# Report: Staffing of Respiratory Care Practitioners in the ICU

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## Purpose

Determine the best practices regarding staffing ratios for respiratory care practitioners (RCPs) in Intensive Care Units (ICUs)

## Method

Internet search from 2000 to present, plus solicitation of personal contacts in RCP network.

## Results

### Scientific Studies

Although there are a number of nursing studies showing the relations between staffing levels and patient outcomes, there are only two published studies reporting data regarding staffing of RCPs in ICUs.1 Mathews et al conducted an electronic survey of the respiratory care community with the goal of identifying the ratio of RCPs to critical care units and beds. The authors estimate the survey response at about 51 (5% of the potential population). Survey questions are shown in Table 1.

Table 1. Respiratory care critical care manpower survey questions.



For the distribution of responses to survey question 1, “How many total critical care beds are in your facility?” the range of ICU beds across all respondents was 3 to 126 and the true mean lies between 33 and 53 beds 95% of the time.

Figure 1 illustrates the distribution of responses to survey question 2, “How many critical care units are in your facility?” For question 2, the mean lies between 3 and 5 units about 95% of the time. The arithmetic mean is 4 critical care units, with a range of 1–13 units. Clearly, this distribution is heavily biased by the existence of several large teaching hospitals with a large number of critical care units.

Figure 1. Distribution of critical care units.



Distribution of responses to survey question 3, “**How many RCPs on staff are assigned to critical care units**?” are shown in Figure 2. However, the authors thought that some or all respondents may have interpreted the question to mean, “What is the total number of therapists who could be assigned to or were designated as critical care therapists?” rather than our intended, “How many therapists are assigned to critical care units on a given day?” They adjusted the data and the arithmetic mean becomes **4.0**, and the upper and lower 95% mean values still remain in the 3.0–6.5 range.

Figure 2. Distribution of RCPs assigned to critical care units.



Responses to survey question 4, “How many respiratory care practitioners would you like to be assigned to critical units?” shows that all of the critical care units would like to have at least one RCP. Removing an outlier response and recalculating yields a mean of 5.4. Estimates of the lower and upper 95% mean ranges then fall in the 3.0–8.0 range.

The mean ratio of beds to critical care units was 14:1 for large hospitals, 15:1 for medium-size hospitals, and nearly 10:1 for small hospitals.

The authors suggest their data indicate that the **actual** **ICU bed-to-RCP** **staffing ratio** is **10.8:1** whereas the **preferred** staffing ratio is **9.4:1**. These staffing ratios are “… relevant to all hospitals sizes…”.

The authors also said “… there may be a staff-to-bed ratio that is relevant to all hospitals sizes and have further suggested that increases in ICU bed numbers can be used to predict staffing-increase requirements. Our data indicate that **for each increase of 11 beds** (11.3 actually), **1.0 additional RCPs is needed** to cover ICU respiratory care requirements.”

In the Conclusions, the authors note that: “Currently (2006), many hospitals are retracting the skilled respiratory therapist caregivers from the acute care floors and concentrating these manpower resources in the critical care units and emergency departments (empirical data).”

In a report of organizational changes related to staffing in a single ICU, Parker et al2 reported that pre-intervention, the 10 bed ICU at the University of Maryland Medical center was staffed at a RCP:bed ratio of between 1:14 and 1:19. After the intervention, a new 29 bed ICU was staffed at a ratio **no less than 1:10**.

### Position Statements

The American Association for Respiratory Care (AARC) position statement on Best Practices in Respiratory Care Productivity and Staffing was revised in 2015. While not presenting any specific recommendations for staffing levels, the statement did specify that “Any metric, model, or system that is used to define respiratory staffing levels within institutions should recognize and account for all the activities required of a Respiratory Care Department in that institution.” Furthermore, it states that “**Use of unweighted metrics of workload may lead to the determination of inaccurate staffing requirements**.” By “unweighted” they mean simply counting billable procedures and not accounting for differences in time required to perform different procedures (ie, time-weighted). This position is significant because **the Cleveland Clinic currently uses unweighted metrics of workload (Action OI)**. The position statement also suggests that respiratory care resources can be justified “…value outcomes, inclusive of indicators of quality cost reductions, customer satisfaction, penalty reduction, decrease readmissions, and other metrics…”. The statement concludes with these words: “Understaffing Respiratory Care services places patients at risk for unsafe incidents, missed treatments, and delays in medication delivery, as well as increases the liability of risk for the facilities. Patient harm directly related to inadequate staffing must be reported to the appropriate state and federal regulatory agencies.”

### Laws

There are not many laws or regulations that specify staffing ratios for RCPs. California is a rare exception and Title 22 states that “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 (RCP:ventilator)** or fewer on each shift”[[1]](#footnote-1)

### Benchmarking

The AARC Uniform Reporting Manual (URM)[[2]](#footnote-2) is considered the gold standard for RC staffing. Many State Licensing Boards as well as the Joint Commission make reference to the AARC URM as a mechanism to use to insure adequate staffing. Many consulting and benchmarking firms also use the AARC URM, and most RC departments who state they have time-weighted productivity metrics employ the AARC URM.

The AARC hosts a productivity benchmarking website[[3]](#footnote-3) from which data can be mined regarding staffing levels. However, there are no data regarding specifically ICU bed:RCP ratios. Ventilator:RCP staffing ratios are reported. Unfortunately, there are no tools for directly exporting or mining the data that are not actually included in your hospital’s compare group. And data are only reported in that group for members who have entered data for the query period. (Although laborious, it would be possible to collect data by hand from the hospital profiles). Nevertheless, a small sample of urban hospitals characterized as being either academic or university affiliated shows a wide range of ventilator:RCP ratios (Figure 3). These data suggest that the median (50th percentile) is **6 ventilators per RCP** and **80% of the time the ratio is ≤ 8:1**(comparable to the above mentioned California law).

Figure 3. Percentile plot for Ventilator :RCP staffing ratios from the AARC benchmarking database (2014).



## Conclusions

There are neither official AARC Guidelines nor benchmark data suggesting appropriate staffing levels in hospital ICUs. Sparse scientific data suggest that the standard of care is approximately 10 beds per RCP or approximately 6 ventilators per RCP, regardless of hospital size.

More importantly, thinking about staffing as a simple average bed:RCP ratio, or even a ventilator:RCP ratio is a gross oversimplification because it assumes a static demand:supply situation. This leads to a continual situation of either over- or under-staffing, resulting in either inefficiency or poor staff morale/reduced patient care standards. Worse, management never knows which situation is in effect at any particular time, nor to what degree, making effective and timely remedial action impossible.

As suggested by the AARC position statement, staffing levels must be based on time-weighted metrics. Furthermore, they must be based not on average workload but on dynamic work rate metrics.3 Such methods allow for staffing plans associated with probability statements concerning the likelihood of inappropriate levels.

## References

1. Mathews P, Drumheller L, Carlow JJ. Respiratory care manpower issues. Crit Care Med 2006;34(3 Suppl):S32-45.

2. Parker AM, Liu X, Harris AD, Shanholtz CB, Smith RL, Hess DR, et al. Respiratory therapy organizational changes are associated with increased respiratory care utilization. Respir Care 2013;58(3):438-449.

3. Chatburn RL, Gole S, Schenk P, Hoisington ER, Stoller JK. Respiratory care work assignment based on work rate instead of work load. Respir Care 2011;56(11):1785-1790.

1. Barclays Official California Code Of RegulationsTitle 22. Social Security Division 5. Licensing And Certification Of Health Facilities, Home Health Agencies, Clinics, And Referral Agencies Chapter 1. General Acute Care Hospitals Article 6. Supplemental Services. [↑](#footnote-ref-1)
2. AARC 2004 Uniform Reporting Manual, American Association for Respiratory Care , Irving TX [↑](#footnote-ref-2)
3. <https://www.respiratorybenchmarking.org/index.aspx> [↑](#footnote-ref-3)