Next Stop, The Virtual Medicine Zone

Rhode Island Telehealth and CyberSecurity
Professional Development and Education Conference

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UMass Memorial Health Care

Best Place to Give Care - Best Place to Get Care

UMass Memorial – Community Healthlink
UMass Memorial HealthAlliance-Clinton Hospital
UMass Memorial – Marlborough Hospital
UMass Memorial Medical Center
UMass Memorial Medical Group
UMass Memorial Accountable Care Organization, Inc.

Everyone, Everyday.

UMassMemorial Health Care | University of Massachusetts Medical School

Disclosure

I have no financial relationships with a commercial entity producing healthcare-related products and/or services relevant to the content I am presenting.

About Us

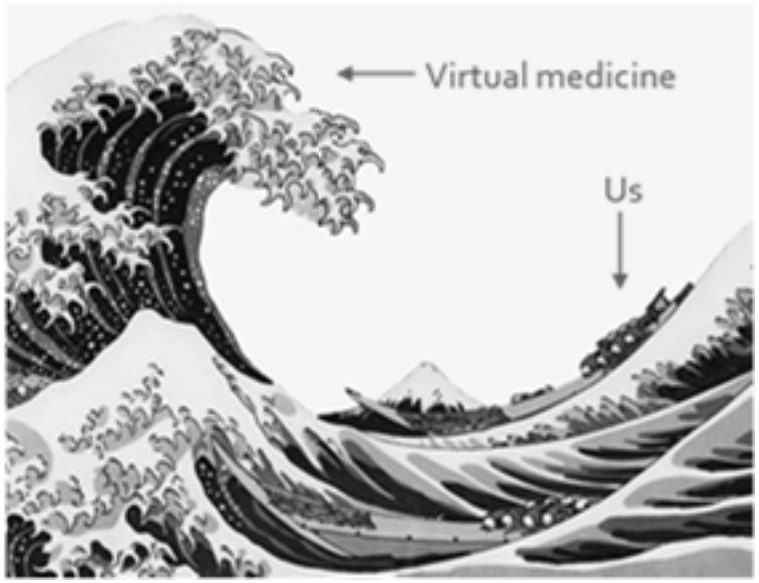
UMass Memorial Health Care is:

- 6-hospital healthcare network serving Central MA
- Clinical partner of UMass Medical School
- 13,000 employees
- 3,000 RNs / 1,700 MDs
- 1,125 beds
- 225,000 ED / 1.5M ambulatory visits
- Region's only Level I Trauma and Level III NICU

Program Overview and Strategy

The Telehealth Wave

What is driving the sudden explosion in virtual care?



- 65M live in a primary care "desert"
- Aging population
- Access to specialty services
- Advances in technology
- Positive trends in reimbursement
- Shift in consumer behaviors

Benefits of Telehealth

- Creates value for patients, payors and providers
- Increased access
- Convenience
- Expanded reach of healthcare services
- 24x7x365 availability
- Higher patient satisfaction
- Improved outcomes

Telehealth Program Evolution

2000-2005

- Ronald McDonald Care Mobile, Massachusetts Child Psychiatry Access Project (MCPAP)

2006-2008

- **eICU Program launch**, Primary Care BH online education, core video infrastructure investment

2009-2011

- **TeleStroke**, TeleGI, mobile vascular lab, capsule endoscopy, NICVIEW, MyCareTeam (diabetes)

2012-2014

- Patient and wellness portals, image sharing, CANDO, inpatient neurology, video for hearing impaired

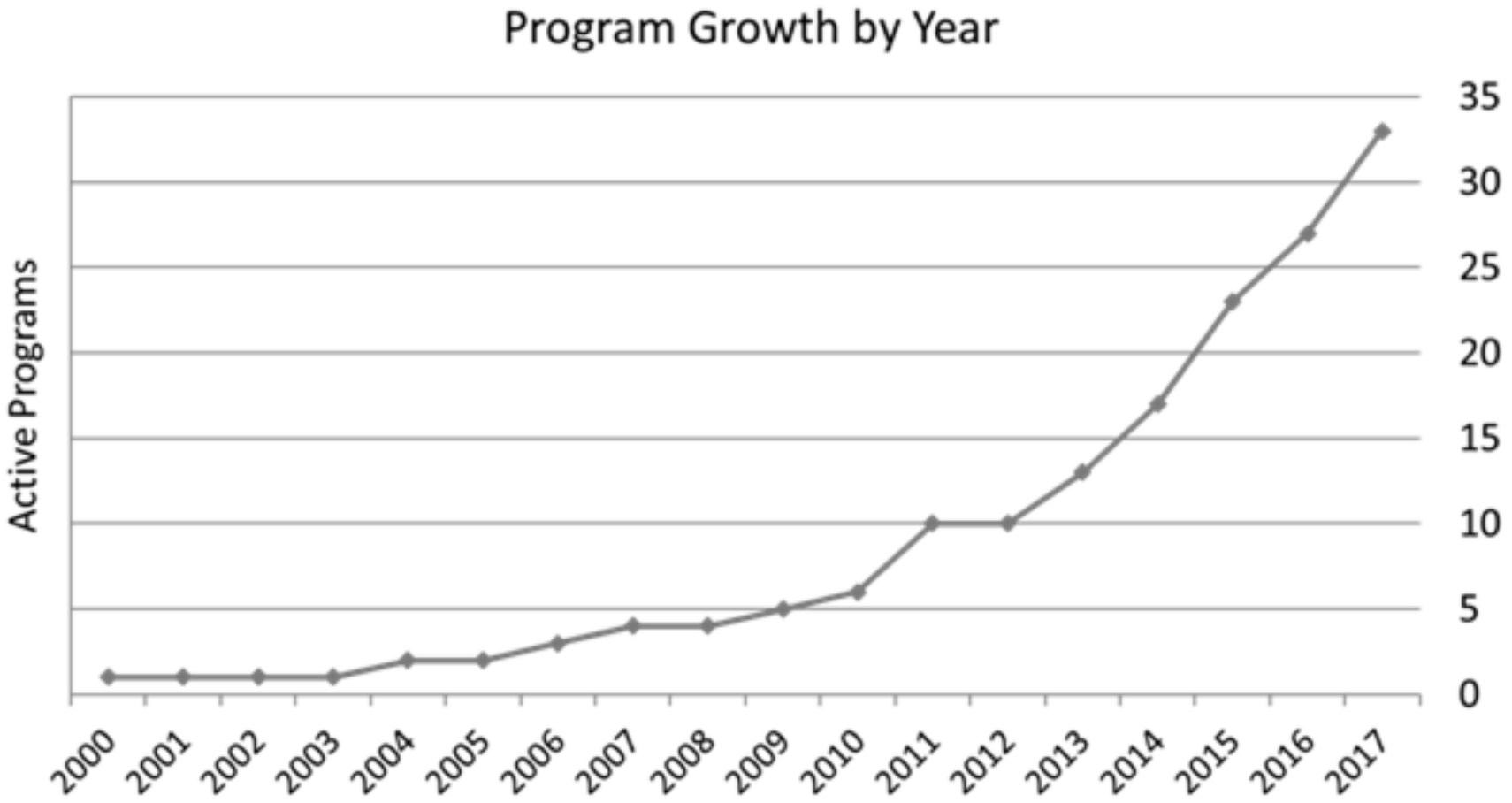
2015-2016

- Remote video interpreters, e-visits, urgent care centers, teleradiology, video dialysis, TeleDerm

2017-2019

- Multiple behavioral health initiatives, TelePathology, ***strategic alignment of all telehealth initiatives***
  - Expansion of services through a common platform, common workflows and common entry point

Telehealth Trajectory



UMMHC Virtual Medicine by the Numbers

21 direct care programs

10 supporting services

39 technology solutions

33 medical facilities plus patient home

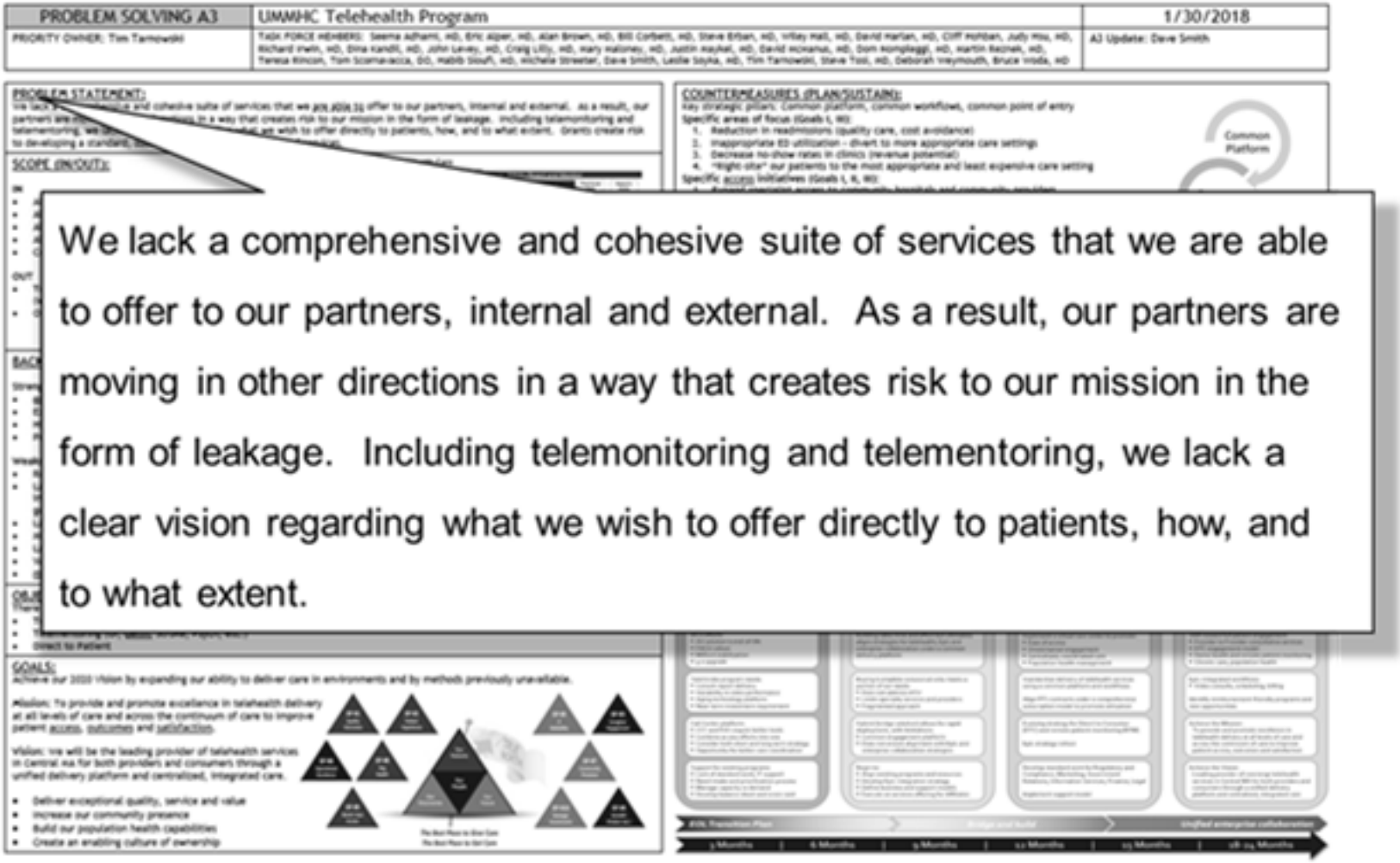
8 oversight committees

6 intake pathways

80 work efforts in the pipeline

4 FTEs supporting program growth and unification

Lean A3 Problem Statement



Contributing Factors (SWOT Analysis)

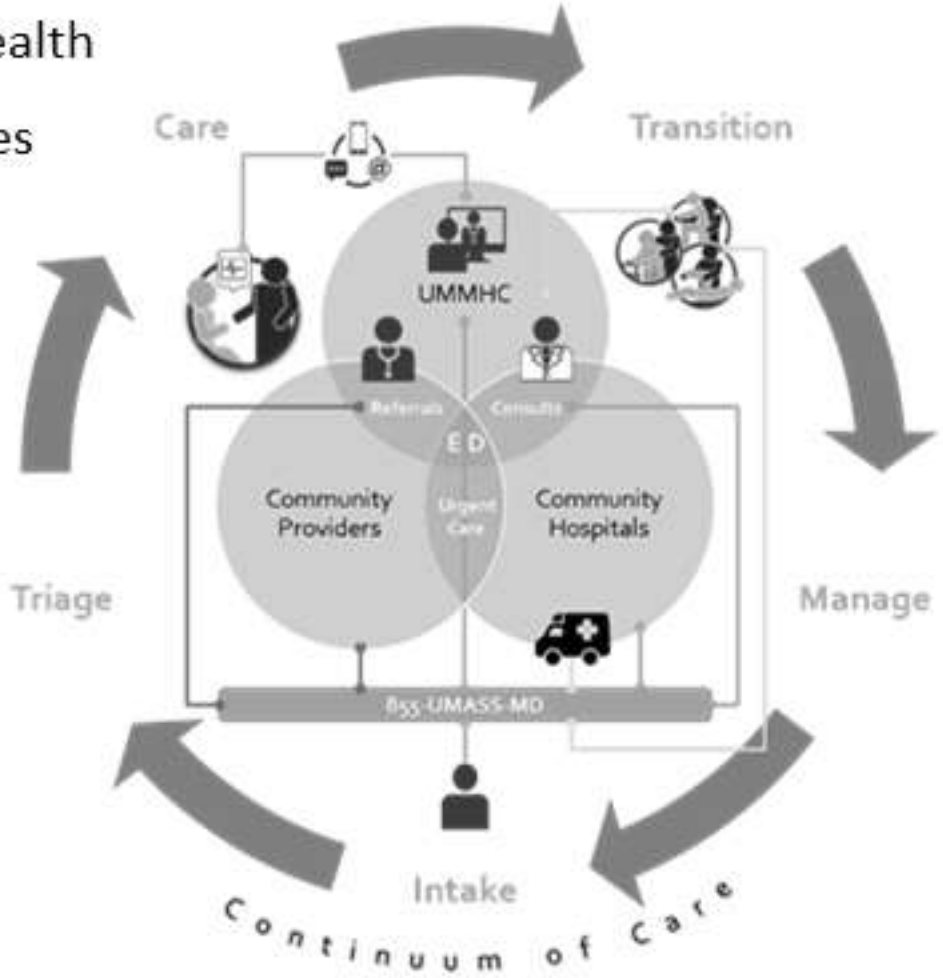
- Fractured access to services
  - Many numbers to call, no centralized point of entry
- Lack of visibility across care settings
  - Leads to readmissions and poor outcomes
- No common delivery platform
  - Cannot leverage shared investments
- End of life equipment was failing
  - TeleStroke and eICU required immediate action
- Limited resources to support growth
  - Providers, IT, reimbursement, marketing, operations, etc.

Countermeasures

- Develop a service bundle for community hospitals
  - Start with existing programs, leverage existing coverage models
- Stabilize current programs
  - Address IT obsolescence and plan for future investment
- Deliver a common platform across service lines
  - Consider time to implement, workflows, resource constraints
- Centralize access to services
  - For providers and patients alike, one number to call
- Integrate care delivery across the continuum of care

Patient Engagement Lifecycle

A holistic approach to population health through centralized access to services and coordinated care enabled by telehealth strategies



Virtual Medicine Mission and Vision

Mission:

To provide and promote excellence in telehealth delivery at all levels of care and across the continuum of care to improve **access**, **outcomes** and patient **satisfaction**

Vision:

We will be the leading provider of telehealth services in Central MA for both providers and consumers through a unified delivery platform and centralized, integrated care

High Level Objectives

Areas of focus:

- Reduction in readmissions (quality care, cost avoidance)
- ED avoidance tactics
- Decrease no-show rates in clinics
- "Right site" patients to most appropriate and least expensive care setting (flow)

Access initiatives:

- Expand specialist access to community hospitals and community providers
- Improve ease of access by driving all services through 855-UMASS-MD, 24x7
- Increase virtual case volume for dermatology, neurology, cardiology and behavioral health
- Direct-to-patient interactive video encounters for primary and urgent care

Outcomes initiatives:

- Post-discharge and post-operative follow up virtual visits for bundled payment cases
- Home health programs for chronic disease management (align with ACO target conditions)
- Focused, data-driven population health management (align with ACO target population)

Satisfaction initiatives:

- Drive up patient satisfaction through improvements in access and outcomes
- Leverage telehealth as a tool for improving communication and physician engagement

Close Alignment with ACO Objectives

- Personalized care coordination services across the healthcare continuum
- More effective physician visits and communication among providers
- Targeted health and wellness programs focused on disease prevention
- Coordination of appointments, medication management, and follow-up care
- Improving efficiency in patient care

communityHELP
Health and Everyday Living Programs

Interdisciplinary Approach to Virtual Care Delivery

EXTEND INFORMATION SERVICES AND EPIC TO CENTRAL MASSACHUSETTS

- Improve Outcomes and Access to Care in a Cost-effective Setting (Telehealth)

WHAT

SERVICE	CAPACITY	DEMAND	COMPLEXITY	FINANCIAL ROI
Critical Care	✔	L	H	✔
Stroke / Neurology	✔	H	M	✔
Behavioral Health	✔	H	L	✔
Dermatology	✔	H	L	✔
Gastroenterology	✔	M	L	✔
Radiology	✔	M	M	✔
Cardiology	✔	M	L	✔
Pharmacy	✔	M	M	✔
Chronic Care	✔	M	M	✔
Urgent Care / DTC	✔	M	M	✔

WHO

Internal Providers | Patient Access Services | Physician Referral Services | eICU | TrAC (Pt transfer) | Case Management | ACO | Clinical Affiliations | External Provider Pool

855-UMASS-MD

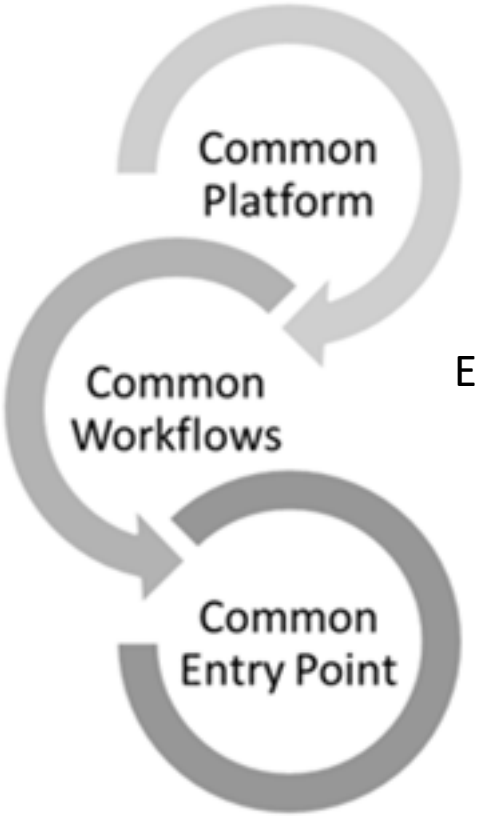
HOW

Common Platform | Common Point of Entry | Common Workflows

WHERE

Community Hospitals | Urgent Care Centers | Primary Care | Acute Care | Post Acute Care | Patient Home

Development of Standard Work



UMMHC clinical portal @https://ummhc.avizia.com

Standardized devices for various use cases and care settings

Emergent, on demand, scheduled, ad hoc workflows built

Designing and implementing Epic workflows

Centralized intake through clinical portal

Begin to align service areas and care coordination

Simple, effective, efficient, repeatable, reproducible…

Communities our Programs Serve

Program Highlights and Outcomes

Tele-ICU

Pictured: Dr. Craig Lilly, eICU Medical Director

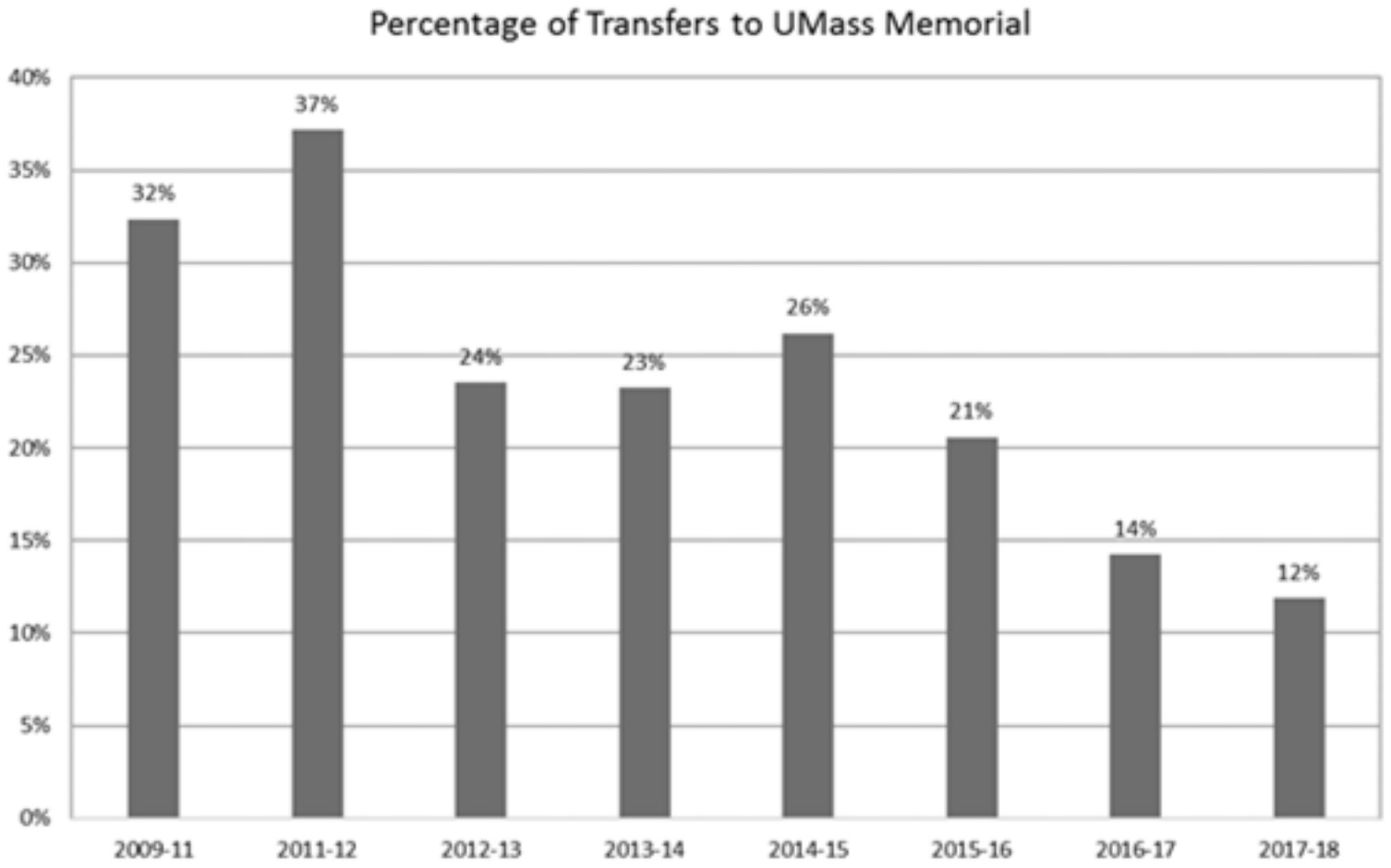
Tele-ICU Program Statistics

- 149 beds monitored 24x7x365 across 14 adult ICUs and PACUs
- 24,820 true positive alarms responded to in 2017
- 6,570 medical interventions managed from the eICU in 2017
- Substantial reduction in preventable adverse events

Measure	Pre TeleICU	Post TeleICU
ICU Mortality Rate	10.7%	8.6%
ICU Length of Stay (Days)	6.4	4.5
Stress Ulcer Prevention	83%	96%
DVT Prophylaxis Prevention	85%	99.5%
VAP Cases	13%	1.6%
Cardiovascular Protection	80%	99%

Source: JAMA, Published online 16 May 2011

Tele-ICU Program Statistics



Tele-ICU in the News

"UMass Memorial finds success with remote ICU"
THE BOSTON GLOBE, May 17, 2011

"JAMA study finds remote monitoring in e-ICUs reduced mortality"
iMedicalApps, May 27, 2011

"Use of telehealth network can boost care, study says"
USA TODAY, December 5, 2013

"UMass, state taking telemedicine to next level"
Worcester Business Journal, August 1, 2016

"Telemedicine Study Cites Tele-ICU's Positive Impact on Patients"
mHEALTH INTELLIGENCE, January 25, 2017

TeleStroke

Pictured: Dr. Wiley Hall, TeleStroke Program Director

Case Study : TeleStroke

The Problem:

- Stroke is the 5th leading cause of death in the US
- Many rural areas lack access to 24x7 neurology services
- Brain-saving treatment is extremely time sensitive

The Solution:

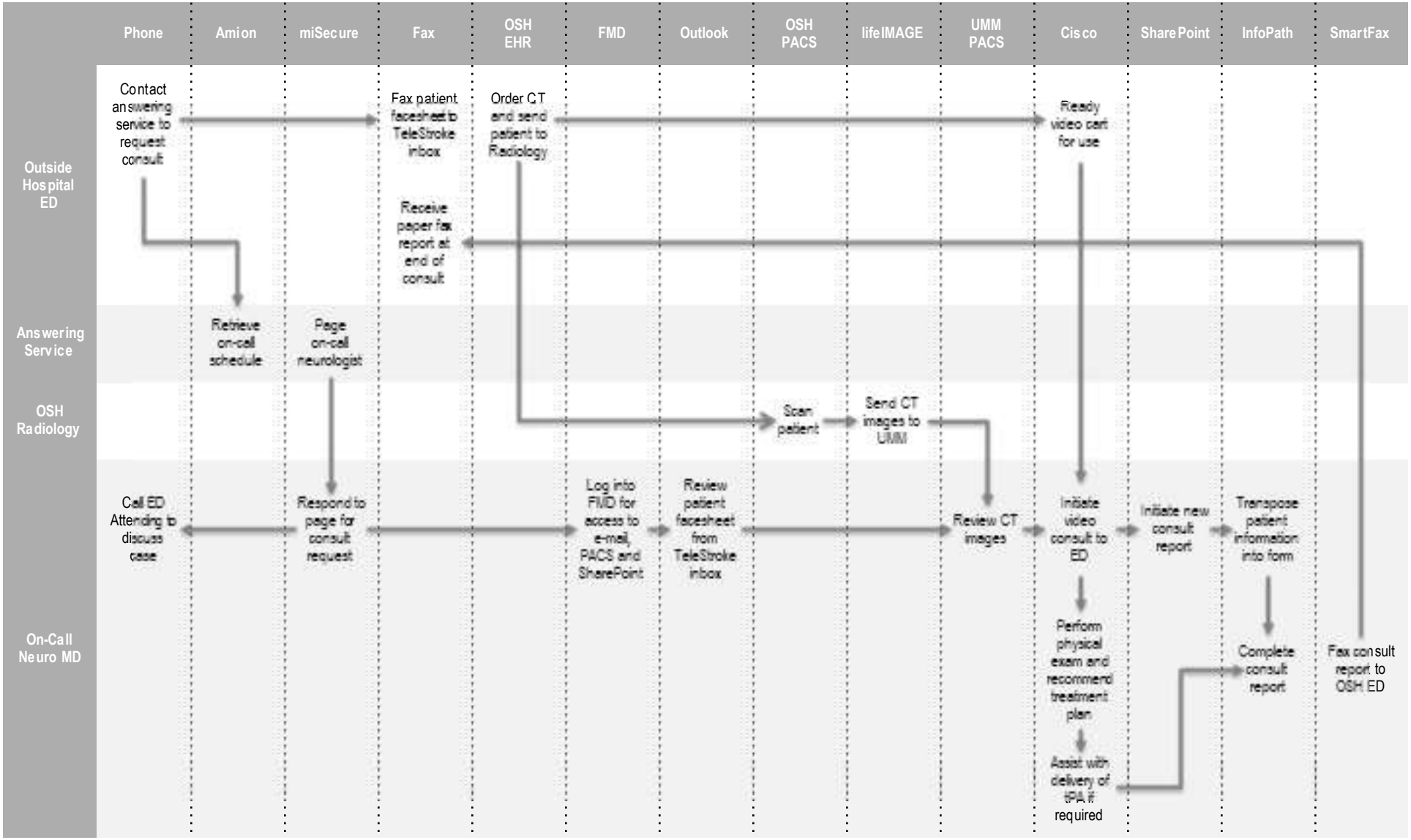
- Rapid access to a specialist through interactive video
- Remote interpretation of brain image (CT)
- Mobile video cart for physical exam and treatment plan

Case Study : TeleStroke

Program Requirements:

- Two-way audio/video capability
- Mobile video cart in ED
- HD video with PTZ and far end camera control
- Access to patient CT scan
- Multiple points of entry (both on and off network)
- Ability to perform remote consultation from home

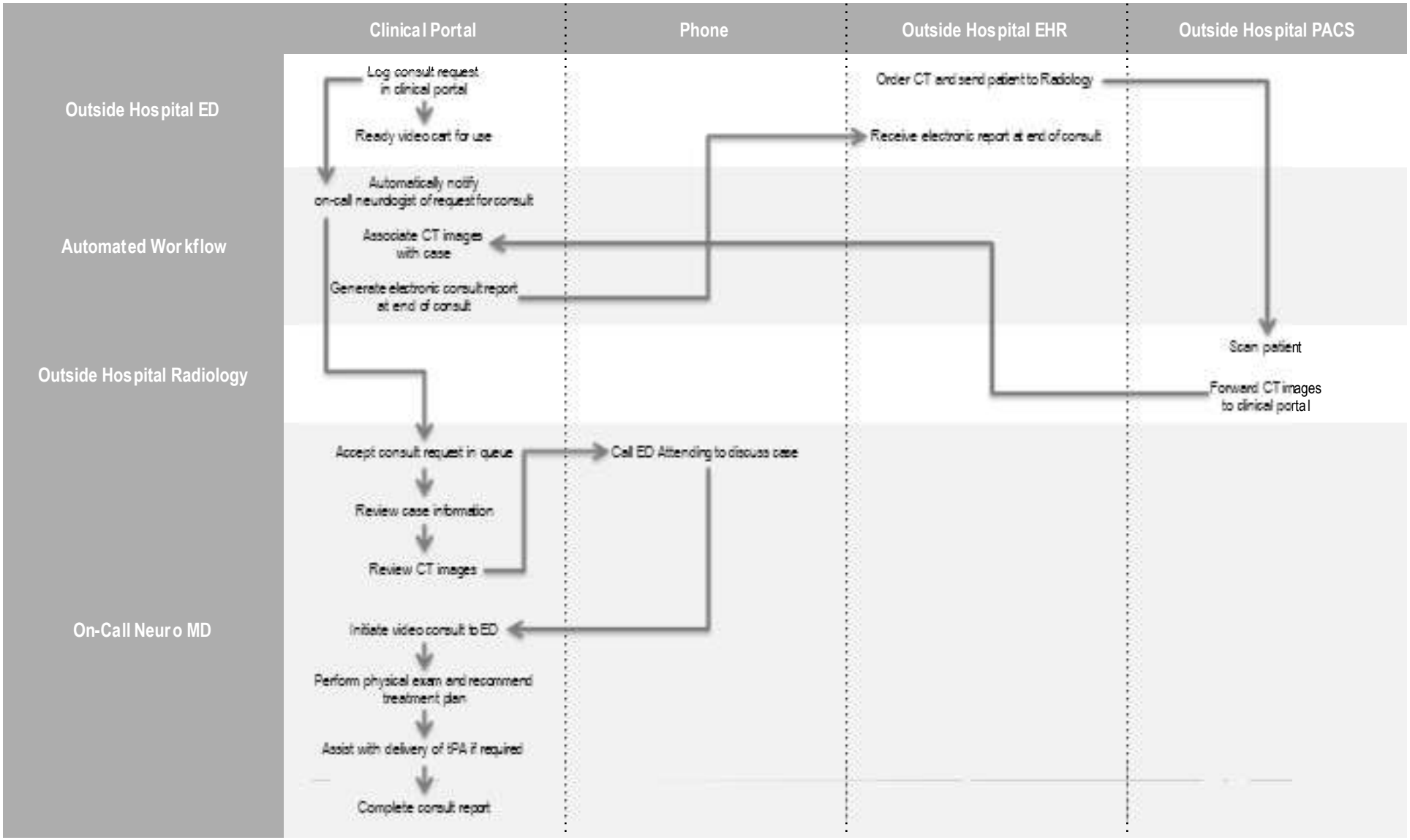
TeleStroke Prior State Workflow



Streamlined Workflow

- Automatic case creation and notification
- Standardized and simplified intake
- Single cart for multiple consult types

TeleStroke Current State Workflow



Operational Improvements

Opportunity:
- Home-grown TeleStroke program was built 10 years ago
- Involved 14 disparate communication systems and 21 process steps
- Required outdated versions of software to maintain compatibility

Solution:
- Consolidate communication systems and workflow steps
- Standardize and streamline intake and consult notification
- Utilize device-agnostic platform to improve response time

Result:
- Decreased the number of communication systems from 14 to 4
- Reduced the number of process steps from 21 to 13
- Increased efficiency by consolidating imaging, video, and NIH stroke scale

Outcomes

1000+
Telestroke consults completed in the first 6 months

71%
Decrease in number of communication systems used for telestroke

38%
Reduction in steps required to conduct a telestroke consult

TeleNICU

Pictured: Dr. Javed Mannan, TeleNICU Program Director

Problem : Pre-Term Births

The rates of pre-term births have been rising over the last few years and are now as high as 10% in the United States

With the rise in pre-term births there is an increasing demand for teams with expertise and high levels of knowledge in neonatal resuscitation

Neonatal Care in Rural Hospitals

- Pre-term delivery or the need for resuscitation in full term infants is unpredictable
- Clinicians who work in community hospitals may not be exposed to high volume acute cases
- Infants born at community hospitals without NICUs are at risk for increased mortality and morbidity

Phibbs CS et al, JAMA 1996
Phibbs CS et al, NEJM 2007
Lasswell SM et al, JAMA 2010
Lorch SA et al, Pediatrics 2012

Solution : Telemedicine in the NICU

- Few caregivers receive enough exposure to become proficient in execution of the NRP algorithm
- Telemedicine has been used as a bridge to provide immediate access to expert subspecialty neonatal care
- Also shown to improve patient safety and quality of care, as well as decrease costs

Jukkala AM, JOGNN 2009
Kim EW et al, Journal of Perinatology 2013
Fang AL et al, Resuscitation 2018

High-Level Workflow

Remote Site L&D	NICU Provider	Transport Team
• Identify need for neonatal consultation • Bring video cart to bassinet • Initiate consultation request by tapping "TeleNICU" button • Provide situational report to NICU provider when video call is initiated • Follow care instruction from NICU provider until transport team arrives	• Receive alert notification of consultation request • Initiate video call to remote site via app or web portal • Assess situation and initiate NRP resuscitation algorithm • Provide care direction and oversight to remote site team • Invite NICU transport team into video call while en route to remote site	• Join video call in ambulance via iPad • Observe resuscitation activities while en route to remote site • Assume responsibility for resuscitation activities upon arrival to remote site • Stabilize infant and determine need to transfer to NICU • Work with NICU to coordinate post-stabilization care plan

Results : TeleNICU in Simulation

Comparison of time to effective ventilation, interventions, and use of the corrective steps between control and intervention groups:		
Time to effective ventilation in seconds, mean (range)	Control group (*n*=23)	Intervention group (*n*=23)
	251 (125-479)	**162 (98-233)**
Use of the first five corrective steps, *n* (%)	Control group (*n*=23)	Intervention group (*n*=23)
M: adjusts mask position	**11 (48)**	**23 (100)**
R: repositions the head	**16 (70)**	**23 (100)**
S: suctions mouth and nose	**11 (48)**	**23 (100)**
O: opens mouth or lifts jaw	**4 (17)**	**23 (100)**
P: increases positive inspiratory pressure	**3 (13)**	**23 (100)**

Fang J et al, Resuscitation 2014
Umoren RA et al, Air Medical Journal 2018

Key Takeaways

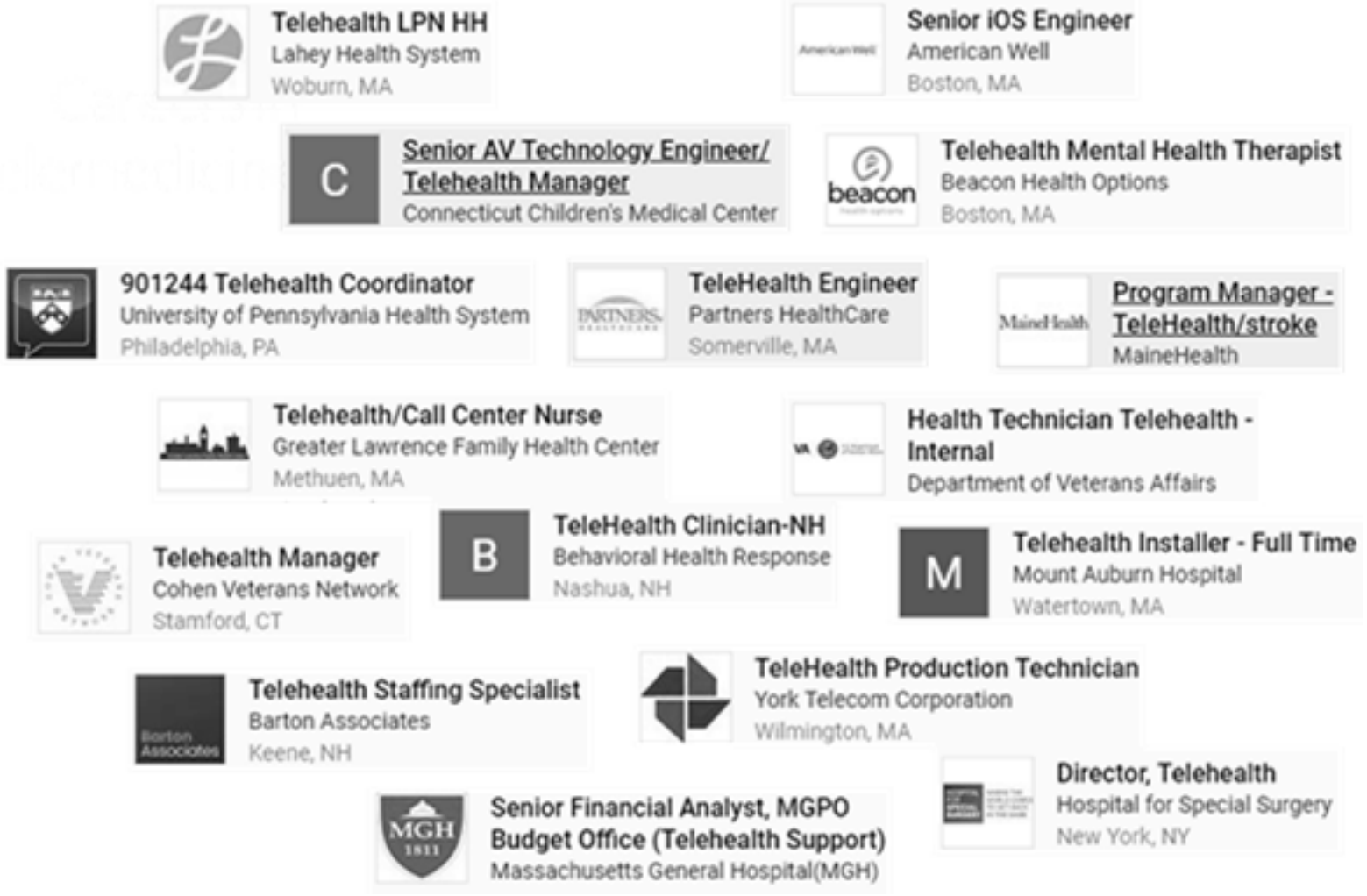
- NICU responders can now see and hear what is happening at the point of care, and can direct more effective care within the first minutes of life
- Live simulation training helped all care teams become familiar with the workflow and identify process gaps
- By using everyday communication tools, technology became transparent to the care teams

The Future of Virtual Medicine

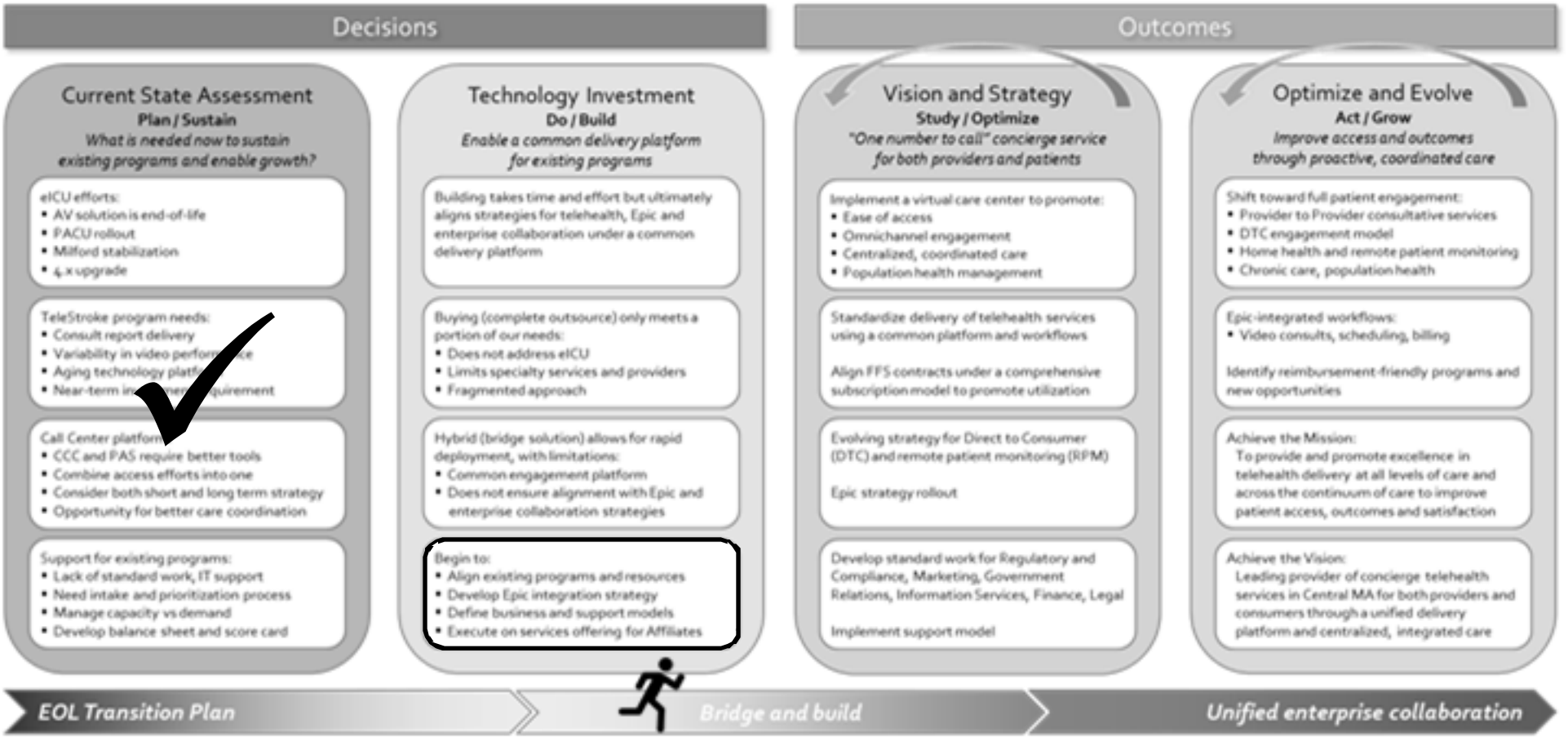
Opportunities for Virtual Medicine

Use Cases	Specialties	Care Settings
Telementoring	Critical Care	Emergency
Telemonitoring	Stroke / Neurology	Inpatient
TelelCU	Behavioral Health	Community Hospitals
TeleStroke	Gastroenterology	Primary Care
Population Health	Dermatology	Urgent Care
E-Visits (asynchronous)	Infectious Disease	Transitional Care
Interactive Video Visits	Rheumatology	Skilled Nursing Facilities
Store and Forward	Surgery / Post-Op	Community Practices
Health Education	Cardiology	Medical Home
mHealth	Pathology	Schools
RPM	Radiology	Retail Clinics
	Ophthalmology	Correctional Facilities
	Chronic Care	Direct to Patient
	Preventive Care	FQHCs

Opportunities in Virtual Medicine



Telehealth Transformation…The Journey Continues



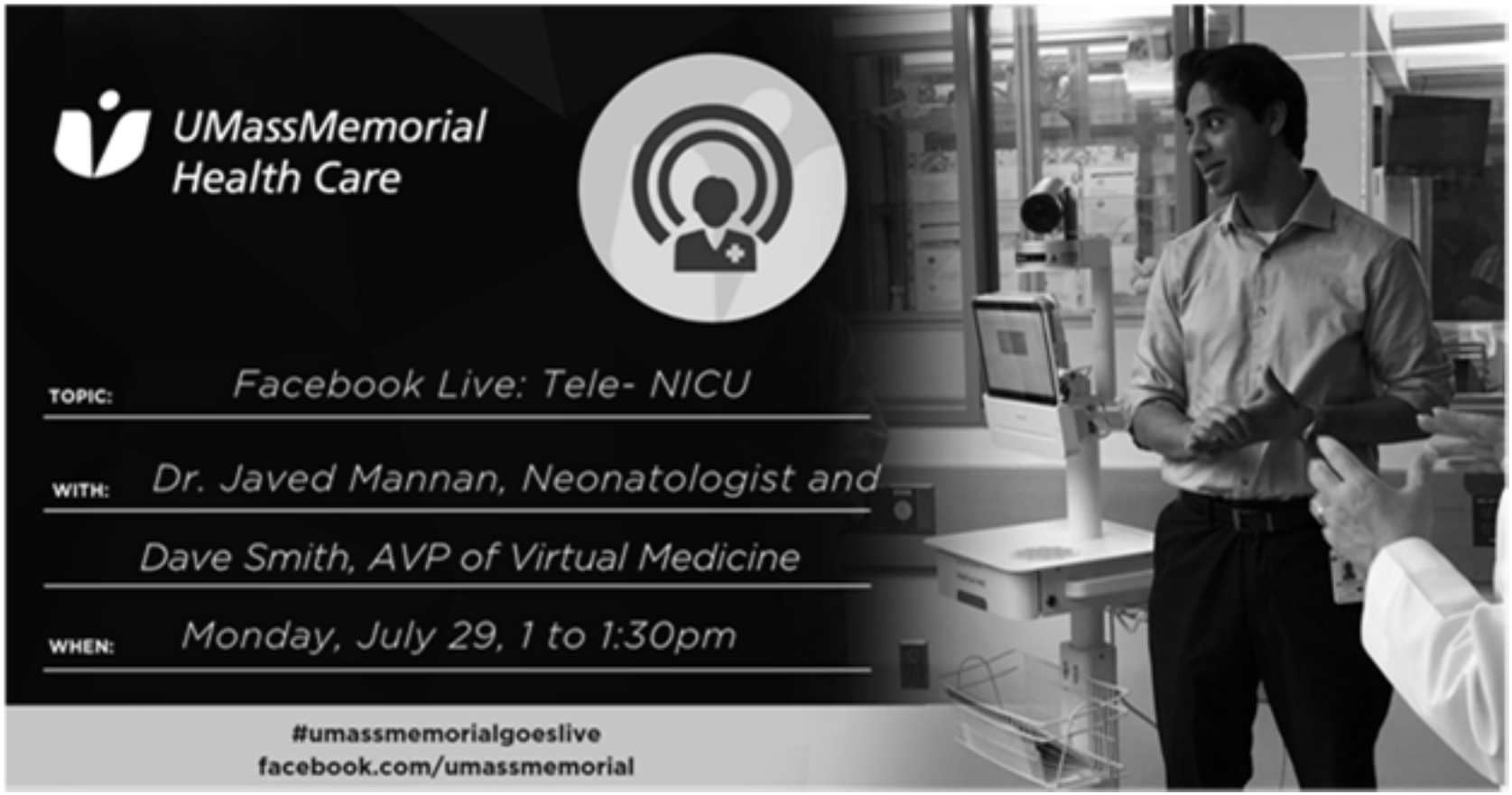
The Future Foretold

"It's the future of medicine," said Dr. Eric Dickson, CEO of UMass Memorial Health Care, about the telemedicine expansion.

Coming in 2019-20:

▪ Pediatric neurology consults	▪ Telecardiology	▪ Virtual check-ins
▪ Clinic-to-dinic video visits	▪ Telepsychiatry (more)	▪ Remote evaluation services
▪ Epic e-Visits	▪ School-based video visits	▪ Infant Sp02 remote monitoring
▪ Epic e-Consults	▪ ED virtual triage	▪ MyChart video visits
▪ Post-op virtual follow up visits	▪ Affiliate specialty expansion	▪ VM training and simulation lab

Watch Us on Facebook Live!



Thank You!

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