2017 National DNP Conference

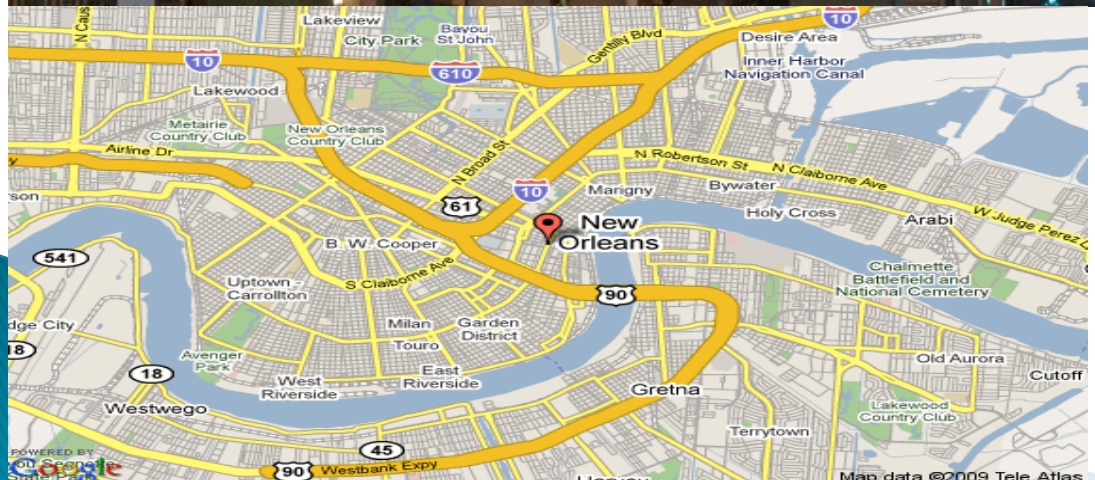
- ***Adverse Patient Outcomes: A Problem in Search of a Solution***
- **Bill Howie, DNP, CRNA**
- **R. Adams Cowley Shock Trauma Center**
- **La Salle Ballroom A/B**

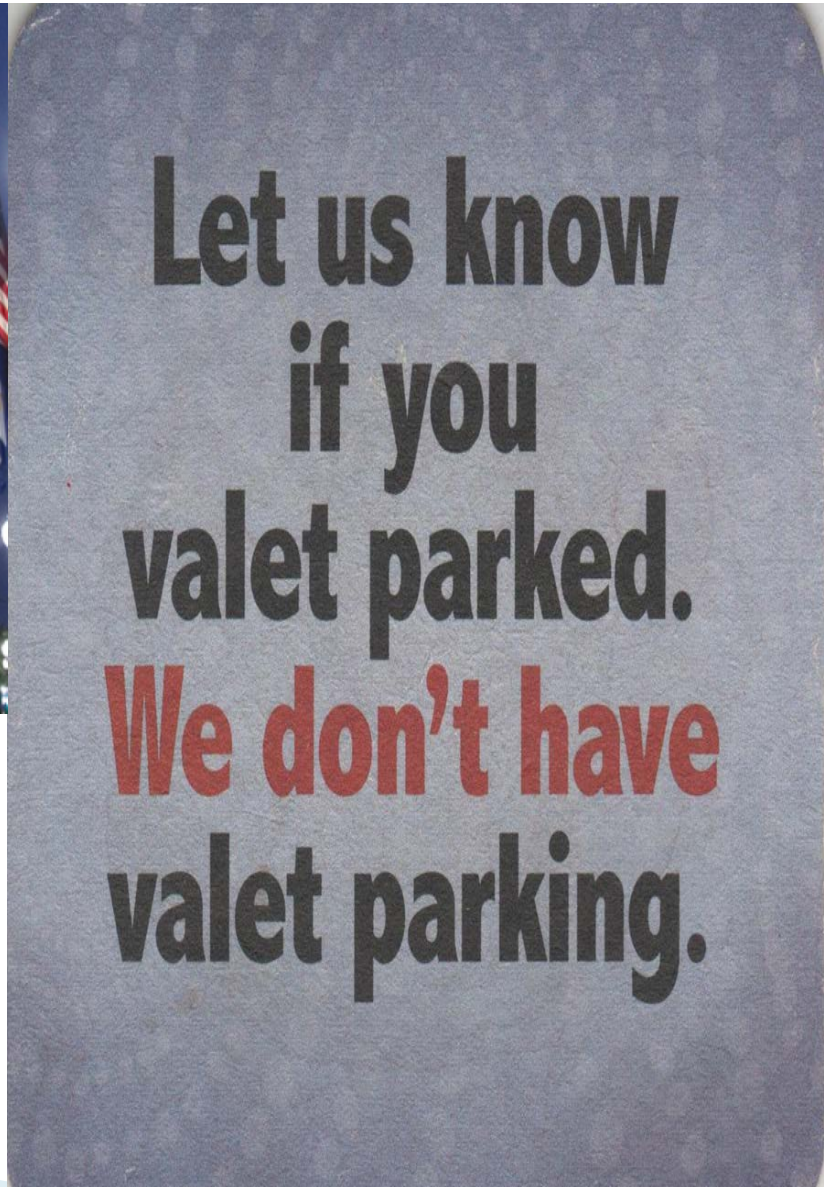
- **CE Value 1**
- **15 Sept 2017 (0830-0930)**

September 13-15, 2017 New Orleans

Tenth National Doctors of Nursing Practice Conference: New Orleans, LA

Public Service Announcement





Why a DNP?

- Prepares nurses for not only advanced clinical practice, but for leadership, management, and policy.
- Provides nurses with knowledge and skills to address the needs of increasingly complex health care systems.
- Increases numbers of educated providers, faculty, and leaders.
- More education typically translates to better patient outcomes.

Source: American Nurses Association. *Frequently asked questions about the Doctor of Nursing Practice*. Available at: http://www.nursingworld.org/DNPFAQ

Nursing Education Makes a Difference

- 10% increase in proportion of baccalaureate-prepared nurses on hospital units associated with lowering odds of patient mortality by 10.9%.

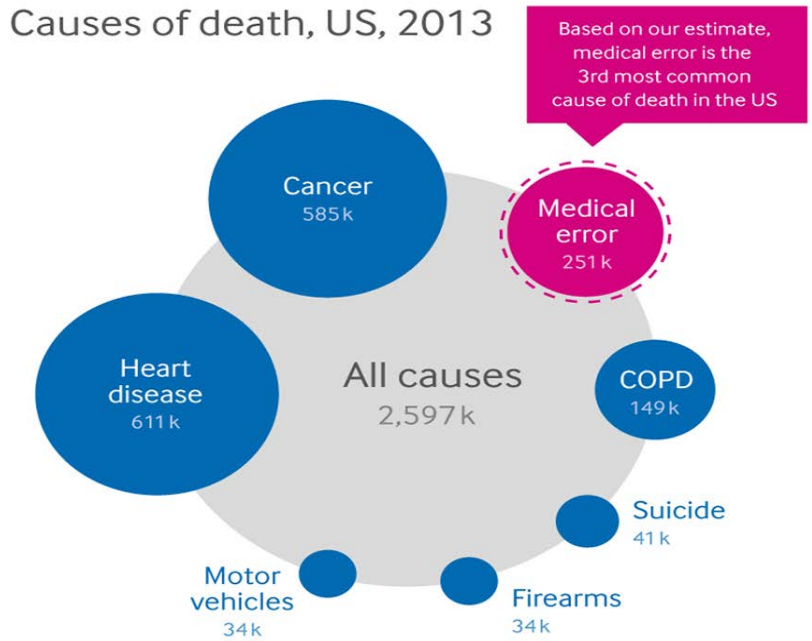
- Cross-sectional study of 21 Healthsystem Consortium Hospitals found those with higher numbers of BSN or higher degrees in nursing had lower rates of congestive heart failure mortality, decubitus ulcers, failure to rescue, postoperative DVTs, pulmonary embolism, and shorter lengths of stay. Data are compelling that education makes a tremendous difference!

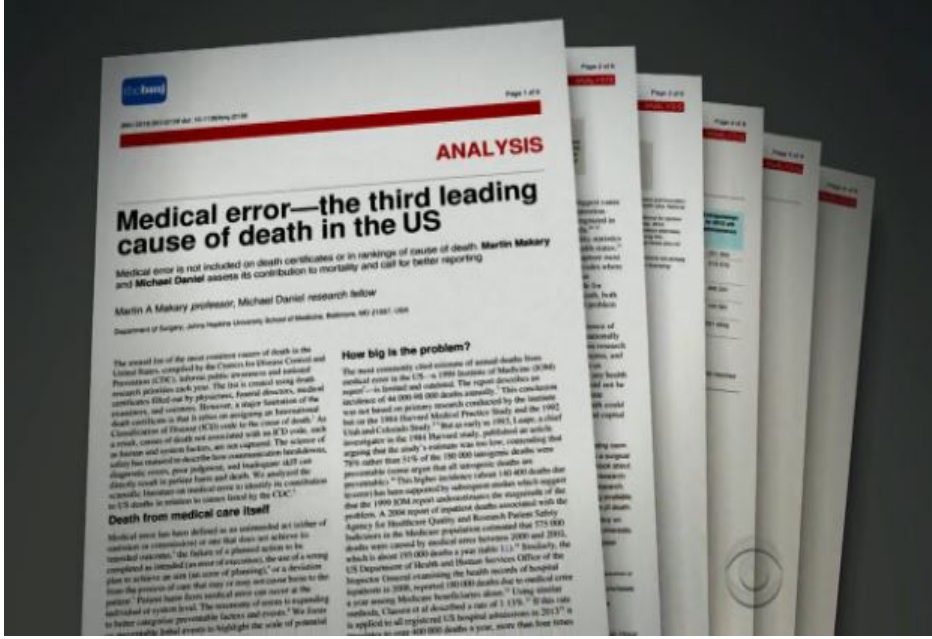
- Sources: Yakusheva, O. (2014). Economic evaluation of the 80% baccalaureate nurse workforce recommendation. *Medical Care*. Available at: http://journals.lww.com/lww-medicalcare/pages/default.aspx.
- Institute of Medicine. (2011). The Future of Nursing: Focus on Education http://www.iom.edu/Reports/2010/The-Future-of-Nursing-Leading-Change-Advancing-Health/Report-Brief-Education.aspx

IOM and RWJ Report

- "The ways in which nurses were educated during the 20th century are no longer adequate for dealing with the realities of health care in the 21st century. As patient needs and care environments have become more complex, nurses need to attain requisite competencies to deliver high-quality care…[including] leadership, health policy, system improvement, research and evidence-based practice, and teamwork and collaboration, as well as competency in specific content areas such as community and public health and geriatrics."
- "Nurses also are being called upon to fill expanding roles and to master technological tools and information management systems while collaborating and coordinating care across teams of health professionals… the IOM committee calls for nurses to achieve higher levels of education and suggests that they be educated in new ways that better prepare them to meet the needs of the population."

- Source: Institute of Medicine & Robert Wood Johnson Foundation. (2011) . *The future of nursing: Focus on education. Available at:* http://www.iom.edu/Reports/2010/The-Future-of-Nursing-Leading-Change-Advancing-Health/Report-Brief-Education.aspx.





10 Leading Causes of Death by Age Group, United States – 2015

	Age Groups										
Rank	<1	1-4	5-9	10-14	15-24	25-34	35-44	45-54	55-64	65+	Total
1	Congenital Anomalies 4,825	Unintentional Injury 1,235	Unintentional Injury 755	Unintentional Injury 763	Unintentional Injury 12,514	Unintentional Injury 19,795	Unintentional Injury 17,818	Malignant Neoplasms 43,054	Malignant Neoplasms 116,122	Heart Disease 507,138	Heart Disease 633,842
2	Short Gestation 4,084	Congenital Anomalies 435	Malignant Neoplasms 437	Malignant Neoplasms 428	Suicide 5,491	Suicide 6,947	Malignant Neoplasms 10,909	Heart Disease 34,248	Heart Disease 76,872	Malignant Neoplasms 419,389	Malignant Neoplasms 595,930
3	SIDS 1,568	Homicide 369	Congenital Anomalies 181	Suicide 409	Homicide 4,733	Homicide 4,863	Heart Disease 10,387	Unintentional Injury 21,499	Unintentional Injury 19,488	Chronic Low. Respiratory Disease 131,604	Chronic Low. Respiratory Disease 155,041
4	Maternal Pregnancy Comp. 1,522	Malignant Neoplasms 354	Homicide 140	Homicide 158	Malignant Neoplasms 1,469	Malignant Neoplasms 3,704	Suicide 6,936	Liver Disease 8,874	Chronic Low. Respiratory Disease 17,457	Cerebro-vascular 120,156	Unintentional Injury 146,571
5	Unintentional Injury 1,291	Heart Disease 147	Heart Disease 85	Congenital Anomalies 156	Heart Disease 997	Heart Disease 3,622	Homicide 2,895	Suicide 8,751	Diabetes Mellitus 14,166	Alzheimer's Disease 109,495	Cerebro-vascular 140,323
6	Placenta Cord. Membranes 910	Influenza & Pneumonia 88	Chronic Low. Respiratory Disease 80	Heart Disease 125	Congenital Anomalies 386	Liver Disease 844	Liver Disease 2,861	Diabetes Mellitus 6,212	Liver Disease 13,278	Diabetes Mellitus 56,142	Alzheimer's Disease 110,561
7	Bacterial Sepsis 599	Septicemia 54	Influenza & Pneumonia 44	Chronic Low Respiratory Disease 93	Chronic Low Respiratory Disease 202	Diabetes Mellitus 798	Diabetes Mellitus 1,986	Cerebro-vascular 5,307	Cerebro-vascular 12,116	Unintentional Injury 51,395	Diabetes Mellitus 79,535
8	Respiratory Distress 462	Perinatal Period 50	Cerebro-vascular 42	Cerebro-vascular 42	Diabetes Mellitus 196	Cerebro-vascular 567	Cerebro-vascular 1,788	Chronic Low. Respiratory Disease 4,345	Suicide 7,739	Influenza & Pneumonia 48,774	Influenza & Pneumonia 57,062
9	Circulatory System Disease 428	Cerebro-vascular 42	Benign Neoplasms 39	Influenza & Pneumonia 39	Influenza & Pneumonia 184	HIV 529	HIV 1,055	Septicemia 2,542	Septicemia 5,774	Nephritis 41,258	Nephritis 49,959
10	Neonatal Hemorrhage 406	Chronic Low Respiratory Disease 40	Septicemia 31	Two Tied: Benign Neo./Septicemia 33	Cerebro-vascular 166	Congenital Anomalies 443	Septicemia 829	Nephritis 2,124	Nephritis 5,452	Septicemia 30,817	Suicide 44,193

Data Source: National Vital Statistics System, National Center for Health Statistics, CDC.
Produced by: National Center for Injury Prevention and Control, CDC using WISQARS™.

Centers for Disease Control and Prevention National Center for Injury Prevention and Control

Patient Outcomes are a Concern

- Given the number of errors in hospitals, it is literally safer to skydive! Four studies encompassing more than 4,200 patients determined that serious adverse events occurred in about 21% of cases and rates of lethal adverse events happened about 1.4% of the time. By way of extrapolation, preventable errors contribute to about 210,000 patient deaths in hospitals each year.

Source: Allen, M. (2013). How many die from medical mistakes in U.S. hospitals? National Public Radio. Available at: http://www.npr.org/blogs/health/2013/09/20/224507654/how-many-die-from-medical-mistakes-in-u-s-hospitals.

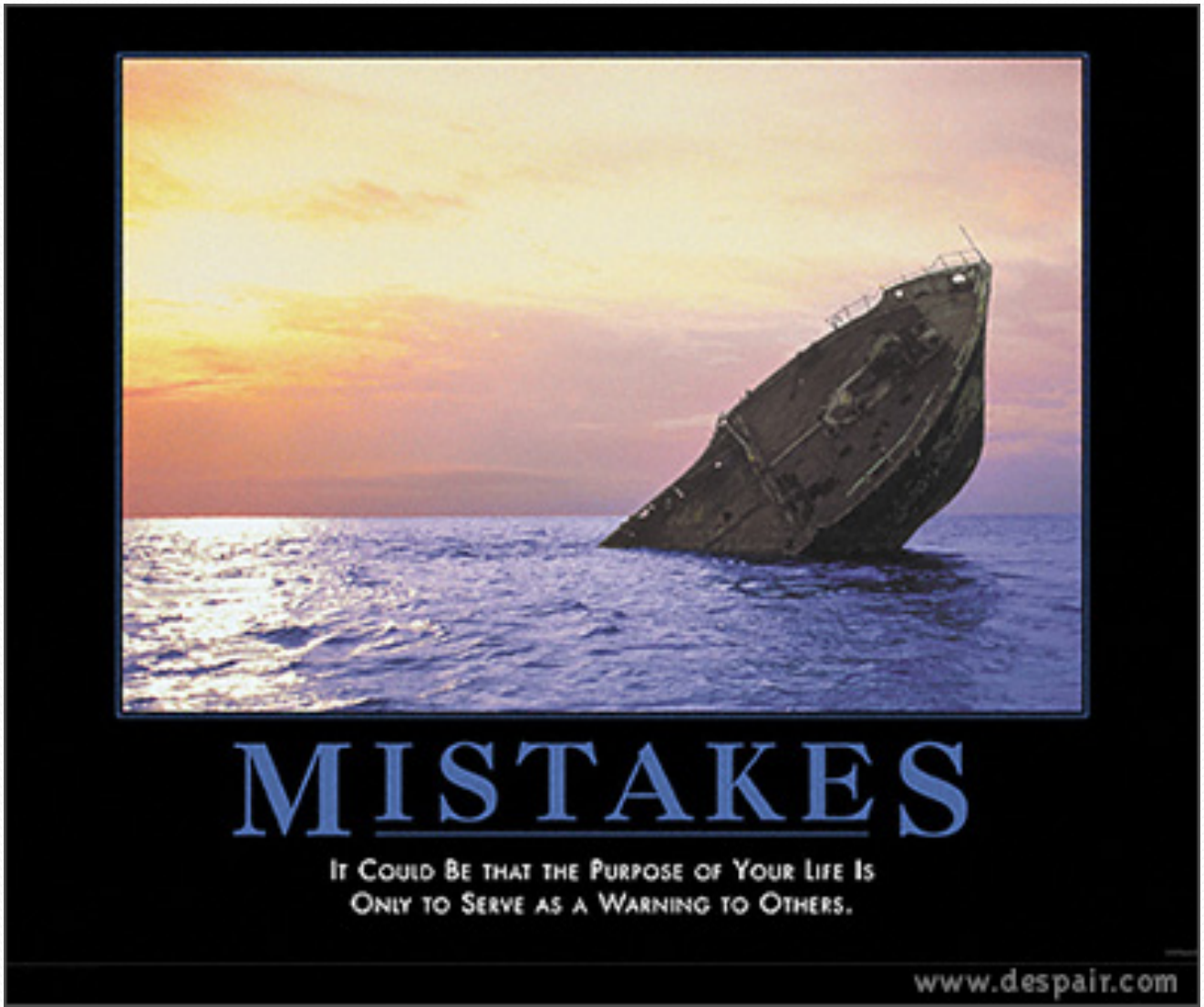
Objectives

- Following this presentation the participant will:
  - State common sources of adverse events in health care.
  - Discuss how facility quality improvement data can be used to address common adverse patient outcomes/ sentinel events.
  - Discuss how checklists can be used to affect identified adverse patient events.
  - Discuss ways to make patient safety part of the organization's mission.

Objectives

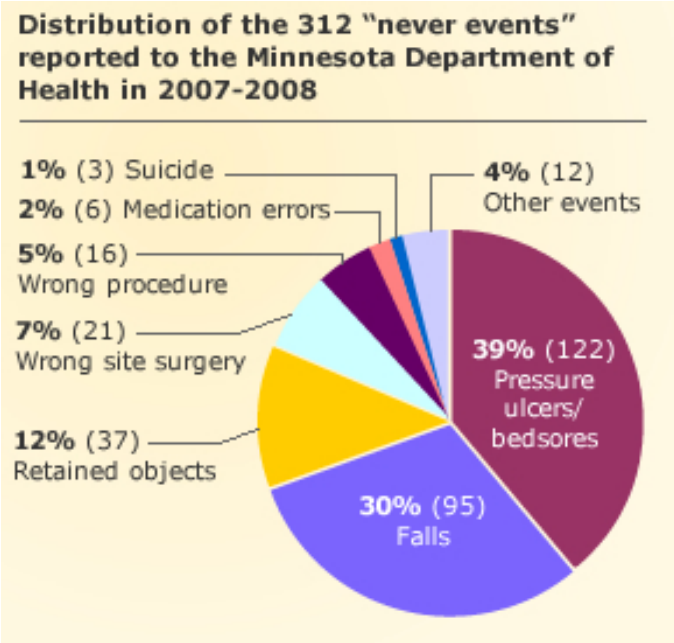
- Describe factors that commonly lead to extubation failure in adult patients (at the STC).
- Discuss how an extubation checklist can potentially decrease the incidence of extubation failure postoperatively.
- Identify evidenced based guidelines to include in the pre-extubtion checklist.

What is learned from mistakes?

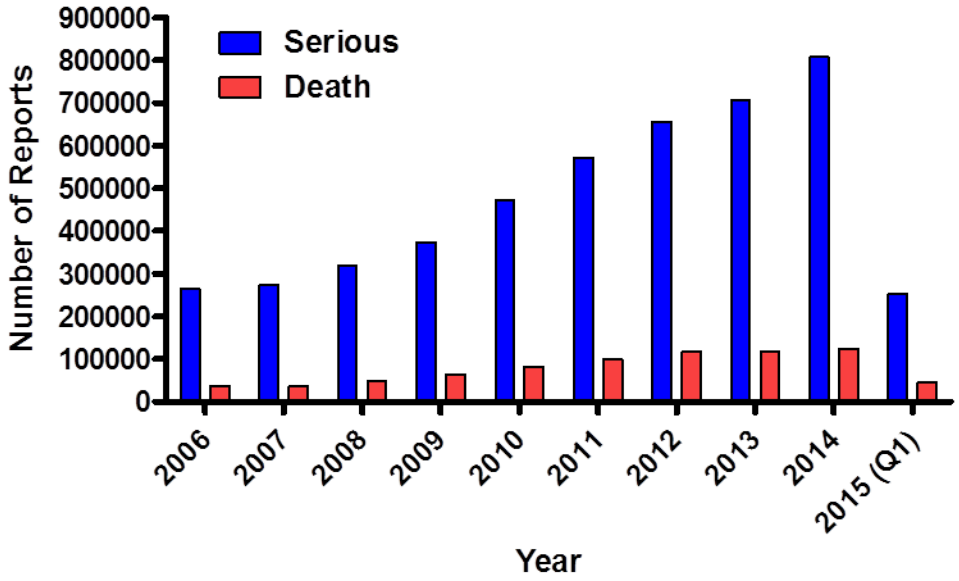


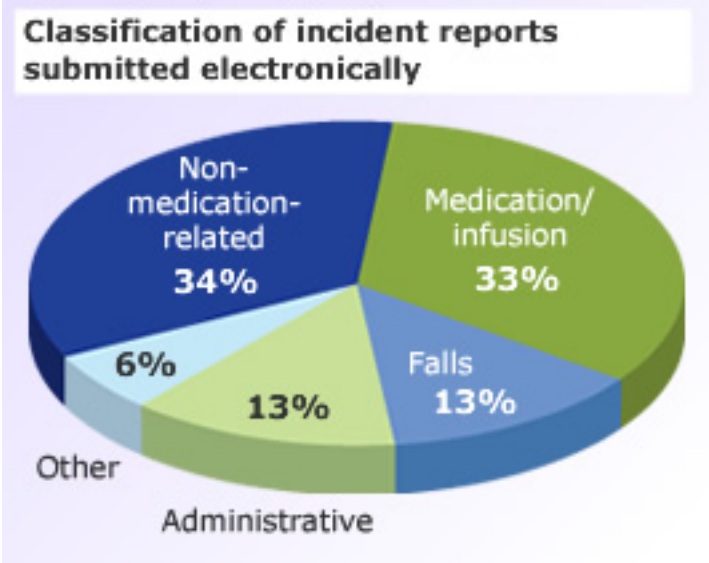
Source of Adverse Patient Care Events

- Maryland Health Claims Arbitration
- National Practitioner Database
- Facility QI Committee
- State Boards of Nursing
- Facility Risk Management Department
- Joint Commission
- State Boards of Health



Sources of Adverse Patient Event Reporting





Surgeons make thousands of Errors (National Practitioner Data)

- 9,744 cases (1990-2010)
- Just over 6% died;33% had permanent damage; 59% suffered temporary injury.
- Estimated that 4,082 mistakes occur in US each year (wrong site/wrong procedure/ object left in patient).
- American Hospital Association estimates 53 million surgeries occur annually in the US and the rate of these critical incidents are very rare.

National Practitioner Data

Table 2. Number of Licensed Providers by Profession

Nurse Practitioners	Physician Assistants	Allopathic Physicians
N = 180,233[a]	N = 86,500[b]	N = 834,769[c]

[a] The Henry J. Kaiser Family Foundation. State Health Facts: Total Nurse Practitioners. http://www.statehealthfacts.org/profileind.jsp?ind=773&cat=8&rgn=1. Accessed August 13, 2013.
[b] American Academy of Physician Assistants. PA Fact Sheet Vital Statistics. http://www.aapa.org/uploadedFiles/content/News_and_Publications/For_the_Media/VitalStats_Factsheet.pdf. Published January 2013. Accessed August 13, 2013.
[c] The Henry J. Kaiser Family Foundation. State Health Facts: Providers & Service Use. http://www.statehealthfacts.org/profileind.jsp?cat=8&sub=100&rgn=1. Accessed August 13, 2013.

Table 3. Comparison of Closed Claim Malpractice Payment Amount by Profession Between 2008-2013*

Payment Category	Nurse Practitioners	Physician Assistants	Allopathic Physicians
Mean	$150,590	$171,161	$257,738
Median	$72,500	$87,500	$145,000
Mode	$97,500	$72,500	$245,000

*Adapted from the National Practitioner Data Bank Public Use Data File, SPSS Version. http://www.npdb-hipdb.hrsa.gov/resources/publicData.jsp. Updated April 2013.

Table 1. Malpractice Claims Closed by Profession Between 2008-2013*

Nurse Practitioners	Physician Assistants	Allopathic Physicians
N = 190	N = 237	N = 10,240

*Adapted from the National Practitioner Data Bank Public Use Data File, SPSS Version. http://www.npdb-hipdb.hrsa.gov/resources/publicData.jsp. Updated April 2013.

Table 5. Comparison of Specific Malpractice Allegation by Profession Between 2008-2013*

Nurse Practitioners (N = 190)	Physician Assistants (N = 237)	Allopathic Physicians (N = 10,240)
1. Failure to Diagnose (n = 43)	1. Failure to Diagnose (n = 86)	1. Improper Performance (n = 2,082)
2. Improper Performance (n = 22)	2. Improper Performance (n = 24)	2. Failure to Diagnose (n = 1,607)
3. Failure to Treat (n = 17)	3. Delay in Diagnosis (n = 19)	3. Delay in Diagnosis (n = 744)

*Adapted from the National Practitioner Data Bank Public Use Data File, SPSS Version. http://www.npdb-hipdb.hrsa.gov/resources/publicData.jsp. Updated April 2013.

Miller, K.P. (2013). The National Practitioner Data Bank: An annual update. *J. Nurse Practitioners. 8*(9), 576-580).

National Practitioner Data Bank

Table 4. Comparison of Malpractice Allegation Group by Profession Between 2008-2013*

Nurse Practitioners (N = 190)	Physician Assistants (N = 237)	Allopathic Physicians (N = 10,240)
1. Treatment Related (n = 81)	1. Diagnosis Related (n = 86)	1. Surgery Related (n = 3,213)
2. Diagnosis Related (n = 57)	2. Treatment Related (n = 24)	2. Diagnosis Related (n = 2,617)
3. Medication Related (n = 21)	3. Medication Related (n = 19)	3. Treatment Related (n = 2,061)

*Adapted from the National Practitioner Data Bank Public Use Data File, SPSS Version. http://www.npdb-hipdb.hrsa.gov/resources/publicData.jsp. Updated April 2013.

Table 6. Comparison of Severity of Malpractice Allegation by Profession Between 2008-2013*

Nurse Practitioners (N = 190)	Physician Assistants (N = 237)	Allopathic Physicians (N = 10,240)
1. Death (n = 62)	1. Death (n = 73)	1. Death (n = 2,973)
2. Minor Temporary Injury (n = 32)	2. Minor Temporary Injury (n = 39) Minor Permanent Injury (n = 39)	2. Minor Temporary Injury (n = 1,485)
3. Major Temporary Injury (n = 25)	3. Major Permanent Injury (n = 28)	3. Major Temporary Injury (n = 1,346)

*Adapted from the National Practitioner Data Bank Public Use Data File, SPSS Version. http://www.npdb-hipdb.hrsa.gov/resources/publicData.jsp. Updated April 2013.

Miller K.P. (2013). The National Practitioner Data Bank: An annual update. *J. of Nurse Practitioners*. 8(9) 576-580).

Surgical "Never Events"

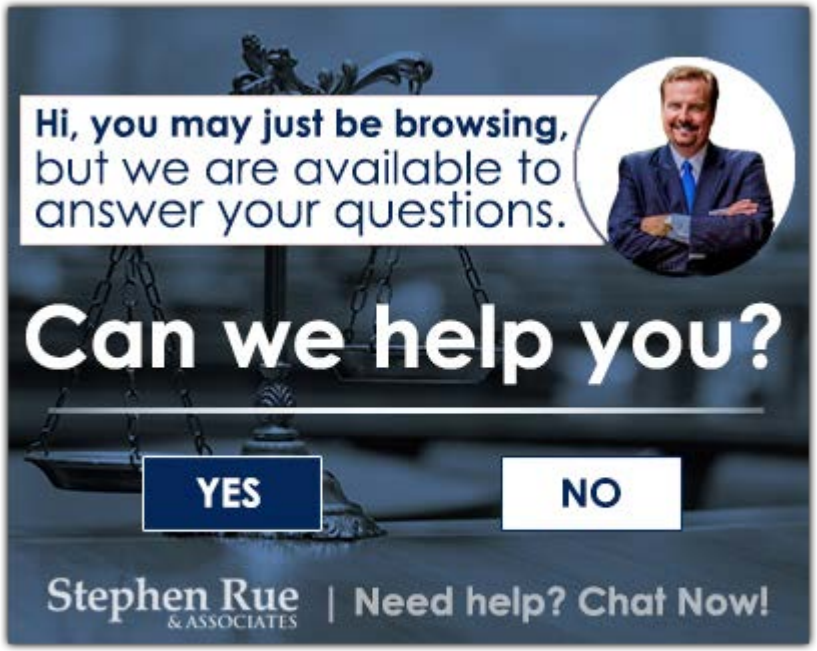
- A foreign object (sponge/towel/needle, etc.) estimated to be left in a patient 39 times/week and a wrong procedure or wrong body site is involved 20 times per week.
- 1990-2010, 9,744 paid malpractice claims for these " never events" totaled $1.3 billion.
- These numbers most likely underestimate the true occurrence.
- Can anesthesia be named in one of their lawsuits?

Mehtsun.W,T., et al. (2013). Surgical never events in the United States. *Surgery,153,* 465-472.

ASA Closed Claims Project

- The Closed Claims Project dedicated to scientific studies of adverse anesthetic outcomes.
- Studies malpractice claims against anesthesiologists. The project has 10,000+ claims for events from 1970-2013.
- 20-25 ASA member reviewers travel 50-60 days annually to review claim files; 21 insurance companies participate who insure more than 13,000 anesthesiologists.

Malpractice Attorneys?



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2017

Joint Commission

2015 Hospital National Patient Safety Goals

The purpose of the National Patient Safety Goals is to improve patient safety. The goals focus on problems in health care safety and how to solve them.

Identify patients correctly	
NPSG.01.01.01	Use at least two ways to identify patients. For example, use the patient's name *and* date of birth. This is done to make sure that each patient gets the correct medicine and treatment.
NPSG.01.03.01	Make sure that the correct patient gets the correct blood when they get a blood transfusion.
Improve staff communication	
NPSG.02.03.01	Get important test results to the right staff person on time.
Use medicines safely	
NPSG.03.04.01	Before a procedure, label medicines that are not labeled. For example, medicines in syringes, cups and basins. Do this in the area where medicines and supplies are set up.
NPSG.03.05.01	Take extra care with patients who take medicines to thin their blood.
NPSG.03.06.01	Record and pass along correct information about a patient's medicines. Find out what medicines the patient is taking. Compare those medicines to new medicines given to the patient. Make sure the patient knows which medicines to take when they are at home. Tell the patient it is important to bring their up-to-date list of medicines every time they visit a doctor.

Can a DNP Capstone Project Positively Impact Quality of Patient Care?

- What factors determine the success of improved patient outcomes? (patient education/provider education/culture of safety that stresses self reporting of “near-miss” and actual patient injury).
- How can electronic medical records be used to facilitate improved patient safety?
- How can electronic medical records be used to improve provider compliance with evidence-based best practice guidelines?

The Key to Successful Reduction In Adverse Patient Events is to Pick Problems that Occur Often Enough to Measure and to Fix.

Extubation Failure in the Shock Trauma Center Patient 2000-2017

Bill Howie DNP, CRNA

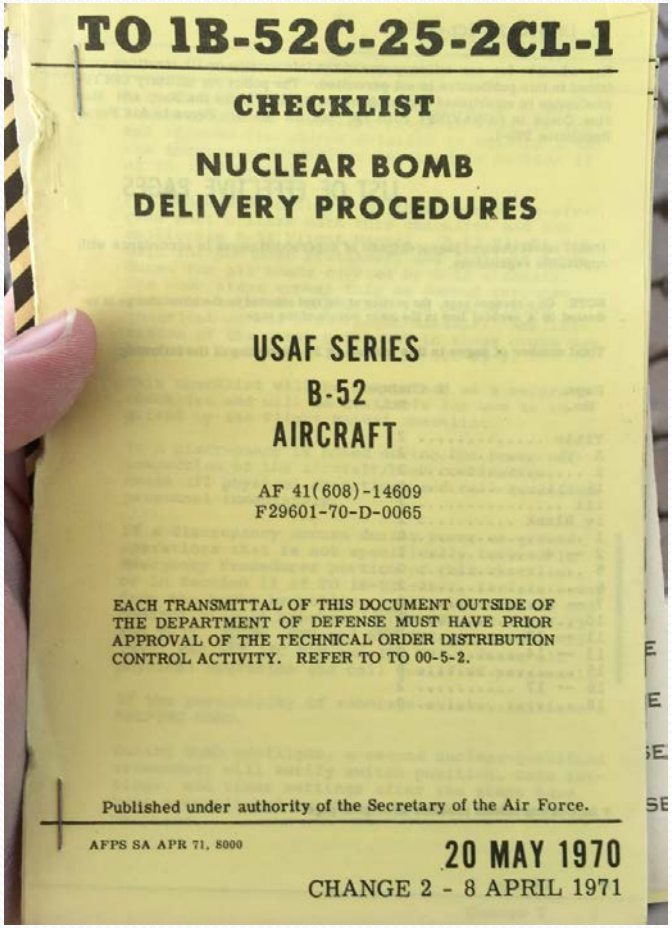
DNP Conference

September 2017

Application of the Agency for Healthcare Research and Quality (AHRQ) Model to Extubation Failure in Adult Trauma Patients at Shock Trauma Center (STC)

	1 **Knowledge Creation and Distillation**	2 **Diffusion and Dissemination**	3 **Adoption, Implementation and Institutionalization**
Process	1a. Creation of a new knowledge on factors related to extubation failure in adult trauma patients. 1b. Distillation of key knowledge on extubation in adult trauma patients	2a. Creation of dissemination partnerships/ knowledge transfer teams at STC Quality Assurance Committee 2b. Mass diffusion of key knowledge related to extubation failure to STC anesthesia providers. 2c. Targeted dissemination/persuation in OR and PACU.	3a. Development of extubation criteria. 3b. Adoption and implemention of standardized extubation criteria. 3c. Confirmation, adaption and internal institutional- Izationof extubation criteria on patient record. 3d. External routinization of extubation criteria in all adult trauma patients.
Knowledge/ Dissemination Sources Actors Target Audience	Extubation Guidelines QA Committee, anesthesia experts ASA, AANA Guidelines for Extubation Adult post-op patients requiring extubation Anesthesia providers	QA Committee, STC Educational Committee AHRQ National Patient Safety Foundation The Joint Commission ASA, AANA Journals, Anesthesia Conferences and Inservices, ANA Professional leaders are the QA Committee	Dissermination partnerships with other trauma centers Anesthesia and critical care providers in OR, PACU IOM, AANA, MD. Cost Review Commission, Insurers
Activities	Record review of STC Quality Assurance Data Base and patient records Synthesis of literature on extubation failure Consensus of QA Committee and expert anesthesia providers for priorities	Publications and conference presentations relevant to anesthesia providers Inservices, workshops, and webcasts to surrounding trauma centers	Training on extubation Culturally sensitive teaching STC inservices, grand rounds, Intranet posting of guidelines Compare costs of using new guidelines with costs of extubation failures in the past Measure decrease in extub. failure EBP policy on extubation

How Important are Checklists?

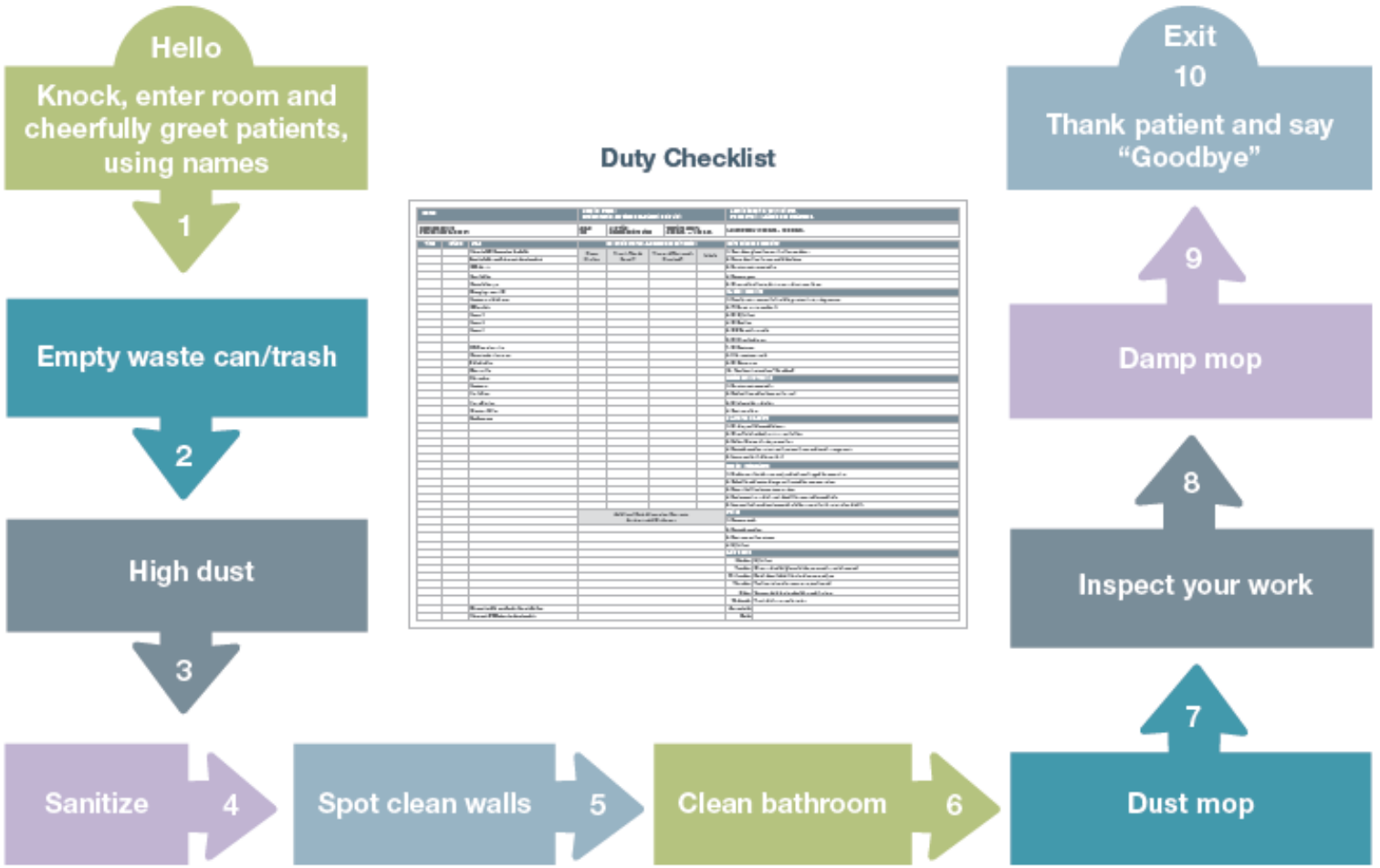


Use of Checklist in Healthcare

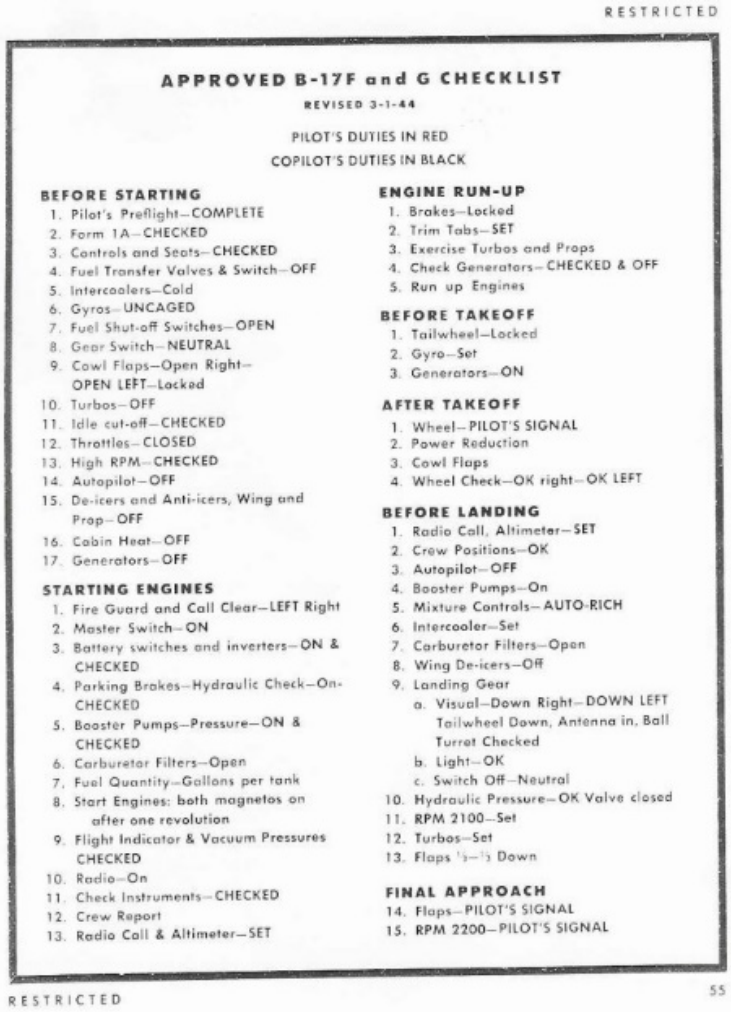
- "Checklists can be a good way of making healthcare safer. There's no doubt about that. They work by improving recall - prompting people to do all the necessary steps - and by making clear the minimum expectations. But they have to be used wisely," Professor Pronovost. (2017)
- The mistake most commonly made is to assume that a checklist - a technical solution - can solve a cultural problem. Many providers resist using checklists because of how they are socialized. "And it's a mistake to think that you can get workers to use checklists just by insisting on it."

http://catalyst.nejm.org/patient-centered-checklists-next-frontier/

Checklist are everywhere



B 52 Bomber and Anesthesia Machine



RESTRICTED

APPROVED B-17F and G CHECKLIST

REVISED 3-1-44

PILOT'S DUTIES IN RED

COPILOT'S DUTIES IN BLACK

BEFORE STARTING

1. Pilot's Preflight—COMPLETE
2. Form 1A—CHECKED
3. Controls and Seats—CHECKED
4. Fuel Transfer Valves & Switch—OFF
5. Intercoolers—Cold
6. Gyros—UNCAGED
7. Fuel Shut-off Switches—OPEN
8. Gear Switch—NEUTRAL
9. Cowl Flaps—Open Right—OPEN LEFT—Locked
10. Turbos—OFF
11. Idle cut-off—CHECKED
12. Throttles—CLOSED
13. High RPM—CHECKED
14. Autopilot—OFF
15. De-icers and Anti-icers, Wing and Prop—OFF
16. Cabin Heat—OFF
17. Generators—OFF

STARTING ENGINES

1. Fire Guard and Call Clear—LEFT Right
2. Master Switch—ON
3. Battery switches and inverters—ON & CHECKED
4. Parking Brakes—Hydraulic Check—On-CHECKED
5. Booster Pumps—Pressure—ON & CHECKED
6. Carburetor Filters—Open
7. Fuel Quantity—Gallons per tank
8. Start Engines: both magnetos on after one revolution
9. Flight Indicator & Vacuum Pressures CHECKED
10. Radio—On
11. Check Instruments—CHECKED
12. Crew Report
13. Radio Call & Altimeter—SET

ENGINE RUN-UP

1. Brakes—Locked
2. Trim Tabs—SET
3. Exercise Turbos and Props
4. Check Generators—CHECKED & OFF
5. Run up Engines

BEFORE TAKEOFF

1. Tailwheel—Locked
2. Gyro—Set
3. Generators—ON

AFTER TAKEOFF

1. Wheel—PILOT'S SIGNAL
2. Power Reduction
3. Cowl Flaps
4. Wheel Check—OK right—OK LEFT

BEFORE LANDING

1. Radio Call, Altimeter—SET
2. Crew Positions—OK
3. Autopilot—OFF
4. Booster Pumps—On
5. Mixture Controls—AUTO-RICH
6. Intercooler—Set
7. Carburetor Filters—Open
8. Wing De-icers—Off
9. Landing Gear
   a. Visual—Down Right—DOWN LEFT Tailwheel Down, Antenna in, Ball Turret Checked
   b. Light—OK
   c. Switch Off—Neutral
10. Hydraulic Pressure—OK Valve closed
11. RPM 2100—Set
12. Turbos—Set
13. Flaps ⅓—⅓ Down

FINAL APPROACH

14. Flaps—PILOT'S SIGNAL
15. RPM 2200—PILOT'S SIGNAL

RESTRICTED

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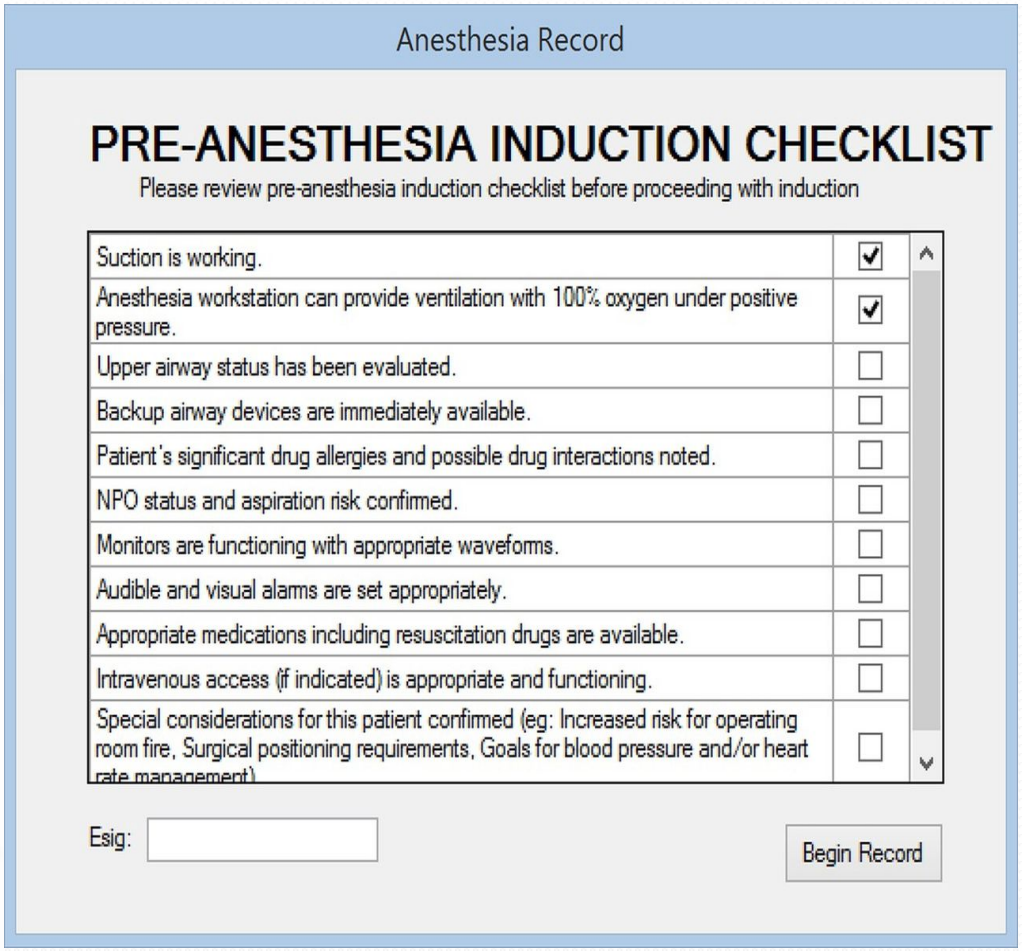


Anesthesia Record

PRE-ANESTHESIA INDUCTION CHECKLIST

Please review pre-anesthesia induction checklist before proceeding with induction

Suction is working.	☑
Anesthesia workstation can provide ventilation with 100% oxygen under positive pressure.	☑
Upper airway status has been evaluated.	☐
Backup airway devices are immediately available.	☐
Patient's significant drug allergies and possible drug interactions noted.	☐
NPO status and aspiration risk confirmed.	☐
Monitors are functioning with appropriate waveforms.	☐
Audible and visual alarms are set appropriately.	☐
Appropriate medications including resuscitation drugs are available.	☐
Intravenous access (if indicated) is appropriate and functioning.	☐
Special considerations for this patient confirmed (eg: Increased risk for operating room fire, Surgical positioning requirements, Goals for blood pressure and/or heart rate management)	☐

Esig:

Begin Record

High Reliability Organizations (HROs).

- Checklists have been a cornerstone of safety management in HROs for nearly a century, and are becoming increasingly popular in medicine.
- Acceptance and compliance are crucial for checklist implementation in health care.
- Experiences from HROs may provide valuable input to checklist implementation in healthcare.
- *Scandinavian Journal of Trauma, Resuscitation and Emergency Medicine* 2011, **19**:53 doi: 10.1186/1757-7241-19-53

Pugel AE., et al. Use of the surgical safety checklist to improve communication and reduce complications (2015) Journal of Infection and Public Health. 8, p 219-225.

Development and Implementation of Evidenced Based Guidelines for the Extubation of Adult Trauma Patents in the Early Postoperative Period.

William Howie University of Maryland Medical Center R Adams Cowley Shock Trauma Center
The Johns Hopkins School of Nursing

Clinical Question

Further exploration is required to determine which patient risk factors play significant roles in patients who fail an elective extubation despite meeting standard extubation criteria. Because the process of reintubation and mechanical ventilation places patients at an increased risk for airway misadventures, prolonged hospitalization/ICU stay, ventilator acquired pneumonia, and higher levels of morbidity and mortality.

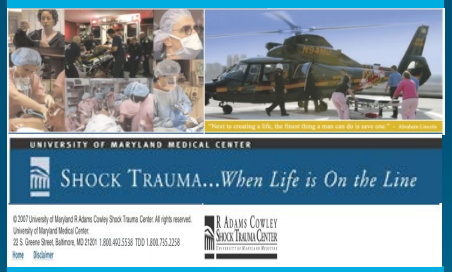
What are the predictors of extubation failure in the adult trauma patient who meet standard extubation criteria?

Search Methods

The literature search for this systematic review was performed during December of 2008 using Pubmed, Medline, CINAL, Cochrane Database, Googlescholar, and a selective handsearch. Approximately 110 articles that were written in English and contained the search terms: "re-intubation", "failed extubation", "extubation failure", "respiratory failure", "postoperative", "perioperative", "trauma", "post-surgical", "multiple trauma", "poly trauma", "trauma patient", "extubation criteria", "adult", "anesthesia", "complications", and "adverse events". .

Method of Grading Evidence

The articles were reviewed for relevance, and a total of 13 articles published between 1996 and 2008 were selected for in-depth review (Table 1), including 1 randomized control trial (RCT), 4 prospective record reviews, and 8 retrospective reviews. Such studies have generally been setting-specific (neurological ICU, teaching hospital, pediatric intensive care unit).



Synthesis of Findings

Factors predictive of extubation failure gleaned from quality assurance and medico-legal sources serve to clearly define many key factors that commonly lead to failed extubation. Residual neuromuscular blockade, excessive narcotics, over sedation, failure to employ standard intubation guidelines, or inadequate use of basic extubation criteria were the most likely causes of the extubation failure. Available evidence supports adherence to standardized extubation guidelines (awake, follows commands, reversal of muscle relaxant) and taking appropriate steps to secure the airway (ASA airway algorithm) minimizes airway misadventures

SUMMARY OF RESEARCH
Factors predictive of extubation failure

Level of consciousness (does not follow commands) GCS < 8 (69 % failure rate)
Not able to protect the airway (inadequate cough)
Abundant secretions (16 times more likely to fail extubation)
Hemoglobin level < 10 (5 times more likely to fail)
Does not follow commands, abundant secretions and ineffective cough strength (close to 100% fail)
Advancing age (> 60), higher ASA classification, low albumen levels, emergency surgery, abdominal surgery, thoracic surgery, more complicated surgery.
Smoking history, COPD or debilitating pulmonary disease.
Over resuscitation or under-resuscitation of the surgical patient

Translation Framework

Application of the Agency for Healthcare Research and Quality (AHRQ) Model to Extubation Failure in Adult Trauma Patients at Shock Trauma Center (STC)

Translational Framework appears to be appropriate.	1 Knowledge Creation and Distillation	2 Diffusion and Dissemination	3 Adoption, Implementation and Institutionalization
Process	1a. Creation of a new knowledge on factors related to extubation failure in adult trauma patients. 1b. Distillation of key knowledge on extubation in adult trauma patients	2a. Creation of dissemination partnerships/ knowledge transfer teams at STC Quality Assurance Committee 2b. Mass diffusion of key knowledge related to extubation failure to STC anesthesia providers. 2c. Targeted dissemination/ persuation in OR and PACU.	3a. Development of extubation criteria. 3b. implemention of standardized extubation criteria. 3c. Confirmation, adaption and internal institutional- Ization of extubation criteria on patient record. 3d. External routinization of extubation criteria in all adult trauma patients.
Knowledge/ Dissemination Sources Actors Target Audience	Extubation Guidelines QA Committee, anesthesia experts ASA, AANA Guidelines for Extubation Adult post-op patients requiring extubation Anesthesia providers	QA Committee, Educational Committee AHRQ National Patient Safety Foundation The Joint Commission ASA, AANA Journals, Anesthesia Conferences and Inservices,	Dissemination partnerships with other trauma centers Anesthesia and critical care providers in OR, PACU IOM, AANA, MD. Cost Review Commission, Insurers
Process	Record review of STC Quality Assurance Data Base and patient records Synthesis of literature on extubation failure Consensus of QA Committee and expert anesthesia providers	Publications and conference presentations relevant to anesthesia providers Inservices, workshops, and webcasts to surrounding trauma centers	Training on extubation Culturally sensitive teaching STC Inservices, grand rounds, Intranet posting of guidelines Compare costs of using new guidelines with costs of extubation failures in the past Measure decrease in extub. failure EBP policy on extubation

Project Work Breakdown Structure

Projected Project Timeline

Activity	Time Start	Time Finish
Faculty approval of Comprehensive Plan	16 Mar 2009	08 May 2009
IRB Approval from UMMS and JHU	14 Feb 2009	23 May 2009 (estimated)
Collect/Analyze data	24 May 2009	23 Aug 2009
Develop guidelines	24 Aug 2009	24 Sept 2009
Staff in-services	25 Sept 2009	25 Oct 2009
Implement guidelines	26 Oct 2009	15 Jan 2010
Assess for changes in reintubation rate	16 Jan 2010	17 Feb 2010
Incorporate guidelines as standard practice standard	18 Feb 2010	Indefinitely

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Clinical Area of Concern

- STC the dedicated acute care trauma hospital for Maryland
- Admits approximately 8,500 patients/year
- Approx 6,500 operative cases are performed annually.
- Approx 5,000 intubations are conducted each year.
- Approx 30 patients re-intubated following extubation in the first 24 hours post-op
- Failed extubation the most frequently reported sentinel event since 2000, occurring at a rate of 2 to 3 cases per month.

Clinical Area of Concern

- Extubation failure can produce outcomes, including cyanosis, hypoxia, tachycardia, hypertension, negative-pressure pulmonary edema, acute bronchospasm, agitation and in a worst case scenario, cardiopulmonary arrest (Hagberg, Georgi, & Krier, 2008; Lobato, 2008).
- Literature notes a significantly increased risk to these patients in terms of prolonged hospitalization/ICU stay, ventilator acquired pneumonia, and higher levels of morbidity and mortality (Epstein, 1997, 2001, 2002, 2004).

Systematic Review of Evidence

- According to the fifth annual Patient Safety in American Hospitals Study, medically related errors cost upwards of $8.8 billion and resulted in 238,337 potentially preventable deaths from 2004 through 2006.
- Of 1.1 million patients safely incidents at 249 hospitals, post-operative respiratory failure was among the most frequently cited events, occurring at a rate of one out of every 16 patient-safety incidents (HealthGrades 2008, p. 2).

Systematic Review of the Evidence

- Anesthetic records between 1994 to 1999 were examined (152,939 cases). 191 cases of failed extubation were reported.
- Prolonged neuromuscular blockade occurred in 11 cases (16/191, 8.4%). Excessive narcotic use was reported in nine cases.
- Respiratory insufficiency , respiratory obstruction , and laryngospasm/bronchospasm were implicated in 58.6% of failed extubations. Some 71.6% cases of respiratory insufficiency occurred in the PACU.
- 68.1% cases of respiratory obstruction/laryngospasm/ bronchospasm occurred in the operating room.

Weaknesses of the Evidence

- Data derived from a self-reporting system. There must be 100% compliance to strengthen confidence in the conclusions that are drawn.
- Number of failed extubations was likely underestimated.
- Lack of documentation of neuromuscular blockade, in the form of a train of four scale on the anesthetic record. The researchers stated that it was not a provider requirement in terms of a policy.
- Would have been helpful to know % of patients who required reintubation and met standard anesthesia endotracheal weaning criteria. This was not included in their review.

Review of Evidence

- **Value of Checklist Utilization**
- Checklist represents a list of essential actions or performance criteria arranged in a systematic manner (Biddle, 2010).
- Encourages user to record the presence or absence of the items listed to ensure they are all considered or completed each time the checklist is used (Hales, Pronovost, 2006).
- A clinically sound checklist clearly highlights only essential criteria that should be considered in a particular area (Hales, Terblanche, Fowler, Sibbald, 2007).

Review of Evidence

- **Value of Checklist Utilization**
- The use of a checklist is a form of Human Factors Engineering that can compensate for human cognition failures in a variety of settings (Leape, Berwick, Bates, 2002).
- Important goal of any checklist is to limit errors of omission by clearly defining expected provider behaviors in a variety of clinical patient care settings.
- Particularly true during stressful conditions when vigilance, memory or clinical reasoning may be adversely effected (Biddle, 2010).

Shock Trauma Data Collection

- Records of 195 patients reviewed that required reintubation during 2000 and 2009.
- 171 records met the basic criteria of requiring reintubation following elective extubation within 6 hours.
- Data obtained from STC QA records, patient records, and Dr Hyder's self proclaimed confessionals.
- QA data from the sentinel events self reporting system utilized at STC.

Results

- The time from extubation until the patient was reintubated was:
  - 54% of the patients within 5 minutes.
  - 65% of the patients within 10 minutes.
  - 67% of the patients within 15 minutes.
  - 69% of the patients within 20 minutes.
  - 78% of the patients within 30 minutes.
  - 94% of the patients within 120 minutes.

Results

- The patients were reintubated:
  - 34% of the time in the OR.
  - 64% of the time in the PACU.
  - 1% of the time in the TRU.
  - 1% of the time in the ICU.

Cause of Extubation Failure: 2000-2009

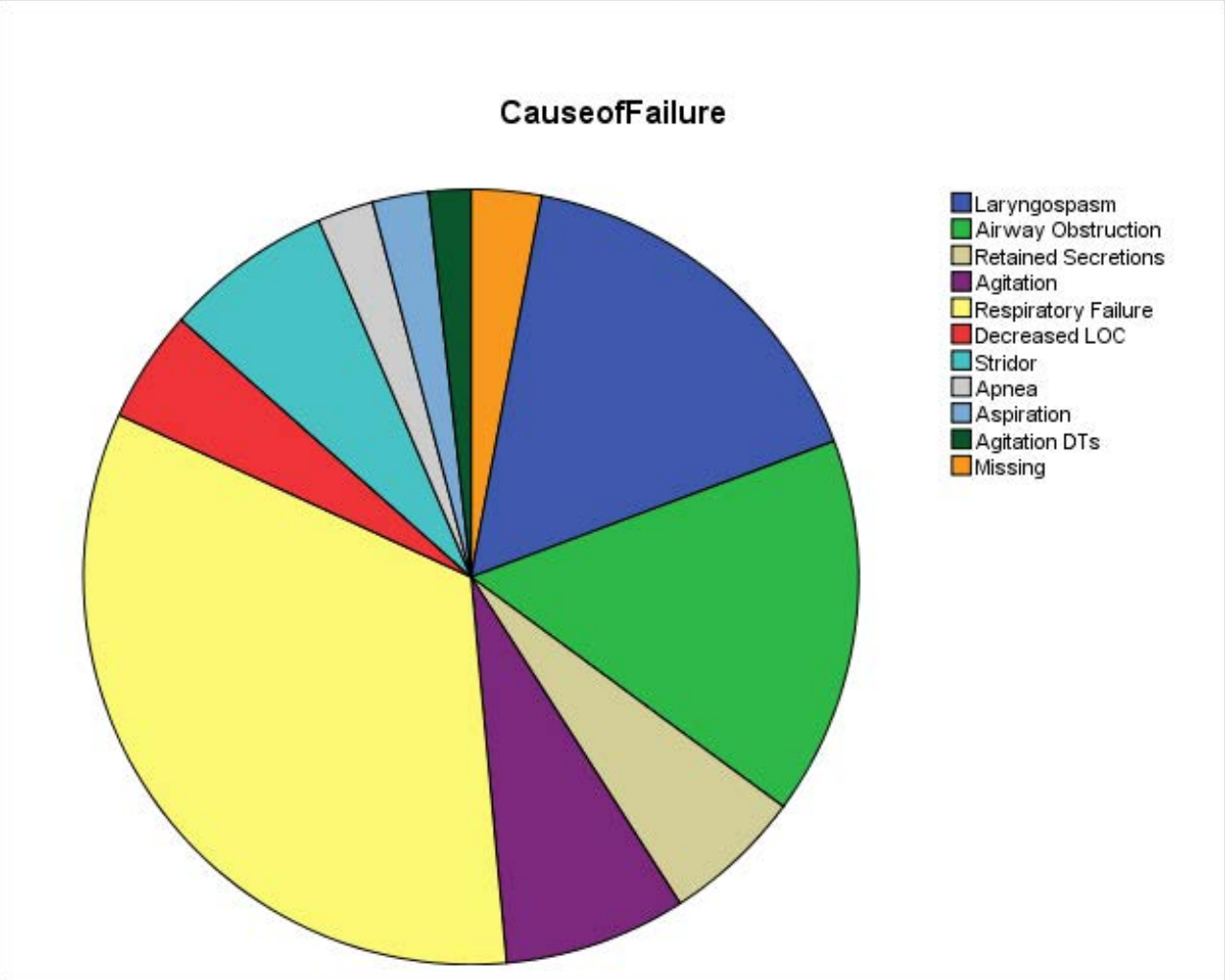
CauseofFailure

		Frequency	Percent	Valid Percent
Valid	Laryngospasm	28	16.4	16.9
	Airway Obstruction	27	15.8	16.3
	Retained Secretions	10	5.8	6.0
	Agitation	13	7.6	7.8
	Respiratory Failure	57	33.3	34.3
	Decreased LOC	8	4.7	4.8
	Stridor	12	7.0	7.2
	Apnea	4	2.3	2.4
	Aspiration	4	2.3	2.4
	Agitation DTs	3	1.8	1.8
	Total	166	97.1	100.0
Missing	System	5	2.9	
Total		171	100.0	

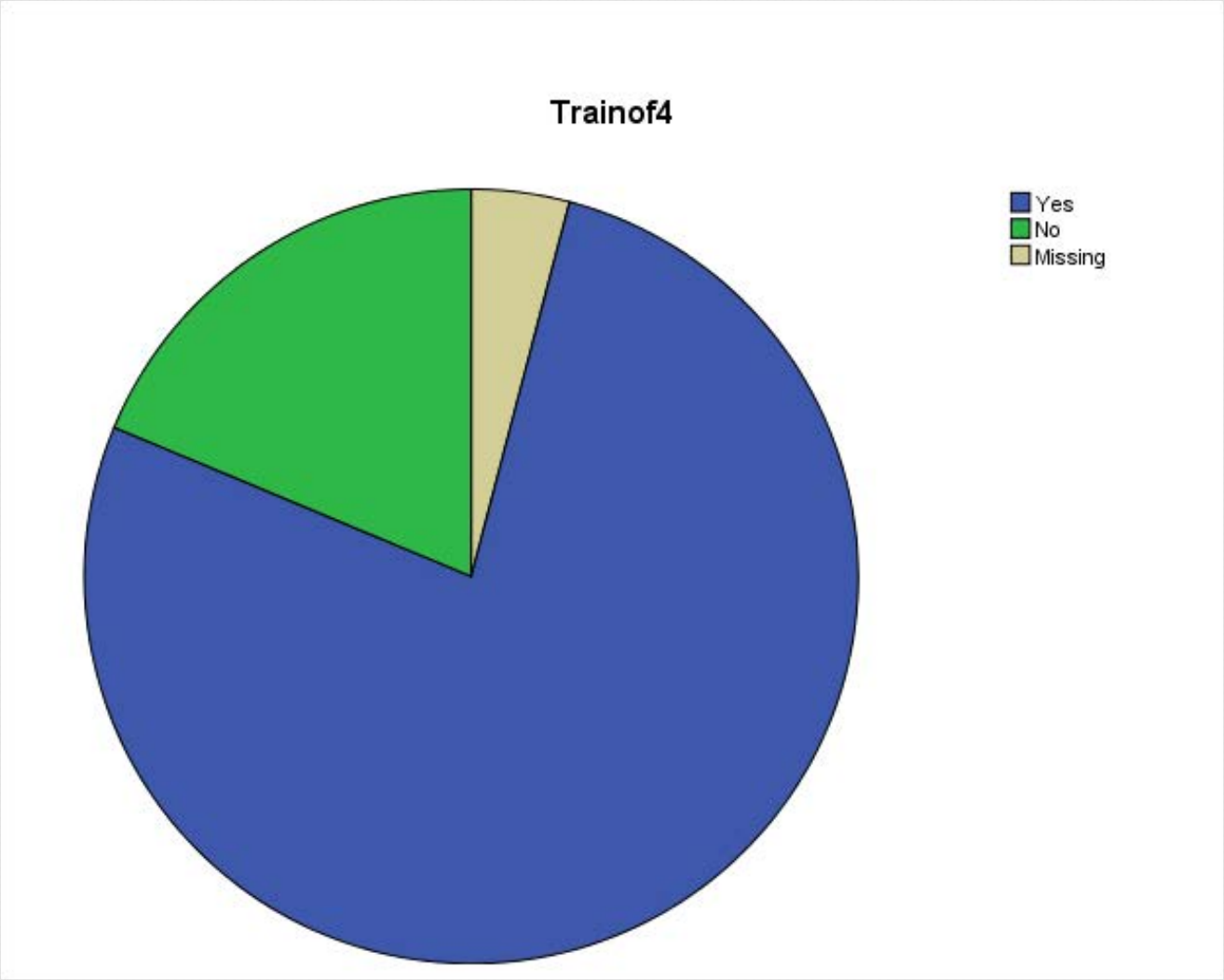
Cause of Extubation Failure: 2000-2011

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Laryngospasm	35	17.4	17.9	17.9
	Airway Obstruction	31	15.4	15.8	33.7
	Retained Secretions	10	5.0	5.1	38.8
	Agitation	14	7.0	7.1	45.9
	Respiratory Failure	72	35.8	36.7	82.7
	Decreased LOC	10	5.0	5.1	87.8
	Stridor	12	6.0	6.1	93.9
	Apnea	4	2.0	2.0	95.9
	Aspiration	4	2.0	2.0	98.0
	Agitation DTs	3	1.5	1.5	99.5
	Broncospasm	1	.5	.5	100.0
	Total	196	97.5	100.0	
Missing	System	5	2.5		
Total		201	100.0		

Causes of Failure post-extubation



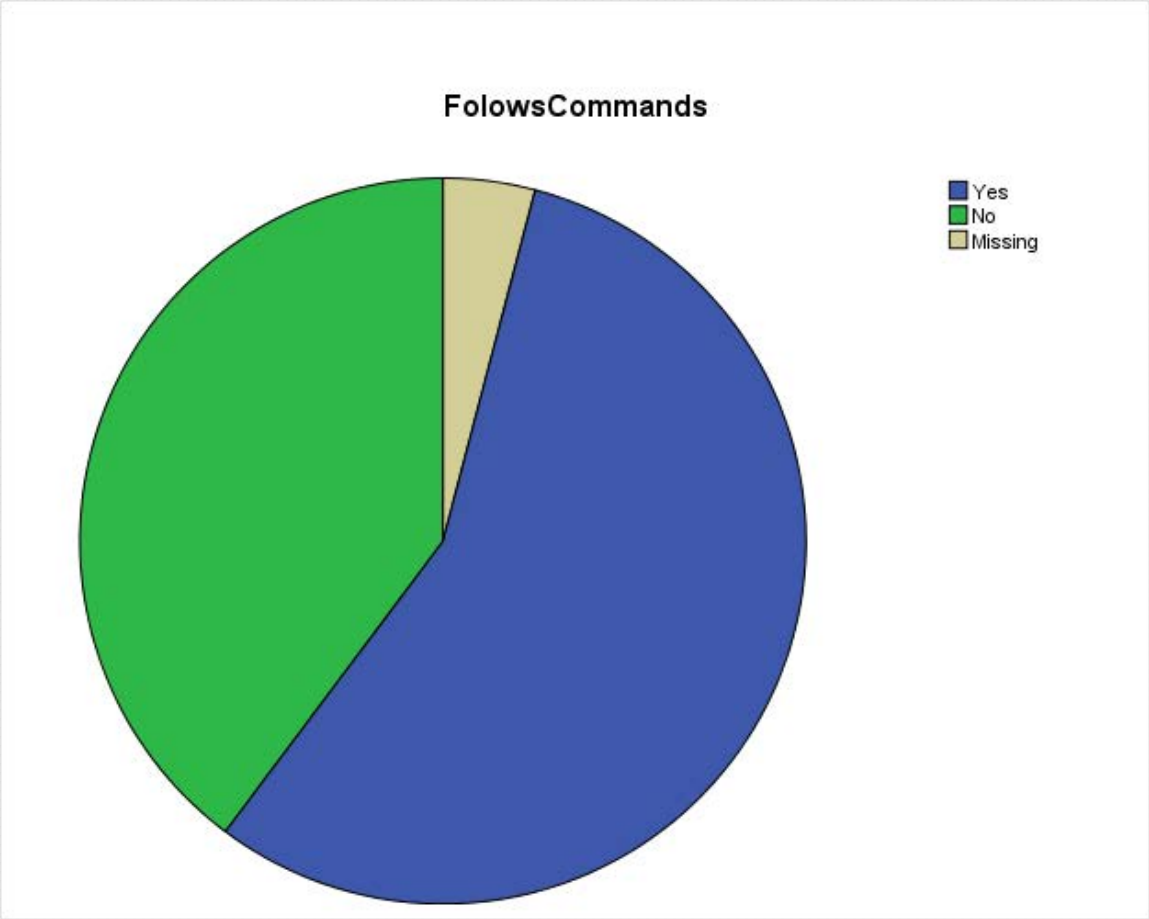
Results: Train of 4 Recorded



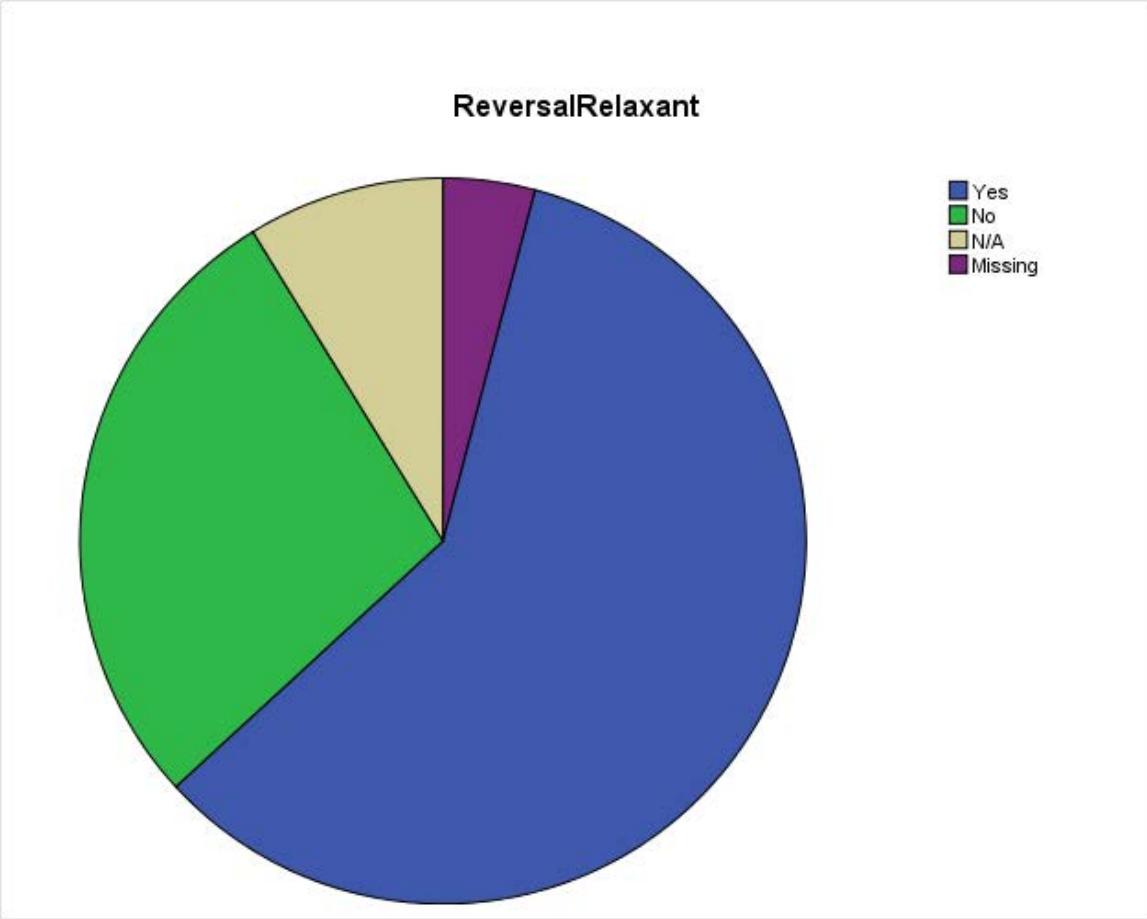
Results: Follows Commands

- 56% (96 patients) Yes
- 40 % (68 patients) No
- 4 %   (7 patients) Not documented

Follows Providers Commands



Muscle Relaxant Reversed



Implications and Plans

- Is it possible to reduce the number of failed extubations in this hospital?
- Will increased consideration of basic extubation criteria lead to reduction in patients who fail extubation?
- Are there factors specific to the trauma patient/soft tissue patient/re-admit patient that contribute to extubation failure?

Plan

- Implementation of Patient Extubation Check List that considers:
  - Is the patient awake/Cooperative/Following Commands?
  - Is the patient agitated?
  - Is the patient hemodynamically stable (BP/Temp)?
  - Did the patient have a train of 4 recorded/was the patients muscle relaxant reversed?
  - Was the patient a difficult airway?
  - Was a leak test done for patients with potential stridor?

Plan

- Implementation of these guidelines for about 12 weeks.
- Continue to track extubation failure through ongoing self reported QA system.
- Will this plan reduce the number of extubation failures?
- Should a checklist similar to this be made a part of the anesthesia flowsheet?

Systematic Review of Evidence

- Following IRB approval (STC and Johns Hopkins University). a review of failed extubations that occurred between January 2000 and October 2009 was conducted. A total of 240 patients failed extubation. 173 failed extubation within the early postoperative period (86.5%).
- 53% of the time, the anesthesia provider did not document adherence to evidence-based, nationally recognized extubation criteria.

Description of the project

- Findings of QI chart review shared with all providers in the Department of Anesthesia at STC.
- Information on the retrospective record findings presented during two in-service sessions to the anesthesia department and the post-anesthesia care unit.
- Provider input and suggestions regarding items that should be incorporated into the checklist and final EBP Trauma Extubation Checklist was obtained (Figure 1).

Criteria		
(1) Awake	Yes	No
(2) Follows Commands	Yes	No
(3) Agitated	Yes	No
(4) Cooperative	Yes	No
(5) Muscle Relaxant Reversed	Yes	No/NA
(6) Temperature WNL (97-99F)	Yes	No
(7) Hemodynamically Stable	Yes	No
(8) Difficult Airway	Yes	No
(9) ETT Cuff Leak	Yes	No/NA
Comments:		

Description of the project/ intervention

- Checklist was implemented for 12 weeks (October 15 2009 through January 15 2010).
- Throughout the intervention phase, staff from both units were kept informed (via regular email updates and during bedside consultations) regarding checklist utilization and results of the data collection.
- Several senior staff members served as project champions and regularly encouraged providers to use the checklist.
- All providers encouraged to provide either written or verbal feedback pertaining to perceived concerns or suggestions to improve the checklist.

Results

- Total of 946 patients underwent surgery at STC.
- Total of 622 patients extubated either in the OR or shortly upon arrival to the PACU.
- Of these 622 patients, a total of 488 had completed extubation checklists on their anesthesia record, a checklist completion rate of 77%.

Results: Successfully Extubated

- Comprised primarily of males (n=435, 70.4%), with a mean age of 43.8 years (range 10-100 years).
- Most frequent surgical procedures were orthopedic procedures (n=259, 41.5%), soft tissue infections (n=134, 21.7%), and general surgeries (n=99, 15.9%).
- Surgical times were slightly less than two hours on average (112.5 minutes), and these individuals were closer to ideal body mass index, with an average BMI of 28.5.

Results

- Only four of 622 patients failed extubation during utilization of the checklist (0.6%)
- All these patients were males, and averaged 56 years of age (range 47-69).
- Most had surgery for a soft tissue infection (n=3, 75%). The remaining patient who failed extubation was a readmission, and had a general abdominal surgery .
- The failed extubation group surgeries averaged slightly over one hour (76 minutes). This group had an average BMI of 36.5 (range 27.9-50), placing all of them into the overweight or obese categories.

Results: Failed Extubation

- 1:4 patients documented to have met extubation criteria. He failed extubation due to brochospasm.
- Other 3 patients were reintubated due to respiratory failure.
- Train of 4 was noted on only one of the cases, despite use of a muscle relaxant.
- Only 2 of the 4 patients were given a reversal for the muscle relaxant.
- Two of the 4 patients were cared for by the same provider.

Results

- Prior to utilization of the checklist, approximately 2-3 patients/month experienced an extubation failure.
- Following utilization of the extubation checklist, there were four extubation failures during a three month period (1.25 patients/month).
- Extubation criteria was documented 92.5% of the time on the anesthesia flow sheets of all patients extubated during the intervention phase.

Results

- A Fisher's Exact Test confirmed that extubation failure occurred less frequently when the extubation criteria were documented than would be expected by chance (p=.001, Fisher's exact test).

Recommendations

- Results of this project indicate that a extubation checklist may positively influence both provider documentation of evidence-based criteria for extubation as well as reduce the occurrence of preventable extubation failures.
- Given the relatively short duration of this evidence-based project, was recommended that the study be replicated for a longer period of time.

Recommendations

- Impact of the checklist would be improved by increasing the sample size. Thus, a longer period of implementation suggested.
- Appropriate use of an extubation checklist may help determine additional factors predictive of extubation failure in the adult trauma population.
- To improve sustainability, recommended that regular staff in-services be conducted on proper use of the checklist. These in-service programs could either be "live" or computer-based tutorials.

Dissemination and Translation

- Following three meetings with the system administrator for the UMMC anesthesia department, checklist was included within the newly acquired Anesthesia Information Management System.
- The AIMS system went "live" in October of 2010.
- The rate of failed extubations has remained consistently lower following implementation of checklist and the AIMS system as of January 2014.

Can a DNP Capstone Project positively impact long term quality of patient care?

- What factors are necessary to prove this to be true ?
- Should the patient care improvement project be integrated into the organizations daily operations? (placement of the extubation checklist into the Electronic Medical Record)
- Would adoption of an organizational safety culture help to reduce adverse patient outcomes? (extubation failure /catheter acquired line infections/medication errors/patient falls/hospital re-admissions/etc.)

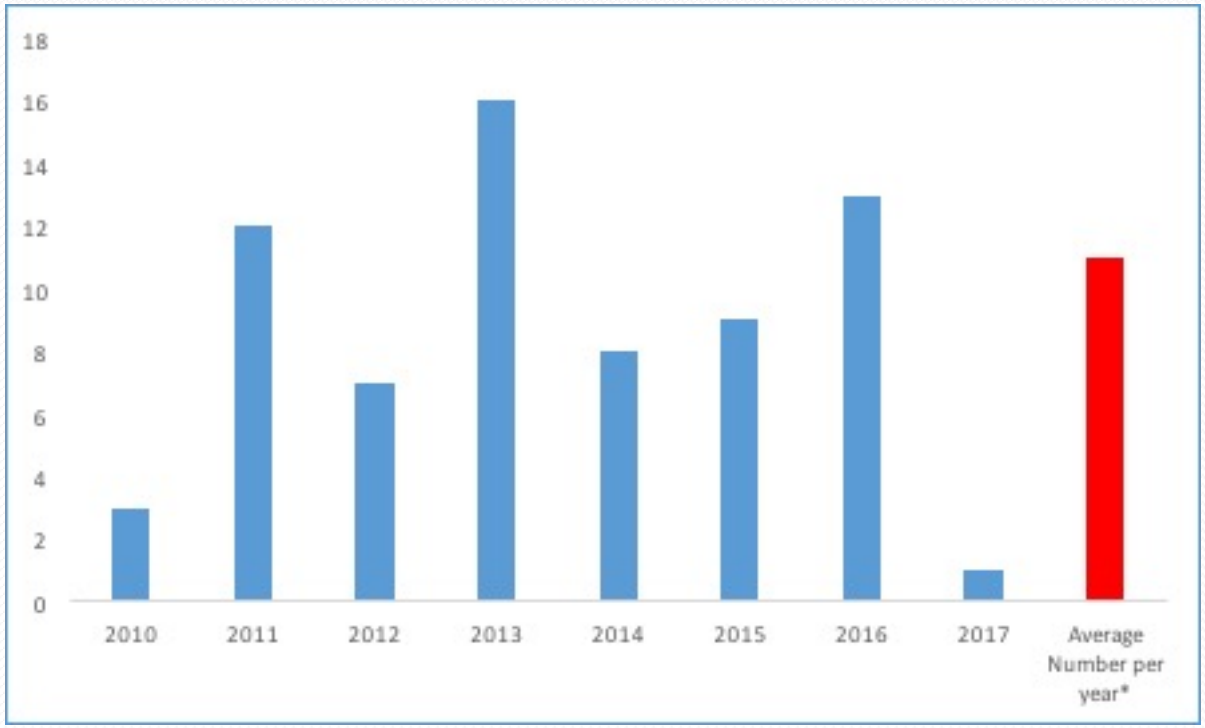
Results of data collection 2010 through 2017 (n= 24,329)

- Preventable Extubation failure pre checklist 2.5 patients/month.
- Rate dropped to 1.2 patients/month post checklist use to 0.9 patients/month at end of the 7 year follow-up.
- Determined that cases who failed had a mean checklist number that was less than their non-failure counterparts (mean=1.7; SD=1.9 versus mean=3.2; SD=1.8, p=0.0001).

2010 to 2017 Results

- Checklist not used for 5817 of the extubations (23.9%)
- Clearly an area for improvement that has been addressed with notes from the QI committee to individual providers. (preventable or potentially preventable extubation failures)
- Periodic presentation of cases at Departmental Morbidity and Mortality Rounds.
- Should am in-service on the use of this checklist be required of all new hires and in yearly Hospital Mandatory Training?

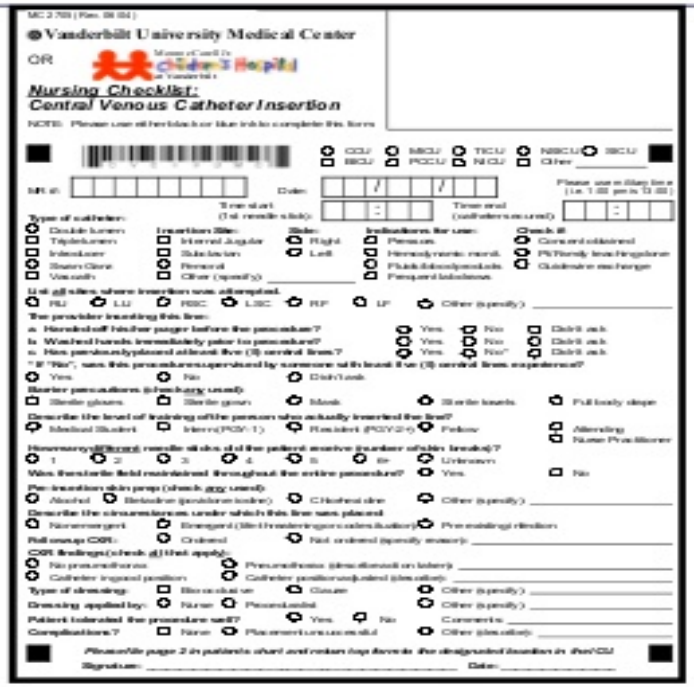
Failed Extubations 2010-2017 out of 23, 329 patients



Sources of potential quality improvement projects the Joint Commission

Most Checklists Can be Modified to Address Particular Needs

The Check List



Vanderbilt University Medical Center

OR

Nursing Checklist:
Central Venous Catheter Insertion

- Adapt to your own institution
- Must be filled out for each line insertion
- Include 5 BSI bundle elements
  - Simpler is better
  - Can always add elements as you become better at capturing data

Vanderbilt Infection Control & Prevention

"Mr. Osborne, may I be excused?
My brain is full."

There are
NO STUPID QUESTIONS
or stupid answers.