



The Future is Safer, Better Medical Care through Science & Tech

Karen Wolk Feinstein, PhD
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Jewish Healthcare Foundation
Pittsburgh Regional Health Initiative

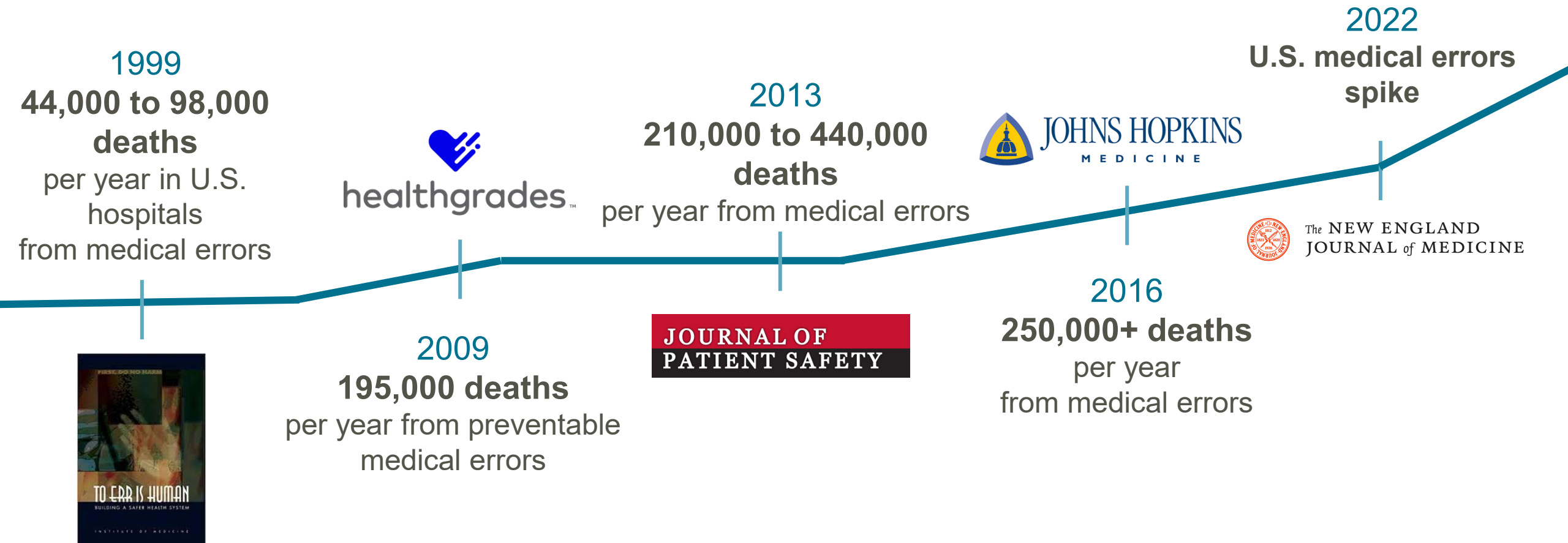
October 4, 2023



Patient Safety

The Persistent Problem of Medical Errors

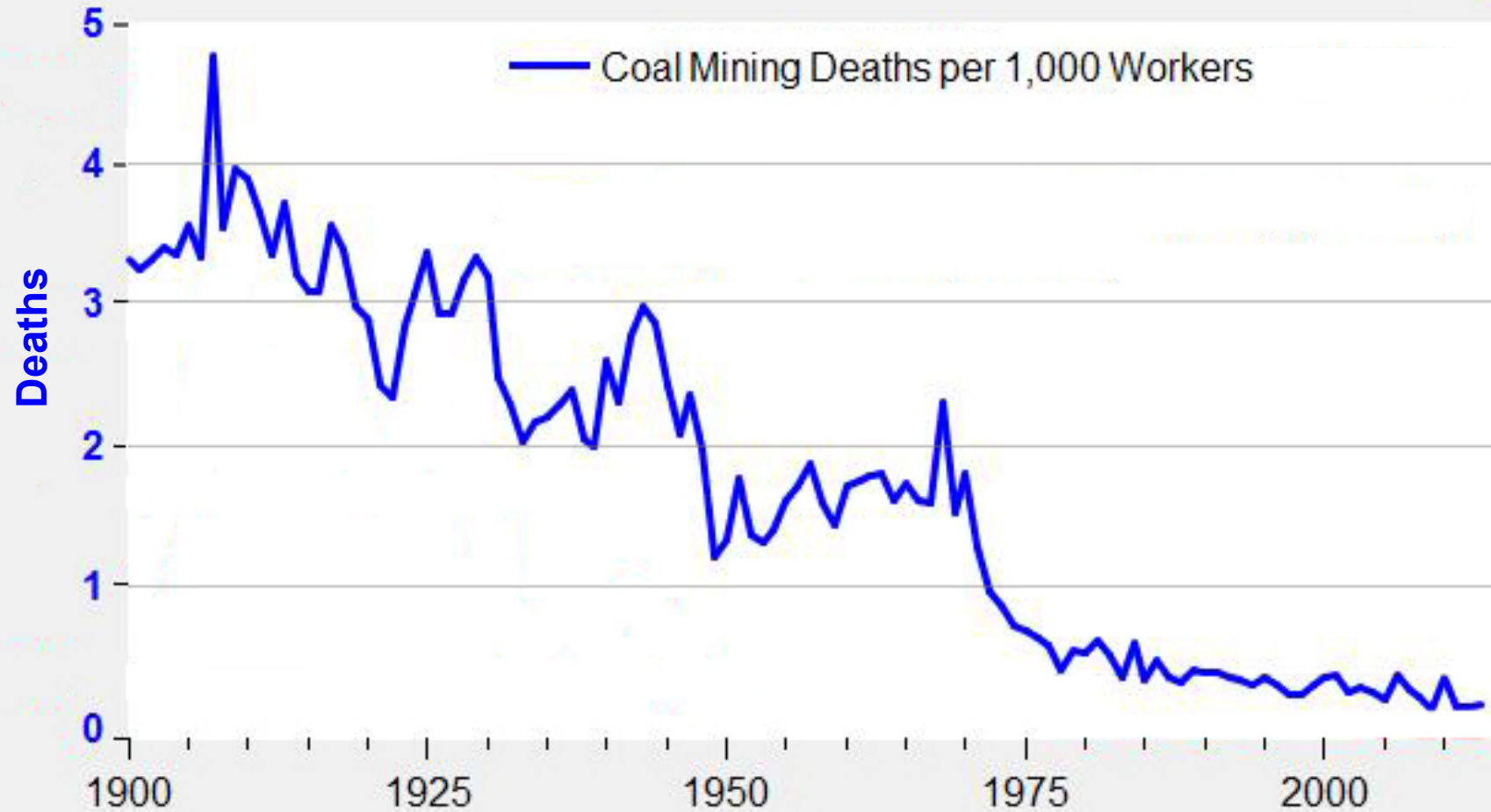
3rd Leading Cause of Death | 1 in 4 Experience Harm



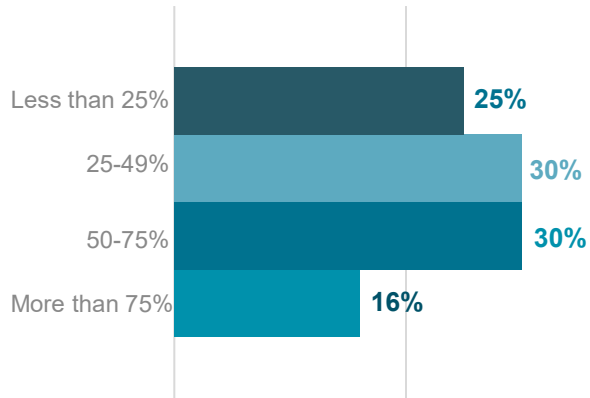
Other Industries Have Gotten Safer

Mining Safety

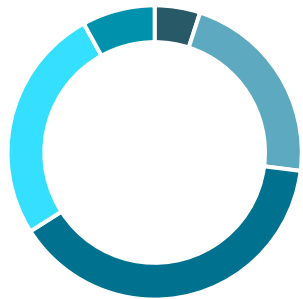
Coal Mining Deaths in the US, 1900 to 2013



Workforce Burnout & Patient Safety



55% of nurses in acute care hospitals indicated that **less than half the time their unit does not have the necessary number of staff to provide quality care**



27% of nurses responded that ancillary staff is **seldom or never available to adequately support safety**

- Never
- Seldom
- Sometimes
- Often
- Always

American Nurses Foundation 2022 Workplace Survey

40% of nurses expressed an **intention to leave** their practice within 2 years

24% of physicians expressed the same **intention to leave** within 2 years

Mayo Clinic Dec 2021

38% of nurses reported an **increase in medication errors** or delays

Hospital IQ Nov 2021 Survey



The model to follow:



- APSF facilitates accessible, time-sensitive patient safety material frequently translated into a significant safety improvements
 - Field of Simulation

Command Centers

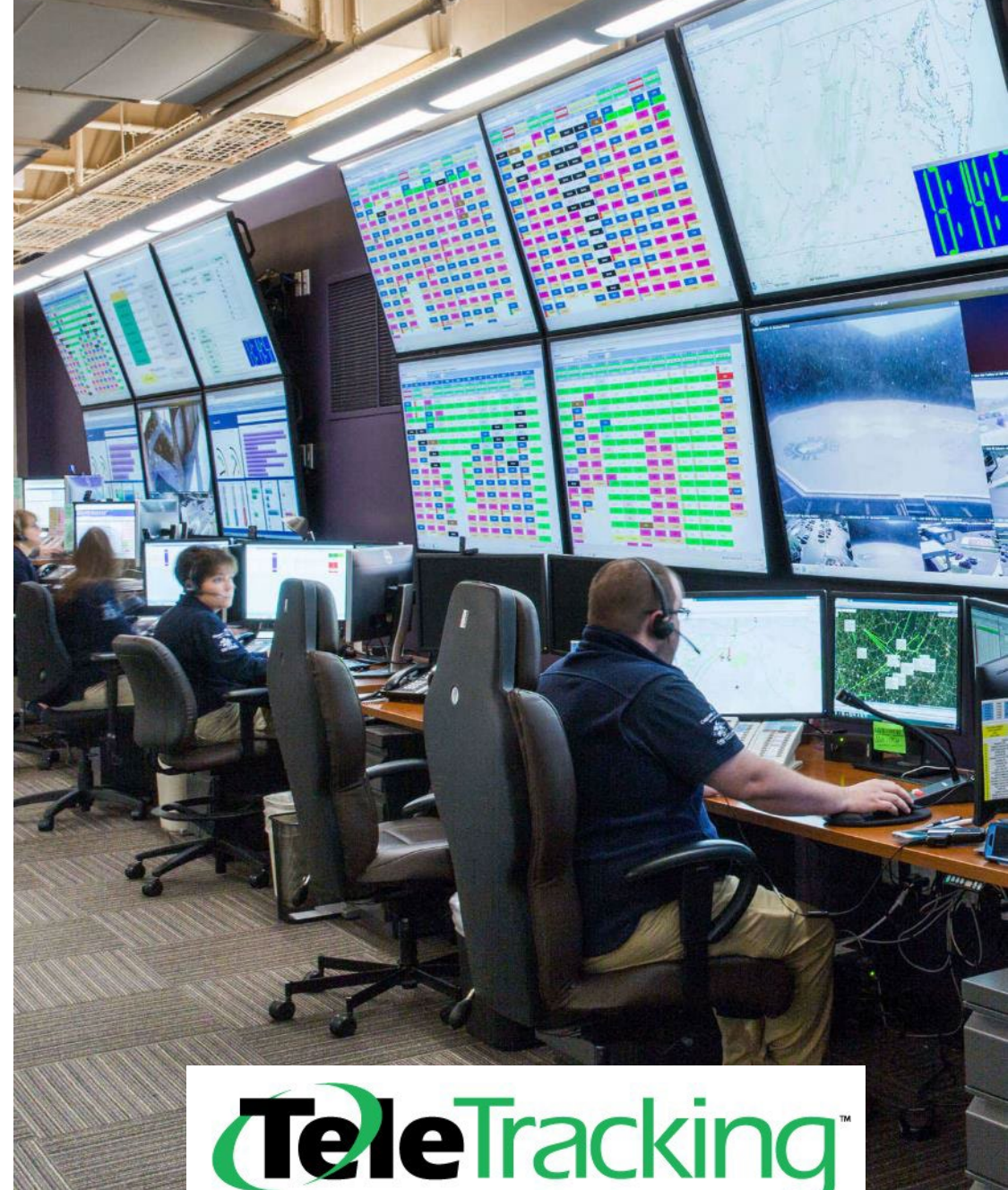
Enable peak operational efficiency

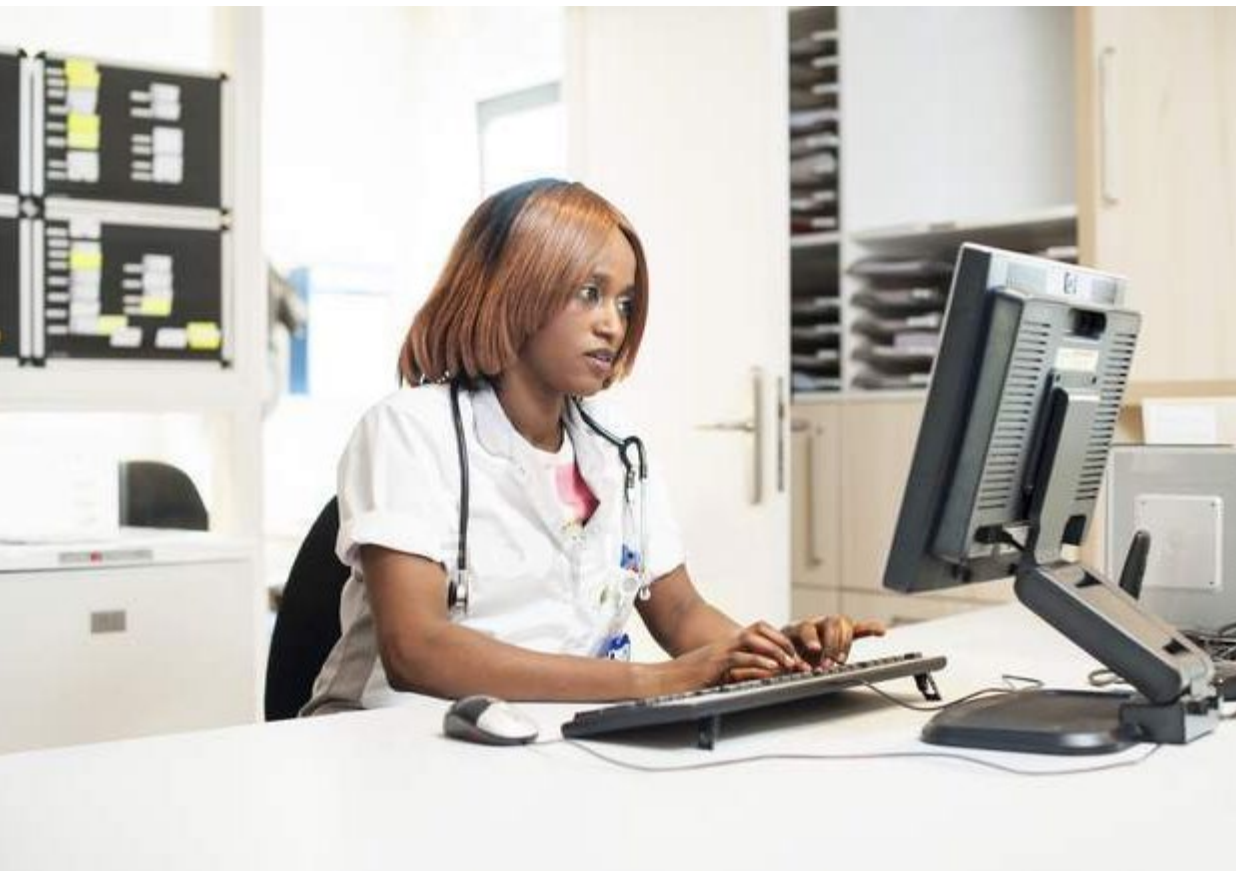
Provides real-time information and situational awareness by incorporating **sensors**, **monitors**, and establishing a **pipeline of information** that is **collected and centralized** for improved decision-making to inform:

Logistics

Staffing

Bed availability





The Enhanced Detection System or Healthcare-Associated Transmission System

Developed by Pitt & CMU, EDS-HAT uses existing data to identify undetected outbreaks and responsible transmission routes enabling proactive action

Leveraging predictive capabilities and real-time problem identification

Through collecting real-time data and using predictive analytics, clinical teams have the foresight to act when a problem occurs to prevent additional harm and death



Pitt
Medicine

Carnegie
Mellon
University

Dr. Lee Harrison & Artur Dubrawski

Digital Twin Eye

Creating a **digital twin of a patient**

Using an automated personalized medicine system, Digital Twin Eye allows for more effective treatment based on individual health data paired with predictive analytics.

As the AI algorithms learn from patient data, the Digital Twin Eye will provide an individualized treatment course for the patient that considers the range of factors that may influence disease progression and a patient's ability to adhere to treatment.



UPMC

Dr. Jose-Alain Sahil

THE Eye
& Ear
Foundation
OF PITTSBURGH



Using Machine Learning to Identify Patients Before Surgery at High Risk for Postoperative Adverse Events

A gradient-boosted decision tree machine learning method created a preoperative surgical risk prediction tool that accurately identified patients undergoing surgery who were at high risk of adverse outcomes

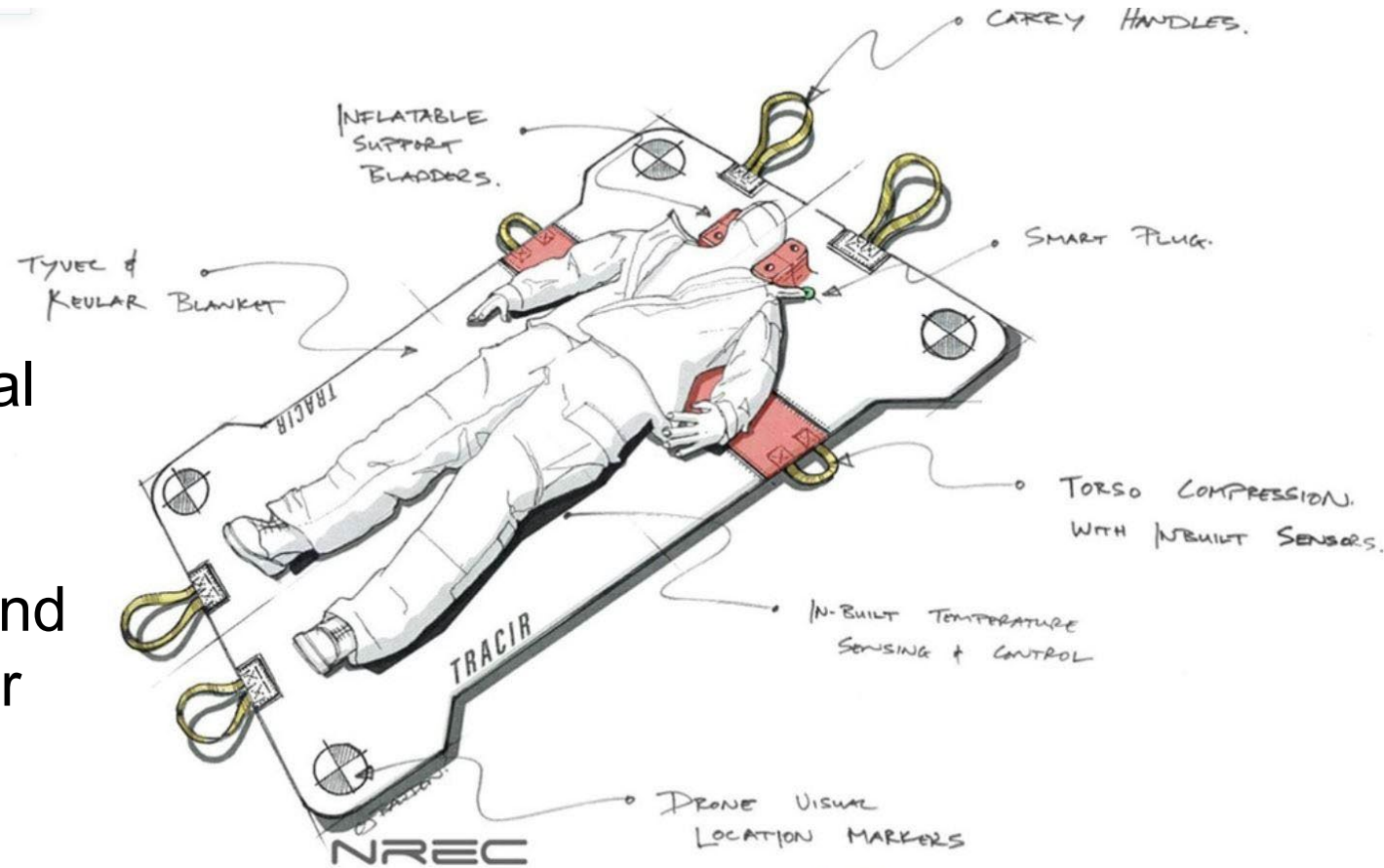
UPMC
Dr. Aman Mahajan

TRAuma Care In a Rucksack (TRACIR)

Autonomous medical care system

TRACIR is a fully autonomous medical backpack enabling medical interventions that extend the “golden hour” for treating combat casualties and ensure an injured person's survival for long medical evacuations.

Could be deployed in community settings.



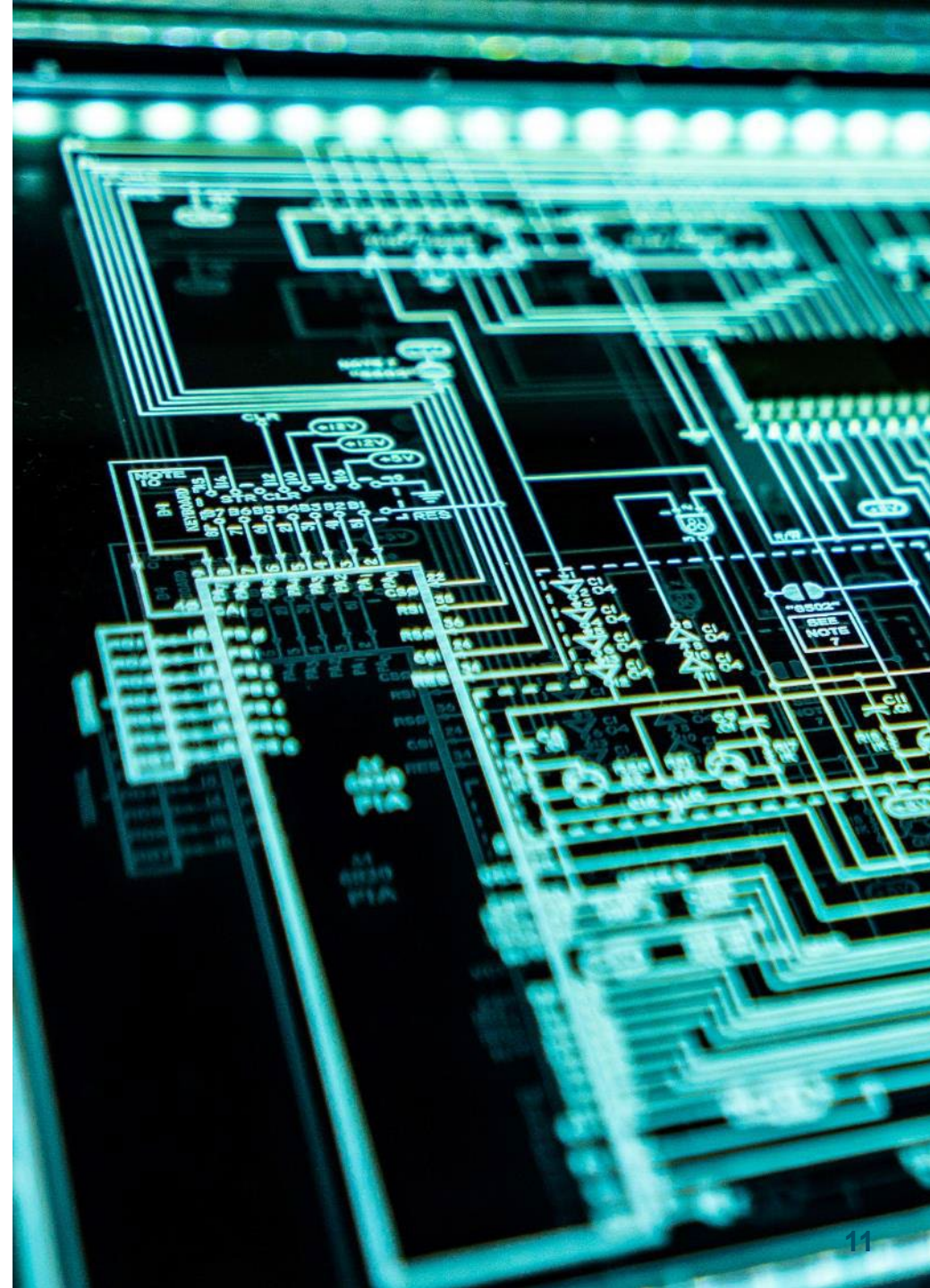
Dr. Ron Poropatich

Medication Error Avoidance at Region Scale (MEARS)

Piloting a novel medication monitoring clinical decision support tool that uses medication error rules, computable phenotypes, and data from multiple settings to support patient-specific medication risk assessment and enable population-level monitoring of medication safety concerns



Dr. Michael Becich



SEATTLE

INNOVATION HUBS

with funded patient safety tech prizes

United States

SALT LAKE CITY

CHICAGO

PGH

NYC + PHILLY

BOSTON

LONDON

BAY AREA

CINCINNATI

DC + BALTIMORE

LAS VEGAS

RESEARCH TRIANGLE

SO CAL

PHOENIX

DALLAS

CONWAY

ATLANTA

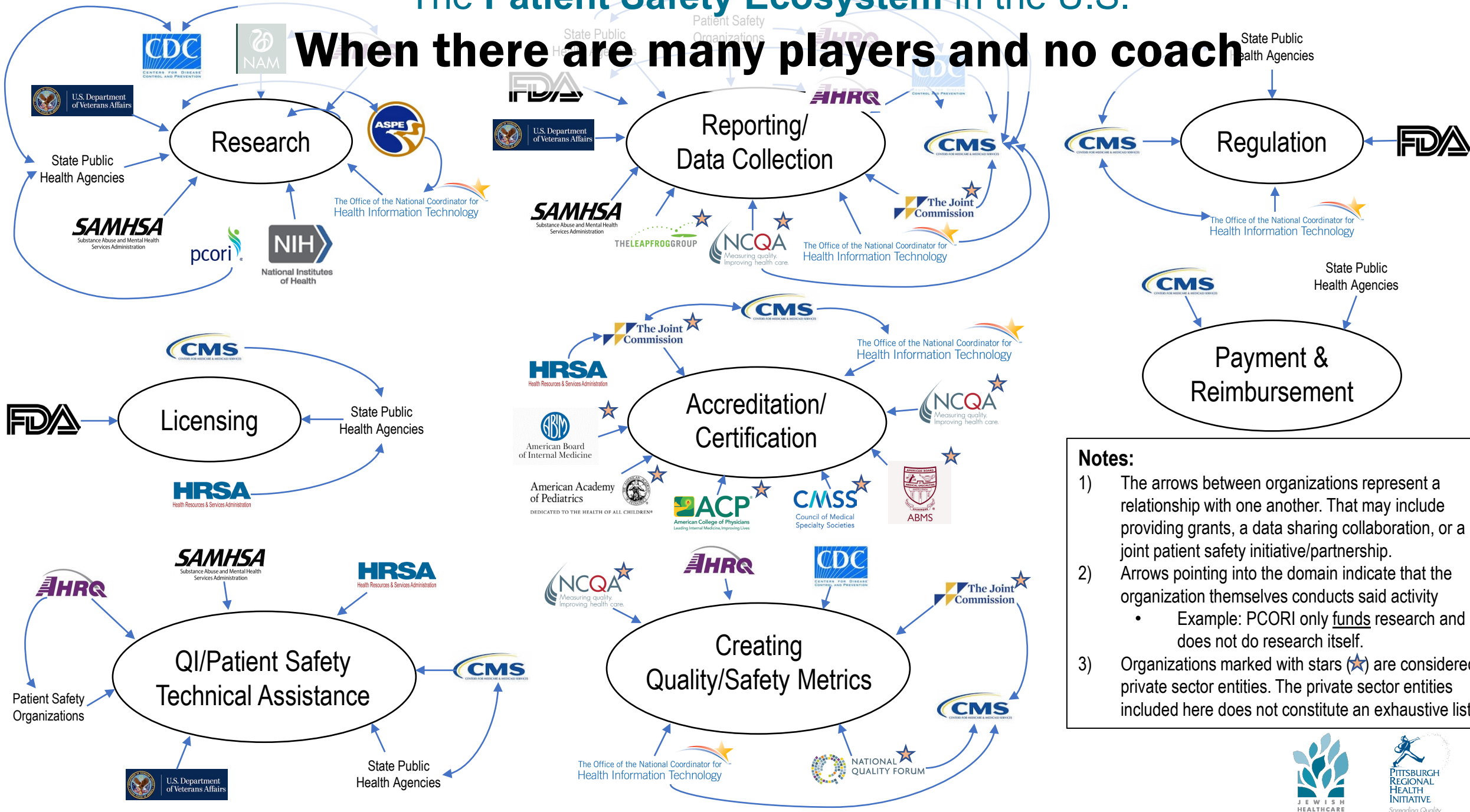
BIRMINGHAM

TUSKALOOSA

AUSTIN

The Patient Safety Ecosystem in the U.S.

When there are many players and no coach



NATIONAL PATIENT SAFETY BOARD

npsb.org



Modeled on CAST, NTSB, and APSF as a non-punitive, collaborative, multi-disciplinary R&D team at HHS to:

- ✓ **Identify and anticipate** significant harm
- ✓ Understand the **causes and pre-cursors** to harm
- ✓ Create **solutions**

The NPSB's **solutions** would **prevent harm before it occurs** and **reduce the burden** on health systems and frontline teams