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Sedation in Sin City: How COVID-19 Changed Our Approach

Joseph McCoy, PharmD
Jeffrey Murawsky, M.D., FACP
John DeVilbiss, PharmD, BCCCP

July 18, 2023

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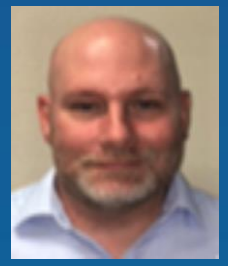
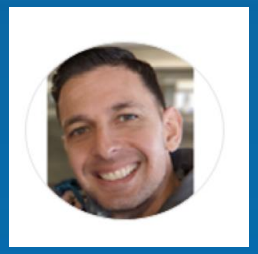
Meet the Presenters



Joseph McCoy, PharmD
Division Director of Pharmacy
Far West Division

Jeffrey Murawsky, M.D., FACP
Division Chief Medical Officer
Far West Division



John DeVilbiss, PharmD, BCCCP
Critical Care Pharmacist
Southern Hills Hospital

Disclosures

- The presenters have no real or perceived conflicts of interest related to this presentation

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Learning Objectives

At the end of this session, participants should be able to:

1. Recall the components & principles of appropriate sedation for patients on mechanical ventilation
2. Identify critical processes needed for a successful sedation stewardship program & reduction in ICU sedation utilization
3. Recognize important communication strategies through the development & sharing of actionable data

Chapter 1: Mechanical Ventilation & Respiratory Management

Joseph McCoy, PharmD

Mechanical Ventilation: Introduction

Mechanical ventilation is a life-saving intervention that provides breathing assistance

Mechanical ventilation delivers a controlled amount of oxygen & air pressure to the lungs, & supports respiration

Mechanical ventilation is commonly used in intensive care units (ICUs) & emergency departments to treat respiratory conditions

Mechanical ventilation intended to improve oxygenation, remove carbon dioxide, & relieve the work of breathing

Mechanical Ventilation: Early History

- In 1767, the English physician John Fothergill invented a bellows-like apparatus called the "pulmonary engine"
- Mid-20th century significant advancements in mechanical ventilation were made
- In the 1950s, positive pressure ventilation using endotracheal intubation became more widely adopted
- These early innovations laid the foundation for the modern mechanical ventilators used today

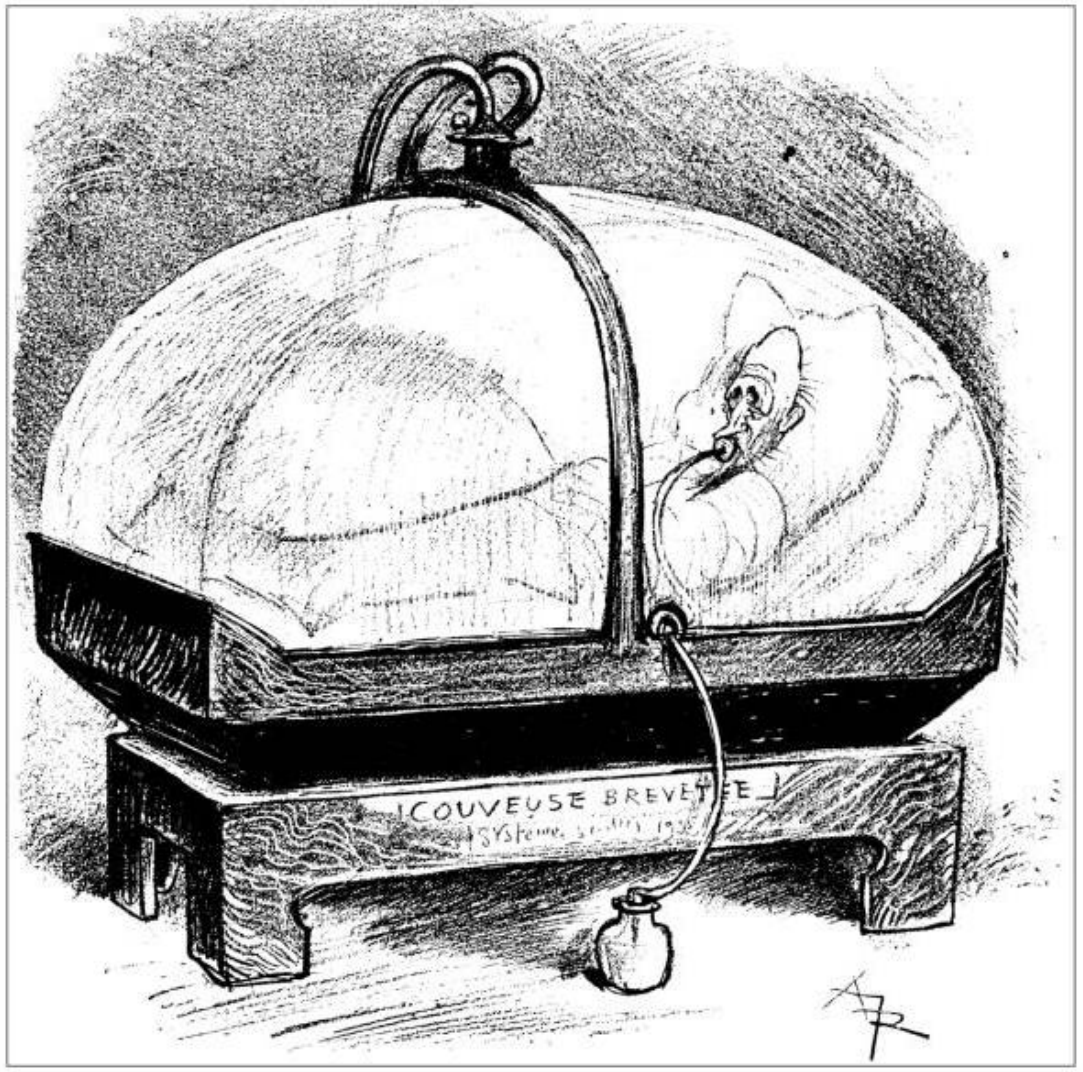


Photo: Getty Images

Source: Slutsky AS. History of mechanical ventilation. From vesalius to ventilator-induced lung injury. Am J Respir Crit Care Med. 2015;191(10):1106-1115.

Mechanical Ventilation: Mechanical Ventilation Management in the Modern Era

- Mechanical ventilation has undergone significant advancements in terms of technology & patient management
- Modern mechanical ventilators offer a wide range of advanced ventilation modes, allowing for tailored respiratory support
- Management of ventilated patients has become increasingly sophisticated to optimize patient outcomes while minimizing complications
  - Ventilator settings
  - Weaning strategies
  - **Sedation practices**

Source: Kacmarek RM. The mechanical ventilator: past, present, and future. Respir Care. 2011;56(8):1170-1180.

Mechanical Ventilation: Ventilator-Associated Complication of Agitation

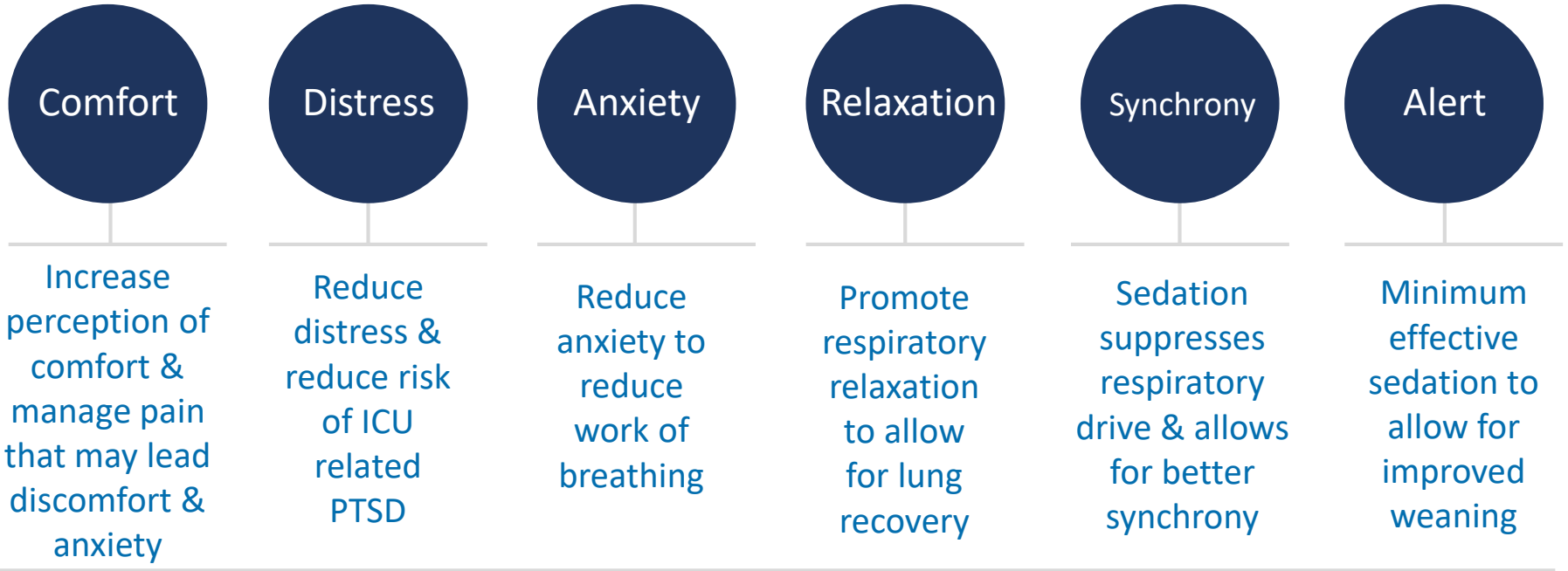
- Agitation is a common complication associated with mechanical ventilation
- A variety of factors, including the patient's underlying condition, pain, discomfort, anxiety, or medication side effects can lead to agitation
- Agitation can lead to increased oxygen consumption, elevated heart rate, & or self-inflicted injuries & self-extubation
- To manage agitation in mechanically ventilated patients, various interventions can be implemented
  - Pain control
  - **Optimizing sedation**
  - Managing delirium

Source: Tate JA, Devito Dabbs A, Hoffman LA, Milbrandt E, Happ MB. Anxiety and agitation in mechanically ventilated patients. Qual Health Res. 2012;22(2):157-173.

Chapter 2: Sedation in Mechanical Ventilation

Jeff Murawsky, M.D., FACP

Goals of Sedation in Mechanical Ventilation



The overall goal of sedation is to facilitate comfort, synchrony with ventilator & avoid sedation-related complications

Source: Pearson SD, Patel, BK. Evolving targets for sedation during mechanical ventilation. Curr Opin Crit Care. 2020;26(1):47-52.

Sedation Assessment & Monitoring

Sedation assessment & monitoring are **essential** to ensure patient safety & optimize sedation levels during mechanical ventilation

This involves regularly assessing the patient's level of sedation using validated tools

- Richmond Agitation-Sedation Scale (RASS)
- Sedation-Agitation Scale (SAS)

Assessment tools help quantify the degree of sedation & allow adjustment of sedation levels based on patient response

Sedation assessment & monitoring are the tool to validate the minimum sedation to keep patient comfortable is maintained

Sosurce: Pearson SD, Patel, BK. Evolving targets for sedation during mechanical ventilation. Curr Opin Crit Care. 2020;26(1):47-52.
Sessler CN, Grap MJ, Ramsay MA. Evaluating and monitoring analgesia and sedation in the intensive care unit. Crit Care. 2008;12 Suppl 3(Suppl 3):S2.

Sedation-related Challenges & Considerations in COVID-19

COVID-19 presents unique challenges in the management of sedation for mechanically-ventilated patients

Unique challenge with COVID is acute respiratory distress syndrome (ARDs)

- ARDs presents often with severe hypoxemia & impaired gas exchange which frequently requires deeps & prolonged mechanical ventilation

Increased risk of respiratory compromise & rapid deterioration seen in COVID-19 patients, may necessitate deeper sedation levels

- To maintain patient-ventilator synchrony
- Reduce patient agitation

Balancing sedation between ensuring patient comfort & preventing oversedation that may prolong weaning is crucial

Source: Karamchandani K, Dalal R, Patel J, Modgil P, Quintili A. Challenges in sedation management in critically ill patients with covid-19: a brief review. Curr Anesthesiol Rep. 2021;11(2):107-115.

Assessment Question # 1

Which of the following are considered goals of sedation in mechanical ventilation:

A. Increased sedation
B. Reduced comfort
C. Reduced distress
D. Reduced anxiety
E. Improved ventilator synchrony
F. C,D,E
G. All of the above

Assessment Question # 1 | Answer…

Which of the following are considered goals of sedation in mechanical ventilation:

A. Increased sedation
B. Reduced comfort
C. Reduced distress
D. Reduced anxiety
E. Improved ventilator synchrony
F. C,D,E
G. All of the above

Chapter 3: Call to Action & Mitigation Strategies

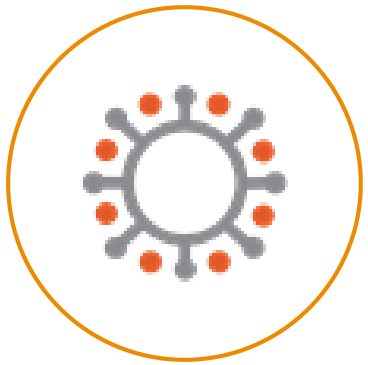
John DeVilbiss, PharmD, BCCCP

Medication Supply Disruptions During COVID-19

- The COVID-19 pandemic resulted in disruptions to global supply chains for many critical medications
- Supply challenges were created due to increased demand, production delays, transportation restrictions, & export/import disruptions
- Limited availability of sedation agents **posed challenges in providing for critically ill COVID-19 patients** on mechanical ventilation
- Careful management & prioritization of available sedation medications are necessary
- Pharmacists & healthcare teams needed to play an increased role in monitoring & optimizing sedation regimens

Source: Socal MP, Sharfstein, JM, Greene JA. The pandemic and the supply chain: gaps in pharmaceutical production and distribution. Am J Public Health. 2021;111(4):635-639.

Mitigation Strategies for Managing Sedation Agent Shortages



- Regular reassessment & adjustment of sedation levels based on individual patient needs & response is crucial during periods of shortage
- Conservation measures, such as dose optimization, utilization reduction & waste reduction play a vital role in maintaining inventory during supply challenges
- Development of standard processes & education surrounding appropriate levels of sedation became imperative during the pandemic

Sources: De Castro REV, Rodríguez-Rubio M, de Magalhães-Barbosa MC, et al. A review of key strategies to address the shortage of analgesics and sedatives in pediatric intensive care. Front Pediatr. 2022;10:895541.
Burry LD, Barletta JF, Williamson D, et al. It takes a village…: contending with drug shortages during disasters. Chest. 2020;158(6):2414-2424.

Far West Division Call to Action

- In light of increased sedation burden with COVID-19 ARDs & increase in the supply disruption there was a Far West Division Call to Action
- To mitigate potential suboptimal patient care the following actions were employed around sedation stewardship
  - Improve communication & collaboration
  - Directed education
  - Creation of appropriate sedation utilization assessment tools
  - Charged ICU pharmacists with enhanced role in sedation stewardship
  - Integrated stewardship principles into existing workflows

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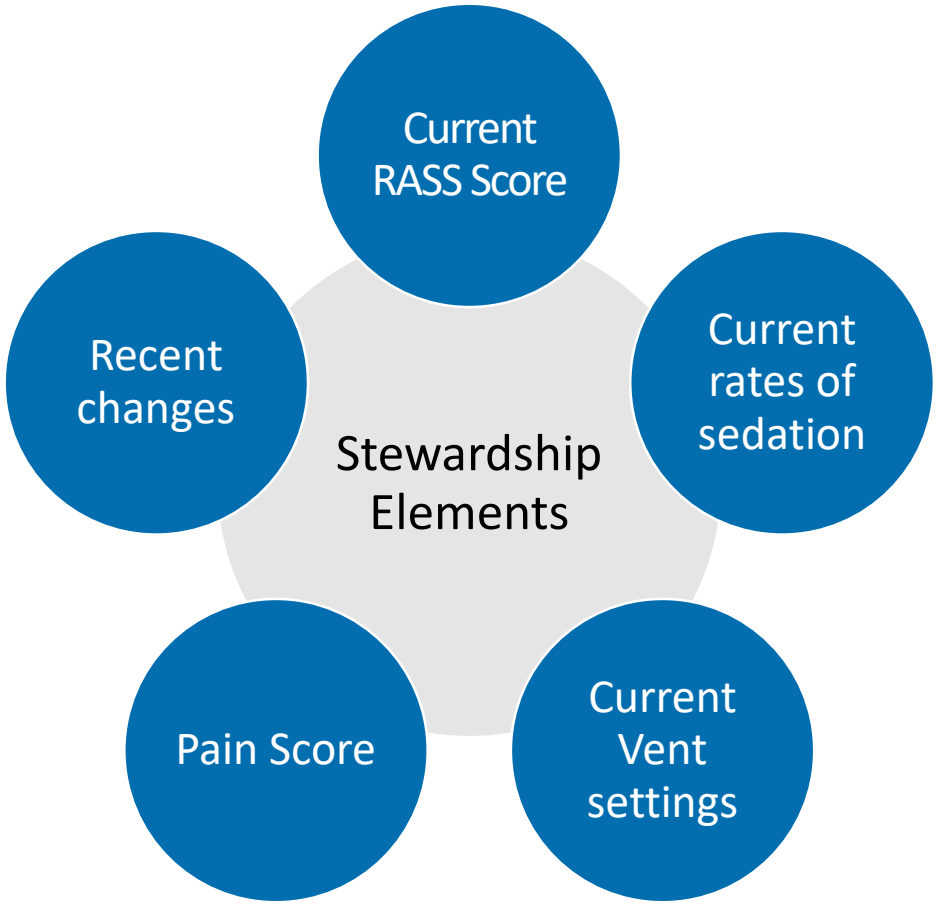
Far West Division Sedation Stewardship: Communication & Education

- Created open lines of communication with physicians, nurses, pharmacists, & respiratory therapists
  - Ensure a shared understanding of sedation goals & strategies
- A gap in education was identified in current practice in Far West Division with sedation management
- Education was a key role in sedation stewardship to implement evidence-based sedation practices
- Started education campaign
  - Education on sedation utilization assessment
  - Strategies for minimizing sedation-related complications
  - Regular evaluation & adjustment of sedation regimens
  - Engaged nursing leaders to assist with education & promotion

Source: Wynia MK, Osborn CY. Health literacy and communication quality in health care organizations. J Health Commun. 2010;15 Suppl 2(Suppl 2):102-115.

Far West Division Sedation Stewardship: Enhanced Role of ICU Pharmacists



- Collaborated with ICU teams to develop multidisciplinary rounds sedation assessment
- Integrated sedation evaluation into multidisciplinary ICU rounds for real-time assessment & changes
- ICU pharmacists charged with initiating sedation stewardship conversations

Source: Arredondo E, Udeani G, Horseman M, Hintze TD, Surani S. Role of clinical pharmacists in intensive care units. Cureus. 2021;13(9):e17929.

Far West Division Sedation Stewardship: Enhanced Role of ICU Pharmacists

ICU ADMIT DATE:	**Hospital LOS:**	**CODE STATUS:** CAT1 CAT2 CAT3 PALLIATIVE			**PATIENT LABEL:**	
Attending MD:						
ADMIT DX/REASON FOR ICU ADMIT:						
CONSULTED PHYSICIANS:	**Intensivist**	**Cardio**	**Pulm**	**GI**	**Endo**	**ID**	**Renal**
Isolation						
ICU Day / Shift	/ 7A	/ 7P	/ 7A	/ 7P	/ 7A	/ 7P
Pressors: Agent Titratring ↑↓						
Analgesia: Agent/Dose						
Pain: CPOT (goal < 3)						
Sedative: Agent/Dose						
RASS Actual/ Changes/Goal						
CAM-ICU (if +, cause of delirium & next steps)	Pos / Neg Delirium Cause: Next steps:	Pos / Neg Delirium Cause: Next steps:	Pos / Neg Delirium Cause: Next steps:	Pos / Neg Delirium Cause: Next steps:	Pos / Neg Delirium Cause: Next steps:	Pos / Neg Delirium Cause: Next steps:
SAT **If failed, why?**	Pass Fail	Pass Fail	Pass Fail	Pass Fail	Pass Fail	Pass Fail
ROUNDING TEAM:	**MD**	**RT**	**Pharm**	**PT/OT**	**CM**	**RN**
ICU Day / Shift	/ 7A	/ 7P	/ 7A	/ 7P	/ 7A	/ 7P
Intubation / Trach Date						
Vent Settings:	Mode PS Rate PEEP	Mode PS Rate PEEP	Mode PS Rate PEEP	Mode PS Rate PEEP	Mode PS Rate PEEP	Mode PS Rate PEEP
Vent Plan: Next 24 hrs						
SBT **If failed, why?**	Pass Fail	Pass Fail	Pass Fail	Pass Fail	Pass Fail	Pass Fail

- Real-time assessments during rounds created a forum for all disciplines to evaluate patient, sedation & weaning readiness
- Assessment tool was integrated into multidisciplinary rounds & included in nursing report out
- Nursing report out would provide valuable information to determine appropriateness of current sedation
  - What sedative agents the patients were receiving
  - Current RASS score, & quick validation of current RASS
  - Recent changes in RASS score
  - Current rates of sedation & recent changes
  - Pain assessments
  - Respiratory reports out current vent settings after nursing report

Source: Arredondo E, Udeani G, Horseman M, Hintze TD, Surani S. Role of clinical pharmacists in intensive care units. Cureus. 2021;13(9):e17929.

Far West Division Sedation Stewardship: Delirium Prevention & Management

- Delirium has several sequalae with ICU population when present
  - Shown to increase ventilator days & ICU days
  - Increases risk for self-harm
  - Frequently see greater use of sedation despite cause of delirium
- Delirium is frequently underdiagnosed
- Formal assessment tools were used to assess delirium
- Sedation rounding tool was also used to identify potential delirium
  - Careful evaluation of recent sedation changes prompted further assessment
  - Hyperactive
  - Hypoactive
  - Mixed

Source: Lang J. Appraisal of clinical practice guideline: clinical practice guidelines for the prevention and management of pain, agitation/sedation, delirium, immobility, and sleep disruption in adult patients in the icu. J Physiother. 2022;68(4):282.

Assessment Question # 2

Which of the following answer(s) below is a critical process needed for a successful sedation stewardship program to reduce utilization of sedation in the ICU?

A. Provide ongoing education to the critical care team about the importance of appropriate sedation
B. Incorporate validated sedation assessment tools in sedation stewardship program
C. Establish focused communication points surrounding sedation and ventilator liberation during rounds
D. All of the above

Assessment Question # 2 | Answer…

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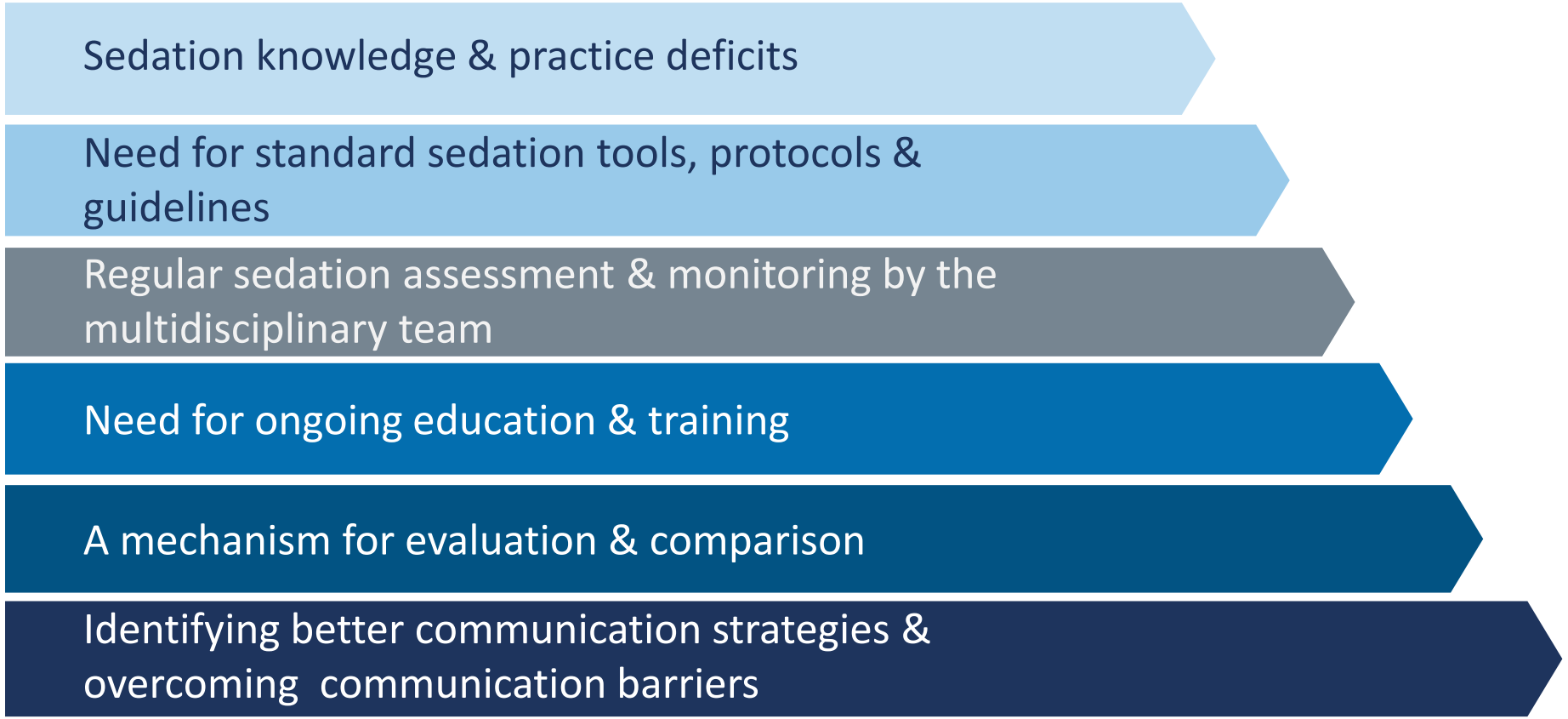
D. All of the above

Chapter 4: Lessons Learned

Jeff Murawsky, M.D., FACP

Far West Division Lessons Learned: Future Preparedness

Lessons learned post COVID-19 pandemic



Far West Division Lessons Learned: Quality Improvement & Research

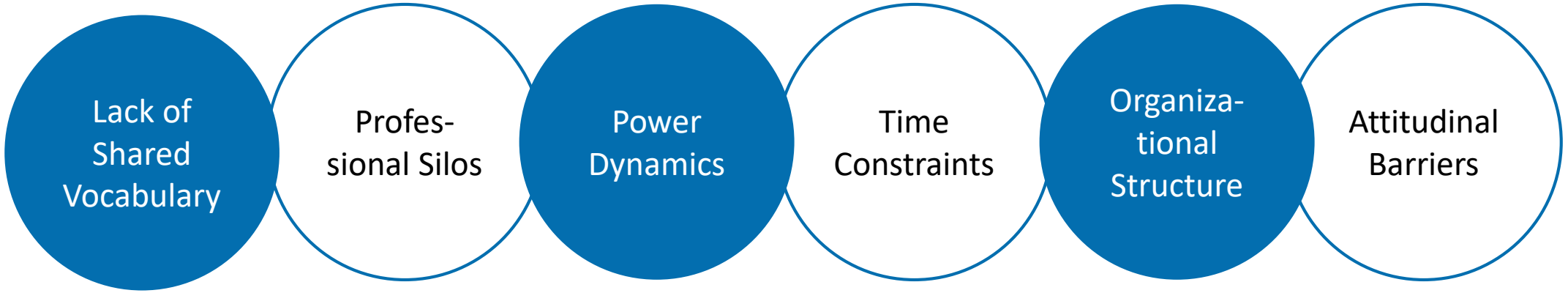
Research, Data Analysis & Practice Sharing

- Sedation-related data to identify opportunities for improvement
- Research aimed to expand the knowledge base & evidence surrounding sedation practice
- Research efforts also focus on further developing & validating FWD sedation tools/dashboards
- Practice sharing
- Analytics to identify measures of improvement

Source: Knudsen SV, Laursen HVB, Johnsen SP, Bartels PD, Ehlers LH, Mainz J. Can quality improvement improve the quality of care? A systematic review of reported effects and methodological rigor in plan-do-study-act projects. BMC Health Serv Res. 2019;19(1):683.

Far West Division Lessons Learned: Barriers to Interdisciplinary Communication

Barriers identified during the pandemic with effective communication



Source: Liu P, Lyndon A, Holl JL, Johnson J, Bilimoria KY, Stey AM. Barriers and facilitators to interdisciplinary communication during consultations: a qualitative study. BMJ Open. 2021;11(9):e046111.

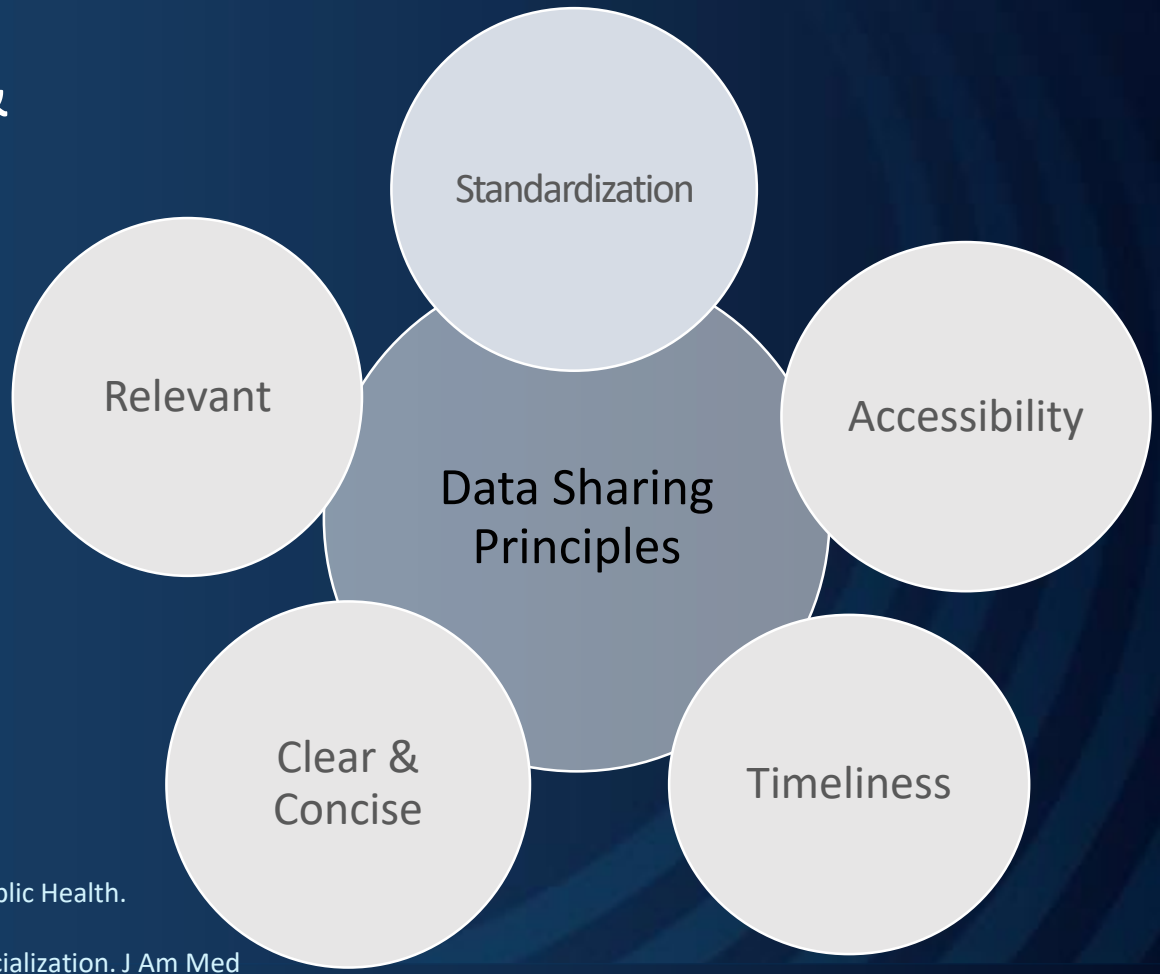
Far West Division Lessons Learned: Effective Documentation & Information Sharing

- Sedation stewardship principles should be continued outside of pandemic
- Identify new & unique broad communication strategies
- Successful integration of daily stewardship strategies hinged on effective data sharing

Source: Hulsen T. Sharing is caring-data sharing initiatives in healthcare. Int J Environ Res Public Health. 2020;17(9):3046.

Far West Division Lessons Learned: Effective Data Sharing Principles

- Utilizing common data elements & formats
- Making data easily accessible
- Consistent & timely data sharing
- Information is easily understood
- Information provides relevant elements



Sources: Hulsen T. Sharing is caring-data sharing initiatives in healthcare. Int J Environ Res Public Health. 2020;17(9):3046.
Cole CL, Sengupta S, Rossetti Née Collins S, et al. Ten principles for data sharing and commercialization. J Am Med Inform Assoc. 2021;28(3):646-649.

Assessment Question # 3

Important communication strategies around the development & sharing of actionable data include which of the following?

A. Utilize common data elements & formats when sharing pertinent data as part of the communication strategy
B. Make data easily accessible to leadership teams only
C. Communication should be narrow, focused & siloed
D. Attitudinal barriers don't warrant consideration in communication plans
E. Practice sharing should NOT be considered as a communication strategy

Assessment Question # 3 | Answer…

Important communication strategies around the development & sharing of actionable data include which of the following?

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Chapter 5: Monitoring, Measurement & Conclusion

Joseph McCoy, PharmD

Far West Division Lessons Learned: Monitoring & Measurement

Clear goals & objectives for improvement initiatives

Identifying relevant metrics & indicators to track progress

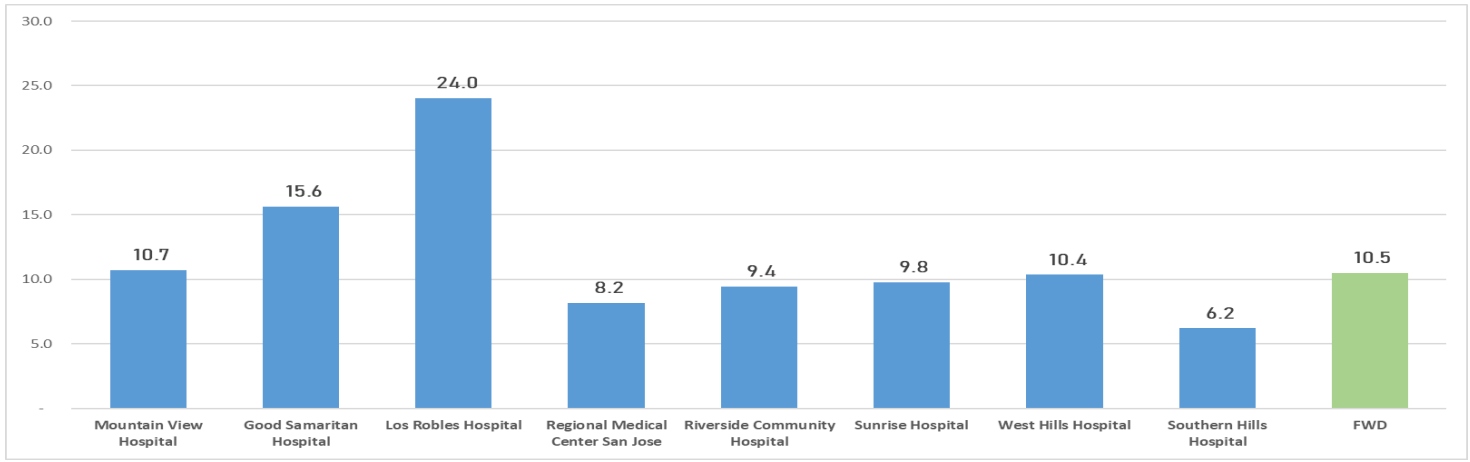
Collect data consistently & regularly

Analyzing & interpreting data to identify trends, patterns & areas for improvement

Source: Vincent C, Burnett S, Carthey J. Safety measurement and monitoring in healthcare: a framework to guide clinical teams and healthcare organisations in maintaining safety. BMJ Qual Saf. 2014;23(8):670-677

Far West Division Lessons Learned: Monitoring & Measurement

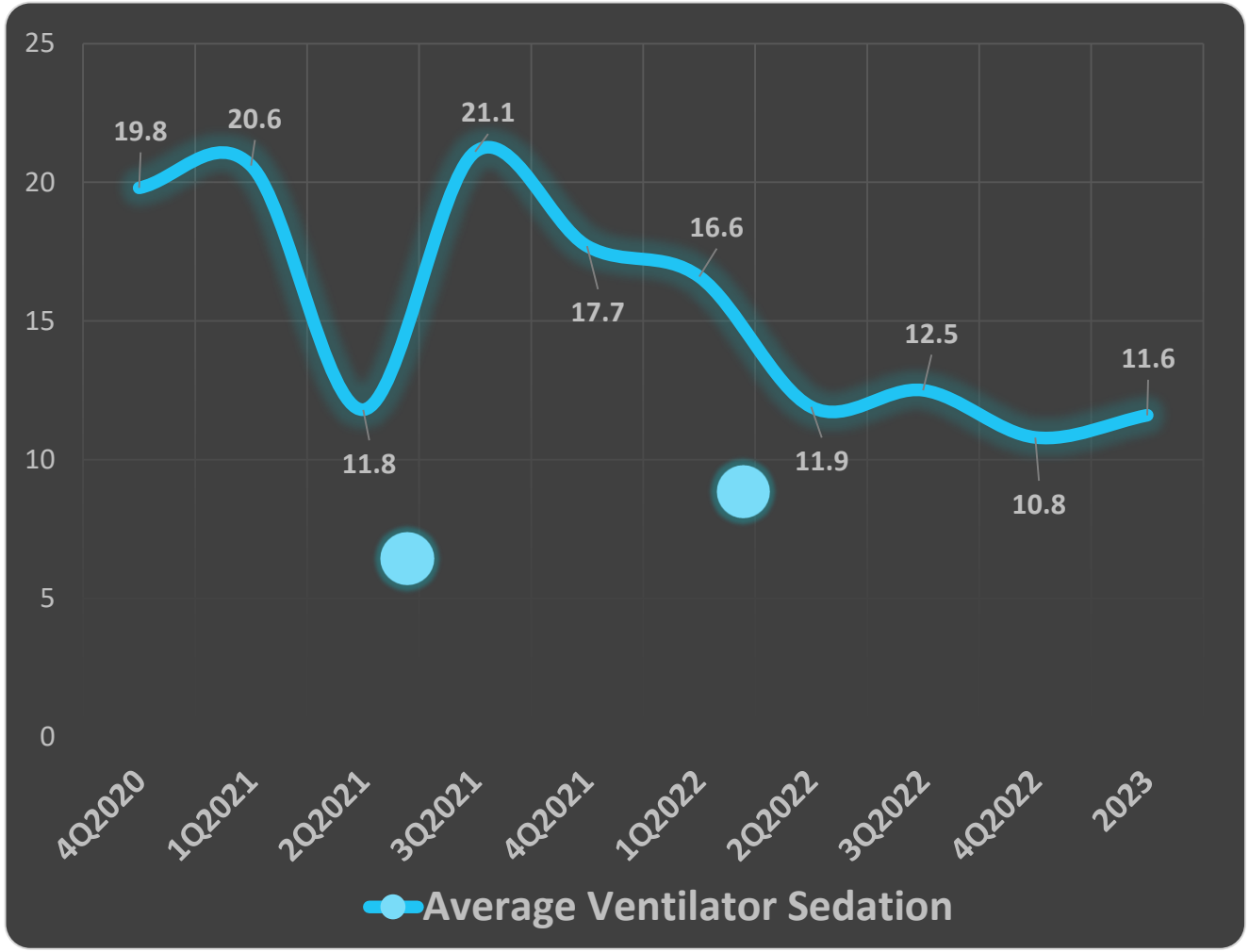
HCA Healthcare | Far West Division



Facility	Vents	Avg Sedation	Avg Dexmedetomidine	Avg Fentanyl	Avg Hydromorphone	Avg Ketamine	Avg Lorazepam	Avg Midazolam	Avg Morphine	Avg Propofol
Los Robles Hospital	31	24.0	3.8	2.0	0.1	3.9	0.0	3.5	0.2	10.6
West Hills Hospital	43	10.4	5.1	0.9	0.1	-	0.5	0.1	0.0	3.7
Mountain View Hospital	44	10.7	5.6	0.8	3.7	0.0	0.0	0.2	0.0	0.2
Southern Hills Hospital	49	6.2	1.6	1.3	0.0	0.1	0.0	0.6	0.0	2.6
Good Samaritan Hospital	54	15.6	8.0	0.5	0.1	0.0	0.0	0.0	0.1	6.3
Regional Medical Center San Jose	61	8.2	2.6	0.9	0.0	-	0.0	0.6	0.0	4.0
Riverside Community Hospital	172	9.4	2.6	1.9	0.1	0.0	0.0	0.7	0.0	3.9
Sunrise Hospital	231	9.8	4.0	2.0	0.1	0.0	0.0	0.9	0.0	2.0
Grand Total	**685**	**10.5**	**3.8**	**1.6**	**0.3**	**0.2**	**0.1**	**0.8**	**0.0**	**3.4**

- Average sedation equals total sedation divided by number of vents divided by sedation normalizing factor
- This is comparative data only
- Data only considers Mechanical Ventilation in the critical care setting
- Data is tracked & sent divisionwide on a monthly basis to key stakeholders
- Data is trended on a monthly basis
- Data can also be traced back to service line

Far West Division Lessons Learned: Monitoring & Measurement



Source: Far West Division Monthly Sedation Data, Vigilanz

- Compared to 4Q 2020 average sedation in 2023 represents a 41.4% reduction in average sedation
- Reduction is a culmination of Far West Division long-term strategies:
  - Sedation Knowledge & Practice Education
  - Standard sedation tools, protocols & guidelines
  - Regular sedation assessment & monitoring by the multidisciplinary team
  - Improved communication strategies & overcoming communication barriers
  - Effective data-sharing practices

References

1. Slutsky AS. History of mechanical ventilation. From vesalius to ventilator-induced lung injury. Am J Respir Crit Care Med. 2015;191(10):1106-1115
2. Kacmarek RM. The mechanical ventilator: past, present, and future. Respir Care. 2011;56(8):1170-1180
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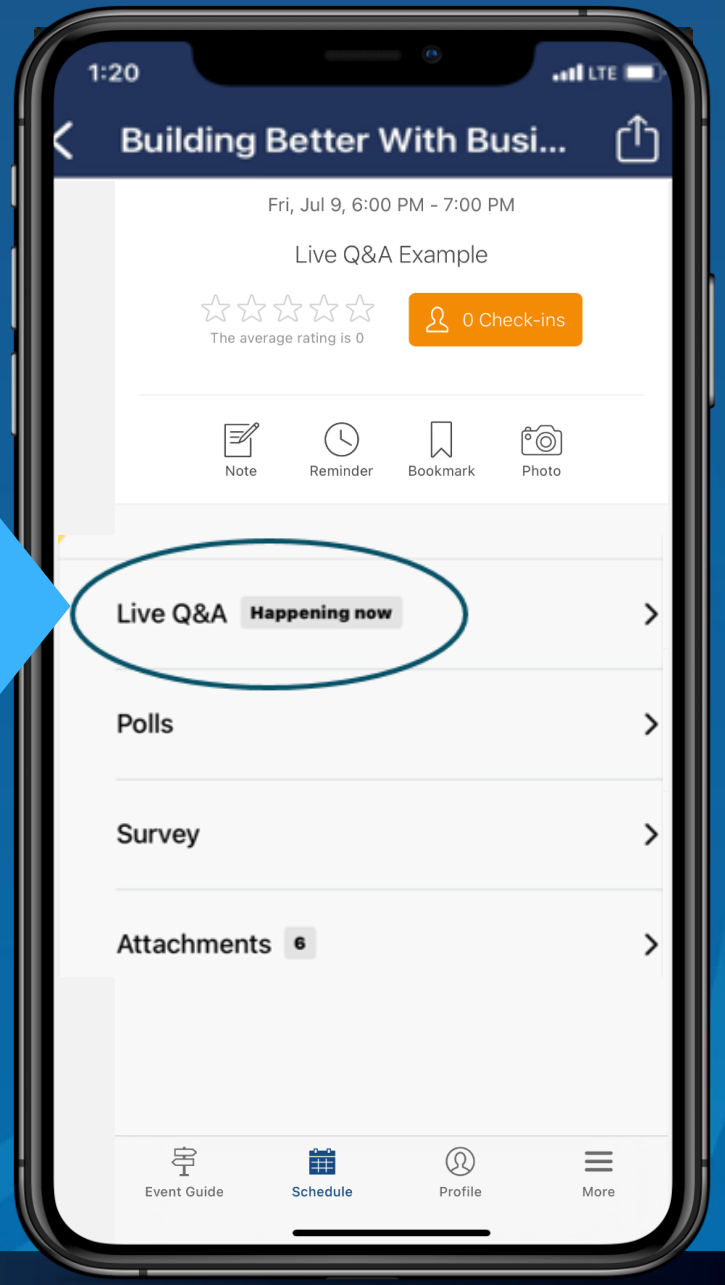

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Thank you...

Joseph McCoy | joseph.mccoy@healthtrustpg.com

Jeff Murawsky | jeffrey.murawsky@hcahealthcare.com

John DeVilbiss | john.devilbiss@hcahealthcare.com

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