

AN EVALUATION OF ANESTHESIA-RELATED
PERIOPERATIVE SCHEDULING AND MANAGEMENT
USING EPIC OPTIME:
BARRIERS IN USER INTERFACE / USER EXPERIENCE

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CAROLINA HEALTH INFORMATICS PROGRAM

Improving Healthcare with Intelligence



THE UNIVERSITY
of NORTH CAROLINA
at CHAPEL HILL

Objectives



UNDERSTAND
BACKGROUND AND
WHY



OVERVIEW OF
PROCEDURE SITES
AND ISSUES



DESCRIBE POSSIBLE
SOLUTIONS



DISCUSSION AND
NEXT STEPS



Background

- Investigate workflow in anesthesia-related perioperative scheduling and procedure tracking via UI/UX
- Project conducted at UHealth Tower / SCCC at University of Miami
- Want to identify the barriers in UI/UX that prohibits the proper scheduling of anesthesia resources and tracking of perioperative events for improved OR management
- Utilize EPIC OpTime and Radiant

Background

- Scheduling: When a case is scheduled, there is an attribute that marks if the case needs anesthesia resources or not. If not, this case doesn't appear on the anesthesia personnel schedules, so it is not staffed.
- Perioperative Tracking: We use Real-Time Locating System (RTLS) in certain sites as well as manual entry by procedure nurses to electronically track the progress of any given case. These two methods have problems with delays and dysfunction.



Why?

- I am an Anesthesiologist and a Board Runner
- Directly and indirectly responsible, daily, for over 15 anesthesiologists and 45 nurse anesthetists and anesthesiology residents
- Want to efficiently utilize anesthesia resources via the schedule
- We need to know which cases need anesthesia, and when they start and end so we know who is available at any given moment



Sites | Main OR

- Resource Scheduling
 - Optimal functioning of scheduling
 - Automatic default anesthesia resource request for all cases in Main OR
 - Cases automatically always appear on Epic snapboard for anesthesia resource allocation
- Perioperative Tracking
 - Optimal functioning of tracking systems
 - Combination of RTLS and manual entry
 - Problems with new ORs 15, 16, and 17 due to vicinity to holding areas; requires manual entry to fix
 - Problems with holding area location; patients in the 'pool'

Sites | Ambulatory OR

- Resource Scheduling
 - Appropriate functioning of scheduling
 - Automatic default anesthesia resource request for all cases in Amb OR
 - Cases automatically always appear on Epic snapboard for anesthesia resource allocation
- Perioperative Tracking
 - Appropriate functioning of tracking systems
 - Combination of RTLS and manual entry
 - Problems with holding area location; patients in the 'pool'

Sites | Endoscopy / GI

- Resource Scheduling
 - Scheduling discrepancies
 - No default anesthesia resource request
 - Outpatient appropriately scheduled
 - Inpatients hit or miss
 - Cases do not always appear on Epic snapboard for anesthesia resource allocation
- Perioperative Tracking
 - Inaccurate tracking systems
 - Combination of RTLS and manual entry
 - RTLS hardware outside of GI rooms
 - Fast-paced environment where manual entry is often delayed

Show Date | Filter Events: Pre Intra Procedure/Panel Post Anesthesia All

Pre

| | | | | | |
|------------------------|----------|--|------------|--|-----|
| In Facility | 11:27 AM | | 04/04/2022 | | Now |
| In Pre-Procedure | 12:35 PM | | 04/04/2022 | | Now |
| Pre-Procedure Complete | 1:03 PM | | 04/04/2022 | | Now |
| Room Ready - Nursing | | | | | Now |

Intra

| | | | | | |
|-------------------|---------|--|------------|--|-----|
| In Room | 1:11 PM | | 04/04/2022 | | Now |
| Procedure Start | 1:19 PM | | 04/04/2022 | | Now |
| Procedure Closing | | | | | Now |
| Procedure Finish | 1:47 PM | | 04/04/2022 | | Now |
| Out of Room | 1:55 PM | | 04/04/2022 | | Now |
| PACU Request | | | | | Now |
| Sent to OR PACU | | | | | Now |

Panel 1: Gastroenterology with Pearlman, Michelle, MD
 ESOPHAGOGASTRODUODENOSCOPY, FLEXIBLE, TRANSORAL; WITH BIOPSY, SINGLE OR MULTIPLE

| | | | | | |
|-----------------|---------|--|------------|--|-----|
| Procedure Start | 1:19 PM | | 04/04/2022 | | Now |
|-----------------|---------|--|------------|--|-----|

Case Tracking Information

| Projected Start Time | Projected End Time | Estimated End Time |
|----------------------|--------------------|--------------------|
| 1:11 PM 04/04/2022 | 1:56 PM 04/04/2022 | |

Accept Cancel

Sites | Interventional Radiology

- Resource Scheduling
 - Scheduling is usually appropriate when anesthesia resources are required
 - No default anesthesia resource request; hybrid location
 - Cases usually appear on Epic snapboard for anesthesia resource allocation
- Perioperative Tracking
 - No RTLS
 - Manual Entry by procedure nurses
 - Usually delayed entry

Sites | Cath Lab

- Resource Scheduling
 - Scheduling discrepancies
 - No default anesthesia resource request; hybrid location
 - Cases do not always appear on Epic snapboard for anesthesia resource allocation

- Perioperative Tracking
 - Inaccurate tracking systems
 - Combination of RTLS and manual entry
 - Usually delayed entry

Sites | MRI

- Resource Scheduling
 - Scheduling is usually appropriate when anesthesia resources are required
 - No default anesthesia resource request; hybrid location
 - Cases usually appear on Epic snapboard for anesthesia resource allocation
- Perioperative Tracking
 - No RTLS
 - Manual Entry by procedure nurses
 - Usually delayed entry

Sites | TEE

- Resource Scheduling
 - Scheduling is usually appropriate when anesthesia resources are required
 - No default anesthesia resource request; hybrid location
 - Cases usually appear on Epic snapboard for anesthesia resource allocation
- Perioperative Tracking
 - No RTLS
 - Manual Entry by procedure nurses
 - Usually delayed entry

Sites | SCCC

- Resource Scheduling
 - Appropriate functioning of scheduling
 - In ORs, default anesthesia requests
 - Cases usually appear on Epic snapboard for anesthesia resource allocation
- Perioperative Tracking
 - No RTLS
 - Manual Entry by procedure nurses
 - Almost always delayed entry

Sites | Summary

| Location | Scheduling | | Perioperative Tracking | | | |
|----------|--------------------|-------------------|------------------------|-------------|--------------|--------------------|
| | Anesthesia Default | Scheduling Errors | RTLS | RTLS Errors | Manual Entry | Manual Entry Delay |
| Main OR | Y | N | Y | Y | Y | N |
| Amb OR | Y | N | Y | Y | Y | N |
| GI | N | Y | Y | Y | Y | Y |
| IR | N | Y | N | NA | Y | Y |
| CathLab | N | Y | N | NA | Y | Y |
| MRI | N | Y | N | NA | Y | Y |
| TEE | N | N | N | NA | Y | Y |
| SCCC | Y/N | N | N | NA | Y | Y |

| | |
|--|--------------------|
| | Positive Attribute |
| | Negative Attribute |
| | Neutral Attribute |

Solution Proposal

- Training
 - Easiest to implement
 - Re-educate on appropriate scheduling and manual entry
 - Training can be provided by superusers within each site
 - A training module can be created in ULearn and required of all schedulers and procedural nurses for appropriate usage



Solution Proposal

- Defaults and Mandatory Fields
 - GI should have Anesthesia resources as default
 - Hybrid locations should have a mandatory field to accept or reject an anesthesia request during scheduling
 - Implementation requires IT and maybe Epic personnel
 - These changes would then have to be provided in a training module

General Information **General Info**

Staff: 3/25/2022 Service: Gastroenterology

Supplies and Drugs: Location: UMH GI Patient class: Hospital Ambulatory Surgery

Anesthesia Information: Case classification: Add-on case?

Equipment/Instruments: Priority: Low Normal High Requested date: Requested time:

Positioning Devices: Diagnosis: Stricture of esophagus [K22.2] Pre-op diagnosis: Stricture of esophagus [K22.2]
Esophageal dysphagia [R13.19] Esophageal dysphagia [R13.19]

Panel 1 - Gastroenterology

| Surgeon | Role | Service | Start Time | End Time | Total Time |
|------------------------|---------|------------------|------------|----------|------------|
| SOUTO, ENRICO OLIVEIRA | Primary | Gastroenterology | 0 | 30 | 30 |

| Row | Procedure/Code | Code | Procedure Description | Card | Laterality | Anesthesia | Region | Length | Ps... | Cmt |
|-----|---|--------------|---|------|------------|------------|--------|--------|-------|-----|
| 1 | ESOPHAGOGASTRODUODENOSCOPY, FLEXIBLE... | 43239 (CPT®) | ESOPHAGOGASTRODUODENOSCOPY, FLEXIBLE... | | N/A | MAC | | 7 | | |

Start panel at: 0 Panel length: 30 Restore Lengths Time Averages

Setup length: 0 Patient prep: 0 Total time: 30

Wrap-up: 0 Cleanup length: 0

Verify Open Chart Schedule Open Times Cancel Void Auth/Cert Case Msg Case Reviewed? Link ADT Contact

General Information **Anesthesia Staff**

| Staff Type | Required? | Staff Member | Start Time | End Time |
|------------------|-------------------------------------|--------------------|------------|----------|
| Anesthesiologist | <input checked="" type="checkbox"/> | VU, LY | 0 | 30 |
| CRNA | <input checked="" type="checkbox"/> | KOZIKOWSKI, ANDREA | 0 | 30 |

Anesthesia Equipment

| Equipment Type | Required? | Equipment | Start Time | End Time | Comment |
|----------------|-------------------------------------|-----------|------------|----------|---------|
| | <input checked="" type="checkbox"/> | | | | |

Solution Proposal

- Automation

- RTLS functions fairly well in the locations it exists, but not without some problems
- Possible to re-locate the sensors (such as inside rooms)
- Increase sensitivity of locators or upgrade hardware
- Must convince decision-making administration to approve capital investment in upgrades or additional locators in procedural areas
- Implementation would also involve front-end configuration with IT and Epic

Solution Proposal

- Interface Design

- Epic Anesthesia OpTime for the intraoperative Anesthesia Information Management System has a 'Hot' button that can be continuously clicked very easily within a split second with each successive intraoperative anesthesia-related event.
- This can be applied with a user interface redesign to include perioperative event 'Hot' buttons so procedural nurses can easily 'click' the button at various event times without delaying patient care
- Implementation would require IT and Epic support along with administrative approvals.
- Epic is not easy to work with for user interface changes; but possible

- Device
- Attest
- Q Note
- Blood
- Output
- Airways
- Lines
- Pediatr...
- Sign R...

Extubation

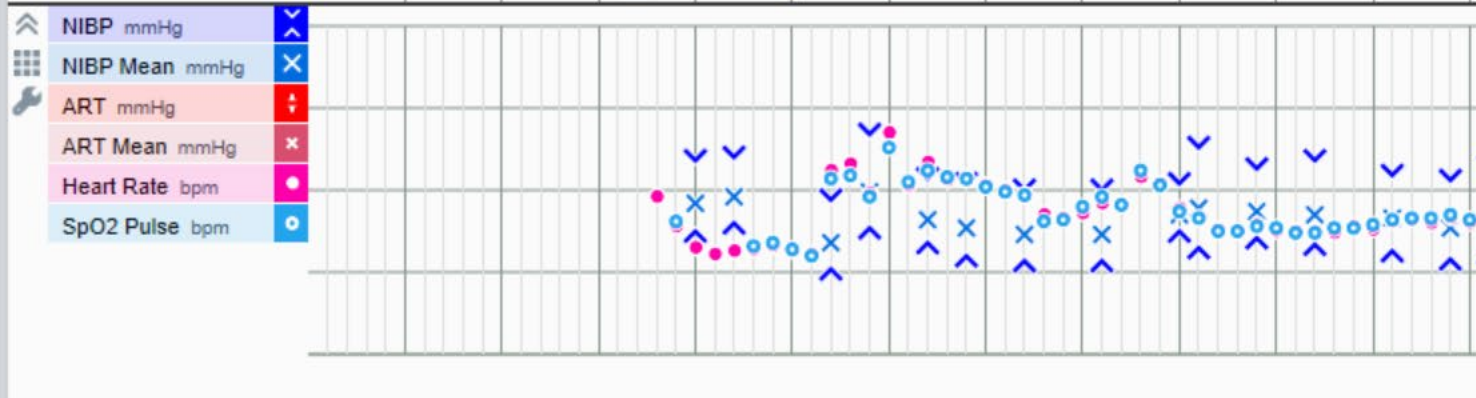
File at time

Events

Mark Now

| | | | | | | | | | | |
|------------------------|--|----|----|---------|-----|-----|-----|-----|-----|-----|
| NG/OG Tube mL | | | | | | | | | | |
| Other mL | | | | | | | | | | |
| Vent Mode | | | SV | PCV-... | | | | | | |
| Resp Rate bpm | | 0 | 6 | 10 | 10 | 10 | 10 | 10 | 12 | 12 |
| ETCO2 mmHg | | 0 | 14 | 33 | 32 | 31 | 30 | 34 | 35 | 35 |
| Insp CO2 mmHg | | 0 | 0 | 0.7 | 0.7 | 0.8 | 0.6 | 0.9 | 1 | 1 |
| FiO2 % | | 96 | 97 | 55 | 47 | 45 | 45 | 45 | 44 | 44 |
| Tidal Volume (Ob... mL | | | 31 | 489 | 499 | 459 | 448 | 448 | 447 | 446 |
| Tidal Volume (Insp) mL | | | 13 | 499 | 499 | 513 | 446 | 438 | 451 | 449 |
| PIP cm H2O | | 1 | 2 | 12 | 14 | 14 | 18 | 18 | 19 | 19 |

Events



| | | | | | | | | | | |
|---------------|--|----|-----|-----|------------|------------|------------|------------|------------|------------|
| Card | | | | | | | | | | |
| Neuro | | | | | | | | | | |
| Other | | | | | | | | | | |
| EKG | | | SR | SR | | | SR | | | |
| SpO2 % | | 88 | 100 | 100 | 100 | 100 | 100 | 100 | 99 | 99 |
| Temp °F (°C) | | | | | 96.8 (...) | 96.4 (...) | 96.3 (...) | 96.4 (...) | 96.6 (...) | 96.8 (...) |
| Train of Four | | | | | | | | | | |
| Position | | | | | | Supine | | | | |

Discussion

- Implementation would require more time and hurdles with IT and Epic personnel
- Some anecdotal change after interviews with somewhat increased incidence of appropriate scheduling of patients with anesthesia resources
- Contextual Design concepts help place interviews in context of end users

Discussion

- UI/UX is vital in any system infrastructure and will need to focus on operability by the end users
- Focus of project to improve scheduling with anesthesia resources and improve perioperative tracking via proposed UI/UX element changes
- Improve workflow; improve user experience; increase efficiency of staffing

Next Steps

Implement proposed solutions

Investigate measurable outcomes

- Measure incidence of scheduling errors before and after implementation
- Measure actual perioperative event tracking delays in manual entry before and after implementations
- Measure incidence of RTLS errors
- Measure anesthesia resource allocation metrics



THANK YOU!



Questions?
