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California Society for Respiratory Care

Safe Staffing Standards

Position Statement and White Paper

October 2016



Table of Contents

Overview-White Paper.....	3
Purpose	3
Principle Definitions.....	5
California Society for Respiratory Care.....	5
Respiratory Care Board of California	5
Respiratory Care Practitioner	6
Provider Competency	8
Regulatory Considerations.....	8
Position Statement	12
Appendix	15
List of Co-authors.....	15
Survey Results.....	16
Document Bibliography	19



CSRC Safe Staffing Standards

Overview-White Paper

Purpose

The CSRC holds “safe and high quality” integral to productivity and staffing levels provided within acceptable standards of practice. Safe Staffing Standards are intended to provide guidance and serve as a resource to CSRC members, the Respiratory Care Board of California, to health care institutions and others interested in the provision of safe and high quality respiratory care.

Declining reimbursement and unfavorable shifts in payer mix have increased pressure for health care providers and administrators in California to seek methods to broadly reduce operating costs and to maintain profit margins. Cost reductions have been achieved by reducing staffing levels as well as utilizing lesser-paid less qualified staff. While such staffing measures may reduce salary dollars short-term, they can increase costs by negatively affecting quality of care and safety of patients and Respiratory Care Practitioners (RCP). Missed care, the provision of inappropriate or unnecessary care, and misapplication of devices are examples of quality measures that can result in substantial increased costs, including hospital readmissions from, for example, COPD, asthma and pneumonia. In addition, several studies have demonstrated that sufficient staffing levels of bedside clinicians reduce costs³⁻⁵. Understaffing also affects employee morale⁶, which results in additional costs of increased sick calls, medical leaves and employee turnover.

The CSRC drafted **Safe Staffing Standards and a Position Statement** to address inappropriate measures frequently applied to determine the number of RCP staff needed at a given institution. The intent is to provide guidance and direction related to the establishment of respiratory staffing levels that promote the highest quality of care and safety. The CSRC issues this Position Statement subsequent to request(s) for rulings and guidance related to staffing from California Respiratory Care Managers and/or Manager Groups, from numerous individual RCP concerns regarding reductions in staffing as it relates to potential risk to patient safety and the inability to provide quality care in a timely and competent manner.



To further evaluate the scope and depth of the staffing level issue, the CSRC conducted a statewide survey of Respiratory Care Department Managers to determine the current staffing metrics and staffing patterns in use, and the effects of staffing levels on patient safety. One Hundred and Thirty (n = 130) Respiratory Care Managers responded to the survey, which was approximately a 28 % response rate from approximately 450 California Hospitals. The questions, results and assessment of the 2011 survey can be found in the appendix

The CSRC also recognized that patients with respiratory impairments require assessment and treatment across the continuum of health care provider organizations. This continuum is inclusive of acute care hospitals, intensive care units, skilled nursing facilities, long-term rehabilitation facilities, clinics, and in the home environment. The Centers for Disease Control and Prevention disclosed that more than 3 million Americans received care in Nursing Homes in 2015. The National Association for Home Care & Hospice estimated that approximately 12 million individuals received home health care in 2010. Wherever patients with respiratory impairments are cared for, it is important that these organizations staff adequate numbers of competent clinicians to care for such patients. For these reasons the CSRC Safe Staffing Standards are applicable in any setting in which a patient may require respiratory care.

An expert panel of administrators, directors, managers, and educators considered experts in staffing, competency assessment, safety, productivity, and benchmarking, cost management drafted this document and protocols (see Appendix B for the list of the Co-Author Panel of Experts). References cited in this Position Paper, as well as numerous additional citations, can be found in the appendix section. In addition, an Interactive Annotated Bibliography pertaining to “Safe Staffing of Respiratory Care Practitioners” has been included. The bibliography contains papers cited as references in the document and expanded to include a number of other publications related to Safe Staffing practices. The expanded bibliography is provided as a reference tool to enhance the depth of knowledge relative to Safe Staffing issues, concepts, and principles.

The authors also referred to the American Association for Respiratory Care Best Practices in Respiratory Care Productivity and Staffing, as well as the AARC Uniform Reporting Manual in drafting this position statement:

American Association for Respiratory Care Position Statement: Best Practices in Respiratory Care Productivity and Staffing 2012

American Association for Respiratory Care. Uniform Reporting Manual. 5th Ed. Dallas, TX, Daedalus publishers, 2012



Principal Definitions

California Society for Respiratory Care

The California Society for Respiratory Care (CSRC), as an affiliate of the American Association of Respiratory Care (AARC), is a non-profit professional organization, whose mission is to represent and support its' members through public and legislative advocacy, educational opportunities, and to continuously strive for excellence in the cardiopulmonary profession. The CSRC is committed to health, healing, and disease prevention in the California community through the art, science, humanity and compassion of the Respiratory Care Practitioner. The CSRC strives to be the elite provider of education and consumer information, as well as the benchmark for professionalism

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Respiratory Care Board of California

The mandate of the Respiratory Care Board (RCB) is to protect and serve the consumer by administering and enforcing the Respiratory Care Practice Act and its regulations in the interest of the safe practice of respiratory care. Licensed RCPs regularly perform critical lifesaving and life support procedures prescribed by physicians that directly affect major organ systems of the body. RCPs provide care directly to the patient in a hospital setting, an intermediate care facility, or the patient's home. Patients may be suffering from acute and chronic respiratory failure, lung cancer, interstitial lung disease, sleep disorders, emphysema, asthma, or cystic fibrosis, or may be premature infants whose lungs have not yet fully developed. As of the second calendar quarter of 2016, 27,803 credentials had been issued to residents of California (*NBRC Horizons* Newsletter, National Board for Respiratory Care, Olathe, KS).

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Respiratory Care Practitioner

RCPs are individuals, who have highly specialized training and demonstrated competency, that are licensed by the RCB to practice respiratory care. Respiratory care as a practice means a health care profession employed under the supervision of a medical director in the therapy, management, rehabilitation, diagnostic evaluation, and care of patients with deficiencies and abnormalities, which affect the pulmonary system and associated aspects of cardiopulmonary and other systems' functions, and includes all of the following:

1. Direct and indirect pulmonary care services that are safe, aseptic, preventive, and restorative to the patient.
2. Direct and indirect respiratory care services, including but not limited to, the administration of pharmacologic, diagnostic, and therapeutic agents related to respiratory care procedures necessary to implement a treatment, disease prevention, pulmonary rehabilitative or diagnostic regimen prescribed by a physician or surgeon.
3. Observation and monitoring of signs and symptoms, general behavior, or general physical response to respiratory care treatment and diagnostic testing and
4. Determination of whether such signs, symptoms, reactions, behavior or general response exhibits abnormal characteristics;
5. Implementation, based on observed abnormalities, of appropriate reporting or referral or respiratory care protocols, or changes in treatment regimen, pursuant to a prescription by a physician or surgeon or the initiation of emergency procedures.
6. The diagnostic and therapeutic use of any of the following, in accordance with the prescription of a physician or surgeon: administration of medical gases, exclusive of general anesthesia; aerosols; humidification; environmental control systems and baromedical therapy; pharmacologic agents related to respiratory care procedures; mechanical or physiological ventilatory support; bronchopulmonary hygiene; cardiopulmonary resuscitation; maintenance of the natural airways; insertion, without cutting tissues, and maintenance of artificial airways; diagnostic and testing techniques required for implementation of respiratory care protocols; collection of specimens of blood; collection of specimens from the respiratory tract; analysis of blood gases and respiratory secretions.
7. The transcription and implementation of the written and verbal orders of a physician or surgeon pertaining to the practice of respiratory care.
8. Respiratory Care staff time that may be required, including each of the following, among others:
 - a Apnea Testing for Brain Death;
 - b Arterial Line Insertion;
 - c Assessment/Screening Patients for Obstructive Sleep Apnea;



- d Assessments/Screening of Patients for Treatment;
- e Assessment/Screening of Patients for Ventilation or BiPAP;
- f Assessment/Screening of Patients for VAP;
- g Assessment/Screening of Patients for Weaning;
- h Attendance at High Risk Cesarean Sections and Deliveries;
- i Cardioversion monitoring of the patient;
- j Code Blue responses for cardio-pulmonary emergencies;
- k Conscious Sedation Monitoring;
- l Endotracheal Tube repositioning and securing;
- m End-Tidal CO₂ set ups and checks;
- n Helium/oxygen (“heliox”) set ups and checks;
- o Incentive spirometry set ups and checks;
- p Inpatient Sleep Apnea Monitoring;
- q Lung Recruitment Maneuvers;
- r Nitric Oxide Administration;
- s Patient and Family Education;
- t Smoking Cessation Intervention and Counseling;
- u Patient transports requiring mechanical ventilation or airway care;
- v Oxygen set ups and checks;
- w Oximeter set ups and checks;
- x Rapid Response Team deployment;
- y Respiratory Care Consultations;
- z Spontaneous Breathing Trials;
- aa Tracheostomy care/replacement;
- bb Bronchoscopy assisting;
- cc Ventilator management and weaning;
- dd Airway management procedures (suctioning, monitoring intratracheal inflatable cuff pressure, manipulation of specialty airways, and application of airway attachments, such as speaking valves);
- ee Setup and monitoring of oxygen delivery devices;
- ff Setup and monitoring of patient monitoring devices (transcutaneous monitors,capnographs, etc.)

The settings in which respiratory care may be practiced include licensed health care facilities, hospitals, intensive care units, clinics, ambulatory or home health care venues, physicians' offices, and public or community health services. Respiratory care may also be provided during the transportation of a patient, and under any circumstances where an emergency necessitates respiratory care.



Provider Competency

The Respiratory Care Board ensures that mechanisms are in place through minimum education requirements, entry-level testing, and ongoing continuing education in order to ensure that a level of competency is achieved and maintained to provide safe and effective respiratory care.

Competency is the ability of a practitioner to integrate the professional attributes required to perform in a given role, situation, or practice setting¹². These professional attributes include knowledge, skill, judgment, attitudes, values, and beliefs. All health care provider organizations providing care to patients with pulmonary impairments, inclusive of acute care and long-term care facilities as well as home care/DME providers, have an obligation to ensure that care providers are competent.

The Respiratory Care Practitioner is the health professional best suited and competent to ensure the safety of all patients requiring the quality and appropriateness of care is properly assessed. The RCP is the only caregiver singularly qualified for the combined didactic, clinical, mechanical and corresponding combined technical skills to assess, treat, reassess, modify, treat and finally evaluate both utilization and outcomes of service provided at the bedside. This specific combination of highly skilled professional attributes specific to Respiratory Care best qualifies the RCP for patient driven- respiratory protocols. These Patient driven- respiratory protocols have proven to improve patient outcomes, decrease interventional application and decrease-associated costs. Given the scope of practice and training of the Respiratory Care Practitioner (RCP), combined with the daily experience and mechanism established by the RCB and CSRC, the RCP is the individual whose training is most focused on procedures and clinical paths that are pertinent to caring for patients with pulmonary diseases and disorders. Therefore, the RCP stands alone to be recognized as having the primary role as a care provider that must be present in sufficient numbers as needed for both the safety and quality of care for these patients.

Regulatory Considerations

Medicare Hospital Conditions of Participation state that there must be adequate numbers of respiratory therapists, and other personnel who meet the qualifications specified by the medical staff, consistent with state law. Medicare Hospital Conditions of Participation further require hospitals that provide respiratory care services to meet the needs of their patients in accordance with acceptable standards of practice. “Acceptable standards of practice”, as noted in the Hospital Interpretive Guidelines for State Surveyors, include compliance with applicable standards that are “set forth in Federal or State laws, regulations or guidelines, as well as



standards and recommendations promoted by nationally recognized professional organizations (e.g., American Association for Respiratory Care, American Medical Association, American Thoracic Society, etc.).”

California respiratory care managers are responsible to supervise their staffs and to ensure that the persons who act under their supervision are adequate in number to provide safe and appropriate respiratory care services. California RCP managers and practitioners have concern that they may be limited in their ability to assure adequate staff assuring compliance with the RCB’s application of Statute 3710.1, Medicare Hospital Conditions of Participation, and most importantly the very reason RCPs are licensed by the RCB.

“Protection of the public shall be the highest priority for the Respiratory Care Board of California in exercising its licensing, regulatory, and disciplinary functions. Whenever the protection of the public is inconsistent with other interests sought to be promoted, the protection of the public shall be paramount”

Individuals responsible for direct management of Respiratory Care Services are accountable for day-to-day RCP staffing operations. Individuals supervising or managing inpatient care environments must meet the same standards of professional competency to ensure safe delivery of care, including Respiratory Care. When respiratory therapy is provided by inadequately educated or unlicensed health care providers, rather than by RCPs specifically trained in Respiratory Care; the most vulnerable and frail are exposed to unreasonable safety risk. Individuals and organizations that provide metrics, comparative data, and benchmarking data, for Respiratory Care staffing levels, directly affect the staffing decisions. These persons or organizations who compromise the Safety Standards then share in the risk promoting unsafe levels of staff and responsibility for unfavorable patient outcomes, including higher morbidity and mortality.

Title 22 California Code of Regulations, in addition to the **Respiratory Care Board**, clearly defines Respiratory Care and services that shall be provided by an individual deemed competent. Title 22 states that there should be clear delineation as to who may perform various procedures, under what circumstances and under who’s supervision. Those services shall be overseen by both a physician and director that assure the availability of such services and the quality of respiratory care personnel. Specific to the care of ventilator patients in an acute intensive care setting, Title 22 specifies that “sufficient respiratory therapist and/or respiratory therapy technicians to provide support for resuscitation and maintenance of the mechanical ventilators be provided at a ratio of 1:4 or fewer each shift.”



As per the **Respiratory Care Board**, any person or system which provides respiratory care as defined by the RCB, CMS Conditions or Participation, and Title 22 is performed by Non-licensed RCP's or other provider in which the provision of respiratory services is not included in their legal scope, may be deemed *Practicing Respiratory Care Without a License* and punished to the fullest extent of the law.

Other Key Considerations in Staffing

Safe practice is largely dependent on staffing adequate numbers of competent RCPs. The provision of adequate numbers of RCPs requires the use of metrics that identify the time required to provide services. Subsequently, the CSRC develop this guidance statement to better assist and ensure those making decisions regarding the quality and quantity of staffing use appropriate metrics. In some cases, these metrics are based on recommendations from outside consultants to the organizations and are not considered acceptable practice by the CSRC:

1. **Exclusive reliance upon billable procedures based, Current Procedural Terminology (CPT) code or other standard billing protocol and workload estimation systems.** In such cases, a large component of work is not captured. There exists a limited set of billable patient care procedures through CMS for respiratory care. Critical high-risk procedures such as transports, code blue, rapid responses, and ventilator assessments do not have CPT codes associated with them and are therefore not included in metrics to determine staffing. The failure to include high-risk, critical procedures can misrepresent actual staff required, leading to missed treatments, delays in respiratory care, and unsafe situations for both patients and RCPs. More importantly, there is a legal obligation for the RCP to perform procedures that are ordered by a physician or driven by medical staff approved protocols. Not accounting for procedures, which are medically and legally obligatory, but without assigned CPT codes, places performance of these critical high-risk procedures at risk.
2. **Using standardized models that are derived solely from general data such as patient days, or average daily census.** These metrics fail to take into account the intensity (acuity) of treatment per patient. In such cases, patients that require varying types and quantity of care is not differentiated. Failure to account for patients requiring multiple, labor-intensive interventions can result in the inability to properly assess the number of RCPs required, missed treatments, delays, and unsafe situations.
3. **Application of benchmarking ratios and establishment of a target based on a ranking within a comparison group.** Such targets are frequently utilized to reduce staff without considerations for structure, functions, and programs that differentiate departments. Reductions without such consideration can result in failure to properly assess the number of RCPs required leading to missed treatments, delays in respiratory care and unsafe situations.



- 4. The absence of an RCP, and use of non-qualified individuals, in a setting in which patients require care for cardio-pulmonary impairments in which skills ranging from assessment, care planning and ventilator management are required has been observed and reported.** In such situations, there is a clear violation in practice standards as individuals providing respiratory care must be qualified, competent and the services, which they provide, must be included in their legal scope of practice. Such referenced practice compromises both care quality, patient safety and perhaps diminish patient outcome. California Respiratory Care Managers have identified the potential for inappropriate if not dangerous strategies to determine RCP staffing levels. The managers made a request to assist a ruling that would minimize risk of patient harm specifically in cases where inadequate staff was due to such strategies and methods. RCP Managers are responsible to ensure that the persons who act under their supervision provide both safe and quality RCP services. Safe and quality RCP services must be synchronous with sufficient numbers of competent RCPs assigned and available to provide that same safe and quality care.

Individuals or organizations that present or recommend these incomplete staffing models may fail to insure there are adequate numbers of qualified staff to perform the volume of services ordered and insure safe and effective high quality care. Failure to provide adequate numbers of qualified staff risk the ability of the caregiver organization to provide for required and obligatory ordered and related support activities.

Organizations that provide patients with respiratory care services however have staffing models that do not include appropriate numbers of licensed individual deemed competent in the provision of those services, may receive disciplinary action(s) by the Board. Practicing Respiratory Care in California without a license is a Respiratory Care Act violation, and subject to actionable scrutiny by the RCB.

The need for RCPs to serve as patient advocates

RCPs have a professional obligation of being patient advocates. RCPs have a responsibility to ensure patient care dispensed in their institution is consistently high in quality and safe. Stating one's position as it relates to safe staffing, and advocating for patient safety, will gain trust of from care team members. Ensuring respiratory care services are provided by credentialed and appropriately trained RCPs provides a qualified gatekeeper within the health care team as to the appropriateness, proper application, and knowledge of options available to the patient.



CSRC Safe Staffing Standards

Position Statement

The Position Statement has been composed with one overarching goal in mind: to ensure that the safety of patients to whom respiratory care is administered in the state of California is guaranteed. This goal, in turn, is optimized when that care is delivered by competent caregivers

The California Society for Respiratory Care (CSRC) recommend that the following guidelines be observed to implement safe and effective staffing levels in organizations and settings in which patients may require the scope of respiratory services and treatment defined by the California Respiratory Care Board (RCB).

1. **CSRC recommend any staffing system must account for all activities of the RCP workday.** Physician orders or medical staff approved protocols, which include assessment regimens must be accounted for regardless of CPT code or of eligibility for CMS payment. If physician or protocol obligates RCP performance, that performance must be accounted for in determining staff required.
2. **CSRC recommend staffing programs and systems be based on national RVU time standards, such as the AARC's Uniform Reporting Manual (URM).** Respiratory Care procedures, along with any RC staffing/productivity system should be based upon Relative Value Units (RVUs) for all the services provided by an individual department. RVUs provide the ability to define the time required or percent of staff that should be allocated to a specific procedure as defined in the American Association for Respiratory Care Uniform Reporting Manual (AARC URM). RVUs were specifically chosen due to the variability of time required to perform different procedures. Alternate metrics correlate poorly with RVUs and should not be used to determine staffing and productivity⁸. RVUs have been adopted by the Centers for Medicare and Medicaid Services (CMS) for physician reimbursement and provide another mechanism for weighting specific procedures⁹.
3. **CSRC recommend department staffing plan based upon RVUs.** Driven by an RVU-based staffing plan such a system provides the flexibility to direct patient care staff based upon actual facility service needs. The assessment of work



demand, should be geared to specific procedure volume with associated RVU values used to drive staffing decisions. Peer-reviewed, evidence-based research indicates that a daily, RVU based, flex-staffing system met staffing requirements for patient needs and reduced cost by approximately \$250,000 per year (5 FTE) in a 400-bed Acute Care hospital¹⁰.

4. **CSRC recommend “core-staffing” or “minimal staffing” be determined and utilized.** Core staffing provides for emergency response and other services in a timely manner. Core staffing requires consideration as well as some level of exclusion from being managed through a flexible staffing model.
6. **CSRC recommend staffing be provided for unscheduled procedures.** Based upon historical data and work rate, unscheduled events, which require RCP services, can be both quantified and qualified. Literature¹¹ suggests that unscheduled Respiratory Care activities, such as Emergency Department procedures, patient transports, rapid response calls, etc., may account for up to 40% of workload. Failure to include unscheduled procedures in staffing projection, results in mathematically impossible workloads with subsequent negative cascading events (patient care compromise, understaffing, departmental, delays in provision of service and facility cost increases)
7. **CSRC recommend adequate numbers of both administrative and support staff be determined to a support the provision of services. At a minimum, administrative support staff as defined by California Title 22 shall be in place. The AARC URM provides both Non-Allocated and Support functions and task that should be considered in determining the classification and number of these staff.**
8. **CSRC recommend the use of Patient-Driven Protocols.** Programs that identify the medical necessity for care are recommended for the provision of staffing resources to administer. Assuring appropriate utilization of services optimizes care on a continual basis and minimizes RCP provided therapy not considered efficient or productive. The use of RVU-based staffing in conjunction with Patient-Driven Protocol type systems assures resources are only consumed in the provision of evidence-based care.

As defined by the American College of Chest Physicians, respiratory care patient driven protocols have been designed to allow assessment by properly trained and credentialed respiratory care practitioners, and for initiation and adjustment of treatment within guidelines previously decided by the physician. In a number



of hospitals these protocols have proved highly efficient, safe and cost-effective. (1992 ACCP Position Paper “Respiratory Care Protocols”)

9. **CSRC recommend any setting in which patients may require the provision of respiratory services as defined in the Respiratory Care Practice Act, that qualified RCPs are available to provide such care.** In settings such as clinics and home care where an RVU based system may not be practical secondary the wide variability in time requirements and cross utilization of duties, the staffing model should be structured to ensure that competent practitioners are available number sufficient practitioners based on quality outcomes/safety metrics. Staffing adjustments, driven by any metric/benchmark/system, must include mechanisms to assess the impact of staffing on patient outcomes. Monitoring such quality outcomes as length of stay, COPD or asthma readmissions, pneumonia readmissions, missed therapy, delays in treatment, and other complications provide indicators to validate adjustments toward safe as well sufficient staffing. A reduction in bedside clinical staff, without mechanisms to assess the impact of such reductions, represents practice that can place patients at risk.
10. **CSRC recommend realistic metrics, staffing models, evidence-based, utilizing recognized benchmarks for data-driven organizations, which provide care to patients with cardio-pulmonary impairment.** Organizations, which embrace these guiding concepts, will be best able to develop comprehensive, yet realistic: metrics, staffing models, and benchmarks, in capturing the full range of activities required of RCPs. This will push forward, not only realistic staffing models with consistent, safe, cost-effective, high quality care but; will build the quality metrics to improve healthcare delivery.
11. **CSRC recommend the value of care drive the role of the RCP in all staffing models.** This value, defined as quality in relation to cost may be recognized through data driven RVU staffing models that demonstrate the productivity advantage and flexibility of the RCP in meeting the unique needs of this patient population. Value may also be demonstrated in the measure of specific clinical outcomes in which the provision of services by an RCP resulted in improvement. In addition, organizations can demonstrate value when the use of an RCP in a specific role allows for avoidance of financial penalties and new revenue opportunities afforded by health care reforms, such as those incorporated in the Affordable Care Act.



CSRC Safe Staffing Standards

Appendix

List of Co-authors

This Position Statement, and its' supporting documentation, was composed by an Ad Hoc Committee appointed by the Board of Directors of the California Society for Respiratory Care. The members of this committee were:

Patrick Moore, RRT, RCP, Chairman
H. Robert Bence, RRT, RCP
Jeffrey A. Davis, RRT, RCP
Robert R. Demers, RRT, RCP
Richard M. Ford, RRT, RCP
Carol Mihailuk, RRT, RCP
Wayne Walls RRT RCP
Michael Madison RRT, RCP (Ex Officio)
Samuel Louie, MD (CSRC Medical Director)

The committee gratefully acknowledges the assistance provided to us by Dottie Stenbenz, RRT, RCP and Ednalee Warnecke, RRT, RCP during the preparation of this Position Statement.



Survey Results

In order to evaluate the scope and depth of the staffing level issue, the CSRC conducted a statewide survey of Respiratory Care Department Management to determine the current staffing metrics and staffing patterns in use, and the effects of staffing levels on patient safety. One Hundred and Thirty (n = 130) Respiratory Care Managers responded to the survey, which was approximately a 28 % response rate from approximately 450 California Hospitals. The survey results indicated the following issues:

1. It was the general perception of 30% of respondents they did not have adequate staff over the course of the past year. In such situation, managers identified the need for additional staff in relation to patient need.
2. It was the intent to address the issue of being significantly understaffed on an ongoing basis, defined as a consistent shortage greater than two FTEs over 60 days. This would represent a more serious issue in which over 21% indicated significant and chronic understaffing exists. This question clearly identifies that greater than 1 out of 5 centers are struggling with being understaffed on a chronic basis.
3. A key intent of the survey was to also identify the reasons for departments being understaffed. The most significant reasons for chronic understaffing were extended medical leave and delays in the on boarding process. Specific results were as follows:

Extended leaves	20.0%
Organizational delays in on boarding	15.2%
Metric other than AARC being applied	9.6%
Budget targets	4.8%
Benchmarking targets	4.8%
Staff turnover/resignations	4.0%
Hiring freezes	0.8%

4. 20% of the surveyed hospitals were using external consultants in setting FTE targets. In those using consultants, 50% of those institutions ascribed short staffing to poor metrics, administrative targets, hiring freezes, or budget-related causes. This compares to only 24% attribution of short staffing to the aforementioned causes in hospitals not using consultants. These data would indicate that administrative targets are reasons identified for being short staffed to a much greater degree than facilities in which consultants are not employed.



5. The primary metrics being applied were the AARC Time Standards in 29%. Metrics used in determining productivity targets ranked as follows:

AARC RVUs	28.0%
Total Procedures	23.2%
Other	19.2%
Billable Procedures	16.8%
Total Patient Days	4.8%
Inpatient Days	4.0%
Vent Hours/Days	3.2%
Outpatient Procedures	0.8%

6. Filtered analysis indicated, for centers that employ consultants, that the AARC URM time standards were utilized only 21% of the time. The use of AARC time standards in facilities that do not utilize consultant was appreciably greater (32%).
7. It is apparent that, for those that report they are chronically understaffed, there is a greater usage of patient-driven vs. procedure-driven metrics
8. Over 90% of departments reported a flex staffing model in place; however, it appears that the reasons for being short staffed remain unchanged, flex staff model or not.
9. Nearly 30% of Directors felt that, at some point, there were patient safety issues that resulted from applying data from external consultants that affected the ability to maintain required numbers of staff.
10. In situations where understaffing exists, there were a number of quality care issues identified. The most significant issues were delayed treatments, missed treatments, and delays beyond CMS guidelines. These issues ranked as follows (note: there were 393 responses from 125 respondents):

Medication Delay	74.4%
Missed Medication	66.4%
Concurrent Treatment	45.6%
Significant Delay (> CMS 60-Minute Rule)	41.6%
Other	20.8%
Decreased Compliance with Hand washing	15.2%
Patient Experienced Distress	12.0%
Delays in Response	11.2%
Delay in Testing	10.4%



11. Data indicated that the ideal assignment could not always be facilitated during the busy season, as identified in the previous questions. During the busy season, actual ventilator assignments were 1-2 ventilators greater than the staffing plan indicated. Actual ventilator ratios were identified as follows:

3 Patients	4.8%
4 Patients	28.8%
5 Patients	30.4%
6 Patients	16.8%
7 Patients	5.6%
8 Patients	6.4%
More than 8	7.2%



CSRC Safe Staffing Standards

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12. AARC and University Health System Consortium's (UHC) Respiratory Care Network White Paper: Safe initiation and management of mechanical ventilation, downloadable from <https://www.aarc.org/resources/professional-documents/whitepapers/safe-initiationand-management-of-mechanical-ventilation/>

Interactive Annotated Bibliography Related to the Provision of Staff Staffing

The Advisory Board Company. An under supported nurse workforce (essay) website URL: <https://www.advisory.com/Members/Request-Access?item=%2fresearch%2fnursing-executivecenter%2fstudies%2f2004%2fbenchmarking-unit-support-services%2fessay-an-undersupportednurse-workforce&user=advisory%5cAnonymous&site=website&iPath=%2fresearch%2fnursingexecutive-center%2fstudies%2f2004%2fbenchmarking-unit-support-services%2fessay-anundersupported-nurse-workforce>

The restricted content at this website mentions that, while California is the only state to have enacted nurse-to-patient ratio legislation to date, legislative activity elsewhere in the U.S. suggests that other states may soon enter the fray. The Massachusetts Nurses' Association has been lobbying for such ratios since 1995, and a national mandatory nurse-ratios bill has been introduced in the U.S. Congress.

AARC Clinical Practice Guidelines. Long-term invasive mechanical ventilation in the home. **Respir Care** 2007; 52:1056-62, retrieved from <http://www.rcjournal.com/cpgs/pdf/08.07.1056.pdf> on May 1st, 2016.

This document is one of a host of Guidelines created by the American Association for Respiratory Care(AARC), the national voluntary professional organization for respiratory care practitioners (RCPs). It is a detailed, authoritative, comprehensive, and highly granular description of the approach to patients managed with long-term ventilation in the home.

AARC Patient Safety Roundtable. RT-Driven Monitoring Cuts Rapid Response Team Calls by Half. Retrieved from <http://www.aarc.org/rt-driven-monitoring-cuts-rapid-response-team-callsby-half/>

In this web-log ("blog") entry, the implementation of instrumentation which furnished continuous, real-time readouts of patients' oxygen saturation and end-tidal carbon dioxide tension was shown to drastically reduce the incidence of emergent calls to the Rapid Response Team at White Memorial Medical Center in Los Angeles, California. The monitoring is



managed entirely by the Respiratory Care Department at White Memorial, under the leadership of Richard Kenny, RRT, the Director of Respiratory Care Services.

American Association for Respiratory Care. Position Statement: pre-hospital ventilator management competency. 2014, retrieved from http://c.aarc.org/resources/position_statements/documents/prehospital.pdf on May 1st, 2016.

This AARC Position Statement was revised in July of 2014. It formally recommends that personnel who apply mechanical ventilation to patients prior to the arrival of those patients in the hospital receive competency training at regular intervals so that they can demonstrate their mastery of the requisite skill set.

AARC Uniform Reporting Manual, 5th Edition, Dallas, TX, Daedalus Publishers, 2013.

This resource can be purchased from Daedalus, a wholly-owned subsidiary of the AARC.

It lists the results of time-and-motion studies conducted in over one hundred medical centers throughout the United States, wherein time allocations for various respiratory care procedures were determined, generating supremely reliable statistics (mean, Standard Deviation, etc.) for the full spectrum of services provided by the typical RC department. This Fifth Edition updated materials that had appeared in the previous edition. Specifically, the current edition contains data pertaining to institutions in addition to Acute-Care hospitals, which render this version of the URM especially valuable to those who are interested in the full spectrum of care venues within which RCPs administer care to respiratory patients.

AARC White Paper: Best Practices in Respiratory Care Productivity and Staffing, November 8th, 2012, retrieved from <https://www.aarc.org/resources/professional-documents/whitepapers/productivity-staffing/>

This paper provides guidance and considerations in the application of the AARC Position Statement: "Best Practices in Respiratory Care Productivity and Staffing" adopted by the AARC Board of Directors in July 2012.

AARC and University Healthsystem Consortium's (UHC) Respiratory Care Network White Paper: Safe initiation and management of mechanical ventilation, April, 2016, downloadable from <https://www.aarc.org/resources/professional-documents/whitepapers/safe-initiation-andmanagement-of-mechanical-ventilation/>



This White Paper provides guidance for best practices for the safe initiation and management of mechanical ventilation. It helps define the competency, training, and the interdisciplinary approach necessary for patient safety and improved outcomes.

Barclay's Official California Code of Regulations, Title 22, retrieved from <https://www.google.com/#q=Barclays+Official+California+Code+Of+Regulations+Title+22.+Social+Security+Division+5.+Licensing+And+Certification+Of+Health+Facilities%2C+Home+Health+Agencies%2C+Clinics%2C+And+Referral+Agencies+Chapter+1.+General+Acute+Care+Hospitals+Article+6.+Supplemental+Services> on March 12, 2016.

The pertinent portion, Section 70405(d), of these voluminous regulations reads: "Sufficient respiratory therapists and/or respiratory therapy technicians to provide support for resuscitation and maintenance of the mechanical ventilators in a ratio of 1:4 or fewer on each shift.

Blackwood B, Alderdice F, Burns K, Cardwell C, Lavery G, O'Halloran P. Protocolized versus non-protocolized weaning for reducing the duration of mechanical ventilation in critically ill adult patients. Cochrane systematic review and meta-analysis (abstract) retrieved from <http://www.ncbi.nlm.nih.gov/pubmed/20464747>

Eleven trials that included 1971 patients met the inclusion criteria. The geometric mean of the total duration of mechanical ventilation in the protocolized weaning group was, on average, reduced by 25% compared with the usual care group (N = 10 trials, 95% CI 9% to 39%, P = 0.006); weaning duration was reduced by 78% (N = 6 trials, 95% CI 31% to 93%, P = 0.009); and ICU LOS by 10% (N = 8 trials, 95% CI 2% to 19%, P = 0.02). However, there was significant heterogeneity among studies for total duration of mechanical ventilation (I(2) = 76%, P < 0.01) and weaning duration (I(2) = 97%, P < 0.01), which could not be explained by subgroup analyses based on type of unit or type of approach.

Blackwood B, Alderdice F, Burns K, Cardwell C, Lavery G, O'Halloran P. Use of weaning protocols for reducing duration of mechanical ventilation in critically ill adult patients. Cochrane systematic review and meta-analysis. Retrieved from <http://www.bmj.com/content/342/bmj.c7237> on May 14, 2016.

The authors sought to investigate the effects of weaning protocols on the total duration of mechanical ventilation, mortality, adverse events, quality of life, weaning duration, and length of stay in the intensive care unit and hospital. There was evidence of a reduction in the duration of mechanical ventilation, weaning, and stay in the intensive care unit when standardized weaning protocols were used, but there was significant heterogeneity among the



(eleven) studies, and an insufficient number of studies to investigate the source of this heterogeneity.

Bloom BS. Effects of continuing medical education on improving physician clinical care and patient health: a review of systematic reviews. **Int J Tech Assess Health Care** 2005;21(3):380-385 (abstract) retrieved from <http://journals.cambridge.org/action/displayAbstract?fromPage=online&aid=322735&fileId=S026646230505049X> on May 1st, 2016.

The authors of this paper make a startling statement: “Even though the most effective CME [Continuing Medical Education] techniques have been proven, use of least-effective ones predominate.” The authors provide meta-analyses of peer-reviewed monographs dealing with physician education.

Chatburn RL. Report: Staffing of Respiratory Care Practitioners in the ICU (White Paper dated March 2, 2016) [Staffing of RCPs in the ICU](#)

In this brief (four-page) document, Robert Chatburn, former Director of the Respiratory Care Department at Rainbow Babies’ & Children’s Hospital in Cleveland, Ohio, and an acknowledged authority on the day-to-day operation of a Respiratory Care Department, provides the results of a survey that he conducted. The survey specifically examined “best practices” pertaining to safe staffing ratios for RCPs in ICUs.

Chatburn RL, El-Khatib M, Mireles-Cabodevila E. A taxonomy for mechanical ventilation: 10 fundamental maxims. **Respir Care** 2014; 59(11):1747-1763

This full-text monograph furnishes a standardized taxonomy of terms that enables clinicians to unambiguously describe the parameters that govern the manner by which mechanical breaths are initiated and delivered to patients interfaced to such machines. It succeeds in clarifying the details of ventilator function and abolishing the confusion introduced into this area by a plethora of proprietary terms.

Chatburn RL, Gole S, Schenk P, Hoisington ER, Stoller JK. Respiratory Care work assignments based on work rate instead of workload. **Respir Care** 2011; 56(11): 1785-1790 (abstract) retrieved from <http://rc.rcjournal.com/content/56/11/1785.short>

Studies performed prior to the publication of this paper suggested that basing assignments on average work load led to periods of unachievable work rate, resulting in missed treatments and staff dissatisfaction. Respiratory Care managers have only limited ability to reduce peaks in work rate, but staggering treatment times is effective. Fair assignment of work should differentiate scheduled from unscheduled work.



Cho S-H, Ketefian S, Barkauskas VH, Smith DG. The effects of nurse staffing on adverse events, morbidity, mortality, and medical costs. *Nursing Research* 2003; 52(2): 71-79, retrieved from <http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.541.4680&rep=rep1&type=pdf> on May 14th, 2016.

This report summarizes findings of a study performed in 232 acute-care hospitals in California. It confirms impressive reductions in the incidence of pneumonia observed among patients admitted to medical/surgical and coronary units referable to increases in baseline RN staffing and increases in RN-to-patient ratios triggered by flex staffing during periods of high acuity.

Cox CE, Carson SS, Ely EW, Govert JA, Garrett JM, Brower RG, et al. Effectiveness of medical resident education in mechanical ventilation. *Am J Respir Crit Care Med* 2003;167:32-38 (abstract) retrieved from <http://www.atsjournals.org/doi/abs/10.1164/rccm.200206-624OC#.VyV5oKsm78s> on May 1st, 2016

The authors of this paper contend that senior resident physicians are not being supplied with essential evidence-based elements of the information that they need to provide effective care for mechanically ventilated patients. Those who peruse this paper might be led to think that this monograph describes a dangerous situation, but, to the extent that Intensive Care Unit Teams incorporate RCPs as well as physicians and nurses, the claims of the authors do not necessarily imply the existence of a dangerous situation.

Dasta JF, McLaughlin TP, Mody SH, Piech CT. Daily cost of an intensive care unit day: The contribution of mechanical ventilation. *Crit Care Med* 2005; 33(6): 1266-1271. Retrieved from <http://journals.lww.com/ccmjournals/Pages/toc.aspx?year=2005&issue=06000>

Intensive care unit costs are highest during the first two days of admission, stabilizing at a lower level thereafter. Mechanical ventilation is associated with significantly higher daily costs for patients receiving treatment in the intensive care unit throughout their entire intensive care unit stay. The mean incremental cost of mechanical ventilation in intensive care unit patients was \$1,522 per day. Interventions that result in reduced intensive care unit length of stay and/or duration of mechanical ventilation could lead to substantial reductions in total inpatient cost.

de Brantes F, Rosenthal MB, Painter M. Building a bridge from fragmentation to accountability- The Prometheus Payment Model. *N Engl J Med* 2009; 361:1033-1036. Full-text monograph retrieved from <http://www.nejm.org/doi/full/10.1056/NEJMp0906121>



In the current debate over health care reform, many observers are proposing new delivery structures to move U.S. health care away from fragmentation, poor performance, and dysfunction toward accountability for high-value care. Ideally, these new structures would promote clear accountability for both improving quality and controlling costs and would encourage health care professionals to organize themselves into teams working on behalf of patients. For such structures to be sustainable, however, the payment system must reward professionals for the quality and efficiency of services, rather than the quantity.

Dummit LA. Medicare Physician Fees: The Data Behind the Numbers. Issue Brief Number 838, National Health Policy Forum, July 22, 2010. Retrieved from https://www.nhpf.org/library/issuebriefs/IB838_McarePhysicianFees_07-22-10.pdf

This Issue Brief describes the methodology used by the Center for Medicare and Medicaid Services (CMS) in determining reimbursement schedules for physicians.

Ely EW, Baker AM, Evans GW, Haponik EF. The distribution of costs of care in mechanically ventilated patients with chronic obstructive pulmonary disease. **Crit Care Med** 2000; 28(2): 408-413 (abstract) retrieved from https://www.researchgate.net/publication/12607918_Ely_EW_Baker_AM_Evans_GW_et_al_The_distribution_of_costs_of_care_in_mechanically_ventilated_patients_with_chronic_obstructive_pulmonary_disease_Crit_Care_Med_28_408-413

These researchers found that the costs of ICU and non-ICU respiratory care for patients with COPD are higher than the costs of care for other mechanically ventilated patients. Although the increased cost of bronchodilators and oximetry in these patients may serve as target areas for reductions in respiratory care costs, it may also be true that these modalities of therapy and management are necessary, and need to be used with even greater intensity to achieve better outcomes.

Ford RM. Staffing the Respiratory Care Department: New considerations (editorial). **Respir Care** 2011; 56(11): 1864-1865. Retrieved from <http://rc.rcjournal.com/content/56/11/1864.full.pdf>

The author of this editorial, a recognized authority on RC department staffing, describes the advantages of employing “work rate” as a metric that lends itself to the widespread deployment of computerized electronic medical record (EMR) systems. He persuasively argues that the careful linking of work rate to the EMR can generate staffing levels that are, at the same time, safer for patients and more rewarding for bedside RCPs.



Forsetlund L, Bjørndal A, Rashidian A, Jamtvedt G, O'Brien MA, Wolf FM, et al. Continuing education meetings and workshops: effects on professional practice and health care outcomes (abstract) **Cochrane Database Syst Rev** 2009;2:CD003030, retrieved from <http://www.ncbi.nlm.nih.gov/pubmed/19370580> on May 1st, 2016.

These authors assert that educational meetings (a common activity whereby physicians learn of new developments in their practice), when taken alone, are not likely to be effective in altering complex behaviors. But they go on to claim that certain methodologies, implemented by clinical educators, can substantially improve educational effectiveness. These techniques include auditing, systematic provision of feedback, and focusing on outcomes likely to be perceived as serious.

Goligher EC, Ferguson ND, Kenny LP. Core competency in mechanical ventilation: development of educational objectives using the Delphi technique (abstract) **Crit Care Med** 2012;40(10):2828-2832, retrieved from http://journals.lww.com/ccmjournals/Abstract/2012/10000/Core_competency_in_mechanical_ventilation_.12.aspx on May 1st, 2016.

These researchers sought to identify and standardize the core clinical knowledge required to care for mechanically ventilated patients. They describe a consensus that core competencies among resident physicians requires a broad range of knowledge application and skill.

Grady D, Smith T. Healthcare cost reductions using a daily RVU-based flex staffing system for a Respiratory Care Department (abstract) **Respir Care** 2011; 56(10): 1703 (abstract), retrieved from http://rc.rcjournal.com/site/open_forum/2011_OF.pdf

In this abstract, the authors, who manage a Respiratory Care Department in an 800-bed medical center in North Carolina, document the cost savings that their department achieved by employing Relative Value Units (RVUs) as the metric of choice for staffing their department. The implementation of this strategy elicited far safer staffing levels for RCPs in their institution. In addition, the savings that were realized in salary expenses alone was \$247,953 in one fiscal year. Their methodology was so successful that it was subsequently adopted by other clinical departments (Neurodiagnostic Lab, Pulmonary Rehabilitation, Inpatient Dialysis, and Sleep Disorder Center) in their hospital.

Grady D, Smith T, Collar LA. Comparison of metrics for a Respiratory Care Department in an 800-bed Medical Center (abstract) **Respir Care** 2011; 56(10): 1703. Retrieved from http://rc.rcjournal.com/site/open_forum/2011_OF.pdf



In this abstract, the authors, who are employed by Mission Health System in Asheville, North Carolina, demonstrate how the metrics used by various proprietary consulting companies correlate very poorly with Relative Value Units for: Total Patient Days; Total Inpatient Days;

Average Daily Census; Non-billable Procedures; and Adjusted Discharges per Patient Day, with Correlation Coefficients ranging between 0.002 and 0.61. They recommend that Relative Value

Units (RVUs) be adopted as the exclusive metric by state licensing boards to ensure that staffing levels are adequate for the safe delivery of services.

Jha AK, Orav EJ, Zheng J, Epstein AM. Patients' perception of hospital care in the United States. *N Engl J Med* 2008; 359:1921-1931. Full-text monograph retrieved from <http://www.nejm.org/doi/full/10.1056/NEJMs0804116>

This portrait of patients' experiences in U.S. hospitals offers insights into areas that need improvement, suggests that the same characteristics of hospitals that lead to high nurse-staffing levels may be associated with better experiences for patients, and offers evidence that hospitals can provide both a high quality of clinical care and a good experience for the patient.

Jha AK, Zhonghe Li MA, Orav EJ, Epstein AM. Care in U.S. hospitals- The Hospital Quality Alliance Program. *N Engl J Med* 2005; 353:265-274. Full-text monograph retrieved from <http://www.nejm.org/doi/full/10.1056/NEJMs051249>

Analysis of 2005 data from HCA national reporting system shows that performance varies among hospitals and across indicators. Given this variation and small differences based on hospitals' characteristics, performance reporting will probably need to include numerous clinical conditions from a broad range of hospitals.

Institute for Patient Access. Improving access to respiratory care (White Paper), April, 2016, retrieved from <https://www.google.com/#q=IfPA+Improving+Access-to-Respiratory-Care+April-2016.pdf> on May 14, 2016.

Although treatments for respiratory disorders continue to improve, more people died of COPD in 2011 in the United States than succumbed to diabetes and breast cancer combined. This White Paper concludes that voices of medical providers are crucial in keeping the physician patient relationship at the forefront.

Kacmarek RM. Mechanical ventilation competencies of the respiratory therapist in 2015 and beyond. *Respir Care* 2013;58(6):1087-1092 (full-text [PDF](http://rc.rcjournal.com/content/58/6/1087.full.pdf+html)) <http://rc.rcjournal.com/content/58/6/1087.full.pdf+html>



This author, who is considered by many to be the single foremost spokesman for the respiratory care profession, contends that the competencies of the respiratory therapist specific to mechanical ventilation will markedly increase over the ensuing decade. He further asserts that the entry level of education of the RCP of the future must be set at the baccalaureate level.

Kim MK, Hancock WM. Applications of staffing, scheduling, and budgeting methodologies to hospital ancillary units. *J Med Syst* 1989; 13(1): 37-47 (abstract) retrieved from [http:// www.ncbi.nlm.nih.gov/pubmed/2723559](http://www.ncbi.nlm.nih.gov/pubmed/2723559)

In this study, a computer-aided methodology for integrating the budgeting, staffing, and labor productivity systems of Ancillary Services using Respiratory Therapy as an example is presented. The data needed, staffing computations and schedules, and productivity analysis are presented and discussed. A summary of the predicted savings and other benefits for the application hospital are presented, with comparisons to their then-current productivity systems.

Kollef MH, Micek ST. Using protocols to improve patient outcomes in the intensive care: focus on mechanical ventilation and sepsis. **Semin Respir Crit Care Med** 2010; 31(1):19-30 (abstract) retrieved from <http://www.ncbi.nlm.nih.gov/pubmed/20101544> on May 1st, 2016.

Marin Kollef, who is a widely respected intensivist, opines that protocols that are jointly developed by physicians and RCPs can be uniquely effective in improving outcomes and ensuring safety among mechanically ventilated patients.

Logani S, Green A, Gasperino J. Benefits of high-intensity Intensive Care Unit physician staffing under the Affordable Care Act. Retrieved from [http://www.ncbi.nlm.nih.gov/pmc/articles/ PMC3206504/](http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3206504/)

The Affordable Care Act signed into law by President Obama, with its value-based purchasing program, is designed to link payment to quality processes and outcomes. Treatment of critically ill patients represents nearly 1% of the gross domestic product, and 25% of a typical hospital budget. Data suggest that high-intensity staffing patterns in the intensive care unit (ICU) are associated with cost savings and improved outcomes. This study evaluates the literature investigating the cost effectiveness and clinical outcomes of high-intensity ICU physician staffing as recommended by The Leapfrog Group (a consortium of companies that purchase health care for their employees), and identifies ways to overcome barriers to nationwide implementation of these standards. Hospitals that have implemented the Leapfrog initiative have demonstrated reductions in mortality and length of stay and increased cost savings. High-intensity staffing models appear to be an immediate cost effective way for hospitals to meet the challenges of health care reform.



Mathews PJ, Drumheller L, Carlow JJ. Respiratory care manpower issues. **Crit Care Med** 2006; 34(3Supplement): S32-S45 (abstract) retrieved from https://www.researchgate.net/publication/7300195_Respiratory_care_manpower_issues

In this paper, the authors provide a unified data set of key demographic information obtained from the three professional bodies guiding the development of the respiratory care profession: the American Association for Respiratory Care (AARC); the National Board for Respiratory Care (NBRC); and the Committee on Accreditation of Respiratory Care Education (CoARC). They demonstrate that, although mandatory overtime is a common practice in Respiratory Care Departments, it is not overwhelmingly utilized in comparison to other bedside caregivers (most notably, Registered Nurses).

Metcalf AY, Stoller JK, Fry TD, Haberman M. Patterns and factors associated with respiratory care protocol use. **Respir Care** 2015;60(5):636-643 (abstract) retrieved from <http://rc.rcjournal.com/content/60/5.toc> on May 1st, 2016.

This study extends prior research by clarifying features of hospitals and providers associated with use of respiratory care protocols. The authors claim that validation in future hypothesis testing samples will further advance this knowledge.

McGlynn EA, Asch SM, Adams J, Keeseey J, Hicks J, DeCristofaro A, Kerr EA. The quality of healthcare delivered to adults in the United States. **N Engl J Med** 2003; 348:2635-2645. Full-text monograph retrieved from <http://www.nejm.org/doi/full/10.1056/NEJMsa022615>

The deficits identified in this paper pertaining to adherence to recommended processes for basic care pose serious threats to the health of the American public. Strategies to reduce these deficits in care are warranted. Some of those strategies are described in this paper.

Muse & Associates. Executive Summary: A comparison of Medicare Nursing Home Residents who receive services from a respiratory therapist with those who do not. August, 1999. Available from <https://c.aarc.org/resources/muse/>.

This analysis found that Medicare beneficiaries treated by respiratory therapists had better outcomes and incurred lower costs than those not treated by RCPs. A multivariate analysis and subsequent analyses further showed that these findings were true regardless of age or sex, the presence of comorbidities, or the incidence of stroke.

Needleman J, Buerhaus P, Pankratz VS, Leibson CL, Stevens SR, Harris M. Nurse staffing and inpatient hospital mortality. **N Engl J Med** 2011; 364: 1037-1045. Full-text monograph retrieved from <http://www.nejm.org/doi/full/10.1056/NEJMsa1001025#t=articleTop>



Evidence from an increasing number of studies has shown an association between the level of in-hospital staffing by registered nurses (RNs) and patient mortality, adverse patient outcomes, and other quality measures. Quality measures that are related to nurse staffing have been adopted by the National Quality Forum, the Agency for Healthcare Research and Quality (AHRQ), and the Joint Commission. In this study, the authors examined the association between mortality and day-to-day, shift-to-shift variations in staffing at the unit level in a single institution that has lower-than-expected mortality and high average nurse staffing levels, and has been recognized for high quality by the Dartmouth Atlas, rankings in U.S. News and World Report, and Magnet hospital designation.

Orens DK, Kester L, Konrad DJ, Stoller JK. Changing patterns of inpatient respiratory care services over a decade at the Cleveland Clinic: Challenges posed and proposed responses. *Respir Care* 2005; 50(8): 1033-1039 (abstract) retrieved from <http://rc.rcjournal.com/content/50/8/1033.abstract>

From 1991 to 2001, there were important expansions in the scope of respiratory care practice by the Cleveland Clinic's Section of Respiratory Care, while the volume of respiratory care services delivered per year increased 1.96-fold (from 339,600 to 665,921 services/yr). The number of respiratory therapy consults performed yearly, beginning in 1992 when the service was first implemented, rose to over 10,000/yr by 2001. At the same time, the cost of respiratory therapy services delivered per patient decreased by 4.2%. Regarding staffing trends, the number of full-timeequivalent employees increased by 50% (from 65 to 97.5). However, the percent turnover rate among respiratory therapists decreased by 2.3-fold (from 11.5% to 5%). In the face of these trends, the hospital mortality rate for patients with diagnosis-related group 088 (high users of respiratory care services) decreased by 53%, and the length of hospital stay for all patients receiving respiratory treatments decreased by 30%.

Robertson RH, Hassan H. Staffing intensity, skill mix, and mortality outcomes: The case of chronic obstructive lung disease. *Health Serv Manage Res* 1999; 12(4): 258-268 (abstract) retrieved from <http://hsm.sagepub.com/content/12/4/258.abstract>

The authors serve as educators at the highly-regarded School of Allied Health Professions, University of Alabama at Birmingham, Birmingham, AL. They were able to document that, during the 1989-1991 time period, hospitals with higher staffing intensities for both respiratory therapists and respiratory therapy technicians had better outcomes for their Medicare inpatients being treated for COPD.



Ross KL, Dewan N, Bloomfield HE, Grill J, Schult TM, Nelson DB, Kumari S, Thomas M, Geist LJ, Beaner C, Caldwell M, Niewohner DE. Disease management program for chronic obstructive pulmonary disease: A randomized controlled trial.

Am J Respir Crit Care Med 2010; 187(7): 890-896 (abstract), retrieved from <http://www.ncbi.nlm.nih.gov/pubmed/20075385?dopt=Abstract> on May 14, 2016.

These investigators implemented a straightforward disease management program at five Veterans Administration medical centers, enrolling 743 COPD patients over a one-year period.

They observed a reduced rate of hospitalizations for cardiac/pulmonary conditions other than COPD (by 49%), hospitalizations for all causes (by 28%), and Emergency Department visits for all causes (by 27%). The P-value for each of these reductions was < 0.05.

Schwenzer KJ, Wang L. Assessing moral distress in respiratory care practitioners. **Crit Care Med** 2006; 34(12): 2967-2973 (abstract) retrieved from <http://www.ncbi.nlm.nih.gov/pubmed/17075370>

The authors created a factor analysis yielding a five-factor structure. Several questions in the "not in patient's best interest" category scored the highest moral distress, including disagreements with surrogate decision makers and providing futile care. Higher scores were also found with questions regarding the perception of unsafe staffing and passively or actively participating in deception. None of the demographic variables predicted career dissatisfaction or job turnover. However, the perception of unsafe staffing was found to be a significant factor in predicting career dissatisfaction and job turnover.

Seiler B: More Lives Saved with 24/7 Intensivist Staffing and Other Enhancements in Medical ICU (Press Release), retrieved from <http://umm.edu/news-and-events/news-releases/2010/morelivesaved-with-24-7-intensivist-staffing-and-other-enhancements-in-medical-icu>

This press release documents that an increase in coverage (by physicians, pharmacists and RCPs) of the University of Maryland's Medical Intensive Care Unit elicited a rise in survival and enabled patients to be weaned from ventilator support earlier than had previously been observed.

Thalman JJ, Ford RM. Labor and productivity measures. **Respir Care Clin N Amer** 2004; 10(2): 211-221 (abstract) retrieved from <http://www.ncbi.nlm.nih.gov/pubmed/15177246>



Respiratory Care Department directors are now becoming experts in staffing models that are unique to services provided through allied health professionals. The basic human resource management tenets of “attract”, “retain”, and “motivate” remain at the core of management focus. However, time standards, volumes, staffing variables, and flexible budgets are the current twists added to the litany of labor management terms. Optimizing resource consumption and

establishing measurable patient outcomes to justify staff use will also be part of the manager's challenges related to health care delivery in the twenty-first century.

Zimmerman B. Michigan nurses link patient deaths to understaffing in new survey (press release) retrieved from <http://www.beckershospitalreview.com/quality/michigan-nurses-link-patient-deaths-to-understaffing-in-new-survey-6-things-to-know.html> dated March 25th, 2016.

Over twenty percent of Michigan nurses reported knowledge of a patient dying as a consequence of understaffing, according to a survey conducted in March, 2016 by the Anderson Robbins Research firm of Boston, Massachusetts and commissioned by the Michigan Nurses' Association.