



AGENCY FOR HEALTHCARE RESEARCH AND QUALITY



AHRQ National Web Conference on the Role of Health IT to Improve Care Transitions

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Agency for Healthcare Research
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Agenda



- Welcome and Introductions
- Presentations
- Q&A Session With Presenters
- Instructions for Obtaining CME Credits

Note: After today's webinar, a copy of the slides will be emailed to all participants.

Presenter and Moderator Disclosures



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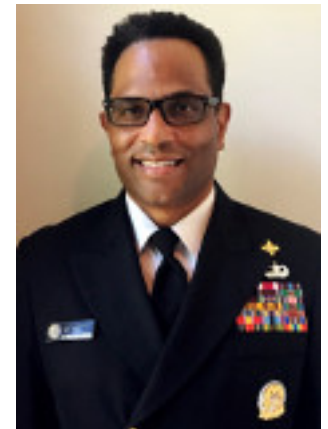
Anuj K. Dalal, MD
Presenter



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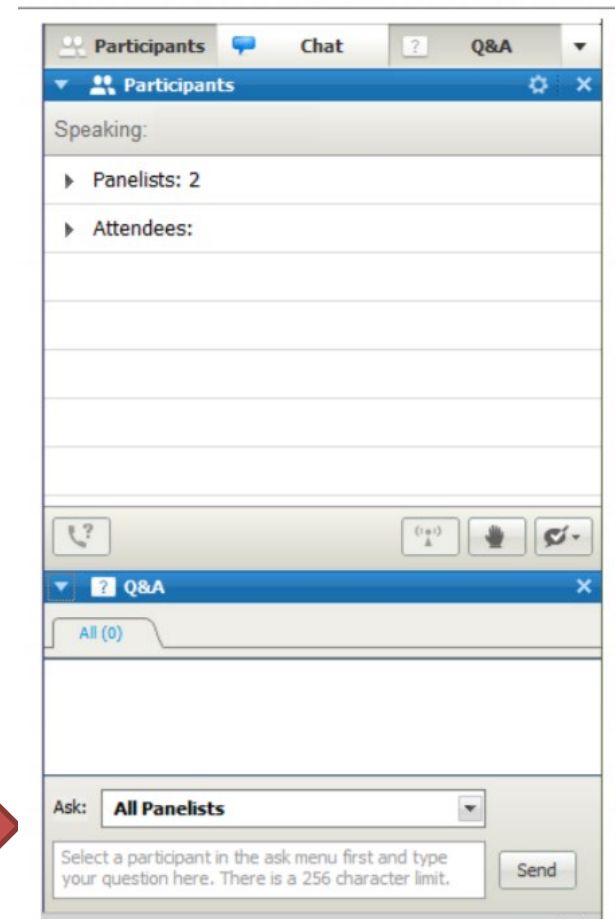
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- At any time during the presentation, type your question into the “Q&A” section of your WebEx Q&A panel.
- Please address your questions to “All Panelists” in the drop-down menu.
- Select “Send” to submit your question to the moderator.
- Questions will be read aloud by the moderator.



Learning Objectives

At the conclusion of this web conference, participants should be able to:

1. Describe the role of health IT in improving health outcomes during care transitions for patients with complex conditions.
2. Describe how mHealth technology can be used to improve care coordination and transitions.
3. Identify barriers and facilitators of implementation, adoption, and use of a patient-centered discharge toolkit.
4. Discuss the use of clinical decision support tools to improve the quality of transitions for adults with multiple chronic diseases.



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Interactive Patient-Centered Discharge Toolkit (PDTK) to Promote Self-Management During Transitions

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Associate Professor of Medicine, Harvard Medical School

Associate Director, Brigham-Harvard Fellowship in Hospital Medicine

Learning Objectives



Learning Objective 1: Describe design and development considerations

Learning Objective 2: Identify barriers and facilitators to implementation, adoption, and use of patient-centered discharge tools in clinical practice

Learning Objective 3: Discuss potential impact of patient-centered discharge tools on key patient accounts

Background

- Transitions from the hospital can be unsafe, resource intensive, associated with poor experience
 - ▶ Discharge process is often initiated late during the hospitalization
 - ▶ Suboptimal discharge preparation can lead to delays, stress for clinicians, dissatisfaction among patients and caregivers
- Incorporating patient/caregiver-reported concerns about their discharge preparedness via standardized checklists may facilitate proactive identification of concerns prior to discharge

Project Goals



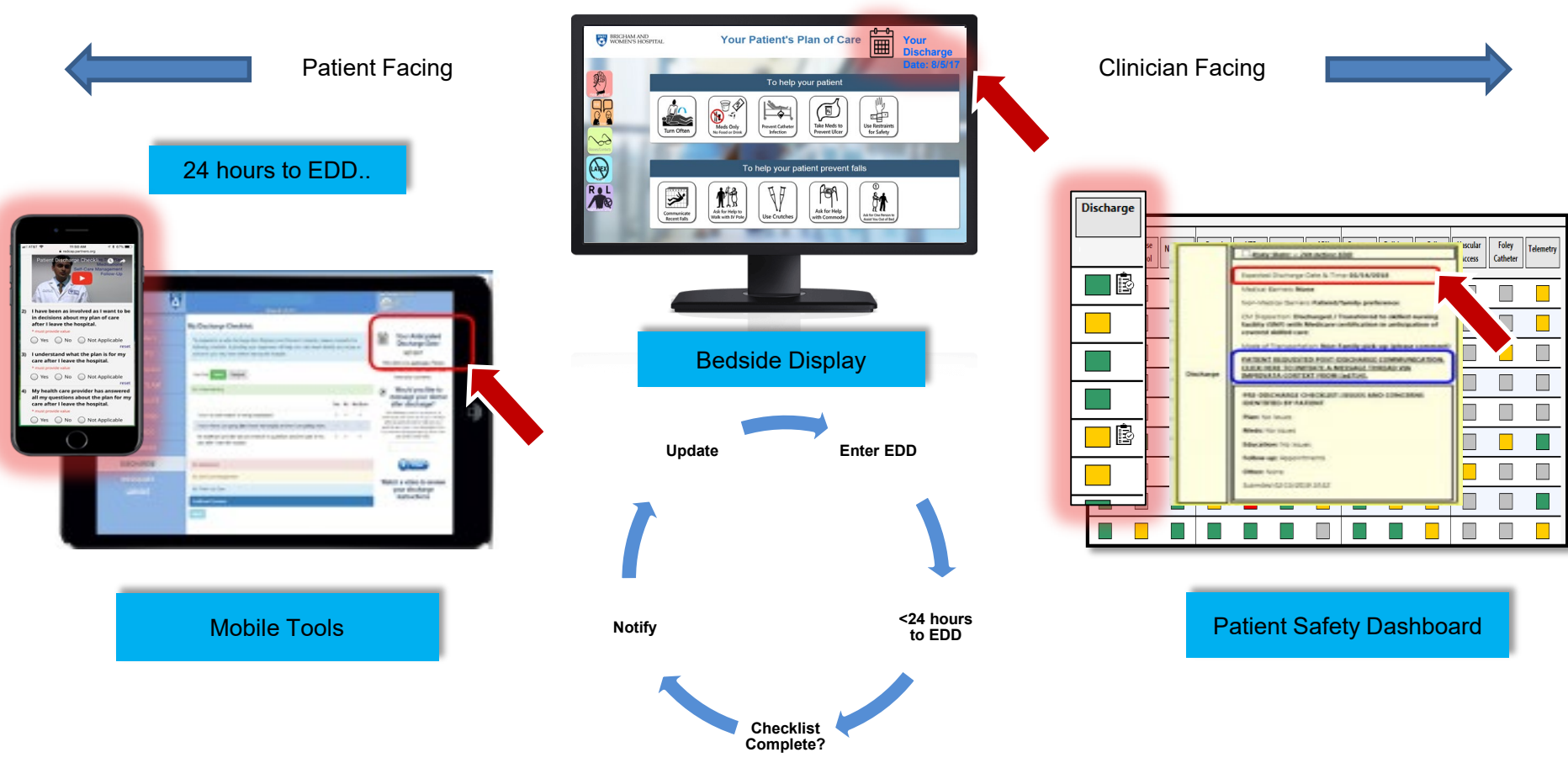
As part of our AHRQ-funded (R21 HS024751) study, we aimed to:

- Facilitate proactive discharge preparation by administering a 16-item electronic discharge checklist and web-based video to patients (or caregivers) approx. 24 hrs prior to their expected discharge date (EDD)
- Display patient-reported concerns from the checklist on a clinician-facing safety dashboard (integrated into the EHR) in real time
- Provide patients (or caregivers) the option of requesting secure post-discharge text messaging with their discharging attending

Methods

- Engaged institutional stakeholders to ensure intervention components aligned with organizational priorities:
 - ▶ Identifying discharge barriers, improving accuracy of EDD entry, enhancing patient experience, reducing costs (decrease length of stay, readmissions)
- Implementation:
 - ▶ Measured quantitative patient and clinician usage data and type/frequency of patient-reported discharge concerns
 - ▶ Conducted interviews and observations, and analyzed feedback from patients and clinical staff; used a 2-person consensus approach to identify key implementation barriers and strategies to promote adoption
- Evaluation:
 - ▶ Conducted pre-post study to assess impact of intervention on key clinical outcomes: Patient Activation (PAM-13), post-discharge healthcare resource utilization (urgent care, emergency room visits, readmissions)

Digital Health Intervention: PDK Enhancements to Epic-Integrated Infrastructure

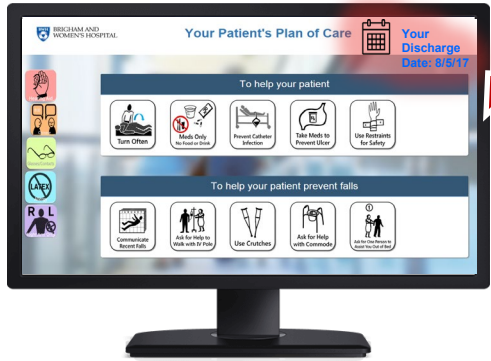


Patient Facing

24 hours to EDD..

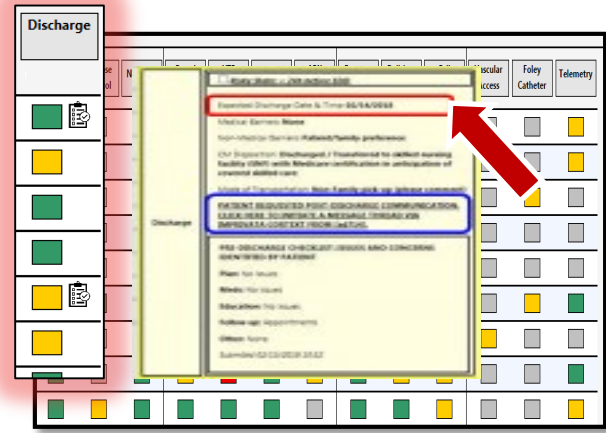


Mobile Tools



Bedside Display

Clinician Facing



Patient Safety Dashboard

PDTK: Checklist & Video



PATIENT DISCHARGE PREPARATION CHECKLIST

(To be completed by patients or caregivers
24-48 hours before estimated discharge date)



My Understanding

Yes No Unsure

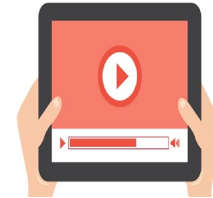


- I know my main reason for being hospitalized
- I know where I am going after I leave the hospital and how I am getting there
- My healthcare provider has answered all my questions about my stay at the hospital

My Medications



- I understand what medications I will be taking (including over-the-counter and prescription) and how to take them once I leave the hospital
- I understand how to get my medications and will take them as directed
- I will be able to cover the out-of-pocket costs for my medications, including any copayments, deductibles, or authorizations required by my insurance plan
- I understand the potential side effects of my medications and who to contact if I should have one
- I am all set with my prescription home medications, I do **NOT** need any refills or renewals right now



My Self-Care Management

Yes No Unsure



- I understand everything I can do to keep my health problems from getting worse
- I understand what signs/symptoms I need to watch out for and what to do if I notice them after I leave the hospital
- I understand what I can eat, what activities and exercise I am permitted to do after I leave the hospital
- I understand what medical equipment and supplies I will need at home and how to use them comfortably



My Follow-Up



- My family or someone close to me knows that I am leaving the hospital and what I need
- I have a follow-up appointment scheduled with my primary care provider or another healthcare provider, and I have a plan in place to get to it
- I have the name and contact information of a hospital provider I can contact if a problem arises after I leave the hospital
- I understand the tests and procedures that require follow up as well as the ones that I need to have after I leave the hospital



Do you have additional concerns about your discharge?
(e.g., estimated discharge date, work notes, belongings,
parking validation, specific questions, etc.)

PDTK: Checklist-Dashboard Interaction

A Patient's Pre Discharge Checklist

Please select which of these you are: Patient Caregiver

My Understanding

My Medications

	Yes	No	Not Sure
I understand what medications I will be taking (including additions and changes), what they are for, and how to take them once I leave the hospital.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I understand how to get my medications and will take them as prescribed after I leave the hospital.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I will be able to cover the out-of-pocket costs for my medications, and my care team has received all authorizations required by my insurance plan.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I understand the potential side effects of my medications and who I should contact if I have one.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I am all set with my prescription home medications, I do NOT need any refills or renewals right now.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

My Self-Care Management

A Upon submission, a checklist icon is triggered in dashboard → patient-reported data available in EHR in **real time**

14A Unit Safety Dashboard

Service: 15:33	Discharge	Code Status	Glucose Control	Nutrition	Bowel Regimen	VTE PPX	Opioid Mgmt	ABX Mgmt	Pressure Ulcers	Delirium Mgmt	Fall Risk	Vascular Access	Foley Catheter	Telemetry	Pa Expe
ed: 15:18	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
hed 15:34	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
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B Providers can review the checklist in the safety dashboard

C At discharge, initiate secure messaging thread

Legend: ■ Not Applicable ■ Guideline Compliant ■ Risky State ■ Action Needed



Implementation: Usage & Adoption



- 752 general medicine patients approached from January 2018 to June 2018
 - ▶ Checklist submitted for 510
 - ▶ Checklist non-submitted for 242: patient unavailable (126); not appropriate per RN (97); declined (41); did not speak English or Spanish, no caregiver available (33); did not respond by email when reminded (8); encountered technical issues (8)
- Demographics of non-submitters:
 - ▶ Older; more often Hispanic and non-English speaking; had non-standard insurance or self-insured, had higher DRG weights, longer lengths of stay; discharged to a destination other than home.

Implementation: Usage & Adoption



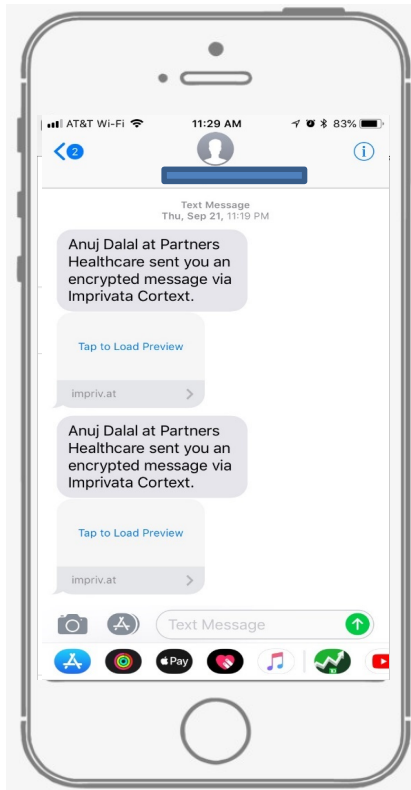
Discharge Checklist Results (N=510)

- ▶ 2,164 patient-reported concerns across all domains; 4.24 concerns per checklist submitted
- ▶ 355 plan (16.4%); 664 medications (30.7%); 437 self-care (20.2%); 656 followup (30.3%)
- ▶ 52 (2.4%) “Other”; unaddressed clinical concerns and non-medical barriers

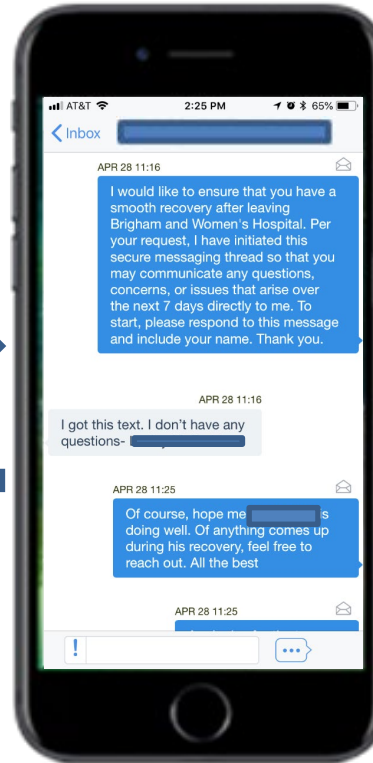
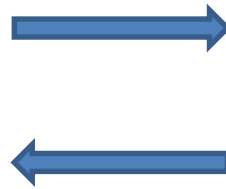
Post-Discharge Messaging (N=422)

- ▶ 141 (33.4%) patients requested post-discharge messaging by providing their mobile phone number when they submitted a checklist
- ▶ Of these 141 requests, 3 (2.1%) physicians (2 attending, 1 senior resident) initiated communication

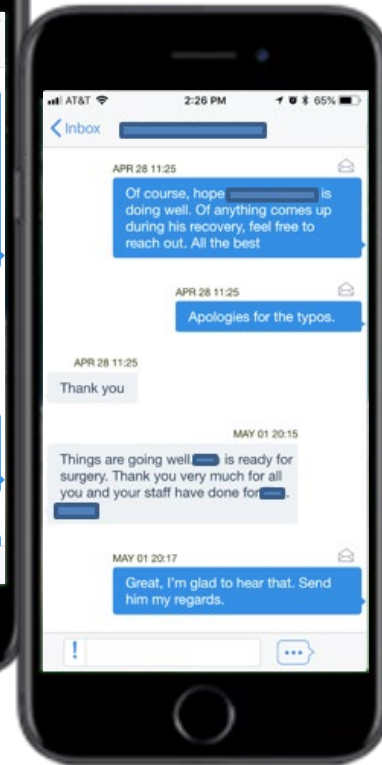
Implementation: Example of Secure Text Exchange After Discharge



Patients or Care Partners



Clinicians



Implementation Themes: Description & Quotes



Checklist and Video		
Valuable for patients	The checklist and video increased understanding of self-care needs and follow-up plans and promoted patient engagement and empowerment in the discharge process.	<p>“I may think of questions I didn’t really have. Definitely worth it. It actually makes you think.” –a patient</p> <p>“[The checklist] made the patient feel like a more active participant [in] their care...” –a clinician</p>
Patient utility dependent on timing of administration	The checklist and video were most useful when administered close to discharge, but prior to detailed discussion of discharge preparation by a care team member.	“Well, it was a little unclear given that we’re not about to leave. It’s hard to report on the process because it hasn’t actually happened yet.” –a patient
Safety Dashboard		
Low awareness, variable workflow	Although clinicians were generally aware, checklist answers were variably viewed on the safety dashboard.	“[Discharge checklist responses] on the dashboard?... Did not know that.” –a clinician
	Reinforcement and reminders to use the safety dashboard to review patient-reported discharge concerns was variable.	“When it first rolled out there was a lot of information about it and then it just dropped off, and then the usage dropped off...” –a clinician
	The workflow for entering and updating EDD was inconsistent and included both clinical and non-clinical staff.	“[EDD] not really my workflow...I mean we’ll put in [the EDD], and it’ll get changed by a unit coordinator on a different pod” –a clinician
Lack of optimization	Discharge column flag logic was often misinterpreted by different clinicians.	“The senior resident did not know really, what green [dashboard flags] meant...are [the patients] ready to be discharged?” –a clinician
	Summarized checklist responses displayed in safety dashboard were too broad and non-specific. Clinicians could not quickly access the entire checklist.	“I would look at [the safety dashboard] sometimes and wonder what [the patient] clicked off [on the checklist], but sometimes I couldn’t tell exactly what they had questions about.” –a clinician
Inconsistent leadership	Usage was dependent on senior level clinician leadership (attending or senior resident).	“...when the attendings were into it we were all into it for that week.” –a clinician

Evaluation

- Enrolled 245 pre-intervention, 234 post-intervention
 - ▶ 215 (45%) available for follow-up at 30-days
- Mean PAM-13 scores significantly increased from pre to post in unadjusted but not adjusted analyses
- Post-discharge healthcare utilization was unchanged
 - ▶ Urgent care
 - ▶ ED visits
 - ▶ Readmissions

Lessons Learned

IMPLEMENTATION BARRIERS	STRATEGIES TO PROMOTE USE
Video	
Timing and access of video after admission to unit	<ul style="list-style-type: none">• Make videos available via patient portal, bedside display, television• Engage nurses to have patients watch videos as EDD approaches
Too generic and impersonal	<ul style="list-style-type: none">• Have clinical unit leaders create unit-specific videos• Create videos for each attending, play video for patient's current attending by linking to the treatment team in the EHR• Translate videos into common languages (e.g., Spanish) using medical interpreters

Lessons Learned

IMPLEMENTATION BARRIERS	STRATEGIES TO PROMOTE USE
Checklist	
Timing and administration	<ul style="list-style-type: none">• Determine optimal timing of checklist administration for specific patient categories (e.g., admissions for acute on chronic disease exacerbations; awaiting procedures; undifferentiated diagnoses)• Demonstrate impact on key hospital priorities and process metrics (EDD accuracy, early hospital discharges)
Patients' belief that clinicians will address all items	<ul style="list-style-type: none">• Encourage patients to review checklist early during hospitalization• Allow patients to update checklist responses as EDD approaches or changes
Checklist responses out-of-date due to discharge delays	<ul style="list-style-type: none">• Identify workflow to update checklist after initial submission (e.g., notification via patient portal, email, or mobile app)

Lessons Learned

IMPLEMENTATION BARRIERS	STRATEGIES TO PROMOTE USE
Safety Dashboard Discharge Column	
Variable EHR data entry of key data elements (EDD, medical, non-medical barriers)	<ul style="list-style-type: none"> • Demonstrate how EDD can be viewed by patients (patient portal, bedside display) and clinicians (bedside display, dashboard) • Add a confidence indicator that estimates the likelihood that EDD will equal ADD to manage patient and clinician expectations • Demonstrate value of structured EHR data entry for driving dashboard logic (flagging red when EDD not entered) • Encourage checklist completion for patients at high risk for readmission by incorporating patient-specific readmission risk scores from EHR
Competing quality improvement (QI) interventions	<ul style="list-style-type: none"> • Understand current institutional priorities and emerging workflows for identifying and escalating discharge barriers • Propose enhancements based on lessons from concurrent QI efforts
Poor specificity of patient-reported concerns viewed in dashboard	<ul style="list-style-type: none"> • Provide a link to discharge checklist questions and patient's responses • Link patient-reported concerns to specific clinical actions (e.g., if poor understanding of main diagnosis, update After Visit Summary with condition-specific educational materials)

Lessons Learned

IMPLEMENTATION BARRIERS	STRATEGIES TO PROMOTE USE
Secure Post-Discharge Messaging	
Physician resistance	<ul style="list-style-type: none">• Frame the initiation of secure messaging thread as an opt-in process• Align with value-based incentives for clinical services (readmissions)• Communicate success stories from early adopters to assuage fears
Managing patient expectations about whether physicians will initiate secure messaging	<ul style="list-style-type: none">• Educate patients about the opt-in process for attendings• Encourage patients to request attendings to use this feature for clearly defined reasons (e.g., concern about obtaining a key medication)

Conclusions (I)

- High degree of acceptance by patients and caregivers for completing the checklist and watching videos:
 - ▶ Potentially useful strategy for engaging patients in discharge preparation at scale
 - ▶ Most patients self-reported some uncertainty about specific checklist items, indicating they may not be well prepared for discharge
- Modest use of EHR-integrated components
 - ▶ More work required to make the information more actionable for clinicians

Conclusions (II)

- Many patients requested post-discharge messaging; however, few clinicians acted upon the request:
 - ▶ Patients want to communicate with their physicians after discharge
 - ▶ Clinician awareness is poor, and they have no incentive to do this
- Key outcomes (patient activation, post-discharge resource utilization, readmissions) unlikely to be improved unless:
 - ▶ Adoption challenges addressed
 - ▶ Intervention used more routinely as part of clinical operations

Acknowledgements



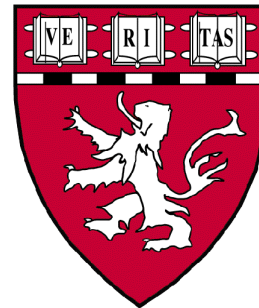
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AGENCY FOR HEALTHCARE RESEARCH AND QUALITY



Using Location-Based Smartphone Alerts Within a System of Care Coordination

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Research Collaborators

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Participants/Partners

- Patient participants
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- Northwestern Memorial Hospital
- Feinberg School of Medicine

Background: Care Coordination

- Care coordination: important but difficult
 - ▶ Especially difficult *between* organizations
- Care transitions: multiple opportunities (& failure points)



Care Coordination & Health IT



- Provider-facing information technology (IT)
 - ▶ Limited adoption of health information exchange (HIE)
 - ▶ Health IT use not associated with receiving hospital discharge information
- Patient-facing IT
 - ▶ Patient portals: low use by vulnerable populations
 - ▶ Smartphone ownership nearly universal among age <65
 - ▶ Rise of location-based smartphone services
 - Navigation
 - Ads
 - Ride hailing

Exploratory Research: Location Tracking for Care Coordination



Patient focus groups

- Most had Android OS
- Limited concerns with location tracking
- Minimize prompts/false alarms, battery drain

Clinician & care manager interviews

- *'The only time I know when my patients are in the hospital is when I send them there'*
- *'We just want to know that they're there, and then we can... triage whether they actually need to come in at a later date'*

Aims

To design and implement an intervention that uses smartphone location tracking to facilitate care coordination following hospital encounters

1. App identifies hospital encounters*
2. Timely notification of care team
3. Team-based coordination

* Emergency department (ED) visits or inpatient admissions

Setting: FQHC with Care Management Program

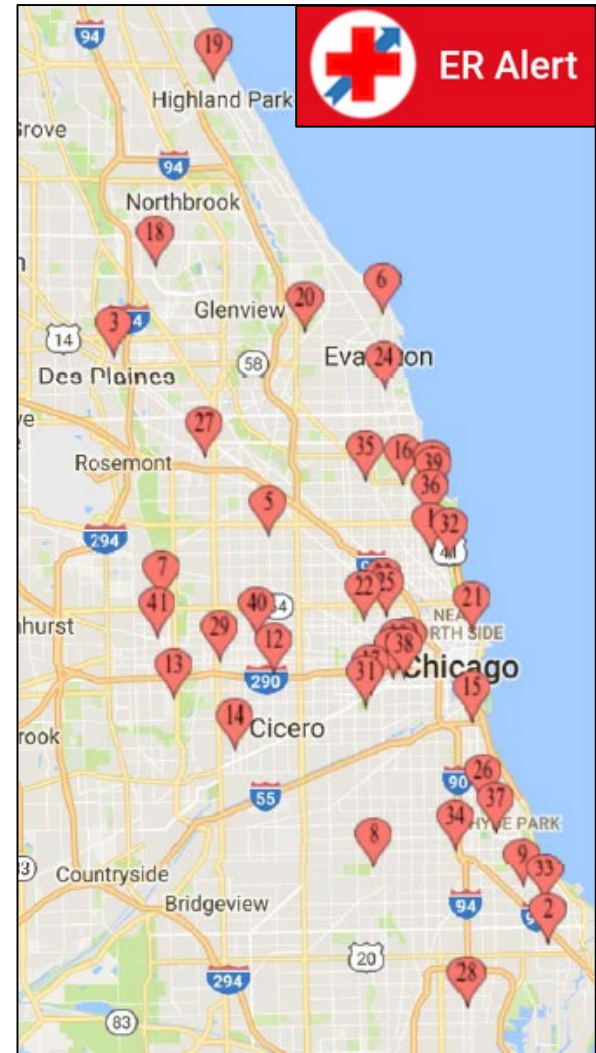


Erie Family Health Centers delivers culturally sensitive health care to over 75,000 medical patients and 12,500 dental patients. Our community-based health centers are portals to high-quality care—and a higher quality of life—for all.

FQHC: federally qualified health center
<http://www.eriefamilyhealth.org/>

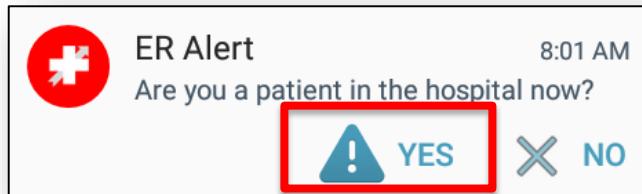
Study Phase 1 (of 2): Initial App Build

- Design retreat
- Android OS (English version)
- Hospital geofences, defined by latitude/longitude (N=41)
- Alpha testing/bug fixes



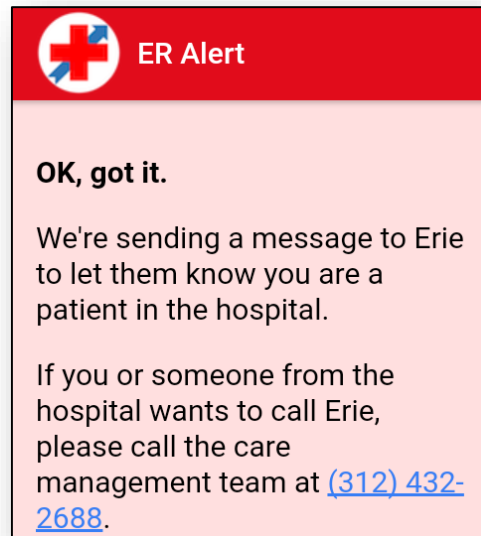
Care Coordination Workflows

1. Location-Based Notification*



ER Alert 8:01 AM
Are you a patient in the hospital now?
 YES NO

2. User Confirmation



ER Alert

OK, got it.

We're sending a message to Erie to let them know you are a patient in the hospital.

If you or someone from the hospital wants to call Erie, please call the care management team at [\(312\) 432-2688](tel:3124322688).

3. eFax Routed to EHR Desktop

A Message From the ER Alert App

The following patient confirmed they were receiving emergency or inpatient care:

Patient name

Doe, Jane

DOB

Nov 13, 1986

Patient phone

8475551212

Based on their smartphone's GPS coordinates, it appears they are at Westlake Hospital at 1225 Lake St. Melrose Park, IL 60160

As of March 2017, the main hospital phone number is 708.681.3000 and the number of the ED is 708.681.3000

The patient confirmed receipt of emergency or inpatient care Aug 3, 2017 at 13:22. However, they probably entered the hospital building at least 45 minutes before this confirmation occurred

4. Care Manager Outreach/Follow-Up

* After phone inside geofence for 45 minutes

Study Phase 1: Beta Test (2017)

- Aims
 1. Evaluate app's ability to identify when user visited hospital
 2. Identify barriers to implementation
- Participants: high-risk patients in care management program for Medicaid enrollees
- 3-month followup
- Hospital encounters confirmed by chart review

Characteristic	N (%)
<i>Total</i>	<i>N=12</i>
Age, mean (range)	38 (18-58)
Female	9 (75)
Medicaid insurance	12 (100)
Race/ethnicity	
Black/Af-Am	8 (67)
Hispanic/Latino	2 (17)
Diabetes	5 (42)
Asthma	6 (50)
Hypertension	5 (42)

Beta Test: Results

- Participants obtained care at 7 regional hospitals
 - ▶ 5 ED/inpatient encounters (4 hospitals)
 - ▶ 9 outpatient visits
 - ▶ 7 other events (e.g. visiting loved ones)
- Sensitivity*: 57-75%
- Positive predictive value of notifications: 90-92%

* After smartphone within a hospital for ≥ 45 minutes

Beta Test: Implementation Barriers

Observed Barriers	Changes for Study Phase 2
Limited cell service inside hospitals	Enhanced detection algorithm to increase sensitivity
ED visits: confusion when asked if “in the hospital”	Notifications ask if “in the ER/hospital”
Slow page loading & background processing	Enhanced programming code
Concerns about file size/ storage	Added FAQ page/tab
Low sensitivity for adjacent/ overlapping geofences	Smaller and/or combined neighboring geofences

Study Phase 2: Feasibility Study (2018-19)

- Aims
 1. Evaluate time to post-discharge followup
 2. Explore users' experiences
 3. Identify desired features
- English & Spanish speakers in care management
- 4-month followup
- Hospital encounters confirmed by claims data
- Timely followup: contact within 3 business days OR in-person visit within 1 week of discharge

Characteristic	N (%)
<i>Total</i>	<i>N=57</i>
Age, mean (range)	45 (19-73)
Female	42 (74)
Medicaid insurance	57 (100)
Race/ethnicity	
Black/Af-Am	16 (28)
Hispanic/Latino	33 (58)
Limited health literacy	18 (32)
Diabetes	5 (42)
Asthma	6 (50)
Hypertension	5 (42)

Feasibility Study: Android Curveball



- Sporadic data transmissions, app often went to sleep
 - ▶ Manufacturer changed background app/battery saver settings
- Information sources FQHC used to identify encounters (N=23 encounters at 12 hospitals)
 - ▶ App: 7
 - ▶ Hospitals: 7
 - ▶ Patient self-report: 6
 - ▶ Payer-linked portal: 10

Feasibility Study: Timely Followup

Encounters where timely follow-up completed (n=16)

Participant ID	Encounter type	Information source			
		Payer Portal	Hospital	App	Patient Self-Report
1	Observation stay		✓	✓	✓
2	ED visit		✓	✓	✓
3	ED visit		✓		✓
4	ED visit		✓		
5	ED visit	✓			
6	ED visit	✓		✓	
7	ED visit	✓	✓		✓
8	ED visit		✓		✓
9	ED visit	✓		✓	
10	ED visit			✓	
11	ED visit				
11	Inpatient admission	✓			
12	ED visit				
13	ED visit	✓			
14	Inpatient admission			✓	
15	Inpatient admission		✓		✓
13	ED visit	✓			

Feasibility Study: Timely Followup

Encounters where timely follow-up not completed (n=7)

Participant ID	Encounter type	Information source			
		Payer Portal	Hospital	App	Patient Self-Report
16	ED visit				
5	ED visit	✓		✓	
17	ED visit				
13	ED visit	✓			
13	ED visit	✓			
13	ED visit	✓			
13	ED visit				

User Experience: Findings

- Common qualitative themes
 - ▶ Appealing/good idea
 - ▶ Efficient/effective solution
 - ▶ Technical difficulties: barrier to acceptability
- Desired new features
 - ▶ Manual reporting of hospital encounters
 - ▶ List of prior hospital encounters (password-protected)
 - ▶ Optional free text fields
 - *Why I'm here*

Discussion

- Developed care coordination app & implemented in a high-risk, low-income sample
 - ▶ Phase 2: low detection of hospital encounters due to technical (but fixable) issues
- Patients understand & support goals of app
 - ▶ Limited use
- Study limitations
 - ▶ Small N
 - ▶ Observational data
 - ▶ Not generalizable to integrated systems or regions with HIE

Potential Utility for Practices & Health Systems

- Improve patient experience
- Payer reimbursement
 - ▶ Transitional care management: CPT 99495, 99496
- Reducing avoidable inpatient use
 - ▶ Readmissions
 - ▶ Initial admission from ED



Conclusions/Recommendations



- Smartphones can be valuable care coordination tool, especially for vulnerable populations
 - ▶ Limited user training after onboarding/installation
 - ▶ Potential expansion/integration with other app functions
- Be mindful of OS updates/mmanufacturer settings
 - ▶ Challenges & opportunities
- Partner with stakeholders at every step
 - ▶ Integrate patient-centered app with care team workflows

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AGENCY FOR HEALTHCARE RESEARCH AND QUALITY



Coordinating Transitions: Health Information Technology's Role in Improving Multiple Chronic Disease Outcomes

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Acknowledgement



Research Collaborators

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Partners

- Elmwood Health Center, FQHC
- HEALTHeLINK WNY Clinical Information Exchange
- New York State Medicaid Data Warehouse

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Multiple Problems

1. Finding out that a patient, who was on the primary care's roster of patients, was discharged from the hospital.
2. Limiting the care alerts to those likely to benefit from more intensive care coordination.
3. How to comply with HIPAA requirements about data sharing.
4. Integrating assessment of social determinants of health into screening.

Coordinating Transitions' Goal



The project goal was to reduce low-value utilization (IP and ED) in the population with pre-existing chronic conditions, and to increase OP followup, especially after discharge.

- This aligned with national emphasis on avoiding admissions, and with the NY State Delivery System Reform Incentive Program (DSRIP) which was a 5-year statewide project started in 2015.

Methods

- Setting: urban PCMH with roster of 6,000 (1/3 on Medicaid)
- Population: population with preexisting major chronic conditions
- Intervention: technology supported RN outreach
- Evaluate change in IP and ED utilization rates in study & comparison practice sites
- Evaluation: descriptive statistics and negative binomial regression

Technology and Big Data Approach

- Targeting the right population
- Alerting the primary care practice (HIE)
- Assessing social determinants of health during outreach call
- Outcome analysis

Technology and Big Data Innovations

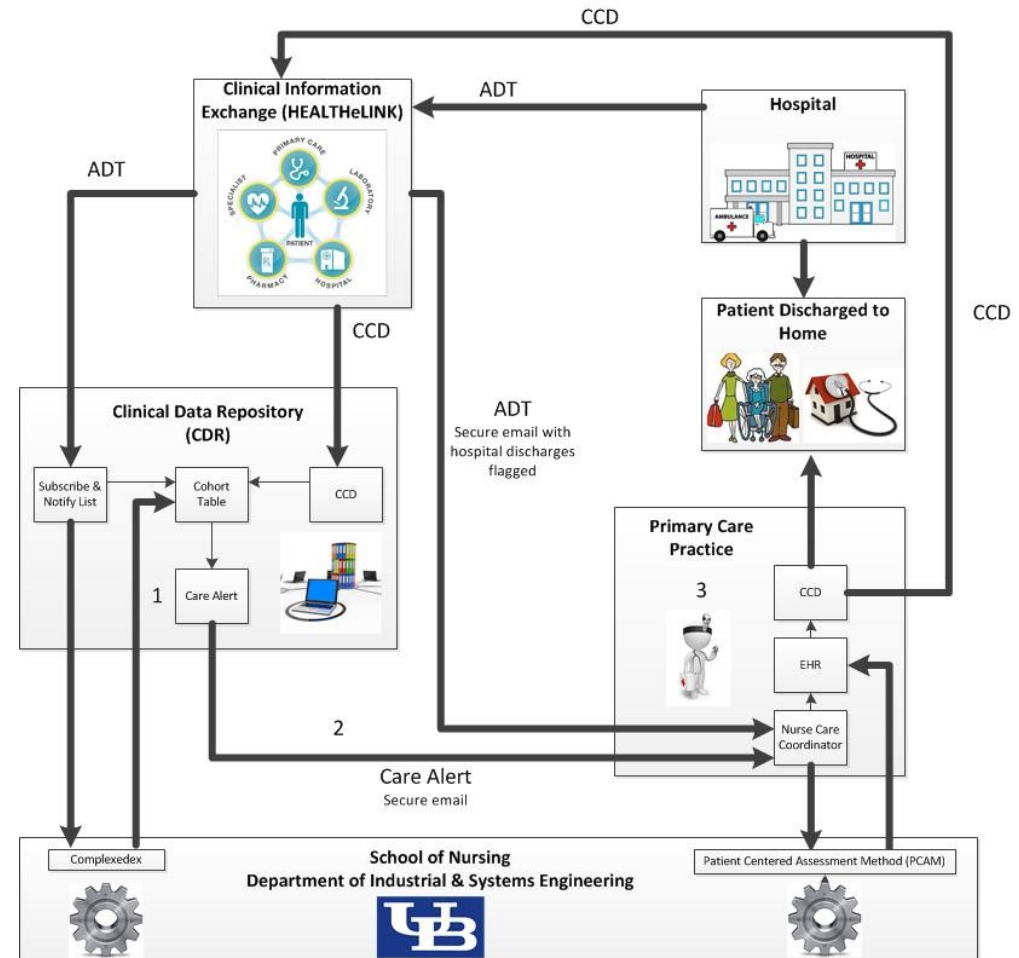


Relied on using existing de-identified electronic data from the Medicaid Data Warehouse and the interoperable exchange of health information across settings:

- Automated care transitions alerts delivered using HIE within 24 hours of discharge
- Complexity algorithm for case identification and outcomes analysis
- Social and behavioral determinants of health integrated into care planning
- Health outcomes analysis that demonstrates the value of the nursing intervention

Care Transition Alert: Health Information Exchange (HIE)

1. Automated electronic notification of discharge to nurse care coordinator in primary care using Care Transition Alerts for cohort with pre-existing chronic disease.
2. Care coordinator telephone outreach incorporating Patient-Centered Assessment Method (PCAM).
3. Integrating social determinants into care plan that is shared with interprofessional team across settings.

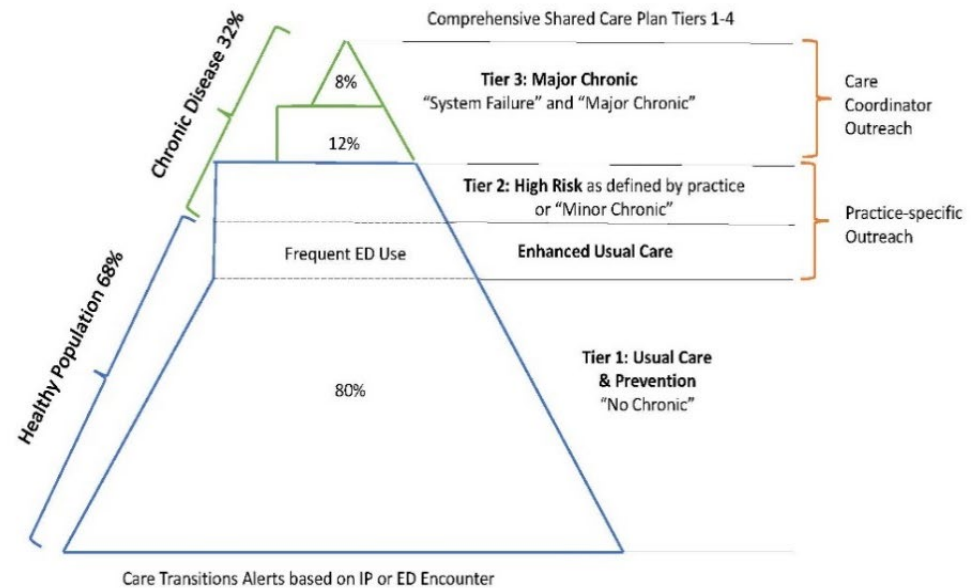


Hewner, S., Casucci, S., Pratt, R., Sullivan, S. S., Mistretta, F., Johnson, B. J., . . . Fox, C. H. (2017). Integrating social determinants of health into primary care clinical and informational workflow during care transitions. *eGEMs (Generating Evidence & Methods to improve patient outcomes)*, 5(2).

Targeting the Chronic Cohort: COMPLEXedex™ Clinical Algorithm

- Practice sent SON medical record number and diagnoses from last 3 years of claims monthly
- Algorithm used to flag those with major chronic conditions
- HEALTHeLINK used flag to limit alert to chronic cohort

Figure 4. Alignment of population complexity segments with outreach



PCAM: An Evidence-Based Tool to Assess Social Determinants of Health



Completed by RN as part of outreach phone assessment.

12 items in 4 domains with 4 levels of severity.

- Health & wellbeing
- Social environment
- Health literacy & communication
- Service coordination

Patient Centred Assessment Method (PCAM) ID _____ Date: ___/___/20___
 Nurse/Clinician: _____
 Instructions: Use this assessment as a guide, ask questions in your own words during the consultation to help you answer each question. Circle one option in each section to reflect the level of complexity relating to this client. To be completed either during or after the consultation.

Health and Well-being				
1. Thinking about your client's physical health needs , are there any symptoms or problems (risk indicators) you are unsure about that require further investigation ?				
No identified areas of uncertainty or problems already being investigated	Mild vague physical symptoms or problems; but do not impact on daily life or are not of concern to client	Mod to severe symptoms or problems that impact on daily life	Severe symptoms or problems that cause significant impact on daily life	
2. Are the client's physical health problems impacting on their mental well-being ?				
No identified areas of concern	Mild impact on mental well-being e.g. "feeling fed-up", "reduced enjoyment"	Moderate to severe impact upon mental well-being and preventing enjoyment of usual activities	Severe impact upon mental well-being and preventing engagement with usual activities	
3. Are there any problems with your client's lifestyle behaviours (alcohol, drugs, diet, exercise) that are impacting on physical or mental well-being ?				
No identified areas of concern	Some mild concern of potential negative impact on well-being	Mod to severe impact on client's well-being, preventing enjoyment of usual activities	Severe impact on client's well-being with additional potential impact on others	
4. Do you have any other concerns about your client's mental well-being ? How would you rate their severity and impact on the client?				
No identified areas of concern	Mild problems- don't interfere with function	Mod to severe problems that interfere with function	Severe problems impairing most daily functions	
Social Environment				
1. How would you rate their home environment in terms of safety and stability ? (including domestic violence, insecure tenancy, neighbour harassment)				
Consistently safe, supportive, stable. No identified problems.	Safe, stable, but with some inconsistency	Safety/stability questionable	Unsafe and unstable	
2. How do daily activities impact on the client's well-being? (include current or anticipated unemployment, work, caring or other)				
No identified problems or perceived positive benefits	Some general dissatisfaction but no concern	Contributes to low mood or stress at times	Severe impact on poor mental well-being	
3. How would you rate their social network (family, work, friends)?				
Good participation with social networks	Adequate participation with social networks	Restricted participation with some degree of social isolation	Little participation, lonely and socially isolated	

4. How would you rate their financial resources ? (include ability to afford all required medical care)				
Financially secure, resources adequate. No identified problems.	Financially secure, some resource challenges	Financially insecure, some resource challenges	Financially insecure, very few resources, immediate challenges	
Health literacy and communication				
1. How well does the client now understand their health and well-being (symptoms, signs or risk factors) and what they need to do to manage their health?				
Reasonable to good understanding and already engages in managing health or is willing to undertake better management	Reasonable to good understanding but do not feel able to engage with advice at this time	Little understanding which impacts on their ability to undertake better management	Poor understanding with significant impact on ability to manage health	
2. How well do you think your client can engage in healthcare discussions? (Barriers include language, deafness, aphasia, alcohol or drug problems, learning difficulties, concentration)				
Clear and open communication, no identified barriers	Adequate communication, with or without minor barriers	Some difficulties in communication with or without moderate barriers	Serious difficulties in communication, with severe barriers	
Service Coordination				
1. Do other services need to be involved to help this client?				
Other care/services not required at this time	Other care/services in place and adequate	Other care/services in place but not sufficient	Other care/services not in place and required	
2. Are services involved with this client well coordinated ?				
All required care/services in place and well coordinated	Required care/services in place and adequately coordinated	Required care/services in place with some coordination barriers	Required care/services missing and/or fragmented	
Routine Care	Active monitoring	Plan Action	Act Now	
What action is required?	Who needs to be involved?	Barriers to action?	What action will be taken?	
Notes:				

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ePCAM as a Clinical Decision Support (CDS) Tool



CDS involved transforming paper-based tool into meaningful information that could be incorporated into a longitudinal shared care plan.

ePCAM

Health and Well being

1. Thinking about your client's physical health needs, are there any symptoms or problems (risk indicators) you are unsure about that require further investigation?

No identified areas of uncertainty or problems already being investigated	Mild vague physical symptoms or problems; but do not impact on daily life or are not of concern to client	Moderate to severe symptoms or problems that impact on daily life	Severe symptoms or problems that cause significant impact on daily life
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Next

Comparison of the CTI Intervention Within the Context of the Quadruple Aim

Steps to achieve fourth aim	CTI intervention implementation tasks
1. Implement team documentation	Nursing documented assessment and problems and adjusted the care plan in the EHR
2. Use pre-visit planning	Secure alerts notified the nurse care coordinator to initiate an outreach phone call to high-risk cases for readmission
3. Expand the role of the nurse	Nurse received calls, made outreach calls, identified problems, engaged appropriate team members, and updated interprofessional care plan. Workshops and weekly feedback to nurse during implementation supported and reinforced benefit of expanded role
4. Standardize and synchronize workflows	Identification of vulnerable population, linked to discharge notification, enabled care coordinator to engage high-risk patients proactively
5. Co-locate the team	The primary care team was currently working in a single practice setting

Results in the Medicaid Chronic Cohort



The Coordinating Transitions Intervention was not limited to Medicaid population, providing care coordination to all patients in the chronic cohort.

However, results are based exclusively on data from the Medicaid Data Warehouse.

Medicaid Chronic Cohort Results



- Utilization results are based on the adult Medicaid population with pre-existing chronic conditions (chronic cohort -- based on clinical algorithm)
- The intervention (study) practice has a roster of ~6,000 cases with 419 persons in the chronic cohort
- Two urban comparison practices with large Medicaid populations
- Comparison with remaining Medicaid population in the chronic cohort

Hewner, S., S.S. Sullivan, and G. Yu, *Reducing Emergency Room Visits and In-hospitalizations by Implementing Best Practice for Transitional Care using Innovative Technology and Big Data*. Worldviews on Evidence-Based Nursing, 2018. **15**: p. 170-177.

Higher-Value Utilization

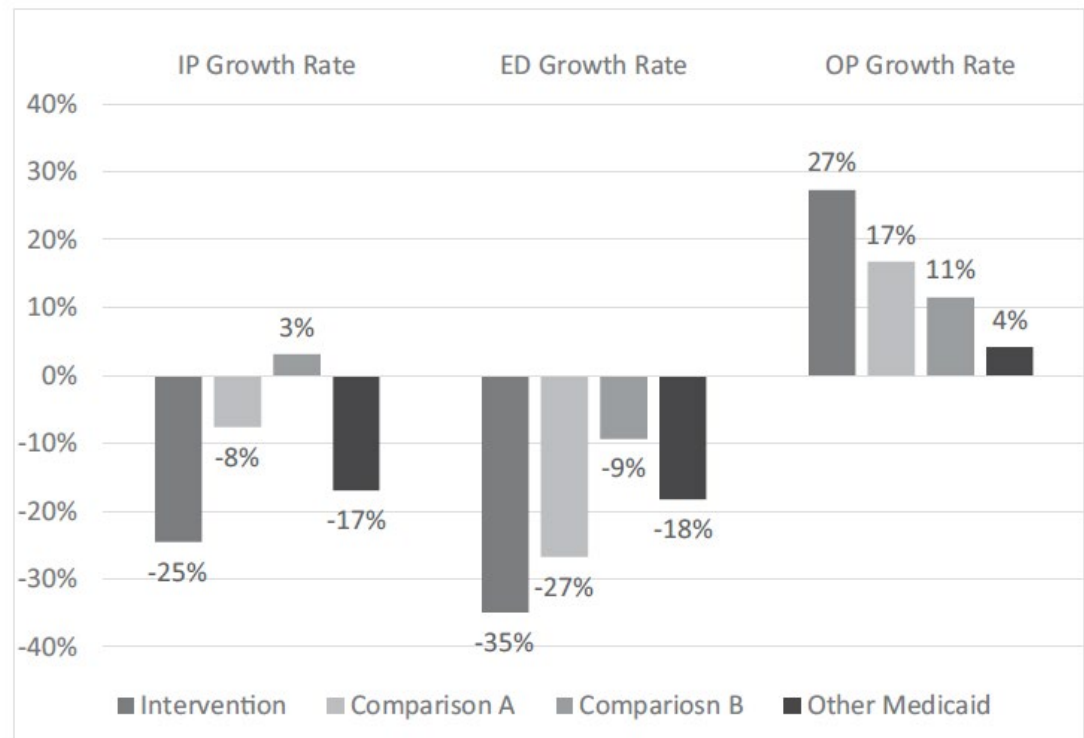
Group (population in 2015)	Event Type	2014 rate per 1,000	2015 rate per 1,000
Intervention site (N=419)	IP	338	255
	ED	2,038	1,327
	OP	6,996	8,907
Other regional Medicaid (N=38,612)	IP	358	297
	ED	1,754	1,434
	OP	7,925	8,253

Note: IP = Inpatient, ED = Emergency Department, OP = Outpatient

- Both groups moved toward higher value utilization with lower IP & ED and higher OP utilization
- However the rate change was greatest in the intervention site
- Intervention site met Delivery System Reform Incentive Program 5-year goals 2015, first year of program

Comparison of IP, ED OP Growth Rates Among Practice Sites

- Comparison A & B were two urban primary care practices with large Medicaid populations
- The decrease in IP & ED in “other Medicaid” was accompanied by only 4% increase in OP utilization – not clinically significant



Statistical Significance in Growth Rates

- Negative binomial regression used when trying to understand rare events, such as IP hospitalization in primary care settings
- All changes highly significant in other Medicaid (N = 39,612), while clinically significant IP reduction (25%) in Intervention site was closest to statistical significance ($p < .10$) in single practices

	Change in IP Rate	Change in ED Rate	Change in OP Rate
Study	↓ 25% +	↓ 35%**	↑ 27%**
Comp A	↓ 8%	↓ 27%**	↑ 17%**
Comp B	↑ 3%	↓ 9%*	↑ 11%**
Other	↓ 17% **	↓ 18%**	↑ 4%**

Note. + indicates $p < .10$, * indicates $p < .05$, ** indicates $p < .001$

Estimated Economic Impact



- Avoided events based on the difference between expected IP and ED utilization rates based on 2014 and actual rates in 2015 for the population size in 2015
- Events avoided multiplied by \$10,855 for IP and \$1,077 for ED
- Additional OP visits generated \$71,289 of new revenue to support the expanded role of the RN care coordinator

	Population size in 2015	Avoided IP Events	Avoided ED Events	Total \$ avoided	\$ Avoided per person
Study	419	-35	-298	-\$699,117	-\$1,669
Comp A	963	-22	-414	-\$689,616	-\$716
Comp B	2,086	18	-333	\$165,050	\$79
Regional	38,612	-2,341	-12,354	-\$38,792,171	-1,005

Short-term Outcomes

- Practice is using the same resources more efficiently and effectively without increasing the workload burden on providers
- While reducing unnecessary hospitalizations and emergency visits
- By providing supportive person-centered care during transitions
- Spread of high-quality, high-value transitional care requires novel solutions to improve the healthcare system
- Redesigned, technology-enabled systems that authentically engage all members of the care team can achieve quadruple aim

Linking Evidence to Action

- Care coordination efforts must transcend settings and share information about social factors that affect health
- Moving from triple to quadruple aim requires attention to workflow, meaningful alerts, targeting the appropriate population
 - ▶ Implications for management, practice, and education

The Quadruple Aim



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