Healthcare IT Megatrends and the Evolution of Evidence-based Medicine

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The Rapidly Evolving Landscape

Healthcare Trends

- Precision medicine

- Consumers take charge

- Healthcare everywhere

- More with less: from volume to value

- Consolidation of healthcare systems

Health IT Implications

- The value of data

- Patient engagement

- Monitoring, telehealth

- Interoperability and analytics

- Consolidation of EMR instances

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New England Journal of Medicine, Nov 2011

Evidence-Based Medicine in the EMR Era

Jennifer Frankovich, M.D., Christopher A. Longhurst, M.D., and Scott M. Sutherland, M.D.

Results of Electronic Search of Patient Medical Records (for a Cohort of 98 Pediatric Patients with Lupus) Focused on Risk Factors for Thrombosis Relevant to Our 13-Year-Old Patient with Systemic Lupus Erythematosus.*			
Outcome or Risk Factor	**Keywords Used to Conduct Expedited Electronic Search**	**Prevalence of Thrombosis**	**Relative Risk (95% CI)**
		no./total no (%)	
Outcome — thrombosis	"Thrombus," "Thrombosis," "Blood clot"	10/98 (10)	Not applicable
Thrombosis risk factor			
Heavy proteinuria (>2.5 g per deciliter)			
Present at any time	"Nephrosis," "Nephrotic," "Proteinuria"	8/36 (22)	7.8 (1.7–50)
Present >60 days	"Urine protein"	7/23 (30)	14.7 (3.3–96)
Pancreatitis	"Pancreatitis," "Lipase"	5/8 (63)	11.8 (3.8–27)
Antiphospholipid antibodies	"Aspirin"	6/51 (12)	1.0 (0.3–3.7)

* In all cases, the sentences surrounding the keywords were manually reviewed to determine their relevance to our patient. Pancreatitis was defined as an elevated lipase level (twice the upper limit of normal) coexisting with abdominal pain. We used the word "aspirin" as a proxy for antiphospholipid antibodies, since it is standard practice at our institution to give all patients with these antibodies aspirin; if "aspirin" was found in the chart, than antiphospholipid-antibody status was confirmed by investigating the laboratory results.

on which to draw?

We recently found ourselves in such a situation as we admitted to our service a 13-year-old girl

of our collective Level V evidence, so to speak — was equally fruitless and failed to produce a consensus.

review board.

Of the 98 patients in our pediatric lupus cohort, 10 patients developed thrombosis, documented

Health

Health Affairs, July 2014

By Christopher A. Longhurst, Robert A. Harrington, and Nigam H. Shah

# A 'Green Button' For Using Aggregate Patient Data At The Point Of Care

ABSTRACT Randomized controlled trials have traditionally been the gold standard against which all other sources of clinical evidence are measured. However, the cost of conducting these trials can be prohibitive. In addition, evidence from the trials frequently rests on narrow patient-inclusion criteria and thus may not generalize well to real clinical situations. Given the increasing availability of comprehensive clinical data in electronic health records (EHRs), some health system leaders are now advocating for a shift away from traditional trials and toward large-scale retrospective studies, which can use practice-based evidence that is generated as a by-product of clinical processes. Other thought leaders in clinical research suggest that EHRs should be used to lower the cost of trials by integrating point-of-care randomization and data capture into clinical processes. We believe that a successful learning health care system will require both approaches, and we suggest a model that resolves this

Christopher A. Longhurst
(clonghurst@stanford.edu) is a clinical associate professor of pediatrics and, by courtesy, of medicine, Stanford University School of Medicine, in Stanford, California. He is also chief medical information officer for Stanford Children's Health, in Palo Alto.
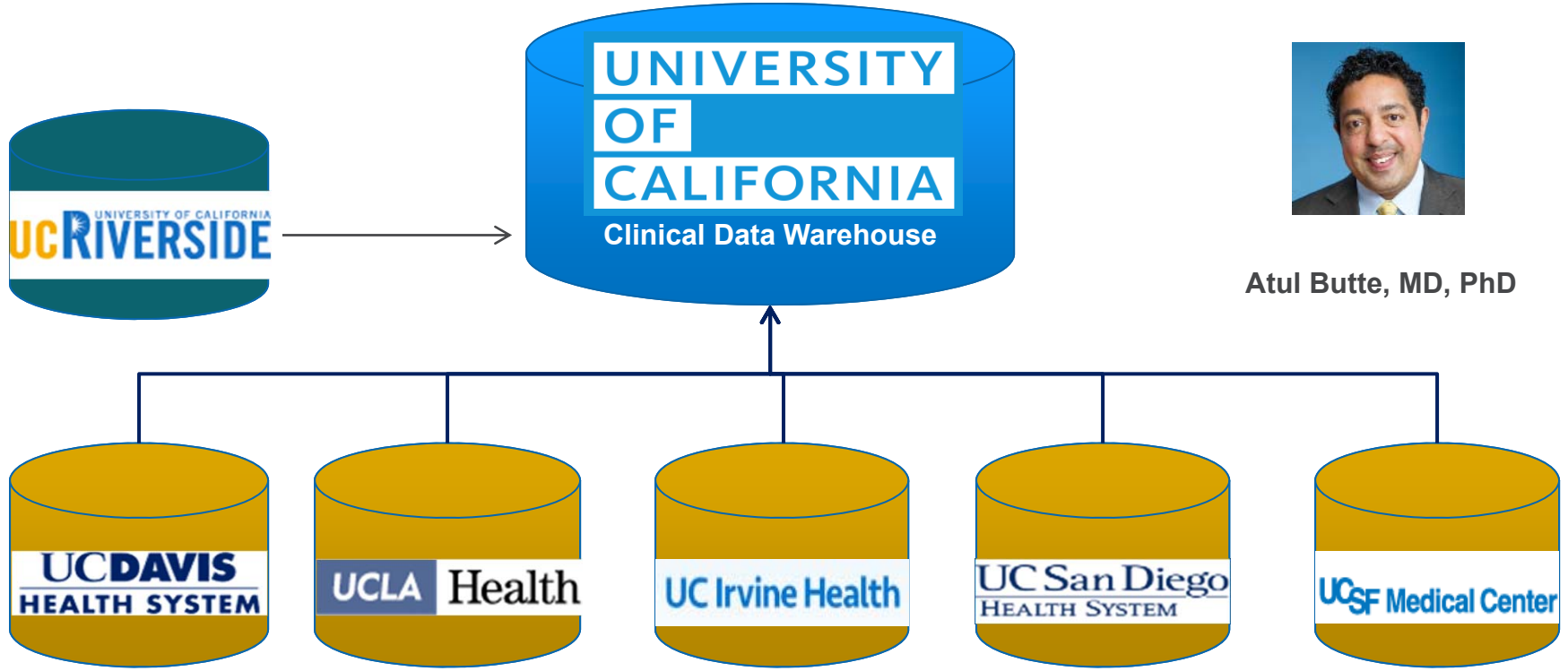
Robert A. Harrington is a professor of medicine at Stanford University School of Medicine.

Nigam H. Shah is an assistant professor in the Center for Biomedical Informatics Research, Stanford University School of Medicine.

Figure 1 – The Green Button in Action
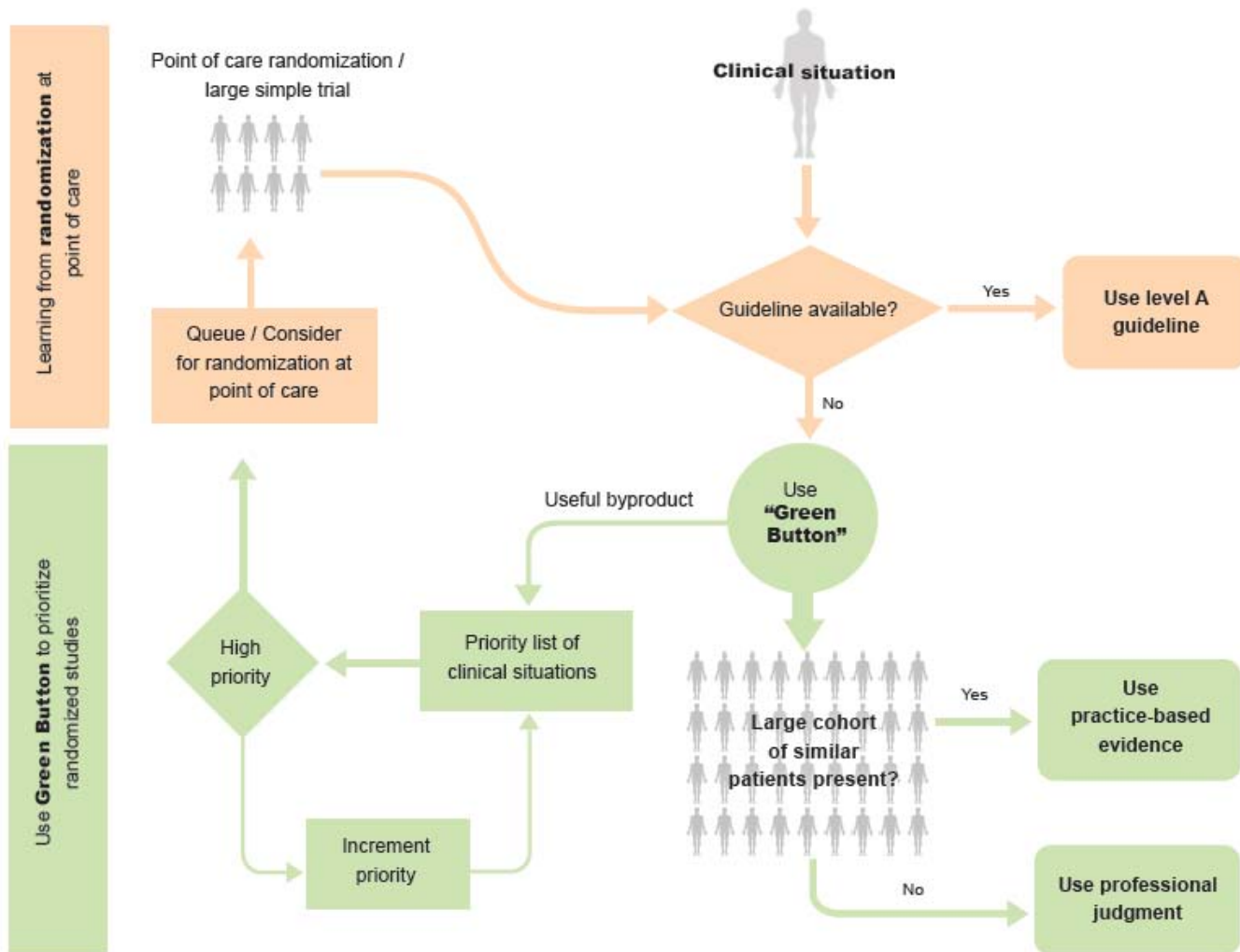
Combining healthcare data from across the six UC medical schools and systems

Clinical Data Warehouse

Atul Butte, MD, PhD

A UC Healthcare Big Data Analytics Platform

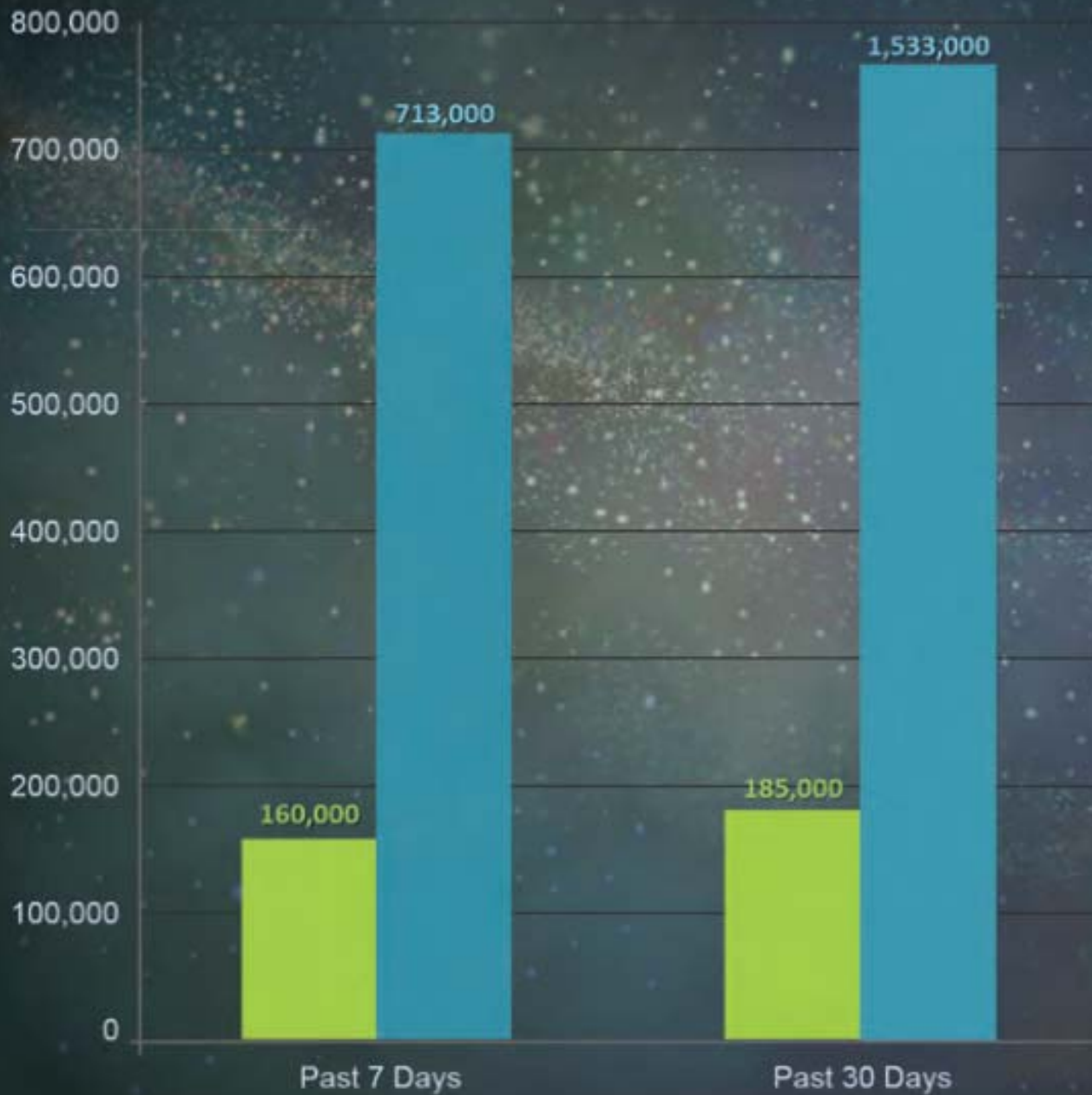# The Rapidly Evolving Landscape

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Patient Portal at UC San Diego Health

Patient Engagement

DATA FOR: Oct - Dec 2016

University of California San Diego

ACTIVATION

43%

OF PATIENTS SEEN IN THE PAST 3 MONTHS
HAVE A MYCHART ACCOUNT
COMMUNITY AVERAGE: 29%

TOP DEPARTMENT ACTIVATION		DEPARTMENTS TO FOCUS ON	
UCSD DOWNTOWN CONCIERGE EXECUTIVE HEALTH	86%	UCSD STUDENT-RUN FREE CLINIC PACIFIC BEA	0%
UCSD SORRENTO VALLEY INTERNAL MEDICINE G	84%	UCSD STUDENT-RUN FREE CLINIC DOWNTOWN	1%
UCSD PERLMAN ALLERGY	84%	UCSD HILLCREST MOS PEDIATRIC HIGH RISK I	1%

41%

OF MYCHART PATIENTS
HAVE LOGGED IN
OVER THE PAST 3 MONTHS

COMMUNITY AVG: 44%

OpenNotes®

MyChart
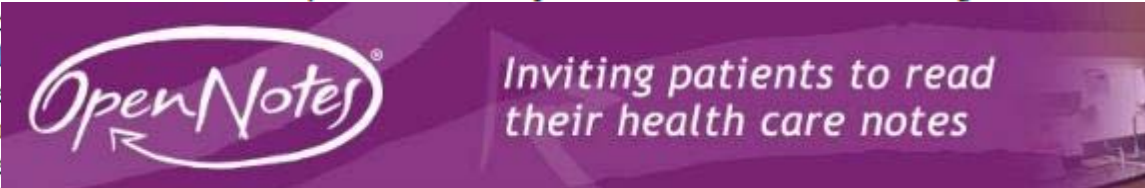OPEN SCHEDULING

VIDEO VISITS

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The Road toward Fully Transparent Medical Records

Jan Walker, R.N., M.B.A., Jonathan D. Darer, M.D., M.P.H., Joann G. Elmore, M.D., M.P.H., and Tom Delbanco, M.D.

Forty years ago, Shenkin and Warner argued that giving patients their medical records "would lead to more appropriate utilization of physicians and a greater ability of patients to participate in their own care."[1] At that time, patients in most states could obtain their records only through litigation, but the rules gradually changed, and in 1996 the Health Insurance Portability and A... virtuall... their r... we're o... such re... ing patients online access. Thanks in part to federal financial incen-

tives,[2] electro... medical records are becomi... mpa- nied inc... ord- prote... pa- tient... ...nd path... ...ure com- muni... ...linicians by e-ma...

One... ... of the records, the no... composed by clinicians, has remained largely hidden from patients. But now ... 2010, at Beth Israel Deaconess Medical Center (which serves ur-

ban and suburban Boston), Geisinger Health System (in rural Pennsylvania), and Harborview Medical Center (Seattle's safetynet hospital), more than 100 primary care doctors volunteered to invite 20,000 of their patients to read their notes securely online.[4]

Although only a small minority of these doctors' patients used the portals, the initial findings were striking. At the end of a ... had ... those ... large ... etter ... their care plans and feeling more in control of their health care. More-

Inviting patients to read their health care notes

The New England Journal of Medicine

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Direct and Open Scheduling @ UCSD Health

UC San Diego Health

Automated integration of continuous glucose monitor data in the electronic health record using consumer technology

AMIA | OXFORD UNIVERSITY PRESS

RB Kumar,[1,2,*] ND Goren,[1] DE Stark,[3] DP Wall,[1] and CA Longhurst[4]

ABSTRACT

The diabetes healthcare provider plays a key role in interpreting blood glucose trends, but few institutions have successfully integrated patient home glucose data in the electronic health record (EHR). Published implementations to date have required custom interfaces, which limit wide-scale replication. We piloted automated integration of continuous glucose monitor data in the EHR using widely available consumer technology for 10 pediatric patients with insulin-dependent diabetes. Establishment of a passive data communication bridge via a patient's/parent's smartphone enabled automated integration and analytics of patient device data within the EHR between scheduled clinic visits. It is feasible to utilize available consumer technology to assess and triage home diabetes device data within the EHR, and to engage patients/parents and improve healthcare provider workflow.

Health Record Data Banks?

Research Article

Applied Clinical Informatics 406

Sociotechnical Challenges of Developing an Interoperable Personal Health Record
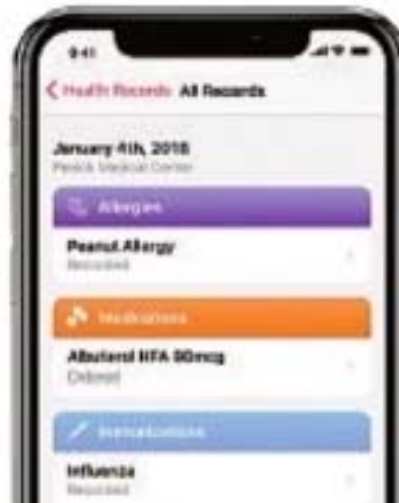

Google health

Lessons

G.L. Gaskin[1]; C.

[1]Program in Sci
of Pediatrics, St
Hospital, Stanfo
Stanford, CA; [5](

UCSD TO PILOT APPLE'S NEW MEDICAL RECORDS PORTAL

Apple's
new medi-
cal records
system
puts pa-
tients' data
from multi-
ple pro-
viders into
one cen-
tralized
location.
APPLE

12 health systems
chosen to test new
tool for patient data

BY PAUL SISSON

UC San Diego patients will be among the first in the nation to test an iPhone-based medical records access system now under development by Apple Inc.

The Cupertino-based technology company announced Wednesday that it has

selected a dozen health systems from coast to coast to pilot automatic synchronization of patient data, from test results to medications prescribed, within a health application that Apple has been including with every iPhone since 2014.

For now, only those UC San Diego iPhone owners brave enough to load the new 11.3 "beta" version of iOS, the system software that runs all iPhones, will be able to try out the new medical records integration, which will appear as a

SEE **APPLE • A9**

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Is EMR Interoperability Solved in the USA?

Breadth of the Epic EHR System

Nationwide **35,483,991** patient records were exchanged using Epic CareEverywhere in April 2017 alone

"190 million, or some 54% of patients in the U.S. are now served by Epic products."

At UC San Diego Health, we have exchanged

> 1 Million Patient Records in 2016 with organizations spanning

50 States, including

830 Hospitals

1,050 Emergency Departments and

22,830 Clinics

UC San Diego Health

Health information exchange policies of 11 diverse health systems and the associated impact on volume of exchange

AMIA   OXFORD
UNIVERSITY PRESS

N Lance Downing,[1] Julia Adler-Milstein,[2] Jonathan P Palma,[1,3] Steven Lane,[4] Matthew Eisenberg,[1] Christopher Sharp,[1] Northern California HIE Collaborative, Christopher A Longhurst[5]

ABSTRACT

Background Provider organizations increasingly have the ability to exchange patient heal mation exchange (HIE) policy decisions can impact the extent to which external informati has not been well studied.

Objective Our objective was to examine the relationship between electronic exchange organizational HIE policy decisions. We focused on 2 key decisions: whether to automatic whether to require HIE-specific patient consent.

Methods We conducted a retrospective time series analysis of the effect of automatic monthly volume of clinical summaries exchanged. We could not assess degree of use or u processes, or generalizability to other vendors.

Results Between 2013 and 2015, clinical summary exchange volume increased by 1349% set up to enable auto-querying, and auto-querying was associated with a significant increa in trend). Seven of the 11 organizations did not require patient consent specifically for HIE, in volume of exchange over time compared to organizations that required consent.

Conclusions Automatic querying and limited consent requirements are organizational HIE poli mately the information available to providers to support optimal care. Future efforts to ensure effective HIE may need to explicitly address these factors.
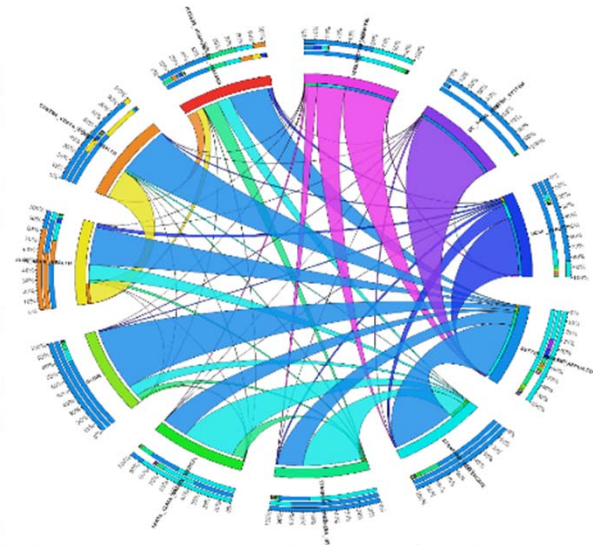
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UC San Diego Health

Electronic health record adoption in US hospitals: the emergence of a digital "advanced use" divide

Julia Adler-Milstein,[1] A Jay Holmgren,[1] Peter Kralovec,[2] Chantal Worzala,[3] Talisha Searcy,[4] and Vaishali Patel[4]

[1]Schools of Information and Public Health, University of Michigan, Ann Arbor, MI, USA, [2]Health Forum, Chicago, IL, USA, [3]American Hospital Association, Washington, DC, USA and [4]Office of the National Coordinator for Health Information Technology, Washington, DC, USA

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ABSTRACT

Objective: While most hospitals have adopted electronic health records (EHRs), we know little about whether hospitals use EHRs in advanced ways that are critical to improving outcomes, and whether hospitals with fewer resources – small, rural, safety-net – are keeping up.

Materials and Methods: Using 2008–2015 American Hospital Association Information Technology Supplement survey data, we measured "basic" and "comprehensive" EHR adoption among hospitals to provide the latest national numbers. We then used new supplement questions to assess advanced use of EHRs and EHR data for *performance measurement* and *patient engagement* functions. To assess a digital "advanced use" divide, we ran logistic regression models to identify hospital characteristics associated with high adoption in each advanced use domain.

Results: We found that 80.5% of hospitals adopted at least a basic EHR system, a 5.3 percentage point increase from 2014. Only 37.5% of hospitals adopted at least 8 (of 10) EHR data for performance measurement functions, and 41.7% of hospitals adopted at least 8 (of 10) patient engagement functions. Critical access hospitals were less likely to have adopted at least 8 performance measurement functions (odds ratio [OR] = 0.58; $P < .001$) and at least 8 patient engagement functions (OR = 0.68; $P = 0.02$).

Discussion: While the Health Information Technology for Economic and Clinical Health Act resulted in widespread hospital EHR adoption, use of advanced EHR functions lags and a digital divide appears to be emerging, with critical-access hospitals in particular lagging behind. This is concerning, because EHR-enabled performance measurement and patient engagement are key contributors to improving hospital performance.

Conclusion: Hospital EHR adoption is widespread and many hospitals are using EHRs to support performance measurement and patient engagement. However, this is not happening across all hospitals.

UC Health CIOs
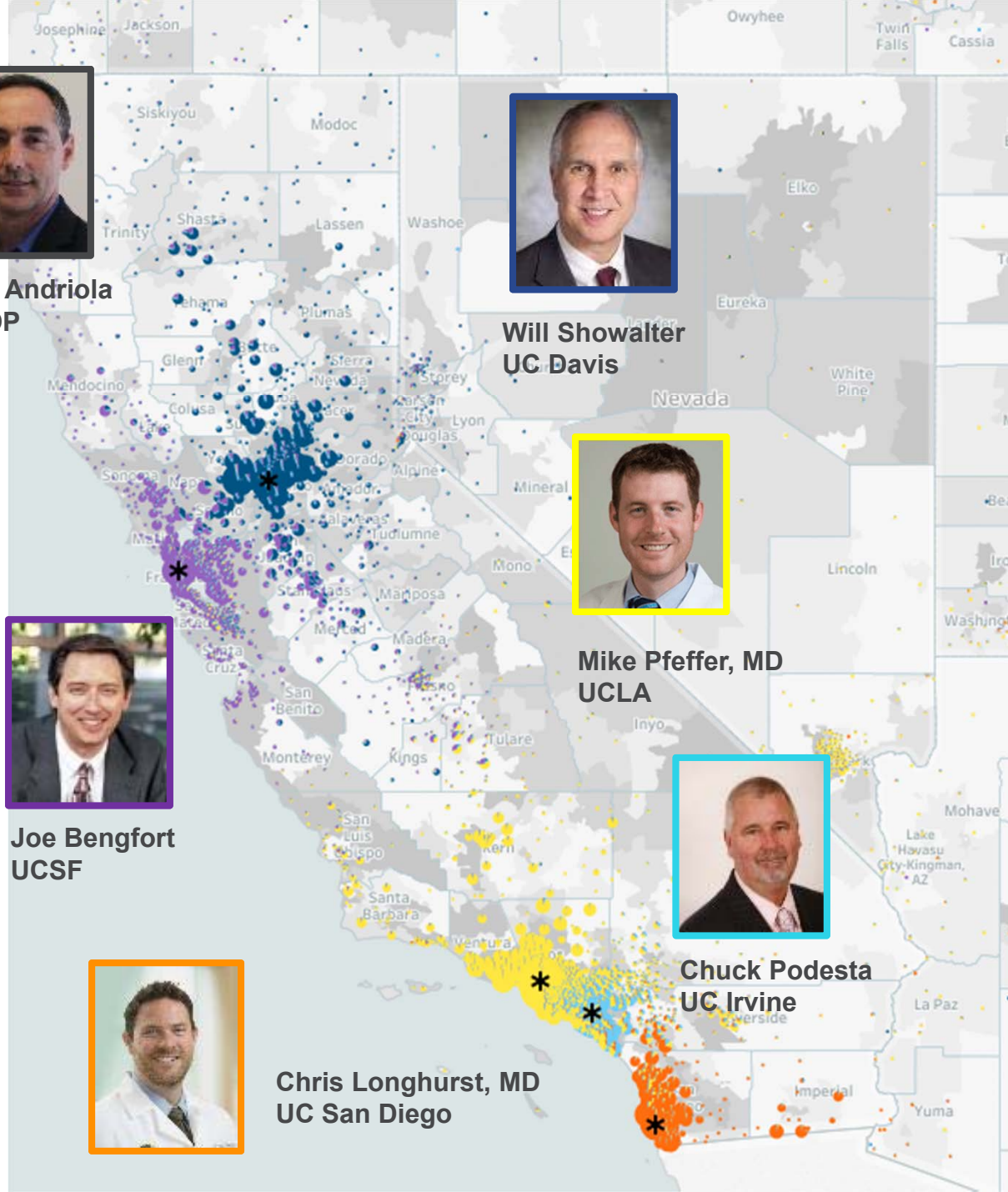

Tom Andriola
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Will Showalter
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Joe Bengfort
UCSF

Chuck Podesta
UC Irvine

Chris Longhurst, MD
UC San Diego

A Single EMR

UC ePIC
Transforming Healthcare Together

University of California Electronic Patient Information Collaborative

UC San Diego Health   UC Irvine Health

UCR | HEALTH

UC San Diego Health pushes EHRs to the cloud, with UC Irvine slated for November

by *Evan Sweeney* | Aug 8, 2017 9:46am

UC San Diego Health has transitioned its EHRs to the cloud as part of a broad effort to improve data sharing across the UC system.

University of California San Diego (UCSD) Health has transitioned its EHR system to the cloud, while its sister hospital is preparing for a similar move by the end of the year.

The transition is part of a broader IT strategy at all five University of California-affiliated hospitals that prioritizes cloud computing and shared data centers. UC Irvine Health, which is in the midst of transitioning from Allscripts to Epic, is scheduled to add its new EHRs to the cloud in November, allowing the two systems to easily share medical records.

UCSD is the first academic medical center to host its EHRs on Epic's cloud infrastructure, the health
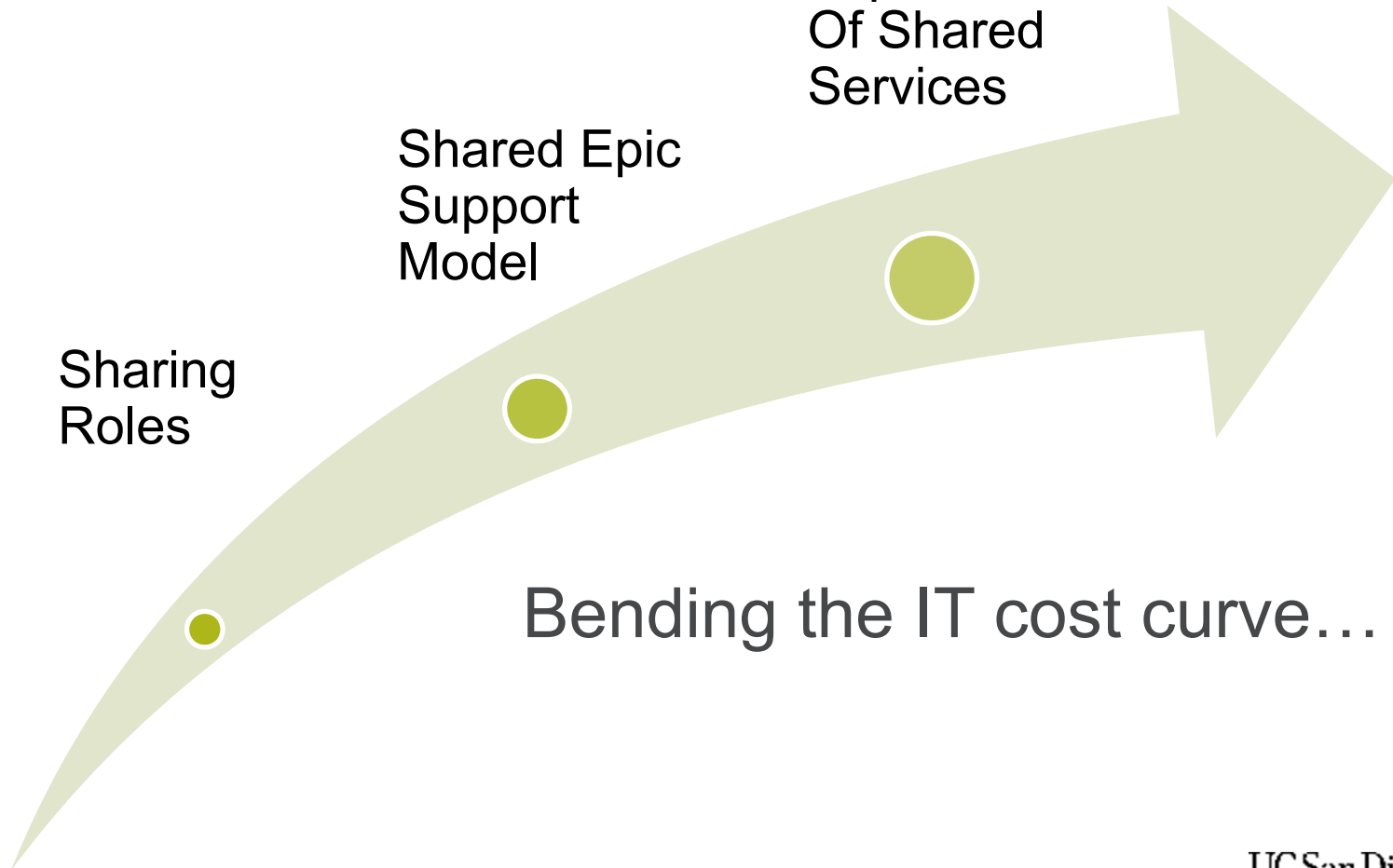
UC San Diego Health

UC San Diego Health and UC Irvine Health IS

Today

FY18/FY19

FY20+

Expansion
Of Shared
Services

Shared Epic
Support
Model

Sharing
Roles

Bending the IT cost curve…

UC San Diego Health

How do we ensure our healthcare system learns from every patient, at every visit, every time?

Thank you!

Chris Longhurst, MD, MS

clonghurst@ucsd.edu

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