

NENIC Posters May 17, 2024!



New England Nursing Informatics Consortium

Nurses Transforming Healthcare Through Informatics

NENIC Member Highlights 2024

Cailin Arthur BSN, RN and Nicolette Marcotte MBA, BSN, RN

Empowering Clinical Nurses to be the Next Generation of Nurse Informaticists: Boston Medical Center's Nursing Informatics Fellowship

Laura MacLean, MS, RN-BC (on behalf of Primary author Elizabeth Baldwin MSN, MHA, RN-BC)

Ambulatory Vital Sign Integration

Ian B. Kirit, DNP, RN, CEN

Improving Patient Safety and Emergency Department Staff Efficiency in Barcode Medication Administration Using a Mobile Scanning Application

Patricia C. Dykes, PhD, RN, FAAN, FACMI (on behalf of primary author Wenyu Song, PhD.)

Multi-state Modeling of Pressure Injury Staging Transition Trajectories



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**Empowering Clinical Nurses to be the Next
Generation of Nurse Informaticists:
Boston Medical Center's Nursing Informatics
Fellowship**

**Cailin Arthur BSN, RN
Nicolette Marcotte MBA, BSN, RN**

**NENIC Trends in Clinical Informatics
May 17, 2024**

Background

- Nursing informatics is a broad field that is essential to nearly every facet of work in a healthcare system (ANA Nursing Informatics Scope and Standards)
- Boston Medical Center (BMC) has a small, highly effective team of experienced Nurse Informaticist
- As part of recruitment and retention, a fellowship was proposed as a succession plan for this group and an extension of the Nursing Informatics Council

Background

- Systemic review of literature
- Fellowship Charter developed
- Formal application process with eligibility requirements including:
 - BSN + two years of employment at BMC
 - Current or past members of BMC's Nursing Informatics Council
 - Excellent communication and technical skills
 - Super users of Epic and related software
 - Letter of Recommendation from unit leadership
- Utilized Patricia Benner's "From Novice to Expert" nursing theory and BMC's official Nursing Professional Practice Model

Who We Were

The fellowship consisted of five staff nurses and a Clinical educator representing Critical Care, Labor & Delivery, IR/Cath Lab, Med/Surg and Professional Development



Informatics Fellows from left to right: Danielle Tremblay, Nicolette Marcotte, Rita Sullivan, Allison Kaelblein, Cailin Arthur, and Michelle Peck

Purpose

- To introduce clinical nursing staff to the Nurse Informaticist role
- Bring at least two bedside RNs into a six month Nursing Informatics Fellowship
- Leverage the clinical knowledge of BMC's seasoned nursing staff to improve system workflows and enhance EHR functionality
- Develop the next generation of professional nurses in the field of nursing informatics

Fellowship Goals

- Work on EHR build/configuration
- At the elbow support (ATE) for upgrades
- Serve as the voice of nursing in various meetings
- Participate in projects
- Lead NIC meetings
- Participate in advanced trainings
- Shadow informatics staff
- Contribute to monthly nursing newsletter
- Join and attend New England Nursing Informatics Consortium's (NENIC) annual conference
- Create presentations and posters
- Testing
- Participate in various meetings

Methodology – What We Did

- **Shadowing** of Nursing IT specialties
- **Didactic methods:**
 - Instruction in frequently used programs at BMC
 - “The Informatics Nurse” program, a 16 hour course by Dr. Tiffany Kelley about the fundamentals of nursing informatics
 - BMC ITS Project Management Institute course
 - Training in different **Epic modules** to improve fellows’ understanding of the EHR and transitions of care,
- Individual and group project participation

Outcome, Results & Growth

- Anticipated having 2 fellows, but expanded the program to include 6 fellows
- 6 month fellowship extended to 8 months
- Fellows were able to learn a new specialty of nursing and drive their own projects
- Utilizing various training methods was beneficial to fellows' learning



Outcome, Results & Growth



- Large project - creation of updated Downtime processes and documentation
- Two Fellows were hired into full time positions within the Nursing Informatics department
- Fellows returned to their home units as change experts with new knowledge and leadership skills
- Nursing leadership plans to offer a second fellowship when feasible

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Ambulatory Vital Sign Integration

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Background



Variability in the methods to collect vital signs (VS) have been shown to impact the measurements and can have implications on clinical care¹



Evidence shows automating the documentation of VS improves the timeliness and completeness of the data in the EHR and decreases staff frustration²



All inpatient bedside devices integrate VS into the EHR



In our ambulatory clinics a variety of devices were used to obtain VS and staff manually entered data into the EHR




Goals

1. Standardization
2. Integration

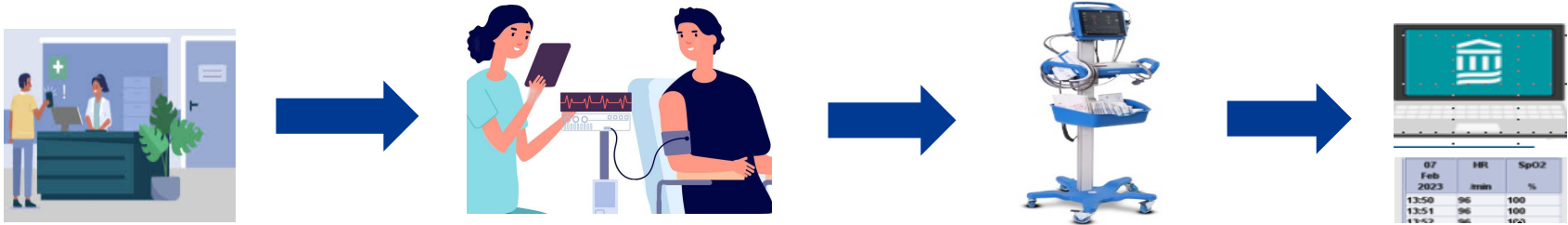


It takes a team!

Bioengineering	Nurse Informaticist (NI) and Clinical Business Analyst	Project Manager
Integration testing to confirm VS populated the EHR	Met with stakeholders to obtain buy in	Scheduled meetings
Evaluated wireless connectivity	Identified resources to support the project	Helped keep project on task
Confirmed number of devices for each clinic	Assessed workflow by shadowing MAs and RNs	
Ordered devices, placed workorders (if necessary) for wall mounted units	Developed training material and go-live plan	
Obtained license for wireless certification	Trained superusers and provided at the elbow support during go live	
Upgraded or installed software and installed devices	Developed a compliance report	



MGB Spot Vital Sign Integration



	User Error	Patient	Device	Transcription Error Risk
Factors that Impact Vital Signs	<ul style="list-style-type: none"> Wrong cuff size Over the Shirt/Sweater Speaking with patients while taking NIBP 	<ul style="list-style-type: none"> Full Bladder White Coat effect Recent Activity 	<ul style="list-style-type: none"> Calibration (Rare) 	<ul style="list-style-type: none"> Increase risk of transcription errors
Integration Roll-Out	<ul style="list-style-type: none"> Staff re-education around the workflow. E.g., Cuff Replacements/NIBP Workflows 	<ul style="list-style-type: none"> No Change 	<ul style="list-style-type: none"> Reduce the use of non-standard tools Increase Device Utilization 	<ul style="list-style-type: none"> Eliminated transcription error Improved timeliness of data entry
Care Team and Patient Experience	<ul style="list-style-type: none"> Efficient training and education around vital signs measurements / onboarding 	<ul style="list-style-type: none"> Predictable patient experience Standardized clinical workflow 	<ul style="list-style-type: none"> Consistent use of standard tools e.g., Use of the same device model Measure device utilization / workflow 	<ul style="list-style-type: none"> Improved accuracy



Lesson Learned



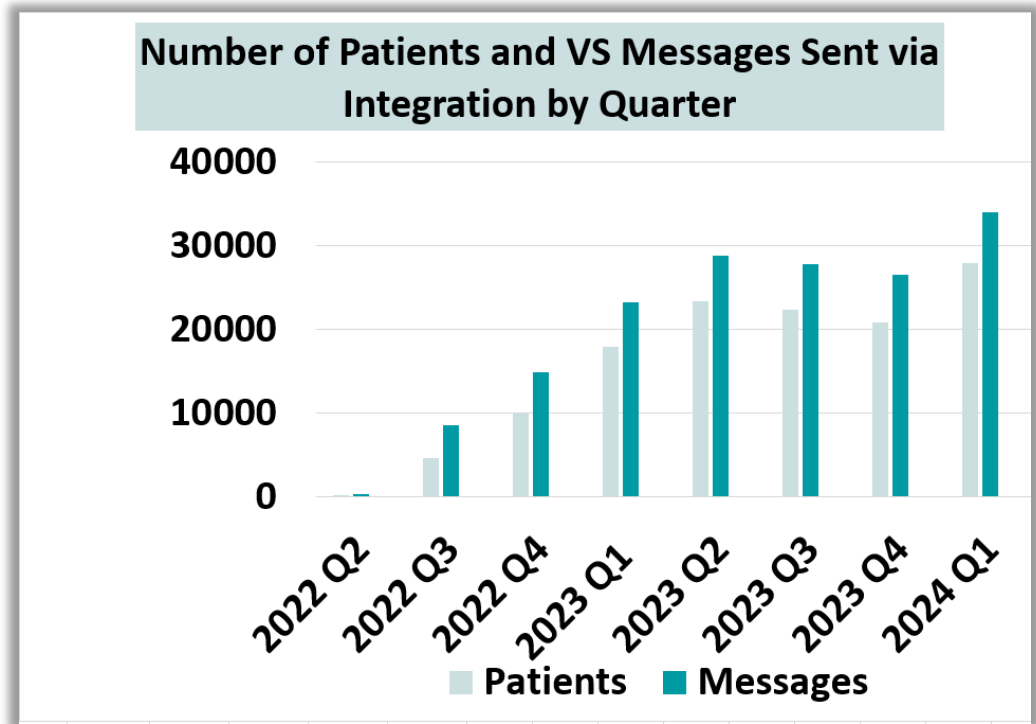
Wireless Connectivity
Sensitive Touch Screen
Real Time Display



Lack of Trust Clinical Leadership Buy In
Log-in Confusion Strong Super User
Compliance Reporting

Outcomes

- 195 devices are integrated
- 189 clinicians have been trained
- 81 ambulatory departments are using the devices



References

1. Cohen, J. B., & Brady, T. M. (2022). Validation of Blood Pressure Device Accuracy: When the Bottom Line Is Not Enough. *Circulation*, *145*(2), 94–96.
<https://doi.org/10.1161/CIRCULATIONAHA.121.055877>
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Mass General Brigham

Improving Patient Safety and Emergency Department Staff Efficiency in Barcode Medication Administration Using a Mobile Scanning Application

Ian B. Kirit, DNP, RN, CEN
Dartmouth Health



Problem Description & Available Knowledge

Problem Description

- March 2023: ED Staff Barcode Medication Scanning Compliance (81-87%); Patient Scanning Compliance (83-87%).
 - Goal: 95% Combined Patient/Medication Staff Scanning Compliance
- Current Process:
 - BCMA with in-room scanners and 2 Workstations on Wheels (WOWs) with portable scanners
 - Top reasons for Not Scanning per Weekly BCMA Audit
 - Scanner Broken
 - Scanner not available

Available Knowledge

- 62.7% of errors occur at time of administration (Cabilan et al., 2017).
- The complexity of the ED with a high potential for errors can benefit from BCMA (Bonkowski et al., 2013).
- Barcoding patients and medications at the point of care reduced medication error rates (Bates & Singh, 2018).
- Computers on wheels are too large to move around, and this leads to workarounds (Van Der Veen et al., 2018).
- Portable devices with scanning capabilities can be convenient in preventing workarounds (Baptiste et al., 2020).

Rationale

- **PLAN:** Scanning App BCMA rollout in the ED
- **DO:** Pilot in Zone D; Staff training
- **STUDY:** Weekly BCMA Audit; Pre-implementation survey
- **ACT:** Whole ED Mobile Scanning App BCMA Rollout; Post-intervention survey
- **Instrument:** Modified Technology Acceptance Model (mTAM) (Lewis, 2019)

Project Aims

Global aim: Improve patient safety and ED staff efficiency in BCMA by using the mobile scanning application

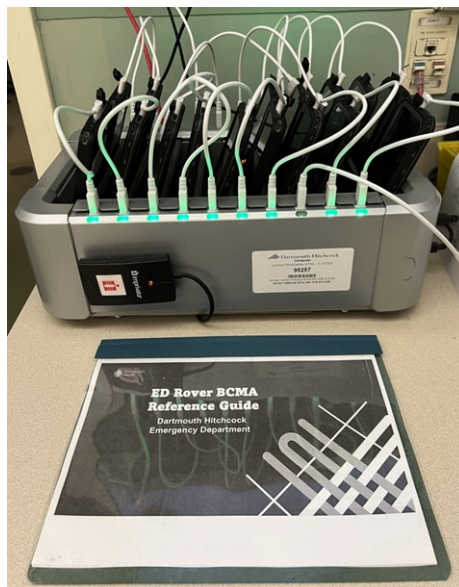
Specific Aims:

- Increase individual staff barcode patient/medication compliance to 95%
- Decrease occurrences of scanning noncompliance due to:
 - Scanner Broken (0-5/week)
 - Scanner not available (0-5/week)
- Increased staff perception of usefulness and ease of use with the scanning app on Mobile devices (mean of 3.5 or greater) as measured by level of agreement to the modified Technology Acceptance Model Likert Scale

METHODS

Intervention

- Deploy 21 mobile devices with the scanning App
- Staff Training/education
 - Train the Trainer approach
 - Regular rounding
 - Training for new hires/travelers
 - Reference guide



Analysis

- Aggregate data
- Descriptive Statistical Analysis

Study of the Intervention

- Weekly BCMA audit
- Pre/Post-intervention survey
 - Categorical data
 - Modified Technology Acceptance Model (mTAM) (Lewis, 2019)
 - Additional Comments

The Technology Acceptance Model (TAM) is designed to give you an opportunity to rate this product's usefulness and ease-of-use.

To as great an extent as possible, think about all the tasks that you do with the product while you answer these questions.

Please read each statement and indicate how strongly you agree or disagree with the statement. Please read the statements carefully, but don't spend a lot of time on each item – your first impression is fine.

Note that for this questionnaire (TAM), all items have a positive tone so greater levels of agreement (to the right of the scale) indicate a better user experience.

1. Please indicate the extent to which you agree with the following statements where 1 = Extremely disagree and 7 = Extremely agree.

	1	2	3	4	5	6	7
1. Using this product in my job enables me to accomplish tasks more quickly than other products in its class.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
2. Using this product improves my job performance.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
3. Using this product in my job increases my productivity.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
4. Using this product enhances my effectiveness on the job.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
5. Using this product makes it easier to do my job.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
6. I have found this product useful in my job.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
7. Learning to operate this product was easy for me.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
8. I found it easy to get this product to do what I want it to do.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
9. My interaction with this product has been clear and understandable.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
10. I found this product to be flexible to interact with.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
11. It was easy for me to become skillful at using this product.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
12. I found this product easy to use.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

RESULTS

Pre-Intervention

- 26 total respondents
- 50% >10 years of experience
 - 62% bachelor's degrees

Has a wide range of experience with Barcode medication administration

85% selected "Sometimes" or "About Half the time" when asked about broken scanners or not being available as reasons for not scanning.

Pre-Intervention Categorical Data	
Total Sample (N=26) n (%)	
Years of Experience	
Less than 1 yr.	0 (0)
1-2 yrs	4 (15.38)
3-5 yrs	4 (15.38)
6-10 yrs	5 (19.23)
>10 yrs	13 (50)
Level of Education	
Associate	6 (23.08)
Bachelor's Degree	16 (61.54)
Master's Degree	2 (7.69)
Doctoral Level	0 (0)
Licensed Practical Nurse	0 (0)
EMT-P	2 (7.69)
How Long Using BCMA	
<1 yr.	3 (11.54)
1-2 yrs.	8 (30.77)
3-5 yrs.	7 (26.92)
6-10 yrs.	6 (23.08)
>10 yrs	2 (7.69)
Scanner Not Available	
Never	1 (3.85)
Sometimes	15 (57.69)
About Half the Time	7 (26.92)
Most of the time	2 (7.69)
Always	0(0)
Declined to answer	1 (3.85)
Scanner is Broken	
Never	0 (0)
Sometimes	20 (76.92)
About Half the Time	5 (19.23)
Most of the time	1 (3.85)
Always	0 (0)

Post-Intervention

- 36 Total respondents
- 86% used the scanning app to scan patients and medications
 - 75% of respondents reported using the scanning App "Sometimes" (53%) and "About Half the time" (22%)
 - 25% reported, it is cumbersome to carry an additional phone and 39% declined to answer when asked about barriers to using the scanning App

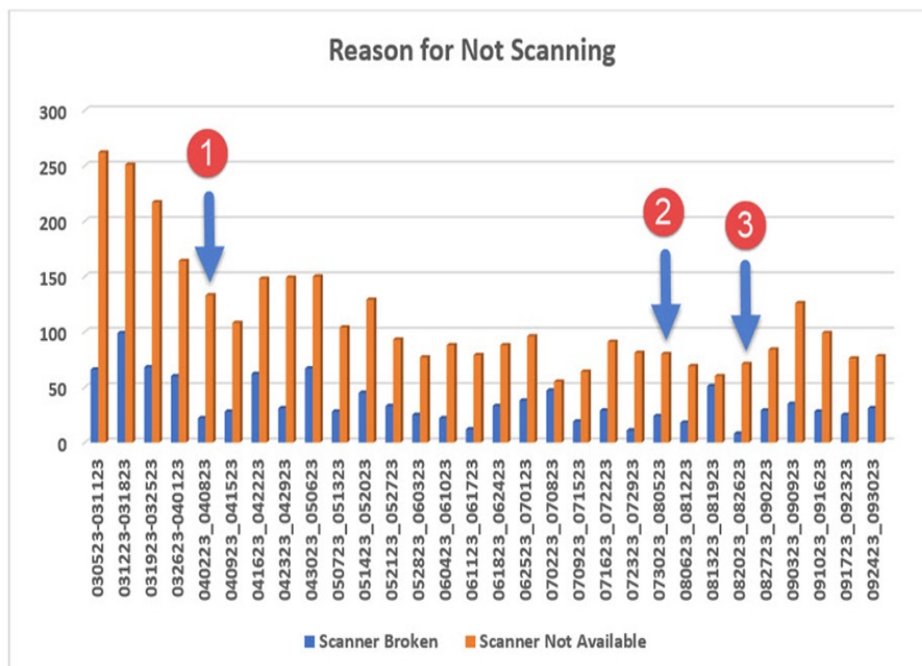
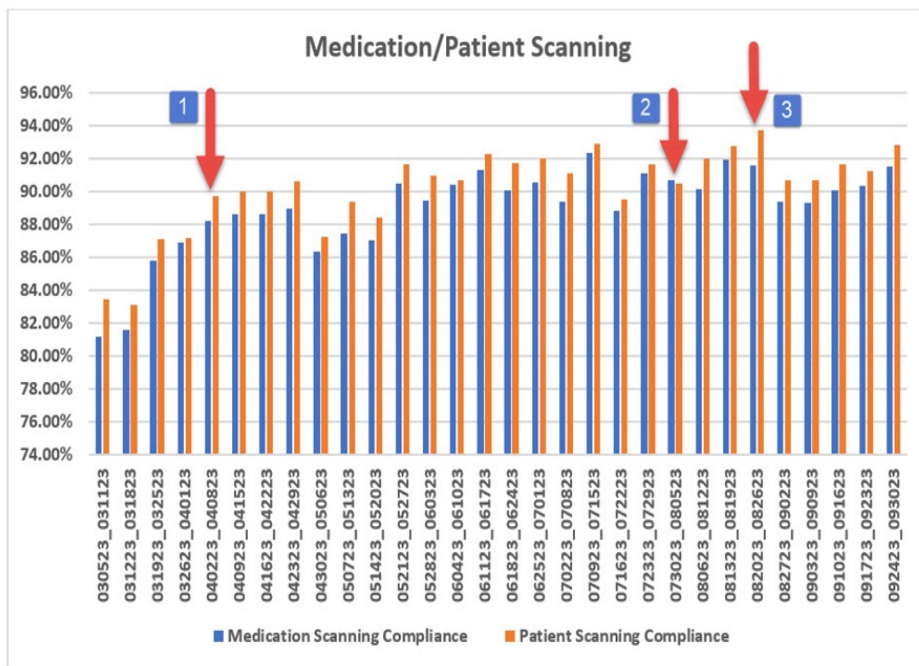
Post-Intervention Categorical Data	
Total Sample (N=36) n (%)	
Scanning with [Redacted] App (N=34)	
Yes	31(86.11)
No	3(8.33)
Declined to answer	2(5.56)
Frequency of using the [Redacted] App	
Never	0(0)
Sometimes	19(52.78)
About Half the time	8(22.22)
Most of the time	2(5.56)
Always	1(2.78)
Declined to answer	6(16.67)
Barriers to Using the [Redacted] App	
It is not required.	3(8.33)
I don't know how to use it	3(8.33)
It is cumbersome to carry an additional phone.	9(25)
Signing in issue	6(16.67)
Prefer not to answer	1(2.78)
Declined to answer	14(38.89)

RESULTS

Arrow 1: Started with 5 mobile phones with the scanning app

Arrow 2: Additional 16 mobile phones with scanning app added

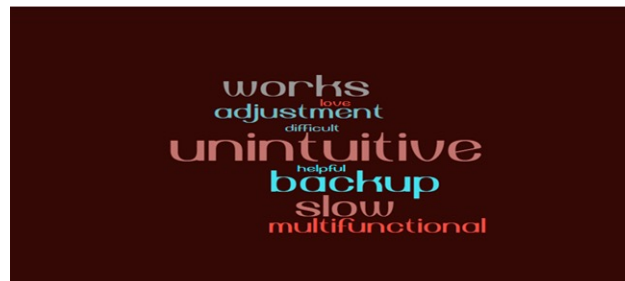
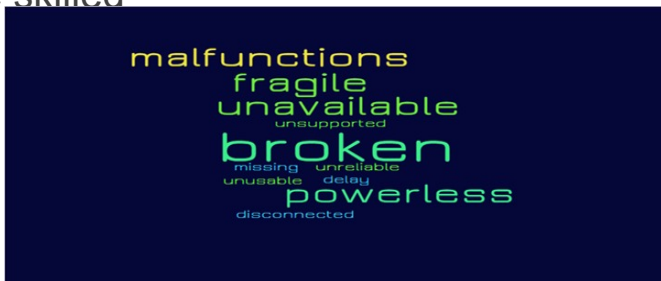
Arrow 3: Email sent out to staff from unit leadership urging the use of the mobile phones with the scanning app



RESULTS: mTAM

Handheld Scanner vs Scanning Mobile App (Mean Comparison)

• Perceived Usefulness		3.73 – 4.03
• Perceived Ease of Use		3.58 – 3.73
• Accomplish tasks more quickly	Mean increased from	3.04 – 3.63
• Increases productivity		3.38 – 3.67
• Makes it easier for them to do their job		3.5 – 3.73
• Easy to do what I want it to do		3.23 – 3.67
• Interaction has been clear & understandable		3.65 – 3.79
• Flexible to interact		3.00 – 3.72
• Learning to operate	Mean decreased from	4.04 – 3.86
• Time to be skilled		3.73 – 3.6



TAM Operational Definition

- **Perceived Usefulness: (PU)**
 - the extent to which a person believes using the system will enhance job performance (Venkatesh & Davis, 2000)
- **Perceived Ease of Use (PEU)**
 - the extent to which a person believes that using the system will be free of effort (Venkatesh & Davis, 2000)

Scoring
$PU = \text{Average (PU1, PU2, PU3, PU4, PU5, PU6)}$
<p style="text-align: center;"><u>Pretest</u></p> <p>= Average (3.04, 3.73, 3.38, 3.77, 3.5, 3.73) = 21.15/6 = 3.5</p> <p style="text-align: center;"><u>Posttest</u></p> <p>= Average (3.63, 3.77, 3.67, 3.77, 3.73, 4.03) = 22.6/6 = 3.8</p>
$PEU = \text{Average (PEU1, PEU2, PEU3, PEU4, PEU5, PEU6) - 1} (100/6) \text{ (Lewis, 2019)}$
<p style="text-align: center;"><u>Pretest</u></p> <p>= Average (4.04, 3.23, 3.65, 3.00, 3.73, 3.58) = 21.23/6 = 3.5</p> <p style="text-align: center;"><u>Posttest</u></p> <p>= Average (3.86, 3.67, 3.79, 3.72, 3.60, 3.73) = 22.37/6 = 3.7</p>
<p>Data Logic = 3.5 + 3.5 / 2 = 3.5</p> <p>App = 3.8 + 3.7 / 2 = 3.75</p>

The overall mTAM scores showed that both handheld scanner and the scanning mobile App were rated between “*Neither agree nor disagree*” and “*somewhat agree*” (Level 3-4 agreement)

INTERPRETATION

- **Combined scanning compliance increased but still under the benchmark of 95%**
- **Low usage of mobile devices with the scanning app; used as a backup option**
- **Scanners broken and unavailable as reasons for not scanning decreased**
- **Leadership engagement is key**
- **In-room handheld scanners are preferred but often found to be faulty**
- **The mobile phone with the scanning app can be cumbersome, and there's a reasonable learning curve**
- **Adding use cases for the scanning app could encourage staff compliance.**

LIMITATIONS & NEXT STEPS

Limitations

- Summer months implementation; high ED patient volume
- Change in leadership
- Lots of new hires/travelers
- Training and education hampered by understaffing
- Delay in getting 21 mobile phones
- Nonmandatory use of the scanning mobile app

Next Steps

- Ongoing Training/Education
- Leadership engagement
- Multi-purpose Mobile app use
- Mobile Scanning Champions
- Issue resolution process

CONCLUSIONS

- A clear use case must be established
- Set standardized processes
- Adequate staff training and education
- Performance/Compliance evaluations
- Leadership engagement
- Mobile scanning unit champions
- Issue resolution process



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- Here's the link to my Final paper as posted in the UNH Scholars Repository:
- https://scholars.unh.edu/scholarly_projects/94 [scholars.unh.edu]
- If you find the time, I would appreciate if you check it out.

Thank You So Much

Questions

Thank you!



*Nurses Transforming Healthcare **Through Informatics***