Digital Integration at Healthcare's Front Door:
Cycle Time Reduction for Registration & Intake

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DukeHealth

Learning Objectives

- Examine how to utilize lean thinking to deploy digital solutions in a complex multi-matrixed organization.
- Articulate how to align priorities across multiple entities within a single organization.
- Describe how Duke has worked to keep people and patients at the center of digital integration and operational improvements.

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About Us

Elizabeth Howe

- Director of Performance Excellence
- Has worked at Duke for 17 Years
- Graduated from Ohio State with Masters of Business Operational Excellence

Priscilla Putnam

- Performance Excellence Coach
- Has worked at Duke for 5 Years
- Graduated from NC State with Masters of Industrial Engineering

Duke University Health System

MISSION
Advancing Health Together

VISION
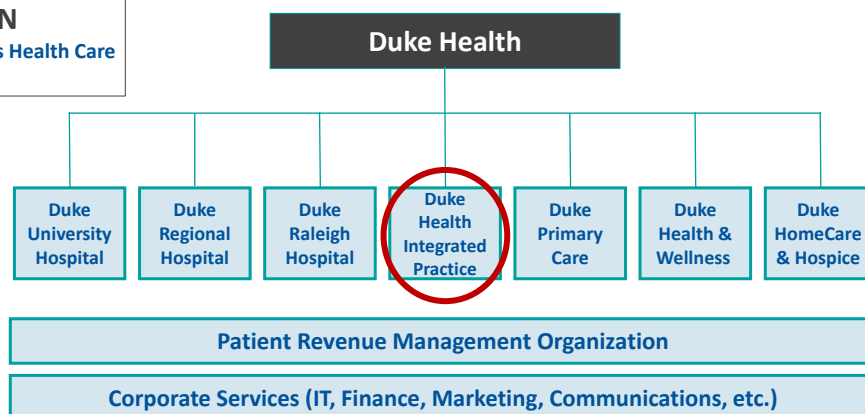Deliver Tomorrow's Health Care Today
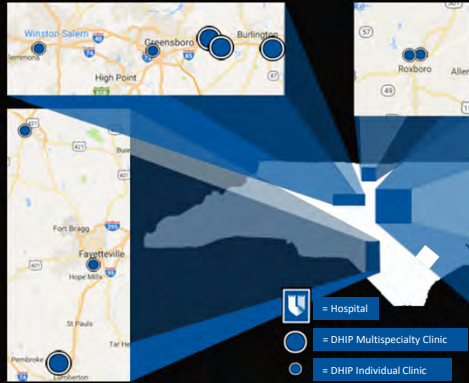
VALUES

Teamwork
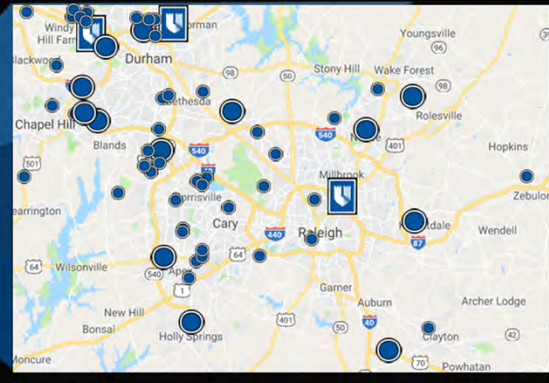
Excellence

Safety

Integrity

Diversity

Duke Health

| Duke University Hospital | Duke Regional Hospital | Duke Raleigh Hospital | Duke Health Integrated Practice | Duke Primary Care | Duke Health & Wellness | Duke HomeCare & Hospice |

Patient Revenue Management Organization

Corporate Services (IT, Finance, Marketing, Communications, etc.)

DukeHealth | Duke Health Integrated Practice

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DHIP Clinic Sites

19 Clinical Departments — 140+ Primary and Specialty Clinics

Poll: What is your Current industry?
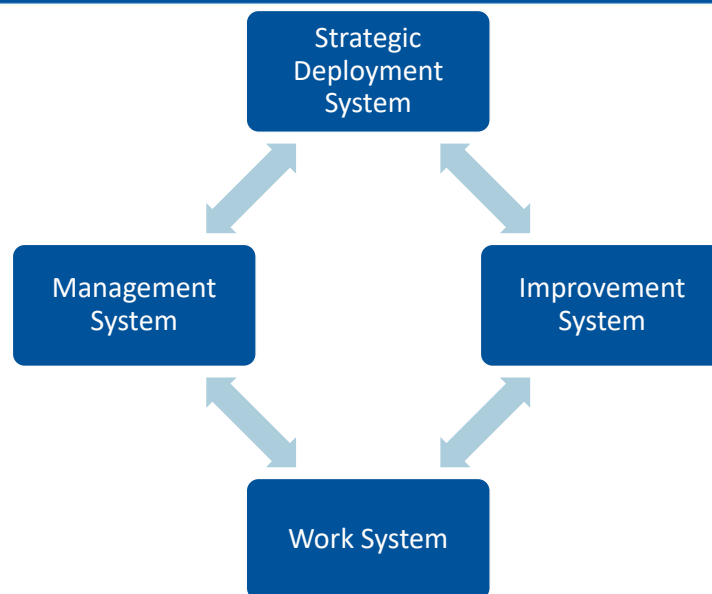
Manufacturing
Healthcare
Service
Tech
Finance/Insurance
Other

The Duke Health Operational Excellence Journey

Duke Primary Care
Lean Initiation:
Work System
— 2010

Duke Primary Care
Continuous Improvement Huddles:
Improvement System
— 2013

Duke Primary Care
Care Redesign:
Rapid Improvement Events
— 2015

Duke Primary Care
Tiered Huddles & Leadership Behaviors:
Management System
— 2017

Duke Quality System
System Wide Engagement
Work, Improvement, Management Systems
— 2019

Duke Quality System
Work Redesign:
Strategic Deployment System
— 2022

Restructure of Performance Services Department
Expansion of improvement team and capacity
— 2023

Timeline: 2010 — 2013 — 2015 — 2017 — 2019 — 2022 — 2023

Duke Quality System

- Strategic Deployment System
- Management System
- Improvement System
- Work System

20% turnover in most industries in 2023

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Photo Credit: digitalspy.com

Reason for Action

At Duke Health, we aspire to **Perfect Patient Care** defined as "what a patient wants and needs, on time, the first time, no inequity, no error, no waste".

The Great Resignation has resulted in unprecedented staffing challenges, impacting our ability to provide **Perfect Patient Care,** and creating a need to re-evaluate our workflows and reduce the dependency on our current staffing models and provide our frontline with different ways of working.
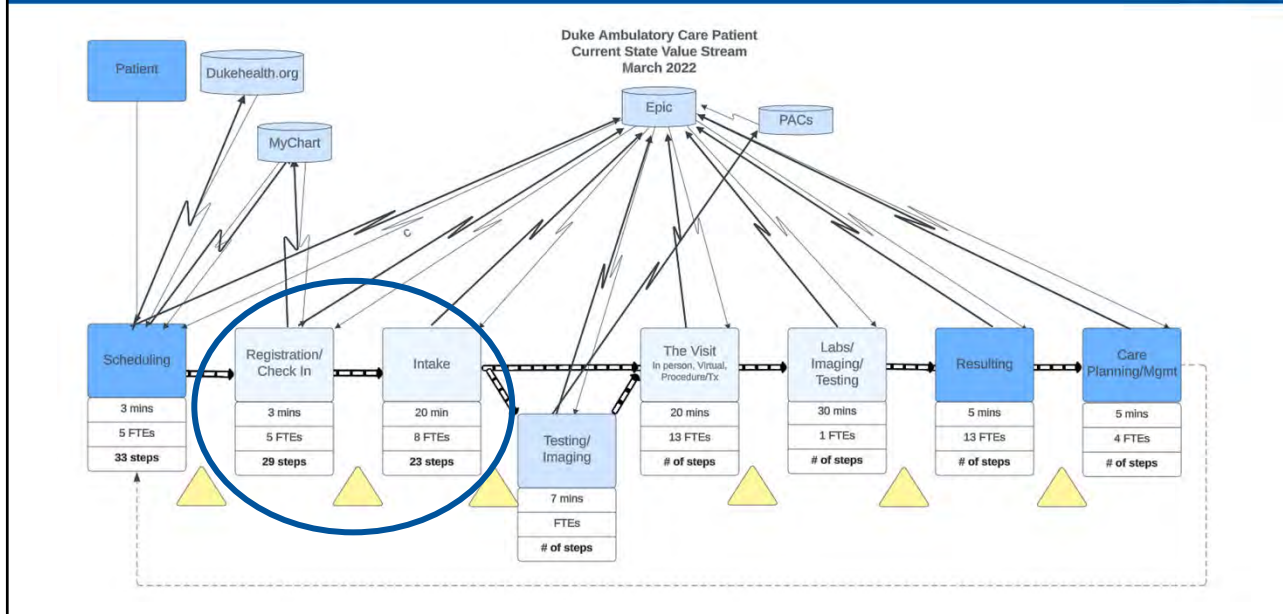
DHIP Leadership engaged in a value stream redesign effort focused on removing waste from workflows and increasing utilization of existing digital platforms to improve the care delivery experience for patients and team members, taking us one step closer to *Perfect Patient Care*.
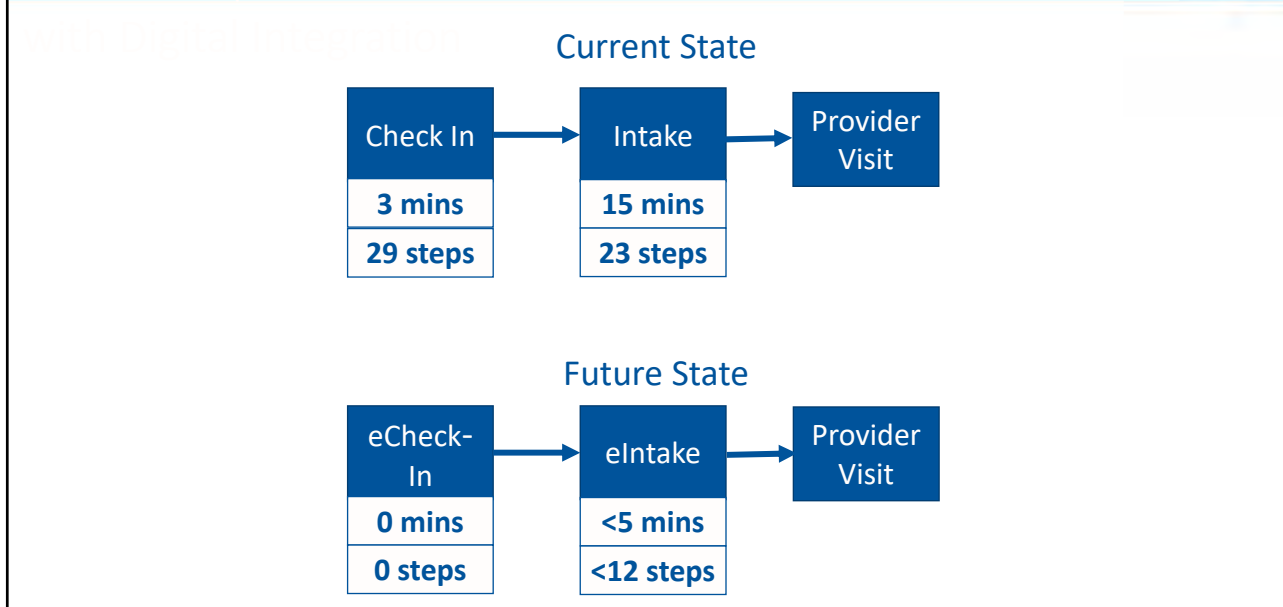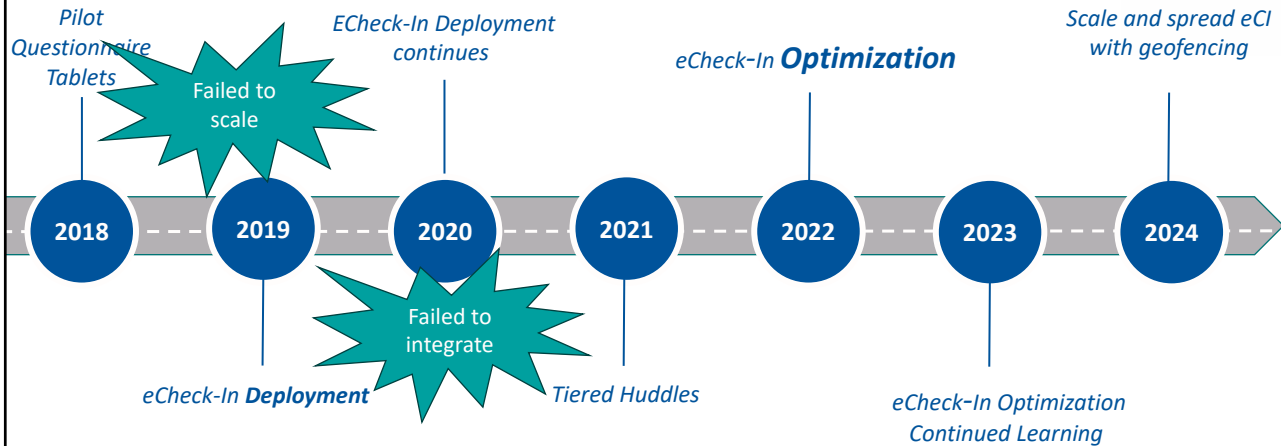
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Value Stream Map

Duke Ambulatory Care Patient
Current State Value Stream
March 2022

Hypothesis: We Can Redesign Ambulatory Workflow by Pairing Lean Principles

with Digital Integration

Current State

Check In	Intake	Provider Visit
3 mins	15 mins	
29 steps	23 steps	

Future State

eCheck-In	eIntake	Provider Visit
0 mins	<5 mins	
0 steps	<12 steps	

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Challenges realizing the promise of digital solutions

Pilot Questionnaire Tablets

ECheck-In Deployment continues

eCheck-In Optimization

Scale and spread eCI with geofencing

Failed to scale

Failed to integrate

2018 — **2019** — **2020** — **2021** — **2022** — **2023** — **2024**

eCheck-In Deployment

Tiered Huddles

eCheck-In Optimization Continued Learning

Failure to Integrate

Key Learning

You can deploy technology, but without a supportive process, it will fail.

Ambulatory Operations

Device Procurement & Support

Digital Strategy Office & MyChart

Registration & Rev Cycle

Photo Credit: istockphoto

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Learning from Previous Failures

Poll: What is the consequence of failure in your organization?

- Blame and Shame
- Reflection and learning
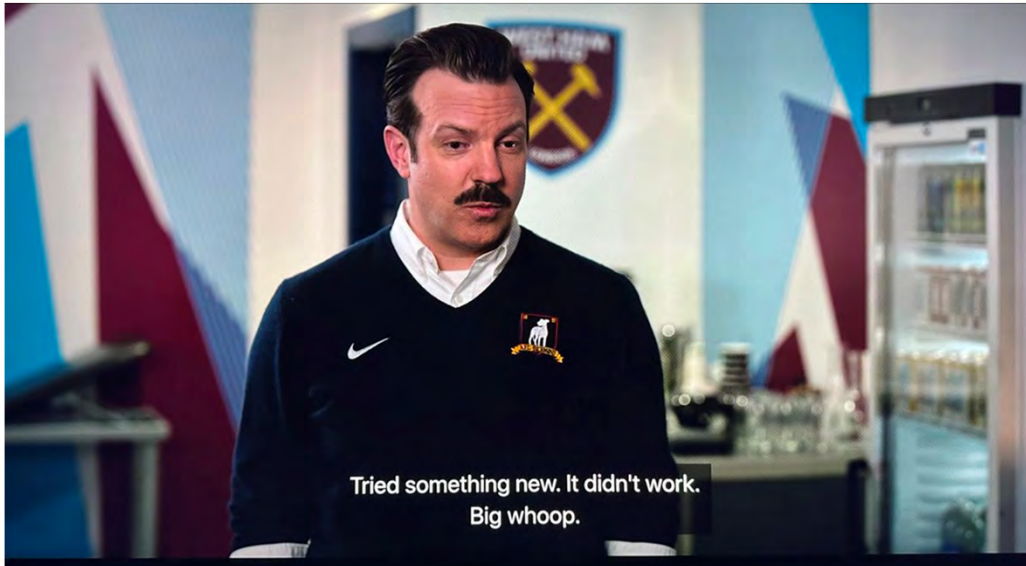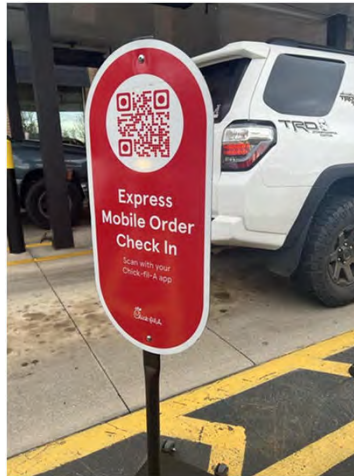- Hide It
- Nothing Happens
- Other

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Tried something new. It didn't work.
Big whoop.

Photo Credit: Mark Graban LinkedIn

Rapid Improvement Event

Photo Credit: Teco Energy

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Voice of the Customer

"We want an optimized digital experience!"

Learning from Previous Failures

Why have we faced difficulties scaling digital registration & intake?

Technology not always reliable
- Barcode scanners don't always work
- Older surface pros get black screens
- No monitoring in place
- Wifi connectivity issues

Lack of ownership
- Local ownership & accountability challenges (one more thing)
- Check the box mentality
- Tickets not submitted timely
- Value not shared and/or demonstrated

Understanding of the why: patients and team
- No expectation setting that digital QTNs are a key part of the visit
- Value not explained to patients or care team
- Check the box mentality vs ensuring functionality
- Poor change management
- "Why" not broadly communicated

Lack of workflow flexibility
- No way to start QTNs at home and finish in clinic
- No method of completing digital workflow in waiting room
- All or nothing set up
- Kickout rules preventing receipt of barcodes for all
- No ability to move equipment

Care team lacks visibility to patient entered information
- Variation in visit navigator set up
- Unable to see QTNs complete vs incomplete
- Unable to see which QTNs have been assigned
- No way to see progress

Patient lacks visibility to important information
- Patient not triggered to complete eCI in MyChart
- Kiosks installed outside of line of sight

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Ambulatory Operations

Registration & Rev Cycle

Device Procurement & Support

Digital Strategy Office & MyChart

Aligning goals across a multi-matrixed organization

- Alignment of strategic priorities
- Consistent goals and measurement across entities
- Shared vision of what success looks like
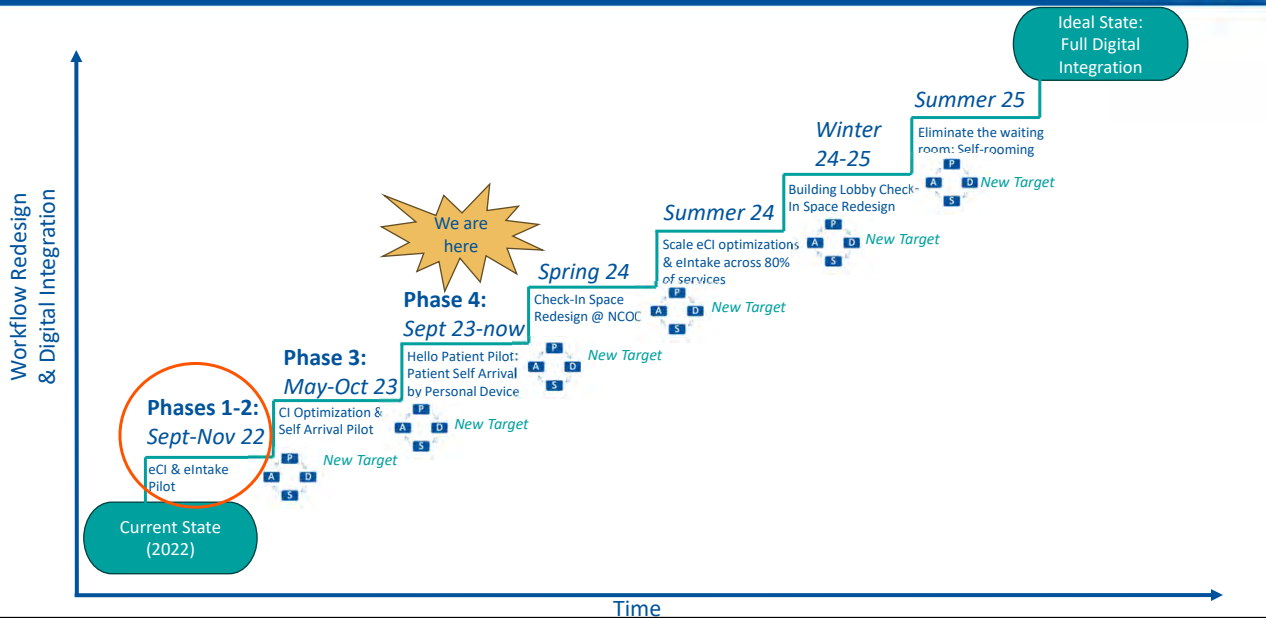- Clarity of who owns what (RACI)
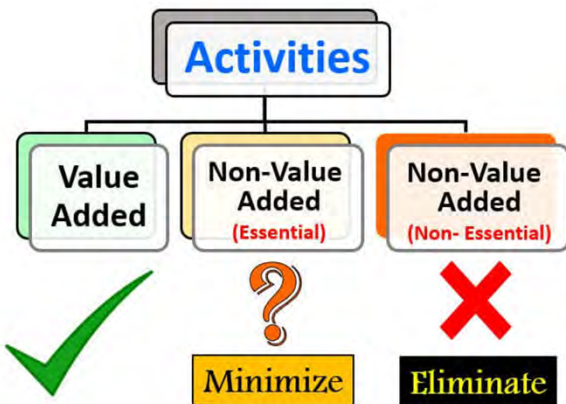- Utilization of the scientific method to ensure gaps are thoroughly uncovered and agreed upon

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Moving from Current to Ideal State

Workflow Redesign & Digital Integration

Current State (2022)

Phases 1-2: *Sept-Nov 22*
eCI & eIntake Pilot
New Target

Phase 3: *May-Oct 23*
CI Optimization & Self Arrival Pilot
New Target

Phase 4: *Sept 23-now*
Hello Patient Pilot: Patient Self Arrival by Personal Device
New Target

We are here

Spring 24
Check-In Space Redesign @ NCOC
New Target

Summer 24
Scale eCI optimizations & eIntake across 80% of services
New Target

Winter 24-25
Building Lobby Check-In Space Redesign
New Target

Summer 25
Eliminate the waiting room: Self-rooming
New Target

Ideal State: Full Digital Integration

Time

Phase 1: Reduction of Non Value Added Processing

What? *(every step)*
Why? *(value added)*
When? *(frequency)*
Who? *(visit type)*
Where? *(digital or in person)*

Photo Credit: Digital eLearning

Phase 1: Reduction of Non Value Added Processing

Intake Standard Work (Rev Date: Sept 5, 2022)

Title: In-Person Orthopaedic Intake

Total Time: <5 mins | **Owner:** *Nurse Manager/Clinic Leader*

Work performed by: RNs, LPNs, Athletic Trainers, Unlicensed Assistive Personnel (MAs, COTs, etc.)

Purpose: To provide a consistent way to prepare the patient for roles.

Expected Outcomes: 1.) Prepped patient ready to see the provider integrated digital intake forms 4.) Improved provider and care te

	New Adult/Peds	Estab Adult
History		
Past Med Hx	x	
Past Surg Hx	x	
Past Fam Hx	x	
Soc Hx	x	
Learn Needs Assess	x	
Soc Drivers Health	x	x(every 6 mos)
Meds	x	x
Allergies	x	x
PHQ2		
Vital Signs		
Height	x	
Weight	x	
BP	x	
HR	x	
Pain Score	x	x
Temp		
O2 Sat		

X- can be bypassed if documented by another provider in the past 30 days

Section Title:		In Person Intake			**Time:** Between 10-15 minutes
No.	**Steps** (A logical segment of the operation that advances the work)	**Time (mins)**	**Expected Outcome** (the why)		**Additional Information**
1	Staff will look at schedule in Maestro to determine if patient has arrived by viewing check in time.	5 sec	Knowing when to start the process		Pull patient information up at the computer before getting the patient. *Ex: Yellow dot indicates patient is ready.* When leaving the computer, lock the screen to protect patient health information (Ex. Press "windows" key + "L" key, or door icon)
2	Call patient from reception area room and escort to exam room (or Intake Room depending on the layout of your clinic).	2 min	*(Connect):* This is the opportunity to set an initial first impression.		Physically go out into the reception area (past the door threshold). Refrain from using Mr/Mrs when calling the patient unless you have looked at the patient's appropriate pronouns. For information regarding different cultures: https://intranet.dh.duke.edu/ent/newscomm/intercom/SitePages/Culture%20Vision%20Tool.aspx
3	Enter the room with the patient, perform hand hygiene while narrating your action before and after any patient physical contact.	3 sec	Articulating the handwashing process and the purpose of protecting patient safety is to ensure that the patient understand that we are		"I am going to wash my hands for your safety" This can be done with soap or hand sanitizer provided in the room

Phase 2: Digital Integration- Registration & Intake

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Phase 2: Digital Integration- Registration

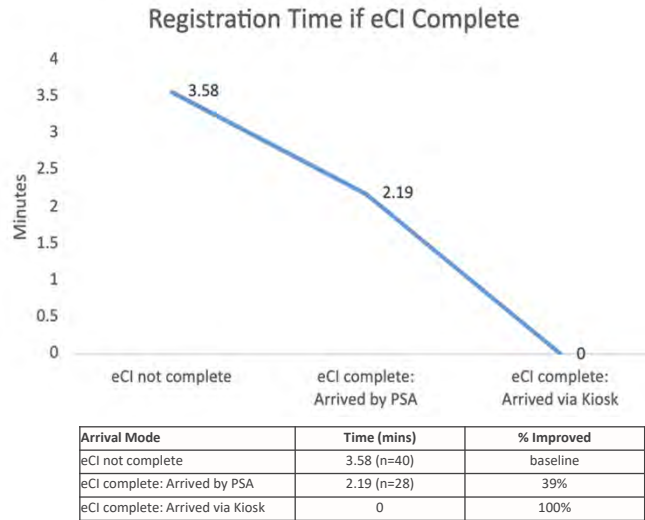# Phase 2: Digital Integration- Registration

Phase 2: Digital Integration- Intake

Phase 2: Digital Integration- Intake

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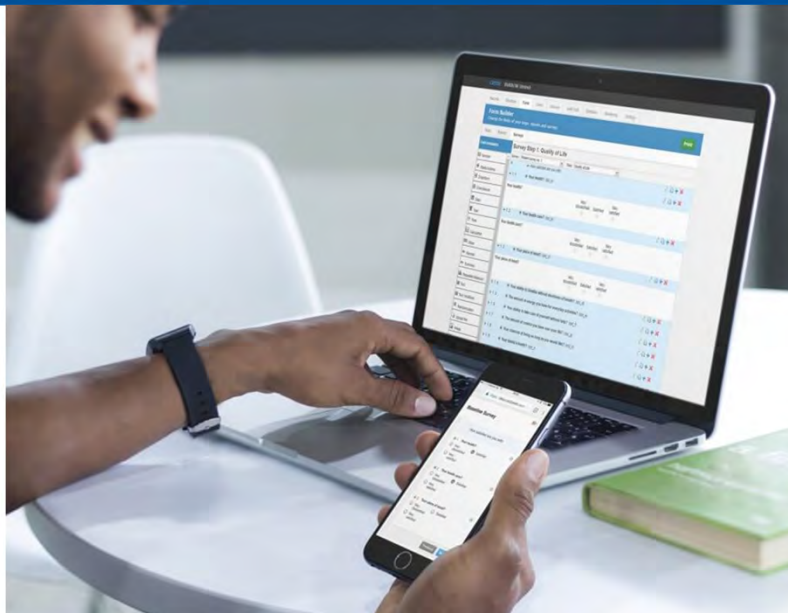
Phase 1 & 2 Results: Registration Time for PSA Reduced by 39%

Registration Time if eCI Complete

Arrival Mode	Time (mins)	% Improved
eCI not complete	3.58 (n=40)	baseline
eCI complete: Arrived by PSA	2.19 (n=28)	39%
eCI complete: Arrived via Kiosk	0	100%

Phase 1 & 2 Results: Overall Intake Time Reduced by 52%!

Intake Time by Visit Type (mins)

Total Intake Time (mins)
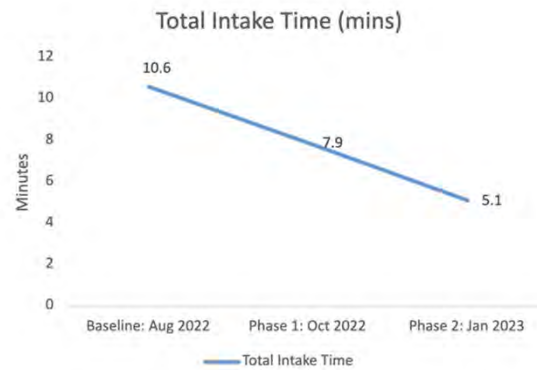
	Baseline: Aug 2022	Phase 1: Oct 2022	Phase 2: Jan-Feb 2023	% Improved
New Pts	11.4	8.4	7.7	35%
Ret Pts	9.8	7.2	4	59%
Post Op Pts	7.8	8.2	4.7	37%

|	Baseline: Aug 2022	Phase 1: Oct 2022	Phase 2: Jan 2023	% Improved
Intake Time	10.6 (n=30)	7.9 (n=46)	5.1 (n=69)	52%

Source: Manual Data Collection @ Ortho Arringdon (8/29/22-2/14/23)

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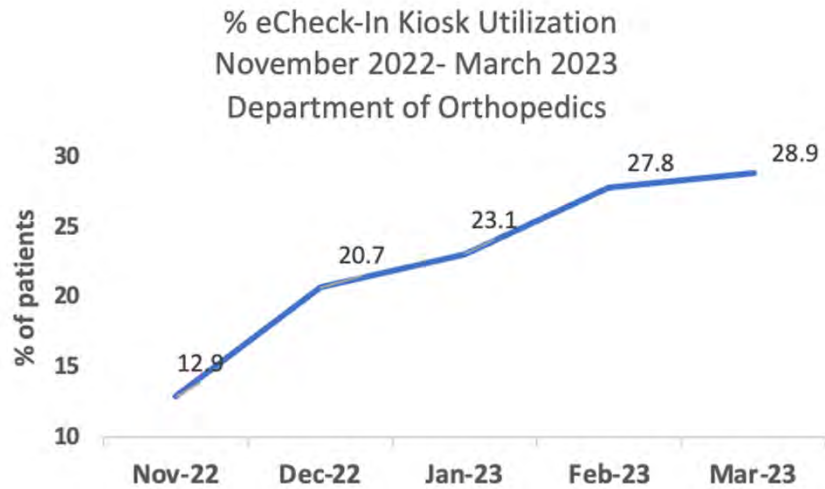# Phase 1 & 2: Reflections & Challenges (Jan 2023)
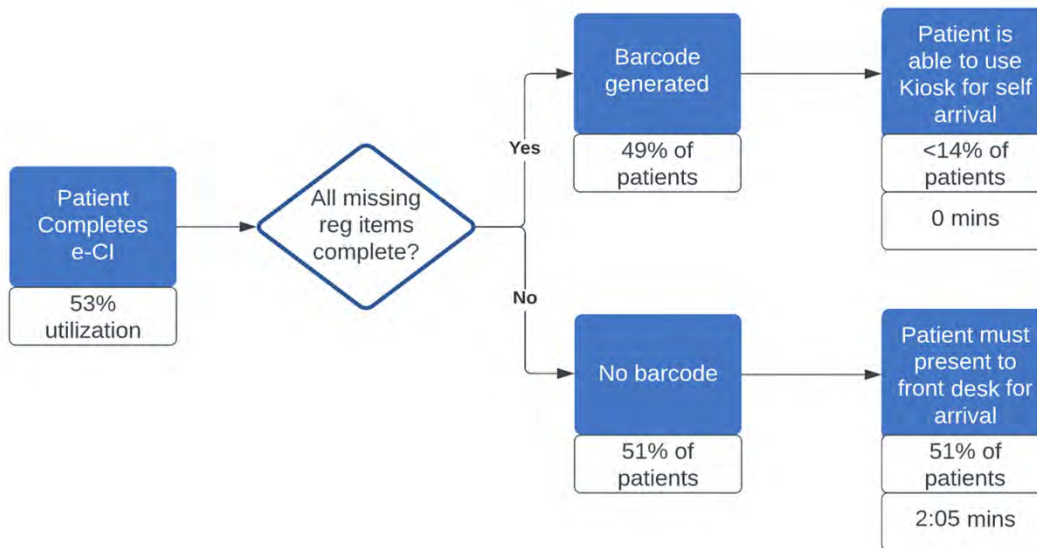
Source: PSWeb Digital Health Engagement Dashboard

Goal #1: Increase % of patients who receive barcodes after eCI completion from 49% to *100% by December 2024*
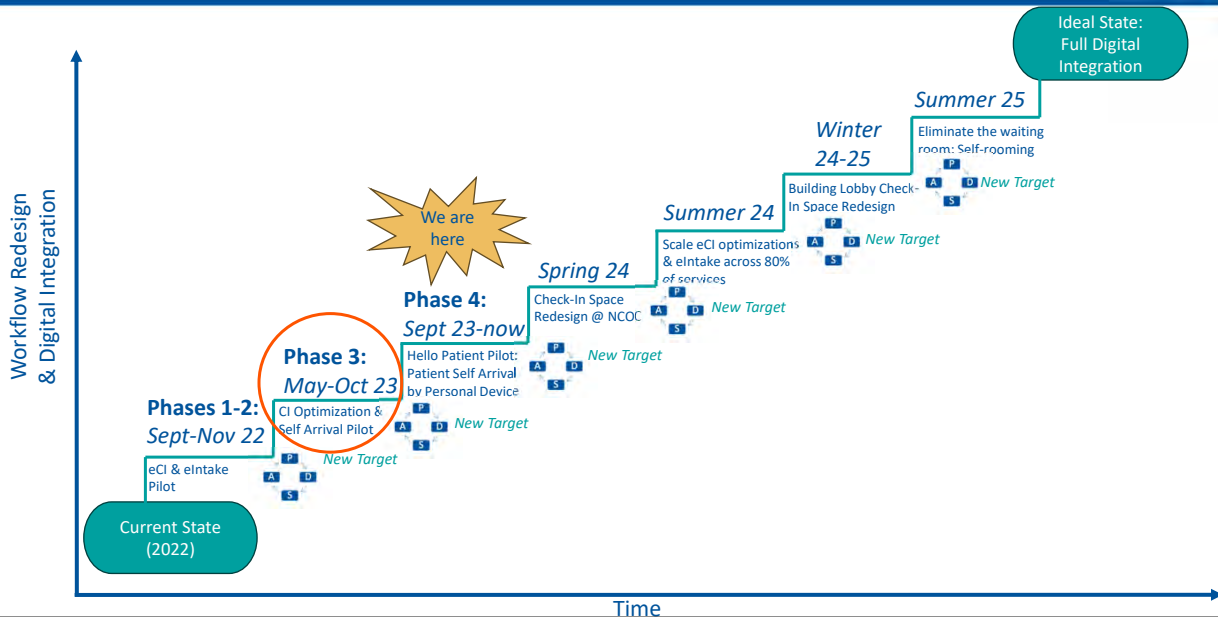

Ortho Pilot: Barcode Suppression Kickouts
11/21/22-12/9/22
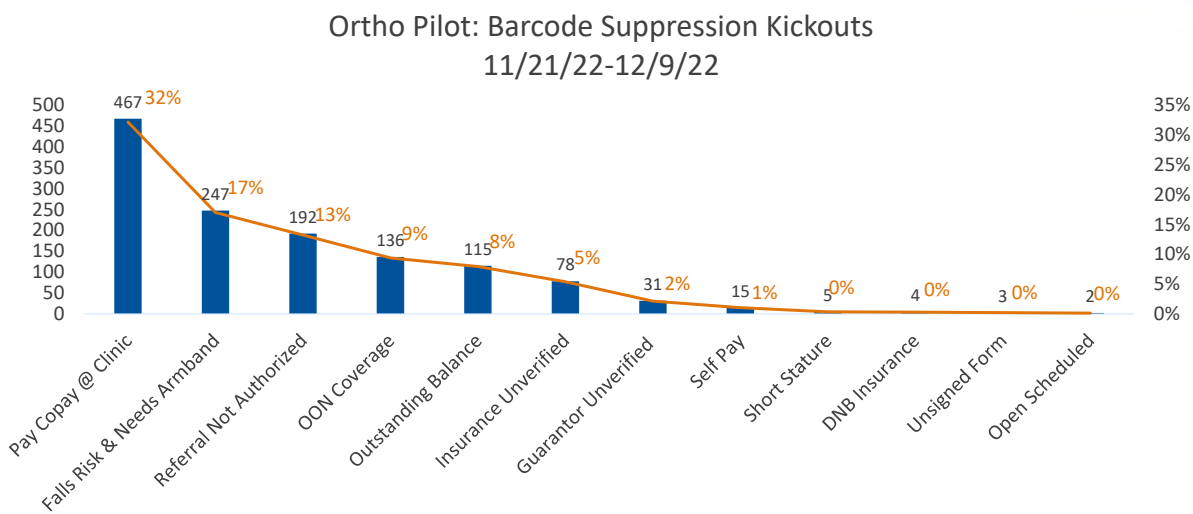
Source: DAR Manual Pull 11/21/22-12/9/22

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Goal #2: Increase % of patients who self-arrive via eCI kiosk from *13% to 60%+ by December 2024*

% eCheck-In Kiosk Utilization
November 2022- March 2023
Department of Orthopedics

Source: PSWeb Digital Health Engagement Dashboard

Moving from Current to Ideal State

Ideal State: Full Digital Integration

Summer 25 — Eliminate the waiting room: Self-rooming — *New Target*

Winter 24-25 — Building Lobby Check-In Space Redesign — *New Target*

Summer 24 — Scale eCI optimizations & eIntake across 80% of services — *New Target*

Spring 24 — Check-In Space Redesign @ NCOC — *New Target*

Phase 4: Sept 23-now — Hello Patient Pilot: Patient Self Arrival by Personal Device — *New Target*

We are here

Phase 3: May-Oct 23 — CI Optimization & Self Arrival Pilot — *New Target*

Phases 1-2: Sept-Nov 22 — eCI & eIntake Pilot — *New Target*

Current State (2022)

Workflow Redesign & Digital Integration

Time

Phase 3: Pilot Summary

Problem Statement: Kickout rules were embedded in the eCI workflow to require patients who had missing registration items to go to the front desk. These rules were preventing ~50% of patients who completed eCI from receiving a barcode to self-arrive via the kiosk.
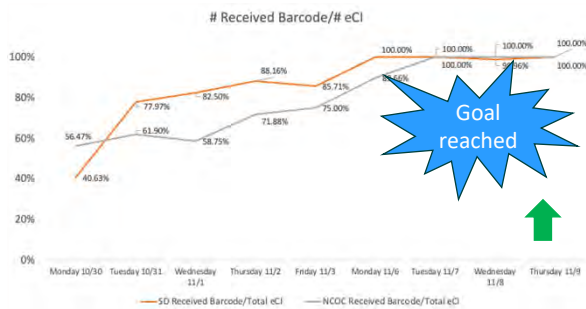
Experiment: Starting 10/30/23, kickout rules were removed for two sites. A custom DAR which allowed front desk staff to identify when a patient self-arrived but still had outstanding items (co-pays, insurance validation, etc.) Patients with missing registration items enabled to self-arrive via kiosk but appointment status displays as "signed in" vs "arrived" until missing items are addressed. Patient engagement materials and verbiage tested.

Measurement: 1.) % eCI barcode generation post eCI 2.) % Self Arrived Appts 3.) % of Signed In Appts of Self Arrived 4.) Registration Quality 5.) Patient and Team Member Feedback
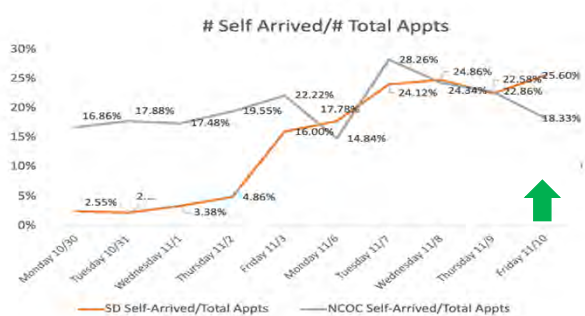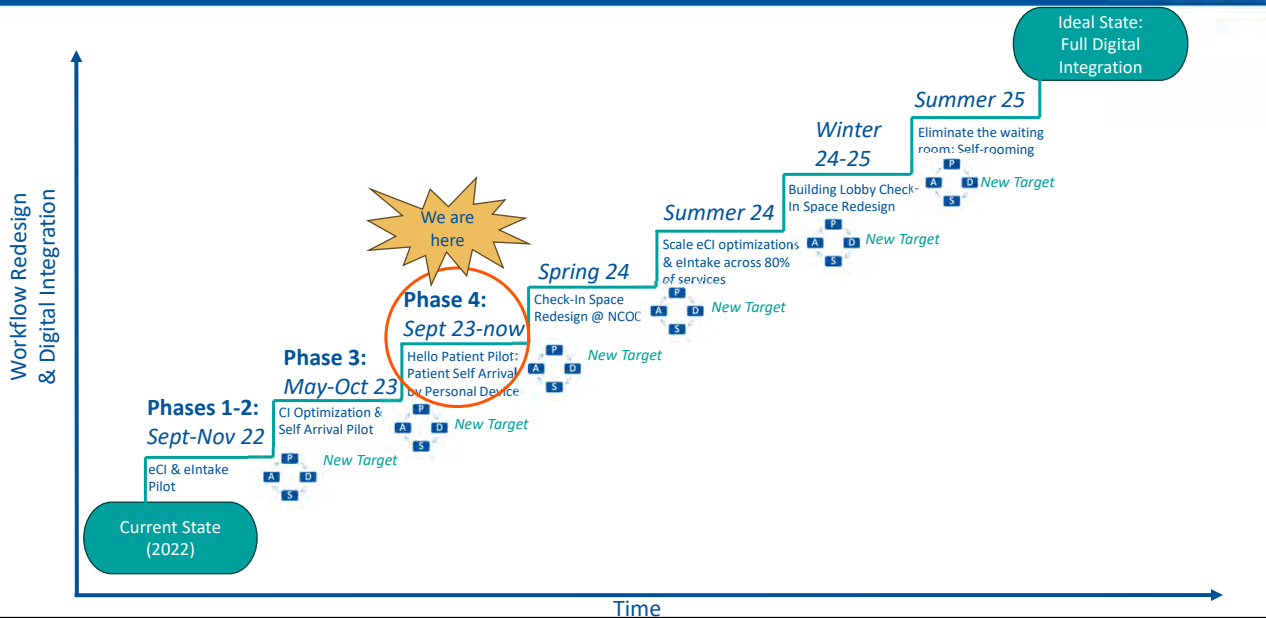

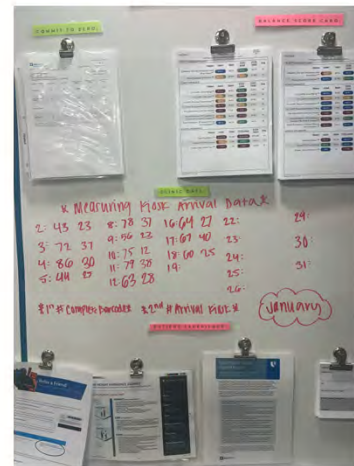
Phase 3: Results

1.) % Barcode Generation

2.) % Self Arrival of Total Appointments

Moving from Current to Ideal State

Workflow Redesign & Digital Integration (vertical axis)

Time (horizontal axis)

Current State (2022)

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Ideal State: Full Digital Integration

Connection to our Management System

Ideal State: Fully Digitally Integrated Experience

Self-Scheduling with 48 hour access

Pre-Visit
- eCheck-In
- eIntake & Screenings

Digital Self Arrival & Rooming
- Virtual or In Person
- Self Arrival
- Self Rooming
- Expedited Intake

Provider Visit
- DAX Supported Documentation
- Staff working to top of scope
- eCheck Out

Digital Care Management
- RPM
- Chat
- 24/7 Triage
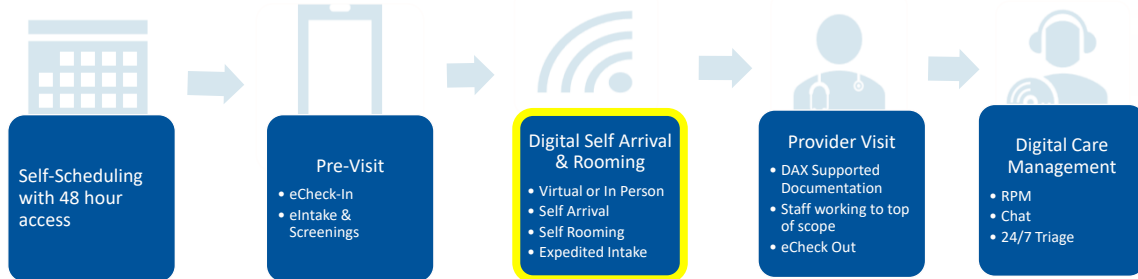
- **Value Stream Redesigned**
  - Registration, clinical screenings, patient histories, reason for visit digitally collected pre-visit
  - Patients able to self arrive via cell phone (Hello Patient or Kiosk)
  - Wayfinding to support direct self rooming
  - Expedited intake supported by self-service

- **Staffing Models Redesigned**
  - PSAs mobile working as concierge
  - Intake staff working at top of scope and supported by non licensed team members for non-clinical tasks
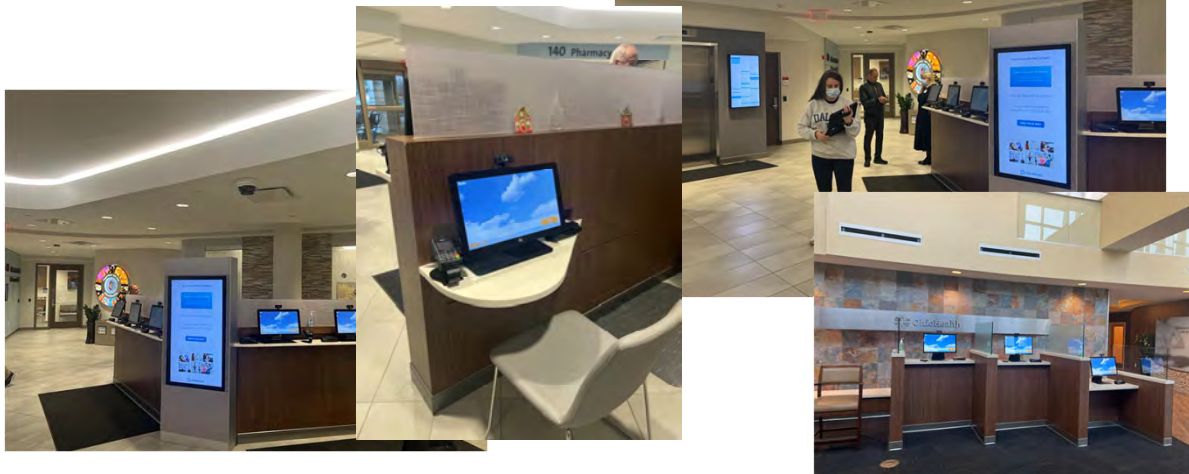- **Clinic Space Redesigned**
  - Space designed to support digital workflows
  - Less space dedicated to front desk
  - More space dedicated to kiosks
  - Limited waiting room space

Learning from Others

Thank you, Ohio Health!

Key Learnings & Reflection

For Duke Health Ambulatory, we anticipate the labor & business challenges will continue.

Rethinking where, when, how, and who does the work is a critical component of long-term sustainability.

Workforce transformation requires an aligned strategy and a deep understanding of the work system.

Workforce transformation also requires psychological safety and a commitment to not lay off employees.

If we fail to keep our people at the center of improvement, those improvement efforts will not sustain.

Learning Objectives

- Examine how to utilize lean thinking to deploy digital solutions in a complex multi-matrixed organization.

- Articulate how to align priorities across multiple entities within a single organization.

- Describe how Duke has worked to keep people and patients at the center of digital integration and operational improvements.

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Discussion & Sharing

1. How have you aligned priorities across your organization? What has worked? What hasn't worked? What did you learn?

2. How have you applied lean principles to digital integration efforts? What has worked? What hasn't worked? What did you learn?

3. How do you leverage the voice of the customer in your improvement work?

4. How has your organization ensured psychological safety amongst front line team members as new technology is deployed?

5. What strategies have you deployed to align stakeholders? What has worked? What hasn't worked? What did you learn?

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