



Lessons from *The Long Fix*: **Fixing Health Care (in 20 min)**

Vivian S. Lee, MD, PhD, MBA

President **Verily Health Platforms (Alphabet)**

Senior Lecturer **Harvard Medical School**



@vivianleemd

www.vivianleemd.com



thelongfix@gmail.com

DISCLOSURES

- Employee and shareholder of Verily Life Sciences
 - Chair of the board of Onduo and Granular, two subsidiaries of Verily
 - Executive leading Healthy at Work, Verily Value Suite
- Adjunct faculty appointment at Harvard Medical School, Massachusetts General Hospital (unpaid)
- Editorial Board for NEJM Catalyst
- Boards: Boston Children's Hospital, The Commonwealth Fund, Association of American Rhodes Scholars, Zions Bancorporation, ROCS Foundation (nonprofit)
- Scientific Advisory Board: Massachusetts General Hospital

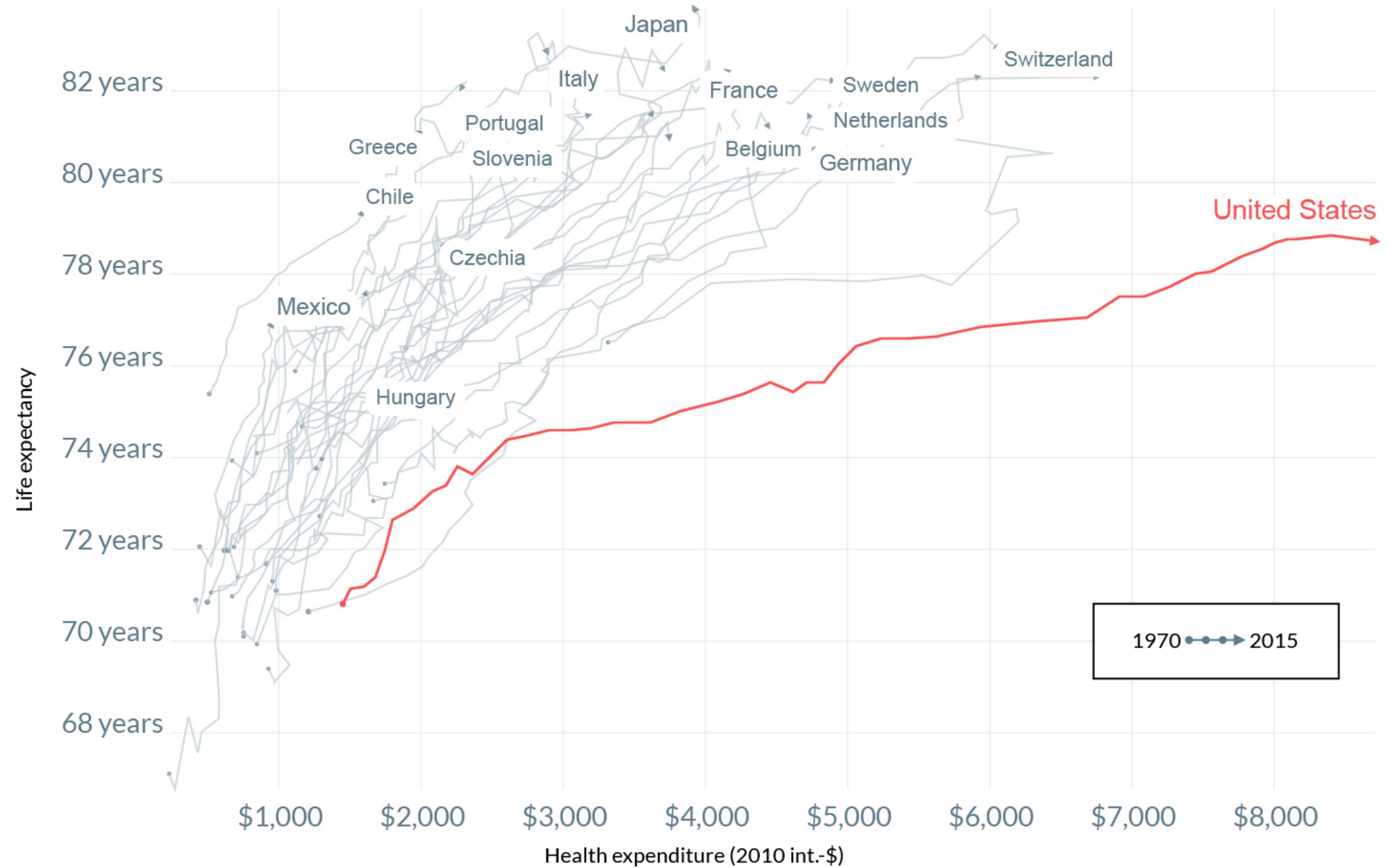
Learning Objectives

By the end of this session, learners will be able to

- Articulate components of physician and patient engagement in building a learning health system
- Evaluate the potential of digital technologies to add value in the form of patient engagement, new types of actionable data, and behavior change
- Assess and implement tools for measuring costs and outcomes of care that are actionable

Our Legacy?

Life expectancy vs. health expenditure, 1970 to 2015



From the skyscrapers of
New York City...



...to a different vertical skyline



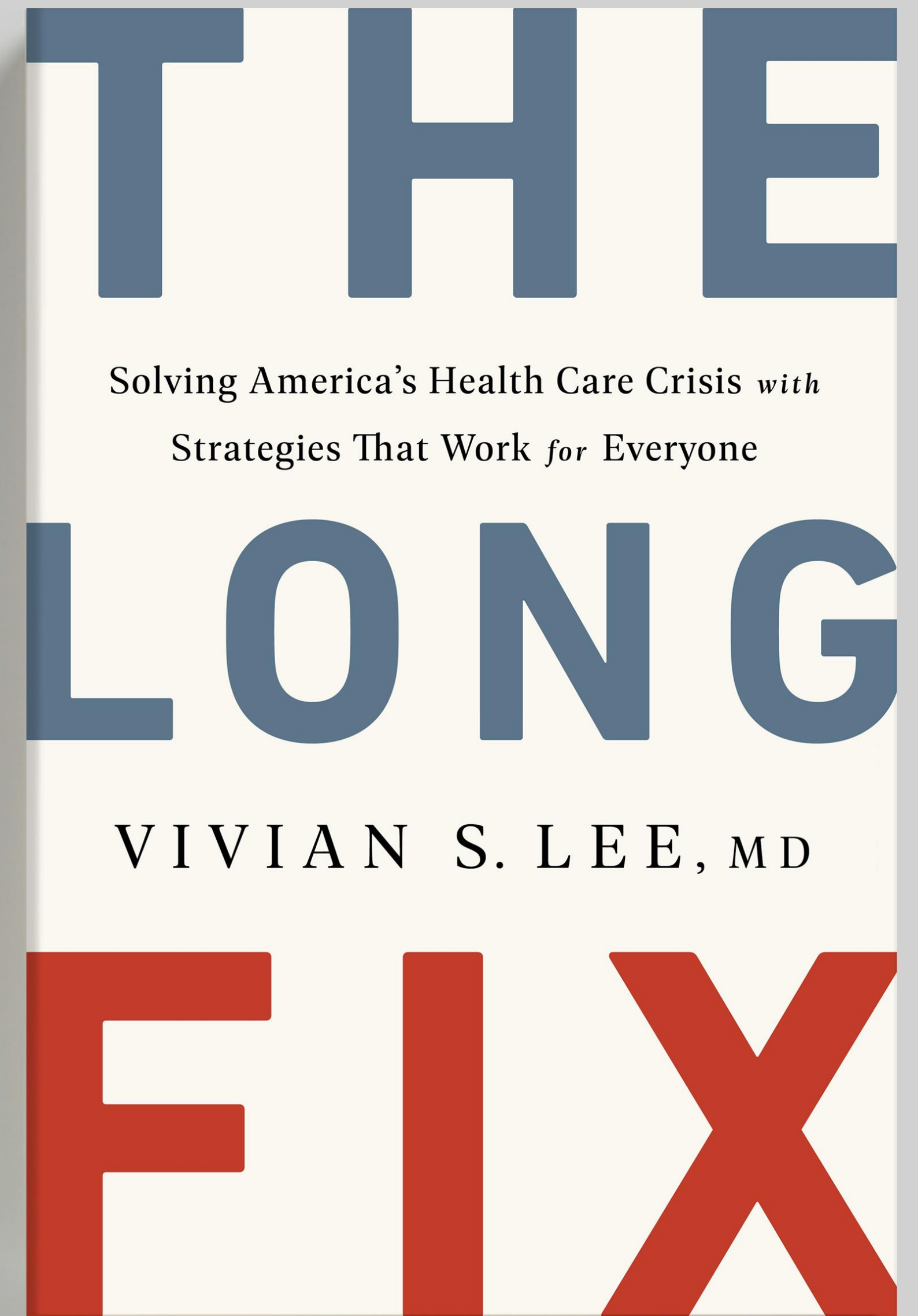
...to a different
world altogether



THE LONG FIX (Elevator version)

To get to better health and lower costs for all:

- **Change the business model** to reward better outcomes and population-level lower costs
 - Make the relationship between payer-provider-patient less adversarial (you win, I lose) and more collaborative
- **Adapt from other industries** especially leverage tech/big data to advance the business model; improve usability, access, consumer engagement, market transparency, democratization of information, personalization, improve equity, and more
- **Find a new balance** between private-public sponsorship that provides basic health care to all (piece together several models)





The Patient-Doctor Relationship

What makes good doctors better?

Reflection Questions

- How would you define the “perfect” doctor?
- In your day-to-day work, what would make you practice better medicine?
- How would you hope to engage patients to get to better outcomes and lower costs of care?



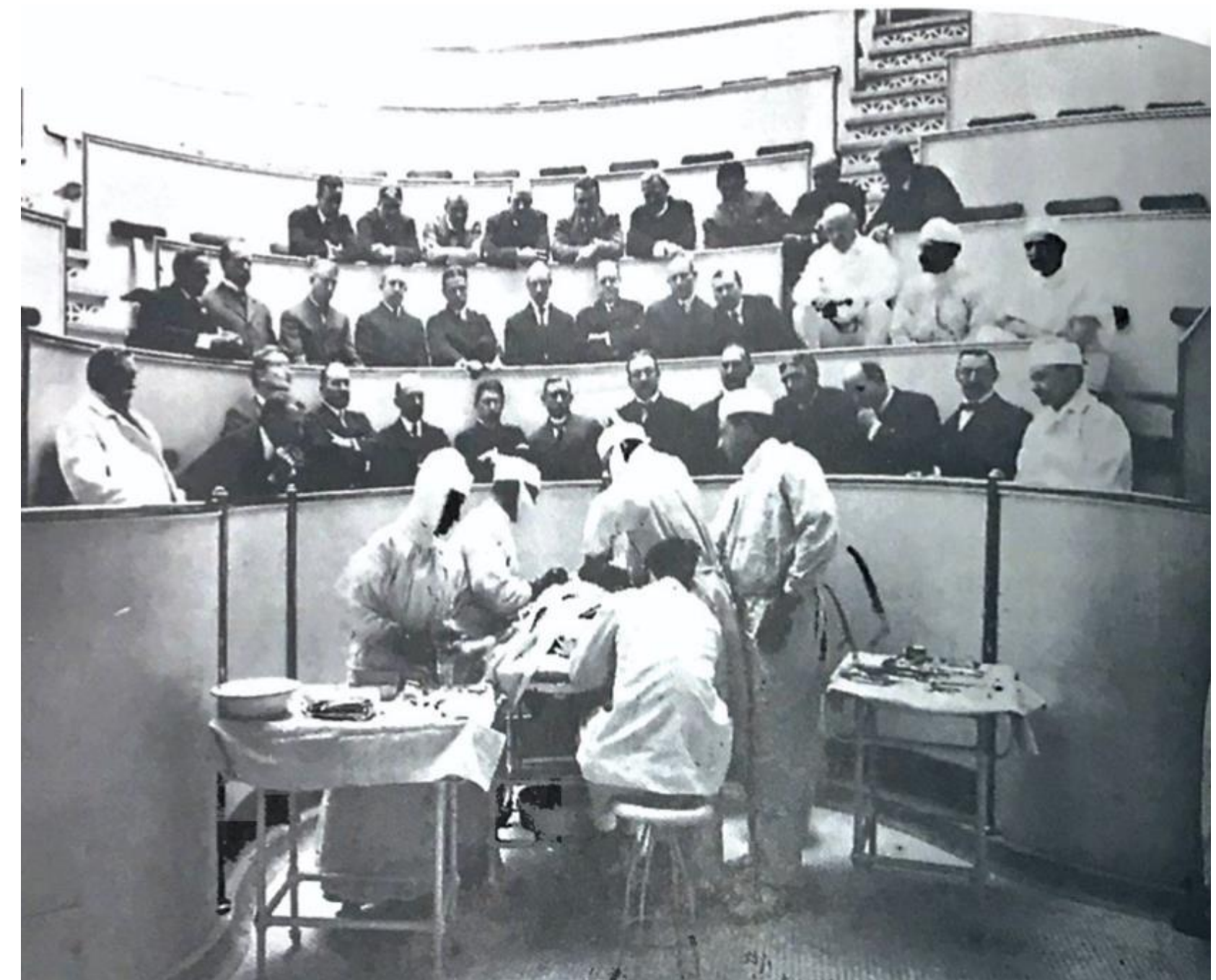
Ernest Amory Codman (1869-1940)

“End Results”



Ernest Amory Codman

“He was sure surgeons were overconfident and misleading themselves about how much good they were doing for patients.”



Amory Codman operating at in Bigelow Amphitheater
Massachusetts General Hospital, 1908



@vivianleemd



vivian-s-lee

www.vivianleemd.com



thelongfix@gmail.com

(c) Vivian S. Lee, 2022

Ernest Amory Codman (1869-1940)

Learning to Deliver Perfect Care

Name	Age	M. W. S.	Date of Adm. l.	Date of Operation	Hosp. No.	Date	Results
Mr. Edward James Gallison	48	M. W. S.	6 | 2 | 14	7 | 7 | 14	204	July 18, '15	Remained well until March, 1915, since which time similar symptoms returned, and also hematemesis and epigastric tumor.
Addr. of Pt. 50 Crescent St., New York City, N.Y.						Re-entry	July 18th. Exploration showed numerous metastases in liver and abd. glands. No comp. Discharged two weeks later.
" " Pt's Phys. Dr. E. M. Black, 45 Grove St., Boston.						Dec. 16, '15	Physician reports that he died on Dec. 1st, '15. No autopsy.
Perm. Addr. of Fr'nd Mrs. George White, Elm St., Salem, Mass.							
Pre-op. Diag. Duodenal ulcer, with grave doubt of cancer of pyloric end stomach.							
Post-op. Diag. Ulcer lesser curvature of stomach about an inch from pylorus. Felt very hard and suggested cancer.							
Came for relief of Epigastric pain soon after meals since September. Vomiting. Achlorhydria. No hematemesis but some melena.							
Opt'r O. N. Meter. Asst. E. W. Force and E. C. Colle.							
Anes. Ether and local novocaine. Ether by E. C. Leed.							
Opt'n. Impor. Pts. Tumor size pigeon's egg on lesser curvature of stomach. Partial gastrectomy. Gall bladder felt as if full of stones. Duodenum normal except for slight induration of pylorus. Closed without drainage.							
Compl. of Convales. None. Except that during convalescence he vomited several times without apparent cause.							
Aut. No. Path. Report by J. A. Wright. Cancer.							
						Signed	A. B. C.

Mallon WJ. 2000 Ernest Amory Codman: The End Result of a Life in Medicine. Philadelphia: WB Saunders.



@vivianleemd



vivian-s-lee

www.vivianleemd.com



thelongfix@gmail.com

(c) Vivian S. Lee, 2022

Ernest Amory Codman (1869-1940)

“End Results”

INDEX OF CASES COMBINED WITH STATISTICAL TABLES USING ANATOMIC AND PATHOLOGIC CLASSIFICATION OF DISEASES AND OPERATIONS

CODMAN HOSPITAL

CARDS: 1 337

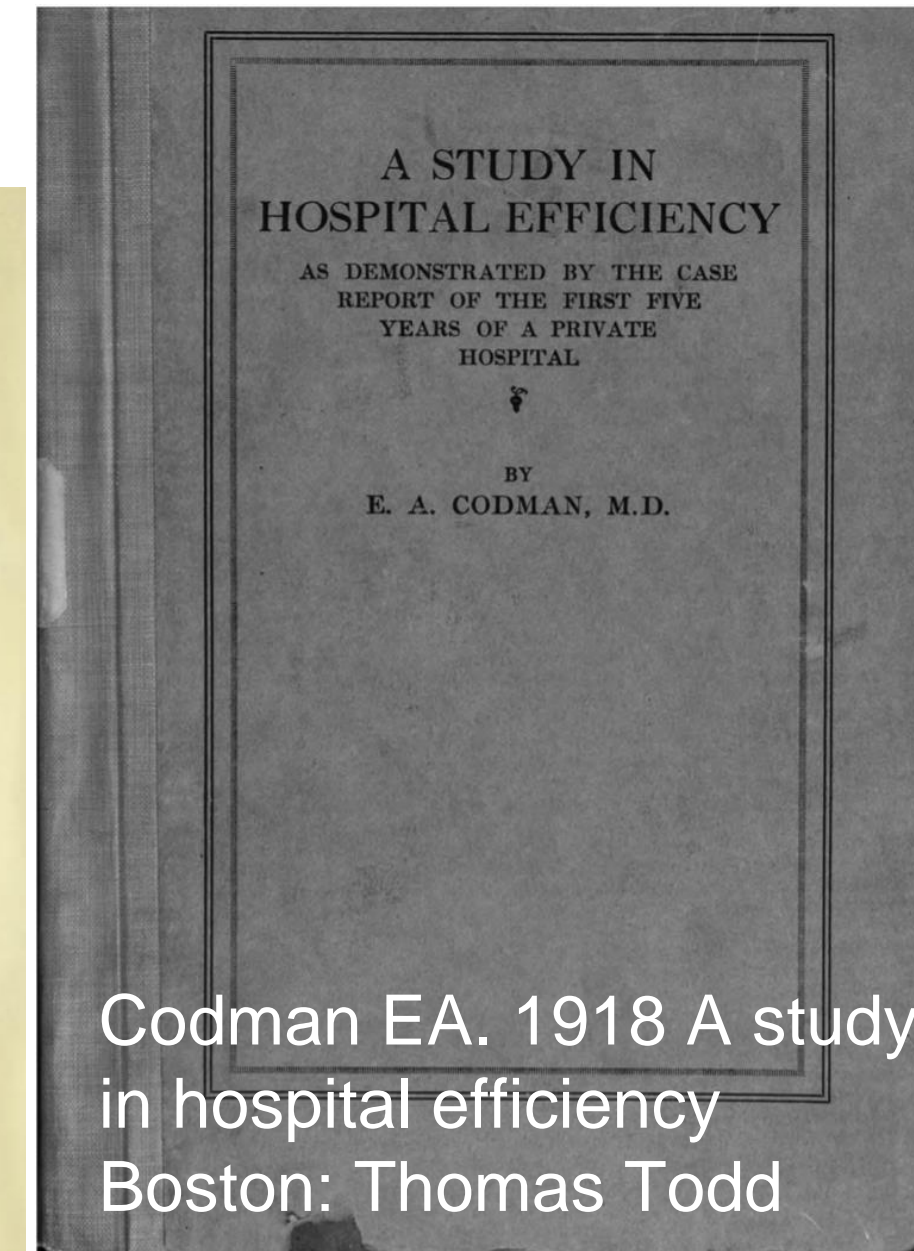
DATE: April 16, 1918

ANATOMIC	NEW GROWTHS		INFLAMMATORY CONDITIONS		OTHER CONDITIONS		TOTALS
	MALIGNANT	BENIGN	ACUTE INFLAM.	CHRONIC INFLAMMATORY	TUBERCULOUS	SYPHILITIC	
HEAD	CRANIUM	...	...	...	...	...	...
THORAX	FACE	...	...	...	...	...	...
	PHARYNX	...	...	...	...	...	...
ABDOMEN	BREASTS	...	...	...	...	...	...
	HEART	...	...	...	...	...	...
TRUNK	LUNGS	...	...	...	...	...	...
	SPINAL CORD	...	...	...	...	...	...
EXTREMITIES	BONES OF	...	...	...	...	...	...
	UNCLASSIFIED	...	...	...	...	...	...
GENERAL	UNCLASSIFIED DISEASES AFFECTING ALL OR MANY PARTS OF THE BODY	...	...	...	...	...	...

TOTALS: 94, 54, 129, 281, 10, 17, 206, 127

CHRONIC APPENDICITIS

NUMBER OF GOVERNMENT - 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100



Codman EA. 1918 A study in hospital efficiency Boston: Thomas Todd



Mallon WJ. 2000 Ernest Amory Codman: The End Result of a Life in Medicine. Philadelphia: WB Saunders.



@vivanleemd



vivian-s-lee

www.vivianleemd.com



thelongfix@gmail.com

(c) Vivian S. Lee, 2022

What makes good doctors better?

Reflections

- Create a learning health system
- Follow the Pareto curve of patients
- Automate the personalized pathway



@vivianleemd



vivian-s-lee

www.vivianleemd.com



thelongfix@gmail.com

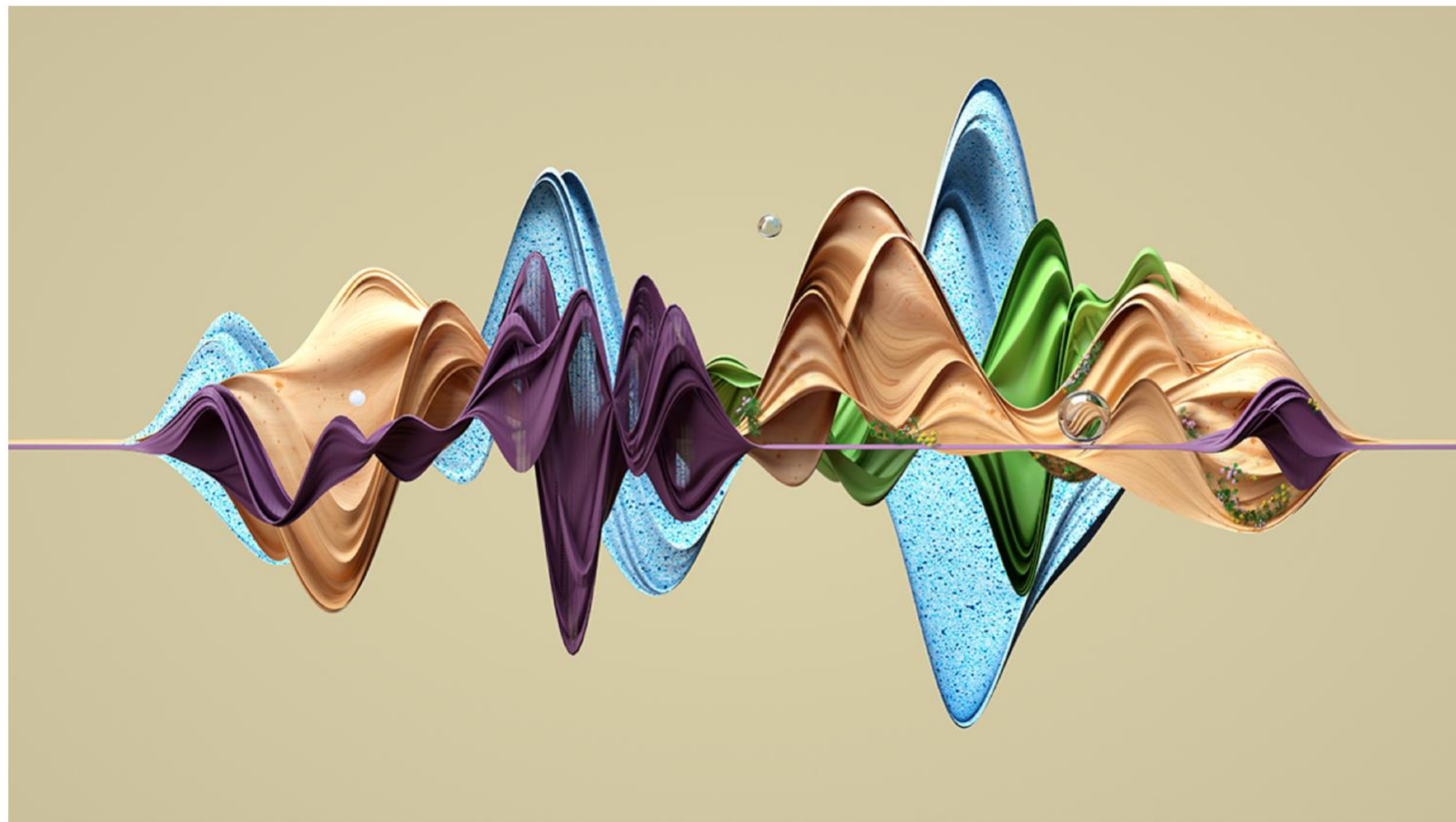
(c) Vivian S. Lee, 2022

We Need to Let Go of the Bell Curve

by Adrian Gore

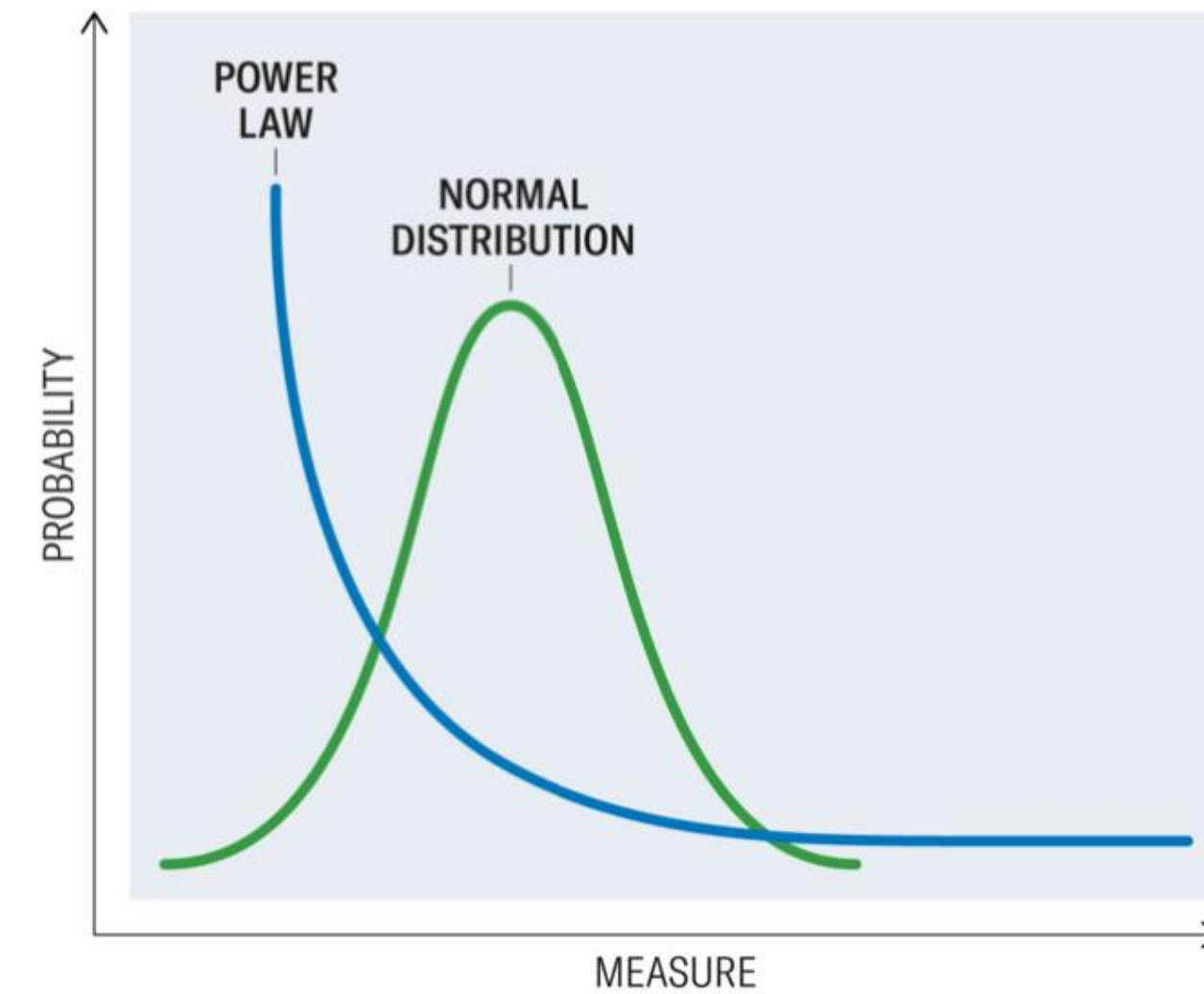
January 14, 2022

Harvard
Business
Review



A Pareto Distribution vs. a Gaussian Curve

A normal distribution (i.e., a Gaussian curve) is bell-shaped, whereas a Pareto distribution (i.e., power law) is shaped like a hockey stick with long tails.



- The 20% who generate 80% of costs
- The 5% who generate 50% of costs



@vivianleemd



vivian-s-lee

www.vivianleemd.com




thelongfix@gmail.com

(c) Vivian S. Lee, 2022

ML-informed Patient Panel

Prediction Models for Future High-Need High-Cost Healthcare Use: a Systematic Review

Ursula W. de Ruijter, MD^{1,2}, Z. L. Rana Kaplan, MD¹ , Wichor M. Bramer, PhD³, Frank Eijkenaar, PhD⁴, Daan Nieboer, PhD¹, Agnes van der Heide, MD PhD⁵, Hester F. Lingsma, PhD¹, and Willem A. Bax, MD PhD²

J GEN INT MED Jan 2022

Patient Browser Home Catalog Favorites Dashboards New Open Signed In As **weblogic**

Encounter From Date: 02/24/2015

Encounter To Date: 03/26/2018

Organization Provider: NULL

Garrison Street Community Clinic
Hickory Center for Advanced Medicine
Olivier Street Health Center
Porter Center for Advanced Medicine
Surrey Street Health Center

Gender: Female Male

Age Range: 0-18 Years 19-44 Years 45-64 Years 65-84 Years 85 Years and over

Final Diagnosis: (All Column Values)











Primary Procedure: (All Column Values)

Substance: (All Column Values)

DRG: (All Column Values)

Service Line: (All Column Values)

Apply **Reset**

Patient Browser dashboard									
Patients		ED Visits		IP Visits		OP Visits		Discharges	
13		0		1		18		13	
Name	MRN	Age	Final Diagnosis	Primary Procedure	ALOS	Admitting Physician	Attending Physician	Clinical Trial Status Code	Encounter Type
 Abigail F Adams	126746	47	Diverticulitis of small intestine with perforation and abscess	Magnetic resonance imaging (MRI) w/o & w/contrast	5	Victoria Edwards	Victoria Edwards	NAV	Outpatient
 Ben L Campbell	123420	45	Mediastinal Carcinoma	Magnetic resonance imaging (MRI) w/o & w/contrast	5	Lucas Perez	Adam Young	NAV	Outpatient
 Georgia J Thompson	132189	47	Mediastinal Carcinoma	Magnetic resonance imaging (MRI) w/o & w/contrast	5	Adam Young	Ryan Lee	NAV	Outpatient
 Ian E Gonzalez	133122	47	Cerebral Infarction (Stroke)	Endovascular - Blood vessel repair by other means	2	Adam Young	Lucas Perez	NAV	Outpatient
 Ian O Davis	130656	46	LII Pneumonia	Magnetic resonance imaging (MRI) w/o & w/contrast	5	Bryce Baker	Debbie Taylor	NAV	Outpatient
 James B Scott	133325	47	Diverticulitis of small intestine with perforation and abscess	Magnetic resonance imaging (MRI) w/o & w/contrast	5	Ryan Lee	Ryan Lee	NAV	Outpatient
 Kevin P Walker	132405	47	Cerebral Infarction (Stroke)	Endovascular - Blood vessel repair by other means	5	Bryce Baker	Ryan Lee	NAV	Inpatient
 Steven I Robinson	122324	45	LII Pneumonia	Magnetic resonance imaging (MRI) w/o & w/contrast	5	Victoria Edwards	Bryce Baker	NAV	Outpatient
 Victoria F Baker	128738	47	Cerebral Infarction (Stroke)	Endovascular - Blood vessel repair by other means	5	Ryan Lee	Adam Young	NAV	Outpatient
 Victoria F Baker	133179	48	LII Pneumonia	Magnetic resonance imaging (MRI) w/o & w/contrast	5	Ryan Lee	Lucas Perez	NAV	Outpatient

Oracle

Geisinger

"An extraordinarily innovative model for the future of the U.S. healthcare system has emerged. In ProvenCare, leaders Glenn Steele and David Feinberg give us the compelling inside story of how they built it and what it will take for the rest of us to do so, too."

—Atul Gawande, MD, MPH, Samuel O. Thier Professor of Surgery, Harvard Medical School, and New York Times bestselling author of *Being Mortal*

Glenn D. Steele Jr., MD
Chairman of xG Health Solutions

David T. Feinberg, MD
President and CEO of Geisinger

ProvenCare

How to Deliver Value-Based
Healthcare the Geisinger Way



@vivianleemd

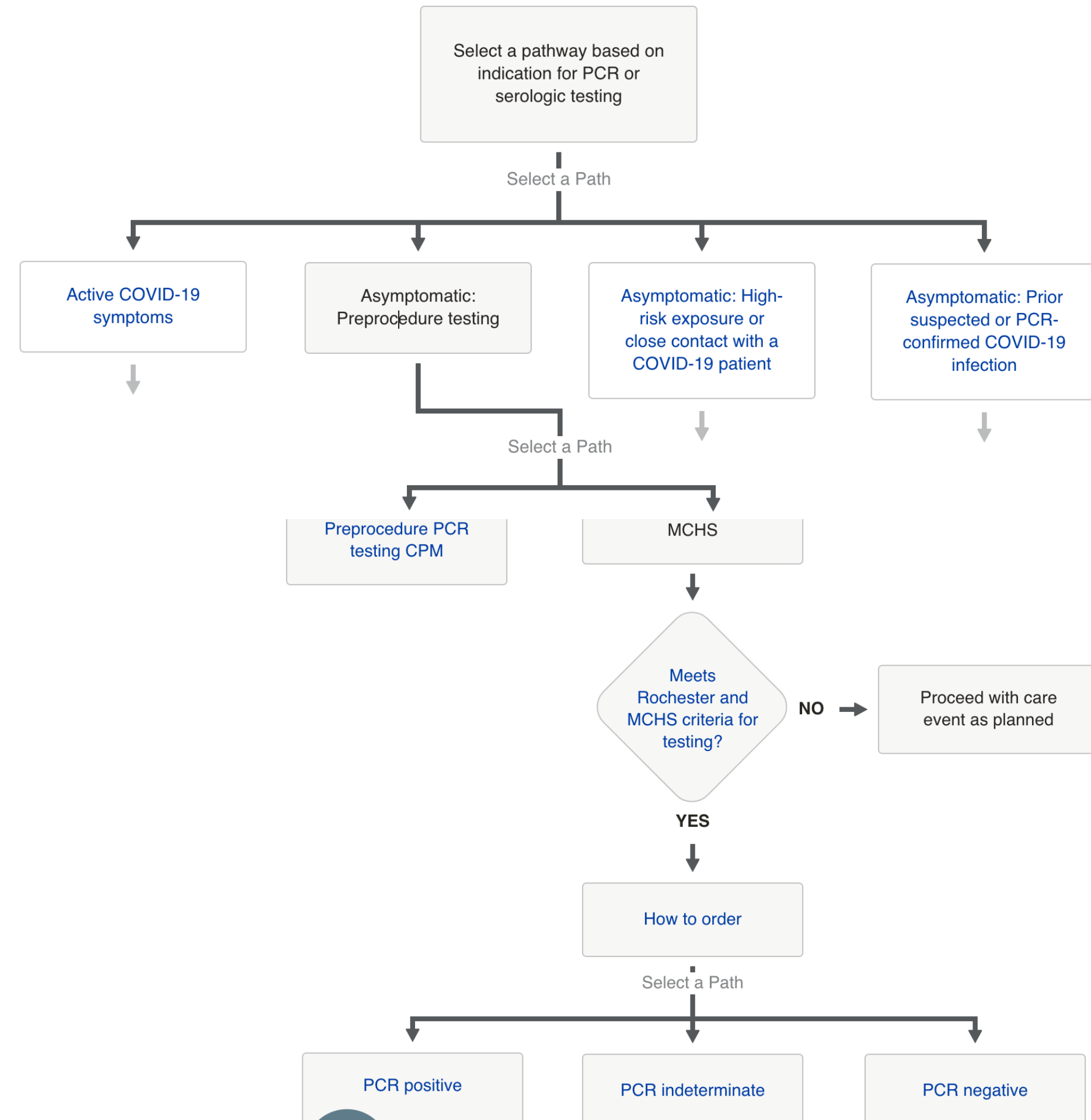


vivian-s-lee

AskMayoExpert

Symptomatic, preprocedure, exposure-related, and prior infection testing

These recommendations reflect Mayo Clinic consensus based on review of existing evidence and guidelines. They do not replace clinical judgment.



www.vivianleemd.com



thelongfix@gmail.com

(c) Vivian S. Lee, 2022

What's the best pathway?

Ask the doctors & clinical team

Perfect Care Tracker

Admit to OTSS	Yes
Early Mobility	No
Hospital Acquired Condition	Yes
Patient Safety Indicator	Yes
SCIP	Yes
30-day Readmission	Yes
ED visit within 90 days	Yes
Perfect Care	No

Results

Two improvement cycles
 Costs 7% (yr 1), 11% (yr 2)
 LOS 3.5 → 3.2 → 2.9 d

JAMA. 2016;316(10):1061-1072

Cost savings

41% supply pricing
 34% LOS

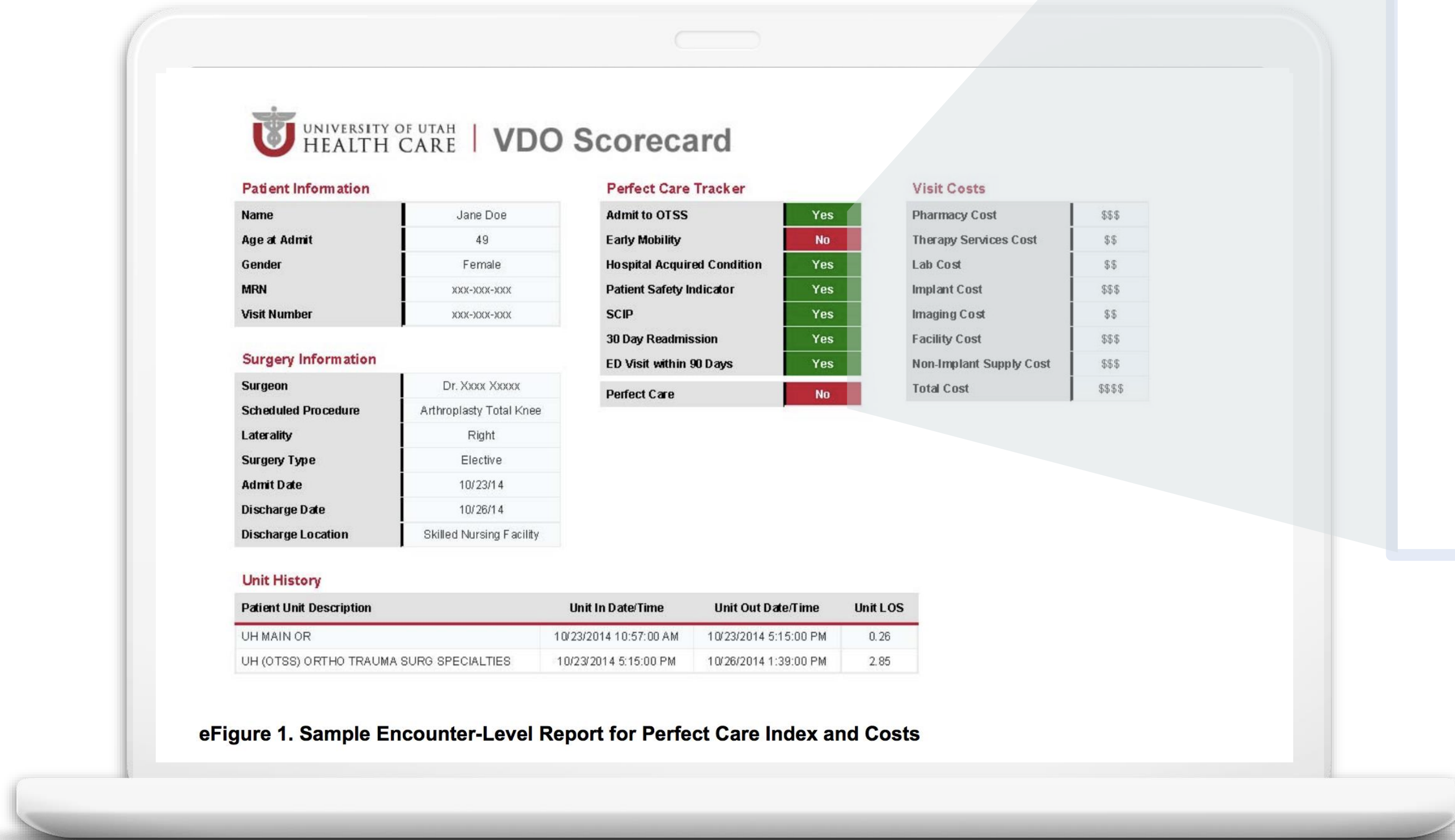


Figure 1. Sample Encounter-Level Report for Perfect Care Index and Costs



@vivianleemd



vivian-s-lee

www.vivianleemd.com

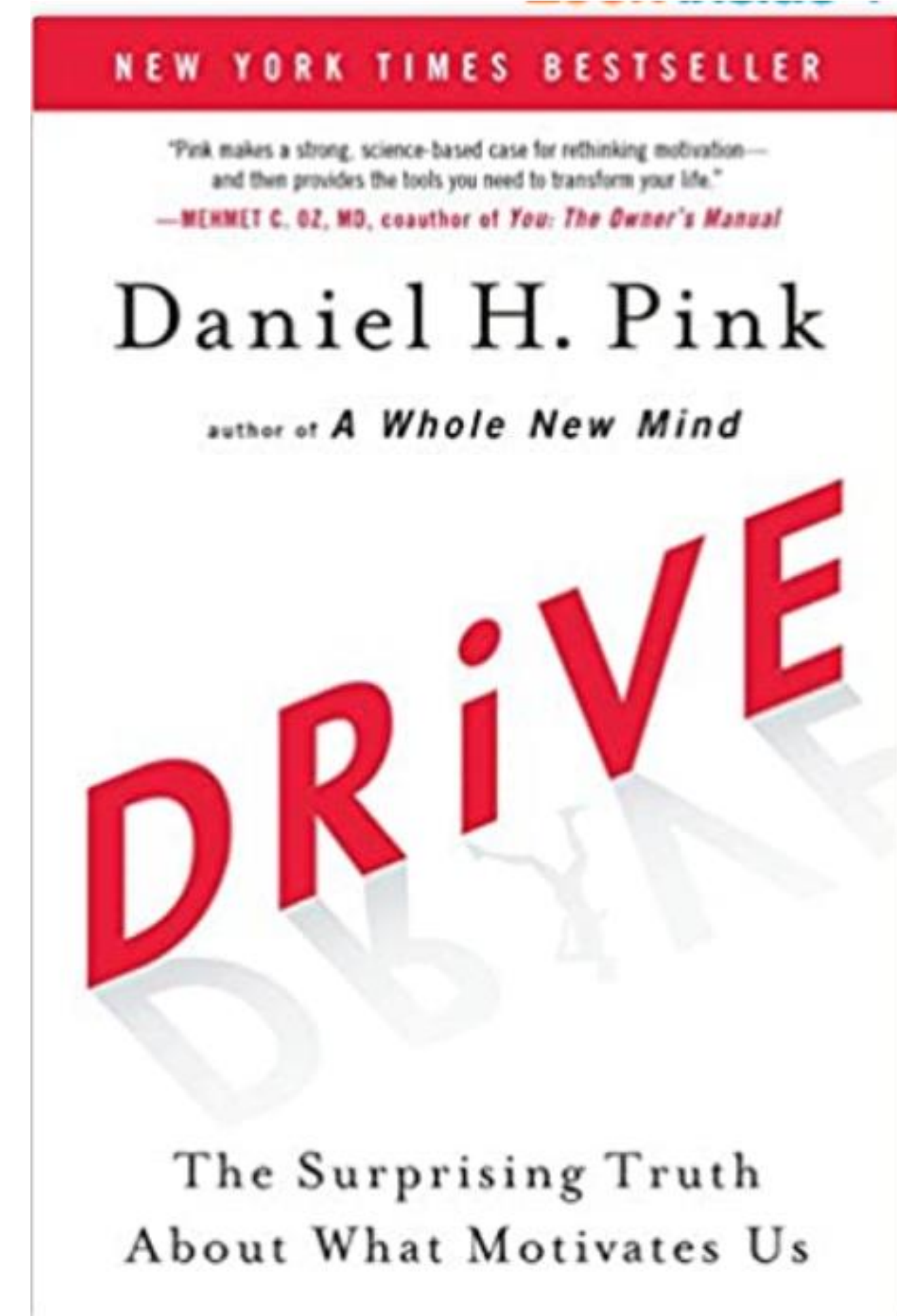
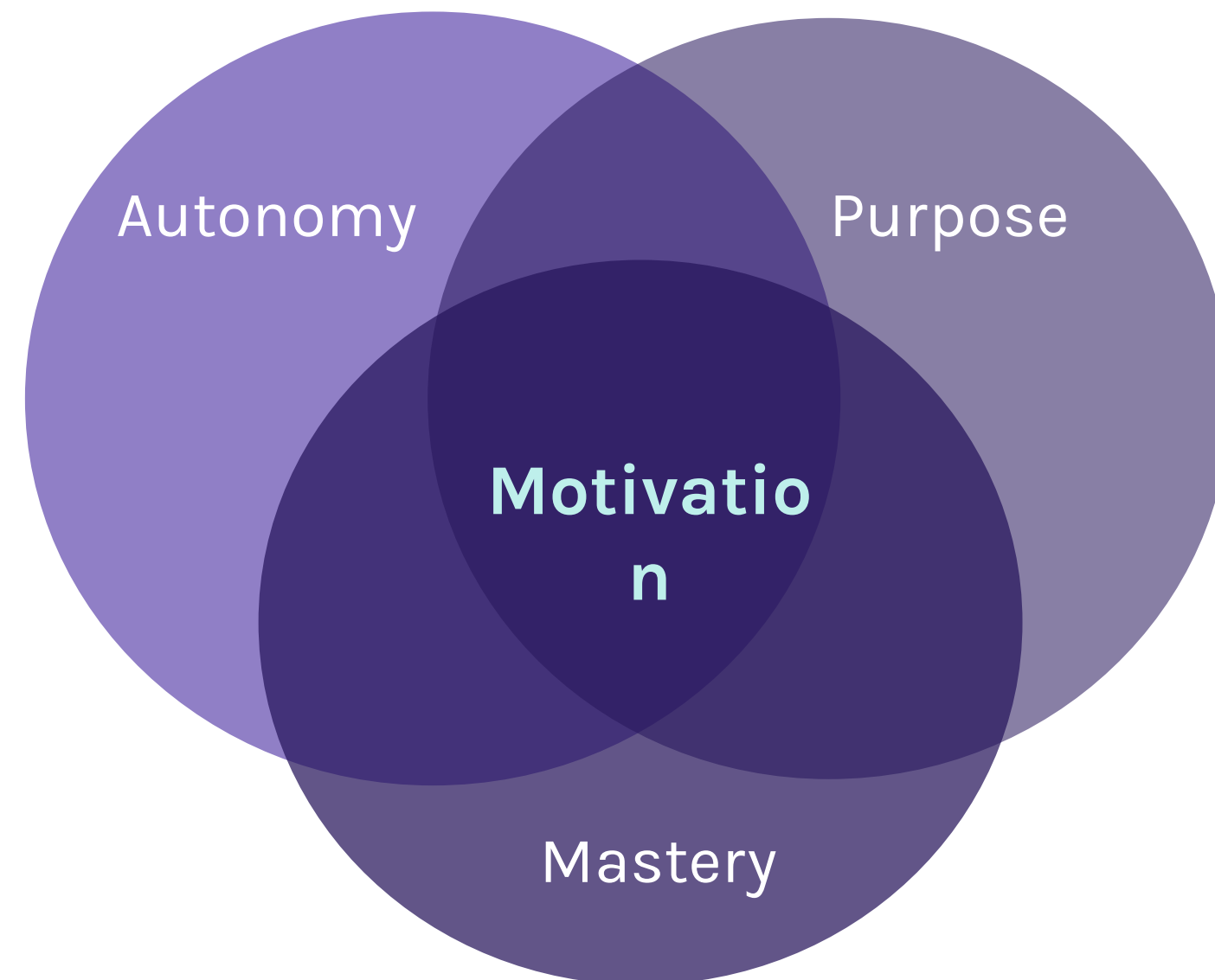


thelongfix@gmail.com

(c) Vivian S. Lee, 2022

“When the reward is the activity itself--deepening learning, delighting customers, doing one's best--there are no shortcuts.”

— Daniel H. Pink, DRIVE



@vivianleemd



vivian-s-lee

www.vivianleemd.com



thelongfix@gmail.com

(c) Vivian S. Lee, 2022

Costs of Care

Chapter 6: The Price Isn't Right

“

Accurately measuring costs and outcomes is the single most powerful lever we have today for transforming the economics of health care

“

-Robert Kaplan & Michael Porter

page 90: Sticker Shock Therapy



@vivianleemd



vivian-s-lee

www.vivianleemd.com



thelongfix@gmail.com

(c) Vivian S. Lee, 2021

Understanding the true costs of care

You can't manage what you can't measure

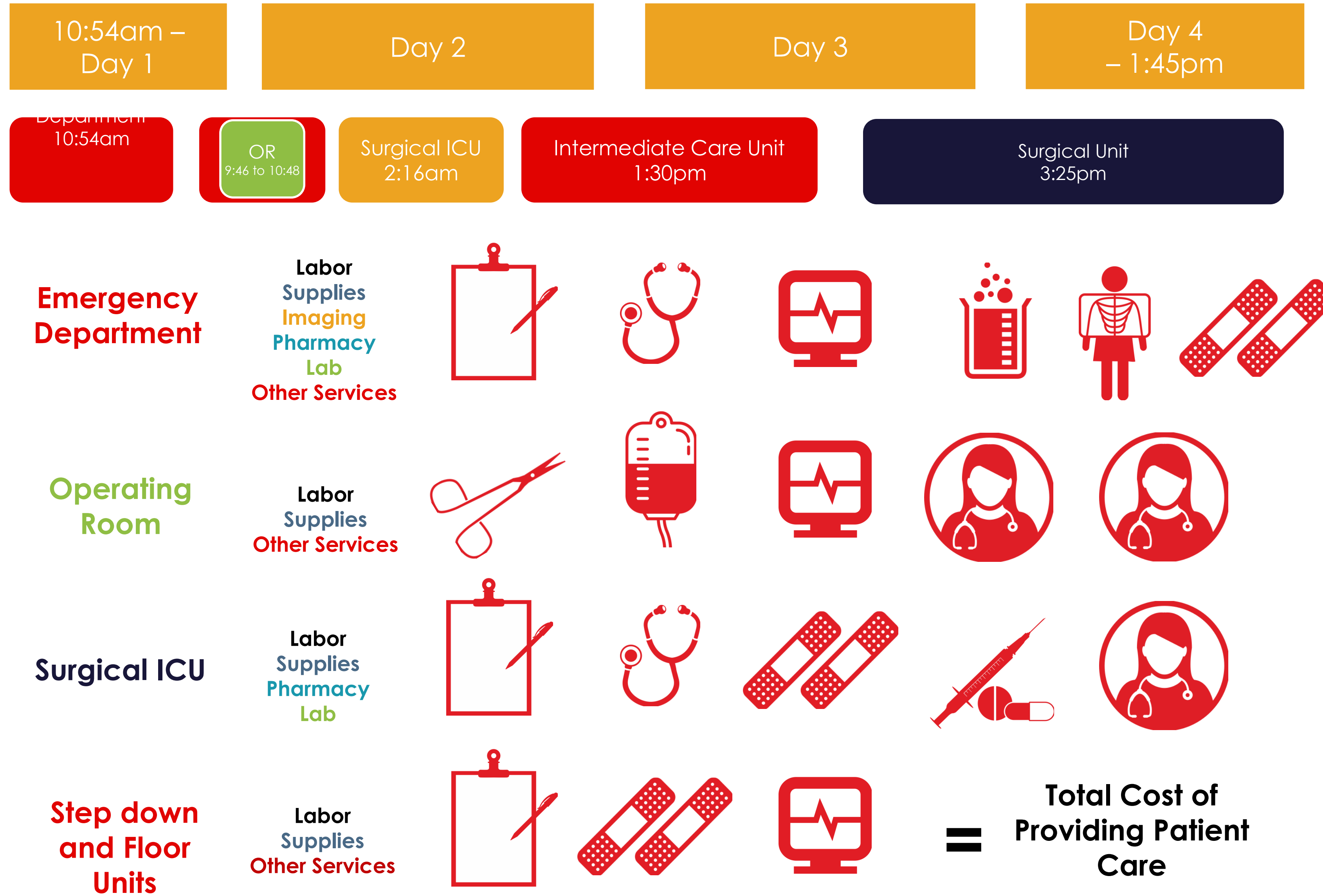
Figures are for illustrative purposes only



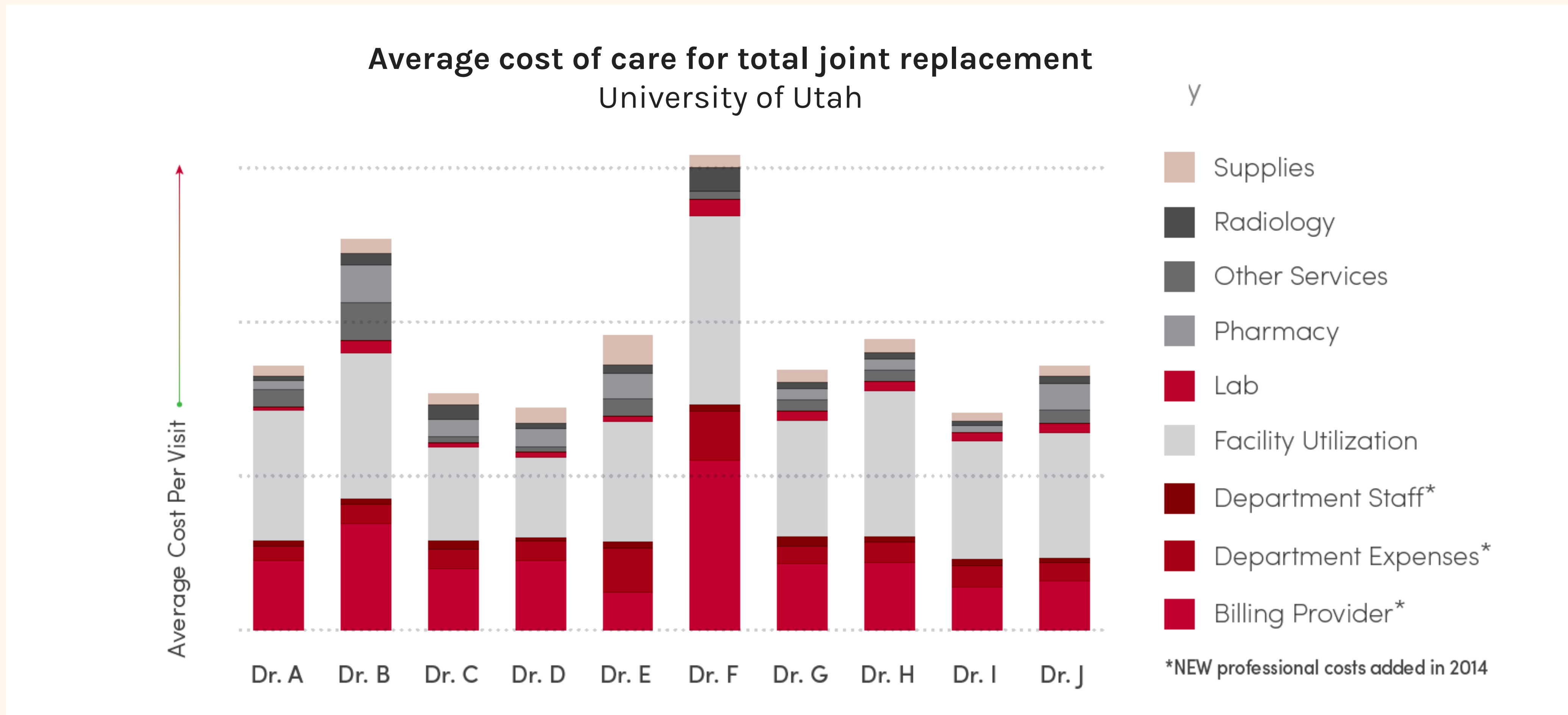
You Don't
Want to
Know



What does it COST to treat Appendicitis?



Determining costs of care



Quantifying costs of care

ENGLISH ESPAÑOL 中文 (CHINESE)

GIFT THE TIMES Account

Monday, November 19, 2018

The New York Times Today's Paper

World U.S. Politics N.Y. Business Opinion Tech Science Health Sports Arts Books Style Food Travel Magazine T Magazine Real Estate Video

What Are a Hospital's Costs? Utah System Is Trying to Learn

By **Gina Kolata**

Sept. 7, 2015

     221

SALT LAKE CITY — Only in the world of medicine would Dr. Vivian Lee's question have seemed radical. She wanted to know: What do the goods and services provided by the hospital system where she is chief executive actually cost?

Most businesses know the cost of everything that goes into producing what they sell — essential information for setting prices. Medicine is different. Hospitals know what they are paid by insurers, but it bears little relationship to their costs.



Dr. Vivian Lee set in motion a process that the University of Utah Health Care is using to save money and to improve care. Sallie Dean Shatz for The New York Times

Quantifying costs of care

JAMA | **Original Investigation** | INNOVATIONS IN HEALTH CARE DELIVERY

Implementation of a Value-Driven Outcomes Program to Identify High Variability in Clinical Costs and Outcomes Association With Reduced Cost and Improved Quality

“[Using] a system that substantially improved the ability to measure costs and calculate cost variability... achieving better quality and lower costs is possible, and everyone can benefit...”

-Michael Porter and Thomas Lee, accompanying editorial

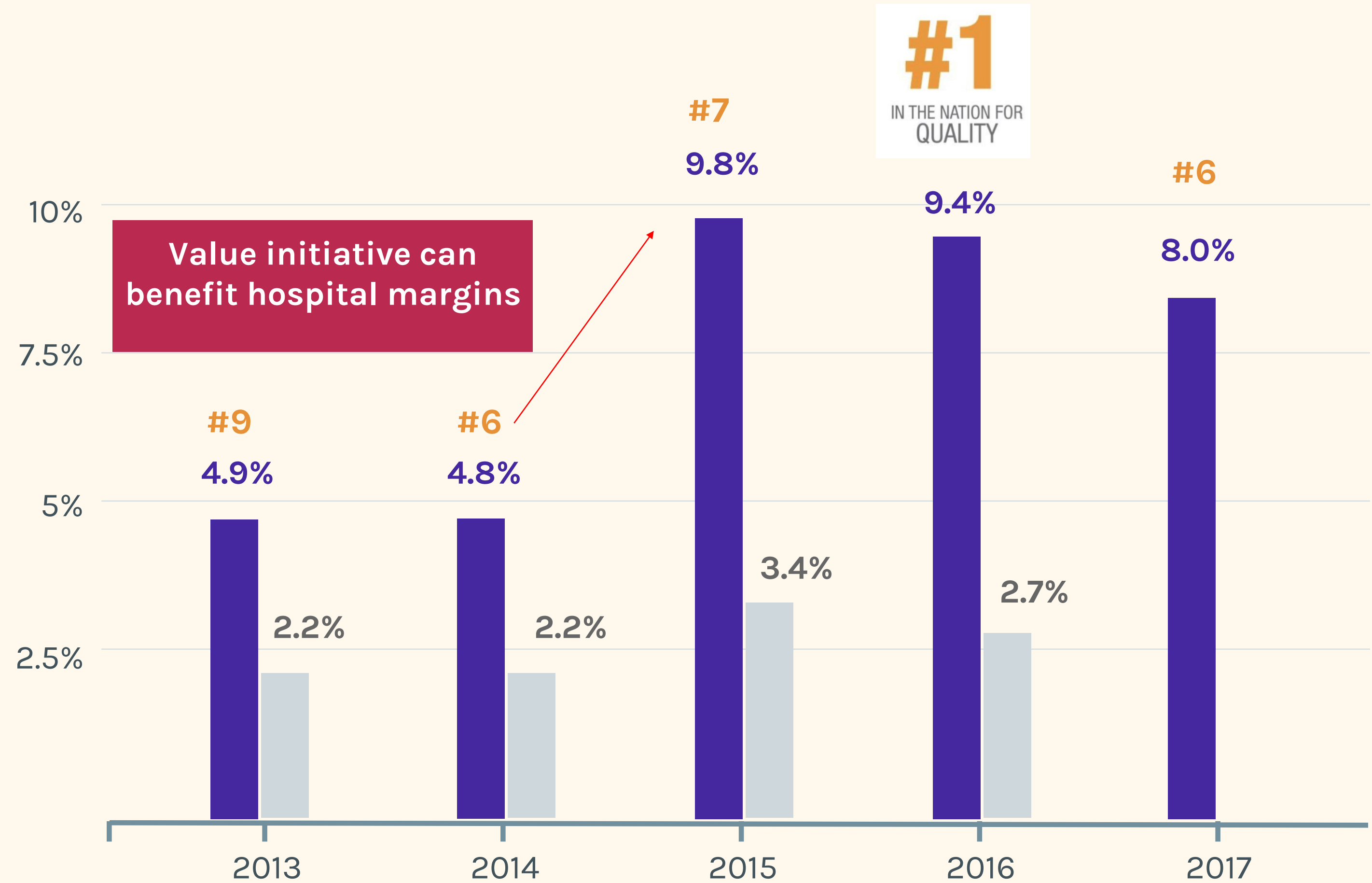
The image shows a screenshot of a JAMA article page and a podcast player. The article is titled "From Volume to Value in Health Care: The Work Begins" by Michael E. Porter, PhD and Thomas H. Lee, MD, MSc. The article is an editorial published on September 13, 2016. Below the article title is a photo of Michael E. Porter. The article is reprinted from Volume 313, Number 22, Pages 2227-2228, June 9, 2015. Below the article is a podcast player for "Value-Driven Outcomes Program and Health Care Cost and Quality". The podcast is 30 minutes and 46 seconds long, published on September 13, 2016. It includes a play button, a progress bar, and options to download the MP3 (14.1 MB) and subscribe to the podcast. There is also a link to view articles.

JAMA. 2016;316(10):1061-1072

With increased pressure on Hospitals—lowering costs of Care can improve margins

- Measure value—outcomes and costs of care
- Engaging, empowering clinicians to Identify opportunities
- By lowering costs of care and reducing waste, US hospitals can improve profitability

Operating Margin Impact



*Quality rankings from University Healthsystem Consortium/Vizient for University of Utah, compared with over 100 university hospitals and their over 124 hospital affiliates in the US



The Patient-Doctor Relationship

Coproducing Health

Chapter 7: From Caring to Coproducing

The Service Economy

VICTOR R. FUCHS

The City University of New York

Assisted by Irving F. Leveson



NATIONAL BUREAU OF ECONOMIC RESEARCH

NEW YORK 1968

Distributed by COLUMBIA UNIVERSITY PRESS

NEW YORK AND LONDON

page 112: Coproducing Health



@vivianleemd



vivian-s-lee

www.vivianleemd.com



thelongfix@gmail.com

(c) Vivian S. Lee, 2021

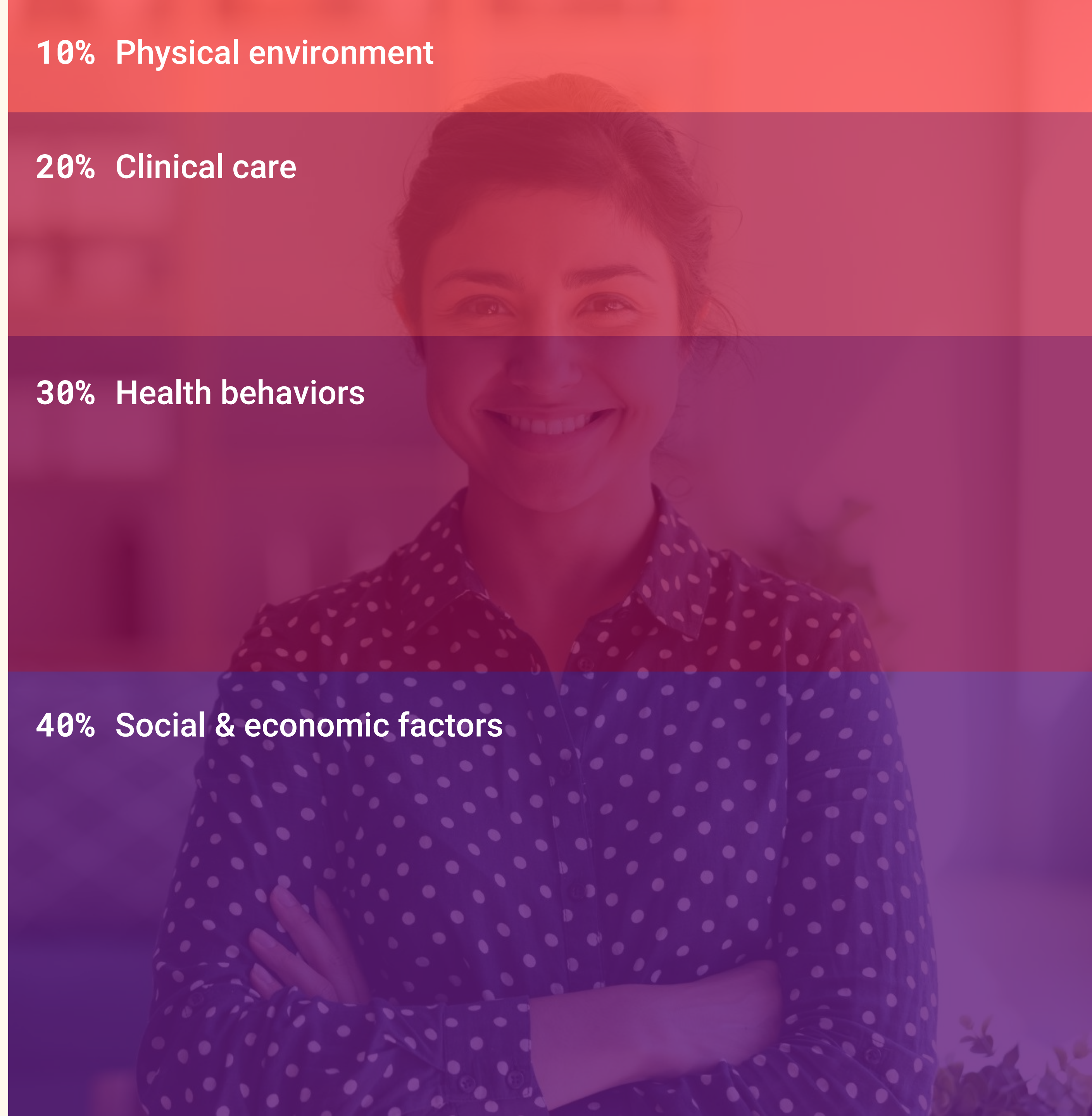
Determinants of health

10% Physical environment

20% Clinical care

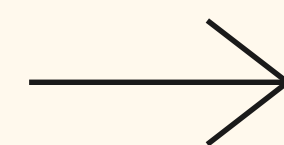
30% Health behaviors

40% Social & economic factors



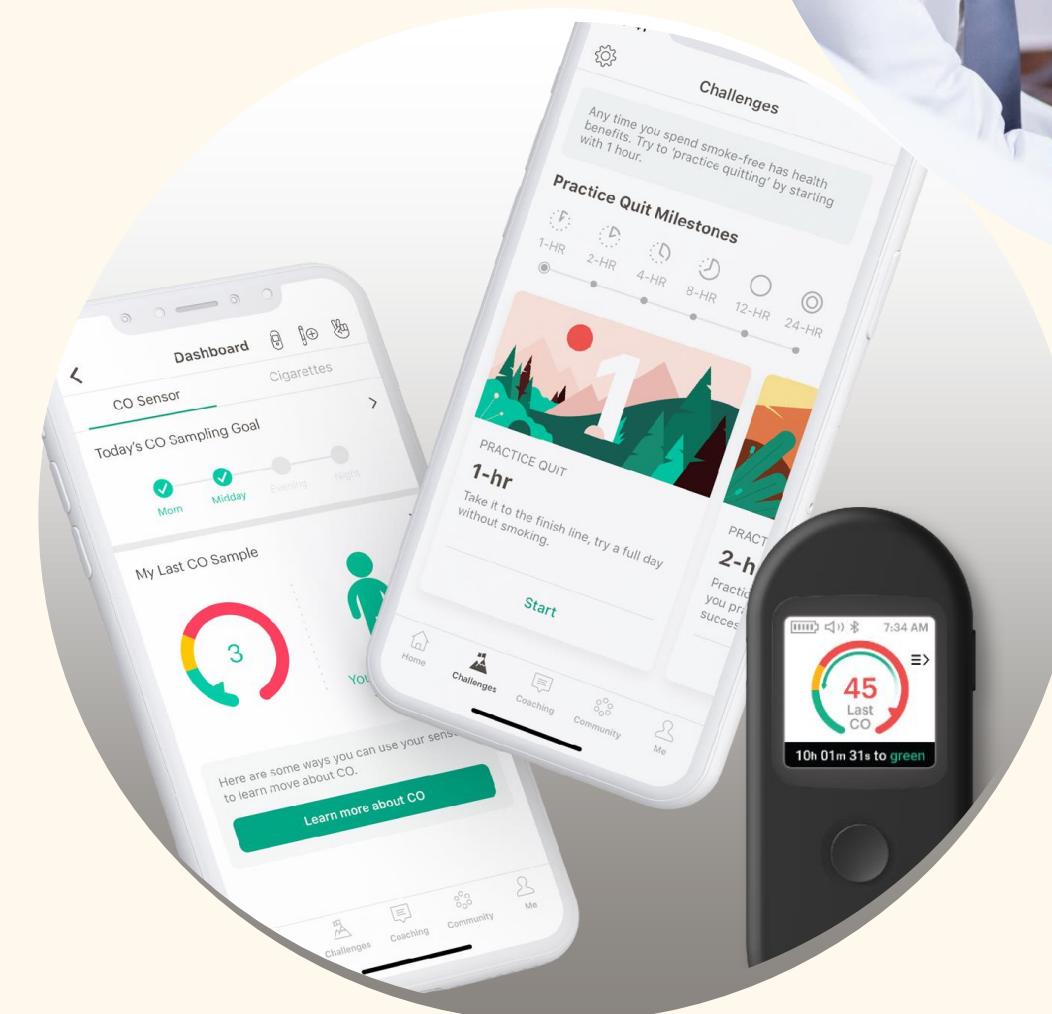
Coproducing Financial Health (Tech-enabled)

**Empowering
users**



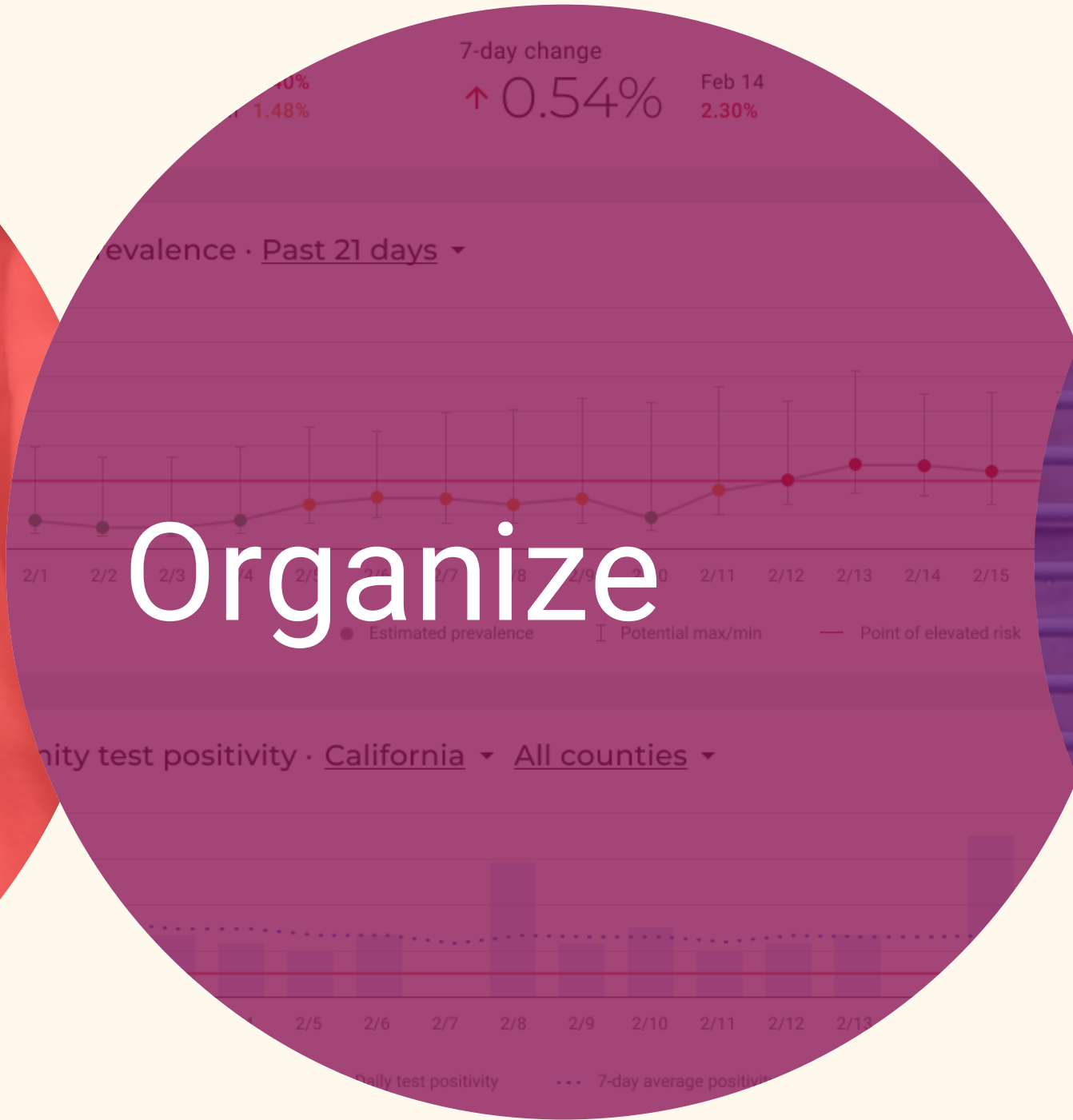
CO-PRODUCING HEALTH

Empowering the people to engage with their health





Collect



Organize



Activate

Who will pay?

Employers

Commercial
insurers

Medicare

Health systems

What makes better patients-doctors?

Reflections

- Create a learning health system: Value purpose, autonomy, mastery
- Follow the Pareto curve of patients: Coproduce health, focus on the 5-20%
- Automate the personalized pathway & make it the patient journey too





The tech-enhanced **Patient-Doctor** Relationship

“THE SECRET OF
CHANGE IS TO FOCUS
ALL OF YOUR ENERGY,
NOT ON FIGHTING THE
OLD, BUT ON BUILDING
THE NEW.”

— *SOCRATES*



Lessons from *The Long Fix*: **Fixing Health Care (in 20 min)**

Vivian S. Lee, MD, PhD, MBA

President **Verily Health Platforms (Alphabet)**

Senior Lecturer **Harvard Medical School**



@vivianleemd

www.vivianleemd.com



thelongfix@gmail.com