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Completion of Congenital Heart Post-Surgical Discharge Readiness Tab

Anjali Gupta MD, Sarah Kandil MD, Adrienne Loth NP, Kristin Cowenhoven RN, Nicole Schwink RN, Stacey Rose RN

Objective:
As recently an adaptive care model was implemented at Yale New Haven Children’s Hospital for post-cardiac surgery patients being discharge directly from the Pediatric ICU, our aim is to increase the utilization of the EPIC Congenital Heart Disease tool to at least 80% complete over the course of a year and optimize the navigator to ensure safe discharge.

Methods:
A steering committee of key stakeholders including a discharge coordinator, cardiac surgery advanced practitioner, PICU fellow, and quality improvement specialist created a key driver diagram highlighting EHR optimization and education among staff. Optimization included adding general care checks such as car safety, vaccinations, and CPR training. Additionally, roles were assigned for navigator completion to incorporate nurses, PICU and Cardiology attendings, fellows, APRNs and discharge coordinators. Baseline data was collected from July 2018 to June 2019 including post-op cardiac surgery patients <18 years old. All interventions were initiated and completed in July 2019 for the first PDSA cycle.

Results:
Overall completion of the Congenital Heart Discharge Readiness Tool/per patient discharged was low with an average of 11% completed in entirety. When each component (feeding, medications, and general care) were evaluated individually the percent complete showed an increase from 67% to 85% for the general care component, 81% to 91% for the medication component. The feeding component remained stable at 82% completed throughout the time period.

Conclusion:
In conclusion, overall compliance of the Congenital Heart Discharge Readiness Tool is poor for completion of tool entirely. However, with education and optimization of the EHR, there has been a steady increase in both the general care and medication component. An important lesson to remember for future PDSA cycles is that education may cause initial compliance, but continuous education is essential for making it a unit standard.

Yale New Haven Health System:
This study may help other YNHH departments who also discharge similar post-op cardiac patients, such as the NICU, Newborn or MS7 floors. It also looks at a multidisciplinary team approach to discharge that can apply to most Pediatric or even adult units.
Compliance with Post-Op Cardiac Surgery Discharge Readiness Tab - Feeding Section

Improve Post-operative Congenital Heart Disease Discharge

Key Drivers

- Engaged Stake Holders
- Awareness of Tool
- Difficult to use
- Undefined Roles
- Undefined Process
- Missing Information in EHR

Interventions

- Engage Discharge planners on rounds
- Create Education Pack/Powerpoint for RNs and MDs
- Optimize EHR, including order set for discharge
- Roles assigned to RN and MDs
- Monthly multidisciplinary meeting to discuss needs
- Components added to EHR (vaccinations, CPR training, NG teaching, etc.)

Global Aim

Safe Discharge of CHD patients

Anjali Gupta MD, Sarah Kandil MD
Updated: January 4th, 2020
Data Driven Panel Management of Chronic Diseases in a Resident Clinic

Andrew J Loza, MD PhD, Benjamin R Doolittle, MD MaDiv

Objective: Improve the management of common chronic diseases using EMR reporting tools in a resident clinic through a multiphase set of QI interventions.

Background: The management of chronic disease is a cornerstone of primary care. However, managing these long-term conditions in a residency clinic presents a unique challenge given that patients are often seen by cross-covering clinicians. Panel management techniques may aid in accurate documentation of chronic diseases to aid in cross-coverage and identify gaps in diagnosis or treatment of vulnerable patients.

Methods: The Epic Reporting Workbench was used to extract the diagnosis rates, degree of control, and spectrum of treatments for obesity, hypertension, hyperlipidemia, and diabetes for the entire panel of patients at the Internal Medicine-Pediatrics Clinic (MP Clinic). Specifically, diagnosis codes for chronic diseases and objective measures (e.g., BMI, Hgb A1c, blood pressure) were extracted and compared. In phase I of this QI project, residents and attendings were provided data on the demographic features of the clinic population, rates of diagnosis for each condition, and degree of control for each condition (where applicable). Results were presented as clinic-wide averages and by provider using an anonymized code.

Results:
The MP residency clinic serves the pediatric and adult population of Waterbury, CT. The panel consists of 910 pediatric and 1079 adult patients spread across 20 providers, including PGY-1-4s and attendings. We focused on problem-list diagnosis and control of obesity, hypertension and Type II Diabetes Mellitus. The rates of problem list diagnosis versus objective criterion for a given diagnosis are shown in Table 1.

<table>
<thead>
<tr>
<th>Problem List Diagnosis</th>
<th>Pediatric BMI ≥ 85th</th>
<th>Adult BMI ≥ 30</th>
<th>Hgb A1C &lt;6.5</th>
<th>Hgb A1C ≥6.5</th>
<th>Last SBP &lt;140</th>
<th>Last SBP ≥140</th>
</tr>
</thead>
<tbody>
<tr>
<td>No</td>
<td>272</td>
<td>306</td>
<td>469</td>
<td>15</td>
<td>674</td>
<td>84</td>
</tr>
<tr>
<td>Yes</td>
<td>8</td>
<td>446</td>
<td>127</td>
<td>140</td>
<td>179</td>
<td>111</td>
</tr>
</tbody>
</table>

Data will be re-collected at 4 months to determine the rate of increased diagnosis and reporting after clinicians received their provider level information.

Discussion:
Data driven panel management can identify significant gaps in diagnosis, disease control, and therapy within a resident clinic population. These data set the stage for focused active interventions which will be part of the next phase of the project.

Implications:
Panel management techniques can enhance clinical care by recognizing areas for improving provider practice as well as identifying at-risk patients for closer follow up.
Early Error Recognition in a Case of COVID-19 Presenting as ST Elevation Myocardial Infarction

Contact Person/Project Lead: Aneil Bhalla (347-666-4279, aneil.bhalla@yale.edu)

Residency/Fellowship Department: Department of Internal Medicine

Team Members: Aneil Bhalla, MD,¹ (Project Lead/First Author), Mojtaba Mirzaei, MD,¹ Murrium Sadaf, MD,¹ Sina Kianoush, MD¹

¹Department of Internal Medicine, Yale University School of Medicine

Abstract Category: Safety Story/Case Vignette

Educational Objective: To identify health care delivery barriers for patients with COVID-19 infection presenting with a severe medical complication.

Case Vignette: A 64-year-old female with a past medical history of controlled hypertension with no other known comorbidities presented from home with two days of fever, cough, and progressively worsening dyspnea.

On arrival to the emergency department, the patient was severely hypoxic with otherwise stable vital signs. Physical examination was significant for bilateral wheezing and crackles throughout the lung fields bilaterally. A nasopharyngeal swab was positive for COVID-19. A chest X-ray demonstrated bilateral basilar consolidations. The patient was intubated for worsening hypoxia; an EKG obtained after intubation showed ST elevations in the inferolateral leads.

In consultation with cardiology, it was decided to treat ST elevation myocardial infarction medically with intravenous heparin and guideline-directed oral antplatelet agents.

While reviewing all medications using a checklist, it was noted that although heparin had been electronically ordered to start immediately, it was rescheduled to start 24 hours later. This was immediately discussed with the pharmacy team who noted that the medication start time had been adjusted in error by the on-call pharmacist.

Safety Event (Pharmacy/Medications): This event exhibits an error in the utilization of an electronic medical system by a healthcare provider. A root cause analysis was performed to identify causal factors to decrease the risk of similar events occurring in the future. In this case, the error was made by the individual who had selected an incorrect medication start date. The etiology of the mistake was possibly due to the hospital system being overwhelmed in the setting of a pandemic. As the on-call pharmacist was responsible for a significantly larger number of acutely ill patients than normal, the risk for error was increased.

Discussion: In conclusion, this case of COVID-19 presenting as ST elevation myocardial infarction underscores the importance of systemically evaluating all electronic orders, especially when patient volumes are high. A recent study depicted the poor prognosis of patients with COVID-19 presenting with an ST elevation myocardial infarction; our case demonstrates an instance of early error recognition decreasing the risk of an adverse outcome in an already high-risk patient.¹ By routinely using comprehensive checklists daily, adverse patient events can be minimized throughout all departments in the Yale New Haven Health System.
Factors Contributing to Cardiac Arrest in Patients Admitted for COVID-19

Contact Person/Project Lead: Aneil Bhalla (347-666-4279, aneil.bhalla@yale.edu)
Residency/Fellowship Department: Department of Internal Medicine
Team Members: Aneil Bhalla, MD,1 (Project Lead/First Author), Francisco Rincon, MD,1 Mojtaba Mirzaei, MD,1 Murrium Sadaf, MD,1 Sina Kianoush, MD1
1Department of Internal Medicine, Yale University School of Medicine

Abstract Category: Safety Story/Case Vignette

Educational Objective: To identify how limitations in healthcare personnel, personal protective equipment requirements, and underlying medical conditions can contribute to a critical patient safety event in the setting of a pandemic.

Case Vignette: A 71-year-old female with a past medical history of coronary artery disease with multiple stents, type 2 diabetes mellitus, and hypertension presented from an extended care facility with three days of fever, productive cough, and chest pain. At baseline, she was independent in most activities of daily living with minimal assistance. On the morning of admission, she was noted to be hypoxic and was brought to the emergency department for further evaluation.

At the time of presentation, she was febrile, tachypneic, and hypoxic to 82% on room air. Physical examination was significant for decreased breath sounds throughout the lung fields bilaterally. Labs were notable for a normal white blood cell count with bandemia and an elevated troponin level. Chest imaging revealed bilateral ground glass opacities. An EKG showed evidence of a prior inferior wall myocardial infarction and left ventricular hypertrophy. COVID-19 testing subsequently resulted as positive.

Shortly after arriving to the hospital, the patient was intubated and transferred to the intensive care unit. Overnight, the patient’s endotracheal tube was dislodged during an episode of severe agitation. The anesthesia team was promptly contacted. Due to multiple respiratory arrests occurring in the hospital simultaneously requiring the attention of the anesthesia team, a delay in reintubation occurred. The patient’s oxygen saturations ranged between 50-70% on a nonrebreather mask during this time. After intubation, oxygen saturations normalized. Minutes after, the patient sustained a cardiac arrest. Although return of spontaneous circulation was achieved, a second cardiac arrest occurred within 24 hours, ultimately resulting in this patient’s death.

Safety Event (Surgery/Procedures): This scenario demonstrates the impact of a limitation in healthcare personnel during an acute patient event in the setting of a pandemic. The increase in time to intubation in the setting of concurrent critical hospital events, utilization of personal protective equipment, and severe underlying coronary artery disease resulted in prolonged hypoxia and cardiac arrest.
**Discussion:** For patients admitted for COVID-19 with multiple comorbidities, including extensive coronary artery disease, time to intubation and risk of cardiac arrest should be minimized by ensuring the availability of healthcare personnel. In addition, since the application of personal protective equipment has been associated with significant delays in the initiation of cardiopulmonary resuscitation, securing appropriate quantities of immediately accessible safety gear is essential.¹ These lessons can decrease the frequency of adverse patient events throughout the Yale New Haven Health System, particularly in departments responsible for the management of critical illnesses during a pandemic.

Title: Early initiation treatment for patients with mild and moderate acute gastroenteritis with a nurse-initiated oral rehydration therapy guideline

Goal: To decrease the length of stay (LOS) for patients with mild to moderate acute gastroenteritis (AGE) from 151 minutes to 120 minutes from June 1, 2019 to September 1, 2020 in the YNHCH Pediatric Emergency Department.

Methodology: A quality improvement project was initiated in June 2019 at an urban tertiary PED. A multidisciplinary team composed of PED attendings, fellows, and nurses created the ORT guideline with eligibility criteria, and are the leaders of the educational phase of this project. The Model for Improvement (Plan-Do-Study-Act (PDSA)) methodology is used for this project. Baseline data was obtained prior to initiation of QI project, which consisted of PED LOS in patient with a clinical diagnosis of AGE seen in our PED. Additionally, we identified key drivers that would lead to a decrease in the time to disposition for this population: PED staff buy-in, parental buy-in, proper identification of patients with mild to moderate AGE, policy implementation, and effective communication between care providers that led to multiple interventions (Figure 1). We utilize statistical process control for analysis (Figure 2). Outcomes related to proportion of ORT provided, proportion of patients receiving Zofran at triage, <72 hours return visit, and number of patients left without being seen is measured.

Results: Despite initiation of a Zofran policy, the mean PED LOS has remained the same. So far, our team has created an ORT guideline, discharge instructions with ORT instructions for parents, and made sure that proper rehydration therapy was stocked. We are currently in the process of educating the PED staff regarding proper identification of mild to moderate AGE and implementation of this nurse-initiated ORT guideline.

Discussion: Using QI methodology and a multidisciplinary group we have been able to identify barriers and study interventions that will allow us to successfully implement a nurse-initiated ORT pathway that we hope decreases PED LOS in our study population.
Implications for YNHH System: PED length of stay for patients with AGE can vary depending on the daily census. This initiative will not only help initiate medical management sooner but will also make sure that appropriate rehydration therapy is initiated. If we are successful, the ORT clinical pathway can be easily implemented and utilized at other hospitals throughout the Yale Health System.

Figure 1. Key Driver Diagram

Figure 2. Statistical Process Control (SPC) chart. X-chart - Median Length of Stay (LOS) in the Pediatric Emergency Department.
Improving Pneumococcal Immunization Compliance in Children with Nephrotic Syndrome

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OBJECTIVE:
To increase the number of nephrotic syndrome patients who receive pneumococcal PPSV23 vaccine counseling to more than 70% of eligible patients within 1 year.

METHODS:
Measure:
Percent of eligible patients where pneumococcal vaccine was documented in the chart as being administered or recommended (Table 1).

Improvement strategies/interventions:
In May 2018, we started educating providers on the pneumococcal vaccine research literature and world health organization pneumococcal vaccine guidelines. In October 2018, we created a departmental immunization protocol to standardize the approach to immunization. Next, we started performance reviews during our monthly division meetings and posted performance charts on the office bulletin board. Lastly, in December 2018, we launched EHR-based reminders for eligible patients to arrive at the provider’s inbox on the day of an eligible patient’s clinic visit.

Quality improvement tools:
We created a key driver diagram (Figure 1) outlining the drivers and interventions. We applied a PDSA cycle for each intervention. Monthly performance was tracked via monthly run charts (Figure 2) and overall immunization rate chart (Figure 3).

RESULTS:
During the first PDSA cycle of raising awareness and knowledge, we increased the cumulative immunization counseling rate from a baseline of 10% to 35%. In the second PDSA cycle,
standardizing immunization practices and improving documentation practices increased the counseling rate to 50%. Toward the end of 2018, we launched EHR-based reminders which improved adherence and we are currently at month 10 of 12 with a cumulative counseling rate of 69%.

**DISCUSSION:**
Our initial success in improving immunization was observed after increasing providers awareness which indicated a knowledge gap in pneumococcal vaccine recommendations. The monthly performance reviews at division meetings helped to sustain awareness and adherence. The EHR-based reminders were associated with the largest improvement in adherence to pneumococcal vaccine recommendations. Our experience highlights the potential role of EHR-based interventions for quality improvement.

**CONCLUSION:**
The two interventions that had the most effect on increasing adherence were improving provider’s knowledge and EHR-based reminders. These interventions can be applied to similar groups of immunocompromised patients in whom the pneumococcal vaccine is indicated (such as chronic kidney disease patients) to ensure immunization.

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**Tables and figures:**

**Table 1. Quality improvement measure.**

<table>
<thead>
<tr>
<th>Measure</th>
<th>Type</th>
<th>Goal</th>
<th>Exclusions</th>
<th>Numerator</th>
<th>Denominator</th>
<th>Data collection</th>
<th>Data reporting</th>
</tr>
</thead>
<tbody>
<tr>
<td>Percent of eligible patients where pneumococcal vaccine was documented in the chart as being administered or recommended</td>
<td>Process measure</td>
<td>70%</td>
<td>History of allergy to pneumococcal vaccine or severe reaction to other vaccines</td>
<td>Number of eligible encounters where pneumococcal vaccine was documented as being administered or recommended</td>
<td>Total number of eligible encounters in that month*</td>
<td>Electronic health record (EHR)</td>
<td>Monthly control chart and cumulative counseling rate</td>
</tr>
</tbody>
</table>

* Eligible patients are nephrotic syndrome patients who did not have a documented pneumococcal vaccination or counseling. ** Eligible encounters are done even for eligible patients.

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**Figure 1:** Key driver diagram. Multiple interventions were implemented in a sequential manner as Plan-Do-Study-Act (PDSA) cycles. Green-colored interventions have been implemented. Grey-colored interventions are ideas to be considered in the future.
Figure 2: Overall cumulative vaccination counseling rate in nephrotic syndrome patients.

Figure 3: Control chart of monthly vaccination counseling rate in nephrotic syndrome patients.
Palliative Care and Advanced Care Planning in Patients with Left Ventricular Assist Device
Jadry Gruen, MD, Emily Pinto Taylor, MD, Laura J. Morrison, MD

Background: As more Americans are living with end-stage heart failure, left ventricular assist devices (LVADs) have emerged as a life-prolonging therapy for patients awaiting or ineligible for heart transplant. Given the high level of potential morbidity associated with LVADs, the Joint Commission has required a palliative care consultation for these patients prior to device implantation since 2014. The current status and outcomes at Yale-New Haven Hospital (YNHH) is unknown, although anecdotal interviews with key stakeholders (LVAD coordinator nurses, advanced heart failure clinicians, and palliative care clinicians) have found that some patients have a limited understanding of the seriousness of their condition or an unrealistic expectation of the benefits of LVAD therapy at the time of their evaluation. We hope to understand the relationship between palliative care consultation and LVAD evaluation processes and eventual decision for or against LVAD implantation.

Objective: To investigate the timing and utilization of palliative care preparedness planning resources for patients under consideration for LVADs at YNHH.

Methods: Patients undergoing evaluation for LVAD implantation as a bridge to transplant or as destination therapy between November 2009 and February 2020 will be included in the study. A request has been made to the YNHH JDAT service to collect data retrospectively from the hospital database. Studied measures will include demographics, palliative care consultations, hospital discharge status, readmissions, code status, advance care planning documentation. Analysis will compare LVAD preparedness practices with national trends. A focused chart review will be performed for a randomly selected subset of 10 to 15 patients to verify our quantitative data.

Results: Pending JDAT results.

Discussion: The LVAD preparedness planning process and outcomes for patients at YNHH have not been well defined to date. This abstract focuses on the design and implementation of a retrospective chart review to better understand the relationship between palliative care consultation and LVAD evaluation. After data analysis, a description of current practices will help to guide future clinical redesign projects and allow for opportunities to improve care for these vulnerable patients.
Preventing the Primary Cesarean Delivery: Adherence to Labor Arrest Guidelines

Objective

To improve adherence to labor arrest criteria within three months of an educational intervention aimed to educate labor providers on labor arrest criteria at YSC.

Methods

We analyzed cesarean deliveries performed for arrest of dilation, arrest of descent and failed induction of labor (IOL) at YSC between September 2018 through December 2019. We focused on cesarean deliveries performed among nulliparous, term patients with singleton, vertex (NTSV) pregnancies and non-NTSV primary cesarean deliveries performed for labor arrest in multiparous patients. Using the guidelines set forth in the Safe Prevention of the Primary Cesarean Delivery, the labor course for each cesarean delivery was examined to determine if minimum criteria for labor arrest were met pre and post educational intervention. The educational intervention consisted of pocket cards, which were distributed to nurses and labor providers, and posters placed on the labor floor beginning October 1st, 2019 that defined labor arrest based on this same criteria. PDSA cycles are being utilized to evaluate the intervention for which we are currently in the “study” time period. The rates of adherence pre and post intervention were assessed.

Results

During the study period, there were 2,447 cesarean deliveries performed at YNHH. Of those, 524 NTSV and 525 primary non-NTSV cesarean deliveries were performed at YSC from September 2018 through September 2019.

- **274 NTSV cesarean deliveries** were performed solely for labor arrest:
  - 97 arrest of dilation of which 27.8% (n=27) met criteria
  - 112 arrest of descent of which 39.2% (n=44) met criteria
  - 65 failed IOL of which 55.3% (n=36) met criteria.

- **47 Primary Non-NTSV cesarean deliveries** were performed solely for labor arrest:
  - 15 arrest of dilation of which 40.0% (n=6) met criteria
  - 15 arrest of descent of which 20.0% (n=3) met criteria
  - 17 failed IOL of which 52.9% (n=9) met criteria.

After initiation of the educational initiative from October 2019 through December 2019, there were an additional 439 cesarean deliveries performed at YNHH. Of those, 93 NTSV and 121 Primary Non-NTSV cesarean deliveries were performed at YSC.

- **50 NTSV cesarean deliveries** were performed solely for labor arrest:
  - 21 arrest of dilation of which 57.1% (n=12) met criteria
-19 arrest of descent of which 63.1% (n=12) met criteria
-10 failed IOL of which 90% (n=9) met criteria
-10 Primary Non-NTSV cesarean deliveries were performed solely for labor arrest:
  -5 arrest of dilation of which 60% (n=3) met criteria
  -3 arrest of descent of which 100% (n=3) met criteria
  -2 failed IOL of which 100% (n=2) met criteria

Run charts for adherence to criteria for arrest of dilation, arrest of descent and failed induction of labor in nulliparous, term, singleton, vertex patients at YSC before and after the intervention are shown below. The arrow indicates the introduction of the intervention.
Discussion

Adherence to criteria for arrest disorders was suboptimal in the baseline period. The above findings show promise that a simple educational intervention can improve adherence to labor arrest guidelines as each labor arrest category showed improvement in the post-intervention period. Further evaluation of prospective adherence to labor arrest criteria and impact on cesarean delivery rates is planned to evaluate whether this educational intervention has a lasting effect on adherence rates as well as an impact on decreasing cesarean delivery rates.

Implications

This educational intervention has the opportunity to decrease cesarean deliveries which has the opportunity to decrease maternal morbidity and mortality. This simple educational intervention can be disseminated to improve adherence rates at other Yale sites.
A Retrospective Review of Cesarean Deliveries for Suspected Fetal Macrosomia: Were They Indicated?

Objective:

To significantly improve adherence to indications for cesarean delivery for fetal macrosomia within three months of an educational intervention at Yale New Haven Hospital and Saint Raphael Hospital

Methods

We analyzed cesarean deliveries performed for suspected fetal macrosomia among individuals undergoing cesarean delivery between September 2018 and December 2019. Using the recorded EFW and actual birthweights, we determined whether criteria for indicated cesarean delivery for macrosomia was met prior to and after an educational intervention aimed to improve adherence to recommendations for cesarean delivery for suspected fetal macrosomia. The educational intervention consisted of pocket cards that defined ACOG recommendations for offering cesarean delivery for suspected fetal macrosomia, which was distributed to all nurses and labor providers on October 1st at the YSC and SRC labor floor. PDSA cycles are being utilized to evaluate the intervention for which we are currently in the “study” time period. The rates of adherence pre and post intervention were assessed.

Results

During the pre-intervention period, 1,716 cesarean deliveries were performed with 25 performed for presumed macrosomia. The average EFW among those 25 undergoing primary cesarean delivery was 4403g. Of the 25 deliveries, 8 pregnancies were complicated by diabetes. Only 5 (20%) met the EFW thresholds, 3 of which had pregnancies complicated by diabetes. The average difference in EFW and actual birthweights was 359g (8%). 13 of the 25 ultrasounds performed for macrosomia had EFWs larger than the actual birth weight. Post intervention between October 2019 and December 2019, 3 cesarean deliveries were performed for suspected fetal macrosomia of which none met criteria. Post intervention, all cesarean deliveries performed for suspected fetal macrosomia were in non-diabetic patients. Average estimated fetal weight was 4410g with no actual birth weights greater than estimated fetal weight. The average difference in EFW and actual birthweights was 114g. The average number of cesarean deliveries for suspected fetal macrosomia decreased from an average of 2 per month in the pre-intervention period to 1 per month during the intervention period. The number of cesarean sections performed for this indication over time is shown in Figure 1 below.

![Graph showing number of cesarean births for suspected fetal macrosomia over time with an intervention point.]
Discussion
The majority of primary cesarean deliveries performed for macrosomia did not follow currently accepted ACOG guidelines. Educational initiatives to improve adherence did not improve the rate of adherence but decreased the average number of cesarean deliveries performed for this indication over a three month period.

Implications
Further interventions aimed to improve adherence to recommendations for cesarean delivery for suspected fetal macrosomia should be pursued in an effort to decrease cesarean delivery rates related to this indication.
Title: Improving Quality Patient Care: A Team Approach

Evaluating patients in a timely manner, in the outpatient geriatric consult setting, is a crucial aspect of training as a geriatric fellow. One attending supervises three geriatric fellows on a weekly basis. The clinic received feedback that patients, families, and caregivers were concerned that visits were too long, and they missed other appointments. Additionally, on several occasions, patients became lost finding their cars in the parking lot as they got out late from the appointment and it was dark outside. The objective was to decrease total new consult clinic time to 60 minutes and follow-up clinic time to 30 minutes over 12 weeks at the fellow clinic. Discrete time points were measured including: arrival time to clinic, time into the room, time fellow out to see attending, when fellow started discussion with attending, time patient out of the room, and total visit time (defined from time patient into room to time patient out of the room). We also collected and tracked what were the barriers to allow this to be accomplished on a per visit basis. Improvement strategies the team adopted included: a team huddle including receptionist, nurse, and medical assistant before clinic and a recap after, agreement to have nurse to call patients before visit to review medication reconciliation, use of time trackers sheets to record all the time points, use VetLink notification system of when patient checked in and vitals done, use of Skype to have nurse/MA notify when patient was ready to be roomed, and use of a huddle with the attending prior to the visits starting. Quality improvement tools used included PDSA, Pareto chart, and Run charts. Due to COVID-19 restructuring the clinic, only 7 weeks of data were collected. However, due to the PDSA process, we were able to bring average new clinic visits to 88 minutes down from 100 minutes and follow-up clinic visit to consistently average of 45 minutes. These numbers included outliers such as an NP student leading the visits on several occasions. We were able to see improvement in our process by utilizing the PDSA cycle, making small changes, and incorporating everyone’s support, participation, and ideas. We learned that a long clinic no longer had to be attributed to it being a fellow trainee clinic, and instead that improvement could be made with small efforts and changes. This can benefit other clinics and departments at Yale and the VA to bring awareness to reasons a clinic may be running late, and how to gradually and consistently cause positive change.
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\textsuperscript{2}VA Connecticut Center of Education (COE) in Interprofessional Primary Care, West Haven, CT

Abstract

1. Title: A multidisciplinary educational intervention to demonstrate proper inhaler technique to primary care residents at West Haven VA Center of Education
2. Objective: To increase residents’ current inhaler technique with a MDI, Handihaler, and Respinmat using a short educational video demonstration at VA Center of Education in Interprofessional Primary Care clinic
3. Methods:
   - With the help of pharmacists, checklists were made to assess proper step-by-step technique for use of three inhaler models (MDI, Handihaler, Respinmat – see below).
   - Residents were provided sample model inhalers and asked to demonstrate the correct use of each inhaler while being scored on the checklist.
   - Short (< 2min) instructional videos were shown for each of the three models and residents were re-assessed on proper inhaler techniques using the same checklist.
   - Our original plan was to perform 3-month follow-up testing using the checklist to assess the degree to which residents retained information, but this was not completed due to COVID-19

**MDI**

- Remove cap, hold Inhaler upright and shake
- Exhale, then place mouthpiece between teeth and form seal with lips
- Press down on canister at the same time as you breathe in slowly for 1-5 seconds
- Remove inhaler from mouth and hold breath at least 5 seconds, then exhale

Total correct: /4

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**Handihaler**

- Open cap and mouthpiece and insert capsule from packet into chamber
- Press button and release
- Exhale, then place mouthpiece between teeth and form seal with lips
- Breathe in forcefully and deeply as long as comfortable (capsule should vibrate)
- Remove inhaler from mouth and hold breath at least 5 seconds, then exhale
- Repeat steps 3-5 once
- Open cap and mouthpiece and remove used capsule

Total correct: /7

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**Respinmat**

- Hold inhaler upright, twist base in direction of arrows until click, open cap
- Exhale, then place mouthpiece between teeth and form seal with lips
- Press down on button at the same time as you breathe in slowly for 3-5 seconds
- Remove inhaler from mouth and hold breath at least 5 seconds, then exhale
- Close, cap then repeat from step 1 for complete dose

Total correct: /5
4. Results: A total of 8 MD residents (2 PGY-1s, 3 PGY-2s, and 3 PGY-3s) and 2 NP residents participated. Assessments were performed over the course of 2 days.

** indicates statistical significance, p < 0.05

![Graph showing average checklist scores pre vs post educational videos](image1)

| Inhaler Type | Pre | Post | p-value 
|--------------|-----|------|------
| MDI          | 39% | 89%  | 0.000672 |
| Handihaler    | 24% | 91%  | 0.0000429 |
| Respimat      | 16% | 91%  | 0.0000266 |

*p-values determined using a paired t-test, alpha set at 0.05

![Graph showing percent of checklist steps correct pre vs post educational video](image2)

5. Discussion:
- Data shows a lack of knowledge of correct inhaler technique among participants for all types of inhalers, with MDI being the most familiar (based on pre-education scores).
- For all three types of inhalers, there was a statistically significant difference in checklist scores pre vs post educational video. It is clear that short (1-2 min) videos can improve resident knowledge in the short-term.

6. Implications: In order for residents to accurately teach and assess inhaler technique of patients, more formal training on proper technique should be included in primary care training programs.
Title: Inhaler Technique in Homebound Veterans Enrolled in Home Based Primary Care

Background: Homebound veterans who have difficulties managing medications may be referred to the VA Home-Based Primary Care Program (HBPC) for assistance. Many patients who receive HBPC services are frail, homebound, older adults who have multiple chronic conditions and evidence of cognitive impairment. As cognition deteriorates, the ability to carry out complex sequential tasks declines, and this can impact correct use of inhalers.

Objective: Through this quality improvement project, we identified a subset of cognitively impaired patients who received HBPC medication management who may benefit from increased inhaler technique instruction.

Methods: We conducted a retrospective chart review at Veterans Affairs Connecticut to identify the cohort of HBPC patients aged ≥ 65 years and currently prescribed an inhaler. We then conducted a telephone interview to ascertain subjective patient confidence in using their inhalers properly and reports of prior inhaler teaching.

Results: Out of the 100 veterans who were enrolled in the HBPC program at the time of the study, 26 patients were prescribed an inhaler. Of the 26, 14 veterans (53%) agreed to participate in the telephone interview. Of those who responded, all were men with a mean age of 82 years and prescribed a mean of 2 inhalers. The mean Saint Louis University Mental Status Examination score was 23/30. Responders had baseline functional dependencies in a mean of 2 ADLs and 6 IADLs. 57% felt confident in their ability to use their inhalers properly. However, 64% of veterans reported they could not remember or never had inhaler teaching. Although 64% reported that they had received printed inhaler technique instructions, only 22% reported reading them.

Discussion: In homebound older adults enrolled in the HBPC program who use inhalers, many reported feeling confident in their ability to properly use the inhalers. Only a minority reported having in-person inhaler technique instruction or reading printed instructions. Future directions of the project include home visits to determine the prevalence of improper inhaler technique and ascertaining if patients can demonstrate proper inhaler technique after watching instructional videos.

Implications: Many older adults are prescribed inhalers throughout the VA Connecticut and YNHH in various departments. Results from this study indicate an opportunity for increased instruction regarding the proper use inhalers in this population, which may ultimately lead to improved compliance and patient outcomes.
Title: Preventing the Next Neglected Pessary: A Quality Improvement Initiative

Authors: Patrick Popiel, MD; Meghan Curran, RN; Maralyn Maggi, RN; Shana Dalal, MD; Leslie Rickey, MD

Introduction: Pelvic organ prolapse (POP) is a major health problem that increases in prevalence as women age. Pessaries are a common non-surgical treatment for POP. The majority of side effects associated with pessary use are minor and self-limited, serious complications can occur without appropriate follow up, including infection and rarely erosion into the vaginal wall, bladder or bowel. A patient with a pessary may either self-maintain the pessary or follow up in the office every few months for maintenance, however there is potential for patients to become lost to follow-up. Although there are case reports of patients requiring surgical intervention for removal of embedded or eroded pessaries, the rates of the “neglected pessary” or loss to follow up is unknown.

We assessed the follow up rates after initial pessary placement in our practice and implemented a quality improvement initiative to capture patients who are at risk of being lost to follow up.

Methods: The PDSA model was used for this quality improvement project. The first phase of our project was to determine the proportion of patients who were “at risk” for loss to follow up, defined as no follow up with our practice within 6 months of initial placement. All patients with a new pessary placement between October 2015 and October 2017 were identified based on CPT code. T-test and chi-squared were done to identify patient factors associated with loss to follow up status.

Based on the loss to follow up assessment, we created a pessary implant protocol. Pessaries are now designated as “implants” in EPIC, and a pessary implant protocol was implemented in February 2018. A report was generated 12 months later to assess staff compliance with proper documentation of the pessary implant at time of placement and during the follow up period.

Results: Over a 2-year period between 10/1/2015 to 10/1/2017, 462 new pessaries were placed. Almost seventeen percent of patients did not have a follow up visit with our practice within the first 5 months of placement and constituted the at-risk group. Compared to patients who did follow up, the at risk group was more likely to be younger (65.7 vs. 72.2, P=0.0003), sexually active (P=0.01), pre-menopausal (P<0.0001), and less likely to have co-morbidities (cardiovascular (P=0.02), endocrine (P=0.03), neurologic (P=0.05), gastrointestinal (P=0.004). The group who did follow up within 6 months was more likely to have an anti-incontinence or prolapse surgery (39% vs. 22% P<0.005).

Looking at all pessaries placed in 2018, after implementation of the pessary implant protocol, initial review of staff compliance found that 77/148 (52%) of patients had appropriate documentation as implant. We identified 21% (31/148) patients with no scheduled follow up including 19 patients who were dependent on provider management for pessary maintenance and therefore at higher risk for complications.

Conclusions: Pessaries are a useful non-surgical treatment for POP. However, foreign bodies can cause harm to the patient, therefore it is important to have appropriate tracking systems in place to decrease avoidable adverse events and enhance patient safety. Through a quality improvement project, we have demonstrated a method by which pessary implants can be easily tracked and the potential risks of a neglected pessary decreased.
Title: Creating a process map of a hospital’s adverse event reporting system in a Low Middle Income Country.

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Objective for the project: To (1) create a process map of and to (2) review the successes, shortcomings and future directions of an adverse event reporting system in a 45 bed non-profit pediatric neurosurgery hospital in Mbale, Uganda.

Methods:
   a. QI Tools used: Interviews, Process mapping
   b. Detailed interviews were used to identify personnel, delineate the steps, discuss the pain points & barriers for adverse event reporting (AER) and understand the review process
   c. At this stage, the focus was on engaging the stakeholders, creating a systems approach and identifying gaps and improvement opportunities. No interventions were instituted yet.

Results:
Figure 1 details the process map.

Strengths of the system:
- Leadership buy in is present
- Process allows for the creation of a repository and quality improvement database
- Availability of standardized monthly forms and standardized definitions of adverse events within institution. Also allows for categorization for subsequent compilation and analysis
- Sensitivity to the local culture of the country
- After events such as patient falls, medication errors, and respiratory events in Post Anesthesia Care Units, changes were made in relevant policies. A video laryngoscope was acquired as a result of data on difficult airways and associated adverse events.
- Culture of safety is cultivated with interdepartmental Morbidity & Mortality meetings and patient safety meetings.
Figure 1: Process Map of the Adverse Event Reporting system for a neurosurgery hospital in a Low Middle Income Country

Legend:

- Pink – Personnel involved
- Green – Review processes
- Blue – Change affected
Barriers uncovered during the interview process:
- Not universally used within the hospital
- Three or four designated people the only ones recording events, gathering data and often times investigating the root cause
- There exists only a verbal reporting system within the hospital which necessitates that you find the designated individuals during the workday
- Since paper charts can often lack detail, data gathering is a cumbersome and effort intensive process
- Missed monthly reports depending on the schedules of the designated reporters
- Fear of individual blame is present in the system
- Insufficient / weak interdepartmental review processes in place
- No retrospective reviews performed of data collected in the database

Future directions per the authors:
- Important to ensure lapses in monthly reporting are recognized and resolved
- Empowering multiple people within each department to report spreads out the burden of reporting monthly and ensures that contingency plans are in place
- Provide all healthcare workers a way to report adverse events without fear of reprisals
- Analysis of database to recognize trends over time
- Reinforcement of a culture of safety and questioning attitude
- More structure required during review processes e.g. root cause analysis
- Education of trainees and hospital personnel about QI processes so that the data collected can be better studied

Discussion:
Establishing and maintaining an AER system is resource intensive and thus seldom found in LMIC healthcare institutions. CURE Children’s Hospital in Mbaale, Uganda provides a unique opportunity to study such a system by Process Mapping. Importantly, this process strengthens team building, involves the frontline staff and provides information in an easy to understand format. Above we’ve discussed the successes, shortcomings and future directions of this system. While a framework is in place to report events, there are few avenues for analyzing the root causes and identifying patterns in the current system.

Implications:
Process mapping is an intuitive Quality Improvement tool that increases staff engagement, builds consensus, streamlines work processes and leads to a deeper understanding of the barriers. Its simplicity also makes it ideal for use in Low Middle Income Countries.

References:
Title:
Pneumonia Antibiotic Stewardship in the Yale New Haven Children’s Hospital Pediatric Emergency Department: A Quality Improvement Project

Objective:
We aim to increase the percentage of otherwise healthy pediatric patients > 3 months of age admitted to the pediatric hospitalist unit at YNHCH with a diagnosis of suspected uncomplicated community acquired pneumonia who receive appropriate evidence-based first-line antibiotic therapy from 12.5% to 80% from January 1, 2020 to July 1, 2020 in the YNHCH Pediatric Emergency Department

Methods:
Measures:
Our primary process measure is to increase the percentage of evidence-based first-line antibiotic treatment for suspected uncomplicated pneumonia. Our secondary process measure is to decrease the percentage of broad-spectrum (i.e. intravenous ceftriaxone) versus narrow-spectrum antibiotics (i.e. intravenous ampicillin) used for uncomplicated pneumonia. Our outcome measure is the patient’s disposition (discharge versus Intensive Care Unit admission). Finally, our balancing measures are the total length of stay and the need for return visit within 72 hours following discharge.

Key driver diagram:
Interventions:
- Dissemination of the Yale New Haven Hospital microbiology report (antibiogram)
- Dissemination of the PIDS/IDSA guidelines
- Incorporation of YNHCH’s pneumonia pathway in the electronic medical records and link to PIDS/IDSA guideline and antibiogram
- Pediatric Emergency Department Staff Education regarding pneumonia antibiotic stewardship via email, online and in-patient lectures
- Generation of reminders in form of “visuals aids” in the PED staff working areas

Quality Improvement Tools Used: PDSA cycle

Results:

![Percentage of IV ampicillin ordered](image)

- PED staff education
- Residents’ education
- Dissemination of YNHCH pathway to antibiogram in Epic
Discussion:
To date the implementation of Pediatric Emergency Medicine Department staff education, Pediatric Resident's education and the Dissemination of the YNHH pathway to the antibiogram in Epic has not resulted in a significant increase in the percentage of IV ampicillin use for the management of uncomplicated pneumonia in the Pediatric Emergency Medicine Department.

Implications:
Further research is needed into the factors that drive antibiotic prescription patterns in the YNHCH pediatric emergency department in order to optimize adherence with guideline-directed therapies.
Project Title: Understand and reduce chronic benzodiazepines/hypnotics uses at Yale Health

Resident: Yiduo Hu, MD PhD, 2GY-Z Internal medicine

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1YHC Internal Medicine; 2YHC Psychiatry and Mental Health; 3YHC Population Health and Information; 4YHC Pharmacy

Aim Statement

To reduce chronic benzodiazepines/hypnotics use by 35% by July 2021. This reduction is defined as either complete discontinuation or dose reduction of at least 50% which was adapted from several clinical trials.

Background

Chronic benzodiazepines/hypnotics uses are common in primary care and often prescribed for non-indicated conditions. In general, benzodiazepines are indicated for short-term treatment for acute anxiety or panic attacks, for alcohol withdrawal symptoms, and for active seizures. However, they are frequently prescribed for chronic use in treating insomnia/sleeping disorders, anxiety and depression, and chronic pains. Similarly, hypnotics such as Ambien are indicated for short-term management of acute insomnia and sleeping disorders as patients commonly develop tolerance to these medications and they become ineffective. Therefore, chronic benzodiazepines/hypnotics use leads to drug dependence, long-term adverse health effects, and psycho-social distresses, as well as increased cost and waste of healthcare resources. Furthermore, certain patient populations are particularly vulnerable to the practice of chronic benzodiazepines/hypnotics use: elderly patients, patients who also use chronic opiates/opioids, patients with alcohol or other substance use disorders, patients with psychiatric comorbidities, and patients with limited social support.

An analysis of pharmacy data of patients in the internal medicine practice at Yale Health identified 144 current patients with chronic benzodiazepines/hypnotics use. A sub-panel analysis of 21 patients revealed that the average age of patients is 59 (range 42-85), the majority are female, 66.6% use benzodiazepine (with Xanax being the most popular, followed by Ativan), 52.4% use hypnotics (most commonly Ambien), and 14.3% use both classes of medicine. In addition to benzodiazepine and hypnotics, 19% also use opioids for pain management, 9.5% use stimulants, 9.5% use muscle relaxants, and 28.6% use anti-depressants/anti-psychotics.

Benzodiazepines/hypnotics, like opiates/opioids, are considered controlled prescribed medications. However, unlike the latter, there is currently no mechanism in place to monitor the prescription and use of benzodiazepines/hypnotics in our patients at Yale Health. Given the success of our chronic opioid therapy program, we plan to modify and expand the program to include benzodiazepines and hypnotics.
Methods
- The primary outcome would be measured as the reduction of number of patients with chronic benzodiazepines and/or hypnotics in the health plan. The information will be collected from pharmacy data in order to accurately track the prescriptions as well as filling of such prescriptions. The data will be analyzed in 3-month intervals.
- As a measure of the process of the project, patients will be asked to sign up a chronic medication use agreement and come for regular follow up. Patients signed up such an agreement will be followed to monitor the progress. Each patient will have tailored tapering schedule and treatment plans. The information will be analyzed in 3-month intervals.
- A major consideration of the project is patient satisfaction. Since internal medicine providers are not the only prescribers of benzodiazepine or hypnotics, a patient who is not satisfied with this change of practice can simply switch to a different provider outside of the health plan. Thus, surveys will be conducted in order to gauge patient satisfaction at the beginning, 3 months, and 9 months after the signing of agreement.

Progress and future plans
We have begun to implement the program with a gradual, phase-based schedule:

Phase I: Jan 2020 – June 2020. (Ongoing but delayed due to SARS-Cov-2 restrictions)
- Develop the protocol and tools needed such as updating our controlled substance agreement and talking points for provider.
- Educate providers.
- Patient education and informing patients about the program.

Phase II: July 2020 – Jan 2021.
- Pilot with a selective panel of patients.

Phase III: Feb 2021 –
- Expand the program to additional providers and their eligible patients.
- Eventually will include all existing and new patients in the Internal Medicine.