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California Respiratory Care Workforce Study

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EXECUTIVE SUMMARY

This report summarizes the findings from a multifaceted research study of California's respiratory care workforce. The principal objective of the study was to discover the *perceptions and opinions* of key stakeholders on a range of critical respiratory care workforce issues. Study components included key informant interviews, a statewide survey of directors of respiratory care services, and a series of focus groups currently employed respiratory therapists. We also conducted a review of academic literature and completed comparative analyses of respiratory therapy education competencies and curricular content.

The broad research issues included the preparedness of new graduate respiratory therapists (RT) to enter the workforce, supervised clinical experiences in respiratory therapy education, minimum degree requirements for entry into professional practice, utilization of RT-driven protocols, and continuing education requirements for RTs. Three additional objectives were: 1) to describe curricular content differences between baccalaureate-level and associate degree-level RT education programs; 2) to describe differences in the stated competencies and minimum curricular content requirements between entry-level RT education programs and physician assistant, physical therapy, nurse practitioner, and baccalaureate registered nursing education programs; 3) to conduct a search of academic literature to identify scholarly work that addresses the relationship between the type of degree earned by respiratory therapists and patient outcomes. The study was conducted over the course of 18 months between July 2015 and December 2016.

Directors of respiratory therapy education programs identified critical thinking as the single most important competency area that should receive greater emphasis in entry-level respiratory therapy education. It underpins every facet of professional practice, including effective communication, the ability to evaluate clinical literature and evidence-based practice, comparing therapies in terms of both cost and therapeutic effectiveness, but most of all clinical reasoning. Many of the education directors noted that employers consistently provide feedback that students' diagnostic skills are "*not where they should be.*" RTs that participated in the focus groups reported new graduates' diagnostic and clinical reasoning skills are underdeveloped, describing new graduates as having conceptual knowledge of tests, procedures, equipment and modes of therapy, but being unable to connect what they have learned with the patient they need to treat.

Evidence-based medicine plays an increasingly critical role in the clinical practice of respiratory therapy. Only 42 percent of surveyed RC directors reported they believe that new graduates are prepared to incorporate evidence-based medicine into their clinical decision-making. Education directors reported that evidence-based medicine is woven into all aspects of the curriculum, however, it was acknowledged that there is substantial variation in the extent to which students are exposed to evidence-based practice during their supervised clinical experiences. RTs that participated in the focus groups underscored this point; they cited the importance of students having the opportunity to complete rotations at clinical sites that have a highly engaged respiratory care department, with a progressive view of the RT scope of practice, and where therapists consistently reference the evidence base in their clinical practice.

There is a lack of consistency in the organization of respiratory therapy students' supervised clinical experiences. When asked to choose a scenario that best describes how supervision of students' clinical training is organized at their facility, 48 percent of surveyed RC directors reported that RT students "train with any available staff therapist." With few exceptions, education directors also reported that program faculty had limited contact with students in the clinical setting and confirmed that the most common arrangement was for students to train with any available staff therapist, acknowledging that there is an element of randomness to the student/preceptor relationship. Nearly 60 percent of surveyed RC directors indicated that inconsistency in the clinical preceptor/student relationship negatively affects the quality of instruction. Education directors emphasized that learning outcomes were better at clinical sites where student precepting is a job requirement, while granting that

they cannot limit clinical placements to such sites, or require that staff RTs who precept their students complete formal preceptor training.

Education directors also cited competition for access to clinical placements as a major challenge to providing quality clinical instruction. Increasingly, there are multiple education programs competing for access to the same facilities. Many programs must rely on placements in sites where students are less likely to experience the full range of clinical pathology, procedures, and equipment used in respiratory care. Inconsistency in the quality of clinical experiences was an issue also raised by RTs who participated in the focus groups. They noted the variability in the number of clinical hours required by different programs and emphasized that too many students rotate through clinical sites that fail to expose them to the full range of clinical experience. Many of the RTs felt that respiratory care, as a profession, would benefit from a greater standardization of the clinical education students receive.

Although there was support among participants for maintaining the current standard of requiring an associate degree for entry into professional practice, overall, there was stronger support for shifting respiratory therapy education to the baccalaureate degree level. RC directors felt strongly that moving respiratory therapy education to the bachelor's level would raise the field's professional standing and help create career opportunities. RTs in the focus groups saw value in the additional didactic and clinical training, believing it would produce therapists who are clinicians as opposed to technicians. Focus group participants also cited the need for RTs to keep pace with the general trend toward higher degrees in health professions education. Education program directors expressed the belief that shifting to the bachelor's degree would allow more in-depth coverage of topics that are highly compressed in the current curriculum due to time constraints, and that it would likely increase students' exposure to clinical procedures. However, the most important factor driving support among education directors was the expectation that a bachelor's degree program would further encourage the development of critical thinking and clinical reasoning.

Results from the survey of RC directors suggest that the use of therapist-driven protocols is widespread. Approximately 75 percent of respondents reported that their facility utilizes at least one therapist-driven protocol.¹ However, there was wide variation in the extent to which facilities reported having different types of protocols in place (e.g. only 20 percent of hospitals reported having a COPD protocol, compared to 67 percent of hospitals that reported having a weaning protocol). This finding was underscored by RTs in the focus groups, with approximately two-thirds of participants reporting that they used protocols at their facility, but with many indicating it was just one or two protocols. The survey of RC directors showed that the frequency with which protocols are applied to their intended patient population is generally consistent: If the facility has the protocol in place, a majority of RC directors reported that it is applied to more than 75 percent of patients for whom the protocol is intended. The perception that medical directors and medical executive committees supported the use of therapist-driven protocols was widely held by RC directors.

Granting RTs the authority to prescribe therapy and medication per protocol² is a complex subject. The idea was overwhelmingly endorsed by study participants, however, they also expressed conflicting views about whether such authority would require RTs to develop additional competencies and how best to ensure those competencies would be attained. Some supported the idea that prescriptive authority should be conditioned on additional degree-based education while others felt that it could be regulated through additional certification. Others held the view that competency could simply be demonstrated on the job and validated by a medical director. A key distinction among

¹ Defined as the "initiation or modification of a patient care plan following a pre-determined structured set of physician orders, instructions, or interventions in which the therapist is allowed to initiate, discontinue, refine, transition, or restart therapy as dictated by the patient's medical condition."

² Defined as "the ability of a respiratory therapist to evaluate and treat patients per protocol, independent of an initial physician order."

the views held by currently employed RTs was that some framed the value of having the authority to evaluate and treat patients per protocol around efficiency of care, while others regarded it as an opportunity to define a more advanced practitioner with a distinct scope of practice that is separately licensed or credentialed. Physician resistance, as well as issues related to insurance and liability, were identified as potential obstacles to establishing RT's authority to evaluate and treat per protocol.

In general, surveyed RC directors and RTs in the focus groups felt that in-person continuing education experiences provided greater value by comparison with online experiences, with RTs citing the value derived from a greater level of interaction with an instructor and the opportunity to network with peers. However, the idea of limiting the number of units that can be completed online or restricting content to specific providers as a means of quality control was contested. RTs emphasized the convenience value of online continuing education and some expressed confusion regarding whether or not such restrictions already exist in the sections of California's Business and Professions Code regulating continuing education for respiratory care. There was strong support among all study participants for the idea of establishing core continuing education courses that all therapists complete, regardless of their clinical practice area. More than 70 percent of RC directors felt that *patient education, patient-centered care, and current approaches to non-invasive ventilation* would make good candidates for required core content.

Many focus group RTs expressed concern about the future of respiratory therapy's position in the healthcare system, citing the influence of facilities' desire to drive down costs through increased utilization of RNs and other health professionals to deliver respiratory care. RTs called for a greater focus on how specialization within respiratory therapy can be promoted as an opportunity for advancement and incentivize investment in additional education and training. There was broad agreement on the need to empower the profession, to develop a stronger professional identity, and to build a stronger advocacy network for professional issues. RTs identified staffing acuity as an important issue, noting that the number of patients they care for has increased dramatically and that there are no clear guidelines around patient safety as relates to RT patient load. Finally, RTs cited the "*flood of new graduates*" entering the field as contributing to a very challenging labor market in terms of opportunity for regular employment and having a negative impact on the profession for "*diluting the quality of the workforce.*" This perception of an oversupply of new graduate therapists was shared by many education directors, who cited the proliferation of RT education programs as a critical workforce issue.

The findings presented in this report identify several critical challenges in both respiratory therapy education and professional practice. The quality of RT students' clinical training lacks consistency due to programs' reliance on non-faculty members to supervise clinical training and facilities that may not expose students to the full scope of respiratory care practice; education program directors cited competition from other RT programs as an exacerbating factor. Currently employed RTs and RT education directors identified critical thinking and its role in diagnostic reasoning as the most important competency needing greater emphasis in respiratory therapy education. Education directors felt this need could be addressed through additional exposure to problem-based learning, but acknowledged that an already compressed curriculum would be a limiting factor.

There is widespread support for moving respiratory therapy education to the baccalaureate degree level, however, education directors identified several concerns, including the administrative demands such a transition would entail. Almost all of the study participants endorsed granting RTs the authority to prescribe and treat per therapist-driven protocol. However, there were conflicting views about the practical steps that will need to be taken in order to establish this authority, and concerns were raised about how it might meet with resistance from other stakeholders. Finally, employed RTs noted the proliferation of RT education programs and resulting increase in the number of graduates as having a deleterious effect on new graduate employment opportunities (a view that was shared by several education program directors).

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OVERVIEW

This report summarizes the findings from a multifaceted research study of California’s respiratory care workforce. The principal objective of the study was to discover the *perceptions and opinions* of key stakeholders on a range of critical respiratory care workforce issues. Study components included key informant interviews, a statewide survey of directors of respiratory care services, and a series of focus groups currently employed respiratory therapists. We also conducted a review of academic literature and completed comparative analyses of respiratory therapy education competencies and curricular content.

The broad research issues included the preparedness of new graduate respiratory therapists (RT) to enter the workforce, supervised clinical experiences in respiratory therapy education, minimum degree requirements for entry into professional practice, utilization of RT-driven protocols, and continuing education requirements for RTs. Three additional objectives were: 1) to describe curricular content differences between baccalaureate-level and associate degree-level RT education programs; 2) to describe differences in the stated competencies and minimum curricular content requirements between entry-level RT education programs and physician assistant, physical therapy, nurse practitioner, and baccalaureate registered nursing education programs; 3) to conduct a search of academic literature to identify scholarly work that addresses the relationship between the type of degree earned by respiratory therapists and patient outcomes. The study was conducted over the course of 18 months between July 2015 and December 2016.

The study included the following components:

- Key informant interviews with directors of respiratory care services
- A statewide survey of directors of respiratory care services
- Key informant interviews with directors of respiratory therapy education programs
- Focus groups held with currently employed respiratory therapists
- Comparative analyses of respiratory therapy education in terms of competencies and curricular content
- A review of academic literature

The principal objective of the study was to discover the perceptions and opinions of key stakeholder groups on a range of critical respiratory care workforce issues through the key informant interviews, the statewide survey, and the series of focus groups. The broad research topics engaged through these activities included the preparedness of new graduate respiratory therapists (RT) to enter the workforce, supervised clinical experiences in respiratory therapy education, minimum degree requirements for entry in professional practice, utilization of respiratory therapist-driven protocols, and continuing education requirements for RTs.

Three additional and related objectives were to: 1) describe curricular content differences between baccalaureate-level and associate degree-level respiratory therapy education programs; 2) describe differences in the stated competencies and minimum curricular content requirements between entry-level respiratory therapy education programs and baccalaureate registered nursing, physician assistant, physical therapy, and nurse practitioner education programs; 3) conduct a search of academic literature to identify scholarly work that addresses the relationship between the type of degree earned by respiratory therapists and patient outcomes.³ The study was conducted over the course of 18 months between July 2015 and December 2016.

³ The full summary of findings from the literature review are attached as Appendix A.

METHODS

Key informant interviews with directors of respiratory care services

The UCSF study team used a membership database maintained by the California Society for Respiratory Care (CSRC) to identify RC directors who were potential candidates for key informant interviews. The database was filtered to select for records indicating the member's primary job responsibility as *director-manager* or *director-technical*; information describing the regional affiliation of these selected records was used to sort potential interview candidates by geographic region. This list was sent to members of the study's expert advisory group who made recommendations regarding potential interviewees, taking into account the goal of having variation in facility characteristics, care settings, and geography.

Ten key informant interviews with RC directors were completed over a two-month period spanning September and October of 2015. Each interview was conducted by phone and lasted approximately 60 minutes. Interviewees were provided a copy of the interview questions in advance. Audio recordings were made for each interview and the recordings were transcribed.

Survey of directors of respiratory care services

The survey instrument was designed to validate findings from the key informant interviews with RC directors, described above. The instrument was developed through a collaborative process involving the UCSF study team and the research study's expert advisory group. The instrument included a mix of structured (dichotomous, multiple-choice, and scaled) and unstructured items, consisting of 49 questions in total. Respondents were provided an opportunity to share any additional thoughts they had about the respiratory care profession in California or to elaborate on any of their responses to questions in the survey through an open-ended comments section at the end of the survey. These comments are included in the report as Appendix D; the survey instrument is included as Appendix F.

Multiple tactics were employed to develop the survey's frame of potential respondents. The UCSF study team examined annual financial data reports for hospitals and long term care facilities made available by the California Office of Statewide Health Planning and Development (OSHPD) to identify sites that maintain and staff their own respiratory care services. These facilities were contacted with a request to provide contact information for the RC director. In addition, the study team used software-based tools to search professional networking sites (e.g. LinkedIn) to find contact information for individuals identified as RC directors and managers. This information was used to connect individuals to hospitals and long-term care facilities previously identified in the OSHPD data as maintaining their own respiratory care departments.

Similarly, annual OSHPD utilization data for home health care agencies were used to select sites that reported having contracted for respiratory care services. These agencies were contacted with a request to provide information about the respiratory care services provider and, in turn, those providers were contacted with requests for contact information for the RC director. In addition, the study team utilized searchable databases to identify companies providing home respiratory services (e.g. respiratory therapy agencies and DME oxygen providers). A sample of these companies was selected and requests for RC director contact information were made.

The study team also utilized the CSRC current membership database, again filtering records to include only those members whose job title was listed as "director" or "manager" (directors of education programs were excluded). In addition, program directors at California's respiratory therapy education programs were contacted and asked to forward a request for contact information for the RC director at each of their program's affiliated clinical sites (the facilities that host their students' supervised clinical experiences). Finally, some contact information for RC directors was provided by the American Association for Respiratory Care, derived from its membership database.

In combination, these different approaches yielded verified contact information for 253 RC directors in California, covering hospital, long-term care, home care, and other outpatient settings. Invitations to participate in the survey were emailed to these RC directors. The email included a link to the online version of the survey, as well as a fillable-PDF form that could be completed by the respondent and returned to UCSF via email or fax. RC directors were contacted with follow-up emails and phone calls to encourage participation. The California Society for Respiratory Care also sent multiple invitations to participate through an email to its membership, which included a link to the online survey.

The survey was open to participant responses for two months in May and June of 2016. The survey elicited 110 unique responses, representing 165 different facilities.⁴ Thirty-three respondents reported information for multiple facilities. A typical example of a multiple facility response was an RC director at a general acute care hospital reporting information for an associated outpatient clinic, rehabilitation facility, or long-term care facility. Characteristics of the facilities represented by survey respondents are described in Appendix E.

Key informant interviews with directors of respiratory therapy education programs

A list of respiratory therapy education programs was sorted by geographic region and by financial control (i.e. public, nonprofit versus private, for-profit). The study's expert advisory group then made recommendations regarding potential interviewees, taking into account the following goals:

- Interviewing program directors from all geographic regions of the state
- Ensuring that both public and private for-profit programs were represented
- Ensuring that at least one bachelor's degree program was represented

Ten key informant interviews with respiratory therapy education program directors were completed over a two-month period spanning July and August of 2016. Each interview was conducted by phone and lasted approximately 60 minutes. Interviewees were provided a copy of the interview questions in advance. Audio recordings were made for each interview and the recordings were transcribed.

Focus groups with currently employed respiratory therapists

Multiple tactics were used to recruit currently employed RTs who work in non-director/non-managerial roles for a series of focus groups. The CSRC membership database was again utilized. Records were filtered to exclude members whose job title was listed as *director-manager* or *director-technical*, or which indicated they worked in an educational institution. The database of hospital, long term care, and home health care RC directors that was developed for the statewide survey (described above) was also used to recruit focus group participants. RC directors at these facilities were contacted and asked to forward an invitation to RTs on staff at their facilities. In addition, respiratory therapy education program directors were contacted and asked to forward an invitation to participate in the focus groups to facilities that provide clinical placements for students in their programs (and to RTs affiliated with their program faculty who maintain a clinical practice). Finally, Service Employees International Union (SEIU) United Healthcare Workers agreed to forward an invitation to participate to union members who work as RTs.

Forty currently employed RTs representing a range of care delivery settings and clinical practitioner roles, from all geographic regions of the state, whose professional experience ranged from as few as two years to as many as 30 years, participated in a series of ten focus group sessions over a span of four months between September and December, 2016. Two of these sessions were conducted in person (one at the UCSF Mission Bay campus, one at the

⁴ At a minimum, respondents had to provide information about their education and professional experience to be considered a valid survey response and included in the analysis.

Sacramento City College campus); the other eight sessions were conducted by telephone. The two in-person sessions lasted approximately 90 minutes; the eight telephone-based sessions lasted approximately 60 minutes. To encourage participation, RTs were compensated in the form of a \$75 pre-paid VISA card. In the interest of efficiency and to help ensure a productive session, participants in the telephone-based sessions were provided a copy of the interview questions in advance; participants in the in-person sessions were not.

PROFILE OF RESEARCH STUDY PARTICIPANTS

This section of the report provides a description of the participants in each of the research study's components: key informant interviews with directors of respiratory care services; key informant interviews with directors of respiratory therapy education programs; focus groups with currently employed respiratory therapists; and the statewide survey of directors of respiratory care services.

Directors of respiratory care services who participated in key informant interviews

The ten RC directors who participated in the key informant interviews represented facilities located across the state, including the Bay Area, Los Angeles, San Diego, the Central Valley, Greater Sacramento, and the Shasta/Cascades region. The facility types included academic medical centers providing care to patients with the highest level of acuity; a multi-site home care provider; rural and semi-rural regional medical centers; a small, rural community hospital; a pulmonary rehabilitation center; a pulmonary function laboratory, and a large, urban, pediatric hospital.

The RC directors reported a range of 20 to 40 years of experience in the field of respiratory care, with 2 to 20 years of experience at the director level. Their professional experience included a range of care delivery settings: outpatient chronic care management (including home-based care); pediatric, neonatal, and adult intensive care; emergency care; pulmonary rehabilitation; pulmonary function testing; sleep disorders; and sub-acute care. All of the RC directors interviewed completed their respiratory therapy education at the associate degree level. Almost all of them had gone on to earn a bachelor's degree in either business administration or health sciences. Two of the RC directors hold a master's degree in healthcare administration. All directors interviewed hold the registered respiratory therapist (RRT) credential.

Findings from the key informant interviews with RC directors formed the basis of the statewide survey of RC directors. The survey questionnaire was designed to validate the information provided by RC directors who were interviewed. In other words, there is considerable overlap in the findings of the key informant interviews and the statewide survey. For this reason, the narrative of this report utilizes the results of the statewide RC director survey as opposed to the findings from the RC director key informant interviews. A summary of the findings from the key informant interviews with RC directors is provided as an appendix to this report (Appendix B).

Directors of respiratory therapy education programs who participated in key informant interviews

The ten education directors who participated in the key informant interviews represented respiratory therapy programs located across the state, including the Bay Area, Central Valley, and Inland Empire regions; Los Angeles and Orange counties; and the greater San Diego and Sacramento areas. These programs included public, private nonprofit, and private, for-profit sponsoring institutions, and included both an entry-level baccalaureate degree program and one of the California community colleges that is participating in the state's pilot program to offer a degree advancement baccalaureate program.

The education directors reported a range of 10 to 40 years of experience in the field of respiratory care. Their collective work experience covered all of the major care settings (inpatient, outpatient, home, long-term care) and clinical practice areas: critical care (adult, neonatal and pediatric); emergency care; patient transport; rehabilitation care; sub-acute care; and pulmonary function and sleep disorders laboratories. They reported a range of 3 to 30 years of experience as a program director. Several of the education directors continue to practice clinically as RTs. All of the education directors interviewed held, at minimum, a master's degree; one director held a medical degree (MD); several directors held doctoral degrees (PhD). The fields of degree included education (adult education, educational administration), healthcare administration, business administration, and health sciences.

Respiratory therapists who participated in focus groups

The 40 RTs who participated in the focus groups represented facilities located throughout the state, including the Shasta/Cascades, Bay Area, Central Valley, and Inland Empire regions; Los Angeles and Orange counties; and the greater San Diego and Sacramento areas. They represented a range of facility types including academic medical centers, community hospitals, pediatric hospitals, outpatient clinics, sleep disorders laboratories, and skilled nursing facilities. They reported a range of 2 to 30 years of experience in the field of respiratory care across a range of care delivery settings: pediatric, neonatal, and adult intensive care; emergency care; home health care; outpatient care, including pulmonary rehabilitation; sub-acute care and long-term care; a sleep disorders laboratory; and a pulmonary rehabilitation clinic. Approximately three-quarters of the participants held an associate degree in respiratory therapy while the other 25 percent had gone on to complete a post-licensure (degree advancement) baccalaureate program in respiratory therapy.

Directors of respiratory care services who participated in the statewide survey

Table 1 shows that, although survey directors of respiratory care services who participated in the statewide survey represent the most common settings in which RT are employed, the most frequently reported setting was, by far, a general acute care hospital.⁵ The four “other setting” responses were a cardiac hospital, a patient transportation services company, a NICU satellite, and a family birth center.

Table 1. RC director survey: Employment settings represented by survey respondents

Employment setting	
General Acute Care Hospital	94
Pediatric Hospital	18
Outpatient Clinic	13
Rehabilitation Facility	11
Home Health Care	7
Long-term Care/Skilled Nursing Facility	7
Psychiatric Hospital	6
Subacute Care Hospital	3
Other setting	4

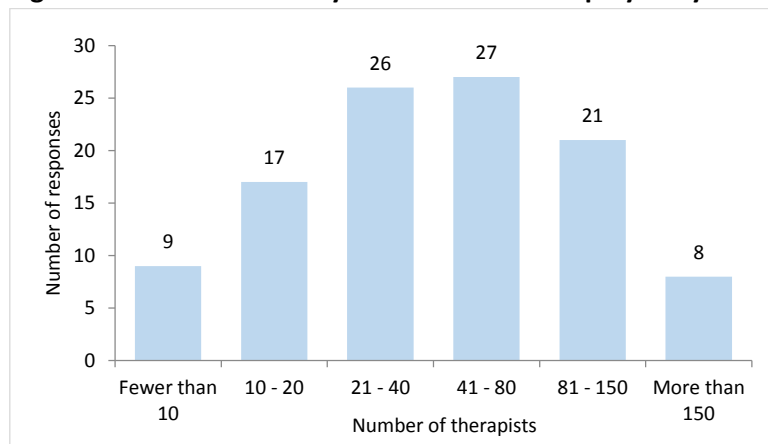
Below, Table 2 shows the different departments and service lines for which survey respondents reported having administrative responsibilities as director of respiratory care services. Eighteen different departmental areas or service lines were identified, indicating RC directors’ wide-ranging scope of work.

⁵ Directors could report more than one type of employment setting, even if reporting for only a single facility.

Table 2. RC director survey: Directors' administrative responsibilities, by department or service line

Type of degree earned		
Pulmonary function laboratory	65	61.9
Blood gas laboratory	62	59.0
MICU	58	55.2
Bronchoscopy	53	50.5
SICU	40	38.1
NICU	38	36.2
CCU	32	30.5
Pulmonary rehabilitation	27	25.7
CTICU	23	21.9
Adult inpatient subacute	20	19.0
Sleep disorders laboratory	20	19.0
PICU	17	16.2
Cardiodiagnostics	17	16.2
Outpatient clinic	14	13.3
Neurodiagnostics	13	12.4
Pediatric inpatient subacute	12	11.4
Home care services	10	9.5
Unique responses	105	--

Figure 1 shows that survey participants reported an average staff size of 55 RTs; the median number of staff RTs was 42, indicating that survey respondents skewed toward larger facilities (over half of the respondents reported that their facilities employ more than 40 staff RTs). The range of staff size extended from as few as 4 RTs to 235 RTs.

Figure 1. RC director survey: Number of RTs employed by facility

108 total responses

Table 3 describes the different clinical care settings in which survey respondents reported respiratory care experience. More than 90 percent indicated having worked in critical care, and nearly 90 percent reported having a clinical background in emergency care. Comparatively, few RC directors indicated having professional experience in sleep disorders, home health care, outpatient care, or research.

Table 3. RC director survey: Directors' clinical experience in respiratory care, by care setting

Type of degree earned		
Critical care	103	93.6
Emergency care	98	89.1
Neonatal/pediatric critical care	86	78.2
Neonatal/pediatric emergency care	68	61.8
Inpatient subacute care	64	58.2
Pulmonary function laboratory	50	45.5
Patient transport	48	43.6
Education	47	42.7
Pulmonary rehabilitation	38	34.5
Long-term care	35	31.8
Sleep disorders laboratory	23	20.9
Home health care	23	20.9
Outpatient clinic	18	16.4
Research	11	10.0
Unique responses	110	--

Table 4 describes general characteristics of RC directors who participated in the survey. The average age of respondents was 53; over half (53 percent) were between the ages of 51 and 65 years old, and the age range of respondents extended from 27 to 70 years old. Survey participants reported an average of 27 years of experience in respiratory care and the range extended from just a single year to 46 years of experience; over 70 percent of respondents reported having at least 20 years of professional experience in respiratory care. Participants reported an average of 13 years of experience in their role as director of respiratory care services and the range extended from just a single year to 43 years of experience; only 20 percent of respondents reported having more than 20 years of experience in a director role.

Only 18 percent of survey participants reported employment in healthcare prior to entering the respiratory care profession. Nearly all respondents reported that their initial respiratory therapy education took place at either the associate degree (69 percent) or a diploma program level (25 percent). Forty percent of survey participants have not earned any additional degrees; among those that have completed additional degree programs, 56 percent reported it was in a field outside of respiratory therapy (either a bachelor's or master's degree), and nearly all indicated it was related to business administration or healthcare administration. Eighty-six percent of survey respondents reported possession of the registered respiratory therapist⁶ (RRT) credential⁷, 85 percent reported membership in the American Association for Respiratory Care (AARC), and 70 percent reported membership in the California Society for Respiratory Care (CSRC).⁸ Finally, 29 percent of survey respondents reported plans to either retire, or leave the profession of respiratory care for other reasons, within the next five years.

⁶ The RRT is an examination-based national credential awarded by the National Board of Respiratory Care (NBRC) and considered an advanced practice credential in comparison to the Certified Respiratory Therapist (CRT) credential.

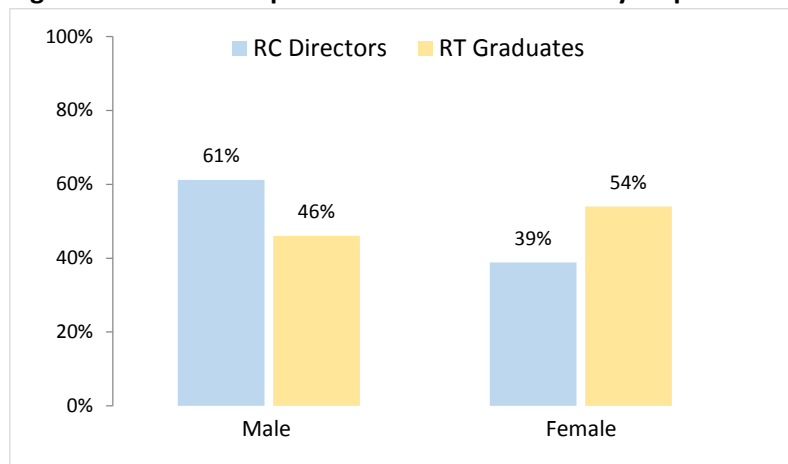
⁷ Survey respondents were far less likely to report other national, examination-based credentials awarded by either the NBRC or another organization: 20 percent reported that possess the neonatal/pediatric specialty (NPS) credential; 15 percent reported that they are certified pulmonary function technologists (CPFT); 10 percent reported that they are registered pulmonary function technologists (RPFT); and less than 5 percent of respondents reported that they are a certified asthma educator (AE-C), or possess the adult critical care specialty (ACCS) credential

⁸ Survey respondents were also much less likely to claim membership in professional societies other than the AARC or CSRC. Less than five percent of respondents reported membership in any of the following organizations: California Thoracic Society

Table 4. RC director survey: Selected characteristics of survey respondents

Description		
Average age of RC directors	53	106
Average number of years of experience in respiratory care	27	106
Average number of years of experience as director of respiratory care services	13	106
Share of respondents employed in healthcare prior to entering respiratory care	18%	110
Share of respondents whose initial RT education was associate degree program	69%	108
Share of respondents whose initial RT education was diploma program	25%	108
Share of respondents that have <i>not</i> earned additional degree beyond initial RT education	40%	108
Share of respondents that possess the RRT credential	86%	101
Share of respondents that are AARC members	85%	101
Share of respondents that are CSRC members	76%	101
Share of respondents planning to retire or leave profession in next 5 years	28%	101

Figures 2 and 3 compare the gender composition and the racial and ethnic composition of survey respondents with 2015 graduates of California's respiratory therapy (RT) education programs.⁹ Figure 2 shows that the share of responding RC directors who identified as female was substantially smaller by comparison with recent graduates of California's RT education programs. Figure 3 demonstrates that RC directors represented by the survey data are much less diverse by comparison with recent graduates of the state's RT education programs.¹⁰

Figure 2. Gender composition of RC director survey respondents vs. 2015 graduates of RT programs in CA

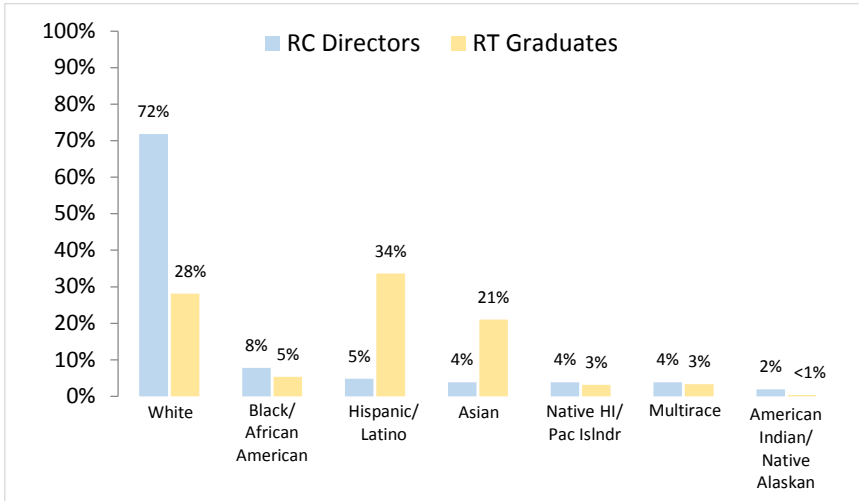
106 total RC director survey responses

(CTS); National Board of Respiratory Care (NBRC); American Lung Association (ALA); American Thoracic Society (ATS); American College of Chest Physicians (ACCP); or the Society of Critical Care Medicine (SCCM).

⁹ Source of data describing graduates is the 2015 Integrated Postsecondary Education Data System (IPEDS) Completions Survey. In 2015, respiratory therapy education programs in California reported 1,260 total graduates.

¹⁰ Unknown race/ethnicity is not shown in Figure 3. In the RC director survey, 2% of all respondents did not report race/ethnicity; in the 2015 IPEDS data, students' race/ethnicity is unknown for approximately 5% of total number of graduates.

Figure 3. Racial & ethnic composition of RC director survey respondents vs. 2015 graduates of RT programs in CA



106 total director survey responses

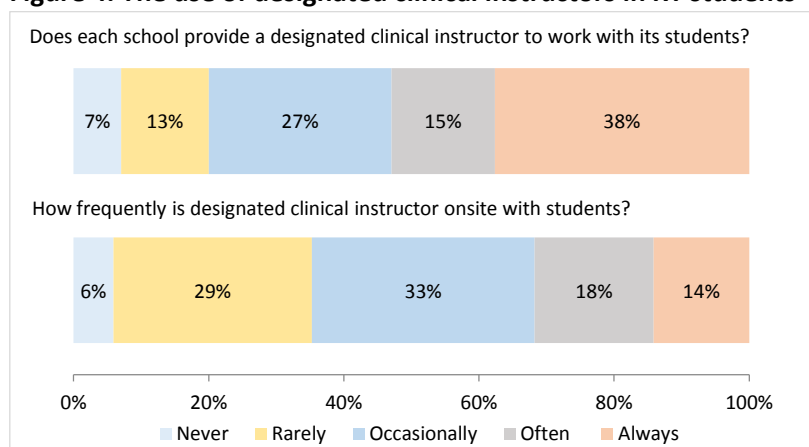
FINDINGS

Organization of clinical training in respiratory therapy education

All stakeholder groups (RC directors, education directors, and currently employed RTs) identified the organization of respiratory therapy students' clinical education as a critical issue. One of the principal challenges is how students are supervised during their clinical experiences. Several RC directors who participated in the key informant interviews commented that the model of clinical supervision today is very different compared with the experience of RTs who trained a generation ago. In the past, students worked closely with a designated clinical instructor (CI) from their program, mostly as a group—a version of what undergraduate medical students still experience. Nearly all of the ten RC directors interviewed reported that, although each school assigns a CI to work with its students during their clinical rotations, these instructors are very rarely onsite. Directors remarked that the CI typically shows up every few weeks to check in with the students, but does not usually provide clinical instruction.

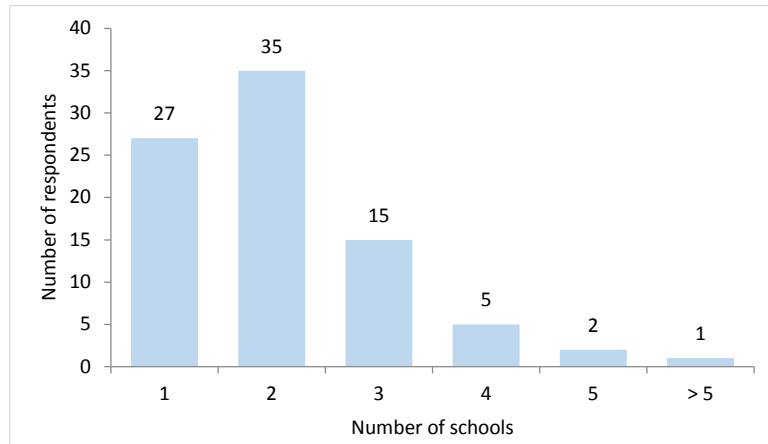
In the RC director survey, 80 percent of the 110 respondents indicated that their facility has a formal agreement with a respiratory therapy education program to provide clinical training to students. Figure 4 shows that just over half (53 percent) of these directors reported that the schools "always" (38 percent) or "often" (15 percent) provide a designated clinical instructor (CI) to work with their students; nearly half of these directors indicated that affiliated schools provide a designated CI no more frequently than "occasionally." However, Figure 4 also shows that these designated CIs do not spend a lot of time onsite with the students. Approximately one-third of directors reported that designated CIs are "rarely" or "never" onsite, while another third indicated that designated CIs are only "occasionally" onsite.

Figure 4. The use of designated clinical instructors in RT students' clinical training

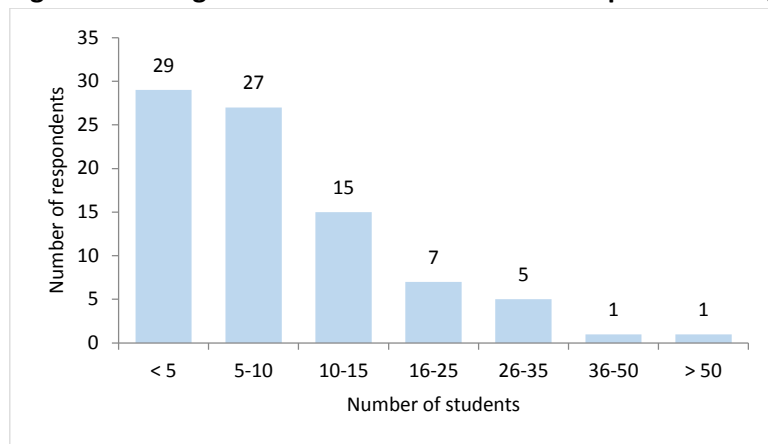


85 total responses

Below, Figures 5 and 6 describe the number of RT programs that facilities provide clinical placements for and the number of students trained per semester. Figure 5 shows that nearly three-quarters of RC director survey respondents whose facilities serve as clinical affiliates for RT programs reported that they train students from just one or two schools. Figure 6 shows that two-thirds of these RC directors reported that they train, on average, fewer than ten students per semester.

Figure 5. Number of RT programs per clinical affiliate

85 total responses

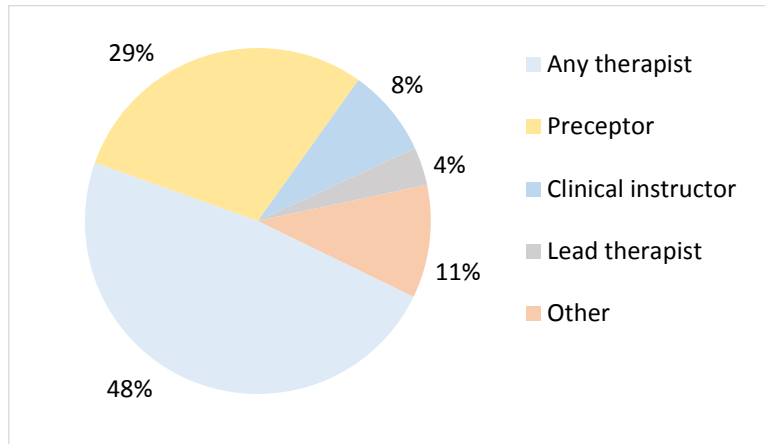
Figure 6. Average number of RT students trained per semester, per clinical affiliate

85 total responses

Surveyed RC directors were asked to choose a scenario that best describes how supervision of students' clinical education is organized at their facilities. The response options were as follows:

- Students train with a clinical instructor provided by the school
- Students train with staff therapists who are formally designated preceptors
- Students train with staff considered to be the lead therapist
- Students train with any available staff therapist
- Some other type of arrangement

Figure 7 underscores the view expressed by RC directors that schools' designated clinical instructors are not often the ones responsible for training students during their clinical rotations. Only 8 percent of directors indicated that it was the scenario that best describes how clinical education is organized at their facility. Approximately 30 percent of directors indicated that students train with formally designated preceptors. However, nearly half of all directors reported that students simply train with any available staff therapist.

Figure 7. Structure of supervision in RT clinical training, by type of supervisor

85 total responses

These survey findings were corroborated by the interviews with education directors. With only two exceptions (out of ten interviews), education directors described scenarios in which program faculty had limited contact with students in the clinical setting. It ranged from as infrequently as “a few hours with the student several times throughout the semester” to as much as 3 hours per week per student. Typically, program faculty are not directly supervising students’ clinical training; that role is filled by staff RTs at the affiliated site. Several education directors reported that their programs employ hospital staff therapists to serve as dedicated preceptors for their students (in some cases this is to comply with the clinical site’s policy). However, the most frequently reported description of how supervision of students’ clinical experience is organized was students train with the staff therapist to which they are assigned. All of these education directors acknowledged that there is an element of randomness to the student/preceptor relationship.

The number of affiliated sites each education program utilizes to provide clinical training for its students ranged from as few as 9 to as many as 26, and these sites can be spread out over a considerable distance geographically. In addition, programs can typically place only one or two students at each location. In practical terms, it is not possible for program faculty to have constant contact with students during their rotations, and limited resources preclude employing staff at all affiliated sites to function as dedicated preceptors. One education director remarked that the amount of contact students have with program faculty is site-dependent; some sites are highly organized and supportive of students during their clinical experiences while other sites are less organized with fewer resources to dedicate to students. As a general rule, program faculty members spend more time at sites that offer a less supportive environment for students.

Several of the education directors described the role of program faculty as encompassing both education and public relations. The time they are able to spend at the different clinical sites is focused on observing students and evaluating their competence as they perform procedures, but also making sure there are not any potential issues – clinical or personnel-related – that need to be addressed. Their time onsite is also spent building and maintaining relationships with the site administration and the staff RTs who provide training. One education director emphasized the critical nature of managing these relationships, noting that students’ exposure to alternative settings or professional practice roles may be dependent on a single person who is an expert COPD educator, for example, or a pulmonary rehabilitation specialist, or someone who does home care. If that relationship is not maintained, students may lose access to that clinical experience. Education program directors also noted that affiliated sites have no obligation to provide clinical access to their students and that the staff RTs who function as preceptors are almost never compensated for the extra responsibility. Additionally, it is uncommon for them to

have their workload reduced. As one director put it, *“it’s very important for us to connect with the staff and see what we can do to support them.”*

Compensation for clinical training

Findings from the survey of RC directors corroborate the issue of RT staff not being compensated for the added responsibility of training students. Less than one-quarter of the 85 RC directors at facilities that train respiratory therapy students reported some kind of compensation structure for staff therapists who provide clinical instruction. Approximately half of these RC directors reported that the compensation was structured as bonus pay (an addition to the therapist’s base pay). The dollar amount reported ranged from additional 50 cents to one dollar per hour. Two RC directors reported the bonus was structured as a percentage of the therapist’s base wage (6% in one case), while another indicated that additional pay was structured as a dollar amount per hour of instruction. Several RC directors noted that compensation for precepting students was determined by a collective bargaining agreement. The remaining RC directors who reported any kind of compensation structure for staff RTs providing clinical instruction indicated they were paid by the school, and only worked as preceptors on days they were not otherwise scheduled to work at the facility.

Evaluation of procedural competence

Education directors described a common approach to evaluating students’ competence with clinical procedures; students demonstrate competence with a procedure first in a laboratory setting and then a second time in a live clinical setting. Programs typically use some version of an evaluation form for the purpose of documentation; two programs reported using a software database called *DataArc* to capture relevant information. Performance in the clinical setting is documented by either a staff therapist/preceptor or by a clinical faculty instructor. In some cases, directors reported that documentation by both is required.

However, there were exceptions to this approach. One education director reported that students’ competence is evaluated in a laboratory setting, stating, *“We used to do the assessment in the clinical setting for it to be authentic, but consistency became an issue. So now we do the final assessment in the laboratory where each student is evaluated in exactly the same way.”* This director went on to note that the program expects each student to have demonstrated (and documented) competence in the clinical setting five times for each procedure before the final assessment is done in a controlled laboratory environment. A second education director also reported that evaluation of clinical competence takes place in the program’s laboratory, using high fidelity mannequins. Again, the stated rationale was to ensure that each student is evaluated consistently.

One of the education directors described a series of end-of-semester practical exams (beginning with the end of the second semester) where students are required to demonstrate procedural competency in a controlled setting. If students do not pass the exam, they are not allowed to continue in the program. This practical exam occurs again at the end of the third semester, with the same condition of needing to pass in order to continue in the program. If students do not pass the final practical exam at the end of the program, they do not graduate. The rationale is to ensure a consistent and adequate assessment of students’ competence.

Education programs also differed from one another in terms of who documents a student’s clinical competence. Among the programs that conduct clinical assessment in the laboratory setting, program faculty determines competence. Several other education directors emphasized that even though evaluation occurs in a live clinical setting, only program faculty determines competency, noting that the staff therapists who train their students are not authorized to sign off. One director remarked, *“We can’t hold the staff at our affiliated sites responsible ensuring that our students are clinically competent. That’s our responsibility as a program.”*

However, other programs do allow staff at the affiliated sites to assess and document competence. These education directors acknowledged that it was not ideal. Said one director, *“Our goal is for all of the competency assessments to be done by one of our faculty, but we’ve found that we can’t always make that happen. We can’t always be onsite when an opportunity for the student to perform a procedure comes up. And so we’ve relented and we do allow students to be checked-off by the staff therapist they’re working with.”*

Obtaining feedback on student performance

In addition to procedural competence, all of the education directors reported use of a formal evaluation process to capture information describing student performance in the clinical setting in three principal domains: cognitive, psychomotor, and affective. Typically, these evaluations also provide feedback on a student’s communication skills and professional conduct. However, there were differences among the programs in terms of how frequently students are evaluated and how programs have organized the process of collecting the information.

Several education program directors reported that students in clinical training are evaluated on a daily basis; at the end of each shift, they leave with an evaluation completed by the staff therapist with whom they worked. One of these directors acknowledged that circumstances sometimes prevent students from obtaining the completed evaluation for every shift and the program has instituted a policy where students need to be evaluated for 80 percent of their clinical days. A second director whose program has a daily evaluation requirement noted that the form consists of only five questions; thus, the program relies on additional evaluations conducted by clinical faculty members during onsite visits. These visits entail communications with a student’s preceptor and department manager to get a more in-depth sense of student performance and, at least twice per semester, direct evaluation of the program’s students.

Several programs conduct evaluations on a weekly basis; one director reported that out of the 15 weeks students spend in clinical rotations, they are required to have 10 evaluations completed by a preceptor. Another director reported that it requires one formal evaluation for each rotation. Finally, one of the education directors indicated that the program surveys each clinical affiliate at the end of the semester regarding student performance.

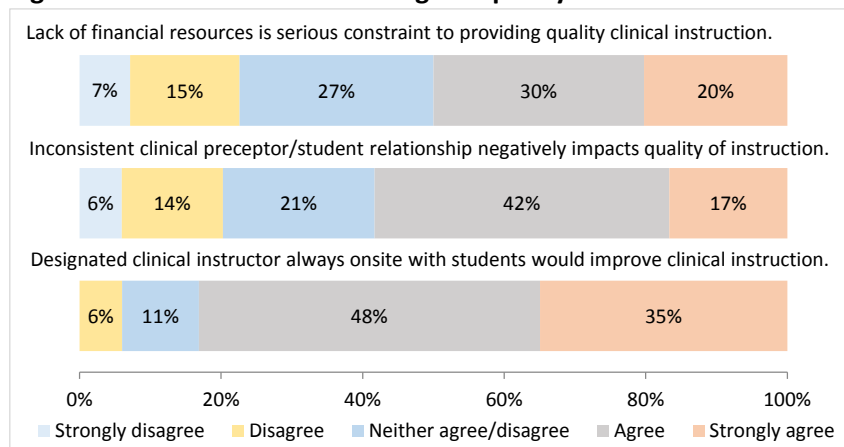
Several education directors who reported using the software tool *DataArc* to document procedural competence also use the tool to record student evaluations, removing the need to have students solicit evaluations from the staff RTs who oversee their clinical training. However, the practice of having students assume responsibility for obtaining and submitting evaluations is common and, among some programs, the student has some power to select which preceptor completes the evaluation. Education directors acknowledged that this practice raises concerns about the objectivity of the process, with one commenting that staff RTs (preceptors) are often reluctant to provide negative feedback: *“No one wants to feel like they’re the reason a student gets failed, or something like that. So everything’s fine until something really bad happens; that’s when you find out what they really think.”* These education directors emphasized the importance of program faculty spending time onsite and talking with staff preceptors and managers, all in addition to having regular meetings with an advisory board whose members include representatives from their clinical affiliates, in order to ensure that honest feedback regarding student performance is received.

Factors affecting quality of clinical training in respiratory therapy education

The survey of RC directors asked respondents whose facilities serve as clinical training sites for respiratory therapy students to indicate the extent to which they agreed or disagreed with a series of statements regarding factors that affect the quality of clinical instruction. Below, Figure 8 shows that half of all directors “agreed” or “strongly agreed” that a lack of financial resources is a serious constraint to providing quality clinical education. Similarly, 59 percent of directors indicated that inconsistency in the clinical preceptor/student relationship negatively affects the

quality of instruction. There was overwhelming agreement (83 percent of RC directors agreed or strongly agreed) that having a designated clinical instructor who is continually onsite and working with the students would improve clinical education.

Figure 8. Selected factors affecting the quality of clinical instruction



85 total responses

Education directors also emphasized the lack of consistency in the student/preceptor relationship as an important challenge to providing high quality clinical instruction. Several directors noted that, too frequently, a student will be paired with a staff RT who, for any number of reasons, finds the responsibility of training the student to be burdensome. Under those conditions, students are less likely to have an effective learning experience, particularly in comparison with clinical sites where precepting students is part of the RT job description. One education director commented, *“We have much better learning outcomes at hospitals where the therapists are all expected to teach students.”* Another director opined, *“Given how the profession is developing, with the added responsibilities and scope of practice, I think we need to require that therapists in these clinical sites are willing and able to precept a student.”* This same director also expressed support for respiratory therapy students completing a rotation paired with physicians, *“so they really get the critical care intensivist’s perspective of what’s expected of a respiratory care practitioner.”*

Education directors raised other issues related to their program’s reliance on RTs who are not trained faculty to provide students’ clinical training. They emphasized that being an effective therapist does not always translate to being an effective educator. They raised concerns about students being precepted by RTs who do not keep up with current guidelines for standards of care or who don’t practice using evidence-based medicine. One education director commented, *“Our students might be with Jane one day, who does things this way, and the next day they’re with John who does things a different way, and neither way is what we’re teaching our students, neither way is consistent with the current standard of care.”*

Education directors acknowledged that there are still RTs who entered the profession through on-the-job training. One director pointed out that at one of the program’s clinical affiliates, almost all of the RTs who staff the intensive care unit (ICU) are Certified Respiratory Therapists (CRT) who have been *“grandfathered in.”* This means they do not meet the current requirements of California state law that RTs be in possession of an associate degree and the Registered Respiratory Therapist (RRT) credential – a higher standard of clinical knowledge and ability in comparison to the CRT credential. This program has had to make an exception to its requirement that students always train with an RRT when completing an ICU rotation. The education director commented, *“They’re good therapists, but it’s easy to see the difference in the level of critical thinking compared to someone with a higher level of education.”*

Nearly all education directors cited competition for access to clinical placements as a major challenge associated with providing high quality clinical education. As noted above, it is common for programs to place only one or two students per clinical site, which means that programs need many different sites to accommodate all of their students. Increasingly, there are multiple education programs competing for access to the same facilities; as a result, some programs need to rely on placements in sites where students are less likely to experience the full range of clinical pathology, procedures, and equipment used in respiratory care.

At some education programs, students do not rotate through multiple clinical sites, meaning a given student will complete all supervised clinical experience at one site. The reason for this is typically to accommodate a clinical affiliate's preference for minimizing the administrative burden of orienting and training new students. Although this may create certain efficiencies for the facility, it can also be a limiting factor in a student's clinical education. One director acknowledged that not having students rotate through different clinical sites makes it difficult to ensure students are exposed to all of the procedures identified in the NBRC licensing exam matrix, but also suggested that *"even if we could rotate our students, there are still things we know our students won't get exposed to."* This raises concerns about whether there are other education programs whose satellite of affiliated clinical sites fails to expose students to full range of clinical practice.

The variability of clinical training was an issue also raised by RTs who participated in the focus groups. They acknowledged that there is some element of being in the right place at the right time. Said one RT, *"There is a luck-of-the-draw factor, in the sense that one student has a shift where nothing happens, and then another student has a shift with all the codes, all the rapids, all the crazy stuff that comes in the ER. As far as exposure, you never really know what you're going to get."* Many RTs also emphasized the fact that too many new graduates do not get the opportunity to rotate through clinical sites that expose them to the full range of clinical practice. One RT commented, *"In my program, we didn't have access to a NICU rotation."* RTs also noted the inconsistency in the number of clinical hours required by different programs.

Many of the RTs in the focus groups felt that as profession, respiratory care would benefit from a greater standardization of the clinical education students receive in terms of the number of hours spent in different clinical environments, more rigorous oversight of demonstration of procedural competence, and more explicit standards defining the specific clinical interventions that students experience. One therapist remarked, *"The clinical experiences can be really impoverished. There are so many programs now, with all the competition for clinical space you can get shut out of the bigger hospitals, and then you're kind of left out of the loop."*

Finally, a few education directors referred to a lack of leadership as an overarching issue that affects quality clinical education. Departmental leadership within the clinical sites was viewed as contributing to differences in organizational culture that result in inconsistent practice. For example, one facility could employ a progressive approach to the use of therapist-driven protocols while another facility does not utilize them at all; one facility empowers RTs to practice to the fullest extent of their training and scope of practice while at another facility therapists are *"mainly interested in making the minimum effort possible."* These differences in the professional culture have a direct impact on the quality of students' clinical training. Said one director, *"We actually dropped a facility recently because our students' experiences were so dispiriting. The staff RTs who precept our students just didn't care. It's a lack of leadership. It's a culture thing and it starts at the top."*

Preceptor training

One of the critical issues affecting the quality of students' clinical training raised by education directors is the reliance on staff RTs who are not trained faculty, and may not have had formal training as a preceptor. All of the education directors reported that they are willing to provide preceptor training to their clinical affiliates (and most have done so in the past). Several reported having structured the training to make it possible for participants to

earn credit for continuing education. Most education directors indicated they are able to provide preceptor training as needed, depending on staff turnover (and interest) at their program's affiliated sites. One director indicated that her program is planning to develop an online preceptor training to make the process more efficient.

Clinical sites may have their own requirement that RTs who train students must themselves be formally trained as preceptors. However, none of the education directors reported having such a requirement. Many education directors cited the impracticality of their programs instituting such a requirement given the large number of affiliated sites, the variability in who students are paired with on any given day, and the possibility that such a requirement may be perceived as burdensome. Several education directors commented that they have experienced resistance from some of their affiliated sites when they have raised the issue of preceptor training.

Availability of clinical internships

Only four RC directors who responded to the statewide survey reported that their facility has a formal clinical internship, one which is open to students not enrolled in a program that has a formal training agreement with the facility. Another facility has a formal internship limited to the neonatal intensive care unit (NICU); two other facilities described an ad-hoc arrangement where the decision to allow a student access to clinical training was made on a case-by-case basis.

Educational preparation of new graduate respiratory therapists

This section describes the *perceptions and opinions* of RC directors, education program directors, and currently employed RTs on a range of subjects related to the general educational preparation of new graduate therapists. These include critical thinking and clinical reasoning, clinical knowledge and skills development, non-clinical knowledge and skills development, exposure to non-acute care settings, exposure to emerging professional roles, evidence-based practice, therapist-driven protocols, the use of information technology, and the expanded scope of respiratory care practice related to the 2015 passage of California Senate Bill 525.

Critical thinking and clinical reasoning

Education directors identified critical thinking as the single most important competency area that should receive greater emphasis in entry-level respiratory therapy education. It underpins every facet of professional practice, including effective communication, diagnostic reasoning, evaluating clinical literature and evidence-based practice, comparing therapies in terms of both cost and therapeutic effectiveness, and overall confidence in clinical decision-making. Many of the education directors noted that employers consistently provide feedback, indicating students' diagnostic skills are *"not where they should be."*

One education director commented that she teaches a course in advanced assessment and *"about half the course is pulmonary diagnostics, but it needs to be more. We get feedback from employers and they wish our students had better diagnostic skills, particularly what would be considered advanced diagnostics."* Another example of underdeveloped critical thinking cited by education directors was students' knowledge of pharmacology. Several education directors reported that students' understanding of the modes and actions of drugs, their side effects, and how drugs interact with one another is incomplete.

This view of underdeveloped diagnostic and clinical reasoning skills was echoed by RTs who participated in the focus groups. New graduates were seen as having conceptual knowledge of tests, procedures, equipment and modes of therapy, but not always able to apply this knowledge to direct patient care. Focus group RTs gave examples of new graduates struggling to conduct patient assessments and determine whether a particular course of therapy should continue or be modified, as opposed to simply *"tweaking ventilator settings or administering medication simply because that is what has been ordered."* RTs pointed to new graduates lacking confidence in

evaluating lab results or other diagnostic tests that provide new information; they are unsure how to incorporate that information into their view of the patient’s condition.

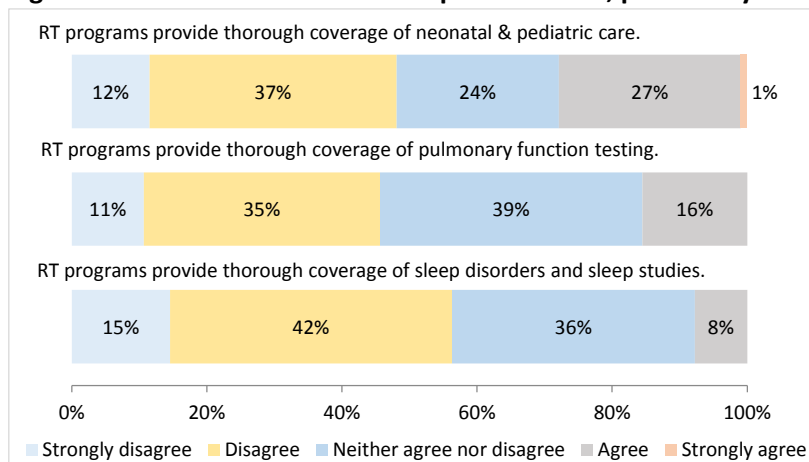
There was a sense among RTs in the focus groups that the lack of critical thinking and clinical reasoning reflected *“too much teaching to the licensing exam in respiratory therapy education.”* One RT who mentors new graduate therapists gave an example of their inability to interpret electrolyte levels: *“They can look at results from an electrolyte panel, and because they’ve memorized what constitutes a normal range, they can identify an imbalance, but they don’t know why an elevated potassium or elevated calcium is important; they don’t know how it should determine the course of care.”* In the view of this RT, new graduates are not being prepared to work in medical centers that serve the highest acuity patients and have the most progressive scope of practice.

One education director suggested that what is missing from students’ training, particularly in the context of critical care, is an experience of the entire continuum of patient care. She noted that students are not often enough involved in either the initial stage or the end stage of care: *“Students typically experience critical care patients during what I would call the ‘middle period’ of care. They’re already on a ventilator, so students are doing a lot monitoring.”* This director felt that students do not get enough experience with initial diagnostic decisions and the development of a care plan, nor with decisions and actions that characterize care transitions. She commented, *“I had a graduate from our last cohort tell me recently that she was working a night shift and had to discontinue a ventilator – she had to extubate a patient – and she said it ‘freaked her out’ because even though it’s something she’d covered in class, she’d never seen it done, let alone done it herself.”* The director suggested that students should be doing an externship in critical care where they are paired with an experienced RT and are exposed to the entire continuum of care.

Clinical knowledge and skills development

The survey of RC directors asked respondents to indicate the extent to which they agreed or disagreed with statements concerning how well education programs cover specific content areas of clinical practice. The results shown in Figure 9 reveal that, overall, directors lean toward the view that education programs do not provide thorough coverage of neonatal and pediatric care, pulmonary function testing, or sleep disorders and sleep studies. Anywhere from 46 percent to 57 percent “disagreed” or “strongly disagreed” with the affirmative statements presented in Figure 9. In addition, although anywhere from 24 percent to 39 percent of directors regarded the statements neutrally – neither agreeing nor disagreeing – directors who felt that education programs are providing thorough coverage of these clinical areas represented a small minority.

Figure 9. RT Education: Neonatal & pediatric care, pulmonary function testing, and sleep disorders



106 total responses

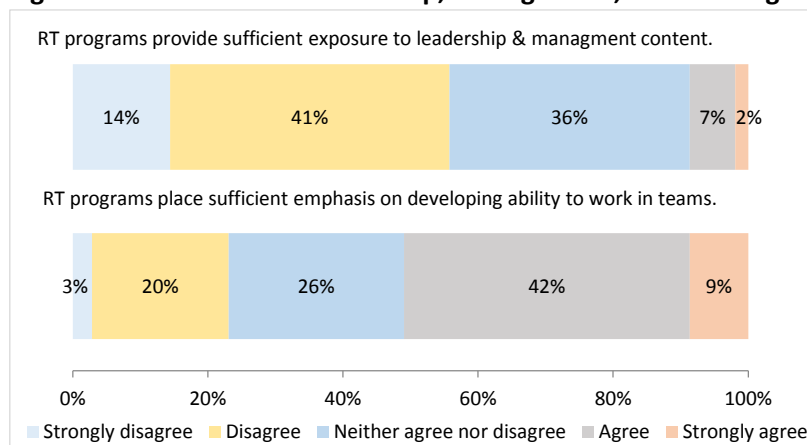
Many of the education directors also identified sleep disorders and advanced pulmonary function diagnostics (metabolic testing and cardiopulmonary exercise testing) as areas that deserve greater emphasis in entry-level education programs. Several education directors also reported that students in their programs have little or no exposure to bronchoscopy procedures. These directors noted that not all students rotate through a clinical site that performs the procedure and, even at sites that do, it can be an issue of timing. One director commented, “A student needs to be onsite at the right time to see it done.” Another director noted, “Hospitals in the region have moved bronchoscopy from the bedside to surgery, so there aren’t many opportunities for students to participate.” Another director cited the expense of a bronchoscope as contributing to students’ lack of exposure to the procedure, stating, “We don’t have a bronchoscope in the program, they’re way too expensive; we don’t have bronchoscopy as a competency.” Other clinical skills or content areas cited by education directors as lacking adequate coverage in the curriculum included:

- Arterial lines and peripherally inserted central catheter (PICC) lines
- Extra Corporeal Membrane Oxygenation (ECMO)
- Conscious sedation
- Advance hemodynamic monitoring
- Transport medicine
- Echocardiograms, EKGs, and stress tests
- Capillary blood gas sampling

Non-clinical knowledge and skills development

Figure 10 shows that more than half of all RC directors who responded to the statewide survey (55 percent) disagreed that the topics of leadership and management are sufficiently covered by education programs. In contrast, 51 percent of directors agreed that education programs are meeting expectations in terms of preparing new graduates to work in teams (approximately one in four RC directors felt that this is a content area needing greater emphasis in education programs.)

Figure 10. RT education: leadership, management, and working in teams



106 total responses

Education directors generally corroborated these results, agreeing that leadership and management could be covered in greater depth in entry-level education. Said one director, “It’s important that students understand the perspective of department leaders and managers, they don’t need an MBA course on the topic, but a solid overview of how and why decisions get made.” Regarding the ability to work in teams, education directors felt that this was an area strongly emphasized in their programs.

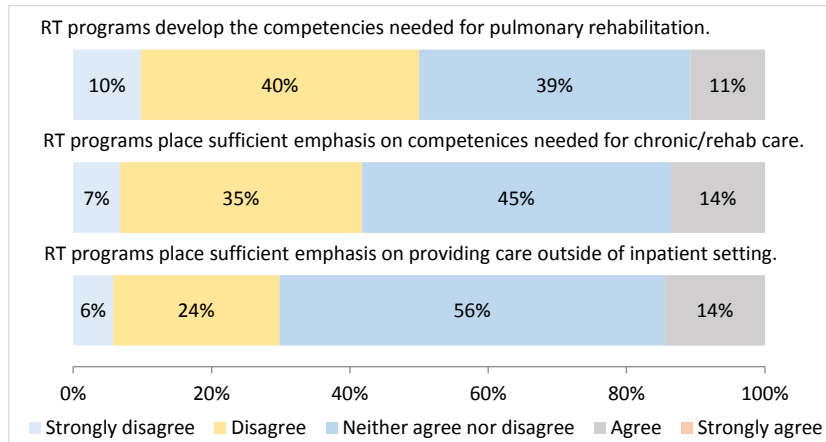
Other non-clinical content areas cited by both education directors and RT focus group participants as deserving greater emphasis in entry-level respiratory therapy education included knowledge of statistics, cultural competence, communication strategies in the context of death and dying, and professionalism. The view of professionalism included not only concepts such as attitude, reliability, respect for colleagues, patients, and the work environment, but also an investment in the profession itself. This includes engagement with leadership on issues of departmental and institutional policy as well as issues that broadly influence the practice of respiratory care. Education directors, although expressing support for greater emphasis on developing skills and knowledge in these areas, also reported concerns about how any additional (or expanded) curricular content could be accommodated given the time and resource constraints programs currently face.

In addition to those cited above, RT focus group participants identified several other non-clinical skills as needing greater emphasis in respiratory therapy education. These included patient-centered care, time management, and professional communication with other healthcare and team-based care delivery. RTs felt that new graduates are focused too much on the technologies and procedures involved in respiratory therapy and often fail to connect with the patients in their care. Some of the younger RTs reported struggling to manage their time effectively and noted that time management, as a discrete skill, was not addressed in their education programs. Finally, RTs emphasized that new graduates lack confidence in their communications with other healthcare providers and it affects their ability to work effectively as part of a team; this was viewed as an issue particularly in clinical settings where there is a high degree of interaction among different healthcare professionals (e.g. the ICU and the emergency department).

Exposure to non-acute care settings

RC directors were surveyed about the extent to which they agreed or disagreed with affirmative statements regarding how well respiratory therapy education programs are preparing new graduates to work in pulmonary rehabilitation, chronic/rehabilitative care generally, or in care settings outside of inpatient, acute care (Figure 11 below). Most striking about directors' responses is the extent to which they expressed neutral views; a plurality (or near plurality) of directors neither agreed nor disagreed with the statements. This is a subject that deserves further exploration, but one possible explanation for directors' neutrality on the importance of preparing new graduates to work in what might be considered alternative settings or roles may be the fact that respiratory therapy is still predominantly practiced in the inpatient, acute care setting. Opportunities to practice in roles and settings outside of this norm are emerging, but the profession is still heavily oriented toward inpatient hospital care.

Among RC directors who did not express neutral views about how well education programs are preparing new graduates for pulmonary rehabilitation, chronic/rehabilitative care, or care delivery in non-acute care settings, many more directors disagreed than agreed with the statements. Half of all directors disagreed that education programs are developing the competencies needed to work as pulmonary rehabilitation therapists, compared to 11 percent who felt they are being developed. More than 40 percent of directors disagreed with the notion that RT programs place sufficient emphasis on developing competencies associated with chronic and rehabilitative care (e.g. effective patient education, or case management), compared to 14 percent who felt they do. Twice as many directors disagreed (30 percent) as agreed (14 percent) with the statement that RT programs place a sufficient emphasis on preparing new graduates to deliver care outside of the inpatient, acute care setting.

Figure 11. RT education: pulmonary rehabilitation, managing chronic care, and alternative settings

106 total responses

Interviews with education directors revealed that, for most programs, exposure to clinical practice outside of the inpatient, acute care setting happens largely through didactic coursework, classroom discussions, or guest lectures. Every program director indicated a belief that it was important to expose students to non-acute care clinical settings, and every director reported that students in their programs have *some* opportunity for direct clinical experience in an alternative setting (though the experience may be elective). However, the extent of exposure to alternative settings varied substantially across the different programs.

For example, one director reported that students “*spend at least one day in the pulmonary function laboratory,*” but otherwise, exposure to care settings outside of the hospital were limited to lectures and readings. In contrast, students in the entry-level bachelor’s program at Loma Linda University (LLU) complete rotations in home care, sub-acute care, post-acute care, long-term care, a pulmonary function laboratory, a pulmonary rehabilitation clinic, a sleep disorders laboratory, and hospice and palliative care. Most education directors indicated that these alternative clinical experiences are brief; it is common for students to spend as few as 16 hours doing home care, or a single shift in a sleep disorders laboratory per semester. In a limited number of cases, these experiences may total as many as 80 – 100 clinical hours.

Several education directors commented on having had rotations in the past that placed students in non-acute care settings that were no longer part of the curriculum due to poor quality or the challenges of coordination and administration. One program director remarked that students used to complete a rotation at a long-term care facility, but it was suspended “*because the level of therapist at the facility was not up to our standard and we felt our students were picking up bad habits more than anything else.*” Some programs relied on a personal relationship with an individual therapist who directs an outpatient laboratory or clinic or home-based care company, and changes in that relationship have led to the program losing its ability to provide the clinical experience.

Focus group RTs cited preventive medicine and chronic care management as areas that are not well covered in entry-level curricula. The need to educate patients and keep them from returning to the hospital was viewed a valuable skill set. One RT suggested that education programs have a responsibility to expose students to non-acute care settings and develop needed competencies, given the realities of the labor market: “*You have to be prepared to enter the workforce in the setting that is going to hire you; in certain markets, the jobs are in sub-acute care, which means you need more training in tracheostomy care, long-term ventilator care, and pulmonary function testing.*”

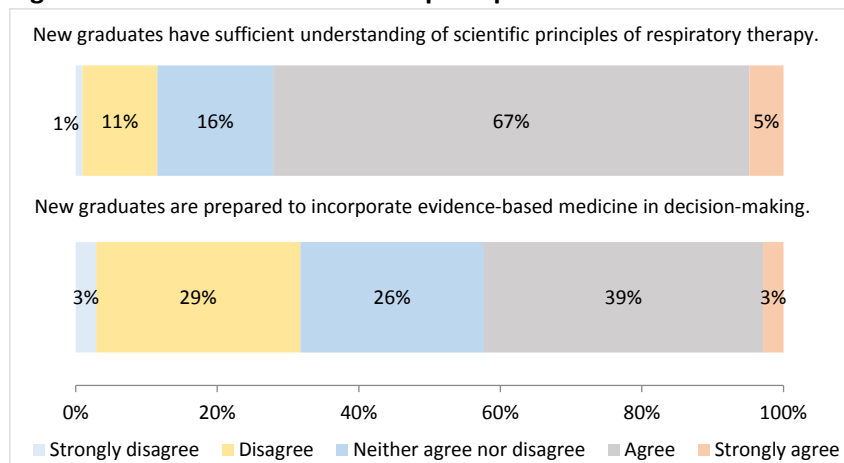
Exposure to emerging professional roles

Exposure to emerging professional roles for respiratory therapists also occurs largely through course readings, class discussions, and guest lectures. Several directors reported that they bring in therapists who work as smoking cessation specialists, asthma educators, or COPD educators to talk with students about the work they do. Students may also encounter therapists working as case managers or clinical educators during their clinical rotations, depending on the site. The director of the baccalaureate program at LLU reported that the curriculum includes a required course in case management, but acknowledged that it is a challenge to find respiratory therapists working as case managers to participate in the course, saying *“I use a different case manager for a guest lecture every week of the course and they’re all registered nurses.”* The overwhelming majority of focus group RTs also expressed the view that programs need to do more to expose students to emerging professional roles, citing pulmonary navigator (COPD, cystic fibrosis), case managers, and discharge planner as examples.

Evidence-based practice

Figure 12 shows that surveyed RC directors reported a high level of agreement with the notion that new RT graduates are coming into the workforce with a sufficient understanding of the scientific principles of respiratory therapy (72 percent agreed or strongly agreed). However, a considerably smaller share of directors (42 percent) agreed that new graduates are prepared to incorporate evidence-based medicine into their clinical decision-making while approximately one-third of directors disagreed with the notion that new graduates are prepared to do so.

Figure 12. RT education: scientific principles and evidence-based medicine



106 total responses

Education directors were asked to describe how evidence-based medicine is incorporated into their program’s curriculum. It is common for students to have a didactic module in their first semester focused on developing a basic understanding of evidence-based medicine. This includes an introduction to clinical literature, how to find journal articles using a database search, and a general framework for conducting research. Once students have had an introduction to the concept, directors reported that evidence-based medicine is woven into coursework throughout the curriculum.

All of the education directors reported that students are required to review journal articles and evaluate clinical research. Students typically present their analyses in a written paper, but several programs described having students present to their peers and, in at least one case, present to the program’s advisory board. All directors emphasized that students are expected to comment on the strength of the evidence that supports their analyses. Several education directors noted that students produce research papers focused on a specific disease or clinical therapy with a focus on how the current literature supports the practice. A few directors reported that after

beginning their clinical training, students are expected to regularly produce case studies based on their experiences and evaluate the cases in the context of current clinical guidelines.

According to all of the education directors, evidence-based medicine plays a major role in students' clinical training; the teaching of clinical practice is based on current guidelines, which are informed by evidence. However, several education directors felt that evidence-based medicine and its role in respiratory care practice deserves to be covered in greater depth and breadth. Said one director, *"I think the students have difficulty translating what they're learning into their clinical practice."* The director remarked that students have reference guides to help them interpret patient information in the laboratory setting; however, when they are working with an experienced therapist in a clinical setting, students *"don't recognize all the assessments that are being made to determine what the appropriate therapy should be, so they don't connect the therapist's decision-making with evidence-based medicine."*

Although evidence-based medicine is incorporated into the curricula of all education programs, the entry-level bachelor's degree program at LLU stands apart from the other associate degree programs by virtue of the extent to which evidence-based medicine is emphasized. Only the LLU program has required coursework in research methods and statistics; additionally, students are expected to engage in primary research with a faculty member and be co-authors on a peer-reviewed journal publication or present findings at a professional conference. In the context of developing students' knowledge of evidence-based practice, an important distinction among education programs is the level of exposure students receive during their supervised clinical experiences. The LLU program has the advantage of being associated with its own academic medical center and healthcare system, as well as being part of an institution that provides graduate-level health professions education including medicine and pharmacy. LLU can ensure RT students experience a diversity of pathology, high acuity patients, a wide range of protocolized therapies, significant interactions with other clinical professionals, and supervision provided by experienced RTs who have trained to precept students. All of these factors contribute to ensure students are exposed to a level of evidence-based clinical practice that may not be available in most other RT programs in the state.

Focus group RTs emphasized the importance of providing students with the opportunity to complete rotations at clinical sites that have a highly engaged respiratory care department, a progressive view of the RCP scope of practice, and where therapists consistently reference the evidence base in their clinical practice. A small number of RTs felt that new graduates coming into the workforce are ready to utilize evidence-based medicine. However, most of the focus group participants expressed the view that, while it is clear that new graduates have been exposed to evidence-based practice in their didactic training, they are not prepared to incorporate it into their clinical decision-making. RTs acknowledged that evidence-based practice is something that is developed over time. However, this underscores the critical nature of a given facility's clinical practice environment. A significant number of focus group RTs reported that evidence-based practice was not reinforced by the culture of their departments; it was incumbent on them to seek out opportunities to stay engaged.

Therapist-driven protocols

As with evidence-based medicine, students are exposed to protocol-based therapy right from the beginning of the program, which is then emphasized throughout the curriculum. All of the program directors reported that students receive extensive preparation in the use of therapist-driven protocols, though there was some variation among programs in terms of the range of protocols covered. Many of the programs use model protocols published by the AARC for students' didactic training. One director reported that protocols from the different affiliated clinical sites are incorporated into the curriculum so that students are already familiar with them when they begin clinical rotations. A common approach to developing students' confidence with protocols is to have them assess patients using case studies and then make determinations about the initiation and modification of protocols.

The director of the bachelor's degree program at LLU noted that students are exposed to a wide range of protocols and are confident in their understanding of evidence-base that supports the protocol. He stated, *"Our students can be put on the spot and be asked for evidence or cite a relevant article to support initiation or modification of a protocol because they've had to do it so often throughout their clinical training."* However, several education directors acknowledged that their students do not get enough exposure to protocol-based therapies during their rotations, having only a few clinical affiliates that utilize only one or two protocols. This directly affects students' preparedness upon entering the workforce. One director commented, *"Only a few of our sites have protocols in place, and even those have just one or two they use. Our students are well-prepared didactically, but they need more repetitions, more experience."*

Informatics/information management

Education directors were asked whether their program's curriculum included any material related to the concept of health information technology *meaningful use* promoted by the Centers for Medicare and Medicaid Services (CMS), which grants incentive payments to eligible professionals and hospitals who can demonstrate outcomes related to the program's objectives.¹¹ Only one of the directors affirmed that her program's curriculum included such content, incorporated through a series of writing exercises where students reflect on their experiences with EHR use in the clinical setting as well as articles and white papers selected by program faculty. Several education directors noted that students may be exposed to EHR *meaningful use* during their clinical rotations, but it was not material covered during their didactic training. A few directors weren't aware of the CMS incentives program.

Expanded scope of practice

Education program directors were asked to describe whether they had made changes to their program curricula to reflect the 2015 amendments to California's Respiratory Care Practice Act outlined in Senate Bill 525, which codified the legal scope of respiratory care practice to include, among other therapies, conscious sedation and extracorporeal membrane oxygenation (ECMO).¹² One director did state that she had developed a lecture on the topic of ECMO. In general, however, education directors reported that *"having discussions"* and *"making students aware"* of the bill's passage was the extent to which expanded scope of practice issues had been incorporated. Directors did note that they revise their curricula on a regular basis, and are aware of the need to engage students on these topics.

With the exception of the baccalaureate program at LLU, directors reported that students have limited exposure, if any, to the types of interventions articulated in Senate Bill 525 during their clinical rotations. In contrast, the program at LLU is actively engaged in training students to the legal extent of respiratory care's scope of practice, including didactic and clinical content. The director noted that his program had recently incorporated lung ultrasound into the curriculum, focusing on point-of-care assessment. He commented, *"I have not found any program in the United States actively pursuing the training of respiratory therapists in the practice of point of care lung ultrasound. When we brought this up to our medical director, his comment was 'You should have started on this 5 years ago.'"*

RC directors: Content areas needing greater emphasis in RT education

RC directors that participated in the statewide survey were asked to identify all content areas they felt should be covered in greater depth by respiratory therapy education programs including clinical and non-clinical skills, alternative settings, emerging professional roles, evidence-based medicine, and other topical content. Table 5 details their responses. Between 70 percent and 80 percent of RC directors identified the interrelated content of

¹¹ <https://www.healthit.gov/providers-professionals/meaningful-use-definition-objectives>

¹² https://leginfo.legislature.ca.gov/faces/billTextClient.xhtml?bill_id=201520160SB525

developing communication skills and engaging in patient education as needing greater coverage. More than half of RC directors expressed support for greater coverage in the areas of evidence-based medicine, leadership and team-building, regulatory issues affecting the profession, and the cost-effectiveness of therapies.

Table 5. Content areas that should be covered in greater depth by RT education programs

Content area		
Communication skills	80	78.4
Patient education	74	72.5
Principles of evidence-based medicine	69	67.6
Leadership and team-building	64	62.7
Regulatory issues impacting respiratory care	63	61.8
Cost-effectiveness of therapies	53	52.0
Chronic care	49	48.0
Case management	45	44.1
Pediatric and neonatal care	45	44.1
Pulmonary rehabilitation	44	43.1
Sleep disorders/sleep studies	41	40.2
Review of clinical research	40	39.2
Outpatient care	31	30.4
Departmental management	30	29.4
Healthcare financing	27	26.5
Oxygen therapy	17	16.7
Unique responses	105	--

Comparing educational accreditation standards and required curricular content

This section presents an analysis of stated competencies and required curricular content contained in the accreditation guidelines for entry-level respiratory therapy programs¹³ compared to physician assistant, physical therapy, baccalaureate-level nursing, and nurse practitioner programs. The bases for this analysis are the current standards published by the respective accrediting agencies: Commission on Accreditation for Respiratory Care (CoARC); Accreditation Review Commission on Education for the Physician Assistant, Inc. (ARC-PA); Commission on Accreditation in Physical Therapy Education (CAPTE); Commission on Collegiate Nursing Education (CCNE); and American Association of Colleges of Nursing (AACN).¹⁴

Note that this analysis does not include the stated competencies and minimum curricular content as outlined in the CoARC accreditation standards for advanced practice respiratory therapy (APRT) programs. It is evident from those standards that the APRT is expected to have an educational background and clinical competence similar to nurse practitioners and physician assistants. However, the APRT role in clinical practice is not yet established, there is no credential that distinguishes the APRT as a clinician, and there are no accredited APRT education programs currently in operation. For these reasons, the APRT standards were not included in the analysis presented here.

¹³ Entry-level respiratory therapy education occurs at the associate degree, bachelor's degree, and master's degree-level.

¹⁴ CCNE is the accrediting body for baccalaureate and graduate nursing education, but the actual elements and framework for the curricula are derived from a series of AACN publications: *The Essentials of Baccalaureate Education for Professional Practice* (2008); *The Essentials of Master's Education in Nursing* (2011); and *The Essentials of Doctoral Education for Advanced Nursing Practice* (2006).

In 2002, the Institute of Medicine (IOM)¹⁵ convened a meeting of key stakeholders to “discuss and develop strategies for restructuring clinical education to be consistent with the principles of the 21st-century health system.” One outcome was the recommendation¹⁶ that health professions students and working professionals develop proficiency in five core competency areas:

- Delivering patient-centered care
- Working as part of interdisciplinary teams
- Practicing evidence-based medicine
- Focusing on quality improvement
- Using information technology

As health professions continued to move toward competency-based education, there were additional efforts to develop a standardized set of competency domains common across the professions.¹⁷ The competency domains listed in Table 6, 7, and 8 account for those identified by the IOM committee and others, but also include domains that can be identified in the current standards and guidelines published by each of the relevant accreditation bodies (CoARC, ARC-PA, CAPTE, CCNE, AACN). The descriptive labels assigned to each domain are generalized representations of the specific language found in these documents. An “X” signifies that the standards and guidelines explicitly state that the program must prepare students to demonstrate competence in that domain, or that the curriculum must include content related to that domain.

All accrediting bodies stipulate that approved education programs develop a curriculum of sufficient depth and breadth to prepare graduates for professional practice. Accordingly, there are differences in the practical level of competence expected of graduates of different education programs. For example, the standard of critical thinking and clinical problem solving demanded of a graduate of a nurse practitioner program will be of a higher order in comparison with the graduate of an entry-level respiratory therapy program. Similarly, it is unlikely that respiratory therapy programs incorporate evidence-based practice into their curricula to the same extent as physician assistant programs. Thus, although there is consistency across programs in terms of competency domains, it is important to keep in mind this caveat regarding differences in practical outcomes.

In each of the tables (6 – 8), the education program types are abbreviated as follows: RT is entry-level respiratory therapy; PA is physician assistant; PT is physical therapy; BSN is baccalaureate nursing; NP is nurse practitioner.

Table 6 focuses on competency domains related to direct patient care. It shows that the domains of *palliative care* and *hospice/end-of-life care* are specified in the accreditation standards for three of the four comparison programs, but are not identified in the CoARC standards for entry-level respiratory therapy programs. It is unclear why there would not be an explicit recognition of these modes of care for respiratory therapy (or physical therapy) programs. Both respiratory therapists (and physical therapists) have a role to play as direct care providers in an interdisciplinary palliative or end-of-life care team.¹⁸ The CoARC standards are framed in terms of the minimum content required, so some respiratory therapy programs may incorporate didactic content or clinical experiences that expose students to these domains. However, no language specifies that entry-level respiratory therapy programs must prepare graduates in these areas of direct care.

¹⁵ The IOM is now called the National Academy of Medicine.

¹⁶ Greiner AC, Knebel E, editors. Health Professions Education: A Bridge to Quality. Washington (DC): National Academies Press (US); 2003.

¹⁷ Englander, R., T. Cameron, A. J. Ballard, J. Dodge, J. Bull, and C. A. Aschenbrener. 2013. 'Toward a common taxonomy of competency domains for the health professions and competencies for physicians', *Acad Med*, 88: 1088-94.

¹⁸ <https://www.uptodate.com/contents/physical-therapy-and-other-rehabilitation-issues-in-the-palliative-care-setting#H143385975>

Table 6. Direct care competency domains by type of educational program

Description					
Perform patient assessment	X	X	X	X	X
Obtain and evaluate clinical data	X	X	X	X	X
Perform diagnostic studies	X	X	X	X	X
Initiate and evaluate treatment	X	X	X	X	X
Develop and manage a care plan	X*	X	X	X	X
Patient-centered care	X	X	X	X	X
Care delivery across settings	X	X	X	X	X
Care delivery across the lifespan	X	X	X	X	X
Culturally competent care	X	X	X	X	X
Chronic disease management	X	X	X	X	X
Rehabilitative care	X	X	X	X	X
Palliative care		X		X	X
Hospice/end-of-life care		X		X	X

*The standard for entry-level programs is to prepare students to *participate* in the development and modification of a care plan.

Table 7 focuses on competency domains beyond the provision of direct patient care, including modes of analytical reasoning, communication, administrative and organizational capacity, public and preventive health, and healthcare systems knowledge. As with direct care, there is a degree of consistency across these programs with respect to the identified competency domains. However, Table 7 indicates that the CoARC accreditation standards for entry-level respiratory therapy programs do not include several competency domains that are specified in the standards and guidelines for the comparison programs.

The IOM identified *quality improvement/patient safety initiatives* as a core competency in the health professions, so it is noteworthy that the CoARC curriculum standards for entry-level respiratory therapy programs do not identify content in this domain as required. *Quality improvement* is a systematic effort to improve service delivery and population health status in measurable ways.¹⁹ *Patient safety* is a closely related concept, but focuses on how systems of care delivery can be optimized to reduce medical error, thus improving patient safety.²⁰ The guidelines and standards for each of the other comparison programs conveys expectations that graduates will be prepared to employ principles and methods of quality improvement and patient safety initiatives in a leadership role or as a team member.

The CoARC standards for entry-level programs do not directly address the domain of *health informatics/information management*, which is also identified by the IOM as a health professions core competency. The use of *health informatics/information management* and related technologies contributes to a wide range of activities across healthcare delivery systems, including quality improvement and patient safety initiatives. Their use captures clinical data that informs evidence-based practice, allows for comparing the cost-effectiveness of therapies, and the measurement of patient care outcomes. They extend far beyond the process of basic patient management documentation. Many of these activities are embedded in the concept of health information technology *meaningful use* promoted by the Centers for Medicare and Medicaid Services (CMS), which grants incentive payments to eligible professionals and hospitals who can demonstrate outcomes related to the program's objectives.²¹ Although

¹⁹ <https://www.hrsa.gov/quality/toolbox/methodology/qualityimprovement/>

²⁰ <https://www.ahrq.gov/professionals/quality-patient-safety/patient-safety-resources/resources/advancing-patient-safety/index.html>

²¹ <https://www.healthit.gov/providers-professionals/meaningful-use-definition-objectives>

RTs are not independently eligible, their “meaningful use” would be encompassed within the scope of an eligible hospital employer.

Table 7 also shows there are several other non-direct care competency domains that are common to the comparison programs, but not specified in the CoARC standards for entry-level respiratory therapy education. These include: statistical analysis; the financial organization of patient care services, which entails an understanding of the major forms of service reimbursement; the scope and role of regulatory agencies at both the state and federal levels, including how these agencies impact professional scope of practice; healthcare policy, which encompasses research and analysis as well as advocacy for a broad range of healthcare systems issues; and competencies related to supervising and evaluating personnel. Finally, it should be noted that the CoARC standards for entry-level respiratory therapy education related to research methods as well as organizational and systems leadership²² apply only to baccalaureate or master’s degree programs, not associate degree programs.

Table 7. Non-direct care competency domains by type of educational program

Description					
Case management	X	X	X	X	X
Patient education	X	X	X	X	X
Population health & wellness promotion	X	X	X	X	X
Interprofessional communication & collaboration	X	X	X	X	X
Critical thinking/clinical reasoning	X	X	X	X	X
Evidence-based practice	X	X	X	X	X
Research methods	X*	X	X	X	X
Statistical analysis		X	X	X	X
Professionalism & ethics	X	X	X	X	X
Organizational & systems leadership	X*		X	X	X
Supervising & evaluating personnel			X	X	X
Quality improvement/patient safety initiatives		X	X	X	X
Health informatics/information management		X	X	X	X
Financial organization of patient care services		X	X	X	X
Scope & role of regulatory agencies		X	X	X	X
Healthcare policy analysis		X	X	X	X

*Applies to entry-level respiratory therapy programs offering a bachelor’s or master’s degree, but not associate degree programs.

Table 8 describes domains of advanced practice that entail direct care competencies, broad clinical knowledge, and information synthesis. They are derived from the accreditation standards and guidelines for advanced practice nursing (APN) education programs (nurse practitioner, nurse midwife, nurse anesthetist, and clinical nurse specialist programs). Specifically, these standards state that graduates of APN education programs must be prepared in three core competency domains: *advanced health/physical assessment*, *advanced physiology/pathophysiology*, and *advanced pharmacology*. The language used to describe competence in these areas served as the basis to identify the presence or lack of similar language in the accreditation standards of the comparison programs.

²² The specific language in the CoARC standards reads: “Bachelor’s and master’s degree programs must include content related to leadership development in management, education, research and/or advanced clinical practice.”

Table 8. Advanced practice competency domains by type of educational program

Description			
Advanced health/physical assessment	X	X	X
Advanced physiology/pathophysiology	X		X
Advanced pharmacology	X		X
Prescribe drugs & medicines	X		X

Every clinical health profession has its own standard of competence with respect to health assessment; knowledge of human physiology and pathophysiology; and the uses, effects, and modes of action of drugs. What distinguishes “advanced” competence is a relative concept. Elements of the *advanced health/physical assessment* and *advanced physiology/pathophysiology* domains include risk assessment, emotional health evaluation, the ability to connect information gained through assessment to an “underlying pathology or physiologic changes” across an individual’s life span, and the ability to “analyze physiologic responses to illness and treatment modalities.”²³ Perhaps the most distinctive indicator of competence in these domains is the ability to establish a differential diagnosis, which is the ability to differentiate between two or more conditions that share common symptoms based on myriad assessment data.

The domain *advanced pharmacology* entails an understanding of the “pharmacokinetics and pharmacodynamics of broad categories of drugs”²⁴ and combines with the other advanced practice competency domains to form the basis of a clinical practitioner’s ability to assess a patient’s physiologic response to pharmacotherapy. In combination, competence in these advanced practice domains means to exercise “highly refined assessment skills and employ a thorough understanding of pathophysiology and pharmacotherapeutics in making diagnostic and practice management decisions.”²⁵ Crucially, competence in these related domains are the foundation of a clinician’s authority to *prescribe drugs and medication*. Unsurprisingly, there is no language on *advanced physiology/pathophysiology* or *advanced pharmacology* in the accreditation standards for either entry-level respiratory therapy programs or baccalaureate nursing programs related to these competency domains. The fact that CAPTE standards do not include these competencies presumably reflects the specific scope of physical therapy practice.

Minimum degree requirements in respiratory therapy education

This section describes the *perceptions and opinions* of RC directors, education program directors, and currently employed RTs on the topic of the minimum educational degree requirements for entry into professional practice.

Support for the associate degree in respiratory therapy

Figure 13 shows that 67 percent of surveyed RC directors felt that the associate degree (AD) program in respiratory therapy provides sufficient preparation for new graduates entering the workforce. However, RC directors were less unified about whether or not the AD program is too compressed and provides enough coverage of the core competencies of respiratory therapy. Thirty-six percent of directors agreed while 35 percent disagreed that the AD program is too compressed.

One possible interpretation of these results is that while directors generally feel that the AD program covers the topics and content needed to prepare new graduates to enter the workforce, at least some of these same directors also feel that coverage of some core content is sacrificed. Several of the RTs that participated in focus groups

²³ The Essentials of Doctoral Education for Advanced Nursing Practice, American Association of Colleges of Nursing, 2006.

²⁴ Ibid.

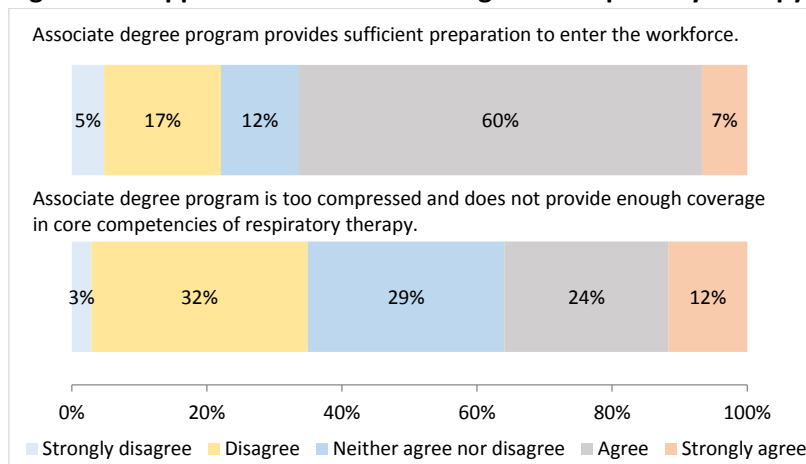
²⁵ Ibid.

expressed the view that although the AD program provides basic preparation for entry into practice, it is a “*starter education*.” These RTs acknowledged that new graduates are coming into the workforce still requiring significant on-the-job training as opposed to entering “*work-ready*.”

Some of the support for the AD program expressed by RTs would be more accurately characterized as resistance to the idea of bachelor’s degree requirement. These RTs cited concerns that there would be no financial incentive tied to the bachelor’s degree; there would be no associated increase in potential earnings. One RT found the notion that a higher degree would be needed to gain professional respect troubling: “*The idea that we need another set of initials behind of our names to earn respect irritates me and makes me mad.*”

Out of ten education program directors interviewed, only one held the view that a bachelor’s degree *should not* be the required credential for entry into professional practice. This director commented that she supports efforts to increase the number of therapists trained at the bachelor’s level, however, with regard to requiring the bachelor’s degree, she commented, “*I don’t think we’re there yet. Students get what they need in the two-year program to go out and be great respiratory therapists.*” She compared respiratory therapy to registered nursing (RN), noting that RNs are still educated at the AD level: “*I would expect registered nursing to require a bachelor’s degree for entry into practice before we do.*”²⁶

Figure 13. Support for the associate degree in respiratory therapy

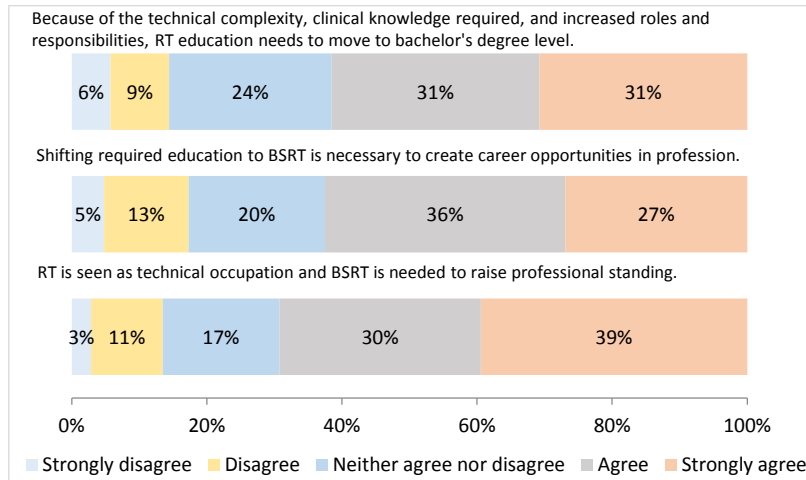


106 total responses

Support for the baccalaureate degree in respiratory therapy

Figure 14 presents RC directors’ responses to questions about baccalaureate education in respiratory therapy. Although a significant majority of directors view the AD program as sufficient preparation to enter the workforce (Figure 13 above), there is also strong support for moving respiratory therapy education to the baccalaureate degree level. More than 60 percent of directors agreed with the notion that because of the technical complexity of respiratory care, the clinical knowledge it requires, and the broadening roles and responsibilities of RTs as care providers, respiratory therapy education needs to move to a four-year bachelor’s degree. In addition, more than 60 percent of responding RC directors agreed that moving respiratory therapy education to the bachelor’s degree level is necessary to create career opportunities in the profession. Finally, there was strong agreement among RC directors that respiratory therapy is perceived as a technical occupation and moving to a bachelor’s degree requirement is necessary to raise the field’s professional standing.

²⁶ In its 2010 report, *The Future of Nursing: Leading Change, Advancing Health* the Institute of Medicine (now called the National Academy of Medicine) recommended that the 80 percent of the registered nursing workforce be educated at the baccalaureate degree level by 2020. In recent years, the number of RNs completing entry-level bachelor’s or post-licensure bachelor’s (RN to BSN) education programs has increased dramatically.

Figure 14. Support for the bachelor's degree in respiratory therapy

106 total responses

Focus group RTs offered several reasons in support of a bachelor's degree requirement for entry into practice. Many saw value in additional didactic and clinical training, believing it will produce RTs who are clinicians as opposed to technicians (underscoring the view of RC directors presented in Figure 14). Some RTs felt that the bachelor's degree would expose students to broader systems-knowledge such as process improvement, compliance, reimbursement, EHR meaningful use, and patient safety, which could help foster professional opportunities. RT focus group participants were also sensitive to their standing relative to other health professionals, in particular RNs. They acknowledged that there is a trend in health professions education toward higher degrees. One RT commented, *"We're an academic medical center. We have a lot of communication with nurses and physicians; we have interns, residents, fellows and attendings [physicians] asking us for feedback. I think that having the bachelor's degree requirement, it will definitely benefit us in terms of respect within the team and really with all other staff."*

A common sentiment among RTs was that a bachelor's degree is needed to develop the clinical competencies and depth of knowledge that will be required to prepare RTs to practice to the full extent of their legal scope of practice. One of the focus group participants who had returned to school to earn her baccalaureate degree in respiratory therapy felt that the value came from *"being exposed to advanced diagnostics, to clinical research, to statistics...from engaging all of these things at a much deeper level. It gave me confidence; I know I have the knowledge base to deal with complex cases."* There were also several RTs who felt that the AD curriculum is simply too compressed; there is not enough time to cover all of the didactic material and receive adequate clinical training.

Many of the RTs were aware of the possibility that shifting to a bachelor's degree requirement might function as a barrier to entry, reducing the supply of new entrants to the labor force, which was viewed mainly as a positive outcome, as the view that there are too many education programs and too many new RTs looking for employment was widely held. Equally, the possibility that a higher degree requirement could induce a selection effect that changes the profile of a student who wants to pursue respiratory therapy was also seen as a potentially positive outcome. *"If it results in a more motivated student who really wants to be in respiratory therapy – rather than someone who didn't get into the nursing or rad tech program – that's going to be good for the profession,"* commented one RT.

Nine of the ten education directors interviewed expressed support for requiring a bachelor's degree in respiratory therapy, though some expressed concerns. These education directors worried that a bachelor's degree requirement may prove to be a disincentive to some students who are attracted to respiratory therapy because they are able to gain entry to a good career with just an associate degree, in contrast to many RTs in the focus groups who saw this

possibility as a positive outcome. One director noted that the additional expense in tuition, fees, and the opportunity cost of a longer time to degree was a concern, remarking, *“I’m not sure there’s any reason to expect the bachelor’s degree will result in therapists being paid more.”*

Education directors offered several reasons in support of shifting respiratory therapy education to the bachelor’s degree level, including the belief that it would allow more in-depth coverage of topics that are highly compressed in the current curriculum due to time constraints and the possibility of increased exposure to clinical procedures. Directors indicated that a bachelor’s degree program could offer more extensive coverage of topics related to leadership and departmental management, healthcare finance, as well as research methods and professional communication (e.g. presentation skills, patient education, difficult conversations).

As with RC directors and many of the RTs who participated in focus groups, education directors also felt that a baccalaureate degree requirement was important for reasons related to professional development. Several education directors reported expectations that emerging professional roles would receive greater emphasis in a bachelor’s program. One director commented, *“We would look for opportunities to pair students with therapists who are working as clinical educators or case managers, or someone who does utilization review, or even tele-health, so students actually have a point of reference and understand the expectations for those kinds of roles.”* Many of the education directors referenced the minimum educational requirements for non-physician health professionals covered under Medicare law, noting that respiratory therapists will need a bachelor’s degree to be reimbursed for services.

Education directors also cited the need for respiratory therapy to keep pace with other professions in terms of educational attainment, referencing physical therapy, occupational therapy, and physician assistant as examples of professions that have all raised the level of degree required to practice over the past decade. Echoing both RC directors and RT focus group participants, one education director remarked that respiratory therapy *“is still looked upon by some as on-the-job training, a technical occupation, not a profession. Educating our students at the bachelor’s level can help change that perception.”*

The most important factor driving support for the bachelor’s degree among education directors was the expectation that it would encourage the development of critical thinking. One director commented, *“I have students in my program who already have their bachelor’s degree and they stand out...their critical thinking and decision-making stands out compared to the other students; their thought process is more developed.”* Another education director who strongly supported a bachelor’s degree requirement reiterated the value of critical thinking: *“If you’re going to communicate to a physician about a change in therapy, or why you think a patient would benefit from this treatment more than that treatment, you need to be able to support why you’re asking for a change.”* This director felt that a bachelor’s-level curriculum will help develop and refine the critical thinking skills that support clinical reasoning. Education directors also reported expectations of being able to incorporate problem-based learning (e.g. case studies and patient scenarios) to a greater extent in a bachelor’s degree curriculum in comparison with the associate degree. Said one director, *“If we had more time to spend on these aspects, I think we’d really improve students’ ability to see the whole picture rather than just focus on one small piece of the puzzle.”*

As noted in the overview section of this report, the UCSF study team conducted a review of academic literature to identify scholarly work that addresses the relationship between the type of degree earned by respiratory therapists and patient outcomes (see Appendix A). Although the review did not discover any scholarship addressing this specific question, one of the salient themes in the literature was the importance of developing RTs ability to think critically. Critical thinking is a broadly applied skill influencing all other areas of competency including critiquing published research, interpreting statistical testing, modifying protocols based on new evidence, and articulating rationales for modes of therapy. A national survey of education program directors found that baccalaureate level

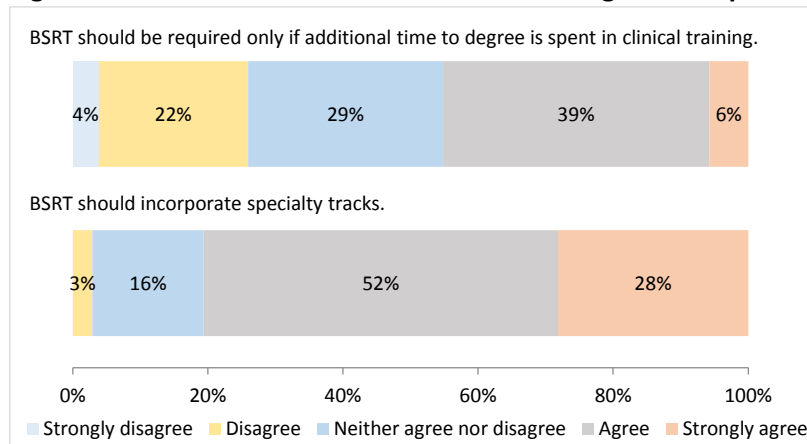
programs are more likely than associate degree programs to teach the types of competencies that develop critical thinking skills.²⁷

There is some evidence that a greater breadth of coursework is associated with greater critical thinking ability. In a study of respiratory therapy students enrolled in a baccalaureate-level program, those with a strong science course background (i.e. more coursework) scored significantly higher on the Watson-Glaser Critical Thinking Appraisal compared to students who had a weaker background.²⁸ Other studies of critical thinking ability in health sciences students have shown that coursework in the humanities and interdisciplinary fields have a statistically significant positive association with critical thinking.²⁹ If developing respiratory therapists' ability to think critically is necessary, for all the reasons noted by education directors and RTs who participated in the focus groups, there is some evidence to support shifting entry-level education to the baccalaureate level in order to achieve this goal.

Content and structure of baccalaureate degree in respiratory therapy

RC directors who participated in the survey were asked to agree or disagree with statements regarding the structure and content of a bachelor's degree in respiratory therapy. Figure 15 shows that 45 percent of RC directors supported the idea of making the bachelor's degree the required educational credential, but only if the additional time to degree is focused on developing clinical skills (i.e. practicing respiratory therapy). Eighty percent of RC directors agreed with the notion that a baccalaureate degree program should incorporate specialty tracks (e.g. research, education, management) into the curriculum.

Figure 15. Content & structure of a bachelor's degree in respiratory therapy



106 total responses

Many of the focus group RTs felt strongly that a baccalaureate-level curriculum would need to increase the amount of time students spend in clinical training, but there were concerns expressed regarding the availability of high quality clinical experiences. Any increase in clinical hours should ensure that students are exposed to a greater diversity of pathology, the full range of therapeutic interventions and procedures, and the chance to work in a setting which emphasizes evidence-based practice and utilizes a wide range of therapist-driven protocols. *“Don’t increase the number of clinical hours just to add more hours”* was a common refrain.

²⁷ Barnes, T. A., Kacmarek, R. M., & Durbin, C. G., Jr. (2011). Survey of respiratory therapy education program directors in the United States. *Respiratory Care*, 56(12), 1906-1915.

²⁸ Wettstein, R., Wilkins, R., Gardner, D., Restrepo, R. (2011). Critical Thinking Ability in Respiratory Therapy Care Students and Its Correlation with Age, Educational Background, and Performance on National Board Examinations. *Respiratory Care*, 56(3), 284-289.

²⁹ Tsui L. Courses and instruction affecting critical thinking. *Res High Educ* 1999; 40(2):185-200.

The views of education directors were mixed on the subject of how the additional time-to-degree in a baccalaureate-level curriculum should be weighted in terms of didactic versus clinical content. Many acknowledged that increasing the number of clinical hours would be valuable. However, education directors emphasized the practical challenges of coordination and administration that are involved. These include access to clinical placements that would add value, often exacerbated by competition with other programs, as well as the fact that programs have limited resources (e.g. time, money, and staff) to commit to establishing and managing relationships with affiliated clinical sites. The value of additional didactic content and the time to cover existing content in greater depth was obvious to education directors; they regarded added classroom time as a less resource-intensive demand in terms of restructuring the curriculum to meet the standards of a baccalaureate degree program.

Regarding the issue of incorporating specialty tracks into a baccalaureate-level program, most focus group RTs were generally neutral to skeptical about the proposition. There was a strong sense that the value of the bachelor's degree would be the opportunity to cover existing content in greater depth. Some coverage of additional content related to research methods, statistics, leadership, and broader systems issues (e.g. healthcare finance, policy) would be of benefit, but not at the expense of core material. Some focus group participants even expressed concerns that a bachelor's degree curriculum would incorporate a broader range of material. Said one RT, *"I wouldn't go for it if we have to learn all about upper management, do case studies and quality improvement projects...all the stuff they make RNs do."* In general, RTs warned that a bachelor's degree needs to focus on meeting the needs of the working therapists, noting that many RTs who have earned an associate degree go on to pursue healthcare-related bachelor's degrees that aren't specifically focused on respiratory care.

Comparing the curricular content of a baccalaureate and associate degree program

This section employs a case study approach to compare the curricular content and structure of two respiratory therapy education programs in California: a well-regarded associate degree program in the state's community college system, and the state's only entry-level bachelor's degree program at Loma Linda University (LLU).³⁰ Both programs require two years of full-time study to complete.³¹ The bases for the comparison are the program requirements and detailed course descriptions published in each institution's 2016-2017 academic catalog.³² The recoded course descriptions are included in Appendix I. Relying on course descriptions to identify differences in curricular content has limitations, one of which is that they supply only partial information regarding the range and depth of content to which students are exposed. Still, they provide enough information to draw some general conclusions.

In addition to differences in the structure and content of the curricula, other important characteristics distinguish the two programs. LLU is a private, non-profit health sciences university that awards both undergraduate and graduate degrees across a wide range of health professions, including medicine and pharmacy. It is much easier for LLU to expose its students to valuable interprofessional educational experiences, both clinical and didactic, by comparison with a community college program. LLU also has its own affiliated academic medical center and healthcare system, affording the respiratory therapy program a high degree of control over students' supervised clinical experiences in terms of quality, depth, and scope. As is true for many RT programs throughout the state, the community college-based associate degree program is dependent on clinical placements across a large number of local and regional clinical sites and competes with other respiratory therapy programs for clinical placements.

³⁰ There is a second post-professional baccalaureate degree program, open to currently licensed respiratory therapists.

³¹ Loma Linda University's program entails only respiratory therapy-related coursework and clinical experiences; prerequisite coursework in the humanities, fine arts, communications, math and natural sciences can be completed at any accredited postsecondary institution.

³² The number of supervised clinical hours was provided by each program director.

Prerequisite coursework for the associate degree program consists of 21 semester units of math and science (anatomy and physiology, microbiology, and chemistry),³³ plus an additional eight semester units covering communication, composition, and a course that provides students a basic orientation to roles and responsibilities of a clinical health professional. Although recommended, applicants are *not required* to have completed all coursework needed for the sponsoring institution to award the associate degree prior to being accepted into the respiratory therapy program. In other words, a student could theoretically finish the respiratory therapy program but still have general education coursework to complete in order to satisfy the requirements for an associate degree.³⁴ In contrast, students admitted to the entry-level bachelor's degree program at LLU must have already completed the equivalent of an associate degree before beginning the two years of coursework in respiratory therapy.

Table 9 details the differences in volume of academic credit required by each degree program.³⁵ As noted, students admitted to the program at LLU have already completed, at a minimum, the equivalent of an associate degree; they are beginning the course of study with considerably more academic experience. Over the course of two years, students in the baccalaureate degree program at LLU complete approximately 1.5 times as many semester units as do students in the associate degree program. Table 9 also demonstrates that much of the difference in credit volume occurs in the first year of the program. The curriculum at LLU requires students to complete more than 41 semester units in the first year, compared to a total of 22 units in the first year of the associate degree program.

Table 9. Number of required semester units by content area and by degree type

Prerequisite coursework	52	29
Required units in first year of RT program*	41.33	22
Required units in second year of RT program	34.67	26
Total required units in RT program	76	48

* For both programs, this includes the summer term between the first and second years.

Table 10 shows there is a substantial difference in the number of hours spent in supervised clinical training and the number of semester units that are laboratory-based between the two programs.³⁶ Students in the LLU baccalaureate program complete 1,200 hours of clinical training compared to 850 hours for students in the associate degree program.³⁷ In addition, LLU students complete more than twice as many semester units that have a laboratory component.

³³ The program also recommends completing an introductory course in physics, though it is not required.

³⁴ It is not known if this is common policy. Other programs in the community college system may require all non-respiratory therapy coursework needed for the associate degree award to be completed prior to beginning the program.

³⁵ Loma Linda University awards credit using a quarter-based system, while the associate degree program uses a semester-based system. The number of units assigned to each required course in the LLU curriculum was converted to a semester-based equivalent using a standard formula: 1 quarter-based unit = .667 semester-based units.

³⁶ If any part of a course indicated a laboratory component, it was counted. For example, some courses were described as having both lecture and laboratory sections, they were counted as having a laboratory component.

³⁷ Based on key informant interviews with education program directors conducted for another component of this study, 800 to 900 hours of supervised clinical training is typical for associate degree programs.

Table 10. Hours of supervised clinical training and laboratory-based semester units by degree type

Description		
Number of supervised clinical hours	1,200	850
Number of laboratory-based semester units	14	6

Table 11 compares the volume of coursework in each program for selected content areas. These specific areas were chosen for two reasons. First, they are distinctive enough to be identified from course descriptions. Some course descriptions indicated overlapping content areas, making it difficult to assign the course to a category that would allow for comparison. The process of recoding course content in order to make comparisons erred on the side of caution to avoid misrepresentation. Second, these areas effectively demonstrate what distinguishes the bachelor's degree program from the associate degree program in terms of depth and breadth of content. Table 11 shows that students in the baccalaureate program at LLU complete more than twice as many semester units related to pathology and pathophysiology compared to students in the associate degree program. Table 11 also highlights the fact that students in the bachelor's degree program complete coursework in six different content areas, including statistics/research methods, pulmonary rehabilitation, case management, and leadership, that are not part of the associate degree program's curriculum.³⁸

Table 11. Number of required semester units by selected content area and by degree type

Pathology/pathophysiology	7.33	3
Statistics/research methods	4	0
Pulmonary rehabilitation	2	0
Population health/health promotion/clinical prevention	2	0
Case management	1.33	0
Educational/instructional methods	1.33	0
Leadership	1.33	0

Another curricular feature that distinguishes the baccalaureate program from the associate degree program concerns how content is organized. As noted previously, it is common for a single course to combine multiple content areas in the associate degree program. For example, a single course called "principles of respiratory care" might include content related to patient assessment, diagnostic testing, pathophysiology, and elements of pharmacology. The baccalaureate degree curriculum at LLU is more likely to structure courses to focus on a single topic, whether theoretical (conceptual or applied) or the development of technical skills. Below, Table 12 presents a comparison of courses in each program that focus on a single topic or content area.

Presenting information in this manner makes the important assumption that course work focusing on a single concept allows for a more developed understanding of that concept. For example, it is presumed that a two semester-unit course focused only on pulmonary function methods will provide greater depth and breadth of content related to this topic compared to a three semester-unit course covering cardiovascular disease and related pharmacology, treatment of acute coronary syndrome and related disorders, and monitoring techniques that include, among others, *pulmonary function testing*. There is enough variation among associate degree curricula that

³⁸ There is no language in the required course descriptions that would indicate students are exposed to these content areas.

if another program had been selected for comparison, the specific differences presented in Table 12 would change. However, it is unlikely that the general pattern would change.

Table 12 reinforces the conclusion that the LLU bachelor's degree program exposes students to a significantly greater scope of content and it suggests that this content is covered in greater depth. There are 16 more single-topic courses in the baccalaureate degree curriculum by comparison with the associate degree curriculum, ranging from conceptual and applied knowledge to discrete skills development. Some of these differences are the result of the associate degree program not offering coursework in certain content areas, as illustrated by Table 11 above. However, some of the content described in Table 12 reflects the core bodies of knowledge and clinical practice in respiratory therapy, such as *mechanical ventilation, diagnostic tests and procedures, patient assessment, pharmacology, and pulmonary function methods*.

Table 12. Single-topic courses by degree program

Description		
Cardiopulmonary anatomy & physiology	X	X
Principles of physics in respiratory therapy	X	X
Neonatal/pediatric care	X	X
Cardiopulmonary pathophysiology	X	X
Respiratory therapy equipment & devices	X	X
Mechanical ventilation	X	
Diagnostic tests & procedures	X	
Patient assessment	X	
Pharmacology	X	
Pathology	X	
Pulmonary function methods	X	
Pulmonary rehabilitation	X	
Cardiology	X	
12-lead ECG interpretation	X	
Population health/health promotion/clinical prevention	X	
Case management	X	
Psychosocial elements of clinical care	X	
Statistics/research methods	X	
Ethics	X	
Educational/instructional methods	X	
Leadership	X	

All accredited entry-level respiratory therapy programs at all degree levels include didactic and clinical content that prepares students to the standards of professional practice. However, in combination with the findings presented in Tables 9, 10, and 11, Table 12 suggests that if associate degree programs are preparing new graduates to this standard, the preparation students in the LLU bachelor's degree program receive exceeds it. Finally, an implicit assumption of the case study approach used for this analysis is that the program at Loma Linda University is representative of entry-level baccalaureate degree programs, and the two-year community college program is representative of entry-level associate degree programs. It is possible that comparisons made with a different baccalaureate-level program, or a two-year, private, for-profit associate degree program would result in a different set of findings. A more expansive study and analysis, beyond the scope of what is presented here, would be needed to confirm this.

Challenges of transitioning from associate degree to baccalaureate degree program

This section describes respiratory therapy education directors' views of the challenges associated with a transition from awarding the associate degree to awarding the bachelor's degree in respiratory therapy. Three of the education directors interviewed reported that their programs are in the process of transitioning to a baccalaureate-level degree program. One is part of the pilot program to award bachelor's degrees within California's community college system; the other two are programs in the private, for-profit sector.

All of the education directors³⁹ expressed concerns about the administrative burdens related to transitioning from the associate degree to the bachelor's degree program. In general, RT education programs operate with limited resources in terms of staff and budget. The education director whose program is participating in the CA community college pilot program reported that the entire process, from developing the pilot program application to meeting the standards for accreditation, *"required an enormous amount of work"* that was done with *"very limited staff and financial resources."* Another director, who consulted for a different community college that is piloting a bachelor's degree program underscored this point, describing the process as a group effort: *"They didn't do it alone; they got a big group of educators involved."* Both of these directors referenced the challenge of meeting the requirements to offer upper division general education units, including technical issues such as how much content can be distance learning versus traditional *"face-to-face"* classroom learning. The director whose program is participating in the community college pilot acknowledged that these types of issues and a lack of clarity throughout the process contributed to delays that resulted in the enrollment of the first cohort of students being pushed back by a year.

Supporters of awarding bachelor's degrees within the community college system expressed hope that the specific challenges the pilot programs faced and their lessons learned will serve to identify best practices for other programs. One education director, reflecting on having weighed the pros and cons of applying to take part in the pilot program, commented that *"Our college considered applying but decided to take a wait-and-see approach. Let these other schools be guinea pigs and see how it goes."* However, even with the opportunity to learn from the experiences of the pilot programs, some directors expressed doubts that their programs would garner the institutional support needed to navigate the transition to offering baccalaureate-level respiratory therapy education. The director taking part in the pilot program described having received *"great buy-in from the college administration and other department faculty."* However, a director whose program considered applying to be one of the community college pilot programs reported that members of the administration at her institution, who opposed the idea, cited the various challenges (e.g. curriculum development, meeting accreditation standards, awarding credit for upper division coursework) as evidence for why the college should not apply. Two other education directors reported that leadership at their respective colleges simply opposed the idea of offering a bachelor's degree; one of these directors commented, *"Our program is a clinical director, two faculty members, and me. Where do we find time to develop a bachelor's degree program, especially if we have no support from the administration?"*

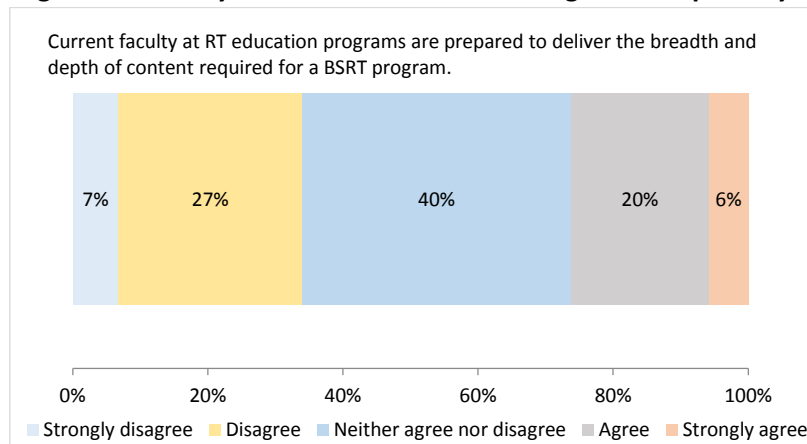
The other significant challenge identified by directors was the need for qualified faculty. As one education director pointed out, *"If you increase the number of hours and the scope of the program you need more faculty, and finding faculty qualified to teach at the bachelor's level will be difficult."* CoARC accreditation standards specify that program directors and directors of clinical education for programs that offer baccalaureate or master's degrees in respiratory therapy must themselves hold a master's degree. Many of the education directors acknowledged that there is a limited pool of people who possess the requisite knowledge of respiratory therapy content and a master's degree. The required credentials for all other instructional faculty in baccalaureate degree programs are not specified in the CoARC standards (they must be *"appropriately credentialed"* and *"qualified in the content areas"*

³⁹ The director of the baccalaureate degree program at Loma Linda University was not asked this question.

that they teach). However, postsecondary education institutions generally require faculty members to be educated at the highest level of degree available in their respective fields. If the baccalaureate degree becomes the standard for entry into practice, presumably, all instructional faculty will need to hold a bachelor's degree.

On the subject of needing qualified faculty at the baccalaureate level, RC directors who participated in the statewide survey were asked to agree or disagree with the following statement: "Faculty at respiratory therapy education programs are sufficiently prepared to deliver the breadth and depth of content that would add value to the four-year bachelor's degree program." Figure 16 shows that a plurality of directors expressed a neutral view of this statement, neither agreeing nor disagreeing. However, more directors disagreed (34 percent) than agreed (26 percent) with the notion that current faculty are sufficiently prepared to deliver the type of content that would add value to a baccalaureate degree program.

Figure 16. Faculty readiness for bachelor's degree in respiratory therapy



106 unique responses

Professional practice issues in respiratory therapy

This section describes the *perceptions and opinions* of RC directors, education program directors, and currently employed RTs on a range of professional practice issues. These include: the use of therapist-driven protocols; granting RTs the authority to prescribe therapy per protocol; career ladders and incentives for additional education; respiratory care departmental administration; continuing education requirements; the value of required ethics training; education directors' perceptions of labor market conditions faced by new graduate therapists; and RTs' view of critical professional issues.

Utilization of therapist-driven protocols

RC directors who participated in the survey were asked a series of questions regarding the use of respiratory therapist-driven protocols at their facilities. These topics covered the different types of protocols utilized and the frequency of their use, monitoring protocol compliance, measuring and reporting protocol use, and institutional support for the use of therapist-driven protocols. A therapist-driven protocol was defined as the "initiation or modification of a patient care plan following a pre-determined structured set of physician orders, instructions, or interventions in which the therapist is allowed to initiate, discontinue, refine, transition, or restart therapy as dictated by the patient's medical condition."⁴⁰

Approximately 75 percent of RC directors reported that the facilities they represent utilize at least one therapist-driven protocol as defined. Table 13 describes the extent to which common protocols are used by these facilities

⁴⁰ <http://www.aarc.org/resources/professional-documents/whitepapers/protocol-program-structure/>

and the frequency with which they are applied to their intended patient population. Weaning, oxygen management, and ventilator setup and management protocols are utilized by more than 60 percent of the facilities represented by these data. In contrast, use of medication selection, emergency room care, nitric oxide administration, and COPD management protocols were reported by less than one-third of represented facilities.

The data describing the frequency with which different protocols are applied to their intended patient population indicate a consistent pattern. With one exception, Table 13 shows that if the protocol is in place, a majority of facilities apply the protocol to its intended patient population more than 75 percent of the time. For example, approximately 61 percent of facilities that utilize a weaning protocol apply it to its intended patient population more than 75 percent of the time. Approximately 74 percent of facilities that utilize an oximetry monitoring protocol apply it to the appropriate patient population more than 75 percent of the time. The one exception to this pattern was nitric oxide administration; approximately half of all directors who indicated that their facility has such a protocol in place reported that it is applied to less than 25 percent of its intended patient population.

Table 13. Utilization of therapist-driven protocols, by type of protocol

Weaning	70	66.7	6.1	33.3	60.6
Oxygen management	65	61.9	3.3	32.8	63.9
Ventilator setup & management	65	61.9	1.6	43.8	54.7
Oximetry monitoring	53	50.5	5.7	20.8	73.6
Aerosolized medications	50	47.6	10.4	37.5	52.1
Secretion clearance	44	41.9	11.9	26.2	61.9
Lung hyperinflation	32	30.5	9.4	34.4	56.3
Device selection	31	29.5	16.1	22.6	61.3
Medication selection	29	27.6	13.8	31.0	55.2
Emergency room care	28	26.7	14.3	25.0	60.7
Nitric oxide administration	25	23.8	48.0	28.0	24.0
COPD management	21	20.0	0.0	36.8	63.2
Unique responses	105	--			

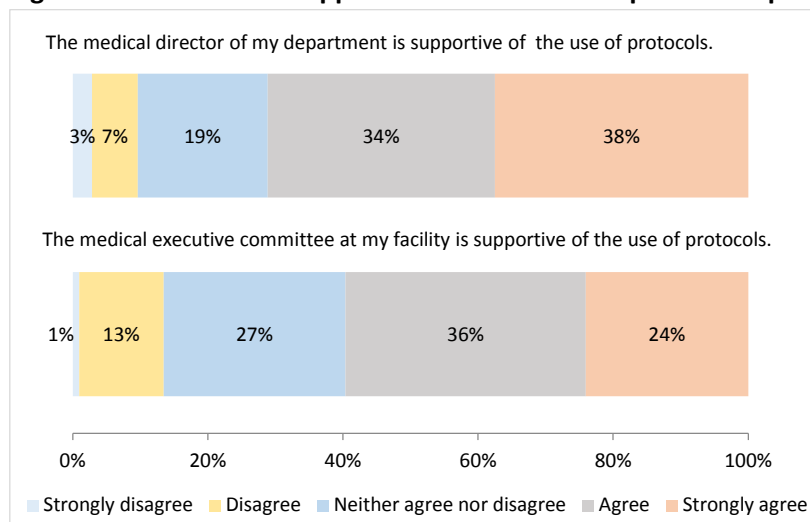
Almost all directors whose facilities utilize therapist-driven protocols reported using some version of an audit and review process to monitor compliance with protocol use. However, there is variation in how frequently this process occurs. It may occur as often as daily, using an EHR system to review all respiratory care-related treatments. More common is a weekly or monthly audit of patient charts that are reviewed by staff, which may include quality assurance specialists, physicians, and registered nurses, in addition to respiratory therapists. In some instances, RC directors reported using random, real-time audits of patient care conducted by supervisory staff. In addition, directors indicated that monitoring protocol compliance is dependent on the nature of the protocol. For example, protocols for weaning patients off mechanical ventilation may occur daily, while compliance with other protocols may occur less frequently. Very few directors reported having no formal method to monitor compliance.

Approximately one-quarter of the directors who responded admitted that they either do not measure the outcomes of protocol use or do not measure them effectively. Directors who reported the use of outcome measures gave examples that included readmission rates, hospital length of stay that is tied to specific diagnoses, time spent on a ventilator, a comparison of patients treated per protocol versus non-protocolized therapy, and change in the number of unwarranted medications. Some RC directors described using decision-support models that allow them to continually re-assess a patient's condition and link it to protocol use or to measure costs associated with improper protocol use. Other directors reported measures that are protocol-specific; for example,

monitoring agreement among physicians, RNs, and RTs for extubation based on spontaneous breathing trials, or monitoring resuscitative protocols by reviewing code calls for RT intervention. In terms of how outcomes are reported, directors generally described a process whereby patient charts are reviewed by internal staff leading to the preparation of a report of key findings, which is then shared with other committees (e.g. the medical executive committee; critical care committee; quality excellence committee). This can occur as often as every month or as infrequently as twice per year.

Surveyed RC directors were asked to agree or disagree with statements regarding institutional support for the use of therapist-driven protocols. Figure 17 shows that there is a widespread perception among RC directors that their medical directors and medical executive committees support the use of therapist-driven protocols. Seventy-two percent of directors agreed with the statement “the medical director of my department is supportive of the use of respiratory therapy protocols;” sixty percent of directors agreed with the statement “the medical executive committee at my facility is supportive of the use of respiratory therapy protocols.” The share of directors who disagreed with either of these statements was comparatively small.

Figure 17. Institutional support for the use of therapist-driven protocols



106 total responses

Granting RTs prescriptive authority per protocol

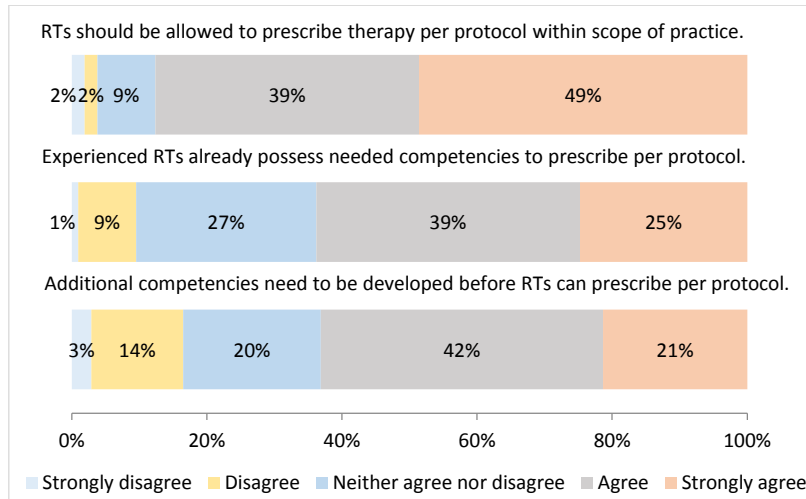
Participants in the RC director survey were asked to agree or disagree with a series of statements regarding RTs being allowed to prescribe therapy (including medication) per protocol. In this context, prescriptive authority was defined as “the ability of a respiratory therapist to evaluate and treat patients per protocol, independent from an initial physician order.”⁴¹ Figure 18 shows that directors overwhelmingly support prescriptive authority for respiratory therapists; nearly 90 percent of directors agreed with the statement “respiratory therapists should be allowed to prescribe therapy (including medications) per protocol within the scope of practice.”

However, Figure 18 also presents some ambiguity regarding whether or not therapists would need to develop additional competencies before prescriptive authority could be granted. Nearly two-thirds of RC directors (64 percent) agreed with the statement that “experienced therapists already possess the needed competencies to exercise prescriptive authority per protocol”, whereas 63 percent agreed with the statement that “there are additional competencies that need to be developed before therapists can be granted the authority to prescribe therapy per protocol.” It may be that RC directors believe experienced RTs (but not all RTs) are prepared to

⁴¹ This isn’t a formally recognized definition. It’s derived from the definition of a therapist-driven protocol published by the AARC (and cited above), and was developed in consultation with the research study’s expert advisory group.

prescribe therapy using some protocols, since the first statement is expressly focused on experienced RTs, whereas the second statement could be interpreted as all RTs (i.e. including those without much experience.)

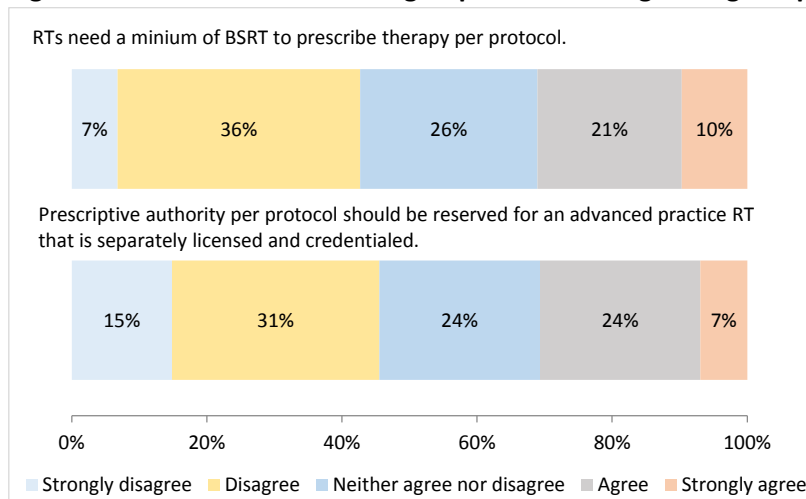
Figure 18. Support for granting RTs prescriptive authority per protocol



106 total responses

Figure 19 indicates that a plurality of directors disagreed with the notion that granting RTs the authority to prescribe therapy per protocol should either require a bachelor’s degree or be reserved for an advanced practice RT that is separately licensed and credentialed. Forty-three percent of directors disagreed with the statement “respiratory therapists would need a minimum of a bachelor’s degree in respiratory therapy to exercise prescriptive authority per protocol.” Similarly, 46 percent disagreed with the statement “the authority to prescribe therapy per protocol should be reserved for an advanced practice respiratory therapist who is separately licensed and credentialed.”

Figure 19. Educational & licensing requirements for granting RTs prescriptive authority per protocol



106 total responses

RTs who participated in the focus groups largely echoed the findings presented in Figures 18 and 19. There was near unanimous support for the notion that therapists be allowed to prescribe therapy and medication per protocol. However, while they agreed that a clear demonstration of competency would be required, there were different views regarding how that demonstration should be structured. Some RTs supported the idea that prescriptive authority be conditioned on additional degree-based education; other RTs felt that it could regulated

through additional certification; still other RTs held the view that competency could simply be demonstrated on the job and signed off by the medical director. Said one RT, *“If you are a licensed RT and your facility has an established protocol, and you’ve been appropriately trained on that protocol and have the confidence of your medical director, then you should have that authority to evaluate and treat per that protocol.”*

RTs framed the value of having the authority to evaluate and treat patients per protocol in different ways. For some it was efficiency of care, as one RT commented, *“It would alleviate so much of the hassle and headache of always trying to contact the doctor every single time we need something.”* Others viewed prescriptive authority as an opportunity to define a more advanced practitioner with a distinct scope of practice that is separately licensed or credentialed. These RTs referenced nurse practitioners and physician assistants as potential models for an advanced practice RT. As one participant put it, *“It shouldn't just be any therapist. It should be someone with authority, with a license, with the education and the critical thinking skills”* to evaluate and treat using the full range of respiratory care protocols.

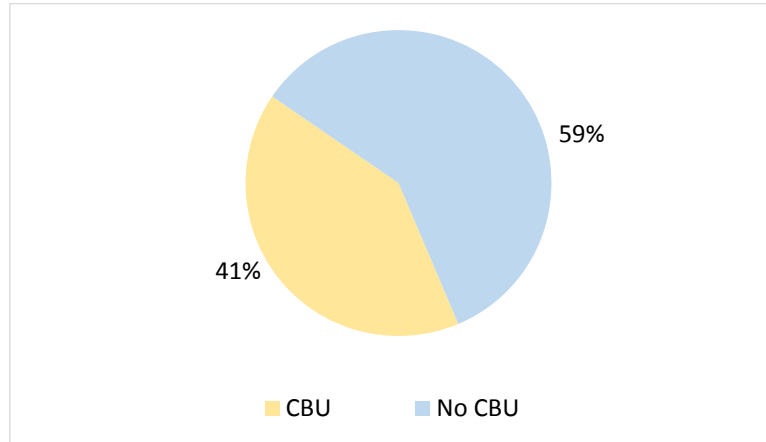
Most RTs identified physician resistance, as well as issues related to insurance and liability as major obstacles to establishing RTs authority to evaluate and treat per protocol. There was also a widely held perception that both registered nurses and physicians would strongly resist RTs having such authority. The conditions under which RTs would be allowed to prescribe therapy, including medication, the mechanism that establishes this authority, and the potential obstacles to its implementation are all issues that warrant further study.

Characteristics of RC departmental administration

The survey of RC directors asked respondents a series of questions related to departmental administration. The topics covered included: the impact of collective bargaining units on departmental management; the structure of departmental reporting; barriers to expanding RT service lines; the practice of allowing other non-RT health professionals to delivery respiratory therapy; and the role played by their department’s medical director in defining the scope of respiratory care at their facility.

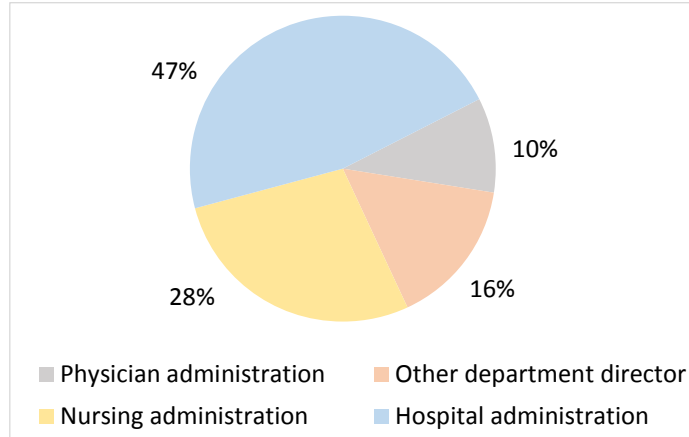
Forty-one percent of survey respondents reported that staff RTs at their facilities were members of a collective bargaining unit (Figure 20 below). A majority of these RC directors described the collective bargaining unit as having a negative impact on the department, referencing a *“confrontational”* and *“entitled”* attitude the arrangement fosters, particularly during contract negotiations. However, the most frequently reported negative impact was the *“lack of incentive”* that the arrangement creates. Directors noted the fact that professional advancement, including wages, is determined by the terms of the negotiated contract as opposed to performance. They also reported that the collective bargaining structure favors seniority, which can have the effect of demoralizing younger staff who have no choice but to wait their turn for new opportunities. Overall, survey respondents who viewed the collective bargaining unit negatively felt that it significantly limited the tools that departments might otherwise employ to promote exceptional patient care.

In contrast, approximately ten percent of the RC directors who manage departments with represented staff described the arrangement as a *“labor-management partnership,”* reporting that it was generally beneficial. These RC directors emphasized that it fostered a collaborative atmosphere and had the effect of making staff feel engaged. One-quarter of the surveyed RC directors who reported managing staff RTs represented by a collective bargaining unit indicated that it had little or no impact on the department.

Figure 20. Share of RC directors that manage staff who are members of a collective bargaining unit

110 total responses

RC directors were asked indicate whom they report to within their organization. Figure 21 shows that nearly half of all RC directors (47 percent) directly report to a hospital administrator, which included the following position titles: *CEO, COO, Chief Administrative Officer, Facility Administrator, Director of Clinical Services, and Director of Ancillary Services*. More than one-quarter of respondents indicated they report directly to the *Chief Nursing Officer (CNO)*. Position titles for the response category of “physician administration” included *Medical Group Administrator and Chief Clinical Officer or Director of Critical Care Medicine*. Position titles represented by the response category of “other department director” included *Director of Ambulatory Services, Director of Acute Care Services, and Director of Pulmonary Services*.

Figure 21. Organizational reporting structure for RC directors

104 total responses

Surveyed RC directors were asked to describe any barriers to expanding respiratory therapy service lines at their facilities. Approximately one-quarter of respondents reported having no barriers to expanding service lines, indicating that the relationships between the different administrative structures involved were generally positive and that upper management was supportive of service line growth.

For RC directors who reported barriers to expanding service lines, including the use of therapist-driven protocols, the reasons can be categorized into broad groups:

Financial – RC directors frequently cited financial barriers to expanding service lines. At many facilities this is due to an overall desire to reduce operating costs; at others, it is the impact of budget limitations that prevent the development of new service lines, including the hiring of qualified staff. RC directors also cited low

reimbursement rates for respiratory care services—including revenue loss on respiratory care procedures—as barriers, particularly under circumstances where labor costs are considered high.

Scope of practice – RC directors cited a lack of awareness by key stakeholders (administration, other clinicians) as to the range of clinical activities respiratory therapists can perform and how they might be utilized in different care settings (e.g. inpatient, ambulatory or home-based settings). They also reported that there is overlap in the functions and responsibilities of respiratory therapists and registered nurses, which contributes to a sense of territoriality. Factors such as convention, tradition, or an organizational culture influenced by RNs can have the result that RTs are under-utilized. Additionally, among facilities that are teaching hospitals, directors indicated that some services are reserved for physicians in the interest of providing learning opportunities.

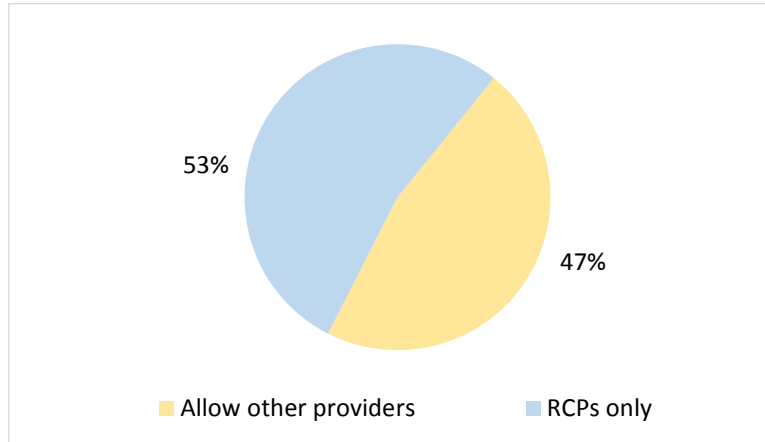
Lack of Support – RC directors reported that a lack of institutional support functions as a barrier to expanding service lines. They cited medical directors who are unwilling to implement therapist-driven protocols or other physician and nursing personnel who view expanded utilization of RTs as a challenge to their authority. They also reported that expanding service lines requires a commitment of time and resources (e.g. development of proposals and implementation plans); even under circumstances where there may be no outright opposition, the lack of political will can be a significant barrier.

Staffing – RC directors reported that staffing issues contribute to limiting the expansion of certain service lines. For example, an insufficient number of staff RTs with the requisite clinical preparation or skills was cited as a barrier. The lack of an obvious career ladder at some facilities can be a disincentive to pursue further education and training, which may contribute to a less engaged staff and a culture less interested in pursuing new opportunities. In facilities with union-represented staff, labor agreements may present a contractual barrier to developing new service lines.

Administrative – RC directors indicated that barriers to expanding respiratory therapy service lines sometimes derive from administrative organization. Related to scope of practice, inefficient departmental reporting structures contribute to a lack of awareness of the range of clinical services RTs can deliver across settings. If decision-making is highly centralized, with multiple administrative layers, the time and effort needed to gain approval for a change in service or an expansion of service can be a barrier.

Below, Figure 22 describes RC director responses to a question about whether their facilities allow other clinical healthcare professionals to provide respiratory care services. It shows that facilities were nearly evenly divided over this practice. Fifty-three percent of respondents reported that the delivery of respiratory care is limited to RTs; 47 percent indicated that other clinical practitioners are allowed to provide respiratory care services.

Registered nurses were the most frequently cited non-RT provider of respiratory care. However, many of the RC directors reported that RNs do so only in specific circumstances; for example, only in an emergency or if an RT is not immediately available. In addition, almost all RC directors reported that respiratory care delivered by RNs or other non-RTs was limited in scope. The most common types of interventions reported were administering a nebulizer, oxygen therapy, or delivering medication with a metered dose inhaler (MDI). A small number of directors reported that licensed vocational nurses (LVN) and medical assistants (MA) also provide respiratory care, specifying that MAs perform bedside spirometry and LVNs deliver breathing treatments in the subacute care setting.

Figure 22. Share of facilities that allow other clinical healthcare professionals to provide respiratory care

110 total responses

Surveyed RC directors were asked to describe the role the medical director plays in defining the scope of respiratory therapy practice at their facility. Nearly a quarter of respondents reported that the medical director played little to no role in this context. A smaller number (approximately 15 percent) indicated that the medical director plays a consultative role, serving as an advisor in the development of departmental policies and clinical procedure guidelines, but does not take an active role in defining the scope of practice.

The majority of RC directors who responded described an actively engaged medical director. The specific ways in which medical directors play a role in defining the scope of respiratory care practice included:

- Taking the lead role in developing departmental policies and defining clinical procedure guidelines
- Collaborating in the design of therapeutic protocols and advocating for their implementation
- Being a champion for expanding the clinical practice of RTs into areas traditionally covered by physicians and registered nurses
- Serving as a liaison between RTs and other care providers as well as the respiratory care department and other administrative departments
- Encouraging interdisciplinary care teams
- Determining what service lines are offered and collaborating in the development of new lines
- Supporting RTs with education and training resources as new modalities are introduced into practice
- Advocating for clinical practice initiatives driven by evidence-based medicine
- Playing an active role in the continuing education of staff RTs
- Serving as a mentor to staff RTs

Career ladders and incentives for additional education

RTs who participated in the focus groups were asked whether their facilities had a defined career ladder, or professional development plan. In general, participants indicated there was no defined career ladder or plan designed to encourage professional development. Some RTs described the career ladder at their facilities as *“get hired as a floor therapist, then get a specialty credential (e.g. critical care) and work in that area until a supervisor position becomes available, and then hang around some more until a managerial position becomes available, and then wait for the head of the department to retire.”* However, this “pathway” to career advancement may not be available for some RTs. Several participants noted that there is no distinction between supervisors and managers at their facilities or among specialty areas (i.e. no recognition for being credentialed).

There were exceptions to this characterization. RTs who work in academic medical centers or in facilities that have a similarly comprehensive set of services were more likely to describe a defined clinical ladder that involved increased compensation for demonstrating competence in defined roles, such as *charge therapist* or *clinical preceptor*. These RTs were also more likely to report opportunities to do things such as participate in research activities or play a role in administrative committees focused on systems issues like quality improvement, governance, or hiring policy that may, in turn, lead to professional opportunities with more broadly defined responsibilities (i.e. not limited to the practice of respiratory care).

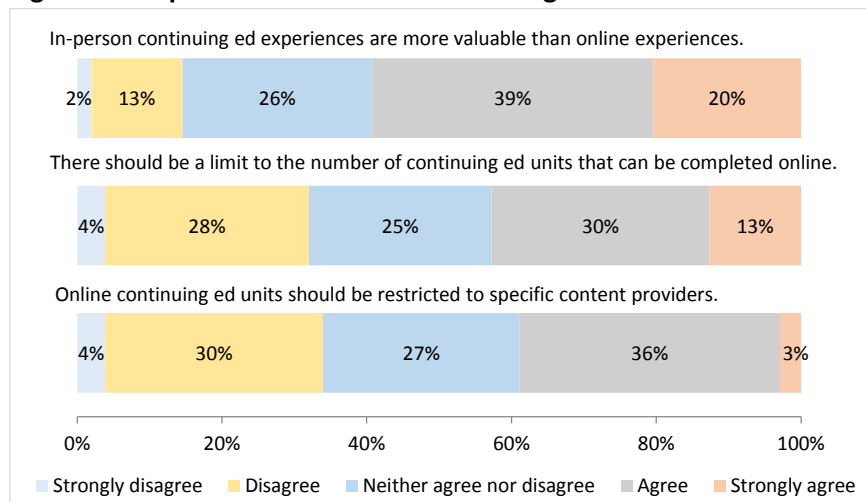
Financial support for degree advancement or specialty credentials was common, though the amount varied considerably; in many cases there was support for either degree advancement or specialty credentialing. Most RTs reported small amounts of scholarship money available for degree-based education or specialty credentialing, though they also reported that it was difficult to access the support for reasons related to administrative “*red tape*” or schedule-related challenges. Several therapists reported having to lobby aggressively to make use of available funds.

As with career ladders, RTs who work in academic medical centers or in facilities that have a similarly comprehensive set of services were more likely to describe generous support for additional education (either degree advancement, specialty credentialing, or attendance at professional conferences). They were also more likely to report encouragement by departmental administration to pursue additional education. Said one RT, “*At my facility, we provide \$10,000 for degree advancement [a lifetime cap], we provide reimbursement for certifications, and we also provide each employee 20 hours a year for conferences.*” Whether or not their facility provided support, almost all RTs emphasized that self-motivation was (or would be) the driving force for degree advancement or pursuit of a specialty credential rather than financial gain or the expectation of promotion.

Continuing education requirements

RC directors who participated in the statewide survey were asked to agree or disagree with a series of statements regarding continuing education for respiratory therapists. Figure 23 (below) indicates substantial support for in-person continuing education compared with online education. Nearly 60 percent of directors agreed with the statement “in-person continuing education experiences are more valuable than online continuing education experiences.” However, the view that in-person continuing education has more value does not necessarily translate into support for the idea that online education should be limited. Only 43 percent of directors agreed with the statement “there should be a limit to the number of continuing education units that can be completed online.” A slightly smaller share of directors (39 percent) agreed with the statement “online continuing education units should be restricted to specific content providers (e.g. AARC, Society of Critical Care Medicine).”

Figure 23. In-person versus online continuing education

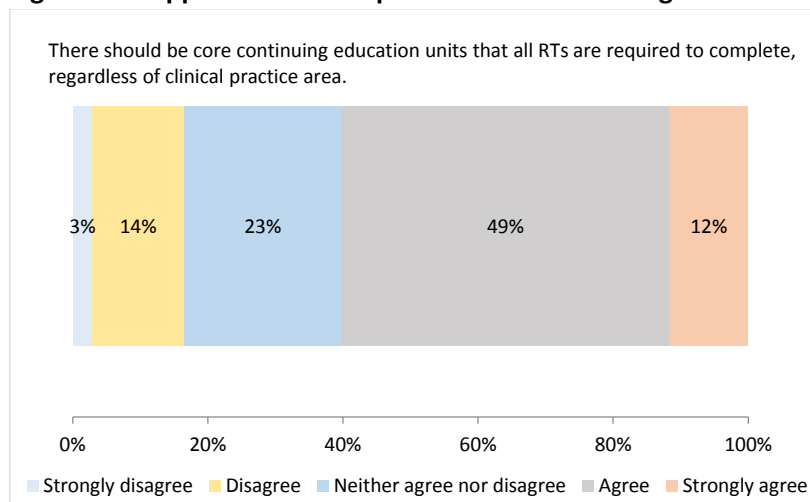


103 total responses

RTs who participated in the focus groups expressed similar views of the value of in-person continuing education experiences relative to those delivered in an online format, citing the greater level of interaction with an instructor as well as the opportunity to network with peers. However, as with RC directors, the convenience of online continuing education is also valued. Many RTs emphasized the challenges of scheduling time off to attend education-related events; additionally, for those who work in less populated areas of the state, the costs of travel (both time and money) can be prohibitive. With respect to restricting online continuing education to specific content providers, many RTs expressed support for the idea in the interest of quality assurance, but others expressed confusion regarding whether or not such restrictions already exist. They wondered why there would be reason to impose limits beyond those already defined in the section of California’s Business and Professions Code regulating continuing education for respiratory care.

Figure 24 shows that surveyed RC directors expressed strong support for the idea of establishing core continuing education requirements for all respiratory therapists, regardless of specialty or clinical practice area. Sixty-one percent of directors agreed with the statement “there should be core continuing education courses that all respiratory therapists are required to complete, regardless of their clinical specialty.

Figure 24. Support for core requirements in continuing education



103 total responses

In general, focus group participants also expressed support for the idea of establishing core requirements for continuing education. A small number of RTs raised concerns over how such core requirements might limit their opportunities to pursue continuing education related to their clinical practice areas. However, RTs who supported the idea viewed it as having the potential to develop stronger professional norms and expectations. One RT noted, *“I think it could help us build our professional identity as respiratory therapists.”*

Surveyed RC directors were asked to identify areas of content that could represent potential core continuing education units that all RTs would complete. Table 14 shows that three broad areas of content had the support of approximately three-quarters of all directors: patient education, patient-centered care, and current approaches to non-invasive ventilation. It also shows that very few directors (4 percent) felt there should be no core requirements for continuing education. Directors were given the opportunity to write-in content areas (not listed in the survey instrument) that could be considered for potential core continuing education requirements. Their responses included chronic disease management, psycho-social care, pulmonary diagnostics, and ventilator management.

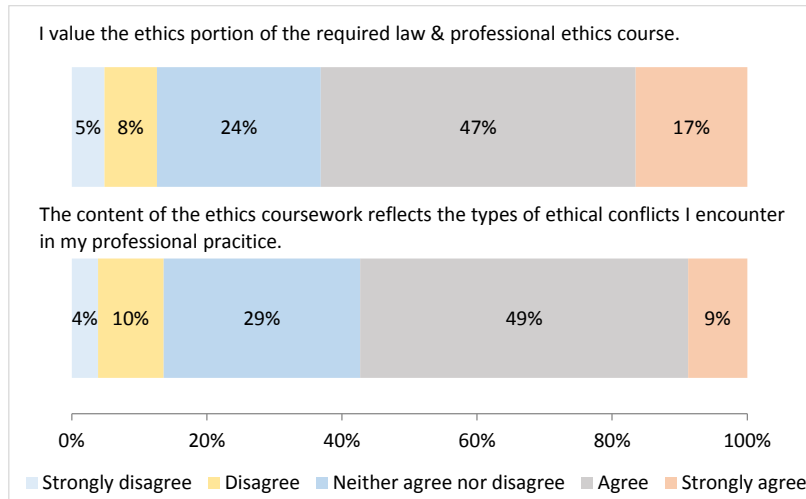
Table 14. Suggested content areas for required continuing education units

Type of degree earned		
Patient education	80	79.2
Patient-centered care	77	76.2
Current approaches to non-invasive ventilation	73	72.3
Aerosolized medications	62	61.4
Accountable healthcare (cost-effectiveness)	56	55.4
Communication strategies for difficult conversations	55	54.5
Leadership development	55	54.5
Case management	46	45.5
Community health models	43	42.6
None	4	4.0
Other	9	8.9
Unique responses	101	--

Among RTs who participated in the focus groups, the topics suggested as potential core CE courses included current research/evidence-based medicine, financial reimbursement systems, EHR meaningful use criteria, critical thinking in the context of emergency or critical care, neonatal/pediatric versus adult care, ventilator therapy, pharmacology, treatment of asthma, and chronic obstructive pulmonary disease (COPD).

Required ethics coursework

RC directors were asked to agree or disagree with statements regarding the ethics portion of the required *Law & Professional Ethics Course* that licensed respiratory therapists must complete every other renewal period. Approximately two-thirds of directors agreed with the statement *“I value the ethics portion of the required law & professional ethics course,”* as shown in Figure 25 (below). A smaller share (58 percent) agreed with the statement *“the content of the ethics portion of the required law & professional ethics course reflects the types of ethical conflicts I encounter in my professional practice.”* The share of directors who disagreed with either of these statements was comparatively small, indicating the ethics portion of the course is generally well-regarded in terms of the value it holds for the profession and its ability to incorporate real-world ethical conflicts. RTs who participated in the focus groups expressed similar support for the ethics course, describing it as having a generally positive effect on the profession. None of the RTs felt there was any reason to stop requiring the course or change how often it is required. However, most RTs felt the content of the ethics course could be updated more frequently to keep it relevant.

Figure 25. Value of ethics content in required law & professional ethics course

103 total responses

Education directors' perceptions of labor market conditions for new RT graduates

Education directors were asked to share their perception of the labor market conditions faced by new graduates of their programs. Their views suggest regional differences in new graduates' prospects for employment. Two program directors in the Bay Area region reported it has become easier for new graduates to find employment in recent years, citing feedback from graduates indicating that it is taking less time for them to find a job. One of these directors indicated that all of the program's 2016 graduates found employment within several months of graduation and attributed the improved job prospects in the Bay Area to an increase in the number of therapists following through on plans to retire.

A program director in the Greater Sacramento area offered a more qualified view of labor market conditions faced by new graduates, stating that there are a "lot of jobs out there," but that students need to be prepared to take a job that is not in the acute care setting. He remarked, "Everybody wants to be an acute care therapist working in the ER or ICU and the reality is, they may get there, but they're going to have to pay their dues in home health or in rehab." He emphasized that although positions outside of acute care may be "less glorified," they are important and offer valuable experience.

Program directors in the Los Angeles and San Diego areas, as well as both the Inland Empire and Central Valley regions, described labor markets in which it is very challenging for new graduates to find employment. Directors reported that these markets are saturated with experienced RTs and indicated that even with open positions, hospitals are reluctant to hire new graduates because they are confident that they will find a more experienced candidate. Adding to the pressure is what education directors who were interviewed described as an oversupply of new graduate RTs. Several directors reported that they are encouraging graduates of their programs to leave California in search of employment opportunities. They pointed to growth in the number of respiratory therapy education programs as the principle factor responsible for the labor market conditions new graduates face. Said one director, "It's ridiculous how the number of respiratory therapy programs has grown in California. There are way too many programs. We don't need this many programs. I really wish our profession would get together and do something because there are too many students graduating who can't find a job."

RTs' view of critical professional issues in respiratory therapy

RTs who participated in the focus groups were asked to identify, from their perspective, the most critical professional issues facing respiratory therapy. Many RTs expressed concern about the future of respiratory

therapy's position in the healthcare system. There was a sense that facilities' desire to reduce costs could lead to greater utilization of RNs and other health professionals to deliver respiratory care. Professional standing was cited by most RTs, noting that physicians and RNs in particular show a lack of respect for the role of RTs. One RT commented, *"I've been working with these same people for more than a decade, they constantly call me for consults and obviously rely on my expertise, but they don't even bother to learn my name, I'm just the RT."*

Many RTs cited the need for professional development opportunities beyond the model of stepwise advances within the department, where the associated pay differentials can be marginal. There was a strong sense that RTs need to push for practicing to the full extent of their scope of practice, but that efforts need to be tied to defining new professional roles for RTs that create opportunities for advancement and incentivize the investment in additional education and training. They emphasized the role of advanced education in shaping professional specialization. There was broad agreement on the need to empower the profession, to develop a stronger professional identity and build an advocacy network for professional issues. RTs acknowledged that they need to be willing to speak up for themselves and make a case for their value in the healthcare system.

Several RTs identified staffing acuity as an important issue, noting that the number of patients they are caring for has increased dramatically and there are no clear guidelines around patient safety as relates to RT patient load. It also creates a dynamic where RTs feel like they cannot schedule time off for fear of making their colleagues miserable. Many expressed a desire to spend the extra time communicating with patients and educating them on medications and discharge planning – to *"practice patient-centered care"* – but cited workload volume as an obstacle. It was suggested that respiratory therapy needs its own RT to patient staffing ratio, akin to California's minimum nurse to patient staffing ratio.

Other RTs cited the *"flood of new graduates"* entering the field as contributing to a very challenging labor market in terms of opportunity for regular employment. One RT described it as *"precarious employment,"* remarking that, *"there are a lot of unemployed respiratory therapists out there."* There is a common perception that RTs need to start their careers in critical care *"where you learn to do everything"* and then move to a less acute practice area if desired. Several RTs expressed concern that when new graduate RTs are not able to find opportunities in critical care settings, over time they become *"second class"* therapists for that lack of experience. Almost every RT who participated in the focus groups had a negative opinion of certain education programs, seeing them as not offering a quality education. In addition to contributing to a challenging labor market, RTs also saw the large number of new graduates entering the field as having the effect of *"diluting the quality of the workforce."*

CONCLUSION

This report summarizes the findings from a multifaceted research study of California's respiratory care workforce. The study components included key informant interviews, a statewide survey, a series of focus groups, comparative analyses of respiratory therapy education in terms of competencies and curricular content, and a review of academic literature. The principal objective of the study was to discover the *perceptions and opinions* of key stakeholder groups on a range of critical respiratory care workforce issues, including the preparedness of new graduate respiratory therapists to enter the workforce, supervised clinical experiences in respiratory therapy education, minimum degree requirements for entry in professional practice, utilization of respiratory therapist-driven protocols, and continuing education requirements for RTs.

The study also analyzed differences in the structure and content of baccalaureate versus associate degree programs in respiratory therapy. In addition, differences in the stated competencies and minimum curricular content requirements of entry-level respiratory therapy education programs in comparison to baccalaureate registered nursing, physician assistant, physical therapy, and nurse practitioner education programs were described. Finally, the study conducted a search of academic literature to identify any scholarly work that addresses the relationship between the type of degree earned by respiratory therapists and patient outcomes.

The findings presented in this report identify several critical challenges in both respiratory therapy education and professional practice. The quality of RT students' clinical training lacks consistency due to programs' reliance on non-faculty members to supervise clinical training and facilities that may not expose students to the full scope of respiratory care practice; education program directors cited competition from other RT programs as an exacerbating factor. Currently employed RTs and RT education program directors identified critical thinking and its role in diagnostic reasoning as the most important competency needing greater emphasis in respiratory therapy education. Education directors felt this need could be addressed through additional exposure to problem-based learning, but acknowledged that an already compressed curriculum would be a limiting factor.

There is widespread support for moving respiratory therapy education to the baccalaureate degree level, however, education directors identified several concerns, including the administrative demands such a transition would entail. Almost all of the study participants endorsed granting RTs the authority to prescribe and treat per therapist-driven protocol. However, there were conflicting views about the practical steps that will need to be taken in order to establish this authority, and concerns were raised about how it might meet with resistance from other stakeholders. Finally, employed RTs noted the proliferation of RT education programs and resulting increase in the number of graduates as having a deleterious effect on new graduate employment opportunities. This view was shared by several education program directors, who reported that they have begun advising their graduates to expand their search for employment to include opportunities outside of California.

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APPENDIX A. Literature Review: Selected Respiratory Care Education Outcomes



California Respiratory Care Workforce Study

Literature Review: Respiratory Care Education Outcomes

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August 11, 2015

This project is supported by funding from the Respiratory Care Board of California.

Overview

The principal objective of the literature review was to identify scholarly work that addresses the relationship between the type of degree earned by respiratory care practitioners and patient outcomes. Other objectives included a review of any literature examining the relationship between type of degree earned and respiratory therapy continuing education outcomes, or literature addressing formal disciplinary actions taken against respiratory therapists in which skills deficiencies or educational background was considered a factor.

Methods

The first step in the literature review was to develop a set of key search terms (see Appendix A). These terms were combined to form dozens of logical variations when performing each search, in each of the databases utilized. Examples of these combinations include “respiratory therapy & education”, “respiratory therapy & education & bachelor’s degree”, “respiratory therapy & degree type & clinical outcomes”, “respiratory therapy & continuing education”, “respiratory therapist & disciplinary action”, “respiratory therapist & disciplinary action & credentials”.

In addition, we used Medical Subject Headings (MeSH) to conduct a supplementary search in PubMed. MeSH is the National Library of Medicine’s “controlled vocabulary thesaurus” used to index articles from more than 5,000 leading biomedical academic journals. We used the entry term “respiratory therapy” and then selected appropriate subheadings (see Appendix A) to filter for publications relevant to the scope of our literature search.

Finally, the citations of articles and reports determined to have relevance to the scope of our search were closely examined to identify literature that may not have been discovered using the key search terms or the MeSH subheadings. This process was augmented by searching specifically for articles and reports published by authors who had been already identified as having published possibly relevant material.

Findings

Our literature review did not identify any scholarly work specifically addressing the relationship between a respiratory therapist’s education level and patient outcomes. Nor did it identify any scholarly work examining the outcomes of respiratory therapy continuing education where degree type was a factor. Our review also failed to discover any scholarly work examining formal disciplinary actions taken against respiratory therapists in which skills deficiencies or educational background was implicated.

A common theme in the literature that we reviewed was an awareness of the lack of peer-reviewed research that could be used to guide policy-making. There is a body of literature that addresses the educational requirements of respiratory therapists, including whether or not the bachelor’s degree should be the standard for entry into professional practice. However, in the debate over the necessity of baccalaureate education, the “evidence” is derived from perceptions and attitudes.

We identified only a single study that used empirical data to examine differences in outcomes of any kind, where the type of degree earned by a respiratory therapist was a factor. In that study, the authors compared respiratory therapy credentialing exam results for candidates who had earned an associate degree with those of candidates who had earned a baccalaureate degree. The authors found small, but statistically significant, increases in exam pass rates for baccalaureate-educated candidates. However, the authors also concluded that type of degree explained only a small part of the variation in credentialing exam results.

The results of surveys measuring perceptions and attitudes regarding baccalaureate education reveal a mixed picture. For example, in a national survey of respiratory therapy department directors in health care organizations, preferences for hiring therapists educated at the baccalaureate level versus the associate degree level were equal. However, more directors (58 percent) felt that the associate degree should remain the required degree for entry

into practice than felt it should shift (42 percent) to the bachelor's degree. In a national survey of respiratory therapy education program directors, 87 percent of directors at baccalaureate programs felt the bachelor's degree should be required for entry into practice, while 81 percent of directors at associate degree programs felt that the associate's degree should remain the required degree.

In a 2007 survey of California employers and educators, only 30 percent of respiratory care directors indicated that the entry-level credential should be increased to a four-year degree. At the same time, 80 percent reported having difficulty hiring therapists and the lack of qualified personnel was cited as a principal reason. In the same survey, only 40 percent of education program directors indicated that a four-year degree should be required. However, 80 percent reported having received feedback from employers that newly hired therapists lacked knowledge of basic concepts of respiratory care.

There does seem to be a consensus around the idea that a bachelor's degree should be required for therapists to advance in the profession. In one national survey of education program directors, all of the directors of baccalaureate programs and two-thirds of the directors of associate degree programs felt that a bachelor's or master's degree should be required at some point after entering practice. In two different national surveys of respiratory care managers, respondents overwhelmingly favored hiring practicing therapists who held or were working toward a bachelor's degree, or requiring a bachelors' degree to advance in the profession.

A salient theme of the literature focused on the educational requirements of respiratory therapists is the importance of developing therapists' ability to think critically. Critical thinking is a broadly applied skill influencing all other areas of competency, and the literature emphasizes its necessity in such contexts as critiquing published research, interpreting statistical testing, modifying protocols based on new evidence, and articulating rationales for modes of therapy. A national survey of education program directors found that baccalaureate level programs are much more likely than associate degree programs to teach the types of competencies, outlined above, that develop critical thinking skills.

There is some evidence that a greater breadth of coursework is associated with greater critical thinking ability among respiratory therapy students. In a study of students enrolled in a baccalaureate-level program, those with a strong science course background (i.e. more coursework) scored significantly higher on the Watson-Glaser Critical Thinking Appraisal compared to students who had a weaker background. Other studies of critical thinking ability in health sciences students have shown that coursework in the humanities and interdisciplinary fields have a statistically significant positive association with critical thinking.

These findings may be relevant to respiratory therapy education, which overwhelmingly occurs at the associate degree level. There are reports that it's common for students to spend three years completing the curriculum. If developing therapists' ability to think critically is considered necessary, given the requirements of an expanding professional role, it may be that this is accomplished by extending the required curriculum to include additional coursework in both the sciences and humanities. Such a scenario could result in a functional equivalency between associate's degree and bachelor's degree programs in terms of time to completion.

Although the literature review did not identify any scholarly work that directly addresses the main objective, it did identify literature that has some relevance. The same cannot be said for the secondary objectives. Our review failed to identify any literature that in any way addressed the outcomes of respiratory therapy continuing education where educational background was a factor. Similarly, it failed to identify any literature on the topic of disciplinary actions taken against respiratory therapists, for any reason.

Journal Articles

Barnes, T.A., Kacmarek, R. M., Durbin, C. G., Kageler, W. V., Walton, J. R., & O'Neil, E. H. (2009). Creating a vision for respiratory care in 2015 and beyond. *Respiratory care*, 54(3), 375-389.

- Findings from the first AARC conference on the future of respiratory care
- Clinical decisions will be increasingly driven by data
- Protocols will become most common way to deliver care
- Need for RTs to be engaged in research and adept at interpreting published findings
- A range of technologies will require RTs to master new bodies of clinical information
- RTs will be expected to play greater role in disease management which will require expanded scope of knowledge and skills
- Directors of RT education programs will have trouble filling vacant faculty positions due to shortage of adequately prepared RTs
- Planned retirements of RT program directors and RT clinical education directors expected to put pressure on accredited RT programs to increase number of graduates trained at baccalaureate and master's level

Barnes, T.A., Gale, D.D., Kacmarek, R.M., Kageler, W.V. (2010). Competencies needed by Graduate Respiratory Therapists in 2015 and Beyond. *Respiratory care*, 55(5), 601-616.

- Findings from the second AARC conference focused on identifying and reaching consensus on the competencies needed by graduates of respiratory therapists to meet scope of practice requirements described in the first AARC conference
- Consensus reached on 69 discrete competencies needed in seven main areas:
 - Diagnostics
 - Disease Management
 - Evidenced-based medicine and respiratory care protocols
 - Patient assessment
 - Leadership
 - Emergency and critical care
 - Therapeutics
- Critical thinking one of the most important skills needed by graduates now entering the workforce as it broadly applies to all areas of competency

Barnes, T. A., Kacmarek, R. M., Kageler, W. V., Morris, M. J., & Durbin, C. G. (2011). Transitioning the respiratory therapy workforce for 2015 and beyond. *Respiratory care*, 56(5), 681-690.

- Findings from the third AARC conference focused on creation of plan to change professional education process to allow RTs to develop needed skills, attitudes, and competencies
- Key recommendations:
 - AARC request that COARC change accreditation standard to state that newly accredited RT programs must award either a baccalaureate or graduate degree, and that currently accredited RT programs transition to new degree standard by 2020.
 - Retire the CRT examination after 2014
 - Clinical simulation be a major tactic used in continuing education venues to assess competency of RTs
- Recommendations that failed to get approval:
 - Two levels of practice be formally established
 - AARC recommend to its chartered affiliates that they recommend to their state regulatory boards that the RRT become a requirement for licensure

Barnes, T. A., Kacmarek, R. M., & Durbin, C. G., Jr. (2011). Survey of respiratory therapy education program directors in the United States. *Respiratory Care*, 56(12), 1906-1915.

- Survey of 435 directors of respiratory therapy education programs focused on:
 - Competencies covered in programs
 - Opinions about program length
 - Education needs of practicing RTs
 - Credentials needed by graduating RTs
- Bachelor's degree program more frequently teach competencies in the major areas of evidenced-based medicine and RC protocols, leadership, diagnostics, chronic and acute disease management, and emergency care
- Bachelor's degree programs *much* more likely to cover:
 - Critique of published research
 - Interpreting statistical testing
 - Application of evidence-based medicine to clinical practice
 - Describing health care financial reimbursement and how to reduce cost of care delivery
- Most program directors thought that the associate's degree was sufficient for entry into practice, but differences in opinion correlated with program type:
 - 87% of directors at bachelor's programs thought bachelor's degree should be required
 - 81% of directors at associate's programs thought associate degree should be required
- All directors at bachelor's programs and two-thirds at associates' programs felt that a bachelor's or master's degree should be *required* to advance in the profession
- Most directors (69%) felt that the RRT credential should be required

Becker, E. A. (2003). Respiratory care managers' preferences regarding baccalaureate and master's degree education for respiratory therapists. *Respiratory care*, 48(9), 840-858.

- More than 1,400 members of the AARC Management Section were surveyed to determine respiratory care managers' preferences regarding baccalaureate and graduate education for practicing RTs
- 70% of managers preferred to hire RTs who held or were working toward a bachelor's degree
- Only 34% of respondents prefer to hire RTs from entry-level baccalaureate programs
- Baccalaureate degree completion via distance education was equally valued as traditional degree program
- Hiring managers expressed preference for hiring RTs with master's degrees for leadership and management positions

Becker, E.A. (2003). Point of View: Promoting Baccalaureate Completion among Respiratory Therapists. *Respiratory Care Education Annual*, 12, 11-19.

- Article examining the characteristics associated with "professional" status
- Associate degree education does not meet standard for professional recognition
- Proposes that RT education move to entry-level baccalaureate in stages and initially target working RTs
 - Challenges manifest by the fact that so much of RT education occurs at associate degree level
 - Job performance of current RTs needs to warrant baccalaureate-level education
- Need for higher-level professional skills (e.g. therapist-driven protocols and evidence-based medicine) is apparent in the NRBC examination matrix shift toward analysis-level items and away from recall and application items
- Associate degree program have less time to address coursework that gives breadth to RT education
- Associate degree programs have credit loads that extend beyond the traditional two years
- Baccalaureate education can improve RT practice:
 - Patient documentation
 - Articulating rationale for therapies
 - New approaches to patient care
 - Interpreting clinical literature

Kacmarek, R., Barnes, T., Durbin, C. (2012). Survey of Directors of Respiratory Therapy Departments Regarding the Future Education and Credentialing of Respiratory Care Students and Staff. *Respiratory Care*, 57(5), 710-720.

- Survey of 2,300 respiratory therapy department directors and managers regarding:
 - Required length of education programs
 - Educational needs of practicing therapists
 - Needed credentials for graduating therapists
- Preference for hiring baccalaureate-prepared RTs was equal to preference for hiring associate degree-prepared RTs
- Median number of weeks to orient a newly hired baccalaureate-trained RT was 4 weeks compared to 6 weeks for an associate degree-prepared RT
- 42% of respondents felt that a baccalaureate degree should be required for licensure compared to 58% who felt that only an associate degree should be required
- 70% of respondents favored requiring a baccalaureate or master's degree to advance in practice
- 81% of respondents favored the RRT credential being required to practice in 2015 and beyond
- 81% of respondents felt that RTs should be required to maintain an *active* credential (whether CRT or RRT) to renew license to practice
- 44% of respondents felt that RT grads and existing staff should know how to critique published clinical research
- 40% of respondents felt that RT grads and existing staff should know how to interpret general statistical tests
- 85% of respondents expected RTs to understand evidenced-based medicine as bases for RT-driven protocols
- 90% of respondents reported that disease management was a major competency area needed by future RTs

Shaw, Robert C., Jr. (2010). National Board of Respiratory Care. Effects from Education Program Type on RRT Candidate Outcomes.

- Study looked at four respiratory therapy credentialing exam outcomes in 2008, comparing two groups of first-time candidates:
 - Graduates awarded the bachelor's degree in respiratory therapy
 - Graduates awarded the associate's degree in respiratory therapy
- Four exams outcomes were:
 - Passing the CRT exam on first attempt
 - Passing the written RRT exam on first attempt
 - Passing the Clinical Simulation Exam on first attempt
 - Passing all three exam components required for RRT credential on first attempt
- Bachelor's degree associated with a small, but statistically significant, increase in CRT exam pass rate, written RRT exam pass rate, and Clinical Simulation Exam pass rate.
- Bachelor's degree candidates were more likely to be successful in passing all three RRT exam components on first attempt, but the small difference was not statistically significant.
- Bachelor's degree exerted the biggest positive effect (statistically significant) on the CRT exam pass rate.
- Author concludes that replacing associates with bachelor's programs would NOT be expected to significantly increase first-time success rate of RRT candidates.
- Overall, degree type explains very little of the variance in exam outcomes.

Walsh, B.K., Gentile, M.A., Grenier, B.M. (2011). Orienting new respiratory therapists into the neonatal/pediatric environment: A survey of educators and managers. *Respiratory Care*, 56(8), 1122-11129.

- Survey of directors of RT education programs and RT department managers in hospital-based respiratory care departments designed to address the following questions:
 - Are RTs adequately prepared to enter neonatal/pediatric environment?
 - What is the length of orientation needed to achieve basic competency in this environment?
 - What are the methods used to train new neonatal/pediatric RTs?
- 21% of respondents *agreed* that associate degree programs adequately prepare RTs to work neonatal/pediatric care environment immediately after graduation
- 36% of respondents *agreed* that bachelor's degree programs adequately prepare RTs to work neonatal/pediatric care environment immediately after graduation

Wettstein, R., Wilkins, R., Gardner, D., Restrepo, R. (2011). Critical Thinking Ability in Respiratory Therapy Care Students and Its Correlation with Age, Educational Background, and Performance on National Board Examinations. *Respiratory Care*, 56(3), 284-289.

- Analysis of 55 students (seniors) in a bachelor's-level RT program to determine relationship between critical thinking ability and selected characteristics of age, background in science, and NBRC clinical simulation exam
 - Critical thinking ability measured by score on Watson-Glaser Critical Thinking Appraisal (WGCTA-S)
 - Background in science measured as number of hard science courses taken in addition to standard science prerequisites
- Statistically significant relationship between strong science course background and critical thinking score; students with above average score were 4 times more likely to have strong science course background

Published Reports

Cowles, E. L. S., S.J.; Eggers, R.; Small, M. (2007). California Respiratory Care Practitioner Respiratory Care Board: Institute for Social Research.

- Multi-component survey of California's RT workforce, RT employers, and RT education programs
- Survey of acute care employers:
 - Nearly 80% reported difficulty hiring RCPs and cited a lack of qualified RTs as one of the main factors
 - Almost half reported that it took 4 months or longer for new RTs to get up to speed on basic skills
 - 37% reported RTs are underprepared by education programs
 - 59% reported RRT should be entry-level credential
 - 66% supported requiring progression from CRT to RRT within time frame after licensure
 - 30% reported entry-level education should be increased to 4-year degree
- Survey of educational program directors
 - 90% supported state requiring minimum number of clinical hours
 - 75% reported RRT should be entry-level credential
 - 70% supported requiring progression from CRT to RRT within time frame after licensure
 - 40% reported entry-level education should be increased to 4-year degree
 - 80% reported that employer feedback indicated that graduates lacked knowledge of basic concepts of respiratory care
 - 75% reported that employer feedback indicated that graduates lacked exposure to the range of technology currently in use
 - 70% reported that employer feedback indicated that graduates don't have enough hands-on experience

Lok, V., & Dower, C. (2008). Respiratory Care and Imaging Technology in California: Education's Response to Workforce Shortages. Center for the Health Professions, University of California, San Francisco.

- Study consists of a series of 15 interviews of directors of RT education programs
- Key findings include:
 - Recruiting faculty from clinical settings to enter academia is ongoing challenge
 - Competition for clinical training sites is a problem for programs in urban areas
 - Cost of training makes securing an adequate budget a challenge for public programs

Modesto Junior College (2014). Application to Participate in California Community Colleges Baccalaureate Degree Program: Respiratory Care.

- Application claims that representatives from the eight health care facilities that provide clinical training spots for the college's RT program all support the development of a baccalaureate degree program.

Skyline College. (2014) Baccalaureate Degree Pilot Program Application for a Bachelors' of Applied Science in Respiratory Therapy.

- Application materials included results of survey of 30 Bay Area respiratory care managers
 - 93% of respondents indicated preference for bachelor's-educated RTs
 - 77% of respondents indicated that a bachelor's degree was either "very needed" or "absolutely needed" to do the job

APPENDIX

Databases Utilized

- PubMed
- CINAHL (Cumulative Index of Nursing and Allied Health Literature)
- Google Scholar
- Scopus (largest existing abstract and citation database of peer reviewed literature)

Key Search Terms

- respiratory therapy
- respiratory therapist
- education
- education level
- baccalaureate
- bachelor's degree
- associate's degree
- degree level
- degree type
- training
- credentialing
- patient outcomes
- patient care
- curriculum
- clinical outcomes
- evidence
- workforce
- continuing education
- adverse event
- disciplinary action

Medical Subject Heading (MeSH) Qualifiers (used for PubMed only)

- economics
- education
- manpower
- organization and administration
- psychology
- standards
- statistics and numerical data
- supply and distribution
- trends

APPENDIX B. Summary of Key Informant Interviews with RC Directors



University of California
San Francisco

California Respiratory Care Workforce Study

Key Informant Interviews with
Directors of Respiratory Care Services in California

Tim Bates, MPP

Joanne Spetz, PhD

Phillip R. Lee Institute for Health Policy Studies

University of California, San Francisco

December 14, 2015

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Executive Summary

This report summarizes the findings from ten key informant interviews conducted with directors of respiratory care services in California. The interviews were undertaken as part of a multifaceted research study. Their purpose was to capture directors' **perceptions and opinions** regarding critical respiratory care workforce issues, which will be used to help inform policy discussions.

Directors were asked about the preparedness of new graduate respiratory care practitioners (RCP) to enter the workforce, the need for baccalaureate education in respiratory therapy, the structure of supervision in clinical clerkships, granting RCPs the authority to prescribe therapy and medication per protocol, the content and structure of continuing education, and the impact of professional ethics and law coursework.

Competency of New Graduate RCPs

Directors were asked to comment on new graduates' level of preparation in specific areas of competence.

Diagnostics

- New graduates lack confidence in interpreting the results of tests used to diagnose different types of sleep disorders, and should be better prepared to evaluate a sleep study in terms of indications and contraindications.
- New graduates should have a more thorough understanding of test results from basic spirometry, better physical coordination of the procedure, and a greater working knowledge of advanced pulmonary function testing such as exercise, cardiac, and metabolic studies.

Disease management

- New graduates are well-prepared in terms of understanding the anatomy, pathophysiology, diagnosis, and treatment of common cardiopulmonary diseases and comorbidities, but have a poor grasp of disease etiology.
- Education programs should include more robust training in neonatal and pediatric disease processes; new graduates are not well prepared to manage care for this population.
- The basic components of patient education are not being effectively integrated into the curricula of respiratory therapy education programs.

Evidence-based medicine and respiratory care protocols

- New graduates should have greater exposure to evidence-based decision-making in respiratory therapy education, including how to critique a journal article and interpret statistical models used to demonstrate clinical findings.
- New graduates are comfortable adopting the use of protocols after extensive on-the-job training, but are not prepared to reference the clinical evidence base to explain the development and application of protocols, or articulate a rationale for updating protocols.

Leadership and management

- Emotional intelligence is underemphasized in respiratory therapy education and new graduates should be better prepared to manage relationships, build consensus, and collaborate in teams.
- New graduates should have stronger written and verbal communication skills.

- Education programs should provide students more meaningful exposure to systems issues such as healthcare financing and reimbursement, healthcare regulatory requirements, the cost-effectiveness of therapies, and departmental budgeting and supervisory structures.

Critical care

- Education programs teach to the knowledge and skills tested by the licensing exam, which is weighted heavily toward critical care competencies. As a result, critical care is the area in which new graduates are most competent.

Therapeutics

- New graduates are competent in assessing the need for, applying, and evaluating common therapies, but their knowledge of therapeutics is not integrated. New graduates should have a deeper understanding of the science that underpins the therapy.
- Respiratory care is becoming too reliant on the functioning of technology in the application of therapies.

New Graduates in Outpatient Settings

- Education programs haven't meaningfully incorporated chronic care and rehabilitation into the curriculum. New graduates are generally not well-prepared to deliver care outside the hospital setting.
- Education programs should incorporate more robust clinical experiences that expose students to pulmonary rehabilitation. The care model is moving toward preventive health and pulmonary rehabilitation is an opportunity for respiratory therapists to provide value-based care.

Supervising Clinical Education

- Clinical instructors designated by schools to work with students during their clinical rotations are very rarely onsite and do not provide students' clinical instruction.
- Formal preceptor programs used to train students during their clinical rotations are rare. Students are typically paired with a lead therapist who has expressed an interest in mentoring students and is regarded as an excellent teacher. However, supervision of clinical education can be as informal as simply pairing a student with an RCP who happens to be scheduled that day.
- Consistency in the relationship between students and the therapists who provide clinical instruction is one of the biggest challenges of the clinical clerkship.

Baccalaureate Education in Respiratory Therapy

Support for requiring a bachelor's degree

- There is wide-spread support for requiring a bachelor's degree for entry into practice.
- A bachelor's degree program is expected to provide additional time to develop clinical skills and knowledge; allow for an expansion of the didactic training to cover topics not adequately addressed in the current curriculum; increase exposure to clinical experiences outside the inpatient, acute care setting; and improve the professional standing of RCPs.
- There is a need to create specialty positions in clinical services, in outpatient care, and in leadership so that respiratory therapy can retain top talent. Requiring the bachelor's degree is seen as a way to drive this kind of professional development.

Concerns regarding a bachelor's degree requirement

- The current faculty may not be prepared to deliver the breadth and depth of content that would add value in a bachelor's degree program.
- It isn't clear what the return on investment would be for the therapist who earns the bachelor's degree:
- Nothing differentiates the bachelor's degree-trained therapist from the associate degree-trained therapist in terms of scope of practice regulations;
- There is no pay differential for earning the bachelor's degree;
- The bachelor's degree currently provides no clear advantage in terms of professional development;
- No evidence that a baccalaureate-trained therapist delivers better patient care outcomes.

Exercising Prescriptive Authority per Protocol

- There is wide-spread support for granting RCPs the authority to prescribe therapy and medication per protocol. However, there are differences of opinion on what will be required of RCPs in terms of training, the care settings in which this authority should be exercised, and the challenges around implementation.
- RCPs should be expected to demonstrate clinical competence at a more advanced level, and new competencies around case management will need to be developed – particularly as the care model expands to incorporate management of chronic conditions.
- RCPs should be educated at a minimum of the bachelor's degree level in order to exercise prescriptive authority per protocol, for reasons related to both clinical training and professional standing. However, there is support for requiring RCPs to hold a master's degree or some kind of post-licensure credential, as well as additional licensing, in order to prescribe per protocol.
- Standardized protocols should be developed by the AARC and NBRC to help the profession advocate for granting RCPs prescriptive authority per protocol.
- There is a belief that the medical community will not support RCPs exercising prescriptive authority because respiratory therapy is viewed as more technical occupation than profession.

Structure of Continuing Education

- There is general support for establishing core continuing education units that all RCPs would complete. Suggested content included current approaches to non-invasive ventilation, aerosolized medications, healthcare leadership, patient education, case management, and community health models.
- In-person continuing education (CE) experiences are generally seen as more valuable, but there is a perception that delivering continuing education units in an online format serves a useful purpose. If restrictions to online CEs are going to be imposed, they should focus on quality of content, as opposed to quantity of content.

Law & Professional Ethics Course

- The ethics portion of the required professional ethics and law course has perceived value. However, the sessions should be longer and more participatory, the content should be updated more frequently and expanded, and be more reflective of the "real world" ethical conflicts RCPs encounter in their clinical practice.

Overview

This report summarizes the findings from ten key informant interviews with directors of respiratory care services in California conducted over a span of two months in September and October of 2015. The interviews were undertaken as part of a multifaceted research study of California's respiratory care workforce. The purpose of these interviews was to discover directors' *perceptions and opinions* regarding critical respiratory care workforce issues, which will be used to help inform policy discussions.

The interview topics include the preparedness of new graduate respiratory care practitioners (RCP) to enter the workforce, the need for baccalaureate education in respiratory therapy, how supervision of clinical education is structured, granting RCPs the authority to exercise prescriptive authority per protocol, the content and structure of continuing education, and the impact of required professional ethics and law coursework.

Methods

We used a membership database maintained by the California Society for Respiratory Care to identify potential candidates for key informant interviews. Information in the database describing primary job responsibility was used to select only those records coded as *director-manager* or *director-technical*; information describing the regional affiliation of these selected records was then used to sort potential interview candidates by geographic region. We sent this list to members of our advisory group who made recommendations about directors we should try to interview, taking into account the goal of having variation in facility characteristics, care settings, and geography.

We completed ten key informant interviews over a two-month period spanning September and October of 2015. Each interview was conducted by phone and lasted approximately 60 minutes. Interviewees were provided a copy of the interview questions in advance. Audio recordings were made for each interview and the recordings were transcribed.

Profile of Directors Interviewed

The directors of respiratory care who participated in the key informant interviews are employed at facilities located across the state, including the Bay Area, Los Angeles, San Diego, the Central Valley, Greater Sacramento, and the Shasta/Cascades region. The facilities they represent include academic medical centers providing care to patients with the highest level of acuity; a multi-site home care provider; rural and semi-rural regional medical centers; a small, rural community hospital; a pulmonary rehabilitation center; a pulmonary function laboratory; and a large, urban, pediatric hospital.

The directors themselves have anywhere from 20 to 40 years of experience in the field of respiratory care, with 2 to 20 years of experience at the director level. Their careers have exposed them to many different care settings: outpatient chronic care management (including home-based care); pediatric, neonatal, and adult intensive care; emergency care; pulmonary rehabilitation; pulmonary function testing; sleep disorders; and sub-acute care. Every director interviewed completed their respiratory therapy education at the associate degree level. Almost all of them had gone on to earn a bachelor's degree in either business administration or health sciences. Two directors hold a master's degree in healthcare administration. All directors interviewed hold the registered respiratory therapist (RRT) credential.

Key Findings

Competency of New Graduate RCPs

Directors were asked to comment on the preparedness of new graduate RCPs to enter the workforce.. The purpose was to identify areas of competence, if any, where directors felt that new graduates are being underprepared by education programs.⁴²

The competency areas⁴³ were defined as follows:

- Diagnostics
- Disease management
- Evidence-based medicine and respiratory care protocols
- Patient assessment
- Leadership and management
- Emergency and critical care
- Therapeutics

Diagnostics

Directors felt that education programs could do more to expose new graduates to sleep medicine. It was acknowledged that this is an area of specialty respiratory care, but directors indicated that new graduates could be more confident in interpreting the results of tests in relation to different types of sleep disorders. Directors also expressed that being able to evaluate a sleep study in terms of indications and contraindications is a competency they should possess, but generally do not. One of the directors interviewed, who oversees a department that includes a sleep disorders center with a staff of more than sixty therapists, reported that it is very difficult to recruit qualified therapists to fill open positions; nearly every therapist working in the sleep disorders center needed extensive on-the-job training.

In addition to sleep medicine, directors reported that new graduates lacked adequate preparation in pulmonary function technology (PFT). Some directors noted that new graduates have a grasp of some features of basic spirometry, such as forced expiratory volume (1 second) and being able to recognize a flow-volume loop. But, they generally felt that new graduates don't know how to read and interpret test results, and they have had little to no exposure to the kinds of advanced testing conducted in PFT labs such exercise, cardiac, and metabolic studies. Said one director, "Unless the student has had the chance to rotate through a PFT lab, they are going to be very weak in this area."

Directors expressed the view that new graduates struggle with the actual physical procedure when performing basic spirometry, they haven't mastered the motor skills required: "They worry about what they're doing with their hands – the physical coordination – while instructing the patient and trying to get a good result." Said one director, "it takes 4-6 months to bring a new graduate up to speed, to get them to the point where they don't struggle while testing patients – where they don't need someone directly instructing them on what to do." It was acknowledged that there isn't time to adequately cover PFT in the current curriculum, given the limited amount of time students

⁴² The specific competency areas were derived from the report "Competencies Needed by Graduate Respiratory Therapists in 2015 and Beyond", which summarizes the proceedings of the second conference held as part of the *2015 and Beyond Project* sponsored by the American Association of Respiratory Care. The focus of the conference (held in 2009) was building consensus around the competencies that would be needed by new graduate RCPs entering the workforce. The report can be found here: http://www.aarc.org//app/uploads/2013/07/2015_competencies_needed.pdf

⁴³ These broad areas were defined in greater detail by including examples of specific competencies in the set questions provided to each director being interviewed. See the Appendix for the set of questions.

have for clinical training. However, directors felt that new graduates should have a more thorough understanding of test results from basic spirometry, better physical coordination of the procedure, and a greater working knowledge of advanced pulmonary function testing.

In terms of invasive diagnostics, directors reported that new graduates are generally well prepared to participate in bronchoscopy procedures. Most are capable of performing a pulmonary artery puncture, and monitoring the patient with pulse oximetry, electrocardiogram, and exhaled gas analysis. However, they also reported that because proficiency depends on repeated exposure to the procedure, there is wide variation in new graduates' competency based on the facilities in which they did clinical rotations: "In some facilities, students may get a lot of exposure to these procedures, in other facilities not so much. New graduates who have seen a lot of bronchoscopies performed are obviously going to be closer to proficiency than those who haven't."

Chronic & acute care disease management

Directors' views of new graduates' competency in the area of disease management were mixed. Regarding the acute care arena, directors generally felt that new graduates were sufficiently prepared in terms of understanding the anatomy, pathophysiology, diagnosis and treatment of common cardiopulmonary diseases and comorbidities. However, several directors expressed the view that new graduates have a poor grasp of disease etiology; more time is spent learning to diagnose and treat, relative to understanding cause of disease.

In terms of being able to develop, administer, or modify a patient care plan in the acute care setting, directors reported that new graduates lack competence in neonatal and pediatric care. They typically require a lot of "backfilling" in terms of building up sufficient knowledge of disease processes in neonates and pediatrics, and this lack of knowledge impacts their ability to manage a care plan. Directors felt that too much time was spent orienting new graduates in these areas and that education programs should include more robust training in pediatric and neonatal patient care.

Directors uniformly described new graduates' competence in patient education as weak. They reported that new graduates aren't being taught the basic components of patient education: how patients learn, how they respond to specific care goals and objectives, and how to coach patients to meet these goals and objectives. Said one director, "New graduates need to see patients as they are in the real world, as opposed to viewing them as just persons in a hospital bed in need of a task-oriented service." Directors emphasized that effective patient education requires a variety of non-clinical skills, and expressed the view that these skills aren't integrated in the curricula of education programs: "Patient education simply isn't a focus of the current curriculum since new graduates don't need it to pass the licensing exam."

This lack of competence in patient education is most visible in the context of chronic care. One director commented that "Chronic care is being taught by people who have no experience with it; they have no cases to demonstrate chronic care to new graduate therapists." However, directors reported an expectation that, over time, chronic care management would only increase in importance as a mode of care delivery. They emphasized that new graduates should develop competence as patient educators and case managers as well as increasing their understanding of preventive and community health models. However, directors don't perceive that these features of care delivery are being effectively integrated into the training received by new graduates.

Evidence-based medicine and respiratory care protocols

Very few of the directors interviewed felt that new graduates are capable of incorporating evidence-based medicine into their clinical practice in a meaningful way. The general perception is that they've had some exposure to it, but it's an area that gets sacrificed due to time constraints. Said one director, "the two-year degree is a basic, starter education, this [evidence-based medicine] is another area where they'll either learn it on the job, or they

won't develop professionally." Directors remarked that new graduates generally don't know how to critique a journal article and then take that information into their communications with physicians, or apply it to clinical therapies. Some suggested that new graduates aren't aware of the difference between sponsored research in which there may be conflicts of interest, and peer-reviewed research.

Directors advocated for greater exposure to evidence-based decision-making in respiratory therapy education. It was suggested that education programs start using journal clubs, if they don't already. This would ensure that students are familiar with the most important sources of clinical literature, and help them develop a framework for how the literature should be evaluated. Further, it would introduce them to the variety of statistical models used to demonstrate the validity of clinical findings; statistical methods is something that directors uniformly felt was lacking in the current curriculum.

Directors offered qualified views on the subject of new graduates being prepared to use protocols to evaluate and treat patients. At those facilities that utilize patient-driven protocols, directors felt that new graduates are comfortable adopting the use of protocols after extensive on-the-job training. However, none felt that they are prepared to reference the evidence base to explain the development and application of protocols, nor use the evidence base to articulate a rationale for updating protocols. Said one director "they simply don't have the clinical experience, nor do they possess the knowledge of published research and skills needed to evaluate the evidence base in order to approach the use of protocols so analytically." The consensus was that all RCPs should possess this kind of clinical expertise: "As the profession continues to develop, working from protocol will become the standard and therapists need to be able to use clinical evidence to develop and modify them in their own practice."

Directors raised related issues that may be factors with regard to preparing new graduates to deliver care per protocol. One is that protocols are not standardized, but rather developed and implemented by individual facilities. Related to this, one facility may be very progressive in its orientation and make use of a wide range of protocol strategies, while another facility may be conservative and employ them in a limited fashion, or not at all. Several of the directors interviewed reported that patient-driven protocols had not yet been implemented at their facilities, including a major academic medical center.

Directors noted that education programs are generally responsive to new processes or standards. It was emphasized that what is needed is a framework that establishes standardized protocols covering the full scope of professional practice. Well-designed, standardized protocols would make it a straight-forward process to define competence. Directors felt that if this kind of framework were in place, education programs would teach to needed competencies and students would be better prepared to evaluate and treat per protocol upon entering the workforce.

Patient assessment

Overall, patient assessment is seen as one of the competency areas in which new graduates are strongest. Directors reported that they perform well when conducting physical exams and reviewing and interpreting common diagnostic data. As noted, an exception to this is interpreting pulmonary function studies, which directors viewed as an area where new graduates need greater exposure. Although most directors felt that new graduates possessed the expected level of competence with regard to taking patient histories, some expressed the view that new graduates should be more accomplished. Said one director, "New graduates don't spend enough time taking patient histories while in training. They aren't adept at using the patient history to capture information that isn't revealed by the physical exam or diagnostic testing."

Leadership and management

Directors were nearly unanimous in their feeling that new graduates are underprepared in terms of competencies related to leadership and management. They acknowledged that new graduates aren't expected to have expertise in some of these areas – healthcare regulation or healthcare finance – but directors did feel that education programs should provide more meaningful exposure to these kinds of systems issues, and more robust preparation in other core concepts related to leadership and management.

For example, most directors felt that new graduates should be better prepared to work in teams, and have a greater sense of the importance of collaboration and coordination of care. They reported that written and verbal communication skills among new graduates are not adequate. The ability to communicate effectively with other health professionals is seen as critically important, especially in written form, as it may be the only mode of communication an RCP has with other care team members. Said one director, "They should be prepared to understand what a leadership role is, to understand how important team building is and how important it is to respect boundaries, and they should certainly understand how critical it is to communicate effectively and professionally."

Several directors spoke of respiratory care being unusual in that during a single shift a therapist might interact with staff from every department in the hospital. The ability to manage relationships, to build consensus, to collaborate in teams – in other words to exercise a high degree of emotional intelligence – is a critical skill. These directors felt that emotional intelligence is underemphasized in respiratory therapy education. One director commented that passing the licensing exam is a strong indicator that a therapist possesses the requisite clinical knowledge and skills, but the most effective therapists also demonstrate a very high emotional IQ: "I had one of the sharpest, most clinically knowledgeable therapists I've ever worked with leave the profession because she simply couldn't find a way to work with other providers." The lack of emphasis on emotional intelligence and related competencies is seen as a major obstacle to professional development: "Collaborating with other providers, building consensus and leading teams, these are not core competencies in respiratory therapy, and it's a bigger problem for the profession than people care to admit."

Other leadership and management competencies were viewed by directors as being important, but it was acknowledged that their development is unlikely in the course of a two-year degree program, given how much content needs to be covered. These include knowledge of healthcare financing and reimbursement systems, healthcare regulatory requirements, the cost-effectiveness of therapies, departmental budgeting and supervisory structures. In the view of one director, "It's unlikely that new graduates have been exposed to these areas at all during their education, but if they have been, it's the ten thousand foot overview."

Directors did indicate that it's not reasonable to expect new graduates to have expert knowledge of healthcare regulation, finance, reimbursement or management-related processes, but nearly all felt there is value in new graduates being exposed to these topics in a meaningful way. Said one director, "They should have some understanding that I'm telling them to do things in a certain way because of regulatory concerns, or because of the financial impact, or because of the way care is reimbursed."

These directors felt that there is value in being exposed to administrative structures so that they understand how departments function. It was suggested that a greater awareness could have value in terms of mitigating potential divisiveness between department management and frontline therapists; it may give new graduate RCPs a better understanding of the decisions that department managers make on their behalf. Exposure to management and administration was also seen as important from the perspective that new graduate therapists may come to the profession with both experience in another professional field and life experience. Several directors felt there is value in exposing students to the different pathways a career in respiratory care might take.

Emergency and critical care

Directors generally felt that new graduates are competent in emergency care. They made the point that new graduates' ability to perform intubations is comparatively weak, but acknowledged it's a skill that requires manual dexterity that comes from repetition. New graduates know how to intubate, they just don't execute it well until they've had repeated opportunities to perform one. They generally don't get enough repetitions during their clinical rotations.

Directors also noted that providing life support during transport of critically ill patients is not a competency new graduates have developed. No director felt that a new graduate would be able to self-manage a patient during transport without extensive additional training. Said one director, "We do hire new graduates into transport roles, but they go through two years of training before they go out and transport patients." The only other point made regarding emergency care competencies was to emphasize that if there are any education programs that don't require new graduates to obtain BLS, ALS, PALS, and NRP certification, that needs to change.

Critical care is seen by directors as the area in which new graduates are most competent. This reflects the fact that respiratory therapists predominantly work in critical care and the licensing exam tests heavily on knowledge and skills in this area. Almost all directors commented that education programs teach to the knowledge and skills tested on the licensing exam, so it's no surprise that new graduates enter the workforce well-prepared in critical care.

Directors did, however, raise a few issues. The first is that new graduates are generally not able to interpret ventilator data beyond recognizing very basic information: "They can recognize wave form tracings as related to flow or volume, but they don't understand what's being communicated by the patient; they don't know what treatment recommendations to make based on the waveform graphics." The other point made by directors is that new graduates are not as well-prepared as they should be to work with critically ill neonatal and pediatric patients.

Therapeutics

As with critical care, directors reported that new graduates are competent in terms of assessing the need for, applying, and evaluating common therapies.⁴⁴ However, many directors commented that new graduates' knowledge of therapeutics is not integrated. They felt that new graduates should have a deeper knowledge of the science that underpins the therapy. Said one director, education programs should do more to get students to understand the "what and why of a therapeutic intervention".

These directors reported a perception that respiratory care is becoming too reliant on the functioning of technology in the application of therapies, and that education programs are abetting this trend: "Schools teach too much to the technology, and not enough to the basic science of respiratory care." Another director commented, "Once upon a time, if we had to troubleshoot a piece of equipment, or a patient wasn't responding as expected, we couldn't just flip a switch on the machine. We had to think through the mechanics of the intervention to make adjustments on the fly. New graduates today are much more reliant on technology. It can be a crutch. If the technology fails and you don't understand the basic science of what you're doing you're going to be in trouble."

One director used the example of pharmacotherapy to illustrate this theme of new graduates lacking an integrated knowledge of therapies. She commented that new graduates know the different types of drugs (e.g. bronchodilators, beta agonists, antibiotics), and what drug to use, but they "aren't able to demonstrate that they know why they're doing what they're doing with the drug therapy." She speculated that the pace of change in pharmacotherapy is a factor, "I suspect there's some lack of understanding on the part of instructors in terms of

⁴⁴ Common therapies that directors were asked about included medical gas, humidity, aerosol, hyperinflation, bronchial hygiene, airway management, and mechanical ventilation.

administration of different types of drug therapies, and I think it's because things develop so quickly. New drug therapies and modes of delivery are released every year and I think the schools have a hard time keeping up."

Another example cited was bronchial hygiene. New graduates are prepared for bronchial hygiene therapy in terms of having awareness of the different approaches and devices (mechanical and manual chest percussor, PAP therapy and devices, intrapulmonary percussive ventilation), but they don't know the evidence base: "They aren't able to determine, based on a patient's condition, that a patient might do better with one approach as opposed to another, or that there is no evidence for a particular therapy. They just know the devices and know that they're supposed to help with keeping the lungs clean." Related to this, another director commented that "new graduates are less likely to understand the limits of a therapy, as opposed to the indication for a therapy."

Finally, a few directors remarked that new graduates could be better prepared to troubleshoot mechanical ventilation in the context of patient-ventilator asynchrony, although it was acknowledged that this can be a challenge for experienced therapists as well. New graduates may not have many encounters with patient-ventilator asynchrony in their clinical training. But because it's such a critical skill to master (directors reported that it's an important component of onboarding training), given the limited amount of exposure new graduates have had, "it's critically important that they understand the basic science of the condition."

New Graduates in Outpatient Settings

The general consensus among directors is that new graduates are not being prepared to work outside of the inpatient care setting. Education programs haven't meaningfully incorporated chronic care and rehabilitation into the curriculum. It was widely acknowledged that schools focus on acute care training for practical reasons: it's where most therapists work, it's the focus of the licensing exam, and programs have a limited amount of time and resources for training.

Directors pointed out that, from a clinical perspective, new graduates should have the skills and knowledge to deliver therapies outside of the inpatient, acute care setting. Said one director, "if a new graduate can pass the NBRC licensing exam, clinically speaking, they are prepared to work in any setting." They also emphasized the value of entering the workforce in the acute care setting: "The variety of pathology and therapeutic applications a therapist is exposed to in acute care is the base of knowledge needed to then go and work in alternative settings."

Although directors felt that new graduates may be clinically prepared to work outside of acute care settings, they acknowledged that there are competencies critical to managing chronic conditions that are not being developed by the current curriculum. Said one director, "Inpatient care is almost the opposite of outpatient care – inpatient care is high-technology and low-touch whereas outpatient care is low-technology and high-touch." Therapists who manage chronic disease and rehabilitation care outside of the hospital need to be effective at coordinating with other providers. They need to be excellent patient educators, dealing with both the patient and family. They may need to coordinate with insurance companies, navigating eligibility for treatments, devices, and supplies, and so they must be familiar with reimbursement issues. Another director commented that "new grads struggle in the outpatient clinics we staff, in terms of the non-clinical skills that come into play. Education programs could give students greater exposure to the differences in how care is delivered outside the hospital."

One of the directors interviewed who manages a staff of therapists providing home care pointed out that these RCPs work with a patient population that is culturally and socio-economically diverse, often with challenging comorbidities and psycho-social issues including depression and anxiety. It's not uncommon for the home-care therapist to provide therapies to patients challenged by access to care issues, and who have a very limited support structure. The role of the home-care therapist expands into areas that are not strictly about respiratory therapy. RCPs managing chronic disease need to be effective case managers. It was the consensus of directors interviewed

that unless new graduates have had prior experience that predisposes them to be successful in this kind of setting, they won't develop the needed competencies in a respiratory therapy education program.

Pulmonary rehabilitation

Directors were asked to comment on whether they felt that education programs are preparing new graduates to specifically work in pulmonary rehabilitation. None of the directors interviewed felt that they are. If students are exposed at all to pulmonary rehabilitation, it's typically a one-day shadowing experience. One of the directors interviewed who heads an outpatient pulmonary rehabilitation clinic associated with a major academic medical center commented that in the course of a two-year degree program, "there is no way schools could prepare them for what they need. They need exposure to exercise physiology and the use of cardio-pulmonary testing in evaluating patients and prescribing therapies. They need to be effective patient educators, and have experience coordinating care with physicians. They need to develop a much different kind of knowledge base around the dynamics of patient care."

Nonetheless, this is an area that directors felt students should be exposed to in greater depth than a one-day shadowing experience. Several directors emphasized that the care model is moving toward preventive health, and pulmonary rehabilitation is an opportunity for respiratory therapists to provide value-based care. Another director suggested that there is an opportunity for therapists to play a role as patient educators in the context of pulmonary wellness while patients are still on the floor, before they are discharged and before they are part of a formal pulmonary rehabilitation program. It was also pointed out that what evidence exists indicates that there is a very large patient population that should receive rehabilitative care for chronic conditions, but is not now receiving services. And, there are no respiratory therapy education programs that train therapists specifically to become pulmonary rehabilitation specialists.

Supervising Clinical Education

Directors were asked to describe how supervision of students doing clinical rotations at their facilities is structured, how students are evaluated in terms of demonstrating clinical competence, and whether there are components of the clinical clerkship experience they felt could be improved.

Designated clinical instructor

Several directors commented that the model of clinical supervision today is very different compared with the experience of RCPs who trained a generation ago. In the past, students worked closely with a designated clinical instructor (CI) from their program, mostly as a group—a version of what undergraduate medical students still experience. Eight of the ten directors interviewed reported that, although each school assigns a CI to work with its students during their clinical rotations, these instructors are very rarely onsite. Directors remarked that the CI typically shows up every few weeks to check in with the students, but does not provide clinical instruction. None of the directors interviewed indicated that the designated clinical instructor is an employee of the facility; the CI is always an employee of the school.

There were two exceptions. One director reported that when a school sends its students to the facility for the first time, a designated CI will work directly with these new students for the duration of their first rotation. When the students return for subsequent rotations, they are paired with staff therapists who provide the clinical instruction.

A second director reported that a designated CI from the schools is always on site if that school's students are on site. The CI doesn't provide the clinical instruction, but is present as a resource for students, and if necessary serves as a disciplinarian. The actual clinical instruction is provided by the facility's therapists who are designated preceptors. The CI signs the documentation that a student has demonstrated competence in a particular clinical skill.

The role of disciplinarian was described as being available in case a student is not sufficiently prepared to engage in a specific clinical area. For example, if a student is assigned to the blood gas lab and the RCP providing clinical instruction finds that the student can't demonstrate basic safety protocols, it is not the responsibility of the RCP to provide this kind of preparation. The student is sent to the CI and it's the CI's responsibility to make sure the student is able to demonstrate she is prepared for whatever the clinical assignment might be.

Preceptors and direct supervision

Formal preceptor programs used to train students doing their clinical rotations appear to be rare, as only three directors interviewed reported having one. More common is a less-formal variation in which students are simply paired with an experienced staff RCP who provides clinical instruction. The least formal scenario is one in which students are assigned to work with an RCP who happens to be scheduled that day, and in terms of clinical content, they cover whatever that RCP is scheduled to do on that particular shift. A more formal version of this scenario (though described by the director as "not a preceptor program") involves students always being paired with a "core therapist", which is an RCP whose core clinical practice is in a specific area. The core therapist works only in that clinical area, so she has strong relationships with the physicians and nurses who also specialize in that clinical area.

Providing consistency in the relationship between students and the RCPs who provide clinical instruction is a challenge, given scheduling issues and the lack of a designated CI. Some directors reported that although staff scheduling is not flexible, they do try to coordinate with schools to make it possible for students to pair with the same RCP for the duration of the rotation. But it's ultimately up to the schools to make sure that the students arrange their schedule to accommodate the staff therapist: "If Jane Doe works a Tuesday/Wednesday/Thursday night shift in the ICU and the student wants to work with Jane every time, then the student needs to do rotations on Jane's schedule." In general, facilities try to pair students with lead therapists, or very experienced therapists, who are regarded as excellent teachers.

Three directors reported having a formal preceptor program to train students, though only one of these facilities has a program that trains students throughout their clinical rotations. The other two facilities have a preceptor program structured to train students at a specific point in their rotations. At one facility, a pediatric hospital, a small number of students who have expressed interest in pediatrics spends the last six weeks of clinical training working in areas of critical care with a designated preceptor. Upon completion of this rotation, the students are hired by the facility. A second director reported a similar arrangement: students complete their final clinical rotation work with designated preceptors in specific clinical areas, though this does not necessarily lead to employment. All three directors who reported their facility has a formal preceptor program indicated that they provide organized training to those RCPs who serve as preceptors.

All of the directors interviewed reported that students work one-on-one with an RCP during training, and that students provide care only under the direct supervision of the staff RCP. One director commented that direct supervision at the facility was a policy he implemented when he became department director. Prior to the policy's implementation, therapists would frequently "off-load" their work to students who were then providing unsupervised care.

Evaluating competence

The process for evaluating the clinical competence of students is similar across facilities. Students are evaluated by the RCP who is providing clinical instruction using a checklist that defines competence; most directors reported that the checklist is provided by the school, while some indicated that it's the same checklist used when onboarding newly hired therapists. The RCP who provides the clinical instruction is the one who signs off that the student has demonstrated competence.

Directors offered a consistent description of how competence with a specific clinical skill is demonstrated: The therapist/preceptor shows the student how to perform the skill; the student and therapist then share in performing the skill; the student then demonstrates the skill by herself and the therapist/preceptor either signs off or doesn't.

Directors commented that the therapists/preceptors will provide feedback to the department director or staff manager if a student is failing to meet expectations in terms of demonstrating competence. The general consensus was that schools are quick to address these kinds of issues. One director indicated that the facility had to drop one of the private, for-profit schools it was working with because the students were consistently underprepared for their clinical clerkships.

Formal internship/externship

A formal internship or externship for students who are not enrolled in an education program that has a formal agreement to do clinical rotations at the facility is uncommon. No director reported having established one, but one director indicated such an internship was being considered. Another director commented that their facility occasionally trains students enrolled in an unaffiliated online program, but this is not a regular occurrence and is dependent on being able to find a staff therapist willing to act as a clinical instructor for that student.

Improving the clinical experience

The most frequently suggested way in which the clinical clerkship experience could be improved was to ensure that students get to work with a designated clinical instructor – someone who is always onsite with the students as they do their rotations and provides their clinical instruction. Every director interviewed felt that this would significantly improve the clinical experience for both students and facility staff. It would help keep the experience organized, provide consistency, and foster a more professional atmosphere.

At facilities where there is no formal preceptor program, the fact that a school's designated CI may be only minimally present makes it less likely that students will have a consistently high-quality educational experience. Directors shared stories of other facilities where staff RCPs simply turn over their workload to students, in place of providing direct clinical instruction. Directors acknowledged that there is a certain element of randomness in the organization of the clerkship. Students can rotate with a different therapist on any given day, depending on what the student needs to cover clinically, and which therapist will be covering that area on that day. As one director commented, "One day they rotate with Joe and he thinks they're ok, but the next day they go with Mary and she finds they're not prepared. There is a lot of having to prove themselves all over again, each day, which delays their learning. They aren't going to do anything until the staff therapist feels comfortable with them and their level of knowledge. So they end up observing, and not doing."

Several directors reported that financial resources to support students' clinical clerkships are an issue. Typically, a lead therapist receives compensation for the time spent training students, but otherwise facilities rely on the willingness of staff RCPs to act as preceptors and mentors—they aren't compensated for the additional workload. Directors acknowledged that some labor agreements require a facility to pay a therapist a stipend for acting in the preceptor role. These directors felt that it should be the schools' responsibility to allocate the financial resources to support their students' clinical training.

One director suggested that (if not done already) the clinical clerkship could be improved by incorporating an evaluation component by which the students get a chance to express how they felt about the experience: what went well, and what didn't go well. It would provide facility staff with feedback that would ensure expectations were met. Another director suggested that respiratory therapy education could adopt the model of a clinical residency program used in nursing or medicine. However, this director recognized that finding the resources to organize and maintain a residency program would be a challenge.

Number of students trained

Directors were asked to report the number of students trained during any given semester. Not surprisingly, the number trained generally correlates with the size of the facility and the number of RCPs on staff. Since the student-to-therapist ratio during clinical rotations is one to one, a small hospital facility with a limited number of RCPs on staff might only train five or six students during a term. Conversely, the larger academic medical centers with large respiratory care departments might have as many as thirty students per day doing a rotation, and train more than hundred different students in the course of a semester.

Baccalaureate Education in Respiratory Therapy

Directors were asked several related questions on the subject of whether or not the bachelor's degree should become the required educational credential in respiratory therapy:

- Can the competencies needed by new graduate respiratory therapists be adequately developed in a two-year associate degree program?
- Are there professional roles that current education programs aren't preparing new graduates to fill?
- Should the current curriculum be expanded to a four-year bachelor's degree?
- If expanded to a four-year degree program, should there be specific areas of study offered as specialty concentrations?

Support for requiring a bachelor's degree

Eight of the ten directors interviewed expressed support for requiring the bachelor's degree for entry into practice. Most of these directors felt that the range of knowledge and skills required to be an effective therapist, at this point in time, cannot be adequately addressed in the two-year degree program. They expressed the view that the didactic portion of respiratory therapy education needs to be expanded to provide greater coverage of topics including healthcare financing, regulatory issues that impact respiratory care, the cost effectiveness of therapies, scholarly research, analysis of the clinical evidence base, leadership and team building, care coordination, patient education and case management, and departmental management. The clinical training should be expanded to increase exposure to outpatient settings including home care, pulmonary rehabilitation, pulmonary function labs, and sleep labs; include greater exposure to pediatric and neonatal care; and provide a "deeper dive into advanced technologies". However, these directors also commented that a bachelor's degree would be valuable just in terms of providing greater depth of coverage in the core clinical competencies of respiratory therapy. Said one director, "The bachelor's degree would give students more time to cover the science of respiratory therapy, and this would have a really positive impact on the profession."

Many of these directors were sympathetic to the fact that part of the appeal of respiratory care may be that it is a field that people can enter through a two-year degree program, particularly those who might be deterred, for whatever reason, by the prospect of completing a four-year program. But they also recognized that the technical complexity of respiratory care, the depth of clinical knowledge required, and the level of responsibility as a care provider are continuously increasing. They expressed the view that it's no longer reasonable to try and cover everything that needs to be covered in a two-year program. One director suggested that "it's irresponsible to send students out into the field with the limited amount of training they currently receive, given what they need to know to be successful." This director worried that new graduates who don't find employment in an institution that continues to develop them risk failing to reach their potential: "New graduates really need more development, the education they receive in school isn't enough."

A few of the directors who expressed support for the bachelor's degree felt that, although the current workplace may not yet require bachelor's-level training, it will in the near future, and it will be driven by the expansion of both

clinical knowledge and the role of the therapist in delivering care. Their view was that respiratory therapists will increasingly play a consultative role in care delivery, articulating options for therapy and providing guidance about the cost-effectiveness of care—including knowledge of capitated payments, the Diagnosis Related Group system, and the impact of meaningful use policies. The role of the therapist as task-oriented technician is becoming outmoded. As one director commented, “Given the way we are expected to engage in care delivery, the additional didactic and clinical training from a four-year degree program is going to be a great benefit.”

Several of the directors felt that the bachelor’s degree should become the educational standard in respiratory therapy for reasons related to professional development. These directors reported that there is a need to create specialty positions in clinical services, in outpatient care, and in leadership, that could be defined by added competencies. They supported the notion that RCPs should function as physician extenders in the delivery of chronic care, but acknowledged that RCPs need broader and deeper clinical knowledge, as well as case management skills before this can happen.

However, these same directors emphasized that the institutional support needed to drive these changes is lacking. They raised the concern that respiratory therapy is seen less as a profession and more as a technical occupation. Requiring a bachelor’s degree for entry into practice was viewed as a step toward developing the needed competencies, but also as something that could have the effect of raising the field’s professional standing. Said one director, “We’re at that moment people have been talking about for several years now, where the RT program needs to go to a four-year degree program to advance the profession. We can’t accomplish this if we continue with business as usual.”

One director recounted losing a top therapist due to a lack of professional opportunity. As there was not a clear path in respiratory therapy that would allow her to develop her interests, she left the field to pursue training as a nurse practitioner specializing in pulmonary care. This director commented that opportunities to pursue a career beyond a staff therapist with clinical expertise are too limited—“waiting for the current director to retire is not a professional development strategy. We have to create these opportunities so that the best and brightest stay in the field.”

Three of the directors interviewed reported perceiving a difference in the level of professionalism, comparing new graduate therapists who’ve trained in bachelor’s degree programs versus those who’ve trained in associate degree programs. One director commented, “We just hired a graduate who did his training in a bachelor’s degree program and the difference between him and the new hires who graduated from the two-year programs that do clinical rotations at our facility is amazing. He’s a lot more confident in his clinical assessments and in his communication with the physicians and nurses. There’s just a real difference in how he carries himself.” These directors were quick to acknowledge that professionalism may be an individual trait and has nothing to do with the degree program. But they also expressed the view that completing the four-year degree takes more drive and determination, which may be an indicator of commitment to the profession.

Concerns regarding a bachelor’s degree requirement

A few directors expressed concerns regarding a move to require a bachelor’s degree in respiratory therapy. Is the current faculty prepared to deliver the breadth and depth of content that would add value in a bachelor’s degree program? Will the faculty also need to be more highly educated? Another concern focused on the fact that it isn’t clear what the return on investment would be for the therapist who earns the bachelor’s degree. In terms of scope of practice regulations, nothing differentiates the bachelor degree-trained therapist from the associate degree-trained therapist, nor is there any pay differential. There is no evidence that a bachelor’s degree in respiratory therapy provides an advantage in terms of professional advancement, nor is there evidence that a baccalaureate-

trained therapist delivers better patient care outcomes. Said one director, “The two-year curriculum gives you the basic knowledge you need, everything else you learn on the job.”

Another director commented that the degree requirement should shift to the bachelor’s degree only if it gives students more time to practice respiratory therapy: “If students spend two years doing general education, and then two years doing respiratory therapy, how is that different from the current two-year degree program?” In the view of this director, it would only make sense to require the bachelor’s degree if students receive significantly more exposure to the clinical setting: “The more they see clinically, the more they know coming onto the job.” Another director reiterated the case that there is no obvious return on investment in earning the bachelor’s degree, beyond personal satisfaction, and emphasized that the increased level of education needs to be linked to expanded professional opportunities to justify the additional expense of the four-year degree. One director commented that, “Right now, I wouldn’t encourage any RCP to get a bachelor’s degree in respiratory care.”

Specialty tracks within a bachelor’s degree program

Although a few directors felt that a four-year degree program could incorporate specialty tracks into the curriculum, such as a management track or a research track, most directors interviewed were against this notion. The feeling was that the components that are underemphasized in the current curriculum should be built up, but it should remain a cohesive degree program. There is simply too much core content to cover without worrying about specialization. These directors felt that if students wanted to specialize in an area, either clinical or non-clinical, that could occur beyond a bachelor’s degree program.

Exercising Prescriptive Authority per Protocol

Nine of the ten directors interviewed expressed the view that RCPs *should* be granted the authority to prescribe therapy and medications per protocol. However, they offered varying perspectives on what would be required for this authority to be established, under what circumstances it would be exercised, and the challenges its implementation would face.

Two directors expressed the view that experienced RCPs already possess the clinical knowledge and skills needed to prescribe therapy and medication per protocol. It’s simply a matter of defining the protocol and demonstrating competence. These directors felt that given how specialized the division of labor has become, many physicians lack the specific clinical expertise that respiratory therapists develop. One director commented that “Physicians routinely rely on therapists to inform them on therapeutic decisions, in situations that could easily be protocolized.” This view was echoed by the other director: “For years therapists have been making decisions about what types of therapy a discharged patient should go home with and counseling physicians on these decisions, it’s just never been formalized.”

Another director pointed out that therapists at her facility have the authority to prescribe nicotine in a recently established smoking cessation program. However, this director emphasized that the program is in the process of training RCPs to do the patient assessments and deliver patient education around quitting smoking. She also noted that these RCPs are working directly with physicians to develop competencies around case management.

This underscores the position held by most of the directors interviewed who support granting RCPs prescriptive authority per protocol: RCPs *should* be granted this authority, but the profession needs to develop additional competencies around case management—particularly as the care model moves toward managing chronic care—and even core clinical competencies will need to be demonstrated at a more advanced level. These directors felt that in order to develop the requisite knowledge base in case management, and deepen knowledge in respiratory therapy’s core clinical competencies, a higher level of education would be needed—especially if there is any expectation that new graduates will enter the workforce and be allowed to prescribe per protocol.

Directors generally felt that granting RCPs prescriptive authority per protocol would require them to be educated, at a minimum, at the baccalaureate level. Two directors expressed the view that prescriptive authority per protocol should require additional training beyond initial respiratory therapy education. They felt it should require a post-licensure master's degree or a post-baccalaureate certificate, as well as additional licensing – nurse practitioners were cited as a potential model.

Several directors commented that requiring a bachelor's degree as a condition for allowing RCPs to prescribe per protocol is justified not only for clinical reasons, but also as a means to increase the profession's standing with other providers and the general public. Respiratory therapists are perceived as technicians, and being granted the authority to prescribe will require that perception to be changed. Said one director, "The four-year degree confers standing in a way that a two-year associate's degree never will."

Some directors felt that standardization of protocols would be needed before RCPs could exercise prescriptive authority. Currently, patient-driven protocols are developed at the individual facility level, and there are still many facilities that don't utilize them at all. Said one director, "If two different therapists assess the same patient, the protocol should lead them to the same therapeutic decisions." It was suggested that the American Association for Respiratory Care (AARC) and National Board of Respiratory Care (NBRC) should take the lead on developing the standards, the needed qualifications, and how competency is going to be demonstrated: "This issue needs the weight of the two most respected organizations in the field of respiratory therapy to be its champion. We need the AARC and NBRC to define this vision of respiratory therapists practicing to the fullest extent of their scope of practice. We need to create a situation where individual facilities are arguing against established, national standards."

Directors raised other institutional issues that need to be confronted. In defining prescriptive authority, how will the respiratory therapy scope of practice be interpreted, broadly or narrowly? How scope of practice is interpreted will define the range of possible protocols, "There are things, clinically, that our scope of practice allows us to do, but we don't do them out of convention." Protocols defined for therapies and medications that would technically fall within the respiratory therapist's scope of practice, but are not commonly delivered, would impose different requirements compared to more standard interventions. Three directors commented that the authority to prescribe therapy and medication should be limited to outpatient settings; in the inpatient setting, they felt that RCPs could put in the order for therapy or medication, but it should require a physician's co-signature. Finally, many of the directors emphasized that one of the biggest challenges facing an effort to establish prescriptive authority per protocol would be getting "buy-in" from physicians and the Medical Board, and expressed skepticism that the medical community would be supportive.

Structure of Continuing Education

Surveyed RC directors were asked to share their views related to respiratory therapy continuing education (CE), including support for the idea of establishing *core* CE courses that all RCPs complete, whether CE courses delivered in an online format should be restricted in any way, and the recent increase in the number of required CE hours.

Core CE coursework

Directors were asked whether there should be core continuing education (CE) courses that all RCPs complete, regardless of their clinical practice area. Seven of the ten directors interviewed offered support for having core CE content. However, the other three directors expressed strong opinions that it was unnecessary, commenting that RCPs should just focus on the areas in which they work. One director noted that therapists who specialize in specific clinical areas already have CE requirements: "For example, someone who is certified for neonatal advanced practice has to complete a set number of CEUs in neonatology. The same is true for therapists certified in adult or pediatric critical care." Another director felt that the spectrum of professional practice is so wide that it would be difficult to

assign content that is germane to every RCP (though this director acknowledged that a possible exception would be to require maintaining CPR and ALS certification.)

Directors who supported the notion of core continuing education coursework made suggestions regarding possible content:

- A series of courses focused on basic components of respiratory care: pharmacology, patient assessment, basic ventilation
- Community health models (health promotion and preventive health)
- Accountable healthcare; cost effectiveness of therapies
- Case management
- Patient education (both adult and pediatric)
- Standard therapies for asthma, or restrictive and obstructive diseases using the redesigned format of the Neonatal Resuscitation Program as a model
- Current approaches to non-invasive ventilation
- Modes of supporting the lungs
- Aerosolized medications
- Patient-centered care
- Communication strategies for difficult conversations
- Healthcare leadership-related content
- Clinical content outside of RCPs practice area (require RCPs to develop greater breadth of knowledge)

Online content

Directors were also asked whether CE courses delivered in an online format should be restricted in any way. The general consensus was that in-person continuing education experiences had a greater chance of providing value compared to an online experience. However, it was also clear that directors felt that online continuing education serves a useful purpose. If restrictions were to be implemented, directors favored those that would serve as quality control measures, such as restricting online content to coursework offered by specific providers including the AARC, the Mayo Clinic, or the Society of Critical Care Medicine.

Number of CE hours

Directors were asked to share their views on the recent change in the number of required CE hours (an increase from fifteen to thirty hours every renewal period). They were either neutral or held a favorable view of the increase in required CE hours. Only one director expressed concern, wondering if there will be sufficient variety of high-quality courses to meet the increased demand. All directors felt that thirty hours of CE every renewal period was enough; no one advocated for increasing the number of required hours beyond thirty.

Law & Professional Ethics Course

Directors were asked whether they felt the required law and professional ethics course has an impact on the profession. Nearly all of the directors commented that the ethics content of the course has value, or at least has the potential to be of value. The law content in the course was less well regarded.

Directors reported that the ethics content in the course sets expectations for new graduates entering the workforce, in terms of standards for professional conduct. One director commented that the Respiratory Care Board routinely dealt with ethics violations prior to requiring the course and that it appears that ethical violations have diminished as a result. However, several directors felt that the content should be updated more frequently and expanded. Several directors commented that not enough time is spent working through the ethical conflicts

RCPs are exposed to; the sessions should be longer and more participatory. Equally important, the scenarios themselves should be more reflective of “real world” situations RCPs encounter in their clinical practice; currently they are “too generic”.

A single director questioned whether the course had any value at all, “Whether it has any influence on the practice of the therapist in terms of their moral and ethical responsibilities, I don’t think it’s clear that it’s of any value.”

None of the directors interviewed felt that the course needed to be taken more often than it is currently, every other renewal period.

Conclusion

Directors expressed the view that respiratory therapy education programs teach to the skills and knowledge tested on the licensing exam, and so new graduate therapists are generally well-prepared in those areas. However, nearly all of the directors interviewed felt that the field of respiratory therapy has reached the point where the competencies needed to be an effective care provider cannot be adequately covered in the two-year associate degree program. There was wide-spread support for establishing the baccalaureate degree as the required educational credential for entry into practice.

Requiring the bachelor's degree was viewed as an opportunity to incorporate the additional didactic and clinical work directors felt new graduates should be exposed to, and it was seen as a way to foster a more deeply integrated knowledge of the therapies and medications that represent respiratory therapy's core clinical competencies. Directors also reported that respiratory therapy is widely perceived as a technical occupation, rather than a profession, and felt that requiring the bachelor's degree was an important step in changing this perception. However, a small number of directors expressed concerns about shifting respiratory therapy education to the baccalaureate level. Among these concerns were a potential lack of qualified faculty, the fact that there is currently no pay differential for earning the bachelor's degree, and no evidence that the bachelor's degree has any impact on patient outcomes.

Directors viewed the clinical clerkship as a generally positive experience, but did feel that it could be improved. There is a lack of consistency in the relationship between the students and the therapists who provide clinical instruction. Although schools designate a clinical instructor for their students, directors indicated that the CI is infrequently onsite during the students' training and does not provide their clinical instruction. It was felt that having a designated clinical instructor continually present when the school's students are doing their clinical rotations would significantly improve the experience for both the students and facility staff.

Among the directors interviewed, there was wide-spread support for granting RCPs the authority to prescribe therapy and medication per protocol. A few directors felt that experienced therapists already possess the needed skills and knowledge to exercise this authority, but most felt that new competencies around case management would need to be developed and that core clinical competencies would need to be demonstrated at a more advanced level. Directors generally felt that RCPs would need to be educated at the bachelor's degree level to exercise prescriptive authority, for reasons related to clinical competence as well as professional standing; a few directors indicated that it should require a master's degree and additional licensing. Directors also anticipated that establishing this authority would be challenged by a lack of support from the medical community.

This report summarizes the findings from ten key informant interviews conducted with directors of respiratory care services in California. The statements contained herein should not be taken as fact; nor should they be taken as representing an official position held by either the facilities that employ the directors interviewed, or the Respiratory Care Board of California. They are solely the perceptions and opinions of the directors who were interviewed. The information contained in this report is intended to help guide policy discussions of critical respiratory care workforce issues, including the development of career pathways in respiratory care, the competencies needed by new graduate RCPs entering the workforce, an expansion of the curriculum in respiratory therapy education, educational credentialing in respiratory care, and extending the practice authority of RCPs to allow them to prescribe therapy and medication per protocol.

APPENDIX C: RC Director Key Informant Interview Guide

Key Informant Interviews: Directors and Managers of Respiratory Care Services in California

1. The following list of competencies was identified by the American Association of Respiratory Care's "2015 and Beyond" project as those that new graduate respiratory care practitioners (RCP) **must possess** upon entry into the workforce. Please describe your perceptions of how well education programs are preparing new graduate RCPs in the competency areas listed below.

Diagnostic technologies and procedures

- Pulmonary function technology
- Sleep – evaluate sleep studies; interpret results in relation to respiratory sleep disorders
- Invasive diagnostic procedures

Chronic and acute care disease management

- Understand etiology, anatomy, pathophysiology, diagnosis & treatment of cardiopulmonary diseases and comorbidities
- Patient education
- Develop, administer, evaluate and modify care plan

Evidence-based medicine

- Review and critique published research
- Interpret the meaning of statistical tests
- Apply evidence-based medicine to clinical practice

Respiratory care protocols

- Explain use of evidence-based medicine in development and application of protocols
- Use evidence-based medicine to articulate rationale for updating protocols

Patient Assessment

- Patient history
- Reviewing diagnostic data
- Physical examination

Leadership

- Working in teams - collaborative decision-making; leading groups in care planning; collaboration with other health professionals
- Healthcare regulatory systems
- Written & verbal communication
- Healthcare finance – basic knowledge of reimbursement systems and methods of reducing cost of care

Emergency care

- BLS/ACLS/PALS/NRP
- Perform intubation
- Cardiopulmonary life support during transport

Critical care

- Invasive & non-invasive mechanical ventilators
- Interpret ventilator data; calibrate monitoring devices
- Make treatment recommendations based on monitoring system feedback
- Knowledge of critical care pharmacology and ability to recommend pharmacotherapy

Therapeutics

- Assess need for specific type of therapy
- Prior to therapy – patient history/interview/physical exam
- Administration of therapy – equipment setup; patient education; infection control
- Evaluation of therapy – complications/adverse effects; modifications; documentation

Application of therapies in practice

(Clinical knowledge, skills and the ability to troubleshoot when delivering the following therapies)

- Medical gas
- Humidity
- Aerosol
- Hyperinflation
- Bronchial hygiene
- Airway management
- Mechanical ventilation

Management skills

- Supervising personnel
- Working with budgets
- Communication with senior management
- Committee participation

2. Do you feel that new graduate RCPs are prepared to provide care in settings outside of acute care (including home care)?
3. Do you feel that new graduate RCPs are prepared to provide pulmonary rehabilitation?
4. Are there skills deficiencies or gaps in clinical knowledge that consistently need to be addressed through onboarding training programs?

5. Do you think it's important that education programs prepare new graduate RCPs to do the following?
 - Critique clinical literature
 - Interpret statistical output
 - Provide evidence that supports clinical decision-making
 - Evaluate modes of care in terms of cost effectiveness
 - Lead consultations regarding goals of care and provide rationales for modes of therapy
 - Conduct research
 - Manage and lead teams
6. Are there professional roles in which new graduate RCPs are expected to function that are not being addressed by education programs?
7. Do you feel that the competencies needed by new graduate RCPs can be adequately developed in a two-year associate degree curriculum?
8. Should respiratory therapy require a bachelor's degree for entry into practice?
9. Are there specific areas of study (e.g. research skills, education, management & leadership) that should be offered as a specialty within a bachelor's degree program?
10. Can you describe the model your facility uses to exercise supervision over students who are participating in the clinical training portion of their respiratory therapy education?
 - Is there a designated clinical instructor continually onsite?
 - What resources are provided by your facility? What resources are provided by the schools?
 - Are students required to provide care under direct supervision of a licensed RCP?
 - Do you have a preceptor program where staff are assigned to mentor students?
 - Do you have an internship or externship program in addition to the clinical training for designated schools?
 - How many students do you typically train during a semester?
11. Can you describe the process you use to evaluate students in terms of demonstrating competence in the different areas of clinical instruction?
12. Are there components to the clinical training portion of respiratory therapy education that you feel need to be improved?
13. Do you feel that RCPs should be allowed to prescribe therapy and medication per protocol? What additional training would be needed for RCPs to exercise prescriptive authority per protocol?
14. Should there be core continuing education courses taken by all RCPs?
15. Does the number of CE hours need to be increased? If yes, why do they need to be increased, and by how much?
16. Should there be any restrictions placed on CE coursework that is delivered in an online format?
17. Do you feel that the required Professional Ethics & Law course is effective? Please describe how you feel it has an impact on the profession.

APPENDIX D. Additional Commentary from the RC Director Survey

RC directors who participated in the statewide survey were provided an opportunity to share any additional thoughts they had about the respiratory care profession in California, or to elaborate on any of their responses to questions in the survey through an open-ended comments section at the end of the survey. Additional commentary from directors who provided it is included here, in its original form.

“There is entirely too much regulation in respiratory therapy and going forward I would advise backing off any higher degree requirements! (This is the opinion of an RT with 40 years of experience in all clinical areas, and who has worked in 6 different states and abroad.)”

“The educational environment is critical. Trade schools charge a great deal of money but don't appear to invest it into their students' education. AS degree programs in state college systems require the completion of prerequisite course work, prior to admission to respiratory programs thus giving the student a solid base in the physical sciences. I believe time and money would be better spent in the prevention of respiratory care provided by unlicensed personnel.”

“Respiratory Care has evolved to a point that, for the public safety, and to reduce the cost of healthcare, it should be minimally a Bachelor's degree profession. Also, there are too many Respiratory Care schools in California and in the U.S. Supply has exceeded demand for several years already. In interviewing graduates, although they know that there is a glut of RTs, they enter into RT school desperate for an occupation so they take the gamble. The private vocational schools are taking advantage of these poor students. They continue to profit from these desperate students, while their graduates struggle to find work. Many settle into jobs that have nothing to do with RT or healthcare at all, and they are strapped with a large student loan.”

“Student preparedness really varies based on the programs and the clinical experience offered through the program. The private programs that exist in our area tend to have limited exposure to those arenas that are active and common in teaching facilities and even community hospitals. In general, they are not as prepared as those from AS or BS programs. In addition, they are flooding the market with these RTs. They are able to pass the credentialing exams but applying their knowledge in the clinical setting does not come as easily to them, due to lack of exposure in clinic. Critical thinking skills are underdeveloped.

In reference to the BS degree in respiratory, its time has come; but realize those RTs still working into their 60s will not go back to school for a degree and their years of experience can be invaluable in mentoring the RTs just entering the field.”

“We must have a well-educated, competent and skilled workforce to provide the right care with the right resources and the right cost to transition into healthcare reform and provide our patients safe, competent, quality care. We have a long way to go in how we provide patient care and run hospitals. Expectations seem to focus around money and not high quality patient care.”

“I personally believe that the future for Respiratory Therapy is positive if we maintain high standards for the RTs. The future for healthcare professionals will become increasingly competitive due to healthcare reform and the Accountable Care Act. Creative methods for providing patient care will determine the success or failure of a healthcare organization. Cost effectiveness with good outcomes will drive healthcare and cross trained professionals that perform clinical care via protocols will be in demand. Future practitioners will be held responsible for providing a broader scope of practice that expands beyond the limited traditional training that is customary with today's educational programs.”

"I believe moving to a bachelor's degree will enhance both the therapist and the public's perception of our profession. Given the required prerequisites needed, a student is virtually one year away from a bachelor's degree anyway. That being said, we still need to do more promotion of our profession - at the director level and upper management, as well as at the therapist level and to others on the care team and public."

"Two year AS respiratory RRT degrees will need to be "grandfathered" into future minimum credentialing standards, but clearly the evolving RCP role in the healthcare model needs to move to a baccalaureate degree and higher."

"I believe a bachelor program needs to be the new standard for all RTs (Entry Level) moving forward."

"I believe the respiratory programs are great the way they are, not every student will walk away with the same knowledge retained. It's up to the students to take advantage of every learning opportunity in school."

"We have required RRT within one year of hire for more than 15 years at our facility; all therapists are required to obtain NPS within 3 years of hire, and we recently added ACCS within 4 years. A select group of therapists have completed neurodiagnostic coursework, and are trained to provide EEG services in all settings of our facility. A select group of therapists have obtained CPFT or RPFT; these individuals are also trained to assist with advanced modalities of diagnostic bronchoscopy (EBUS/ Navigational) and act as our pulmonary lab team.

We struggle due to the fact that our size does not allow for specific ICU therapists vs. floor therapists, and all are required to train and work in the NICU after one year (to include intubation of neonates and management of all ventilatory modalities). Initial orientation of new graduates is approximately 10 weeks, with another two weeks of NICU orientation at one year. This does not seem sufficient due to our union status and the fact that our night shift average years of experience is now less than 4 years. I cannot bring new hires to day shift for a prolonged period (the union's stance is that one RRT is the same as another), despite the fact that the team recognizes the patient safety concerns."

"I believe that icing blood gases totally messes up the results. Take two ABG kits and draw your blood. First run your ABGs on both samples to get the initial results. Now place one of the two kits on ice. Every hour for the next 4 hours run an ABG from both samples and look at the results, the one without the ice will have the best results."

"I am an asthmatic now progressing into COPD. I am 60 years of age, have completed marathons, and the *Climb to Kaiser* bicycle ride of 156 miles with 13000 feet of climbing. I am 35% restrictive and now have severe obstructive lung disease from riding my bicycle outdoors in the number one small particle pollution county in California. We do not listen to patients enough. I have a reaction (along with 30% of patients) to ProAir. We actually wheeze when we take the inhaler. I use Xopenex and can still hit 30 mph on the bike, and 12 mph on the treadmill. We do not use ProAir in our hospital. Physicians will tell you there is no difference. There are thousands of complaints to FDA about ProAir. Nothing is being done.

ARDS ventilation is incorrect; it is the difference between PIP and Peep, not volume. Volume control is the worst mode there is. Bi-level, not APRV, does a far better job of oxygenating and saving H1N1 lives."

APPENDIX E. Characteristics of Surveyed Facilities

Facilities represented by the RC directors who participated in the statewide survey were grouped into regions to assess their geographic distribution. Table E1 below lists the regions used in this report and the counties each region represents.

Table E1. Geographic regions and the counties they represent

Region	
Sacramento & Northern California	Butte, Colusa, Del Norte, Glenn, Humboldt, Lake, Lassen, Mendocino, Modoc, Nevada, Plumas, Shasta, Siskiyou, Sierra, Tehama, Trinity, El Dorado, Placer, Sacramento, Sutter, Yolo, Yuba
San Francisco Bay Area	Alameda, Contra Costa, Marin, Napa, San Francisco, San Mateo, Santa Clara, Santa Cruz, Solano, Sonoma
Central California	Alpine, Amador, Calaveras, Fresno, Inyo, Kern, Kings, Madera, Mariposa, Merced, Mono, San Joaquin, Stanislaus, Tulare, Tuolumne, Monterey, San Benito, San Luis Obispo, Santa Barbara
Los Angeles	Los Angeles, Orange, Ventura
Inland Empire	Riverside, San Bernardino
Southern Border	Imperial, San Diego

Because the RC director survey data represent multiple types of facilities, there is no established benchmark against which their distribution can be compared. However, it is possible to assess the representativeness of just the general acute care (GAC) and pediatric hospitals, since their distribution across the state is known. Table E2 shows the geographic distribution of all facilities in the survey, but also compares the regional distribution of only the GAC and pediatric hospitals with their known distribution in California.⁴⁵ These data indicate that facilities in the Bay Area and the Southern Border region (San Diego and Imperial counties) are overrepresented in the survey; as a result other regions in the state are underrepresented to varying degrees.

Table E2. All responding facilities by region; GAC/pediatric hospitals in survey vs. California, by region

	All Responding Facilities		GAC/Pediatric Hospitals in Survey		GAC/Pediatric Hospitals in California	
Region	Count	%	Count	%	Count	%
Sacramento & Northern California	22	13.3	14	11.4	58	13.2
San Francisco Bay Area	44	26.7	35	28.5	88	20.0
Central California	25	15.2	17	13.8	73	16.6
Los Angeles Area	34	20.6	28	22.8	112	25.4
Inland Empire	23	13.9	14	11.4	83	18.8
Southern Border	17	10.3	15	12.2	27	6.1
Total	165	100	123	100.0	441	100

⁴⁵ General acute care and pediatric hospitals were identified using the California Office of Statewide Health and Planning hospital listing database, and data made available by the Veterans Administration through a FOIA request.

As noted above, the survey data represent multiple facility types making it difficult to assess how representative they are in terms of the rural versus non-rural distribution.⁴⁶ Table E3 shows only GAC and pediatric hospitals and compares the rural/non-rural distribution of survey respondents with that of California as a whole. Rural hospitals are only slightly underrepresented in the survey data.

Table E3. Distribution of responding facilities, by rural/non-rural geographic location

Rural	15	12.2	61	13.8
Non-rural	98	87.8	380	86.2
Total	123	100.0	441	100

⁴⁶ The rural vs. non-rural status of a facility was determined using the 2010 Rural-Urban Commuting Area codes and the hospital's zip code. For more information see: <http://depts.washington.edu/uwruca/>

APPENDIX F. RC Director Survey Instrument

SUGGESTION: Please save and use the PDF survey form to assist in collecting information before you begin the online survey.

DIRECTIONS: Please fill in the numbers or check the categories that most accurately reflect your response to each item or question. Please skip questions that don't apply. You may start the survey and return it at a later time. You must click "FINISH AND SUBMIT" in order to complete the survey.

NOTE: Where text boxes may not appear large enough to contain all of your text, please feel free to enter as much information as you would like. All of your entered text will be recorded. You may also complete the PDF survey form using Adobe Acrobat, save it, and email the completed form to _____ or fax the completed form to _____.

CONFIDENTIALITY: Your individual responses are absolutely confidential and only aggregate data will be reported. You may skip any questions you choose not to answer, but we encourage you to complete the entire survey to ensure a comprehensive picture.

CONTACT INFORMATION

1. Contact information (for clarification purposes only, will NOT be reported):

Name:

Title:

Organization:

Address 1:

Address 2:

City:

Zip:

E-mail:

Telephone number:

2. Please identify the employment setting (or settings) for which you are reporting information (Check all that apply.):

- General acute care hospital/medical center
- Pediatric hospital
- Psychiatric hospital
- Other specialty hospital (Please specify) _____
- Long-term care/skilled nursing facility
- Rehabilitation hospital/facility
- Outpatient clinic
- Home health care agency
- Professional staffing agency
- Other type of facility (Please specify) _____

3. Are you reporting information for more than one facility? (e.g. multiple hospital campuses, multiple home care agencies, multiple outpatient clinics?)

- No
- Yes (Please describe) _____

EDUCATION AND PROFESSIONAL EXPERIENCE

4. From what kind of program did you receive your initial respiratory therapy education? (Select only one.)

- Diploma program
- Associate degree program
- Baccalaureate degree program
- Master's degree program

5. Before you started your initial respiratory therapy education, what was the highest level of education you had completed?

- Less than high school diploma
- High school diploma
- Associate degree
- Baccalaureate degree
- Master's degree
- Doctoral degree

6. After graduating from your initial respiratory therapy education program, have you earned any additional degrees? (Check all that apply.)

- No additional degrees earned
- Associate degree in respiratory therapy
- Baccalaureate degree in respiratory therapy
- Master's degree in respiratory therapy
- Other Associate degree (Please specify.) _____
- Other Baccalaureate degree (Please specify.) _____
- Other Master's degree (Please specify.) _____
- Other Doctoral degree (Please specify.) _____

7. Prior to becoming a respiratory therapist, were you employed in another healthcare occupation?

- No
- Yes (Please specify occupation.) _____

8. Indicate any professional certifications/credentials you possess. (Check all that apply.)

- RRT
- ACCS
- NPS
- CPFT
- RPFT
- SDS
- Other (Please specify.) _____
- Other (Please specify.) _____

9. Indicate any professional societies of which you are an active member. (Check all that apply.)

- AARC
- CSRC
- ATS
- CTS
- ACCP
- SCCM
- ALA
- Other (Please specify.) _____
- Other (Please specify.) _____

10. Indicate the different settings in which you have practiced respiratory care. (Check all that apply.)

- Adult critical care
- Adult emergency care
- Neonatal/pediatric critical care
- Neonatal/pediatric emergency care
- Inpatient subacute care
- Sleep disorders lab
- Pulmonary function lab
- Patient transport
- Home health care
- Long-term care
- Outpatient clinic
- Pulmonary rehabilitation
- Educator
- Research
- Other setting (Please specify.) _____
- Other setting (Please specify.) _____

11. How many years of experience do you have as a licensed respiratory therapist?

12. How many years of experience do you have as a department director/manager?

13. What are your intentions regarding respiratory therapy employment in the next:

TWO YEARS	<input type="radio"/> Continue working as I do now	<input type="radio"/> Leave respiratory therapy but not retire	<input type="radio"/> Retire
FIVE YEARS	<input type="radio"/> Continue working as I do now	<input type="radio"/> Leave respiratory therapy but not retire	<input type="radio"/> Retire

14. Indicate the different departments/services at your facility that you direct/manage. (Check all that apply.)

- Medical intensive care unit (MICU)
- Surgical intensive care unit (SICU)
- Pediatric intensive care unit (PICU)
- Neonatal intensive care unit (NICU)
- Cardiac care unit (CCU)
- Cardiothoracic intensive care unit (CTICU)
- Adult inpatient subacute care
- Pediatric inpatient subacute care
- Neonatal inpatient subacute care
- Sleep disorders laboratory
- Pulmonary function laboratory
- Blood gas laboratory
- Bronchoscopy
- Pulmonary rehabilitation clinic
- Outpatient clinic
- Home care services
- Other service area (please specify) _____
- Other service area (please specify) _____
- Other service area (please specify) _____

15. How many respiratory therapists are employed at your facility? (Please estimate if you don't know the exact number.)

16. Are there any respiratory therapists on staff in your department who are members of a collective bargaining unit?

- No
- Yes

16a. Please describe any impact this has on the department.

17. Within your organization, whom do you directly report to? (Please specify position title.)

18. Within the scope of practice, describe the barriers (if any) to expanding respiratory service lines at your facility.

19. Does your facility allow other licensed professionals to provide respiratory therapy services (e.g. RNs)?

- No
- Yes (Please specify professions.) _____

20. Describe the role the medical director plays in defining the scope of practice of respiratory therapy at your facility.

SUPERVISION OF CLINICAL EDUCATION

21. Does your facility have a formal agreement with a respiratory therapy education program to provide clinical education to students?

- No
- Yes

22. How many different schools send students to your facility for clinical instruction?

23. Approximately how many students does your facility train each quarter/semester?

- Fewer than 5
- 5-10
- 10-15
- 15-25
- 25-35
- 35-50
- More than 50
- Other (Please specify.) _____

24. Does each school provide a designated clinical instructor to work with its students?

- Never
- Rarely
- Occasionally
- Often
- Always

25. How frequently is the designated clinical instructor onsite at your facility working with the students from his/her school?

- Never
- Rarely
- Occasionally
- Often
- Always

26. Which of the following best describes how supervision of students' clinical education is organized at your facility?

- Students train with the clinical instructor provided by the school
- Students train with therapists who are formally-designated preceptors
- Students train with whoever is the lead therapist
- Students train with any available therapist
- Other (Please describe.) _____

27. Do all staff therapists who provide clinical instruction to students receive compensation?

- Yes (Please describe the compensation structure.) _____
- No

27a. Do any staff therapists who provide clinical instruction to students receive compensation?

- No
- Yes (Please describe the compensation structure.) _____

28. Are students required to provide care under the direct supervision of a licensed RCP?

- No
- Yes

29. Does your facility have a clinical internship available to students not enrolled in a program that has a formal training agreement with your facility?

- No
- Yes (Please describe.) _____

30. Please indicate your level of agreement/disagreement with the following statements:

Having a designated clinical instructor who is continually onsite and provides clinical instruction would improve students' clinical education.

Strongly disagree	Disagree	Neither agree/disagree	Agree	Strongly agree
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

A lack of consistency in the relationship between students and the therapists who provide clinical instruction negatively impacts the quality of students' clinical education.

Strongly disagree	Disagree	Neither agree/disagree	Agree	Strongly agree
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

A lack of financial resources is a serious constraint to providing high quality clinical instruction to students.

Strongly disagree	Disagree	Neither agree/disagree	Agree	Strongly agree
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

RESPIRATORY THERAPY EDUCATION

31. Please indicate your level of agreement/disagreement with the following statements:

Education programs provide thorough coverage of sleep disorders and sleep studies.

Strongly disagree	Disagree	Neither agree/disagree	Agree	Strongly agree
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Education programs provide thorough coverage of pulmonary function testing.

Strongly disagree	Disagree	Neither agree/disagree	Agree	Strongly agree
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Education programs provide thorough coverage of neonatal and pediatric care.

Strongly disagree	Disagree	Neither agree/disagree	Agree	Strongly agree
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

32. Please indicate your level of agreement/disagreement with the following statements:

New graduate RTs are prepared to incorporate evidence-based medicine into their clinical decision-making.

Strongly disagree	Disagree	Neither agree/disagree	Agree	Strongly agree
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Education programs place sufficient emphasis on developing the ability to work in teams.

Strongly disagree	Disagree	Neither agree/disagree	Agree	Strongly agree
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Education programs provide sufficient exposure to topics related to leadership and management.

Strongly disagree	Disagree	Neither agree/disagree	Agree	Strongly agree
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

33. Please indicate your level of agreement/disagreement with the following statements:

New graduate therapists have a sufficient understanding of the scientific principles of respiratory therapy.

Strongly disagree	Disagree	Neither agree/disagree	Agree	Strongly agree
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Education programs place sufficient emphasis on delivering care outside of the inpatient setting.

Strongly disagree	Disagree	Neither agree/disagree	Agree	Strongly agree
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Education programs place sufficient emphasis on developing non-clinical competencies associated with chronic and rehabilitative care (i.e. patient education, case management)

Strongly disagree	Disagree	Neither agree/disagree	Agree	Strongly agree
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Education programs develop the competencies needed to work as pulmonary rehabilitation therapists.

Strongly disagree	Disagree	Neither agree/disagree	Agree	Strongly agree
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

34. Please indicate the content areas you would like to see included, or covered in greater depth, in respiratory therapy education programs (Check all that apply)

- Healthcare financing
- Regulatory issues impacting respiratory care
- Cost effectiveness of therapies
- Review of clinical research
- Principles of evidence-based medicine
- Communication skills
- Leadership and team building
- Departmental management
- Patient education
- Case management
- Chronic care
- Outpatient care
- Oxygen therapy
- Pulmonary rehabilitation
- Sleep disorders/sleep studies
- Pediatric and neonatal care
- Advanced technologies (Please describe.) _____
- Other (Please describe.) _____

35. Please indicate your level of agreement/disagreement with the following statements:

The two-year associate's degree provides a sufficient level of education to enter the workforce.

Strongly disagree	Disagree	Neither agree/disagree	Agree	Strongly agree
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

The two-year associate's degree is too compressed and does not provide enough depth of coverage in the core competencies of respiratory therapy.

Strongly disagree	Disagree	Neither agree/disagree	Agree	Strongly agree
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Because of the technical complexity of respiratory care, the depth of clinical knowledge required, and the broadening responsibilities of respiratory therapists as care providers, respiratory therapy education needs to move to the four-year bachelor's degree.

Strongly disagree	Disagree	Neither agree/disagree	Agree	Strongly agree
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

The four-year bachelor's degree should be required only if the additional time to degree completion is focused on developing clinical skills (i.e. practicing respiratory therapy).

Strongly disagree	Disagree	Neither agree/disagree	Agree	Strongly agree
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

A four-year bachelor's degree should incorporate specialized academic tracks such as research, management, and education.

Strongly disagree	Disagree	Neither agree/disagree	Agree	Strongly agree
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

36. Please indicate your level of agreement/disagreement with the following statements:

Moving respiratory therapy education to the four-year bachelor's degree level is necessary to create career opportunities in respiratory therapy.

Strongly disagree	Disagree	Neither agree/disagree	Agree	Strongly agree
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Respiratory therapy is perceived as a technical occupation and moving respiratory therapy education to the four-year bachelor's degree level is necessary in order to raise the field's professional standing.

Strongly disagree	Disagree	Neither agree/disagree	Agree	Strongly agree
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Faculty at respiratory therapy education programs are sufficiently prepared to deliver the breadth and depth of content that would add value to the four-year bachelor's degree program.

Strongly disagree	Disagree	Neither agree/disagree	Agree	Strongly agree
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

USE OF PATIENT-DRIVEN PROTOCOLS

For the purpose of the following questions, protocol is defined as: Initiation or modification of a patient care plan following a pre-determined structured set of physician orders, instructions, or interventions in which the therapist is allowed to initiate, discontinue, refine, transition, or restart therapy as dictated by the patient's medical condition.

37. Do you utilize protocols at your facility?

- No
- Yes

38. Listed below are general categories for commonly utilized protocols. Please indicate whether your facility has such a protocol in place, and how frequently it is applied to its intended patient population.

Description	Protocol in place		Frequency of application to intended		
	Yes	No	< 25%	25% - 75%	> 75%
Oxygen management	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Oximetry monitoring	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Aerosolized medications	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Secretion clearance	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Lung hyperinflation	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Ventilator setup & management	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Weaning	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Nitric oxide administration	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
COPD management	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Emergency room care	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Device selection	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Medication selection	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Other (Please specify.)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

39. Please describe how you monitor protocol compliance.

40. Please describe how you measure and report outcomes of protocol utilization.

41. Please indicate your level of agreement/disagreement with the following statements:

The medical director of my department is supportive of the use of respiratory therapy protocols.

Strongly disagree	Disagree	Neither agree/disagree	Agree	Strongly agree
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

The medical executive committee at my facility is supportive of the use of respiratory therapy protocols.

Strongly disagree	Disagree	Neither agree/disagree	Agree	Strongly agree
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

42. For the purpose of the following questions, prescriptive authority per protocol signifies the ability of a respiratory therapist to evaluate and treat patients per protocol, independent from an initial physician order.

Please indicate your level of agreement/disagreement with the following statements:

Respiratory therapists should be allowed to prescribe therapy (including medications) per protocol within the scope of practice.

Strongly disagree	Disagree	Neither agree/disagree	Agree	Strongly agree
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Experienced therapists already possess the needed competencies to exercise prescriptive authority per protocol.

Strongly disagree	Disagree	Neither agree/disagree	Agree	Strongly agree
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

There are additional competencies that need to be developed before therapists can be granted the authority to prescribe therapy per protocol.

Strongly disagree	Disagree	Neither agree/disagree	Agree	Strongly agree
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

43. For the purpose of the following questions, prescriptive authority per protocol signifies the ability of a respiratory therapist to evaluate and treat patients per protocol, independent from an initial physician order.

Please indicate your level of agreement/disagreement with the following statements:

Respiratory therapists would need a minimum of a bachelor's degree in respiratory therapy to exercise prescriptive authority per protocol.

Strongly disagree	Disagree	Neither agree/disagree	Agree	Strongly agree
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Respiratory therapists would need a minimum of a master's degree in respiratory therapy to exercise prescriptive authority per protocol.

Strongly disagree	Disagree	Neither agree/disagree	Agree	Strongly agree
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

The authority to prescribe therapy per protocol should be reserved for an advanced practice respiratory therapist who is separately licensed and credentialed.

Strongly disagree	Disagree	Neither agree/disagree	Agree	Strongly agree
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

44. Please indicate your level of agreement/disagreement with the following statements:

In-person continuing education experiences are more valuable than online continuing education experiences.

Strongly disagree	Disagree	Neither agree/disagree	Agree	Strongly agree
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

There should be a limit to the number of continuing education units that can be completed online.

Strongly disagree	Disagree	Neither agree/disagree	Agree	Strongly agree
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Online continuing education units should be restricted to specific content providers (e.g. AARC, Society of Critical Care Medicine).

Strongly disagree	Disagree	Neither agree/disagree	Agree	Strongly agree
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

There should be core continuing education courses that all respiratory therapists are required to complete, regardless of their clinical specialty.

Strongly disagree	Disagree	Neither agree/disagree	Agree	Strongly agree
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

45. Please indicate the content areas that you feel should represent required continuing education units (Check all that apply):

- No required CEUs
- Community health models (health promotion and prevention)
- Accountable healthcare (cost effectiveness of therapies)
- Case management
- Patient education
- Current approaches to non-invasive ventilation
- Aerosolized medications
- Patient-centered care
- Communication strategies for difficult conversations
- Leadership development
- Other (please specify) _____

LAW & PROFESSIONAL ETHICS

46. Please indicate your level of agreement/disagreement with the following statements:

I value the ethics portion of the required law & professional ethics course.

Strongly disagree		Neither		Strongly
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

The content of the ethics portion of the required law & professional ethics reflects the types of ethical conflicts I encounter in my professional practice.

Strongly disagree	Disagree	Neither agree/disagree	Agree	Strongly agree
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

DEMOGRAPHIC INFORMATION

47. Gender

- Male
- Female

48. Year of birth (YYYY)

49. What is your ethnic/racial background? (Select all groups with which you identify.)

- African American/Black/African
- Caucasian/White/European
- American Indian/Native American/Alaskan Native
- Other (Please specify): _____
- Asian
 - Cambodian
 - Chinese
 - Filipino
 - Indian
 - Indonesian
 - Japanese
 - Korean
 - Laotian/Hmong
 - Pakistan
 - Thai
 - Vietnamese
- Hispanic or Latino
 - Central American
 - South American
 - Cuban
 - Mexican
 - Other Hispanic
- Native Hawaiian or Pacific Islander
 - Fijian
 - Guamanian
 - Hawaiian
 - Samoan
 - Tongan
 - Other Pacific Islander

APPENDIX G. RT Education Program Director Key Informant Interview Guide

1. How do you perceive the labor market for new graduate therapists in your region? Do your graduates easily find employment? Is there a perception that there are more new graduates looking for work than jobs available?
2. Can you describe how students in your program are supervised during their clinical clerkships? Do they work directly with a designated clinical instructor at each site? Is that clinical instructor paid by the hospital or RC program?
3. How much time does program faculty spend onsite with students when they are doing clinical rotations?
4. Do you require that hospital staff therapists who participate in your students' clinical education be formally trained as preceptors?
5. How are students evaluated in terms of demonstrating competence in the different areas of clinical instruction?
6. How do hospital staff therapists who participate in your students' clinical education provide feedback to your program regarding student performance?
7. Do you receive performance evaluations from employers that have hired recent graduates of your program (e.g. a six-month performance review)?
8. What are the biggest challenges associated with providing students' clinical training? How do you feel that students' clinical training experience could be improved?
9. Please describe how students in your program are exposed to the Medicare/Medicaid EHR Incentive Programs (meaningful use of EHR).
10. Please describe how students in your program are exposed to evidence-based medicine and its role in clinical decision-making.
11. Please describe how students in your program are exposed to protocol-driven therapies.
12. Please describe how students in your program are exposed to respiratory care delivery in alternative settings (i.e. outpatient clinics, home care, end-of-life and palliative care).
13. Please describe how students in your program are exposed to emerging respiratory care provider roles, such as case manager, pulmonary rehabilitation therapist, smoking cessation specialist, patient educator.
14. Do you feel there are clinical/technical competencies needed by new graduate therapists that are not being developed in the existing curriculum?
15. Do you feel there are non-clinical/non-technical competencies needed by new graduate therapists that are not being developed in the existing curriculum?
16. Given the current scope and complexity in the clinical practice of respiratory care, and the emergence of new roles for practitioners, has the profession of respiratory therapy reached the point where a bachelor's degree should be required educational credential for entry into practice?

17. How many hours do your students spend in clinical rotations during their two years? If the bachelor's degree were required for licensure as a respiratory therapist, do you feel that the number of hours spent in clinical rotations should increase?
18. Can you describe the challenges your institution would face in transitioning from awarding an associate's degree to a Bachelor of Science degree in respiratory therapy?
19. How are you refining or expanding your curriculum to accommodate the amendments to the Respiratory Care Practice Act enacted by the passage of Senate Bill 525?

APPENDIX H. RT Focus Group Interview Guide

1. Are there specific clinical skills that you feel should be given greater focus in respiratory therapy education programs?
2. Do you feel that new RT graduates are being sufficiently exposed to the different roles that RTs can play as care provider?
3. Should education programs be doing more to prepare new RT graduates to work in settings outside of inpatient, acute care?
4. Do you think new RT graduates are being adequately prepared to reference evidence-based medicine in their clinical decision making?
5. Are education programs adequately developing critical thinking among new RT graduates?
6. Do you think that variation in the quality of clinical training experiences that RT students receive is an issue, in terms of preparing them to enter the workforce?
7. Do you support moving respiratory therapy education from the associate degree to the baccalaureate degree level?
8. What would be the impact on the profession of requiring a bachelor's degree in respiratory therapy? Could it help develop professional opportunities in the field?
9. Does your facility have a career ladder or a defined pathway for professional advancement? Would completion of a higher degree make any difference?
10. Does your facility provide any financial support for obtaining additional certifications or degrees?
11. Does your facility provide any financial incentive for obtaining additional certifications or degrees (i.e. wage increase, bonus)?
12. What would be your incentive for pursuing additional education (a higher degree)?
13. Does the facility you work at utilize patient-driven protocols?
14. Should respiratory therapists be given the authority to prescribe therapy (including medication) per protocol, within RT scope of practice? Would this require additional education? Should prescriptive authority be reserved for a separately credentialed advance practice therapist (analogous to the nurse practitioner)?
15. Should there be core content CEUs that every respiratory therapist is required to complete, regardless of clinical practice area?
16. Should online CEUs be restricted to certain content providers?
17. Do you value the required law & professional ethics course? How do they impact your practice? Should they continue to be mandated?
18. From your perspective, what are the most important professional issues facing respiratory therapy?

APPENDIX I. Curricular Content Analysis: Recoded Course Descriptions**Table I1. Recoded course descriptions, entry-level AD program in respiratory therapy, California community college system**

Recoded categories	# of units	Description
Single topic: Respiratory therapy equipment & devices	3	Introduction to respiratory equipment and devices. Students learn to assemble, maintain, make minor repairs and correct malfunctions for the most common equipment and devices used in respiratory therapy.
Single topic: Cardiopulmonary anatomy & physiology	4	Physiology of the cardiopulmonary system, including cardiopulmonary and renal anatomy and physiology. Presentation of pulmonary ventilation, gas transport and diffusion, cardiopulmonary circulation, ventilation/perfusion balance, acid-base balance, and mechanics and neurologic control of breathing.
Single topic: Principles of physics in respiratory care	4	Overview of the principles of physics in respiratory care equipment, technology, and patient care including the behavior of gases, electricity and electrical safety. Internal heat, temperature scales, and measurement are covered. Molecular phenomena including osmosis and dialysis, and the mechanics of the cardiovascular and respiratory systems.
Content area: Pathology/pathophysiology	2	Physiology, pathology, diagnosis, and treatment of the common diseases and disorders of the cardiovascular, respiratory, and neuromuscular systems are covered. Laboratory evaluation techniques and monitoring methods are presented. Includes review of cardiopulmonary pharmacology, including antiasthmatic and anti-infective drugs.
Content area: Pathology/pathophysiology	1	Pathology and assessment, diagnosis and treatment of diseases and disorders common to the respiratory, cardiovascular and neuromuscular systems. Includes related patient assessment and monitoring techniques, laboratory evaluation methods, record keeping and review, and patient communication skills development.
None	4	Techniques of monitoring in a critical care setting: electrocardiography, cardiovascular/hemodynamic monitoring, capnography, and pulmonary function testing. Cardiovascular pharmacology and approaches to supporting the intensive care patient. Algorithms for treatment of acute coronary syndrome and other related disorders.
Laboratory	4	Indications, contraindication, administration, and assessment of essential therapeutic procedures. Problem-based learning used develop, evaluate, and modify a respiratory care plan. Case studies use to develop skills related to information gathering and decision-making. Introduction to professional expectations for working in a clinical setting.

Table I1. Recoded course descriptions, entry-level AD program in respiratory therapy, continued

Recoded categories	# of units	Description
Laboratory	1	Clinical simulation and case studies are used to develop, assess and determine the effectiveness of a respiratory care plan. Students develop clinical information gathering and decision making skills. Topics in specialty care are introduced. Students make presentations based on assessment of case studies.
Single topic: Neonatal/pediatric care	4	Presentation of prenatal development, pregnancy risks, and normal labor and delivery in the context of respiratory care. Neonatal and pediatric assessment, neonatal and pediatric diseases and disorders, and respiratory care interventions, techniques, and equipment used in neonatal and pediatric patient care are covered.
Laboratory	1	Clinical simulation and case studies are used to refine student's ability to develop and modify a respiratory care plan. Clinical scenarios are used to further develop clinical information gathering and decision making skills. Topics in specialty care continue.
Supervised clinical experience	20	Four sections of supervised clinical experience totaling 850 total hours

Table 12. Recoded course descriptions, entry-level BS program in respiratory therapy, Loma Linda University

Recoded categories	# of units	Description
Single topic: Patient assessment	1.33	General introduction to the clinical setting. Assesses and evaluates patients with respiratory disease. Develops clinical practice habits and patient-care techniques. Student must obtain current cardiopulmonary resuscitation (CPR) certification from the American Heart Association before the end of the term.
Single topic: Pharmacology	1.33	Surveys pharmacologic agents currently used in medicine—including their kinetics, dynamics, and therapeutics. Emphasizes drugs and their effects on the respiratory, cardiovascular, and autonomic nervous systems. Topics include the bronchodilators, anti-inflammatory agents, mucokinetic agents, cardiovascular agents, diuretics, antimicrobials, neuromuscular agents, and agents used to treat nicotine dependence.
Single topic: Cardiopulmonary anatomy & physiology	2.67	Overview of the principles of physics in respiratory care equipment, technology, and patient care. Investigates anatomic and physiologic components of the cardiovascular and respiratory systems. Emphasizes histology, embryology, diffusion, gases transported in the blood, acid-base balance, lung volumes and capacities, mechanics of ventilation, ventilation perfusion relationships, regulation of respiration, cardiac cell-membrane action potentials, and excitation-contraction coupling. Internal heat, temperature scales, and measurement are covered. Molecular phenomena including osmosis and dialysis, and the mechanics of the cardiovascular and respiratory systems.
Single topic: Principles of physics in respiratory therapy	3.33	Physiology, pathology, diagnosis, and treatment of the common diseases and disorders of the cardiovascular, respiratory, and neuromuscular systems. Basic principles of respiratory therapy, as related to gas physics; medical-gas storage and therapy; and administration of humidity, aerosol and airway-pressure therapies, artificial airways, and resuscitation devices. Emphasizes methods of administration of the therapy, with special attention placed on the equipment used, as well as applies this information to the clinical setting. Laboratory evaluation techniques and monitoring methods are presented. Includes review of cardiopulmonary pharmacology, including antiasthmatic and anti-infective drugs.
None	1.33	Language of medicine, including word construction, word analysis, definitions, and the use of terms related to medical science. Course organized by body systems.

Table 12. Recoded course descriptions, entry-level BS program in respiratory therapy, continued

Recoded categories	# of units	Description
None	1.33	Foundation of basic patient care information and skills for allied health professionals entering the clinical environment. Integrated basic care knowledge and skills required by each profession.
Single topic course: Diagnostic tests & procedures	2	Continues the clinical use of diagnostic tests and procedures. Emphasizes evaluation of chest radiographs, electrocardiography, and monitoring hemodynamics. Lecture and laboratory.
Single topic course: Pathology Content area: Pathology/pathophysiology	2.67	Fundamental mechanisms of disease, including cell injury; inflammation, repair, regeneration, and fibrosis; and vascular, cardiac, respiratory, gastrointestinal, hepatobiliary, urinary, reproductive, endocrine, and integumentary pathologies.
Single topic course: Cardiopulmonary pathophysiology Content area: Pathology/pathophysiology	1.33	Comprehensively studies cardiopulmonary diseases and their adverse effects. Course content includes disease etiology, pathology, pathophysiology, clinical features, prognosis, treatment, and prevention.
Single topic: Pharmacology	1.33	Surveys pharmacologic agents currently used in medicine—including their kinetics, dynamics, and therapeutics. Emphasizes drugs and their effects on the respiratory, cardiovascular, and autonomic nervous systems. Topics include the bronchodilators, anti-inflammatory agents, mucokinetic agents, cardiovascular agents, diuretics, antimicrobials, neuromuscular agents, and agents used to treat nicotine dependence.
Laboratory	3.33	Lecture and laboratory presentation of the principles of respiratory therapy related to lung-inflation therapy; use of artificial airways, and their care and complications. Introduces mechanical ventilatory support, including beginning ventilators, support systems, comparison of methods, and respiratory monitoring. Emphasizes application of this information to the clinical setting.
Single topic course: Pulmonary function methods	2	Evaluates pulmonary function in health and disease through spirometry, plethysmography, helium dilution, nitrogen washout, single-breath nitrogen, volume of isoflow, and diffusing capacity studies—including blood-gas instrumentation, quality control, quality assurance, and current ATS standards. Lecture and laboratory

Table 12. Recoded course descriptions, entry-level BS program in respiratory therapy, continued

Recoded categories	# of units	Description
Single topic course: Pathology Content area: Pathology/pathophysiology	2	Fundamental mechanisms of disease, including the central and peripheral nervous systems, bone and joint, skeletal muscle, developmental, genetic, infectious, and parasitic pathologies; and neoplasia. Fourth unit requires two autopsy viewings and written report.
Single topic course: Cardiopulmonary pathophysiology Content area: Pathology/pathophysiology	1.33	Comprehensively studies cardiopulmonary diseases and their adverse effects. Course content includes disease etiology, pathology, pathophysiology, clinical features, prognosis, treatment, and prevention.
Single topic course: Mechanical ventilation	2.67	Lecture and laboratory presentation of the principles of respiratory therapy related to mechanical ventilatory support, including patient management and ventilatory support systems. Emphasizes methods of ventilatory support, with special attention to the mechanical ventilators commonly used in the students' clinical sites. Applies this information to the clinical setting.
Single topic course: Ethics	1.33	Ethical issues in modern medicine and related fields from the perspective of Christian thought and practice.
Single topic course/content area: Population health/ health promotion/clinical prevention	.667	Current issues related to infectious disease, with special emphasis on principles of epidemiology and the etiology of HIV/AIDS. Discusses disease pathology and modes of transmission compared with hepatitis, tuberculosis, and influenza. Development of ethical response to psychosocial, economic, and legal concerns. Strategies and programs for education, prevention, and identification of resources. Impact on the health-care worker; risk factors; and precautions for blood-borne pathogens, HIV, hepatitis, and tuberculosis.
Single topic course: 12-lead ECG interpretation	1.33	Designed for health-care providers who are familiar with basic ECG monitoring and are seeking to learn principles of application and interpretation of the 12-lead system. Emphasizes recognition of the acute myocardial infarction. Additional topics include identifying axis deviation, acute ischemic conditions, electrolyte imbalances, bundle-branch block, and infarct impostors. Practical application of information to bedside care of cardiac patients, emphasizing patient assessment, data collection, and use of the 12-lead to guide rapid intervention. Certificate issued upon successful completion of the course.

Table 12. Recoded course descriptions, entry-level BS program in respiratory therapy, continued

Recoded categories	# of units	Description
Single topic course: Mechanical ventilation	2.67	Continues the theory, practice, and knowledge of mechanical ventilation—providing an integrated approach to respiratory care in the critical-care arena. A systems-based approach used to incorporate respiratory care concepts, such as planning and implementing of protocols, best-practice guidelines, etc. Presentations, projects, and critical evaluation used to increase critical-thinking skills and patient-care skills.
Single topic course: Patient assessment	1.33	Advanced skills in interviewing, physical examination, and interpretation of laboratory data. Lecture, reading material, and physical examination procedures. Provides insight for better interview and examination of patients with cardiopulmonary disease. Increases understanding of the pathophysiology behind the symptoms.
Single topic course: Neonatal/pediatric care	1.33	Pathophysiology of the newborn, prenatal risk factors, pediatric cardiopulmonary diseases, diagnostics, monitoring of clinical indices, and treatments used in perinatal/pediatric respiratory care. Advanced information on surfactant administration, high-frequency ventilation, and ECMO.
Single topic course: Respiratory therapy equipment & devices	2	Presents and discusses the clinical application of respiratory therapy devices in-depth, and their influences on patient care. Reports and discussions of current and advanced developments. Emphasizes application of this information to the clinical setting.
None	1.33	Adult critical-care concepts presented through a case-study approach. Respiratory care plan used to present diseases, treatment, and procedures relevant to respiratory care. Patient rounds further develop critical-thinking skills in a patient-care setting.
Single topic course/content area: Leadership	1.33	Prepares graduates for entry into the new work requirements. Through observation and participation, students explore the responsibility of today's employee to successfully integrate customer and community service and social responsibility.
Single topic course/content area: Statistics/research methods	2	Presents statistical methods relative to research design for health professionals, with introduction to SPSS statistical package for computer data analysis. Discusses philosophical approaches to scientific inquiry, range of research designs, roles of variables, and ethics.

Table 12. Recoded course descriptions, entry-level BS program in respiratory therapy, continued

Recoded categories	# of units	Description
Single topic course: Pulmonary rehabilitation	2	Metabolism of carbohydrates, lipids, and proteins in energy production, oxygen consumption, carbon dioxide production, and respiratory quotient applied to measurable counterparts of oxygen uptake, carbon dioxide output, and respiratory exchange ratio at rest and during exercise. Metabolic studies, body-fat composition, exercise studies, and malnutrition in chronic obstructive pulmonary disease utilized as a foundation for evaluation and implementation of pulmonary rehabilitation program. Rehabilitation components include team assessment, patient training, exercise, psychosocial intervention, and follow-up
Single topic course: Diagnostic tests & procedures	1.33	Advanced diagnostic theory and practice in the following areas: Holter monitoring, echocardiography, bronchoscopy, sleep studies, and other relevant respiratory care diagnostics
Single topic course: Neonatal/pediatric care	1.33	Pathophysiology of newborn and pediatric diseases likely to be encountered by the respiratory care practitioner. Perinatal risk factors, resuscitation, and research on the transition to extrauterine life. Diagnostics, monitoring of clinical indices, and treatments used in perinatal/pediatric respiratory care. Advanced information on surfactant, high-frequency ventilation, and ECMO.
Single topic course: Neonatal/pediatric care	1.33	Develops respiratory care-management skills in caring for the neonatal and pediatric patient through the presentation of student case studies. Clinical staff and faculty review current management of the newborn, infant, and child. Student presents patients and explains implications of care. Develops presentation skills.
Single topic course: Psychosocial elements of clinical care	1.33	The integration of psychosocial and spiritual care in the clinical setting.
Single topic course/content area: Statistics/research methods	2	Advanced conceptual frameworks, data analyses, and techniques in quantitative and qualitative research. Emphasizes process for obtaining and using evidence-based research

Table 12. Recoded course descriptions, entry-level BS program in respiratory therapy, continued

Recoded categories	# of units	Description
Single topic course: Cardiology	2	Assists the health-care provider to develop assessment skills and to increase knowledge of medical management of the patient with acute and chronic cardiovascular disorders. Focuses on anatomy and physiology, underlying pathophysiology, advanced history taking and physical assessment, cardiovascular pharmacology, electrical modalities, cardiac diagnostic testing, and current research. Emphasizes the emergency care of patients with myocardial infarction and trauma to the cardiovascular system. Assignment includes interaction with cardiac patients and observation of diagnostic studies in the clinical setting.
Single topic course/content area: Case management	1.33	Utilizes a case management approach to patient care in the management and evaluation of treatment and disease. Special emphasis on case management of the respiratory care patient includes discharge planning, utilization review, patient assessment, cost containment, patient education, and integration issues.
Single topic course/content area: Educational/instructional methods	1.33	Develops units of instruction, instructional objectives, and evaluation procedures. Students observe and participate in classroom management; and apply teaching principles through experience in various teaching activities, such as community preventive health care programs, in-service and continuing education, and college classroom and clinical teaching. Conferences and individual guidance.
Single topic course/content area: Population health/ health promotion/clinical prevention	1.33	Selected topics dealing with aspects of disease prevention. Includes the relevance of statistics, epidemiology, research designs, and clinical trials; as well as selected disease trends, lifestyle modification, the role of physical activity, nutrition and immunization, and public health approaches to communicable diseases.
Supervised clinical experience	10	Six sections of supervised clinical experience totaling 1,200 total hours
None	2	Students develop a personal "portfolio" that documents progression toward and achievement of competence in personal and professional areas

