator of innovation
for public good

Neutral convener for
industry-driven R&D

Background: COVID-19 Healthcare Coalition (C19HCC)

- The [C19HCC](#) was a private-sector led response that brought together healthcare organizations, technology firms, nonprofits, academia, and startups to preserve the healthcare delivery system and help protect U.S. populations
- Over 1,100 private sector partners worked together to provide data-driven, real-time insights to improve outcomes
- The C19HCC convened the leading Electronic Health Record (EHR) and healthcare analytics companies to perform *federated studies* on COVID-19

The screenshot shows the homepage of the COVID-19 Healthcare Coalition website. The header includes the coalition's name and navigation links for News & Insights, Resource Library, Decision Dashboard, About Us, and Contact Us. The main content area features a large blue banner with the text "TOGETHER WE CAN" and a quote from Dr. John Halamka and Dr. Jay Schnitzer. Below this is a section titled "CLINICAL CARE OUTCOMES" with a video thumbnail and a "FIND MORE" link. A row of five blue boxes highlights various initiatives: Standards for Federated Analytics, Federated Inpatient Famotidine Study, Natural Language Processing Tools for Researchers, The Fight Is In Us - Plasma Donation Coalition, and Waivers Approved by CMS. The bottom section is titled "SUPPORTING AN AFFORDABLE AND SCALABLE SUPPLY CHAIN" and includes a "FIND MORE" link. A large image on the right shows a person working with medical equipment, with the text "CRITICAL SUPPLIES" overlaid.

COVID-19 | Healthcare Coalition

NEWS & INSIGHTS RESOURCE LIBRARY DECISION DASHBOARD ABOUT US CONTACT US

TOGETHER WE CAN

“ The COVID-19 Healthcare Coalition is a private-sector led response that brings together healthcare organizations, technology firms, nonprofits, academia, and startups to preserve the healthcare delivery system and help protect U.S. populations. Together, we’re working to provide data-driven, real-time insights that improve outcomes. ”

We have a long way to go before this crisis is over. But together we’re making a difference. [Read more about our impact.](#)

DR. JOHN HALAMKA, President of Mayo Clinic Platform
DR. JAY SCHNITZER, Chief Medical and Technology Officer at MITRE

[Watch the latest webinar!](#)

CLINICAL CARE OUTCOMES

ACHIEVING REAL-TIME LEARNING FROM PATIENT DATA

We’re working to identify effective treatments for COVID-19 patient care. Members are using a common language and approach to scan their patient data for positive trends, answering questions such as “which treatments are working for which cohorts.” By federating the results, we can use large-scale analytics to learn in real time.

[FIND MORE](#)

Standards for Federated Analytics [↗](#)

Federated Inpatient Famotidine Study

Natural Language Processing Tools for Researchers

The Fight Is In Us - Plasma Donation Coalition [↗](#)

Waivers Approved by CMS

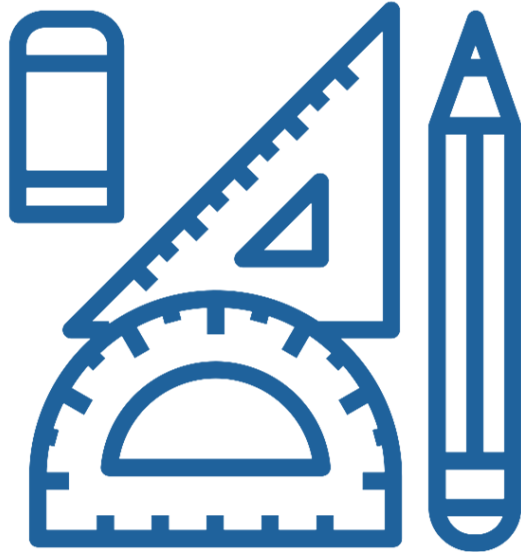
SUPPORTING AN AFFORDABLE AND SCALABLE SUPPLY CHAIN

We’re working to increase the supply of critical equipment by building existing capacity, alternative sourcing, and advanced manufacturing solutions. For example, we’ve identified methods for sterilization and reuse of N95 masks to extend product life and have issued guidance for 3D printing of PPE. The coalition’s Demand Allocation model helps state and county leaders track outbreaks and predict demand for PPE.

[FIND MORE](#)

CRITICAL SUPPLIES

Federated Real-World Data (RWD) Studies



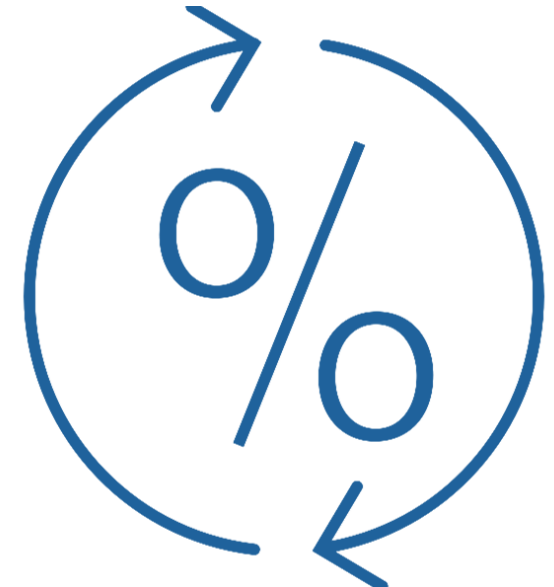
Design and Align

Agree on study design, cohorts and definitions



Run Queries

Implement queries and produce minimum viable aggregate results



Analyze and Refine

Produce statistics and address issues

Famotidine Federated Study

Federated Queries Leveraging EHR and Healthcare Analytics Platform Data



- **Partnered with:** Cerner, Epic, and Health Catalyst
- **High-level methods:** Built Cox proportional hazards model to examine relationship between mortality and famotidine, accounting for several comorbidities. The same model was run by each data vendor.
- **Key findings:** Famotidine was not found to have statistically significant impact on mortality for COVID-positive patients.
- **Surveillance benefit:** Evaluation of off-label use of readily available medications for treatment of novel disease

COVID-19 | Healthcare Coalition

NEWS & INSIGHTS | RESOURCE LIBRARY | ABOUT US | CONTACT US

FEDERATED OBSERVATIONAL STUDY OF CLINICAL THERAPEUTICS

INPATIENT FAMOTIDINE

COVID-19 Healthcare Coalition | Last Updated: 8/19/2020

Complete

Abstract

Introduction

Methods

Results

Discussion

References

Contributors

The data and findings included here are preliminary and may be revised as more data is gathered and the analysis refined. This study was made possible through the unprecedented and open collaboration of leading data analytics and EHR platforms brought together through the COVID-19 Healthcare Coalition (<https://c19hcc.org>).

ABSTRACT

Background and Objective

Famotidine is one of several clinical therapies that is being investigated as a treatment of patients with COVID-19. Scientific evidence is limited as to whether this medication, alone or in combination with other medication(s) and other interventions, is effective in improving clinical outcomes for patients with COVID-19.

We sought to examine whether treatment with famotidine among hospitalized patients with COVID-19 in the United States impacted disease progression, as indicated by death during inpatient stay. This study was designed and conducted by members of the COVID-19 Healthcare Coalition, using electronic health record (EHR) data provided by Cerner Corporation, Health Catalyst, and Epic.

Methods

We conducted three observational retrospective cohort studies using EHR and healthcare analytics data from adult COVID-19 patients discharged from inpatient care on or after January 1, 2020 and discharged or expired in hospital prior to May 31, 2020 across 71 health systems in the United States.

The primary exposure was administration of famotidine early in the hospitalization (day of or day after hospitalization). The outcome of interest was inpatient death within 60 days of admission.

Preliminary Results

A total of 56,193 patients with COVID-19 related hospitalizations were identified, of which 5,618 received famotidine the day of or day after being hospitalized. Use of famotidine was not associated with a reduced risk of death and the effect of famotidine was not statistically significant in any study. Adjusted hazards ratios are presented in Table 1.

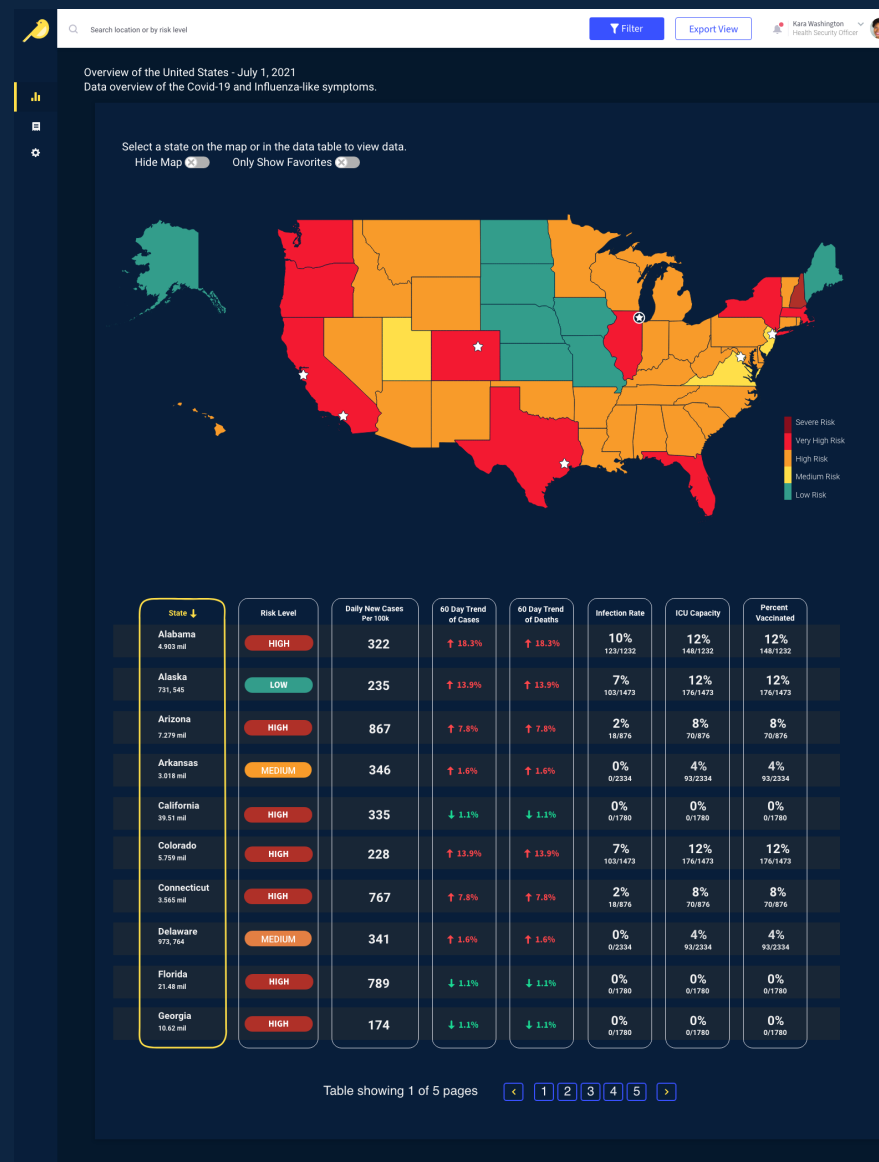
Table 1 - Adjusted hazard ratios

	STUDY A	STUDY B	STUDY C
Adjusted Hazard Ratio (95% CI)	1.16 (0.92, 1.46)	1.11 (0.86, 1.42)	1.04 (0.96, 1.13)
p-value	0.21	0.43	0.35
Sample Size	9,027	6,129	41,037
Sample size (famotidine administration)	582	678	4,358

*Adjusted hazard ratios for famotidine administration and sample sizes

Astute Canary™

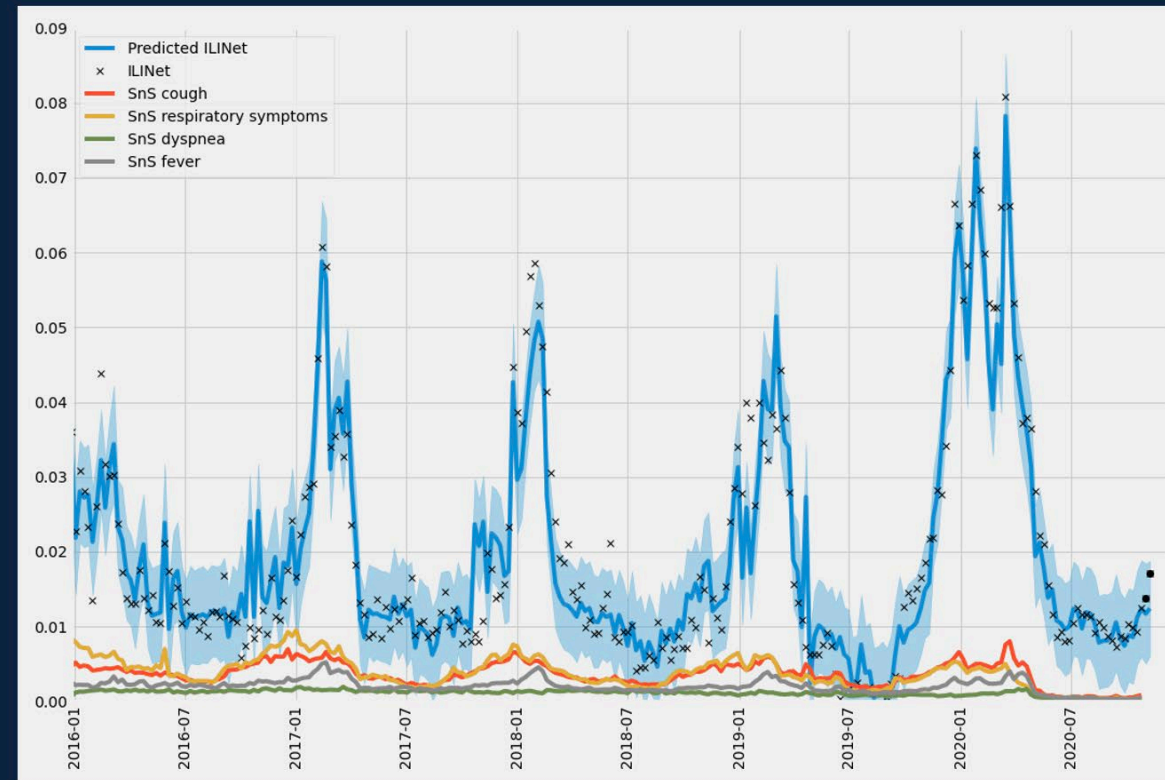
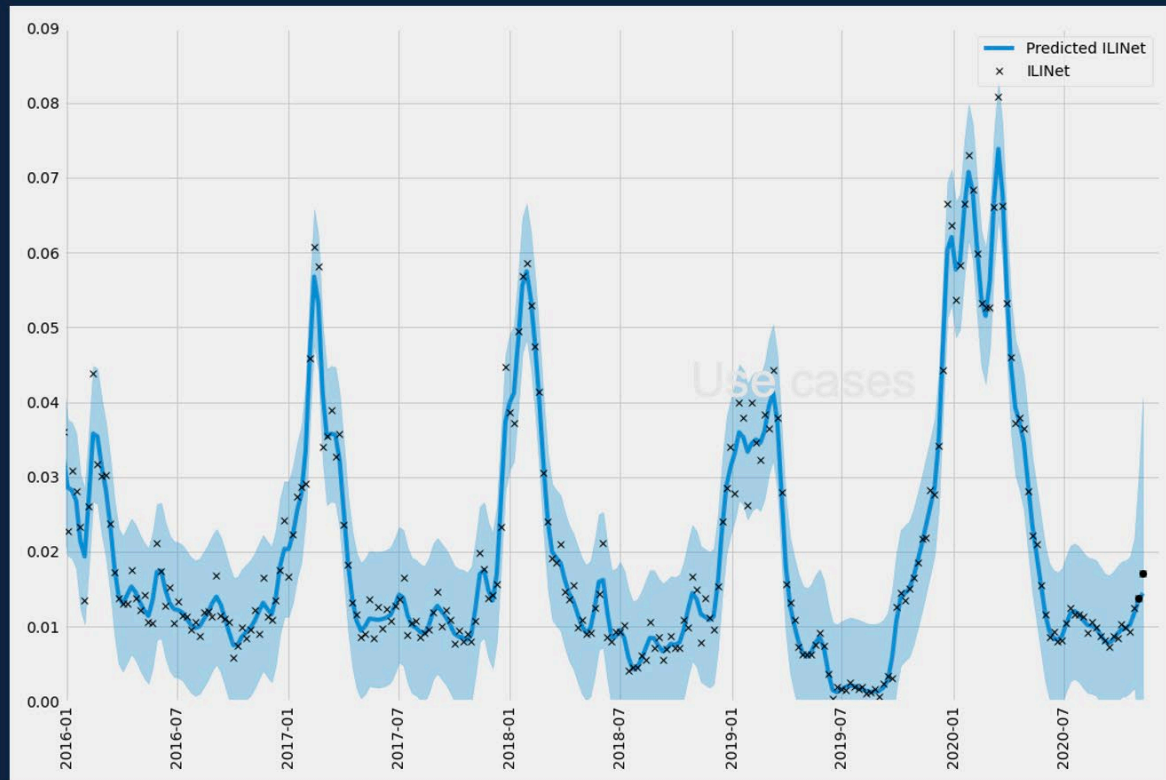
- Goal: develop a data-driven, global capability to nowcast, forecast, predict, and detect health security threats (e.g., pandemic influenza, novel coronavirus, anthrax, etc.) earlier
- Future goals include monitoring trends and better understanding of novel threats in real-time using federated Electronic Health Record (EHR) data, other novel data, and data analytics enabling decision makers to rapidly act and protect the population during a global health security threat



Notional Astute Canary™ Dashboard Mockup

Astute Canary™ Predictive Modeling

AC Nowcasting - Maryland



What now?

- Define opportunities and challenges for AI in medical and public health preparedness and response
 - Technical Innovation
 - Data and infrastructure
 - Use cases



Source: Prompted ChatGPT app GPT-4 DALL-E to “create a business process model for the emergency department” and requested a “conceptual illustration”

Use Cases

Novel Threat
Detection via
Multimodal RWD

Communication
and Coordination
During Novel
Threat

Innovative Tech

Large Language Model - ML/AI

Wearables

Wastewater Surveillance

EHR RWD/E

Data and Infrastructure

Multimodal Data Infrastructure

Information Blocking Rule APIs

Use Cases

Novel Treat
Detection via
RWD

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ENR RWD/E

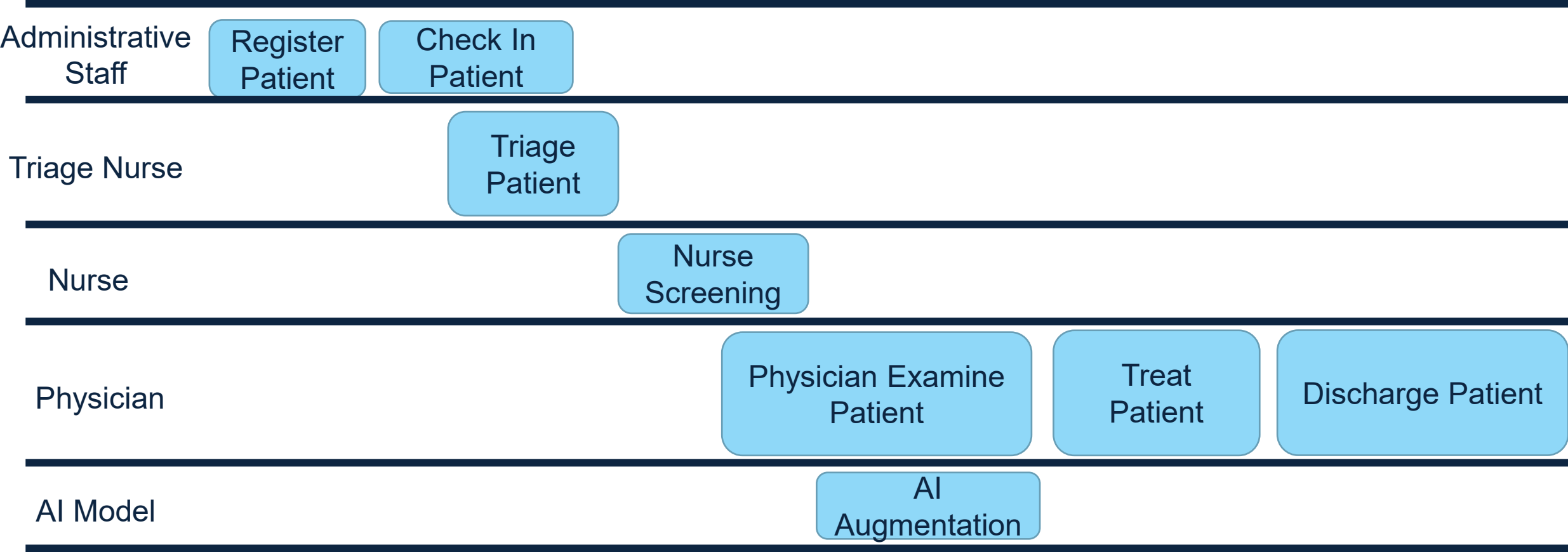
Business Model

Infrastructure

Multimodal Data Infrastructure

Information Blocking Rule APIs

AI Use Case Process Modeling



Q&A