

Assessing Patient Safety and Quality Assurance Events in Non-Operating Room Anesthesia: A Retrospective Analysis of Event Rates and Airway Complications

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Introduction

- The volume of **Non-Operating Room Anesthesia (NORA)** cases is **increasing**, presenting unique challenges to the anesthesiologist due to **older patient populations with higher ASA physical status scores, and fast-paced, often poorly adapted environments.**
- Anesthesiologists report a **heightened sense of anxiety and decreased safety** in NORA environments.
- While NORA is recognized to carry specific patient safety risks, **evidence on its safety relative to the Main Operating Room (MOR) is mixed:**
 - ASA Closed Claims studies report higher rates of deaths and respiratory events in NORA.
 - A 2018 NACOR study found lower mortality and major complications in NORA compared to MOR.
- Existing studies frequently fail to account for patient and procedural confounders that may impact outcomes.
- Study Aims:**
 - Evaluate Quality Assurance (QA) event rates in NORA versus MOR by event type and anesthetizing location.
 - Compare airway-related QA event occurrences in NORA and MOR, adjusting for patient, procedural, and environmental characteristics.

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Methods

- Design:** Retrospective review of all reported QA events at a large academic medical system.
- Data:** Deidentified QA data extracted from anesthesia QA event reports, which are automatically collected at the end of each case via the Anesthesia Information Management System.
- Inclusion Criteria:** Adult surgical and procedural cases from August 1, 2018, to December 31, 2022.
- Exclusion Criteria:** Missing location, PACU, ICU, OB.
- Primary Outcome:** Difference in the rate of airway-related QA events between NORA and MOR locations.
- Analysis:** Generalized linear models (GLMs) controlling for patient, procedural and environmental covariates.

Patient	Procedural	Environmental
<ul style="list-style-type: none"> Age Gender Race/ethnicity ASA physical status Etc. 	<ul style="list-style-type: none"> Length of procedure Primary anesthesia type Surgical service Inpatient vs. outpatient Etc. 	<ul style="list-style-type: none"> Procedure after hours Holiday or weekend procedure Presence of trainees Etc.

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Results: Flow Chart of Inclusions and Exclusions

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      A[387,629 Total QA Reports of Prespecified Type Extracted from Database (Excluding "Testing if Right" Fees Support Requests, and Blank QA Reports)] --> B[483,895 QA Reports from Included Case Locations]
      A --> C[123,734 Cases with Missing Location, ICU, PACU, OB Cases, and Cases Performed Outside of the Two Main Campuses]
      B --> D[256,673 Cases With Complete QA Reports from Included Case Locations]
      B --> E[67,222 Duplicate Cases]
      D --> F[371,404 Adult Cases]
      D --> G[25,269 Cases Involving Patients under 18 Years Old]
      F --> H[335,163 Adult Cases Performed between August 1, 2018 and December 31, 2022]
      F --> I[36,241 Cases with Procedure Date Outside of the Prespecified August 1, 2018 Through December 31, 2022 Range]
      H --> J[335,119 Adult Cases Performed between August 1, 2018 and December 31, 2022 with a Known Anesthesia Type Included in the Study]
      H --> K[44 Cases with Missing or Unknown Anesthesia Type]
  
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Results: QA Events in NORA and MOR Locations

- Among 335,119 cases during the study period, **84,925 cases (25%)** were performed in NORA locations.
- Among the NORA cases, **759 (0.9%)** were associated with at least one QA event.

Location	Events / Cases	% of Cases with at Least One QA Event
Endoscopy Suite	267 events / 51,169 cases	~0.5%
Interventional Radiology	206 events / 15,226 cases	~1.4%
Main Operating Room	3,934 events / 250,194 cases	~1.6%
Cardiac Catheterization Lab	106 events / 3,445 cases	~3.1%

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Results: QA Event Counts by Category in NORA and MOR

	Total N=5,189	MOR N=4,339	NORA N=850
Cardiovascular & Hemodynamic Events	574 (11.1)	479 (11.0)	95 (11.2)
Airway & Oxygenation Events	988 (19.0)	791 (18.2)	197 (23.2)
Medication Error and Reactions	284 (5.5)	256 (5.9)	28 (3.3)
Procedural Complications	351 (6.8)	306 (7.1)	45 (5.3)
Injuries	711 (13.7)	588 (13.6)	123 (14.5)
Disposition Plan Changes	546 (10.5)	436 (10.0)	110 (12.9)
Case Cancellations	263 (5.1)	199 (4.6)	64 (7.5)
Other Events	1,472 (28.4)	1,284 (29.6)	188 (22.1)

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Results: Multivariable GLM Regression Results Comparing NORA and MOR QA Airway Event Occurrence

	Overall Sample		ASA Physical Status ≥3	
	Odds Ratio (95% CI)	p-value	Odds Ratio (95% CI)	p-value
Aspiration	2.08 (1.05, 4.14)	0.04	2.44 (1.11, 5.35)	0.03
Unable to Intubate	2.05 (0.54, 7.78)	0.29	1.21 (0.26, 5.62)	0.80
Unplanned Reintubation	1.07 (0.57, 2.00)	0.84	1.33 (0.70, 2.54)	0.39
Other Airway or Deoxygenation Event	1.11 (0.82, 1.51)	0.50	1.14 (0.80, 1.62)	0.46



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Conclusions

- QA event rates varied across procedural locations, highlighting the **necessity for tailored safety protocols beyond the MOR.**
- "Other" QA events were predominant in MOR settings, suggesting **diverse risks.**
- **Aspiration events** were more frequent in NORA, suggesting challenges specific to these locations.
- Study **limitations** include self-reported data and potential residual confounders due to inherent differences in NORA and MOR procedures.
- Findings underscore **opportunities to enhance NORA safety**, particularly in mitigating aspiration risk.



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Questions?



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