PATIENT SAFETY MOVEMENT

First, Do No Harm. ZERO by 2030

Respiratory Management

How To Use This Guide

This AEBP provides evidence-based actions and resources for executives, leaders, clinicians, and performance improvement specialists. This document is intended to be used as a guide for healthcare organizations to examine their own workflows, identify practice gaps, and implement improvements. In it, you'll find: Best Practice Summary: A high level summary of evidence-based, clinical best practices.

Executive Summary: Executives should understand the breadth of the problem and its clinical and financial implications.

Leadership Checklist: This section is for senior leaders to understand common patient safety problems and their implications related to respiratory management. Most preventable medical harm occurs due to system defects rather than individual mistakes. Leaders can use this checklist to assess whether best practices are being followed and whether action is needed in their organization around respiratory management.

Clinical Workflow: This section includes more specific information about respiratory management across the continuum of care. Leaders should include the people doing the work in improving the work. This section outlines what should be happening on the frontline. Clinicians can use this section to inform leaders whether there are gaps and variations in current processes. This is presented as an infographic that can be used for display in a clinical area.

Education for Patients and Family Members: This section outlines what frontline healthcare professionals should be teaching patients and family members about respiratory management. Clinicians can inform leaders whether there are gaps and variations in the current educational processes.

Performance Improvement Plan: If it has been determined that there are gaps in current practice, this section can be used by organizational teams to guide them through an improvement project.

What We Know about Respiratory Management: This section provides additional detailed information about respiratory management.

Resources: This section includes helpful links to free resources from other groups working to improve patient safety.

Endnotes: This section includes the conflict of interest statement, workgroup member list, and references.

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Best Practice Summary

- ☐ Understand risk factors for respiratory failure in all patients by performing an initial assessment.
- ☐ Evaluate for compounding risk factors, such as, but not limited to, chronic diseases, recent surgery, or anemia, and treat accordingly.
- ☐ Evaluate visual and clinical indicators of hypoxia and respiratory distress.
- ☐ Consider continuous patient monitoring of oxygenation using Wi-Fi technology
- ☐ Ensure adequate oxygenation and ventilation by tailoring the therapy modality to the patient's needs.
- ☐ Examine clinical lab information routinely to assess for changes in patient condition.
- ☐ Initiate treatment for any visual or clinical indicators of respiratory failure.
- ☐ Reassess and intervene immediately upon signs of clinical deterioration.
- ☐ Minimize ventilator exposure as much as possible through sedation vacations, breathing exercises, and extubation readiness discussions.
- ☐ Discontinue therapy as soon as possible.
- ☐ Provide adequate routine care to prevent infection and minimize muscular deterioration.
- ☐ Coordinate routine team-based reassessments of respiratory status to understand the patient's response to therapy and needed adjustments.
- ☐ Communicate effectively with other team members and with patients and family members to ensure all are aware of the current or anticipated changes in the patient's condition.
- ☐ Coordinate appropriate post-discharge follow up to ensure continuity of care and sustained treatments as needed.

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Respiratory Management

Executive Summary

The Problem

Respiratory management spans across multiple settings, involves interdisciplinary team members, and necessitates reliable communication, coordination, and teamwork across the system. Furthermore, the patient safety risks of poor respiratory management, such as infection, failed planned extubations and unplanned extubation, are common and increase organizational cost.

The Cost

The importance of strong respiratory management policies and workflows is evident in the magnitude of mechanically-ventilated patients per year. In just one year within the US alone, there were over 1.1 million discharges with a diagnosis of respiratory failure and need for mechanical ventilation, equating to a 10.5 day average length of stay and $158,443 in hospital costs (Kempker et al., 2020).

The Solution

Many healthcare organizations have successfully implemented and sustained improvements and reduced death from poor respiratory management. This document provides a blueprint that outlines the actionable steps organizations should take to successfully improve respiratory outcomes and summarizes the available evidence-based practice protocols. This document is revised annually and is always available free of charge on our website.

Leadership Checklist

Use this checklist as a guide to determine whether current evidence-based guidelines are being followed in your organization:

Implement and optimize rounds.

- ☐ Implement interdisciplinary team rounding with respiratory therapists (RTs) included. If it is already in place, examine the gap in adherence to participation by involving those on the frontline and those in respiratory therapy leadership.
- ☐ Within interdisciplinary rounds, encourage clinicians to discuss interventions that could be optimized to prevent prolonged respiratory support (e.g., mobility, decreased sedation, extubation readiness testing, mechanical ventilation weaning protocols, etc).

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- ☐ Identify champions to challenge the "this is how we have always done it" mentality and to encourage team-based justification of interventions.
- ☐ Develop a consistent team based approach so that the RN and RT assessment is predictable in timing (e.g., knowing that spontaneous breathing trials are always conducted in the morning allows for planning and timing for those administering sedation).
- ☐ Prioritize a culture of inclusiveness in communication and identify those who may feel inhibited in raising concerns or questions.
- ☐ Assess quality and content of rounds to ensure goals are clearly stated for all team members.

Examine processes and workflows to understand risk. Ensure that adopted respiratory management protocols and standards are evidence-based and embedded into clinical workflows, whether electronic or paper, and are aligned with education, training, and policy throughout the organization.

- ☐ Invite frontline workers into conversations to crosswalk existing protocols with their experiences managing acute and chronic respiratory patients.
- ☐ Examine what happens to chronic versus acute respiratory information after it is initially documented.
- ☐ Assess the data that is being automatically versus manually populated from and to devices, EHR, etc. Determine where inputs can be automated with input from the frontline. Reduce duplicative work if data is being automatically pulled and manually entered.
- ☐ Understand justifications for respiratory care orders and examine trends in inappropriate ordering (e.g., orders that do not reflect best available evidence). Once trends are determined, involve the frontline in understanding why these trends exist (e.g., is a policy change needed?).
- ☐ Analyze longitudinal unit-specific data to understand mismatch between worker capacity and patient demands for respiratory reassessment.
- ☐ Map out the process of coordinating diagnostic studies to determine the steps that could compromise patient safety (e.g., what happens if the radiologist determines there's a need for immediate intervention after a chest X-ray?).
- ☐ Establish evidence-based respiratory care protocols to standardize respiratory treatments.
- ☐ Visually flag a known difficult airway (EHR notification, wristband, poster, etc).
- ☐ Visually tag the crash carts that have been restocked and sterilized and those that require maintenance.
- ☐ Standardize criteria to validate that the receiving facility is prepared to take care of the patient intended to be sent (e.g., appropriate equipment, etc).

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- ☐ Identify whether the organization is equipped to escalate support to venovenous ECMO should a patient deteriorate or if a local ECLS center should be engaged for possible transfer if clinical worsening is encountered.
- ☐ Assess human factors-based use errors for mechanical ventilation devices (Coldewey et al., 2021).

Minimize waste in workflows. Conduct an assessment of your organization's workflows and consider using the questions in Appendix A as a guide to determine areas of inefficiency.

Prioritize patient-centeredness.

- ☐ "Bundle" interventions to ensure the patient is disturbed from sleep as infrequently as possible.
- ☐ Involve patients and family members in rounds and hand-offs.
- ☐ Involve family members in early respiratory rehabilitation.
- ☐ Examine clinician-patient interactions before, during, and after non-invasive ventilation. Identify and implement interactions that mitigate patient anxiety and delirium.
- ☐ Incorporate patient-centered care principles to understand the root cause of the non-adherence to non-invasive ventilation (NIV).

Build systems for team-based situational awareness.

- ☐ Conduct interdisciplinary education around team based care planning.
- ☐ Emphasize the importance of a comprehensive respiratory care assessment (e.g., respiratory rate, work of breathing, dyspnea, etc.) for RT decision making in all disciplines' education.
- ☐ Examine the education that RTs have to complete, and the education RNs have to complete, and reduce duplicity by providing team education when possible.
- ☐ Emphasize each disciplines' use for alarms and monitors and how this translates into their decision making in ongoing interdisciplinary education.
- ☐ Exercise caution when designing EHR or documentation systems with "views" separated by discipline. Ensure EHR design is centered around the patient, rather than around the discipline.
- ☐ Establish an agreed upon time post-respiratory intervention to understand when to come together as a team for verbal revaluation.
- ☐ Require comment for closed loop communication after intervention if verbal conversation is not necessary or will not occur.

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- ☐ Standardize and reinforce those authorized to make changes to mechanical ventilator settings. Assure those authorized to make changes to mechanical ventilator settings are properly trained on the specific devices in their facility.
- ☐ Examine data around who is making ventilator changes to understand variation. Assure documentation in the EHR occurs with mechanical ventilator setting changes.
- ☐ Communicate changes multiple times in multiple ways when new equipment is introduced. Determine whether the new equipment requires education or communication.

Optimize monitoring and alarm management.

- ☐ Prioritize alarm management through individualization of alarms to patient clinical status.
- ☐ Distinguish alarms by priority.
- ☐ Standardize escalation to RTs based on RN assessment of alarm.
- ☐ Clearly outline alarm troubleshooting available for RN.
- ☐ Incorporate an accessible trend chart in the EHR for when vital signs are entered. Select the appropriate items for this trend chart (e.g., vital signs, lab results, etc.) to ensure that deterioration is detected as early as possible. Make this screen very accessible to those on the frontline.

Develop clear roles for escalation for early intervention when a patient is deteriorating.

- ☐ Identify and understand the root causes of delayed respiratory therapy notification in cases of patient deterioration.
- ☐ Consider automating notifications to RT for reassessment based on patient monitors or alarms instead of relying on nursing staff to actively make the call.
- ☐ Standardize escalation criteria for respiratory therapy intervention and rapid response team intervention.
- ☐ Consider implementing electronic secure messaging in the organization to facilitate team notification and communication.

Measure improvements and sustain initiatives.

- ☐ Debrief on perishable information and solicit team feedback with bedside team huddle to solicit feedback about patient response to care plan. Discuss the need to adjust the care plan in consideration of patient response to the care plan.

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- ☐ Regroup huddles should occur at an agreed upon time and frequency.
- ☐ Prioritize the role that leaders have for education at each level in the organization.
- ☐ Hold staff accountable for providing the standard of care and reward success.
- ☐ Ensure that leaders have a simple process to oversee respiratory management improvement work while also considering how it aligns with other initiatives across the organization.

Clinical Workflow

1. PERFORM INITIAL SCREENING FOR ALL PATIENTS

- Assess visual indicators of hypoxia and/or respiratory distress.
  - Cyanosis, increased work of breathing, and/or restlessness, confusion, decreased level of consciousness
    - ◊ If chronic artificial airway is present (tracheostomy), consider immediate assessment and removal/exchange if occluded. See Airway Safety APSS.
  - Apnea, for Respiratory Arrest. See Clinical Emergencies APSS.
- Assess clinical indicators of hypoxia
  - SpO2 < 92%
  - Use of CO-oximeter recommended for assessment of dyshemoglobins.
  - SaO2 < 90%
  - PaO2 < 60 mmHg
  - Allow adjusted norms for age, altitude, congenital/cyanotic heart disease, and chronic pulmonary disease states
  - Assess for co-oxyhemoglobin/dyshemoglobins.
- Assess vital signs for indicators of hypoxia and/or respiratory distress.
  - Heart Rate: > 100/min, < 60/min with hemodynamic instability; +/- 2 SD above normal for age.
  - Respiratory Rate: > 20 breaths/min or < 12 breaths/min.
    - ◊ Assess chest movement visually when respiratory compromise is present

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- ○ Respiratory effort
  - ◊ Increased respiratory effort (i.e. accessory muscle use, paradoxical respiration, grunting, pursed lip breathing, gasping)
- ○ Neurologic
  - ◊ Restlessness, confusion, agitation, decreased level of consciousness
- ○ Blood pressure
  - ◊ For SBP < 90 mmHg or MAP < 70 mmHg or decrease in SBP > 40 mmHg consider sepsis. See Sepsis APSS.
- ○ Allow adjusted norms for age, altitude, congenital/cyanotic heart disease, and chronic pulmonary disease states (e.g., COPD, Interstitial Lung Disease)

• Ensure adequate oxygenation

- ○ Noninvasive monitoring: SpO2 normal > 92%
- ○ Invasive monitoring: ABG SaO2 > 90%; PaO2 > 60 mmHg
- ○ Allow adjusted norms for age, altitude, congenital/cyanotic heart disease, and chronic pulmonary disease states (e.g., COPD, Interstitial Lung Disease) (Ucros et al., 2020; Soria et al., 2016; Branson, 2018; Jacobs et al., 2020; Faverio et al., 2019).
  - ◊ Accept lower SpO2 goals for patients with advanced chronic pulmonary disease (e.g., COPD, Interstitial Lung Disease)
  - ◊ Allow for age and altitude adjusted norms in PaO2
  - ◊ Accept lower SpO2 goals 88% - 92% for patients with advanced chronic pulmonary disease or those with advanced pulmonary disease (e.g., ARDS)

• Ensure adequate ventilation.

- ○ Noninvasive monitoring: Target EtCO2 30 – 40 mm Hg or 5 – 6%
  - ◊ Trend EtCO2 with PaCO2 to assure accuracy.
- ○ Invasive monitoring: Target ABG PaCO2 35 – 45 mmHg.
- ○ Allow for elevated normal PaCO2 in patients with advanced chronic pulmonary disease and normal pH (e.g., COPD).

• Examine clinical lab information. Allow adjusted norms for age, altitude, congenital/cyanotic heart disease, and chronic pulmonary disease states

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- ○ Anemia
  - ◊ Examine alternatives to a blood transfusion if possible. See Safe Blood Management APSS.
  - ◊ Administer oxygen to maintain SpO2 > 92%.
- ○ Carboxyhemoglobin
  - ◊ Provide high FiO2 via non-rebreather mask at ≥ 15 LPM.
  - ◊ Consider hyperbaric oxygen therapy (HBO) (Lin et al., 2018; Eichhorn et al., 2018).
- ○ Sulfhemoglobin
  - ◊ Provide high FiO2 via non-rebreather mask at ≥ 15 LPM.
- ○ Methemoglobin (Cefalu et al., 2020; Gao et al., 2021; Iolascon et al., 2021).
  - ◊ Provide high FiO2 via non-rebreather mask at ≥ 15 LPM.
  - ◊ For methemoglobin > 30%, consider administration methylene blue
- ○ Embolic Risks.
  - ◊ See Embolic Events AEBP.
- ○ B-type natriuretic protein (BNP) (Weber et al., 2006; Berthelot et al., 2020; Ontario Health, 2021).
  - ◊ For BNP >100 pg/mL, assess for cardiac etiology of respiratory compromise
- ○ Imaging to assess for specific cause of respiratory compromise (Miglioranza et al., 2017; Zieleskiewicz et al., 2021; Lichtenstein, 2014).
  - ◊ Lung ultrasound
  - ◊ Computerized tomography (CT)
  - ◊ Chest radiograph
- ○ Consider CT angiogram (CTA) for suspected embolic risks.

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2. INITIATE TREATMENT FOR ANY VISUAL OR CLINICAL INDICATORS OF RESPIRATORY FAILURE.

- For mild hypoxemia (SpO2 88 – 92%, SaO2 88 - 92% PaO2 58 mmHg – 64 mmHg) and effective ventilation (normal PaCO2 & normal pH), administer low flow oxygen therapy.
  - Nasal cannula up to 6 LPM
  - Administer lowest FiO2 required to maintain appropriate oxygenation defined for patient's condition.
- For moderate hypoxemia (SpO2 80% - 87%, SaO2 80 - 87%, PaO2 50 mmHg – 57 mmHg), mild hypoxemia with increased work of breathing and effective ventilation (normal PaCO2 with normal pH), and/or known or suspected carbon monoxide exposure, administer high FiO2 oxygen therapy.
  - Initiate therapy with high FiO2 device (i.e., oxygen mask, reservoir masks/non-re-breather, masks/aerosol mask with double trunk adaptation)
    - Initiate O2 ≥ 15 LPM
    - Consider for short term use and transition to elevated therapy (i.e. heated high flow or NIV) when able.
  - Consider addition of alveolar recruitment therapy with CPAP and high FiO2.
    - Effective in the treatment of cardiogenic pulmonary edema
- For moderate to significant hypoxemia (SpO2 < 80%, SaO2 < 80%, PaO2 < 50 mmHg, P/F < 300, S/F < 235), cyanosis without apnea, failure on high flow oxygen therapy, early ventilatory failure (pH 7.25 – 7.35), and/or cardiogenic pulmonary edema, initiate therapy on non-invasive ventilation (NIV/NPPV).
  - Initiate therapy with 100% O2 and pressure support (PS)
    - Use EtCO2 and/or ABG to guide settings and therapeutic goals.
    - Adjust FiO2 aimed at target SpO2 range and administer lowest FiO2 needed to maintain target SpO2.
    - Adjust PS from 4 cm H2O to 16 cm H2O with max PIP 20 cmH2O to achieve clinically identified decreased work of breathing; goal RR < 25 bmp (Osadnik et al., 2017).

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- For ventilatory failure (pH < 7.25, P/F < 200, S/F < 181), apnea, and/or failure on NIV, consider intubation and mechanical ventilation. See Airway Safety AEBP.
  - Initiate Vt of 6-8 ml/kg of PBW with RR to maintain adequate ventilation
  - Adjust set Vt or set Inspiratory Pressure Level, or PEEP, to achieve driving pressure < 15 cmH2O.
- Allow adjusted norms for age, altitude, congenital/cyanotic heart disease, and chronic pulmonary disease states
- Coordinate team-based reassessment for non-invasive ventilation to understand responsiveness to therapy (Hess, 2013).

3. EVALUATE FOR COMPOUNDING RISK FACTORS AND TREAT ACCORDINGLY.

- Chronic pulmonary disorders
  - Consider institution of home regimen
    - Bronchodilators and aerosolized treatments
    - Secretion clearance therapies
    - Home oxygen therapy
    - Sleep therapy (CPAP, NIV)
    - Mechanical ventilatory support
- Recent thoracic, abdominal surgery, trauma, anemia
  - See Pain Management AEBP for adequate pain control.
  - Assess for compromised lung mechanics and cough mechanism.
    - Initiate lung recruitment maneuvers if evidence of poor cough technique, identified atelectasis, refractory hypoxemia are present.
- Initiate effective secretion management therapy.

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4. MEASURE RESPONSE.

- Initiate continuous monitoring for heart rate, BP and oxygenation.
- Reassess immediately if clinical deterioration presents and notify the response team. See Clinical Emergencies AEBP
- Reassess:
  - ○ After each modality change
  - ○ 30 minutes after the patient is stable with each modality change and sooner if the patient shows signs of deterioration or intolerance.
  - ○ At least every four hours if the patient shows stability with therapy. Increase frequency for unstable patients.
    - ◊ Vital signs assessment
- Provide increasingly supportive respiratory therapy until vital signs are stable and within defined limits for patient condition.
    - ◊ Respiratory rate and pattern
      - Provide increasingly supportive therapy until work of breathing is relieved/tolerable by the patient.
    - ◊ Oxygenation
      - Increase delivered FiO2 until target saturation levels are achieved.
      - Decrease FiO2 as soon as possible, maintain lowest FiO2 required to maintain appropriate oxygenation defined for the patient's condition.
    - ◊ Ventilation
      - Provide increasing ventilatory support until target PaCO2 and/or EtCO2 levels are adequate or within defined limits for patient condition.
      - Goal is pH oriented (>7.35 and <7.45 for all patients).
    - ◊ Tolerance

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- Consider adjunctive non-pharmacological therapeutics (i.e., fans, music, essential oils, quiet, dark) to improve patient adherence to prescribed therapy.
- Consider adjunctive pharmacological therapeutics to improve patient adherence to prescribed therapy (Bennett & Hurford, 2011; Roberts, Haroon & Hall, 2012; Strom & Toft, 2014).

  i.vAnxiolytics

  ii. Light sedation

  iii. Consider deep sedation and neuromuscular blockade for ARDS (Jakob, 2012).

5. PROVIDE ROUTINE CARE.

- Engage in interdisciplinary rounds.
  - Review all respiratory orders each day on rounds to determine necessity.
  - Include assessment of mobility in rounds when discussing respiratory management.
- Follow organizational guidelines and systems for appropriate restraint use. See "Restraint Safety" AEBP.
- Individualize alarms to patient's clinical condition to avoid excessive and non-actionable alarms.
- Determine the optimal way to meet nutritional needs based on the individual patient (Allen & Hoffman, 2019; Gayan-Ramirez, 2018).
- Aim for zero fluid accumulation (Nieto et al., 2021).
- Frequently assess the position of the endotracheal tube. Encourage minimizing routine radiographic exams.
- Perform ventilator-associated pneumonia infection control measures. See Health-care-Associated Infections AEBP

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6. DISCONTINUE THERAPY.

- If on a ventilator, continually assess for capacity to wean support to reduce unnecessary ventilation and associated risk (McConville, 2012; Zein et al., 2016). Perform spontaneous awakening trials and spontaneous breathing trials at the same time daily.
  - See here for clinical criteria involved in readiness assessments.
  - See here for a table of objective, actionable criteria for weaning.
  - See here for complications to watch for during weaning.

7. COORDINATE DISCHARGE AND FOLLOW UP.

- Include family members into the care team. See Care Coordination AEBP for appropriate discharge strategies and see Education for Patients and Family Members section for key information to share upon discharge.
- Verify that the receiving facility is well-equipped to take care of the patient's needs as applicable.
- Ensure thorough and proper communication with all outpatient care team members.

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Education For Patients And Family Members

The outline below illustrates all of the information that should be conveyed to the patient and family members by someone on the care team in a consistent and understandable manner.

- Once the patient is ready to be discharged from the ward, the following recommendations should be considered to ensure a safe transition home from previously being on a ventilator:
  - Discuss realistic expectations and the timeline of expected recovery when returning home.
  - Help the patient understand what appointments and medications will be necessary and why. Provide a timeline of when each appointment should happen and how long they will need to take each medication. Provide contact information for all post-discharge appointments and explain instructions for medication use clearly.
  - Help the patient understand what their responsibilities are for their recovery. Aid in goal-setting for the patient.
  - Provide guidance around nutrition, mobility, and rehabilitation.
  - Follow up with the patient post-discharge. Consider follow up phone calls, home visits, and/or improved provider to provider handoffs (Kripalani et al., 2015).
  - Assess patient's ability to meet activities of daily living (ADLs) unassisted. Involve physical therapy and occupational therapy in assessments.
- Train home caregivers thoroughly and integrate training into the multiple days leading up to discharge to ensure time for competency checks and questions. Training should include:
  - Overview of basic anatomy
  - Description of physiological implications of the patient's condition or disease
  - Overview of health management tools that are new to the patient on discharge (i.e. home oxygen therapy, secretion management tools, proper aerosolized medication administration)
  - Overview of noninvasive ventilation or ventilator settings and how to troubleshoot
  - How to change the ventilator circuit
  - How to perform infection control and sterilization procedures.
  - How to perform suctioning and airway care
  - What to do in an emergency
  - How to perform CPR and bagging

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Performance Improvement Plan

Follow this checklist to improve performance and move your organization toward eliminating the harm and death associated with unplanned extubation:

☐ **Gather the right project team.** Be sure to involve the right people on the team. You'll want two teams: an oversight team that is broad in scope, has 10-15 members, and includes the executive sponsor to validate outcomes, remove barriers, and facilitate spread. The actual project team consists of 5-7 representatives who are most impacted by the process. Whether a discipline should be on the advisory team or the project team depends upon the needs of the organization. Patients and family members should be involved in all improvement projects, as there are many ways they can contribute to safer care.

Complete this Lean Improvement Activity:

Conduct a SIPOC analysis to understand the current state and scope of the problem. A SIPOC is a lean improvement tool that helps leaders to carefully consider everyone who may be touched by a process, and therefore, should have input on future process design.

RECOMMENDED RESPIRATORY MANAGEMENT IMPROVEMENT TEAM

- Respiratory therapists
- Nurses
- Physicians
- Physical and occupational therapists
- Quality and safety specialists
- Patient and family members
- Care coordinators
- Those involved in organizational purchasing decisions
- Environmental service staff
- Engineering staff
- Dietary staff
- Infection control specialists
- Clinical educators
- EHR specialists
- Information technology
- Admitting and registration staff

Table 1: Understanding the necessary disciplines for a respiratory management improvement team

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☐ **Understand what is currently happening and why.** Reviewing objective data and trends is a good place to start to understand the current state, and teams should spend a good amount of time analyzing data (and validating the sources), but the most important action here is to go to the point of care and observe. Even if team members work in the area daily, examining existing processes from every angle is generally an eye-opening experience. The team should ask questions of the frontline during the observations that allow them to understand each step in the process and identify the people, supplies, or other resources needed to improve patient outcomes.

RESPIRATORY MANAGEMENT PROCESSES TO CONSIDER ASSESSING

- Where team members are spending their time
- Initial assessment
- Planning discussions
- Quality of interdisciplinary rounds
- Hand-offs
- Reassessment frequency and quality
- Pain assessment
- Automation of data into the EHR
- Decision making around monitoring changes
- Use of sedation
- Use of restraints
- Nutrition frequency and quality
- Mobility frequency and quality
- Documentation and access to documentation by future team members
- Escalation of therapy decision making
- Transfer quality
- Use of escalation criteria upon deterioration
- ABG decision making
- VAP prophylaxis
- Decision making around ventilator changes
- Coordination of SBTs/SATs
- Patient and family involvement
- Discharge planning
- Material given to patients and family members upon discharge
- Team debriefs

Table 2: Consider assessing these processes to understand where the barriers contributing to respiratory management may be in your organization

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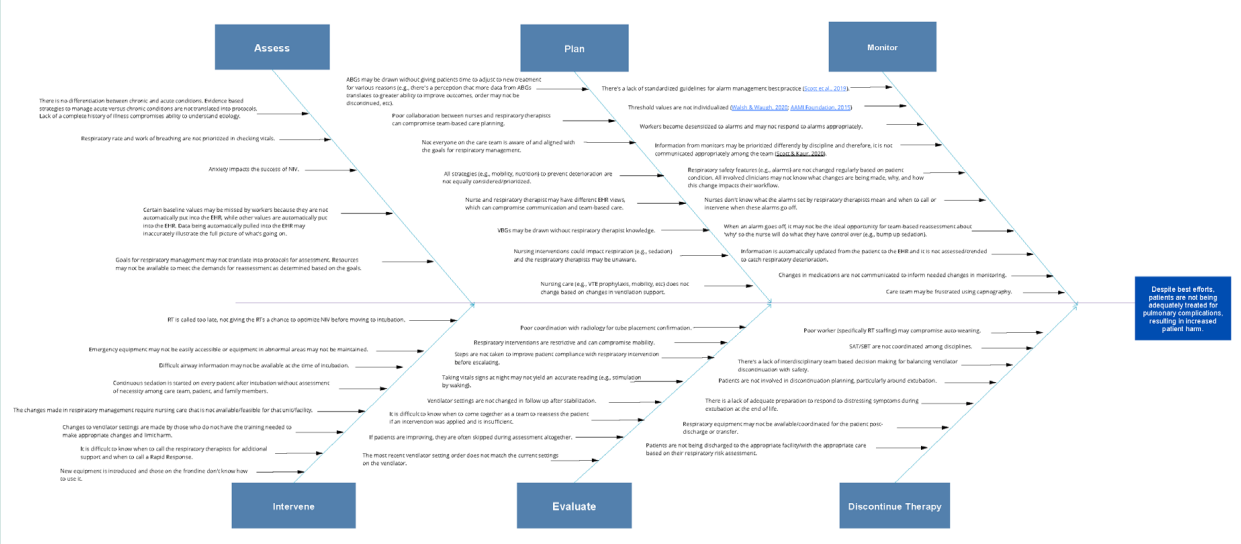
Create a process map once the workflows are well understood that illustrates each step and the best practice gaps the team has identified (IHI, 2015). Brainstorm with the advisory team to understand why the gaps exist, using whichever root cause analysis tool your organization is accustomed to (IHI, 2019). Review the map with the advisory team and invite the frontline to validate accuracy.

☐ **Prioritize the gaps to be addressed and develop an action plan.** Consider the cost effectiveness, time, potential outcomes, and realistic possibilities of each gap identified. Determine which are a priority for the organization to focus on. Be sure that the advisory team supports moving forward with the project plan so that they can continue to remove barriers. Design an experiment to be trialed in one small area for a short period of time and create an action plan for implementation.



Example respiratory management fishbone diagram.

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The action plan should include the following:

- Assess the ability of the culture to change and adopt appropriate strategies
- Revise policies and procedures
- Redesign forms and electronic record pages
- Clarify patient and family education sources and content
- Create a plan for changing documentation forms and systems
- Develop the communication plan
- Design the education plan
- Clarify how and when people will be held accountable

☐ **Evaluate outcomes, celebrate wins, and adjust the plan when necessary.** Measure both process and outcome metrics. Outcome metrics include the rates outlined in the leadership checklist. Process metrics will depend upon the workflow you are trying to improve and are generally expressed in terms of compliance with workflow changes. Compare your outcomes against other related metrics your organization is tracking.

Routinely review all metrics and trends with both the advisory and project teams and discuss what is going well and what is not. Identify barriers to completion of action plans, and adjust the plan if necessary. Once you have the desired outcomes in the trial area, consider spreading to other areas.

It is important to be nimble and move quickly to keep team momentum going, and so that people can see the results of their labor. At the same time, don't move so quickly that you don't consider the larger, organizational ramifications of a change in your plan. Be sure to have a good understanding of the other, similar improvement projects that are taking place so that your efforts are not duplicated or inefficient.

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RESPIRATORY MANAGEMENT METRICS TO CONSIDER ASSESSING

- SBT/SAT performance
- Hand hygiene compliance
- Ventilator associated pneumonia
- Readmission rate
- ICU LOS
- Percent of patients screened for obstructive sleep apnea
- Transfer of patients to a higher level care
- Ventilator duration (days) or ventilator free days
- Reintubation rate
- Rapid response team activations with noninvasive modalities
- Adverse event rate
- Delirium scoring
- Sedation and analgesia use
- Adherence to ventilator management clinical practice guideline

Table 3: Consider evaluating related metrics to better understand respiratory management presence and contributing factors

Read this paper from the Institute for Healthcare Improvement to understand how small local steps

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What We Know about Respiratory Management

Resources

For Respiratory Management Improvement:

- Ventilator Safety
- Sedation in Intensive Care Unit Patients: Assessment and Awareness
- Weaning from Mechanical Ventilation: Readiness Testing
- Patient and Family Education on Mechanical Ventilation Toolkit
- Weaning Predictors: Criteria
- Extubation Management in the Adult Intensive Care Unit
- Enteral Nutrition in Critical Care
- Wake Up Your Patients!
- Non-invasive Ventilation Guidelines for Adult Patients with Acute Respiratory Failure

For Patients and Family Members:

- Questions to Ask Your Doctor about ARDS
- 10 Things to Know if Your Loved One is On a Ventilator

For General Improvement:

- CMS: Hospital Improvement Innovation Networks
- IHI: A Framework for the Spread of Innovation
- The Joint Commission: Leaders Facilitating Change Workshop
- IHI: Quality Improvement Essentials Toolkit
- SIPOC Example and Template for Download
- SIPOC Description and Example

Endnotes

Conflicts of Interest Disclosure

The Patient Safety Movement Foundation partners with as many stakeholders as possible to focus on how to address patient safety challenges. The recommendations in the AEBP are developed by workgroups that may include patient safety experts, healthcare technology p rofessionals, hospital leaders, patient advocates, and medical technology industry volunteers. Workgroup members are required to disclose any potential conflicts of interest.

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Appendix

Appendix A: Minimize waste in clinical workflows

- ☐ Where are clinicians charting and do others know where to find it?
- ☐ Where are those making therapeutic decisions getting their information?
- ☐ What do order sets look like and which are automated? Is this automation known to all on the frontline?
- ☐ What requires documentation? Is there any duplication in documentation?
- ☐ What values are being automatically populated and are these values meaningful or are they contributing to data overload?
- ☐ Who is involved in rounds and under what circumstances are professionals not involved in rounds and should be?
- ☐ What is being discussed in rounds?
- ☐ When are rounds and are rounds competing with other priorities for a certain discipline?
- ☐ What home therapies are patients able to use in the hospital?
- ☐ How is a therapy assessed for effectiveness? What is the mechanism to validate efficacy of a therapy and discontinue quickly if there's no value add?
- ☐ How does the existing clinical workflow compare to the latest existing evidence?
- ☐ What measures determine respiratory therapist productivity and how does this impact staffing allocation? (e.g., using number of intubated patients to determine staffing may compromise optimal staffing).