Data-Driven Medicine in the COVID-19 Era

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Introduction

December 2019

ORIGINAL ARTICLE BRIEF REPORT

A Novel Coronavirus from Patients with Pneumonia in China, 2019

Na Zhu, Ph.D., Dingyu Zhang, M.D., Wenling Wang, Ph.D., Xingwang Li, M.D., Bo Yang, M.S., Jingdong Song, Ph.D., Xiang Zhao, Ph.D., Baoying Huang, Ph.D., Weifeng Shi, Ph.D., Roujian Lu, M.D., Peihua Niu, Ph.D., Faxian Zhan, Ph.D., et al., for the China Novel Coronavirus Investigating and Research Team

March 11, 2020

Coronavirus disease 2019 (COVID-19)
Situation Report – 51

World Health Organization

March 13, 2020

PROCLAMATIONS

Proclamation on Declaring a National Emergency Concerning the Novel Coronavirus Disease (COVID-19) Outbreak

Issued on: March 13, 2020

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March 24, 2020

AMIA

OXFORD

Research and Applications

Rapid response to COVID-19: health informatics support for outbreak management in an academic health system

J. Jeffery Reeves [1], Hannah M. Hollandsworth[1], Francesca J. Torriani[2], Randy Taplitz[2], Shira Abeles[2], Ming Tai-Seale[3], Marlene Millen[4], Brian J. Clay[4] and Christopher A. Longhurst [4]

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Introduction

- Faced new cases of COVID-19
- Need for rapid build of informatics infrastructure
- >95% of US health systems have an EHR
- All phases of care interface with EHR
- Opportunity to leverage technology to enhance patient care

Methodology

Setting: University of California, San Diego Health

- Regional academic medical center
- 2 acute care hospitals, 2 EDs, several urgent care centers
- Full complement of ambulatory services
- Utilizes Epic (Verona, WI)
- Hosts UCI, UCR, Student Health and 300+ affiliate physicians

Methodology

- Local Situation:
  - San Diego County served as quarantine site for Chinese expatriates and cruise ship passengers
  - Experienced early community spread
- Incident Command Center established on February 5, 2020

Incident Command Center

- "Designed to enable effective and efficient incident management by integrating a combination of facilities, equipment, personnel, procedures, and communications."

- Our structure includes:
  - Alternating commanding operator
  - Physician leaders
  - Administration
  - Facility manager
  - Information services

- Identified technological and electronic health record-related needs to support the crisis

Incident Command System Resources. Federal Emergency Management Agency. US Department of Homeland Security. https://www.fema.gov/incident-command-system-resources

Health IT Needs Identified

Electronic Health Record Tools for Managing a Pandemic
Screening Protocols
Triage of Patient Phone Calls
Required Registration/Check-In Screening Questions for All Patients
System Level EHR-Templates
Updated with Current Infection Control Specialist and Command Center Information
Inpatient, Emergency Department and Ambulatory Order Panels
Decision support for testing protocol
Embedded modifiable required isolation orders
Detailed personal protective equipment needs for providers
Detailed instructions for proper specimen collection
Reporting and Analytics
COVID-19 Operational Dashboard
Tracking of COVID-19 and Personal under Investigation (PUIO) in EHR embedded database
Communication Channels
EHR-integrated secure messaging
Artificial Intelligence
Real-time algorithm to assist in diagnostic imaging
Patient Facing Technology
Telemedicine – Video Visits for Outpatient Clinic Encounters
Smart tablets in patient rooms w/ video capabilities

Travel and Screening Questions
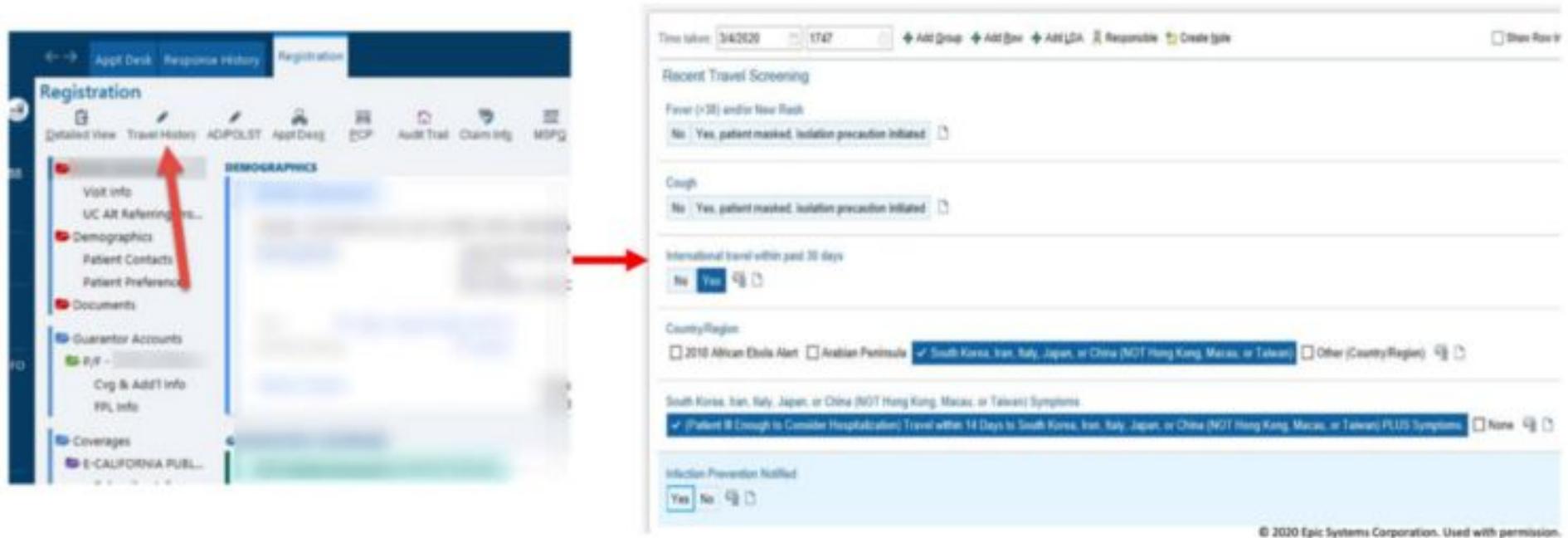
Figure 1. Travel and symptom screening. The above screenshot demonstrates the required screening, as viewed by front desk staff, that was added to the registration/check-in process for all patients.

EHR Based Templated Phrases

.UCSDCOVID19AMBULATORY

Ambulatory COVID-19 Evaluation
(last updated 4/9/2020)

GUIDANCE EVOLVES AS OUR TESTING CAPACITY EVOLVES AND THE COVID-19 OUTBREAK EVOLVES. THANK YOU FOR WORKING WITH US AND UNDERSTANDING GUIDANCE IS CHANGING QUICKLY.

Check-in
1. **All patients with symptoms of an acute respiratory viral infection and personnel evaluating should be given a surgical mask as soon as they enter the clinic (give at front desk or front door).** Make sure the patient is instructed to wear over their nose and mouth and asked to use an alcohol hand rub on their hands.
2. Patients who have respiratory symptoms (fever, cough, shortness of breath) should be placed immediately in a private room, alert physician. Any patient companion should also wear a surgical mask. **All staff interacting face to face with patient (i.e. vitals, exam, testing, etc) should be instructed to wear a surgical mask, eye protection, gown, and gloves when interacting with the patient.**

Evaluation of patient:
Does patient have a fever, a new cough or shortness of breath (SOB) **{Yes / No:63}**
Other symptoms seen in COVID 19 patients include **NEW** chest tightness, anosmia

EHR Based Templated Phrases

Table 2. Modifiable templates available in the electronic health record

Smart phrase	Setting of use	Description of content
.UCSDCOVID19TRIAGE	Phone or in person patient triage	Updated travel and symptom screening, testing criteria, and clear guidance on best setting and location of patient care
.UCSDCOVID19PATIENTCONCERNS	Phone or in person patient encounter	Detailed information on frequently asked questions concerning COVID-19
.UCSDCOVID19HOMEISOLATION	When instructing patients on home isolation	Isolation information for patients, including the discontinuation of home isolation
.UCSDCOVID19AMBULATORY	Ambulatory screening or testing	Clinical decision support on testing criteria, recommended additional work-up, admission criteria/protocol, and discharge information
.UCSDCOVID19URGENTCARE	Urgent Care/ED screening or testing	Clinical decision support on testing criteria, recommended additional work-up, admission criteria/protocol, and discharge information
.UCSDCOVID19VISITORSCREENING	Clinics or inpatient units	Standard documentation of any screening of patient visitors for symptoms of infection
UCSD COVID-19 WORK EXCUSE	Work excuse letter	Templated excuse letter for providers to recommend working from home

Order Panels

Daily COVID-19 Dashboard

Daily COVID-19 Dashboard

Daily COVID-19 Dashboard

COVID-19 Registry

Patient Facing Technology (TeleHealth)

- Outpatient encounters transitioned from in person to video visits

- Multi-provider capable

- Use expanded to inpatient
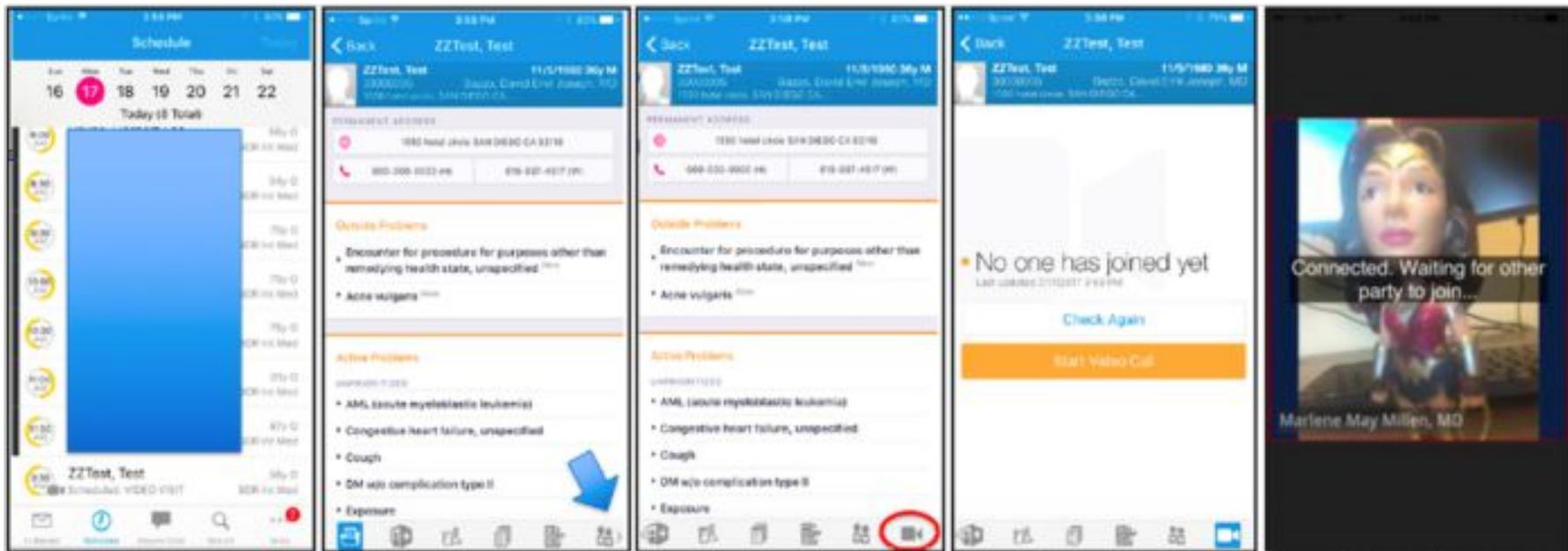
Rapid Expansion of TeleHealth Capabilities
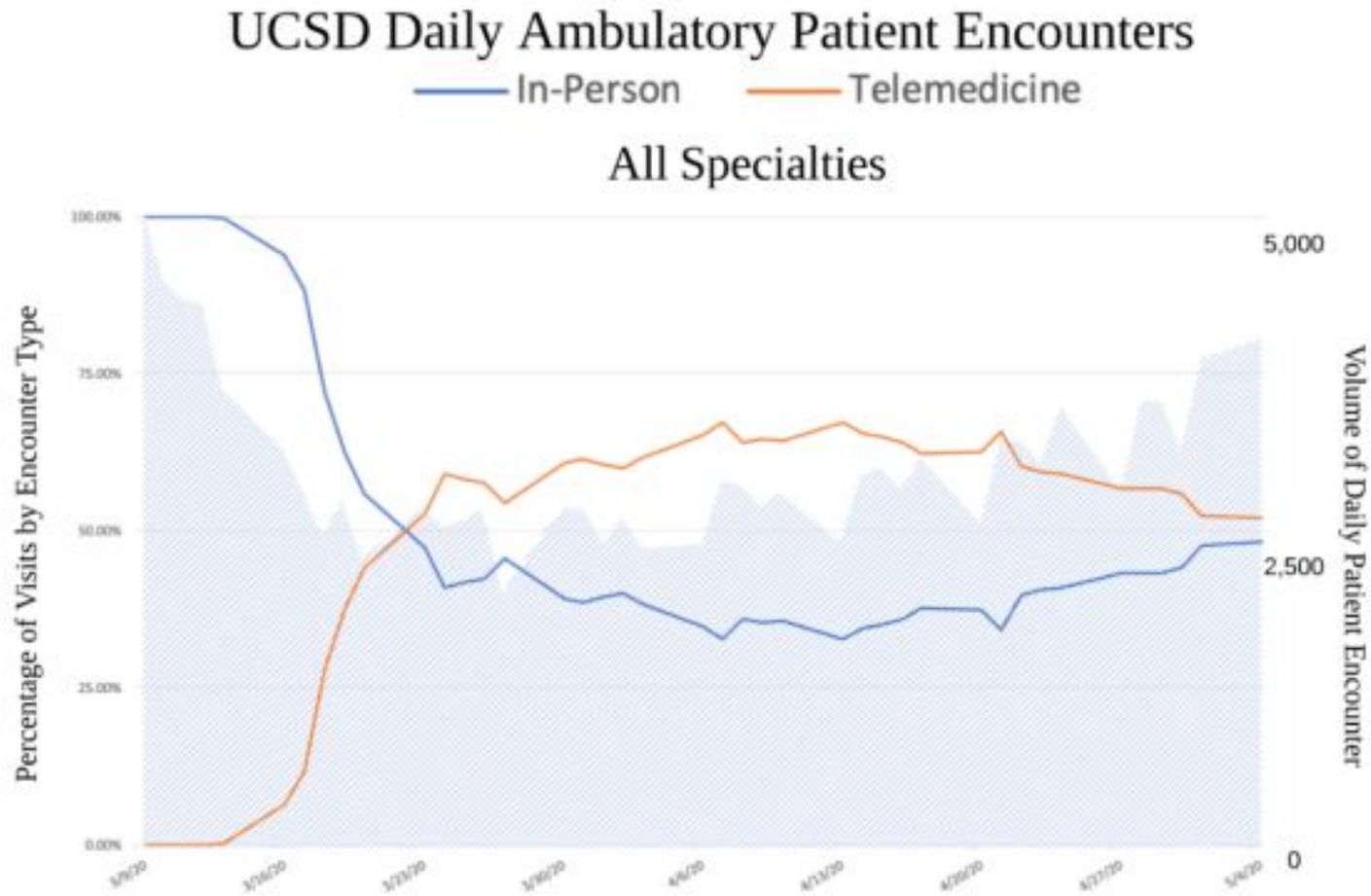
TeleHealth eConsent

EHR-Integrated Secure Messaging
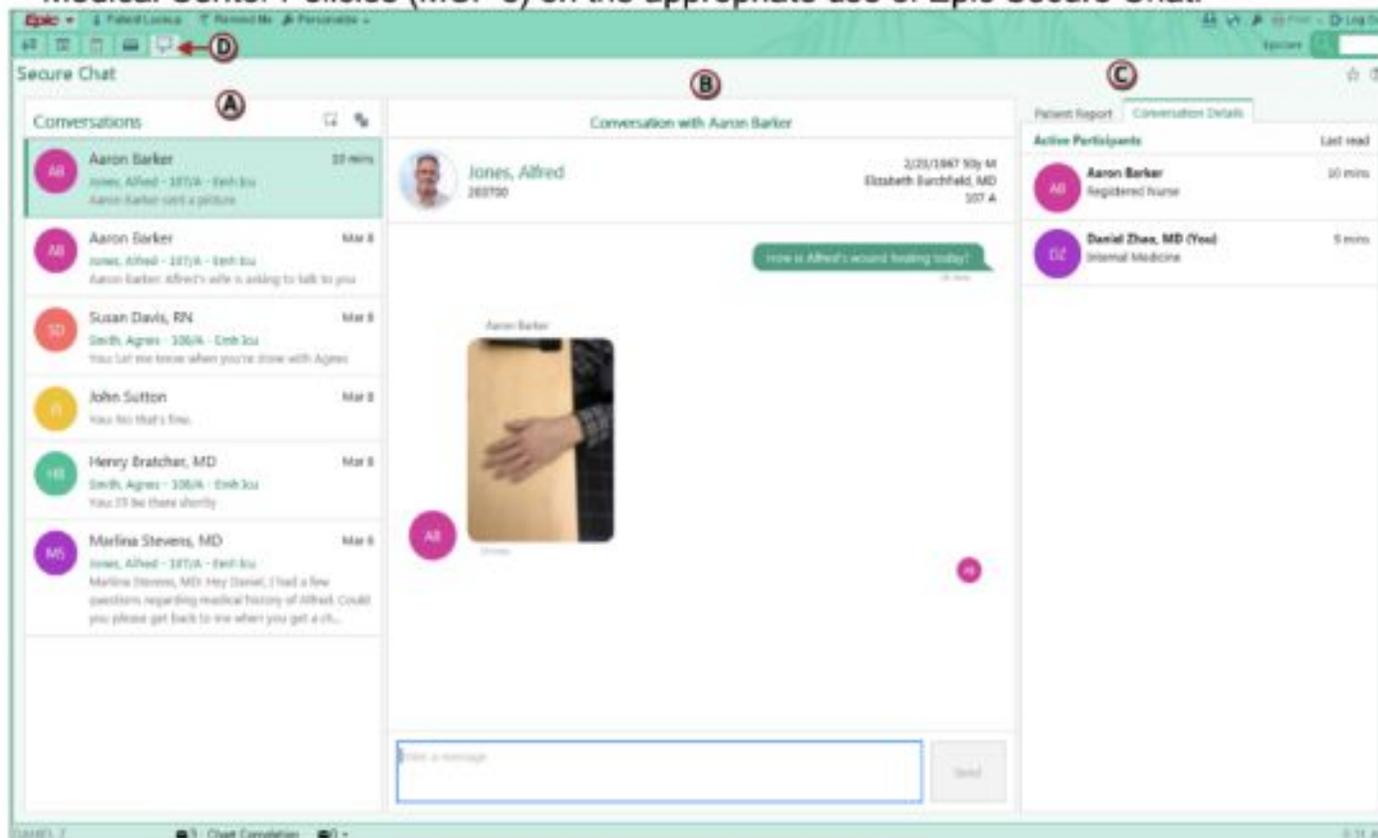
Artificial Intelligence in Diagnostic Radiology
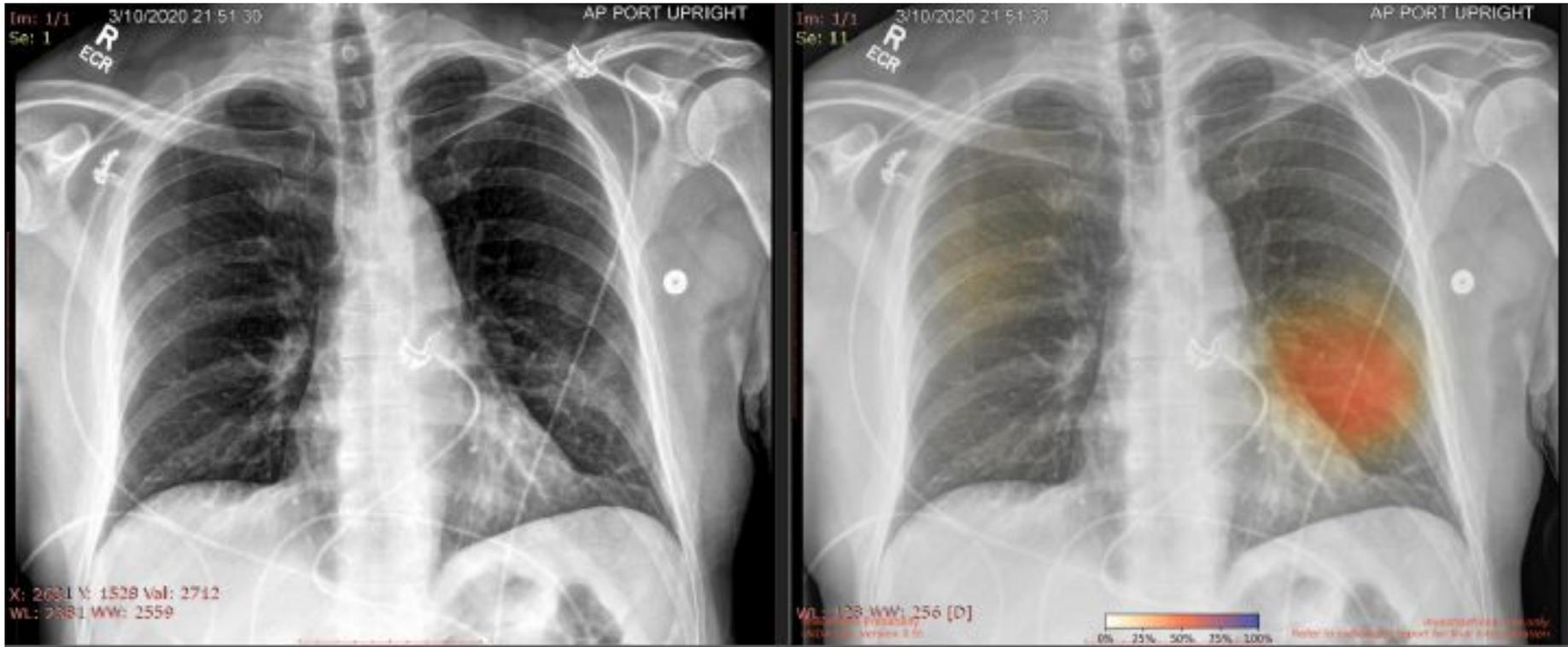
Challenges and Limitations

- Usual process out the window
- Bandwidth of Information Services department put to the test
- Approval from multiple stakeholders
  - Daily engagement huddles
- Focus on non-COVID medical care
  - Usual projects put on hold

Next Steps for Health IT in COVID-19

- Data sharing across health systems, regions, states, and countries
- TeleHealth – finding the appropriate balance
- 3T Stategy – Testing, tracing, and treatment[1]
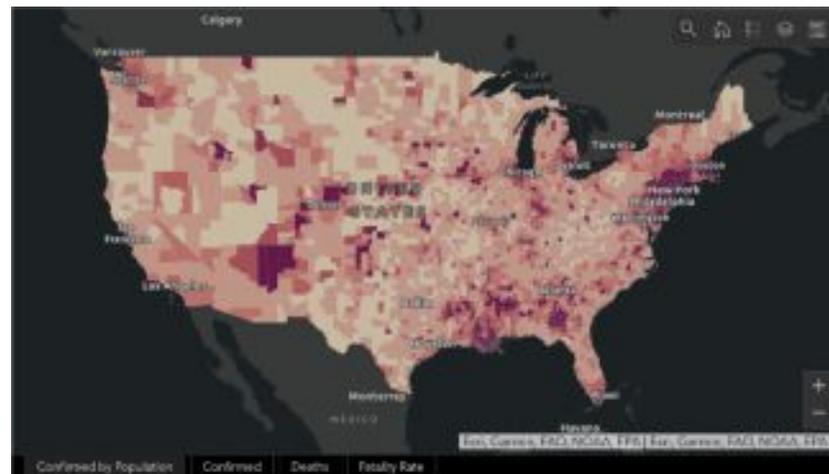
1. San Diego Health & Human Service Agency (HHSA) Director Nick Macchione

TeleHealth vs In-Person

UCSD Daily Ambulatory Patient Encounters — In-Person / Telemedicine
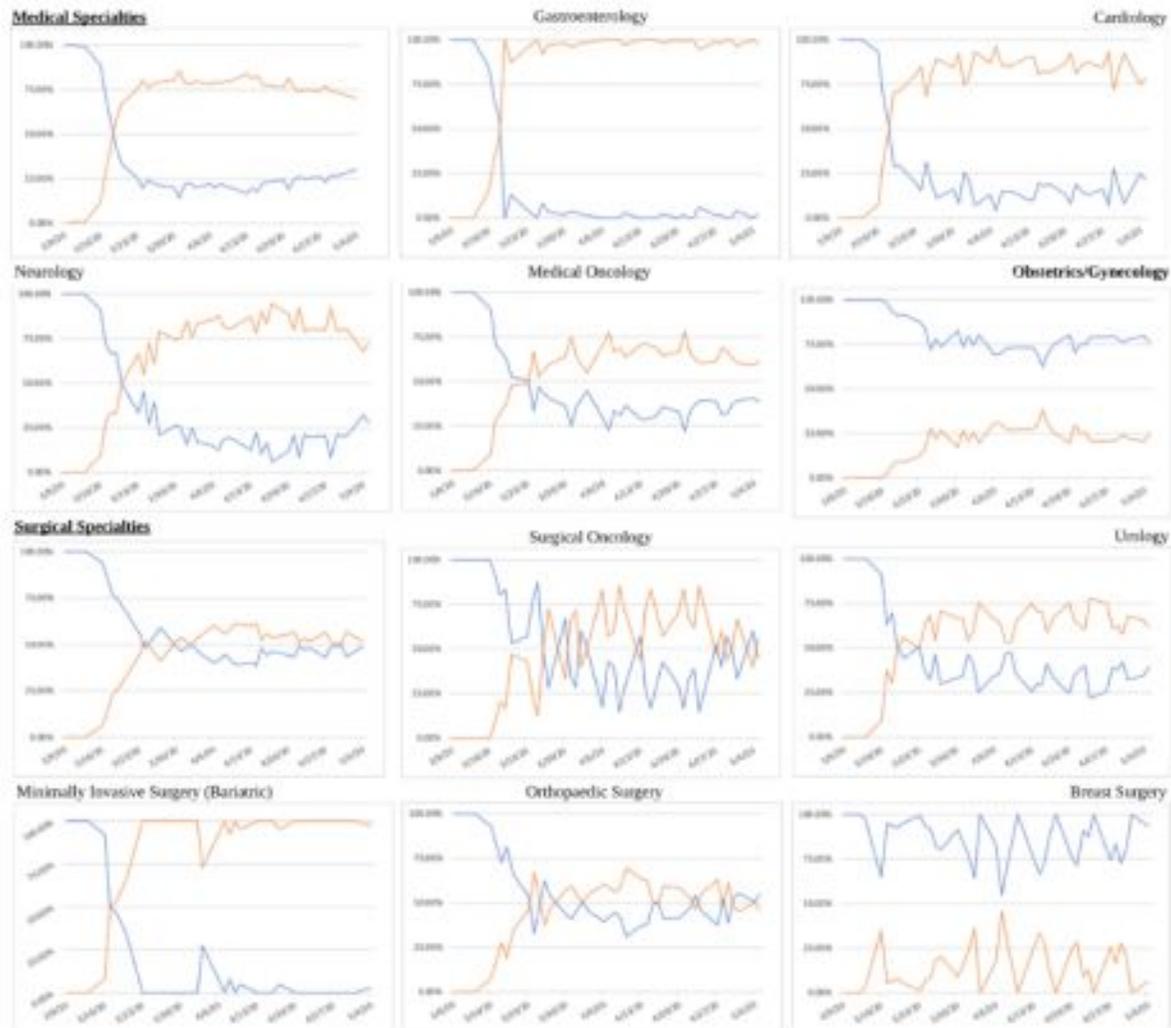
Health IT and Contact Tracing

Opportunities and challenges in utilizing electronic health records for infection surveillance, prevention, and control

Ashish Atreja, MD, MPH,[a,*] Steven M. Gordon, MD,[a] Daniel A. Pollock, MD,[b] Russell N. Olmsted, MPH, CIC,[c] Patrick J. Brennan, MD,[d] and Healthcare Infection Control Practices Advisory Committee
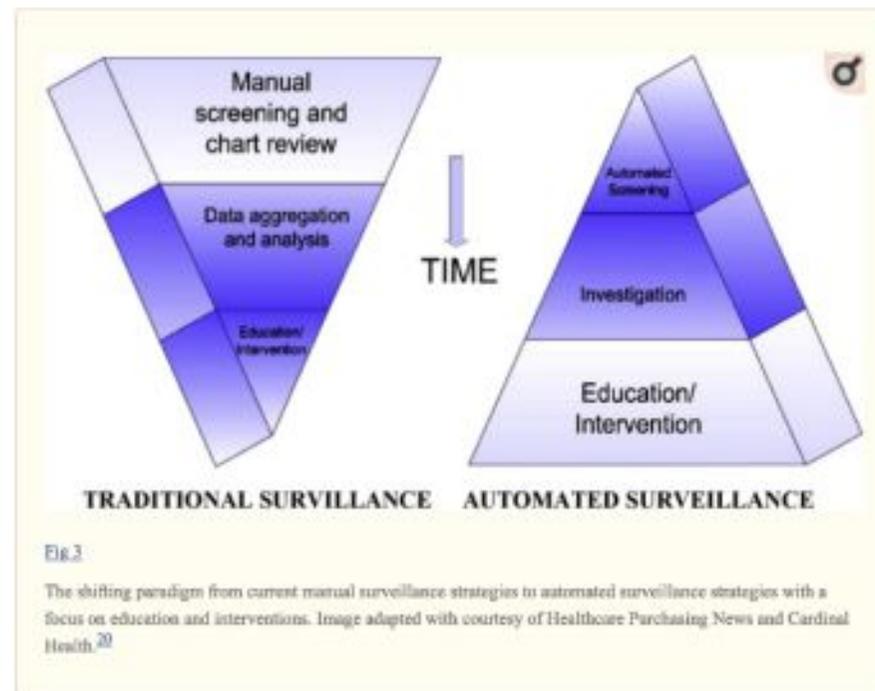
Fig 3

The shifting paradigm from current manual surveillance strategies to automated surveillance strategies with a focus on education and interventions. Image adapted with courtesy of Healthcare Purchasing News and Cardinal Health.[20]

Health IT and Contact Tracing

- Case identification and remote monitoring
- Government database w/ access granted to hospitals, clinics, and pharmacies
- *Centralized versus decentralized tracing through use of smart phones*

Apple and Google partner on COVID-19 contact tracing technology
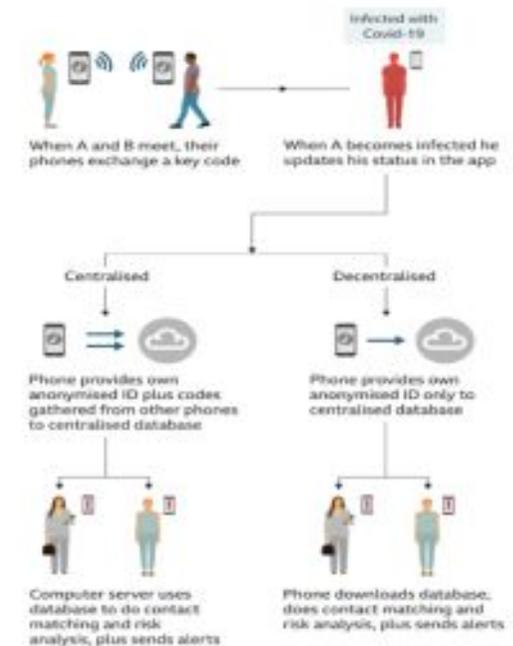
Key Points/Lessons Learned

- COVID-19 required unprecedented response
- The EHR can be your friend, use it well
- Overview of specific EHR-based tools
- Strong relationship between clinicians and analysts is the most important aspect to successful integration of EHR-based tools

Thank you!

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