Deployment of a Best Practice Alert to Discourage Inpatient Orders for Repeat Echocardiograms

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Deployment of a Best Practice Alert to Discourage Inpatient Orders for Repeat Echocardiograms

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Introduction

- Repeat transthoracic echocardiogram (TTE) testing within a year of a prior study commonly occurs in the inpatient setting
- Repeat TTEs within a year of a prior study rarely yield clinically significant findings
- Repeat TTEs represent a significant source of waste within healthcare
- A low-cost intervention to reduce unnecessary testing involves introducing a best practice advisory (BPA) to ensure providers know they are ordering a repeat study

Problem Statement

A real-time interruptive alert through the electronic medical record will cause a statistically significant decrease in repeat echocardiogram completed orders when compared to clinical encounters in which no interruptive alert is displayed.

Methods

- BPA was live March 16th, 2021 to June 15th, 2021, and patients were monitored for 30-day readmissions and 30-day mortality until July 15th, 2021
- Inpatient patients who had a complete TTE ordered during the intervention period and who had a previous complete TTE done in the previous 6 months were included in the study
- BPA was randomized to deploy for half of these encounters based on the last digit of their CSN or encounter number
- Patients had to be 18 years or older and admitted to an inpatient service at any LVHN hospital campus
- Excluded were patients from emergency, observation or rehab services
- Also excluded were patients who underwent transesophageal, point of care, limited study or stress echocardiograms
- IRB approval attained to perform retrospective review of these patient encounters
- Chi-square goodness of fit test utilized to compare echocardiogram order status between the intervention and control groups

Results

	All Patients (n=1611)	BPA (n=804)	No BPA (n=807)	
Sex n(%)				
Female	757 (47.0)	373 (46.4)	384 (47.6)	.229 (p=.632) [a]
Male	854 (53.0)	431 (53.6)	423 (52.4)	
Race n(%)				
White or Caucasian	1404 (87.2)	703 (87.4)	701 (86.9)	2.84 (p=.829) [a]
Black or African American	79 (4.9)	38 (4.7)	41 (5.1)	
Asian	12 (0.7)	4 (0.5)	8 (1.0)	
Multi-racial	31 (1.9)	17 (2.1)	14 (1.7)	
Other	51 (3.2)	23 (2.9)	28 (3.5)	
Declined or refused	8 (0.5)	4 (0.5)	4 (0.5)	
Unknown	26 (1.6)	15 (1.9)	11 (1.4)	
Ethnicity n(%)				
Not Hispanic or Latino	1466 (91.0)	731 (90.9)	735 (91.1)	1.08 (p=.781) [a]
Hispanic or Latino	119 (7.4)	62 (7.7)	57 (7.1)	
Unknown	20 (1.2)	9 (1.1)	11 (1.4)	
Refused	6 (0.4)	2 (0.2)	4 (0.5)	
Age at Time of Order mean (standard deviation)	71.2 (14.74)	71.2 (15.05)	71.2 (14.44)	-.040 (p=.968)[b]

Table 1: Patient Demographics
a: chi-square test
b: Independent samples T-test

	BPA (n=804)	No BPA (n=807)	Statistical Test
Echocardiogram Performed n(%)			
Yes	667 (83.0)	710 (88.0)	8.2 (p=.004)[a]
No	137 (17.0)	97 (12.0)	
Mortality within 30 days of discharge n(%)			
Yes	39 (4.9)	39 (4.8)	.000 (p=.987) [a]
No	765 (95.1)	768 (95.2)	
Readmission within 30 days of discharge n(%)			
Yes	153 (19.0)	134 (16.6)	1.62 (p=.203) [a]
No	651 (81.0)	673 (83.4)	
Cardiology Consult Ordered n(%)			
Yes	460 (57.2)	410 (50.8)	6.66 (p=.010) [a]
No	344 (42.8)	397 (49.2)	
Length of Stay median	6.0	5.0	U= 339,907 (p=.087)[b]

Table 2: Clinical Outcomes by Utilization of BPA
a: Chi-square test
b: Mann-Whitney U test

Discussion

- 1,611 patients total, 804 in BPA group and 807 in control group
- Demographics randomly distributed between groups (p=NS)
- 47% female, 53% male
- 87.2% white or Caucasian
- Mean age: 71.2
- 667 echos performed in the BPA group compared to 710 in the control group
  - 43 fewer with intervention
  - Statistically significant reduction (p=.004)
- No significant difference in 30-day mortality (p=.987)
- No significant difference in 30-day readmission (p=.203)
- No significant difference in length of stay (p=.087)
- No significant difference in number of cardiology consults ordered (p=.010)

Conclusions

- Our BPA led to a statistically significant reduction in the number of echocardiograms performed in the intervention group compared to control without impacting patient outcomes
- If expanded to all patients over a full year, this BPA could lead to about 350 fewer TTEs annually
  - Potentially significant cost savings of around $700,000 for LVHN in a way that is safe for patients
- Additional benefits may include decreased length of stay

SELECT

- SELECT emphasizes a robust understanding of health systems and the iron triangle
  - This BPA succeeds in safely reducing the cost of healthcare via reductions in unnecessary echos
  - Thus, the BPA is able to reduce healthcare costs without sacrificing access or quality
  - Improved healthcare value (Q/C)
  - Potentially will allow for greater investments in quality and access