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EDITORIAL - PROMOTING ADVANCED LEVELS OF EDUCATION FOR RESPIRATORY THERAPISTS

Ten years ago, the American Association for Respiratory Care (AARC) held the second of two National Consensus Conferences on Respiratory Care Education. In the Summary Report of that conference, the participants called for development and promotion of articulation models between schools, colleges, universities, and health care facilities to advance the profession. A major outcome of the consensus conference process was the implementation of the associate degree as the minimum educational level for entry into practice in the field of respiratory care. Since that time, we have seen a phase-out of one-year technician programs and a doubling of the number of programs offering the bachelor of science degree in respiratory care. The profession has continued to advance across all care settings, and respiratory therapists are now practicing in new areas with new roles and responsibilities. We are considered valued partners by our colleagues in other health professions, and many therapists are now working as disease management specialists, physician extenders, and research associates.

Yet there is a sense among some in the respiratory care educational community that, as a profession, we are falling behind. Physical therapy (PT) requires a master's degree for entry into practice and is moving toward a doctoral degree. Occupational therapy currently requires a master's degree, and the physician assistants are rapidly moving to the master's degree as the minimum required for practice. A recent survey, however, identified only three master's degree programs in the U.S. with a major or concentration in respiratory care.

Perhaps the body of knowledge in our sister allied health professions justifies a graduate degree for entry and respiratory care does not. However, when I compare the number of discipline-specific credit hours between the B.S. degree RT program at our university to the master's degree PT program, I find that the PT program requires only 8.5 semester hours more in PT-specific course work for the master's degree than our RT students take specific to respiratory care for the B.S. degree (100 vs. 91.5). When one reviews the body of knowledge that a respiratory therapist must master to be effective in acute and critical care, disease management, rehabilitation and long-term care, assessment-based protocol implementation, pediatric and neonatal respiratory care, and cardiopulmonary diagnostics, it is a wonder that students can acquire this knowledge in two years of schooling. And, of course, this does not address the need for respiratory therapists with leadership training in the areas of education, management and supervision, research, specialty areas, and advanced clinical practice.

Which brings me to this issue of the *Respiratory Care Educational Annual*. The Steering Committee of the Coalition for Baccalaureate and Graduate Education, at the request of the AARC Board of Directors, has written a white paper entitled, "The Development of Baccalaureate and Graduate Degrees in Respiratory Care." This important paper was reviewed and approved by the AARC Board of Directors in July of this year. The paper is contained in its entirety in this issue of the *Annual*. Specifically, the paper identifies the need for an increase in the number of respiratory therapists with

advanced training and education to meet the demands of providing complex services and advanced patient management. The paper further encourages the development of additional baccalaureate degree programs in respiratory care and the articulation of community college programs with B.S. degree programs, so that associate degree graduates may complete their bachelor's degree in respiratory care at the community college or through distance education. And last but not least, the paper calls for the expansion of master's degree programs in respiratory care for leadership development in the areas of management, education, research, and clinical practice.

A second "point of view" paper in this issue of the *Annual*, by Dr. Ellen Becker, describes methods to promote baccalaureate degree completion for respiratory therapists. This is an important topic because, as we have seen, there is a need to increase the number of RTs with advanced levels of education. One important way to achieve this goal is to develop mechanisms for current practitioners to complete the bachelor's degree. Dr. Becker's paper, however, also suggests that, as a profession, we should move towards a baccalaureate entry level. While perhaps this view merits discussion, I would encourage our readers to realize that the AARC has suggested a different path. To quote from a recent AARC letter to the *National Network of Health Career Programs in Two-Year Colleges Newsletter*:

"...The AARC supports and values two-year degree programs in respiratory care..." and "...associate degree programs, which provide the majority of the needed human resources for the field, are an important foundation for the profession..." The letter goes on to state that "...increasing the number of practitioners with advanced credentials and education is essential if we are going to continue to grow and prosper as a profession."

There is a need to maintain and support our excellent network of associate degree respiratory care programs in the U.S. There is also a need to increase the number of baccalaureate and graduate degree respiratory care programs. One goal should not diminish the other. I believe that we should work together in a collaborative fashion to advance the profession. In terms of the future of respiratory care education, I would like to suggest that it is not EITHER/OR but BOTH/AND.

David Shelledy, PhD, RRT
Editor

QUALITY OF INSTRUCTION AND TEACHING EFFECTIVENESS IN CLINICAL RESPIRATORY CARE EDUCATION

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Abstract

Procedures for measuring teaching effectiveness and quality of clinical instruction vary among respiratory therapy schools. The purpose of this study was to investigate determinants of teaching methods on quality of instruction in clinical respiratory therapy education. A survey instrument for student evaluation of clinical practice currently used in a baccalaureate respiratory therapy program was the tool analyzed. Correlations between teaching method and quality of instruction were computed. Regression analysis showed a positive correlation between aspects of teaching and quality of instruction. Integrating theory to practice, allowing adequate time for procedures, clarifying questions, motivating students, and demonstrating enthusiasm significantly ($p < 0.05$) impacted the quality of instruction. These variables can be used to compile a list of prioritized crucial elements that focus on improving clinical training of respiratory therapy students.

Quality of Instruction and Teaching Effectiveness in Clinical Respiratory Care Education

Procedures for measuring teaching effectiveness and quality of instruction vary among respiratory therapy schools. Because of the high correlation between quality teaching and high student achievement (Darling-Hammond, 1997), it is understandable that teaching effectiveness of clinical instructors needs to be carefully monitored. Many colleges and universities have adopted the use of student ratings of instruction as one, and often the most influential, measure of instructional effectiveness (D'Appolonia & Abrami, 1997). Student evaluations of teaching are multidimensional, reliable, stable, primarily a function of the instructor who teaches a course rather than the course itself, relatively valid against a variety of indicators of effective teaching, and useful in improving teaching effectiveness (March & Roche, 1997; March & Bailey, 1993). The instruments currently used for student evaluation of teaching effectiveness differ in terms of quality. Poorly worded and inappropriate items may not provide any useful information for the evaluation of teaching effectiveness (March & Roche, 1997).

Background

Student evaluations of teaching effectiveness were first introduced in North American colleges and universities in the mid-1920s (D'Appolonia & Abrami, 1997). Institutions interested in improving teaching saw the primary purpose of student ratings as providing feedback to teachers that would be helpful for improvement. The quality of teaching within departments, courses, and teachers was evaluated on the basis of the student ratings instructors received. Since then, colleges and universities have adopted the practice of collecting student ratings of teaching as part of their quality assurance system.

Many in education are debating whether student ratings really provide valid data about teaching effectiveness. A number of research studies have been conducted to examine the reliability and validity of student evaluations of teaching. Many authors agree that student ratings are a valid and reliable source of data on teaching effectiveness (McKeachie, 1997; March & Roche, 1997; March & Bailey, 1993; D'Appolonia & Abrami, 1997), but the validity and the usefulness of student evaluations of teaching depend upon the content and the coverage of the items being evaluated. Despite these limitations, student evaluations of teaching effectiveness are useful because they can give insight into how students view their instructor's teaching skills. These evaluations can provide feedback on strengths and weaknesses across different dimensions of teaching effectiveness, rather than just comparisons with each aspect of teaching.

Due to the lack of sufficient literature, there is a need to investigate the identification of perceived factors of quality education and grading that influence the student's participation and evaluation in clinical respiratory therapy education. By identifying these perceived factors, clinical instructors can better understand how to facilitate participation in this important area of respiratory care education. Therefore, two important questions arose within the context of this study:

How do teaching methods impact the quality of instruction in respiratory therapy clinical education?

What factors of the grading policy are related to, or predict, the overall grade of a clinical instructor?

Methodology

Instrumentation

The Department of Cardiopulmonary Care Sciences at Georgia State University uses a survey instrument with a Likert scale (1=Poor, 2=Satisfactory, 3=Good, 4=Excellent) for student evaluation of clinical practice rotation. Although the use of clinical evaluation forms is voluntary, the department requires instructors to make these forms available to the students and to collect the survey at the end of each semester. The evaluation forms are typically distributed to students and collected by a student in the class, and then taken to a central office where they are processed. After the term is over, the typed results are distributed for clinical faculty review.

The student's evaluation of clinical education includes three sections of ratings on clinical practices: (1) teaching methods used and their effectiveness, (2) the use of the grading policy, and (3) overall ratings. Student evaluation of teaching method and effectiveness measures nine evaluation factors (see appendix A for the wording of student evaluation of clinical education). For this study, a set of nine factor scores was used to represent the profile of students' evaluation scores in investigating the quality of instruction in clinical respiratory care education.

Sampling, Data Collection, and Data Analysis

During the 3-year period (1999-2002), a total of 241 surveys were given to students, and 211 surveys were returned for an 87% response rate. Responses were analyzed using SPSS for Windows, version 10.0. To address the research questions, correlations between each teaching method and quality of instruction were analyzed using stepwise multiple regression at a 0.05 level of significance. Stepwise multiple regression analysis is used to estimate the effect that each explanatory and independent variable of teaching methods has on quality of instruction. Therefore, each question was scored from a Likert 4 point scale corresponding to how well the students thought about the effect of teaching methods on quality of instruction in their clinical rotation (Pedhazur, 1997).

Limitations of the Study

Despite the fact that this survey instrument has been in use for sometime now, the major limitation of this study is that the instrument has not been tested for validity and reliability. Within the context of this study, the intention was to assess the perceived factors of quality education and grading that influence student participation and evaluation in clinical education. Therefore, the validity and reliability of the instrument was not assessed.

The group administration of a survey resembles in respondents' minds the taking of a test (Dillman, 2000). In this study, students were surveyed with this type of administration in a classroom setting. Therefore, a criticism of this study might be that students seemed to invoke test-taking behavior. For example, students had a chance to preview all of the questions to get a sense of the complete task or to go over the complete questionnaire and even to change the answers to some questions. However, the investigators believe that group administration of self-administered surveys has several advantages. Giving self-administered questionnaires to a group of people will draw a

sample ahead of time by motivating individuals to complete the questionnaire. Therefore, non-response rate was not an issue in this study. According to Dillman (2000), the cost savings for this type of administration are also enormous.

Results

To estimate how well measures of teaching methods and effectiveness correlated, variables were introduced in a linear regression model predicting quality of instruction in clinical education. In response to Question 1, regression analysis showed that there is a positive correlation between teaching methods and quality of instruction. Integration of theory to practice, allowing adequate time for procedures, clarifying questions, motivating students, and demonstrating enthusiasm significantly ($p < 0.05$) impacted the quality of instruction more than the other variables. Together, these variables explained 84% of the variance for quality of instruction. Other variables of teaching methods, such as providing feedback, minimizing anxiety, being well organized, and providing physician input were not significantly correlated with the quality of instruction. Table 1 indicates the correlations between items of teaching method and effectiveness with quality of instruction.

A stepwise multiple regression analysis was then performed with the nine independent variables in Table 1. At the first step of the model, integration of theory to practice entered the equation and accounted for 71.3% of the variance in quality of instruction. Integration of theory to practice was directly related to quality of instruction. At the second step in the regression, allowing adequate time for procedure learning entered the equation, adding an incremental R^2 change of 8.8% to the model. At the third step, clarification of questions entered, accounting for 2.7% of the variance in quality of instruction. At the fourth level, the variable demonstration of enthusiasm entered the equation, adding 0.9% to the model.

Table 1

Matrix giving correlation among determinants of teaching method and effectiveness with quality of instruction.

	1	2	3	4	5	6	7	8	9	10
1. Quality of Instruction	1	0.836	0.825	0.705	0.753	0.812	0.835	0.83	0.844	0.639
2. Clarified Questions	1	0.903	0.69	0.723	0.748	0.786	0.801	0.779	0.595	
3. Provided Feedback	1	0.738	0.691	0.775	0.783	0.845	0.786	0.567		
4. Minimized Anxiety	1	0.719	0.739	0.795	0.755	0.609	0.433			
5. Well Organized	1	0.797	0.759	0.732	0.703	0.576				
6. Motivated Student	1	0.831	0.824	0.754	0.606					
7. Allowed Adequate Time to Learn	1	0.824	0.76	0.538						
8. Demonstrated Enthusiasm	1	0.765	0.581							
9. Integrated Theory to Practice	1	0.672								
10. Provided Physician Input	1									

Table 2

Matrix giving correlations among predictors of grading policy, including fairness, consistency, and accuracy with overall grade of clinical instructor

	Overall grade	Fairness	Consistency	Accuracy
Overall Grade of Clinical Instructor	1	0.713	0.717	0.678
Fairness	1	0.929	0.951	
Consistency	1	0.884		
Accuracy	1			

At the final step of the model, motivation of students entered the equation and accounted for 0.4% of the variance in quality of instruction.

In order to answer Question 2, a step-wise multiple regression analysis was used to determine the variables that are significant predictors of overall grade. Independent variables considered in the equation were fairness, consistency, and accuracy. Correlation between variables of the grading policy and overall grade are shown in Table 2. Regression analysis showed that consistency and fairness had a significant impact ($p < 0.05$) on overall grade of the clinical instructor. Consistency accounted for 51.4% of the variance in codependency at the first step of the model, and fairness entered the equation by adding R^2 change of 1.6% to the model. These variables accounted for 53% of the total variance (R^2).

Discussion

Clinical instructors are role models for the students who are under their supervision. It appears that students evaluate more favorably on clinical evaluations those clinical instructors and preceptors who make the attempt to integrate theory to practice, allow adequate time for procedure learning, clarify questions, demonstrate enthusiasm, and motivate students. Fairness, consistency, and accuracy are also important when discussing teaching effectiveness. Qualities of patience, friendliness, empathy, sense of humor, and approachability, which were previously cited, lend themselves to a positive clinical experience (Dunlevy and Wolf, 1994).

One strategy to improve student clinical evaluations based on this study may be the concept of critically responsive teaching that is based on the students’ perception of their learning experiences (Brookfield, 1990). Critically responsive teaching requires a change in teaching method, content, and evaluation process in response to the reactions of your students. Frequent and open informal discussions among students and clinical faculty are needed to make the clinical experience more meaningful. This is an important aspect of good teaching and can be fostered by scheduling discussion sessions that are designed to elicit students’ perception of their clinical experience before the final student evaluations are formally made at the end of the semester.

Teaching effectiveness in clinical education is important for respiratory therapy administrators and faculty, clinical instructors, and preceptors in making informed decisions about the appropriate use of teaching methods and how students perceive the learning experience from their evaluations in clinical practice. Quality of instruction in clinical education is important because of the time, money, and other resources spent in providing

an educational experience conducive to learning for students and conducive to increasing the chances for a successful pass on the credentialing exams in respiratory care. Teaching responsively is neither easy nor convenient. Being responsive to your students' perceptions of what is happening to them in the clinical setting requires flexibility, accessibility, and perseverance. However, although the effort required may be considerable, so are the rewards. By actively seeking out the feelings and attitudes of students about their learning, clinical preceptors will be alerted to common patterns of learning and crucial turning points. Most importantly, preceptors will be less likely to underestimate the complexity of learning.

In conclusion, clinical instructors and preceptors who make the attempt to integrate theory to practice, allow adequate time for procedure learning, clarify questions, demonstrate enthusiasm, and motivate students significantly improve the quality of instruction in clinical education. Fairness and consistency make a significant impact on the overall grade of clinical instructors. Therefore, respiratory therapy school administrators and clinical instructors can use the variables that enhance teaching effectiveness and quality of instruction to compile a list of prioritized crucial elements that can assist in focusing training of respiratory therapy students in the clinical settings of the future. This study may also help in the planning and revision of clinical evaluation forms, to more meaningfully capture the true feelings of clinical practice by respiratory therapy students.

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Appendix A

The Students' Evaluations of Clinical Education

Rating of Clinical Instructor:

Teaching Method and Effectiveness

Clarified Questions	1	2	3	4
Provided Feedback	1	2	3	4
Minimized Anxiety	1	2	3	4
Well Organized	1	2	3	4
Motivated Students	1	2	3	4

Allowed Adequate Time for

Procedure Learning	1	2	3	4
Demonstrated Enthusiasm	1	2	3	4
Integrated Theory to Practice	1	2	3	4
Provided Physician Input	1	2	3	4

Grading Policy

Fairness	1	2	3	4
Consistency	1	2	3	4
Accuracy	1	2	3	4

Overall Rating

Quantity of Instruction	1	2	3	4
Quality of Instruction	1	2	3	4
Overall Grade	1	2	3	4

POINT OF VIEW: PROMOTING BACCALAUREATE COMPLETION AMONG RESPIRATORY THERAPISTS

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Abstract

The topic of baccalaureate education for respiratory therapists (RTs) has been discussed for the past decade. This article reviews the literature related to RT baccalaureate education and reprofessionalization. A process model that focuses on encouraging advanced education for working RTs is proposed as a method for increasing the number of respiratory therapists holding the bachelor's degree.

Promoting Baccalaureate Completion Among Respiratory Therapists

Entry level education for the respiratory care profession has advanced steadily throughout the profession's relatively short history. Respiratory care leaders developed the registry exam in the early 1960s, and formal training programs arose throughout the country. Requirements for therapist entry level education were 12 months (1962), 18 months (1967), and 20 months (1972). The 1986 requirements for therapist entry level education did not specify a minimum time frame (O'Daniel et al., 1992). In 2002, the length of therapist entry level programs was extended to include an associate degree ("New Admissions Policies," 2001). Even before implementing the requirement for associate degree entry level preparation, educators explored the need for baccalaureate level preparation (American Association for Respiratory Care, 1994a; Douce & Cullen, 1993). This article examines literature relevant to reprofessionalization and proposes a 2-stage process for moving the respiratory care profession towards baccalaureate degree preparation.

Is Respiratory Care a Profession?

One of the challenges respiratory therapists face is that others do not consistently view them as professionals. A look into the literature related to the definition of a professional lends some insights. Years ago there were only a few true professions: clergy, law, university teaching, and medicine. More recently, professional status has been conferred on a wider variety of disciplines (Wilensky, 1964). Characteristics associated with professions include greater participation in occupational associations (Cullen, 1978; Wilensky, 1964), greater likelihood of a university-based education (Cullen, 1978; Sullivan, 1995; Wilensky, 1964), longer years of education by members of the occupation (Cullen, 1978; Moloney, 1986), prolonged specialized training involving abstract knowledge (Goode, 1960; Wilensky, 1964), higher income (Cullen, 1978), greater social esteem (Cullen, 1978; Moloney, 1986), a service or altruism ethic (Goode, 1960; Moloney, 1986; Wilensky, 1964), and professional autonomy (Moloney, 1986; Wilensky, 1965). Although some authors focus on the attributes that must be present to define a profession, others view lists of professional attributes as continua and recommend evaluating how far along an occupation is on each continuum (Goode, 1960).

The literature on professions reinforces the questions people have regarding respiratory care's status as a true profession. The entry level status of associate degree, which occurred only recently, does not meet the accepted educational standard for professional recognition. Postings on the American Association for Respiratory Care's (AARC) educator e-mail list show how the associate degree entry level status affects potential therapists as well as working therapists. Educators hear parents preferring that their children enter educational programs requiring 4-year degrees. Also, working therapists have difficulty entering professional unions and obtaining officer commissions in the armed services because the educational requirements fall below a baccalaureate degree (Pilbeam, 2002). The Centers for Medicare & Medicaid Services, formerly the Health Care Financing Administration (HCFA), did not initially provide reimbursement to respiratory therapists because HCFA did not recognize individuals without baccalaureate

Table 1
Proposed Change Process for Baccalaureate Education

	Current		Stage I (Proposed)		Stage II (Future)	
	Entry level	Working RTs	Entry level	Working RTs	Entry level	Working RTs
Education	Associate Degree	No major initiative promoting advanced education	Associate Degree	Actively promote baccalaureate and graduate education	Baccalaureate degree	Actively promote baccalaureate and graduate education
Level						
NBRC Job Analysis	Current Level		Knowledge and Skills Expanded beyond Current Level			Knowledge and Skills Expanded beyond Stage I

Note. RTs = Respiratory Therapists. NBRC = National Board for Respiratory Care

degrees as professionals (“New HCFA Regulations,” 2001). Given the educational attributes associated with professions, the majority of respiratory therapists must hold baccalaureate degrees for RTs to consistently receive recognition as professionals.

Current Attempts to Reprofessionalize

Reprofessionalization refers to the process of an emerging profession developing into a full profession (Emener & Cottone, 1989). Most professions undertake this change process through their professional associations. In contrast to the older professions, which established their educational training prior to founding professional organizations, newer professions tend to develop professional associations before establishing advanced education (Wilensky, 1964). Professions use their associations to help them raise their status, define services that only they can properly provide, and achieve and maintain autonomy and influence (Klegon, 1978). To increase status, professional associations may promote increasing the educational level required for practice in the profession. The length of educational preparation for the profession relates primarily to the amount of knowledge needed for the professional discipline (Cullen, 1978). There is also some evidence that professional associations can use their power to promote an entry level education higher than that needed for the clinical practice of their members. However, other social forces limit the degree of professionalizing beyond the profession’s “required” entry level education (Cullen, 1978).

The AARC serves as the respiratory care profession’s national association. Consistent with other newer professions, the AARC formed prior to respiratory care’s affiliation with university education. The AARC has been involved in several reprofessionalization initiatives. In 1992 and 1993, the AARC held two education consensus conferences that led the initiative to require an associate degree as the entry level requirement for the

profession (AARC, 1993b, 1994b). The AARC also lends support for baccalaureate education. The AARC formed an agreement with Western Michigan University in 1990 to facilitate baccalaureate completion among current therapists ("Bachelor Degree Completion," 1991). Since that time, several other baccalaureate completion programs have been added to the AARC web site (AARC, n.d.). In 2000, the AARC established a Coalition for Baccalaureate and Graduate Respiratory Therapy Education (CoBgRTE) ("Baccalaureate Education," 2001). Additionally, the AARC supports two e-mail lists, the Education Specialty Section and CoBgRTE lists, to facilitate discussions on advanced education. At the start of 2003, the AARC, the National Board for Respiratory Care (NBRC), and the Committee on Accreditation for Respiratory Care (CoARC) released a tripartite statement that supports both baccalaureate and graduate education (AARC, 2003). A specific campaign to aid RTs in achieving this goal has not yet been developed.

A number of studies related to baccalaureate respiratory care education appear in the literature. Douce and Cullen (1993) surveyed the views of clinicians, educators, managers, and physicians and found that the study participants could not agree on the length of advanced level education. However, this group predicted it would last longer than 3 post-secondary academic years. The AARC conducted an impact study in preparation for the second of 2 educational consensus conferences held in early 1993 (AARC, 1994a). The AARC study involved respiratory care managers, respiratory care program directors, physicians, respiratory therapists, and administrators of hospitals, home care, rehabilitation, and skilled nursing facilities. Eighty-three percent of respondents felt that conducting specialty education at the baccalaureate and master's degree levels would be beneficial or highly beneficial. Respondents also expressed concerns that increasing entry level education might decrease the overall supply of RTs and disproportionately affect rural hospitals, make RTs too highly priced, and be unsuccessful, as universities may not adopt RT education programs. Another study looked at how RTs in a Midwestern state felt about completing baccalaureate degrees through distance learning (Becker, 1999). This study showed that 40% of RTs without a baccalaureate degree desired one. However, these RTs did not know how their employers would value a baccalaureate degree, which degree major to select, or whether a degree earned through distance learning was valued. A follow-up study showed that RT managers valued an advanced practice respiratory care major most highly. Over half of RT managers felt a baccalaureate completion degree earned through distance learning was of equal value to a more traditional degree, and 70% of managers preferred hiring experienced therapists with baccalaureate degrees (Becker, 2003). Further literature supporting the need for lifelong learning and advanced courses for practicing RTs have appeared in the profession's journal, *RESPIRATORY CARE*, in the form of editorials (Czachowski, 1997; Kester & Stoller, 1996).

In summary, reprofessionalization has been explored both by the AARC and in more limited ways, the respiratory care literature. Both sources address entry level education as well as advanced education for working RTs.

A New Strategy

This paper proposes that reprofessionalization attempts within the respiratory care profession ought to target working RTs. A plan that promotes baccalaureate education for

working RTs is an essential step in the process of increasing the number of respiratory therapists holding baccalaureate degrees. The first reason for beginning the reprofessionalization process with working RTs is that this approach does not directly challenge associate degree educational programs. Currently, 86.7% of respiratory care programs provide associate degrees (CoARC, 2002). Arranging for programs to arise out of baccalaureate degree-granting institutions is a process that takes time. Educators from associate degree institutions would either need to form articulation agreements with baccalaureate programs or seek employment from a new employer, risking the loss of seniority, tenure, and benefits. Educators from associate degree-granting programs might also lack the educational background required by baccalaureate-granting institutions. Many universities require educators to have an academic degree at least one level higher than the degree level being taught. The 2000 AARC human resource study showed that the percentages of educators with master's and doctoral degrees were 42.5% and 10.2%, respectively (AARC, 2001). It would be difficult for the entire educational community to embrace baccalaureate entry level programs at this time.

A more effective reprofessionalization strategy targets working RTs. The job performance of current therapists needs to warrant baccalaureate level preparation before the NBRC can require baccalaureate degrees for entry level exams. Every 5 years, the NBRC conducts a job analysis survey that serves as the basis for updating the credentialing examination matrix (Bryant, 2002). Promoting baccalaureate and graduate education can increase the knowledge and skills of working RTs and prepare therapists for more diverse clinical roles. Over time, the additional knowledge and skills needed to perform these additional clinical roles will emerge from the NBRC job analysis survey, and baccalaureate level preparation may be required. Table 1 summarizes this 2-stage process. Currently, there is an associate degree entry level requirement and no major initiative to promote baccalaureate and graduate education among working RTs. The scope of practice within the profession can expand more quickly if the AARC develops campaigns promoting baccalaureate and graduate education. The 2003 announcement from the AARC, NBRC, and CoARC encouraging advanced education for RTs marks the start of stage 1. If significant practice changes result, the NBRC job analyses might move the profession into stage 2, which may require baccalaureate degrees for respiratory therapists.

Other advantages of targeting current therapists in the reprofessionalization process also exist. Promoting baccalaureate completion would not worsen the current workforce shortage. Individuals desiring an associate degree could still enter the respiratory care field. After entering the workforce, these therapists would be encouraged to complete their baccalaureate degrees. The growth in numbers of baccalaureate therapists and reprofessionalizing initiatives might attract more students, and potentially, students with stronger academic backgrounds. Advancing the educational level of therapists in stages has other benefits. Working therapists have time to upgrade their education before new therapists enter with higher-level degrees. Also, department directors would have time to increase their educational levels. Currently, less than 20% of department directors hold master's degrees as their highest academic degree, and only an additional 40% have baccalaureate degrees (AARC, 2001). It may be uncomfortable for directors to hire entry

level therapists with academic degrees at equal or higher levels than their own. Implementing change in stages allows time for both educators and managers to earn the graduate degrees necessary to prepare the future members of the profession.

Rate of Baccalaureate Completion Among RTs

Will RTs complete baccalaureate degrees? The 1995 study that looked at a group of Midwestern therapists showed that 40% of RTs without a baccalaureate degree desired one (Becker, 1999). However, there are no data on how many RTs who desired baccalaureate degrees pursued their goal. Data from other states are not available; however, data from the AARC human resources surveys have shown that the numbers of RTs with baccalaureate degrees is increasing. In 1992, 16.1% of RTs had a minimum of a baccalaureate degree. This increased to 29.7% in 2000. Graduate degrees increased from 2.3% to 5.7% over the same time frame (AARC, 1993a, 2001). In other words, the number of baccalaureate and master's degrees held by RTs nearly doubled without a specific initiative.

If registry-eligible therapists don't complete their registry exams, what would motivate them to complete baccalaureate degrees? Therapists might complete baccalaureate degrees if they had a more clear understanding of how an advanced degree impacts the perception of their profession, expanded job roles, salary, and promotional opportunities. The 1997 Lewin Group study suggested that the success of the profession in the changing market hinged upon a broader application of existing skills (Shapiro, Levinson, Gaylin, & Mendelson; 1997). Needs for higher-level professional skills have arisen. Stronger assessment skills are needed for RTs to implement therapist-driven protocols and disease management programs (Bunch, 1999). The emergence of evidence-based medicine also requires additional skills, such as the ability to interpret research findings, understand the hierarchy of evidence, and apply this evidence appropriately (Montori & Guyatt, 2001). Further evidence of the trend toward increasing educational needs comes from the 1997 NBRC job analysis. The percentage of items at the recall and application levels in the resulting examination matrix decreased 9% and 15%, respectively, whereas analysis-level items increased 25% (Smith, 1998).

The 1997 Lewin study also recommended that professional education needed to change to keep up with market demands (Shapiro, Levinson, Gaylin, & Mendelson; 1997). Associate degree programs have less time to address the liberal arts and science courses that give therapists greater background information. Furthermore, many associate degree programs have credit loads that extend beyond the traditional two years (Pilbeam, 2002). Baccalaureate programs have the benefit of spending more time in their curricula developing oral and written communication skills, basic research interpretation skills, and a firmer science foundation. A baccalaureate completion program could build upon the existing clinical knowledge and skills of working therapists to help them practice differently. Examples of how a baccalaureate completion degree can improve practice include being able to construct well-written patient documentation, clearly articulating the rationale for current therapies based upon an expanded knowledge of physiology and pharmacology, devising new approaches to patient care, interpreting the literature, and publishing research findings. Clearly, some therapists without baccalaureate degrees

achieve these goals through lifelong-learning skills. However, promoting baccalaureate completion programs provides therapists with a structured learning plan.

In addition to the benefits of increased knowledge, therapists should consider how advanced academic degrees correlate with income. In general, the U.S. Census Bureau (2002) reports that individuals with baccalaureate degrees earn \$14,000/year more than those with associate degrees. Salaries for RTs as a group, however, will not likely change until the median educational level of the profession increases to a baccalaureate level (Cullen, 1978). However, RTs who progress up the career ladder will see salary increases sooner. The 2000 human resources survey demonstrates that the job titles of educator, director, and supervisor are linked to both greater numbers of higher academic degrees and overall higher salaries (AARC, 2001).

An educational campaign by the AARC that provides key information about baccalaureate completion programs could also facilitate decisions by working RTs to return to school. Therapists need to learn how to assess the accreditation status of specific colleges and universities, which degree majors are most valued by managers, which programs grant credit for prior learning, and mechanisms for financing advanced education. Educational programs offering baccalaureate completion already appear on an AARC web site (AARC, n.d.). Additional information could be added to streamline the research process for RTs contemplating an advanced degree. Departmental managers can further aid therapists by highlighting tuition remission policies, facilitating work schedules that make advanced education possible, and promoting study groups within their individual organizations.

Summary

Ultimately, respiratory care needs to move toward a baccalaureate entry level degree to better prepare therapists for an expanding scope of practice and solidify respiratory care's status as a profession. Promoting baccalaureate completion among current therapists is a non-divisive strategy that moves the profession toward a baccalaureate degree entry level at some point in the future. The results of the NBRC job analysis surveys have the most direct impact on entry level educational requirements. Therefore, the scope of the RT workforce's clinical practice needs to warrant baccalaureate degree preparation. Promoting baccalaureate and graduate education among working RTs is an essential stage in the process of increasing the number of baccalaureate-prepared practitioners. Dynamic initiatives that promote increasing educational standards will also make it easier to attract students with higher academic goals and further advance the profession.

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STUDY OF PREDICTOR VARIABLES FOR PROGRAM COMPLETION IN AN ASSOCIATE DEGREE RESPIRATORY CARE PROGRAM

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Abstract

The purpose of this study was to explore whether correlations exist between multiple variables, student scores on the Health Occupations Basic Entrance Test (HOBET), and program completion in an associate degree respiratory care program. The HOBET evaluates critical reading ability, basic mathematics, and comprehension in reading college level material. Variables evaluated included gender, age, total high school grade point average (THGPA), national certification test scores, HOBET scores, and program completion. A substantial association was found between age and HOBET reading percentage to program completion. Our study suggests that the HOBET and the THGPA may be useful instruments to assess students' acceptance to a respiratory care program.

Study of Predictor Variables for Program Completion in an Associate Degree Respiratory Care Program

Tests have allowed educators to assess student knowledge on a myriad of topics. A number of evaluations have been used in the past to help determine whether students will be successful within educational programs. These evaluations may include the student's total high school grade point average (THGPA), specific subject GPA, American College Test (ACT) scores, Scholastic Aptitude Test (SAT) scores, Graduate Record Examination (GRE) scores, and scores from other entrance tests. Some postsecondary schools routinely require some of these tests for admission. Although few studies specifically address respiratory therapy, several programs, such as nursing, occupational therapy, and physical therapy, have studied the correlation between some of the variables in our study and completion of their programs and scores on their national credentialing exams.

Most research on this subject has been concentrated in the field of nursing. The literature reports that nursing GPA predicts successful performance on the National Comprehensive Licensing Examination for Registered Nurse (NCLEX-RN) without the use of other tests (Sharp, 1984; Feldt, 1989; Lengacher, 1990; Foti and DeYoung, 1991; Heupel, 1994; Alexander and Brophy, 1997). However, Jenks, Selekmán, Bross, and Paquet (1989) discovered that previous science GPA transferred from another university or college had a low statistical correlation ($r=0.27$, $p<0.0001$) in predicting success on the NCLEX-RN. Rhodes, Bullough, and Fulton (1994) reported no statistical correlation between age and first year GPA, GPA at graduation, or GRE scores in a study of a graduate nursing program. Rubino (1998) found that the composite reading score on the Nurse Entrance Test (NET) had the only positive relationship to the NCLEX-RN (Beta= 0.50, $p= 0.022$). Aldag and Rose (1983); Sharp (1984); Lengacher (1990); McClelland, Yang, and Glick (1992); and Fowles (1992) reported statistical significance between ACT scores and the NCLEX-RN.

Other allied health programs may find it hard to discover indicators that predict success in the specific program due to limited research on this area and lack of consistency in using these tests uniformly. Scott (1995) found that all subtests of the Allied Health Professions Admission Test (AHPAT), except for chemistry, significantly correlated to exit GPA in allied health programs at their institution. Prerequisite respiratory care program GPA was significantly correlated to reading comprehension, information in natural sciences, and academic aptitude (Standridge, 1997). A study of BS degree respiratory care program students found significant correlations between students' overall entering GPA and prerequisite GPA on both the certification examination and the written registry self-assessment exam (LeGrand and Shelledy, 1999). Several other studies have reported that university students' previous academic performance was the best predictor of success in other allied health programs, such as occupational therapy (Posthuma, 1985), physical therapy (Levine, 1986; Balogun, 1986), and dental hygiene (Shannon, 1989).

Allied health care practitioners use many skills that are learned in their discipline, but many programs require certain standards, such as a high school diploma or equivalent, before entrance into a program is granted. Some of the most common evaluated areas are math and reading skills. Measurement of existing knowledge and skills of prospective

students in these areas may allow schools to anticipate student success if the student can meet some entry level requirements. Several programs administer an entrance test to assure that prospective students are competent in basic math and reading skills.

The respiratory care program studied uses percent scores on reading comprehension and essential math skills from the Health Occupations Basic Entrance Exam (HOBET) as partial pre-admission criteria into the program. The HOBET evaluates critical reading ability, basic mathematics, and comprehension in reading college level material, and identifies learning approach. All prospective students in the program are routinely required to take the test.

The essential math skills section assesses basic operations in math and algebra that are considered fundamental for success in health occupations. The reading comprehension section assesses the student's ability to competently read material at the difficulty of healthcare textbooks. The respiratory care program started using the HOBET for entrants in 1994. The test is being used as a tool to select acceptable students into the program. Even though this test has been used as a tool to select students, it is still not known whether this test adequately selects students that will be successful within the respiratory care program, or if it may keep some students out of the program who would otherwise be successful in the program.

Purpose

The purpose of this study was to explore whether correlations exist between multiple variables, student scores on the HOBET, and program completion in an associate degree respiratory care program. The information will assist respiratory care programs in deciding whether to implement, terminate, or continue using the HOBET as an entrance tool, and in evaluating other variables that may be useful in predicting success.

This study specifically explored correlations between multiple variables and students' scores on the HOBET. Even though certain variables are being used as entrance criteria to academic programs, it is not known what variables should be used as predictor variables for success within the respiratory care program.

Methodology

The study performed was a retrospective study using existing data from student files of the respiratory care program.

Population

The subjects were students accepted into the respiratory care program between 1994 and 1996. Data were collected from 42 students. Individuals included in the study were high school graduates who had taken the HOBET and been accepted into the program. Students successfully completing the program usually sit for the national certification test offered by the National Board for Respiratory Care (NBRC). The scores from this test were also used in the study.

Instrumentation

The data were collected as part of the information that is maintained from each

student. This includes an official copy of his or her high school transcript, the HOBET, and the national certification test score. An instrument was developed to collect information from student files. The variables included in the instrument were gender, THGPA, HOBET scores, national certification test scores, and program completion. The instrument was checked for validity and reliability using a selected group of individuals, then checked again by another person to make sure that what was recorded on each instrument matched that in the student files.

Data Analysis

All data were analyzed using the SPSS v.11 (Chicago, IL) statistical software. Descriptive statistics were calculated for each variable. Correlations between variables were processed using the Davis conventions. (Davis, 1971) Association between variables was described according to the coefficient found, as described below. Measures of variability and central tendency were calculated for each variable. A Pearson product moment correlation was calculated for all ratio scale data. Eta correlations (between ratio and nominal data) were interpreted from contingency tables.

Coefficient	Description
.70 or higher	Very Strong Association
.50 to .69	Substantial Association
.30 to .49	Moderate Association
.10 to .29	Low Association
.01 to .09	Negligible Association

Results

Descriptive Data

Program completion and gender information is presented in Table 1.

Table 1

Gender and program completion distribution among subjects taking the HOBET

Gender of Subjects	Frequency (Percent)
Male	5 (12%)
Female	37 (88%)
<hr/>	
Program Completion	
Completed	32 (76%)
Did not complete	10 (24%)

The passing composite percentage for the HOBET is 46. The students enrolled in the program averaged 13% higher than the passing HOBET composite score, and those who completed the program passed the national certification test for respiratory therapist (CRT) with a mean scaled score of 78, three points higher than the scaled passing score (Table 2).

PROGRAM COMPLETION IN AN ASSOCIATE DEGREE RESPIRATORY CARE PROGRAM

Table 2

	Mean	SD
Age at start of program	25.36	7.37
THGPA	2.91	0.58
HOBET Math %	64.95	17.85
HOBET Reading %	54.64	12.97
HOBET Composite %	59.26	11.99
National Certification Test	77.69*	7.29*

(n=42, *n=32)

Note: Mean and Standard Deviations for study variables.

Correlations

There was a substantial association ($r_{\text{eta}} = .56$) between age of the student and completion of the RT program. Older students tended to be in the completion category more than the non-completion category. There was a very strong association between HOBET math percentage ($r_{\text{eta}} = .86$) and program completion. However, the THGPA ($r_{\text{eta}} = .97$), the HOBET composite percentage ($r_{\text{eta}} = .83$), and the HOBET reading percentage ($r_{\text{eta}} = .64$) showed a strong association with non-completion of the program.

Intercorrelations are presented in Table 3. Although the THGPA had a moderate association with individual HOBET math ($r = .40$, $p < .01$) and reading ($r = .41$, $p < .01$), and a substantial association with the HOBET composite score, it did not show a significant correlation with the national certification exam ($r = .12$, $p > 0.1$). HOBET reading score, HOBET composite, and the national certification test had a moderate ($r = .30$), although not statistically significant, association.

Table 3

	THGPA	HOBET Math	HOBET Read	HOBET Composite	CRT	Age
THGPA	1.00	.40*	.41*	.55*	.12a	-.18
HOBET Math		1.00	.18	.78*	.15a	.18
HOBET Read			1.00	.73*	.30a	-.01
HOBET Composite				1.00	.30a	.13
CRT					1.00a	-.06
Age						1.00

Note. All coefficients are Pearson product-moment correlations.

*Correlation is significant at the $< .01$ level (2-tailed).

(n=42, aCRT n=32 [the values have been shifted; the correlation is for the 32 students that took the CRT exam])

THGPA is total high school grade point average based on a 4.0 scale.

HOBET Math is percentage scored on math portion of test.

HOBET Read is percentage scored on reading portion of test.

HOBET Composite is composite score achieved from math and reading.

CRT is the national certification exam for certified entry level respiratory therapists.

Age is the age of the student at the start of the program.

Discussion

Our study found that only age and the HOBET math percentage score correlated with program completion. Students with higher THGPA, HOBET reading percentage, and HOBET composite percentage had a tendency to be in the non-completion category. However, intercorrelations suggest a significant association between THGPA and the HOBET reading percentage, math percentage, and the composite score. Sharp (1984) has reported that high school GPA is useful in predicting success on state board nursing examinations. For our study, there was no significant relationship between high school GPA and success on the national certification exam. Rubino (1998) reported a positive relationship between the composite reading score of the HOBET and the NCLEX-RN. In our study the correlation between the HOBET reading and CRT scores was not statistically significant. Foti and DeYoung (1991) and Fowles (1992) reported significance between the Mosby Assess Test and the NCLEX-RN, somewhat similar to the present study, which found a moderate, although not statistically significant, association between HOBET composite and the CRT. Rhodes, Bullough, and Fulton (1994) reported no statistical correlation between age and GPA, which is consistent with our data. Alexander and Brophy (1997) reported that age did not predict success on the NCLEX-RN, which is also consistent with the present study.

Educators are concerned with student performance, typically measured with testing. The grade point average becomes a reflection of that performance over time. Many school districts, colleges, and universities use entrance examinations to test students' knowledge in one or more subjects. Health science occupations programs usually try to select only those who are capable of success. Furthermore, health science students are under pressure to be successful in the program, and after graduation most are required to pass a national examination for credentialing. Determining the best indicator(s) to predict success is difficult.

This study included a population of attendees and graduates of a respiratory care program between 1996 and 1999. Therefore, the results of this study can only be generalized to this group of students. Some of the limitations of the study include the fact that some of the subjects in the study were non-traditional students; some may have studied before sitting for the HOBET, and some may have taken a workshop to prepare for the national certification test.

Conclusions

This study was undertaken to aid in determining what variables could be used to predict student success in a respiratory care program. Although our data suggest that only age and score on the HOBET math examination may predict successful completion of a respiratory therapy program, THGPA had a significant correlation with the HOBET scores. The reasons why students with high THGPA, HOBET reading percentage, and HOBET composite percentage may withdraw from the program or fail were not studied.

The respiratory care program may use the THGPA and the HOBET to evaluate student acceptance. Respiratory care programs should use the information from this study to identify student weaknesses and provide appropriate help for success.

Recommendations for Future Research

There is little information about variables that help to predict the success of students in respiratory therapy programs. Based on our results, we recommend studying a sample of subjects that includes students with GED completion rather than just high school graduates; studying other variables that may also successfully predict student success in the program, such as ACT or SAT scores; and studying the variable ethnicity of students and their success in respiratory therapy. A much larger database may be necessary to make prescriptive recommendations on the routine use of an admission test.

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DEVELOPMENT OF BACCALAUREATE AND GRADUATE DEGREES IN RESPIRATORY CARE

A WHITE PAPER FROM THE AARC STEERING COMMITTEE OF THE COALITION FOR BACCALAUREATE AND GRADUATE RESPIRATORY THERAPY EDUCATION

Background

Introduction

Respiratory therapy has become a highly complex occupation in the 21st century. Twenty years of expanded clinical research have empowered respiratory therapists with additional therapeutic techniques, medications, and medical devices used to evaluate and treat patients with increasingly complex cardiopulmonary disorders. Educators are challenged to expand their curricula to prepare students for these new responsibilities.¹⁻⁹ Increasingly, respiratory therapists are expected to assess and quantify their patients' cardiopulmonary status, to provide appropriate respiratory care by applying patient care protocols, and to evaluate the medical and cost effectiveness of their care.¹⁰⁻¹² Critical thinking, decision-making, and competence to perform these responsibilities are expected of most therapists, and many roles previously held by the advanced therapist are now expected at entry-level.¹³⁻¹⁵

Respiratory therapists have often promoted the expansion of services in their communities, such as diagnosis and treatment of sleep disorders, health promotion and disease prevention patient education, pulmonary rehabilitation, disease specific case management, and life support outside of the intensive care unit. Changes in health care policy, regulation, and reimbursements have required therapists to adopt these expanded roles, work more independently in settings across the continuum of care, and collaborate as partners on the health care delivery team. Although experienced therapists have adapted well to the changing and increasing demands, problems have emerged:

Producing new therapists with the knowledge and skills expected of a modern respiratory therapist has become increasingly difficult within the confinement of 2 years of post-secondary education.^{16,17}

With less than a baccalaureate degree, respiratory therapists are often not recognized as professionals by government agencies, third party payers, the

uniformed services, labor unions, and others.

Recruitment of students has declined in recent years, creating severe shortages of therapists.¹⁸⁻²⁰

Severe budget deficits have required some state governments to limit associate degree curricula in community colleges to 60 semester hours, thus limiting what can be taught.

Historical Development

During the latter half of the 20th century, the respiratory care profession evolved from one filled by an on-the-job trained workforce to a college educated and licensed profession. Consistent with this evolution, education and training of therapists began with apprenticeships, followed by hospital-based programs that awarded certificates of study. The first on-the-job hospital-based inhalation therapy schools were unable to provide adequate numbers of graduates. By the mid-1960s new programs began in vocational-technical schools and the community colleges that were mushrooming across the United States. Growth of educational programs in community and technical colleges helped fill the demand for therapists during years of unprecedented growth into the 1980s. Innovative educators with new teaching strategies were able to maximize the compact 2-year time-frame. As the educational needs of new therapists further expanded the curriculum, the responsibility for professional preparation of therapists shifted to colleges and universities that awarded academic credit and degrees. Throughout this period, the demand for therapists exceeded the supply, and the pressure to meet workforce needs may have contributed to an artificially short course of study with artificially low academic awards as compared to other health professions.

Recognizing the need to plan for future change, during the 1990s the American Association for Respiratory Care organized educational consensus conferences and supported research on the future scope of practice and education of therapists.²¹⁻²³ These efforts contributed to the growing recognition of the need for an associate degree minimum academic preparation for entry-level therapists for 2002. As expectations accelerate for therapists to analyze and evaluate patient needs, to plan and provide care, to participate effectively on professional interdisciplinary teams, and to provide patient and caregiver education, the need to expand opportunities for baccalaureate and graduate education has become evident.²⁴ In recent years, respiratory care educational programs at the baccalaureate level have increased by 75%, with 57 such programs identified in 2002.

Rationale

Profound and extensive changes have occurred regarding medicine's delivery systems, economic and governmental constraints, and societal expectations. Over time, the profession of respiratory care has adapted quickly to new technologies and practices never even considered by the profession's founding fathers.^{25,26} We have seen the birth of critical care medicine, pulmonary rehabilitation, and neonatology, as well as advances in cardiovascular diagnostics, sleep-disorders, and emergency transport. The advent of therapist-driven protocols and emphasis on patient outcomes and evidence-based

medicine reflect this continuing transformation into the 21st century.^{27,28} Consequently, respiratory care departments and educational programs have been required to constantly upgrade in order to keep pace with escalating demands on new graduates. Preparation of educated and skilled practitioners in adequate numbers has been a concern over most of the profession's first 50 years.

The profession has always had a core of baccalaureate degree programs, primarily at academic medical centers. In 1970 there were 7 of these programs; currently there are about 60. The need for a greater number of baccalaureate and graduate respiratory care programs is based on multiple evolutionary factors.

The clinical work has become more technically complex:

Respiratory care has evolved from a profession characterized by limited, task-based technical functions to one in which practitioners perform an array of services requiring more complex cognitive abilities and patient management skills. Consequently, the body and complexity of knowledge and skills needed for clinical practice continue to increase and show no sign of abating. The National Board for Respiratory Care (NBRC) examinations have reflected this theme, and questions now emphasize higher levels of cognition beyond recall and application. Earlier versions of the examinations did not include technical advances such as pulse oximetry, noninvasive ventilation, and computer-interfaced medical hardware that are now considered to be routine.

There is a greater demand for respiratory care at alternate sites

RTs today possess increasing levels of non-technical professional abilities that reflect greater levels of responsibility, accountability, and authority.²⁹ Respiratory care continues to incorporate more specialized and diverse services beyond the traditional bedside caregiver role and has moved to alternative care sites. Therapists are becoming more involved in public health, outpatient care, private office practice, end-of-life and palliative care, smoking cessation, and home care, and are also becoming case managers for asthma, COPD, and cystic fibrosis clinics. Therapists are, and will continue to be, more involved in providing patient education and coordinating care in cost-effective approaches and multiple settings. To meet these future needs, educational programs will need to move beyond traditional teaching in hospital wards and ICUs.

There is increased need for non-technical skills

Professional competence goes beyond developing skills to perform technical tasks. Patient care is interactive, humanistic, and impinges on affective and moral dimensions. Practice is now participatory and involves interpretation and deductive reasoning.²⁸ There is need to develop these additional skills.^{29,30} Educational programs that incorporate the liberal arts allow students to face future medical delivery changes, waning economies, and an unsure job market. Meeting such challenges is more certain for practitioners with the ability to write well, speak clearly, and think more critically. Some department managers now look to employees who are not only excellent caregivers, but also have skills to assist in management tasks, patient and staff development education, and research. The current

and future health care environment is creating demand for coordinators and planners instead of only bedside caregivers. Therapists participating in formal teaching or staff development are required to achieve baccalaureate or graduate degrees.

There is a growing educational gap between respiratory care and other health professions

In a delivery system that is based on interdisciplinary teamwork, educational differences are important. Physical therapy, pharmacy, audiology, and other professions have raised educational standards to baccalaureate or higher since the mid-1960s. For example, pharmacy has moved from the BPharm to the PharmD as the entry level within the past 10 years. Physical therapy has moved from the BS to the MS within about the same time frame, and will require the doctoral degree within a few years. Physician assistant studies have mandated a master's degree entry level, and occupational therapy currently requires a master's degree as entry level. The perception of respiratory care as a potential career choice by both young people and adults may be influenced by its minimum educational standards for entering clinical practice.³¹ Failure to provide an adequate education level can negatively impact that perception, suggesting a more technical and less professional career. Governmental agencies, legislators, third-party payers, and the military services all use the baccalaureate degree as a method of professional recognition.

The AARC advocated an increase in the minimum education requirements a decade ago,^{22,23} and the 1995 PEW Commission Report, *Critical Challenges: Revitalizing the Health Professions for the 21st Century*, reiterated much of the AARC report's findings.³² The Commission spoke to innovation, restructuring, and flexibility in both practice and professional medical education. It also urged multi-skilling and streamlining of service delivery instead of continued specialization.

Most notable in this discussion was the PEW Commission's recommendations for nursing, which has maintained two levels of education (AS & BS) for one entry-to-practice credential, registered nurse (RN). This is comparable to respiratory cares' two levels of education (AS & BS) for the registered respiratory therapist (RRT) credential. Among the recommendations for nursing are:

- Recognize the value of the multiple entry points to professional practice available to nurses through preparation in associate, baccalaureate, and master's programs; each is different, and each has important contributions to make in the changing health care system.

- Consolidate the professional nomenclature so that there is a single title for each level of nursing preparation and service.

- Distinguish between the practice responsibilities of these different levels of nursing, focusing associate preparation on the entry-level hospital setting and nursing home practice, baccalaureate on the hospital-based care management and community-based practice, and master's degree for specialty practice in the hospital and independent practice as a primary care provider. Strengthen existing career ladder programs in order to make movement through these levels of nursing as easy as possible.

- Encourage the expansion of the number of master's level nurse practitioner training programs by increasing the level of federal support for students.

For 30 years various groups within the nursing profession have repeatedly recommended the baccalaureate degree as the minimum registered nurse educational entry-level. The American Nursing Association has maintained this position since 1965. In 1996, 24% of nurses held a diploma, 34% held an associate degree, and 31% a BSN. Presently, about 40% hold a baccalaureate or higher nursing degree. However, opposition from state nursing associations, physicians, and hospital administrators has been blamed for the failure to adopt the recommendation.³³

Setting education levels for practice entry has been an economically, politically, and emotionally charged issue for many medical professions. Future challenges will more likely be met by leveraging greater support for baccalaureate and graduate respiratory care education.

How Do We Move Ahead?

On January 10, 2003, the AARC, CoARC, and NBRC issued a Landmark Statement on Education and Credentialing. To support a stronger profession, the statement encourages advanced education and credentialing for respiratory therapists. While reiterating their support for associate degree programs, the groups want to ensure the profession of respiratory care is positioned for the future by encouraging pursuit of advanced training, education, and credentials by the individuals in this country practicing respiratory care.”³⁶

Respiratory Care: Advancement of the Profession Tripartite Statements of Support

The continuing evolution of the Respiratory Care profession requires that every respiratory therapist demonstrate an advanced level of critical thinking, assessment and problem solving skills. These facilities are essential in today's health care environment not only to improve the quality of care but also to reduce inappropriate care and thereby reduce costs. Respiratory therapists are expected to participate in the development, modification and evaluation of care plans, protocol administration, disease management and patient education. Accordingly, the agencies representing the profession (American Association for Respiratory Care), program accreditation (Committee on Accreditation for Respiratory Care), and professional credentialing (National Board for Respiratory Care) together support the following as essential for the continued growth and advancement of the profession.

The RRT credential is the standard of excellence for respiratory therapists. Evidence-based research documents the value of critical thinking, problem solving and advanced patient assessment skills. Therefore we encourage all respiratory therapists to pursue and obtain the Registered Respiratory Therapist (RRT) credential.

We support the development of baccalaureate and graduate education in respiratory care and encourage respiratory therapists to pursue advanced levels of education.

We have complete confidence in the professional credentialing system. The three agencies will cooperate in evaluating the results of national job analysis research to insure that the credentialing system remains current and appropriate as the profession evolves. We recognize the NBRC's obligation to administer job related, validated credentialing examinations based on the results of national job analysis research as mandated by the "Standards for Educational and Psychological Testing" (1999) published by the American Educational Research Association, American Psychological Association, and the National Council on Measurement in Education. Job analysis research is also guided by Section 1607.14 of the Technical Standards for Validity Studies from the Federal Government's Uniform Guidelines on Employee Selection Procedures. These guidelines are found within Title 29 – Labor within the Code of Federal Regulations (29CFR1607.14). In addition, the NBRC must maintain its compliance with the standards for accreditation of certification programs developed by the National Commission for Certifying Agencies (NCCA).

The three agencies recognize the importance of effective recruitment and retention strategies to recruit and retain respiratory therapists for the health care workforce, and qualified respiratory therapy students. We encourage the use of existing resources available from the three agencies.

The three organizations will cooperate in evaluating examination pass rates for entry level and advanced practice programs and for associate and baccalaureate degree programs to assure that the educational requirements for admission both to the educational programs and to the examination system are appropriate.

We encourage the development of appropriate career ladders and pay differentials based on the advanced practice credential (RRT) and education beyond the Associate Degree.

We strongly support faculty development activities specific to educational methodology.³⁷

As evidenced by this tripartite statement it is clear that community colleges are, and will continue to be, important partners in providing respiratory care education. A plan that does not use the resources they can provide will be unnecessarily limited in scope. The AARC must facilitate the development of workable articulation and bridge agreements between community colleges and 4-year colleges. These articulations may take the form of moving students from an associate degree in respiratory therapy to a BSRT, or they may use a model where students receive 2 years of preparatory course work at a community college before transferring to a 4-year college to complete their bachelor's degree. Community colleges could also partner with 4-year colleges and graduate schools to provide sites for distance education. Other options for expanding baccalaureate and graduate education certainly exist and should be explored.

Currently, respiratory care programs tend to have small class sizes but high fixed costs. Of

the 12,183 students who graduated from advanced practitioner respiratory care programs during the years 1998 through 2000, 1,773 (14.6%) were at the baccalaureate level.³⁴ If we are to make it attractive for educational institutions to establish new baccalaureate and graduate programs, we must rethink this model. Models that can accommodate larger classes of baccalaureate level students without a substantial increase in program costs should be explored. Because laboratory and clinical courses are usually the limiting factor for enrollment, they should be the initial targets for remodeling. We must look to other therapy-based allied health professions that successfully accommodate large enrollments in their educational programs and examine how their approach might be adapted for respiratory therapy.

If the respiratory care profession is to move ahead we must make a concerted effort to increase the number of graduate programs. The demand for such programs will increase as we increase the number of baccalaureate program graduates. However, at present, the vast majority of respiratory therapists who seek graduate degrees must do so in another field such as education or physiology. We must develop more graduate degrees that are specific to respiratory care if we are to meet the need for clinical specialists, researchers, faculty, and professional leaders.

The need for graduate education in respiratory care

Currently, there are only a handful of graduate degree programs in the U.S. with majors in respiratory care. Because of this, leadership training in clinical specialty areas, research, management, and education has been provided at the baccalaureate level or not at all. This has resulted in a dearth of qualified individuals able to fulfill the need for trained practitioners to teach, perform management and supervision, assist with research, and fulfill other professional leadership roles. Respiratory therapists with graduate education and training are needed to fill the demand for future educators, managers, researchers, and clinical specialists. A tremendous demand for respiratory care services is projected over the next 15 years. This projected shortage is due to the aging of the population, increases in respiratory diseases (including asthma and COPD), increases in the general population, and advances in technology and treatment. Coupled with an increase in demand for services and personnel, the current generation of educators and leaders in respiratory care will be retiring. There is a major need for the respiratory profession to prepare advanced level respiratory therapists who have a foundation for leadership in the areas of education, management and supervision, and clinical practice. There are over 300 college or university-based respiratory care educational programs in the U.S., and approximately 2,700 respiratory therapists are employed as educators by colleges, universities, and health care agencies. Nationally, the vacancy rate for instructors/educators was 9.8% in the year 2000, and graduates of the existing master's degree programs in respiratory care are sought after by colleges and universities to fill faculty vacancies. In addition, about 11% of the respiratory care workforce is employed in management and supervision (11,685 FTEs in the year 2000), and the demand for managers and supervisors is also expected to increase.³⁵

Graduate education in respiratory care is needed to advance the science and practice of respiratory care by providing a link between the sciences, clinical research, and practice; increase knowledge within the discipline; provide for interdisciplinary collaboration and research; and train future faculty for the profession. The goals of graduate respiratory care educational programs may include to:

- Prepare advanced level respiratory therapists for clinical practice.
- Provide leadership training in the areas of management, supervision, education, and research.
- Develop clinical specialists in the areas of adult critical care, pediatric critical care, neonatal critical care, pulmonary function technology and cardiopulmonary diagnostics, polysomnography, and other clinical areas, as needed.
- Prepare future faculty for college and university based respiratory care educational programs.
- Develop individuals who can formulate appropriate questions, organize and test hypotheses, and apply research results to the practice of respiratory care.
- Prepare clinical practitioners with advanced knowledge and skills in basic and clinical sciences.
- Prepare leaders who are able to plan, develop, and deliver high quality, cost-effective health care services.

Conclusion

There is a need to increase the number of respiratory therapists with advanced levels of training and education to meet the demands of providing services requiring complex cognitive abilities and patient management skills. Therefore, the AARC strongly encourages the continuing development of baccalaureate and graduate education in respiratory care, to include:

Traditional BS degree programs.

Associate degree to baccalaureate degree articulation and bridge agreements with area community colleges.

Distance education for BS degree programs offered at the community college level.

Promotion of Master of Science in Respiratory Care degree programs for the development of leadership in the areas of management, education, research, and clinical specialization.

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