Appendix 1:
An Annotated Bibliography pertaining to Safe Staffing of Respiratory Care Practitioners

The Advisory Board Company. An undersupported nurse workforce (essay) website URL: https://www.advisory.com/Members/Request-Access?item=%2fresearch%2fnursing-executive-center%2fstudies%2f2004%2fbenchmarking-unit-support-services%2fessay-an-undersupported-nurse-workforce&user=advisory%5cAnonymous&site=website&iPath=%2fresearch%2fnursing-executive-center%2fstudies%2f2004%2fbenchmarking-unit-support-services%2fessay-an-undersupported-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-calls-by-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 gamut 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-and-management-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+RegulationsTitle+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 nonprotocolized 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 don 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/ccmjournal/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 one and 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/ccmjournal/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/NEJMsa0804116

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/NEJMsa051249

Analysis of 2005 data from HQA 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

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 (abstract0 retrieved from 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/

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, Keesey 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 then 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-time-equivalent 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/more-livessaved-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.