Clinical Informatics Innovations in the COVID Era

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UC San Diego Health

New England Journal of Medicine, January 24, 2020

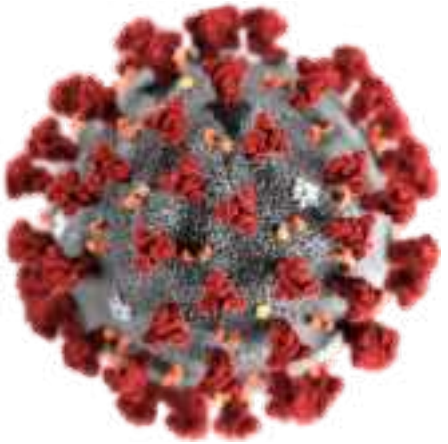
BRIEF REPORT

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., Xuejun Ma, Ph.D., Dayan Wang, Ph.D., Wenbo Xu, M.D., Guizhen Wu, M.D., George F. Gao, D.Phil., and Wenjie Tan, M.D., Ph.D., for the China Novel Coronavirus Investigating and Research Team

SUMMARY

In December 2019, a cluster of patients with pneumonia of unknown cause was linked to a seafood wholesale market in Wuhan, China. A previously unknown betacoronavirus was discovered through the use of unbiased sequencing in samples from patients with pneumonia. Human airway epithelial cells were used to isolate a novel coronavirus, named 2019-nCoV, which formed a clade within the subgenus sarbecovirus, Orthocoronavirinae subfamily. Different from both MERS-CoV and SARS-CoV, 2019-nCoV is the seventh member of the family of coronaviruses that infect humans. Enhanced surveillance and further investigation are ongoing. (Funded by the National Key Research and Development Program of China and the National Major Project for Control and Prevention of Infectious Disease in China.)



UC San Diego Health

February 2020 in San Diego

UC San Diego Health

UC San Diego Health

- Only academic medical center in San Diego county
  - Medical center – 9000+ employees + 800 beds
  - 3 professional schools – 1600+ faculty
- Epic client since 2003

UC San Diego Health

March 2020

March 11, 2020

March 13, 2020

March 24, 2020, *JAMIA*

Journal of the American Medical Informatics Association, 27(6), 2020, 853–859
doi: 10.1093/jamia/ocaa037
Advance Access Publication Date: 27 April 2020
Research and Applications

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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Received 18 March 2020; Editorial Decision 18 March 2020; Accepted 19 March 2020

Health IT Needs Identified

Electronic Health Record Tools for Managing a Pandemic
Screening Protocols
Triage of Patient Phone Calls
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Smart tablets in patient rooms w/ video capabilities

UC San Diego Screening Tool Supports Testing for Symptomatic Employees and Students

- Mandated by San Diego County to screen all students and employees on-site; UC San Diego “strongly encourages” for all regional employees working off-site
- All students and employees who screen positive for new symptoms or exposure are referred to UC San Diego Health for COVID testing *at no cost*

https://blink.ucsd.edu/HR/services/covid-19/symptom-screening/

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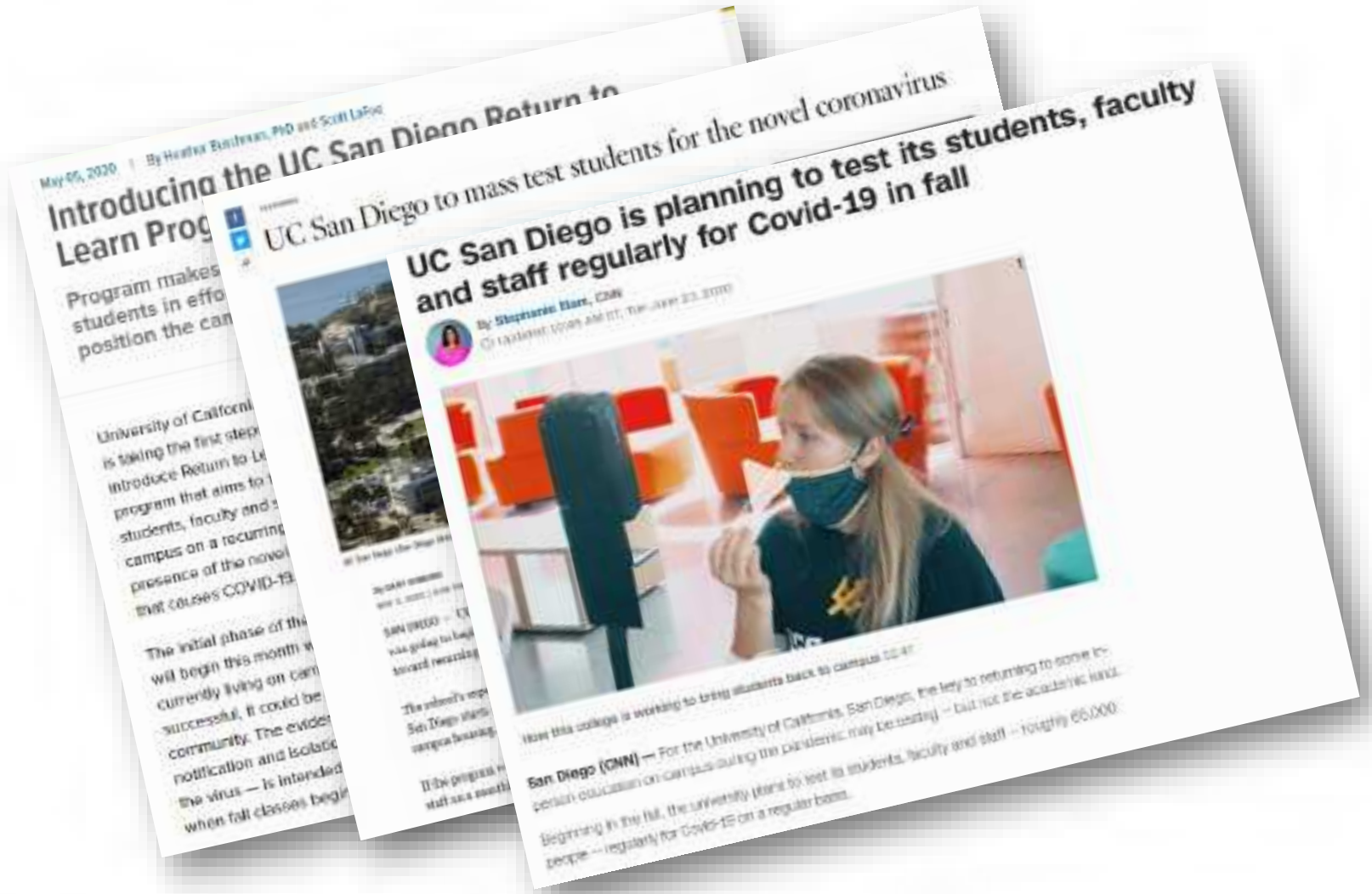
Return to Learn @ UC San Diego



UC San Diego Health

Journal of American College Health, Nov 2020

JOURNAL OF AMERICAN COLLEGE HEALTH
https://doi.org/10.1080/07448481.2020.1845468

Taylor & Francis

CASE REPORT

OPEN ACCESS

Bringing student health and Well-Being onto a health system EHR: the benefits of integration in the COVID-19 era

J. Jeffery Reeves, MD[a], Christopher A. Longhurst, MD, MS[b], Stacie J. San Miguel, MD[c], Reina Juarez, PhD[d], Joseph Behymer, MD[c], Kevin M. Ramotar, PsyD[d], Patricia Maysent, MPH, MBA[e], Angela L. Scioscia, MD[f], and Marlene Millen, MD[b]

[a]Department of Surgery, University of California, San Diego, La Jolla, California, USA; [b]Department of Medicine, Division of Biomedical Informatics, University of California, San Diego, La Jolla, California, USA; [c]Student Health Services, University of California, San Diego, La Jolla, California, USA; [d]Counseling and Psychological Services, University of California, San Diego, La Jolla, California, USA; [e]University of California, San Diego Health, Office of the CEO, La Jolla, California, USA; [f]Student Health and Well-Being, University of California, San Diego, La Jolla, California, USA

ABSTRACT

Objective: To detail the implementation, benefits and challenges of onboarding campus-based health services onto a health system's electronic health record.

Participants: UC San Diego Student Health and Well-Being offers medical services to over 39,000 students. UC San Diego Health is an academic medical center.

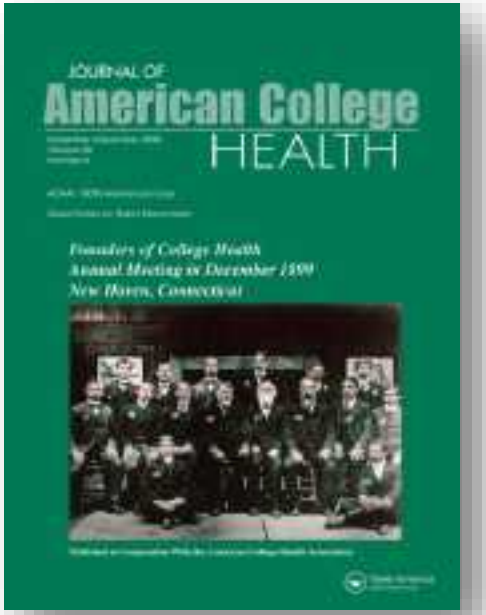
Methods: 20 workstreams and 9 electronic modules, systems, or interfaces were converted to new electronic systems.

Results: 36,023 student-patient medical records were created. EHR-integration increased security while creating visibility to 19,700 shared patient visits and records from 236 health systems across the country over 6 months. Benefits for the COVID-19 response included access to screening tools, decision support, telehealth, patient alerting system, reporting and analytics, COVID-19 dashboard, and increased testing capabilities.

Conclusion: Integration of an interoperable EHR between neighboring campus-based health services and an affiliated academic medical center can streamline case management, improve quality and safety, and increase access to valuable health resources in times of need. Pertinent examples during the COVID-19 pandemic included uninterrupted and safe provision of clinical services through access to existing telehealth platforms and increased testing capacity.

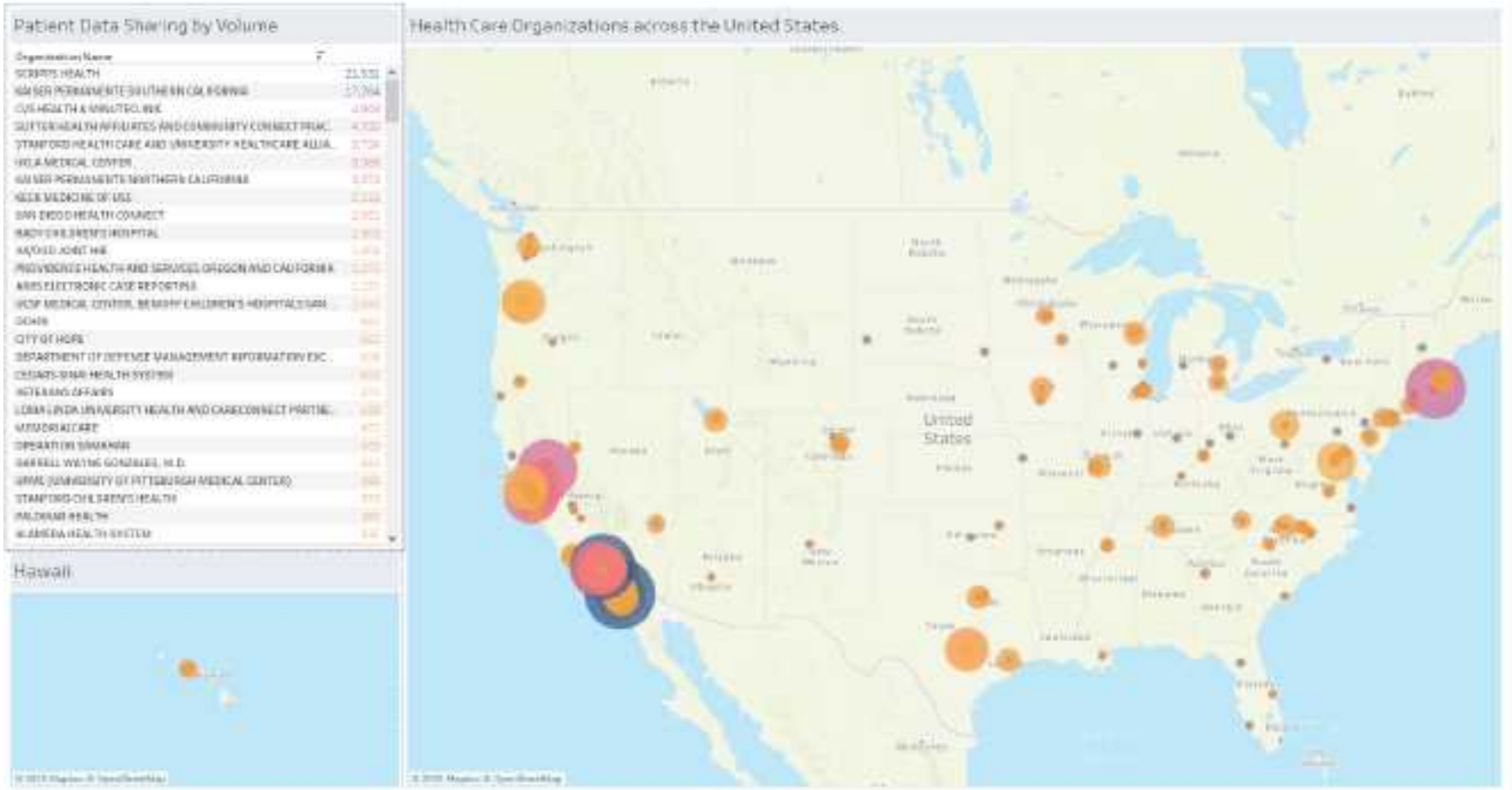
ARTICLE HISTORY
Received 6 July 2020
Revised 8 September 2020
Accepted 18 October 2020

KEYWORDS
Clinical informatics; electronic health record; data sharing; student health; telehealth



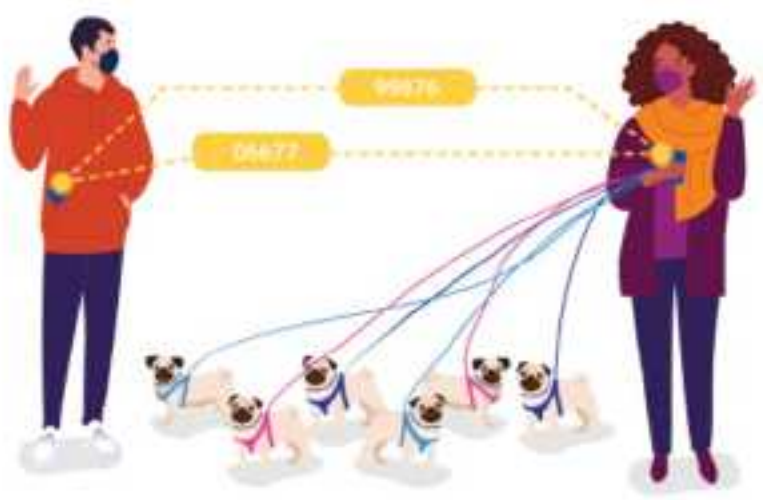
UC San Diego Health

Records shared between student health and USA



UC San Diego Health

How Exposure Notification Works



- Bob and Alice don't know each other
- They both have CA Notify exposure notifications enabled on their phones
- They have a conversation for 15 minutes within 6 feet of each other
- Their phones exchange anonymous keys via Bluetooth

CA Notify does not collect:

your name

contact information

location or movement

identity of people you meet

CA NOTIFY

How Exposure Notification Works

- Later Alice tests COVID-19 positive; her test result is reported to CDPH so she receives an automated text message with a link to launch exposure notifications
- She voluntarily moves forward to send alerts to other CA Notify users she might have exposed

- Bob receives an alert on his phone that he may have been near someone who tested positive for COVID-19.
- He is directed to a website for information on quarantining and testing.

CA NOTIFY

Timeline of Exposure Notification in CA

- **May/June** – advocacy with various stakeholders for ENS in California
- **July/August** – collaborate with UC government relations on proposed state bills
- **September** – UCSD/UCSF pilot announced (9/10) and launched at UCSD with student move-in (9/23) and UCSF (9/30)
- **October** – early outcome data @ UCSD showed >75% on-campus adoption, confirmed privacy and benefit of early notification for quarantine and testing
- **November** – UC pilot expansion announced (11/5) and launched (11/16) at UCB, UCD, UCSB, UCR, and UCLA (managed by UCSD)
- **December** – statewide expansion announced 12/7 as partnership with UC San Diego Health, and launched 12/10. Over 7M users in the first week!

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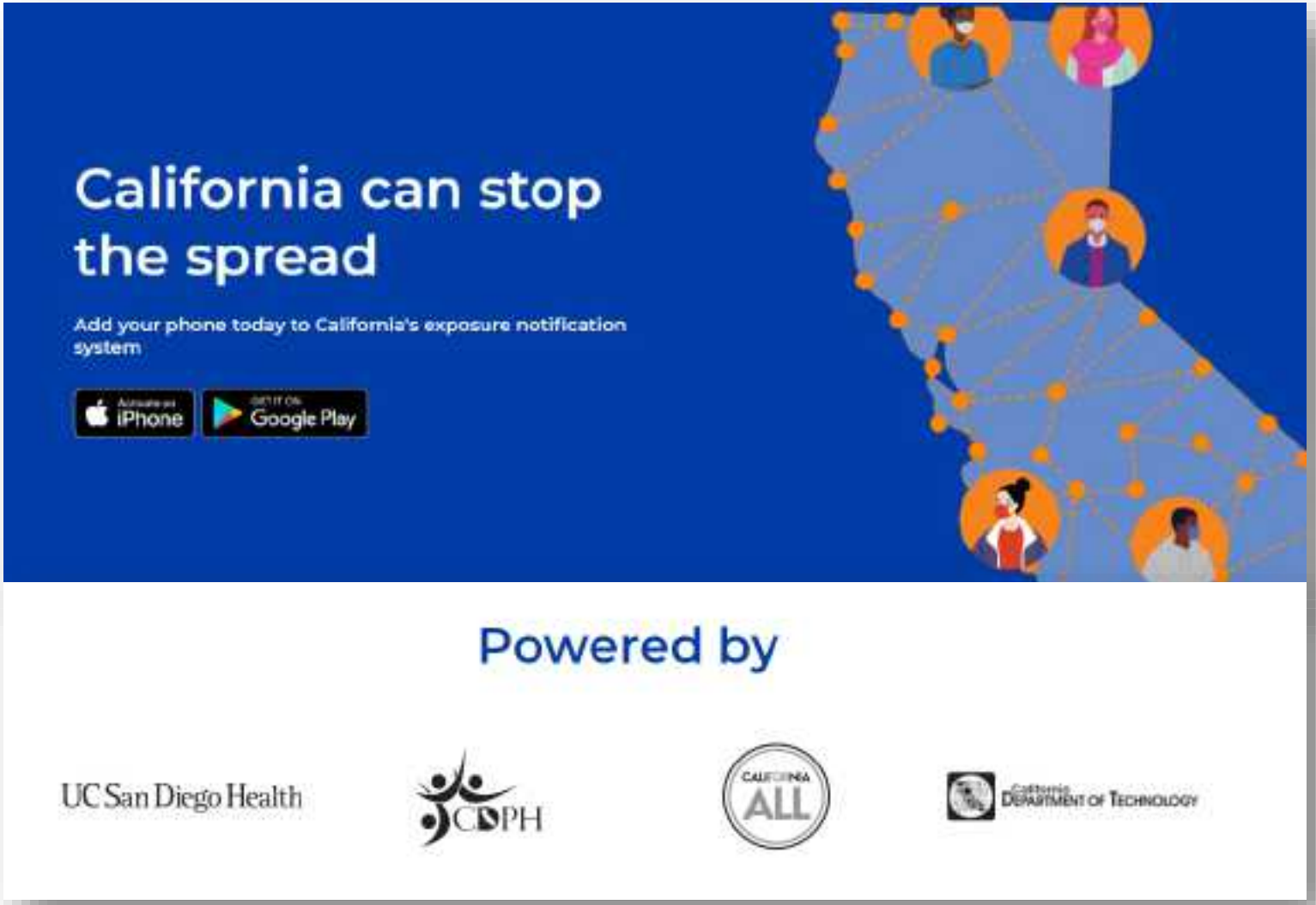
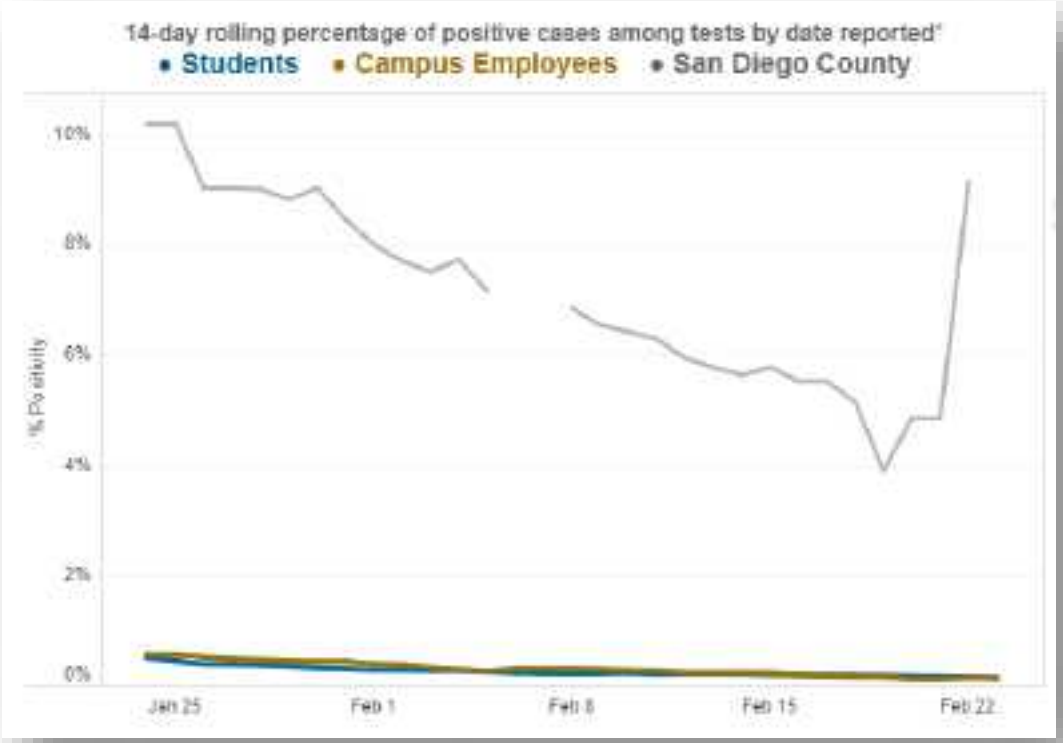
http://canotify.ca.gov



Key Findings from UC San Diego Pilot

1. It works! Multiple students and employees are appropriately quarantined and tested as a result of early exposure notification



https://returntolearn.ucsd.edu/dashboard/

UC San Diego Health

Key Findings from UC San Diego Pilot

1. It works! Multiple students and employees are appropriately quarantined and tested as a result of early exposure notification

2. This technology is not a silver bullet, but is part of a larger pandemic defense effort

https://returntolearn.ucsd.edu/return-to-campus/safety-requirements/

Key Findings from UC San Diego Pilot

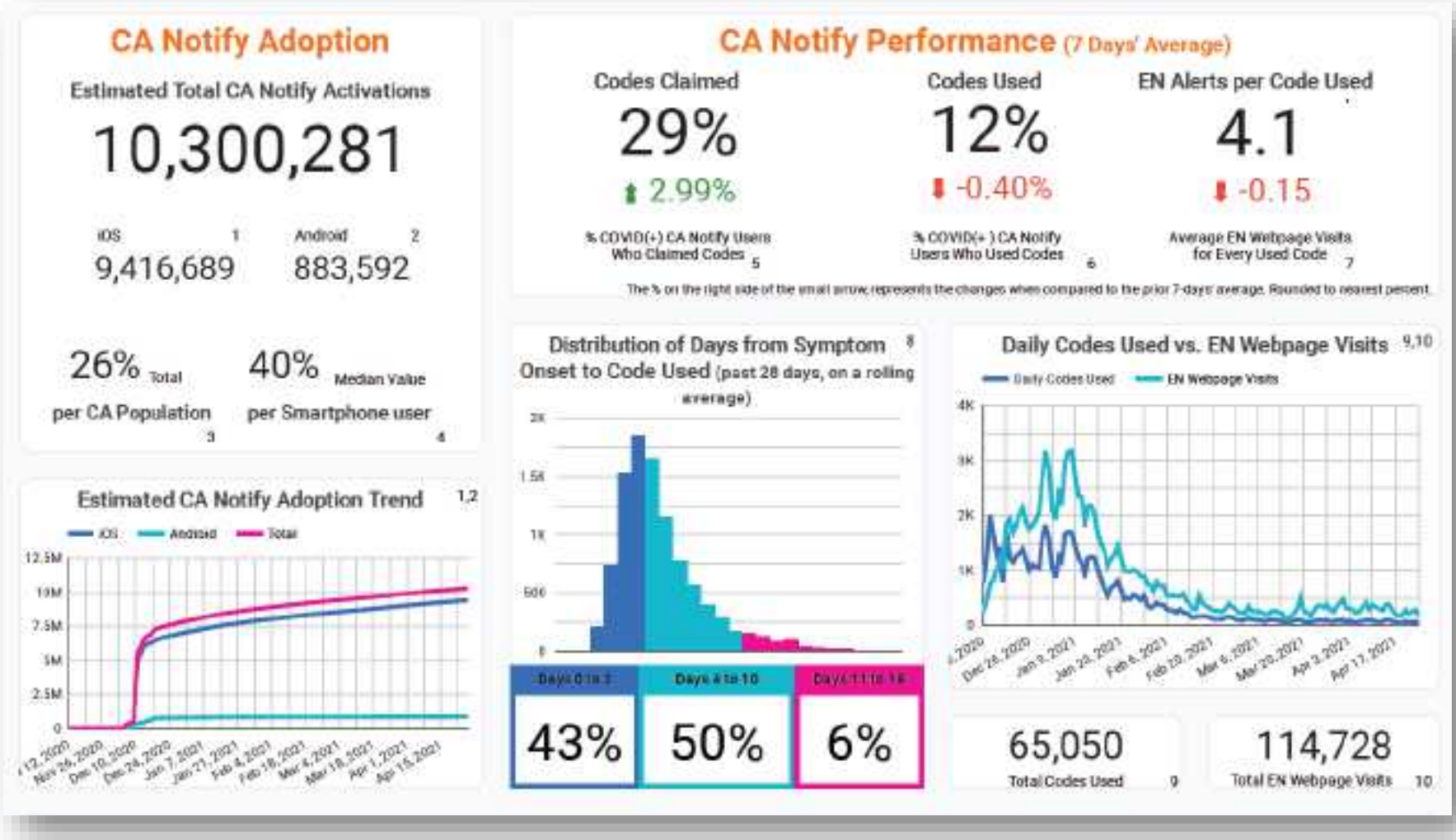
1. It works! Multiple students and employees are appropriately quarantined and tested as a result of early exposure notification

2. This technology is not a silver bullet, but is part of a larger pandemic defense effort

3. The technology is viewed as a health tool. Efficacy in limiting spread is proportional to adoption in a population, and messaging from a healthcare provider was particularly effective at converting users

UC San Diego Health

California as of April 25, 2021



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COVID-19 Daily Readiness Dashboard (March 2020)

UC San Diego Health

Becker's Hospital Review, Aug 2020

How COVID-19 dashboard is fueling engagement across UCSD Health

Jackie Drees - Monday, August 3rd, 2020 Print | Email

As CIO of UC San Diego Health, Chris Longhurst, MD, is familiar with the occasional complaint that comes after sending IT announcements to the organization's 20,000 employees. During this pandemic, however, disgruntled emails have been replaced by praise from staff on UCSD Health's coronavirus dashboard, a real-time digital snapshot of easy-to-understand hospital data.

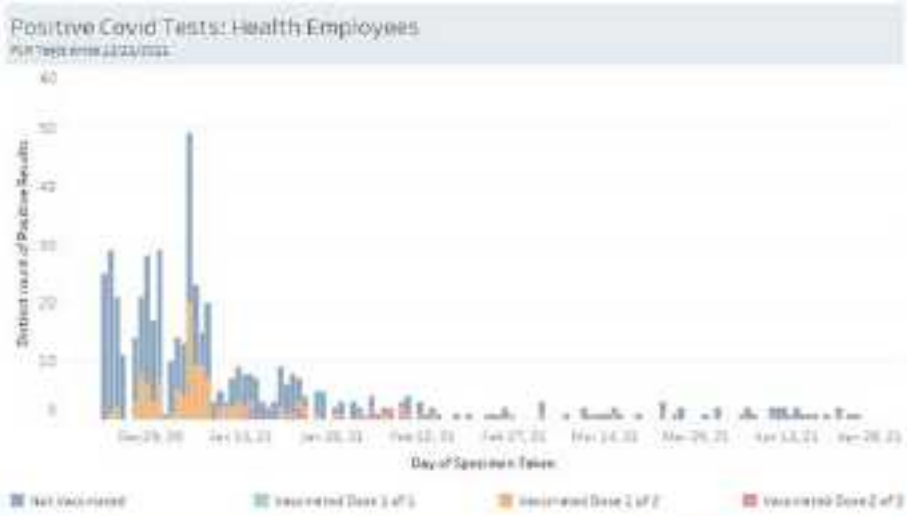
In early April, UC San Diego Health Sciences began sending out a comprehensive COVID-19 dashboard to all its employees. The project, led by Dr. Longhurst and his colleagues, at first was designed specifically to inform UCSD Health's executives and physicians. But after seeing its potential to boost transparency across the health system, CEO Patty Maysent supported making it available to all Health Sciences employees, according to Dr. Longhurst.

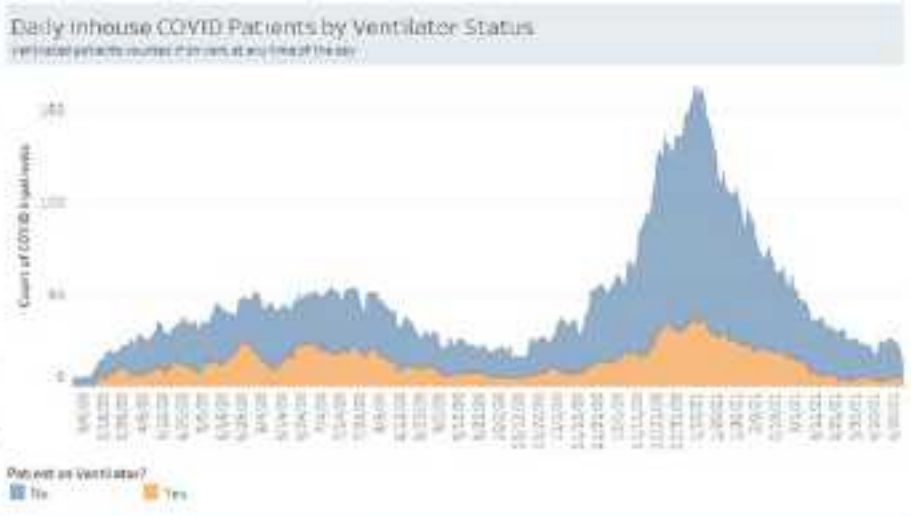
Making the dashboard accessible to all staff has helped "to support a real shift in thinking around data and making data-driven decisions," he told *Becker's Hospital Review*. "The situational awareness of what our health system needs on a day-to-day basis, whether it's PPE, emergency department visits, virtual visits or inpatients with COVID-19, is extraordinary, and available in one view. It's really beyond anything that we've had access to in the past."

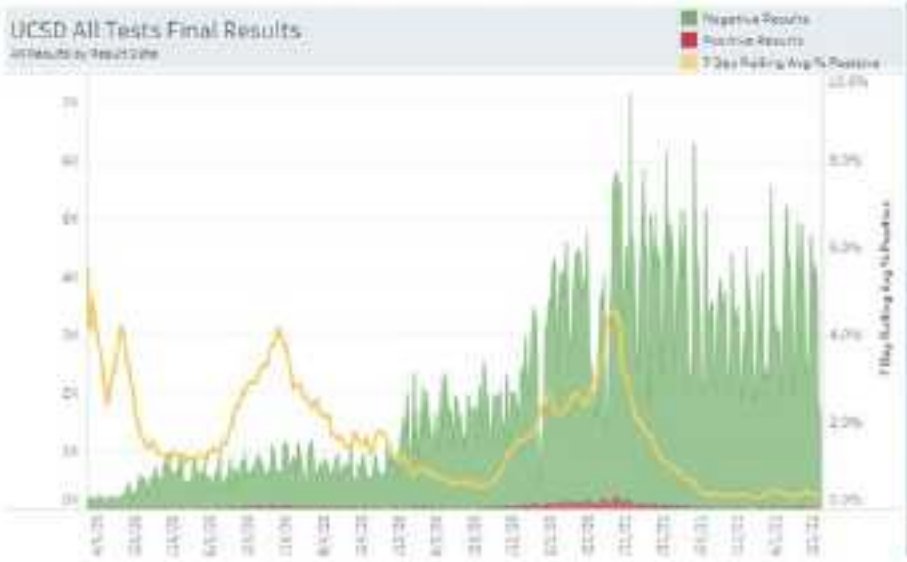
The UC San Diego Health Information Services department sends the data dashboard out in a daily email to staff, giving them access to information ranging from the number of COVID-19 hospitalizations at the health system, available intensive care unit beds and lab test positivity rates. The key operational metrics are meant to help keep employees current on the evolving situation of the pandemic as well as UCSD Health's response. Staff are also advised not to distribute the information outside of the health system to protect sensitive data.

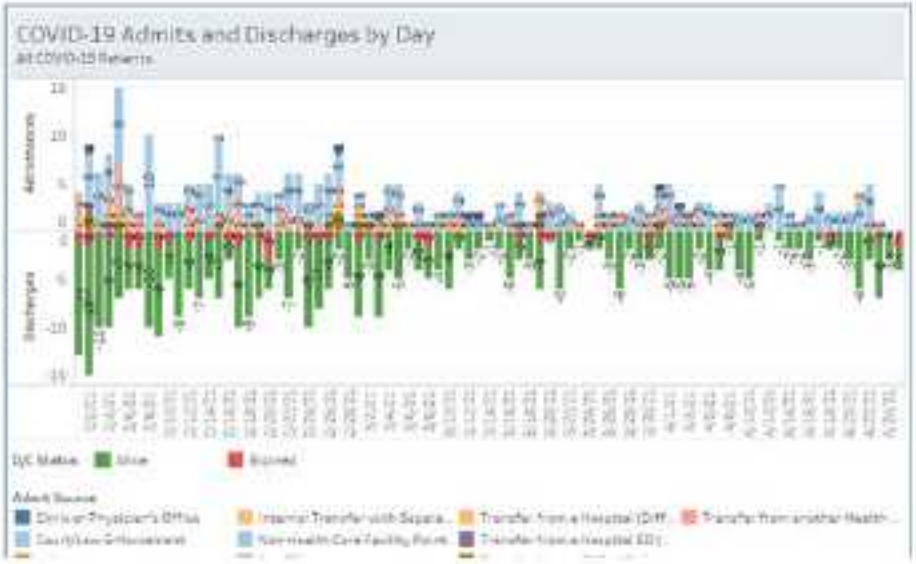
https://www.beckershospitalreview.com/data-analytics/how-covid-19-dashboard-is-fueling-engagement-across-ucsd-health.html

COVID Daily Readiness Dashboard (April 26, 2021)









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Journal of Thoracic Imaging, May 2020

Deep Learning Localization of Pneumonia

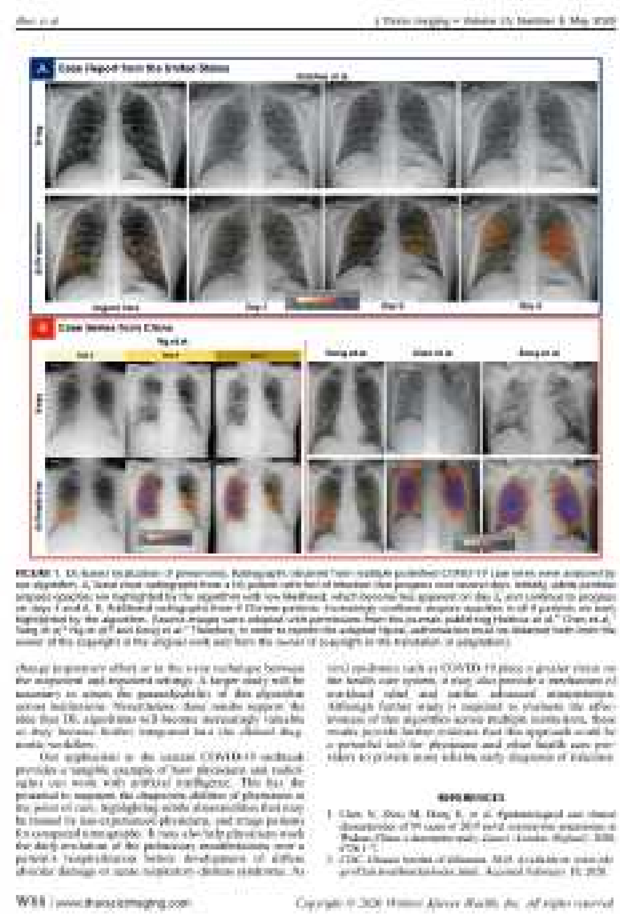
2019 Coronavirus (COVID-19) Outbreak

METHODS

BRIEF INTRO

RESULTS

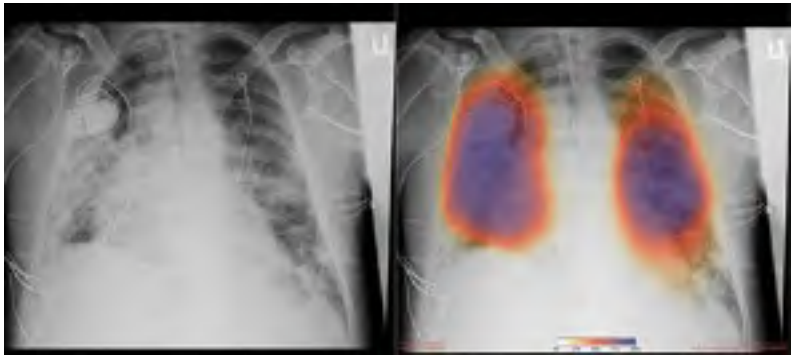
COMMENT



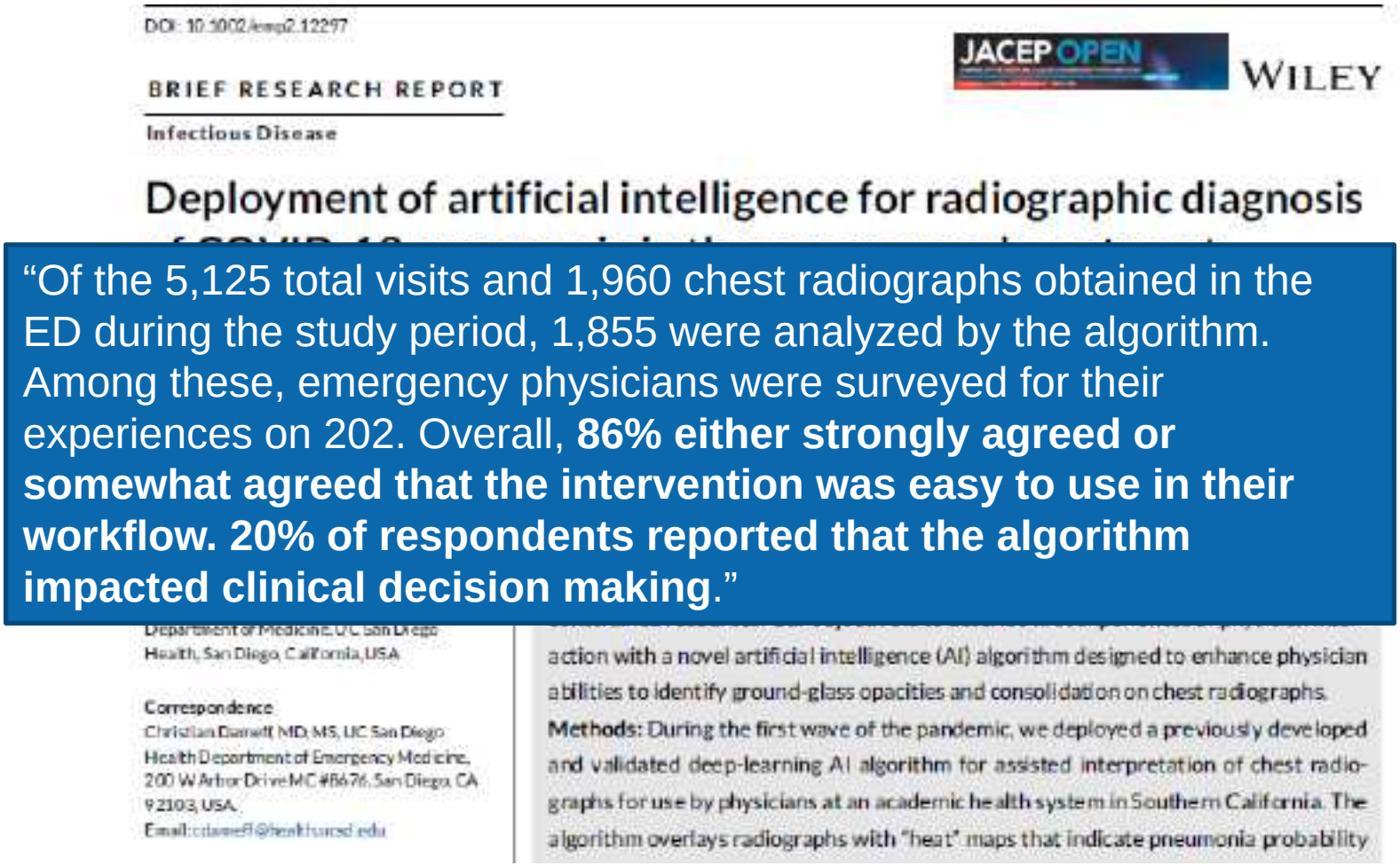
Artificial Intelligence in Diagnostic Radiology

- Preliminary meeting March 13th
- Live in production March 28th
- Every CXR automatically processed in AWS and downloaded to the production PACS…within 60 seconds
- As of December 31st the system had processed 66,731 images



Journal of American College of Emergency Physicians, Nov 2020



DOI: 10.1002/emp2.12297

JACEP OPEN WILEY

BRIEF RESEARCH REPORT

Infectious Disease

Deployment of artificial intelligence for radiographic diagnosis

"Of the 5,125 total visits and 1,960 chest radiographs obtained in the ED during the study period, 1,855 were analyzed by the algorithm. Among these, emergency physicians were surveyed for their experiences on 202. Overall, **86% either strongly agreed or somewhat agreed that the intervention was easy to use in their workflow. 20% of respondents reported that the algorithm impacted clinical decision making**."

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Christian Darnell, MD, MS, UC San Diego Health Department of Emergency Medicine, 200 W Arbor Drive MC #8676, San Diego, CA 92103, USA.
Email: cdarnell@healthcare.edu

action with a novel artificial intelligence (AI) algorithm designed to enhance physician abilities to identify ground-glass opacities and consolidation on chest radiographs.

Methods: During the first wave of the pandemic, we deployed a previously developed and validated deep-learning AI algorithm for assisted interpretation of chest radiographs for use by physicians at an academic health system in Southern California. The algorithm overlays radiographs with "heat" maps that indicate pneumonia probability

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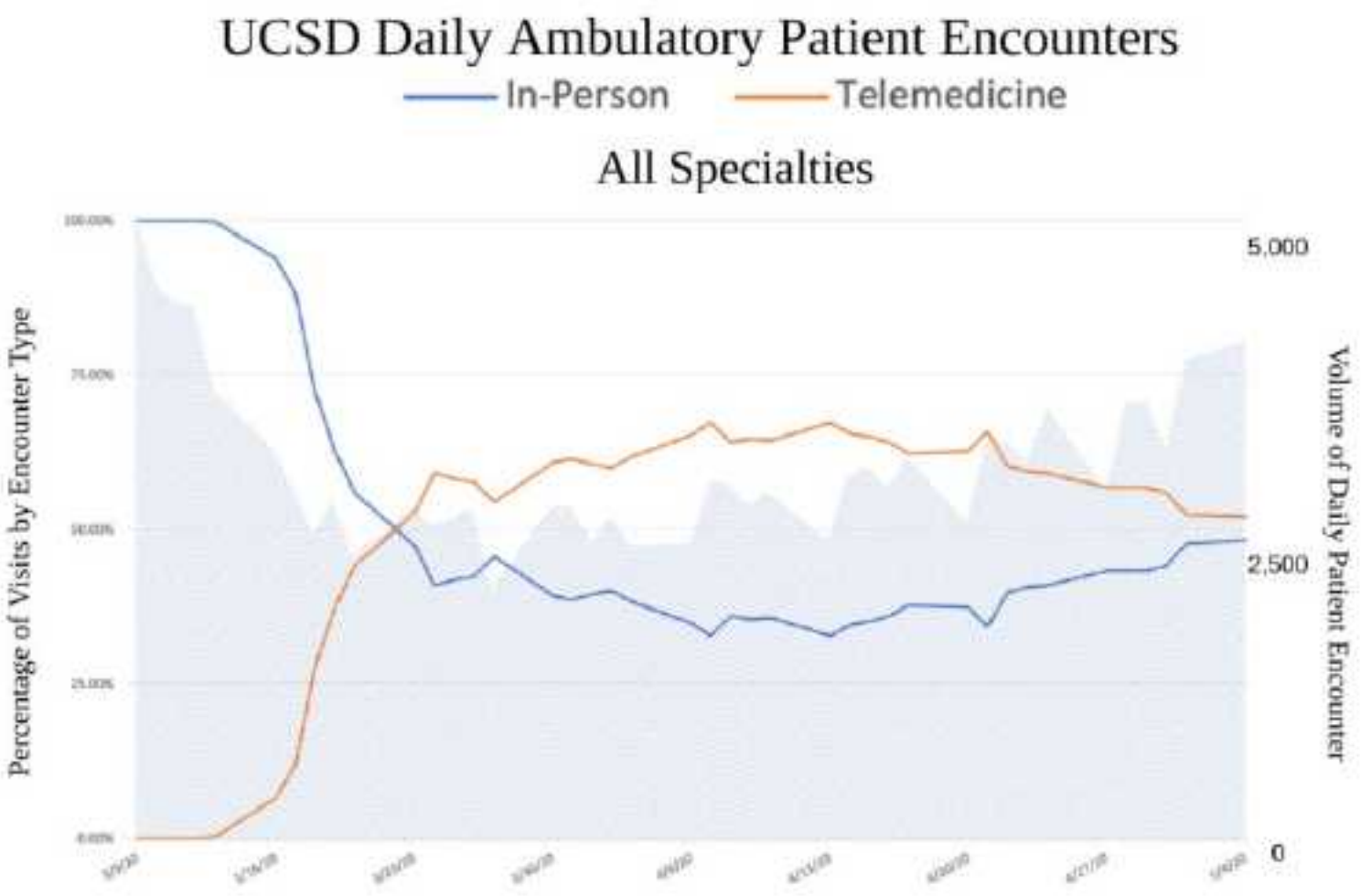
Rapid Expansion of Ambulatory Telehealth



Telemed J E Health, Oct 2020

Medical Undistancing Through Telemedicine: A Model Enabling Rapid Telemedicine Deployment in an Academic Health Center During the COVID-19 Pandemic

Brett C. Meyer, MD, Lawrence S. Friedman, MD, Keith Payne, Lisa Moore, MPH, John Cressler, BA, Stacy Holberg, MBA, Brittany Partridge, MBA, Britney Prince, MPH, Marc Sylwestrzak, BS, Matthew Jenusaitis, MSE, MBA, Brendan Kremer, MHA, Christopher J. Kane, MD, Amy Sitapati, MD, Brian Clay, MD, Marlene Millen, MD, and Christopher Longhurst, MD, MS

University of California, San Diego Enterprise Telehealth Program, San Diego, California, USA.

Conclusion: *This article is designed to offer a "How To" potential best practice approach for others wishing to quickly implement a telemedicine program during the COVID-19 pandemic.*

Keywords: *telemedicine, academic, model, COVID, pandemic*

Introduction

Academic health centers (AHCs) offer highly specialized clinical care and technologically advanced

UC San Diego Health

JMIR, Feb 2021

Viewpoint

Telehealth in the COVID-19 Era: A Balancing Act to Avoid Harm

J Jeffery Reeves[1*], MD; John W Ayers[2*], PhD; Christopher A Longhurst[2*], MD

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Abstract

The telehealth revolution in response to COVID-19 has increased essential health care access during an unprecedented public health crisis. However, virtual patient care can also limit the patient-provider relationship, quality of examination, efficiency of health care delivery, and overall quality of care. As we witness the most rapidly adopted medical trend in modern history, clinicians are beginning to comprehend the many possibilities of telehealth, but its limitations also need to be understood. As outcomes are studied and federal regulations reconsidered, it is important to be precise in the virtual patient encounter approach. Herein, we offer some simple guidelines that could assist health care providers and clinic schedulers in determining the appropriateness of a telehealth visit by considering visit types, patient characteristics, and chief complaint or disease states.

UC San Diego Health

COVID Vaccination @ UC San Diego Health

UC San Diego Health

Vaccination Superstation: Sharing Best Practices

A = entrance B = registration tents C = vaccination tents D = exit

Vaccine Credential Initiative

NEJM, March 23, 2021

SARS-CoV-2 Infection after Vaccination in Health Care Workers in California

TO THE EDITOR: Data from phase 3 clinical trials of messenger RNA (mRNA) vaccines through November 2020 showed 94.1% efficacy for the prevention of symptomat tory syndrome coronavi fection at 14 days after mRNA-1273 vaccine (Mod at 7 days after the second vaccine (Pfizer).[2] Since th were published, a nationw disease 2019 (Covid-19) CoV-2 variants with inc emerged, the Food and D granted emergency use two mRNA vaccines, an initiated across the Unite after vaccination, and the majority (71%) of these persons tested positive within the first 2 weeks after the first dose. After receiving both vaccina- tested positive; of e test results 1 to Only 8 health care days after the sec- positive 15 or more on (Table 1). As of ealth care workers d received the sec- riously; these find- rate of 0.05%. te risk of testing r vaccination was kers at UCSD and

Table 1. New SARS-CoV-2 Infections among Vaccinated Health Care Workers from December 16, 2020, through February 9, 2021.

Days after Vaccination	Vaccinated Persons		
	With New Infection (N=379)	Tested (N=14,604)*	Eligible for Testing (N=36,659)†
	number		*number (percent)*
Dose 1			
Days 1–7	145	5794	35,673 (97.3)
Days 8–14	125	7844	34,404 (93.8)
Days 15–21	57	7958	32,667 (89.1)
Day 22 or later, before dose 2	15	4286	32,327 (88.2)
Dose 2			
Days 1–7	22	5546	23,100 (63.0)
Days 8–14	8	4909	16,082 (43.9)
Day 15 or later	7	4167	14,990 (40.9)

April 26, 2021

In sweeping move likely to be followed by campuses across the nation, the University of California and California State University systems are planning to require Covid-19 vaccinations by the start of the fall semester for all students, faculty and staff.

Two of the country's largest public university systems plan to require vaccinations for all...

nytimes.com

Questions?

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