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ABSTRACT

Under the guidance of an advisory committee from the American Association for Respiratory Therapy (AART), The Psychological Corporation developed three forms of two criterion-referenced proficiency examinations to measure the skills, understandings, and knowledge required in entry level jobs for two levels of respiratory therapy personnel. The examinations were based on the results of an earlier project which had outlined the specific content and work specifications of the two levels. The three forms of the two examinations were administered to a pretest/norming sample composed of students preparing for practice at the two levels and personnel seeking present credentials at the two levels. The small size of the samples precluded the drawing of conclusions, and further study is recommended. The advisory committee also developed a proposal for a credentialing strategy in relation to the use of the tests. (Author/BW)

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FINAL REPORT

CONTRACT NUMBER N01-AH-34062(P)

DEVELOPMENT OF PROFICIENCY EXAMINATIONS AND PROCEDURES FOR TWO LEVELS OF RESPIRATORY THERAPY PERSONNEL

2

Professional Examinations Division
THE PSYCHOLOGICAL CORPORATION • 304 EAST 45th STREET • NEW YORK, NEW YORK 10017

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ABSTRACT

Under the guidance of an Advisory Committee, The Psychological Corporation developed three forms of two criterion-referenced proficiency examinations to measure the skills, understandings, and knowledges required in entry level jobs for two levels of respiratory therapy personnel. The examinations were based on the results of an earlier project which had outlined the specific content and work specifications of the two levels. The three forms of the two examinations were administered to a pretest/norming sample composed of students preparing for practice at the two levels and personnel seeking present credentials at the two levels. The small size of the samples precluded the drawing of conclusions and further study is recommended. The Advisory Committee also developed a proposal for a credentialing strategy in relation to the use of the tests.

Introduction

Contract N01-AH-34062(P) was issued in order to establish a means by which entry level respiratory therapy personnel at two levels might demonstrate their proficiency to function at these levels based on competencies obtained through formal education or work experience. To accomplish that purpose, it was necessary to develop proficiency examinations to measure the skills, understandings, and knowledges required in the jobs of such entry level respiratory therapy personnel.

In a prior contract, known as Phase I, the American Association for Respiratory Therapy (AART) had conducted an extensive task analysis, outlining the specific content and work specifications of the two entry level positions in question, identified as Level II and Level III. That task analysis was to serve as the basis for the content outline for the proficiency examinations to be developed under the present contract.

Another part of the present project called for the review of visual materials and simulations, to determine the feasibility of their use in the type of proficiency testing required by the project. A report of the results of this review is presented in Appendix A.

Advisory Committee

Members of the Advisory Committee for the Phase I project were invited to continue to serve for the second phase, since they were intimately familiar with the roles and functions of the respiratory therapy personnel for whom the proficiency tests were to be developed. Those who attended one or more meetings of the Advisory Committee are listed in Appendix B.

Test Development

The Final Report of the Phase I project, entitled "Delineation of Roles and Functions of Respiratory Therapy Personnel" was analyzed to identify the

specific topics to be included in the test blueprints and to assign appropriate weights to the topics (Appendix C). The blueprints and relative weights were then reviewed and approved by the Advisory Committee.

Letters requesting test questions (Appendix D) were directed to some 170 representatives of the field of respiratory therapy throughout the country. Questions were actually received from only 34 of these, with most questions requiring revision to be suitable for inclusion in the tests, and many others being impossible to salvage for use. Staff reviewed and edited all proposed questions for psychometric characteristics before preparing them for presentation to the item reviewers.

Approximately ten days were devoted to an item-by-item review of proposed questions with participation from project staff, consultants, and representatives of the Advisory Committee. Those who participated in the item review sessions are listed in Appendix E. These reviews led to the compilation of three forms of the tests at both levels, each designed to satisfy the specifications of the respective test blueprints. The six forms, each composed of 250 questions, were then reviewed and approved by the Advisory Committee.

Pretest/Norming Administration

The Advisory Committee had recommended that the examinations be administered to about 500 examinees at each level. At Level II, half of the examinees were to be students about to graduate from technician schools and the others were to be individuals eligible to take the examination of the Technician Certification Board of the AART. Similarly, at Level III, half of the examinees were to be students about to graduate from schools of respiratory therapy, and the others were to be individuals who had taken the written examination of the American Registry of Inhalation Therapists. In addition to these groups, a sample of students not in the field of respiratory therapy were to be administered one form of the Level II examination for purposes of comparison.

Each form of the examination was administered at two testing centers, resulting in the use of twelve different centers, thereby providing geographical distribution within the pretest/norming sample as follows:

LEVEL II	LEVEL III
Form 1 - San Francisco New York	Form 1 - Los Angeles Miami
Form 2 - Boston Seattle	Form 2 - Tulsa Memphis
Form 3 - Miami Chicago	Form 3 - St. Louis Corpus Christi

Schools of respiratory therapy in each city were contacted, and their educational directors asked senior students in the respiratory therapy or respiratory therapy technician programs to participate in the testings. A letter was prepared explaining the details of the program, listing the subject areas to be covered on the respective examinations, and advising participants that they would be paid $25 for their assistance. A questionnaire form was also prepared, to gather information regarding age, educational background, job experience, and testing center preference (Appendix F). Supplies of letters and questionnaires were sent to the cooperating educational directors to be distributed to their students. Students who were willing to participate completed questionnaires which were then returned by the educational directors to the project office in business reply envelopes.

With the knowledge and consent of the Technician Certification Board of the AART, a copy was made of names and addresses on applications of selected candidates who had registered to take the forthcoming Certification Examinations for Respiratory Therapy Technicians. Candidates situated in proximity to the Level II testing centers were selected and contacted to participate in the pretest/norming session, using the letter and questionnaire noted above (Appendix F).

Similarly, a roster of the most recent Registry candidates, supplied by Dr. Robert Lawrence of the Registry, was used to recruit subjects for the Level III examinations, if their addresses indicated that they were in or near the cities where the test centers were situated. Again the same letter and questionnaire were used (Appendix F).

Arrangements were also made for a group of 50 nonhealth-major college students to take the Level II examination at the Level II center in Miami as an additional control group.

The twelve examiners were supplied with sufficient quantities of the appropriate forms of answer sheets (Appendix G) and test booklets for the numbers of examinees at the specified level who were scheduled for their respective centers, plus a few extras. In addition, specially prepared manuals of directions for administration of the examinations were provided (Appendix H).

At the conclusion of the examination, the examiners returned all test materials and answer sheets to the project office. Test booklets were checked in by number to verify that all were received from each examiner.

Processing Answer Sheets

All answer sheets were checked immediately on receipt in the project office to be sure they had been marked correctly and to determine the numbers of examinees in each of the categories. (See Table 1.)

As the table shows, there were 174 examinees who completed the Level II examinations, of whom 33 were students, 131 were candidates for certification, and 10 were candidates for the Registry. There were 141 who completed the Level III examinations, 83 students, 42 Registry candidates, and 16 nonhealth students. No students appeared at either of the two centers that gave Form 1 of Level II, so there are no data for student performance on that form. Although separate materials had been shipped to the two examiners handling Level II and Level III in Miami, decisions were made locally to reassign candidates, with the result that 10 Registry candidates were given the Level II examination instead of Level III, and 16 nonhealth students were given the Level III examination instead of Level II.

TABLE 1

Examinees Tested at Pretest/Norming Sessions

Level II	Certificants	Level II Students	Registrants
Form 1			
San Francisco	17	--	--
New York	36	--	--
Form 2			
Boston	47	9	--
Seattle	--	16	--
Form 3			
Miami	6	--	10
Chicago	25	8	--
Total	131	33	10

Level III	Registrants	Level III Students	Nonhealth Students
Form 1			
Los Angeles	22	27	--
Miami	1	16	16
Form 2			
Tulsa	7	6	--
Memphis	6	14	--
Form 3			
St. Louis	3	11	--
Corpus Christi	3	9	--
Total	42	83	16

All answer sheets were machine-scored, using the key for the appropriate form and level of the test, and all responses for each examinee were recorded in punched cards. Identifying information from the preliminary questionnaire was also keypunched and verified for later merging with item response information. Hand-scoring and checking procedures were used to verify all phases of processing.

Results

Statistics were compiled in terms of items, forms, examinee groups, and identifying categories, as follows:

1. Item analyses: Complete item analyses were prepared for all 250 items in each of the three forms at both levels. These included, for each form, the following data based on the students and certificants combined for Level II and the students and registrants combined for Level III.

    a. Mean total raw score
    b. Variance of total raw scores
    c. Standard deviation
    d. Standard error
    e. Reliability coefficients (KR20 and KR21)
    f. Frequency distribution of total raw scores
    g. Percentile distribution of total raw scores
    h. Distribution summary of item difficulty levels
    i. Distribution summary of item discrimination levels

    The analysis also supplied the following additional data for each item on each form:

    a. Number and percentage of the top 27%, bottom 27%, middle 46%, and total group choosing each option
    b. Point biserial correlation between performance on the item and total score
    c. Mean score of those choosing the correct answer
    d. Mean score of those choosing an incorrect answer

    These data are summarized in Table 2.

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TABLE 2
Summary of Item Analysis Statistics
Based on Combined Samples Tested with Each Form

	Level II			Level III		
	Form 1	Form 2	Form 3	Form 1	Form 2	Form 3
Number of Examinees	53	72	39	66	33	26
Mean Raw Score	171.245	177.069	164.667	184.061	170.152	183.846
Variance	745.359	524.148	689.559	356.063	620.922	189.598
Standard Deviation	27.301	22.894	26.259	18.870	24.918	13.769
Standard Error	7.153	7.054	7.325	6.878	7.216	6.934
KR21 Reliability	0.931	0.905	0.922	0.867	0.916	0.746
KR20 Reliability	0.949	0.931	0.942	0.905	0.937	0.828
No. of Items with Difficulty Levels						
91-100	51	55	37	74	40	81
81-90	43	52	45	53	51	54
71-80	39	43	39	31	43	19
61-70	41	28	38	35	34	26
51-60	21	26	23	16	31	18
41-50	17	11	24	12	21	21
31-40	18	17	24	13	10	15
21-30	11	9	13	5	8	3
11-20	7	4	6	7	7	10
1-10	2	5	1	4	4	2
0	0	0	0	0	1	1
No. of Items with Point Biserials						
71-80	0	0	0	0	1	0
61-70	1	3	1	1	13	2
51-60	15	4	8	3	21	13
41-50	33	31	38	24	28	17
31-40	67	46	55	42	37	29
21-30	61	49	51	58	53	35
11-20	32	50	51	49	30	38
1-10	22	33	25	40	22	31
0 or negative	19	34	21	33	45	85

2. Score Distributions: Complete score distributions were produced for the total scores and part scores on all three forms at both levels. These distributions indicated the following information for each possible raw score:

   a. Number of examinees who achieved the score
   b. Cumulative frequency showing the number who achieved each score and all lower scores
   c. Percentile equivalent showing the percentage of the group who achieved each score and all lower scores

   For each form of the test, the foregoing information was tabulated for each of three groups: certificants or registrants; students at the test's level; and the two groups combined. Thus for each of the six total scores and for each of their respective part scores, there were nine distributions (three groups on each of three forms). At the end of each distribution were recorded the raw score means, standard deviations, and numbers of examinees for that distribution. These data are summarized in Tables 3 and 4.

3. Identifying Information: Summary statistics were compiled for each form at each level with respect to the identifying information supplied by the examinees. As a result, it was hoped to compare performance in each subcategory and on the total test in terms of various items of background information as follows:

Education	Less than high school
	High school
	Practical nursing
	Registered nursing
	Other allied health school
	Technical school
	2 years or less of college
	More than 2 years of college

TABLE 3

Summary of Performance on Level II Examinations

	Total Test		IPPB		Hum/Aer. Th.		Gas Ther.		Pulm.Drng.		Card.Resus.		C-R Drug		Inf.Cont	
	CER.	STU.	CER.	STU.	CER.	STU.	CER.	STU.	CER.	STU.	CER.	STU.	CER.	STU.	CER.	STU
Maximum 11 Forms)	250	250	50	50	38	38	50	50	35	35	15	15	50	50	12	12
Highest Score - Form 1	224	--	48	--	34	--	44	--	32	--	14	--	47	--	11	--
Form 2	235	223	46	46	38	35	46	43	34	32	15	15	48	46	12	11
Form 3	229	189	46	41	34	27	48	39	33	30	15	14	48	36	10	10
Lowest Score - Form 1	107	--	20	--	13	--	20	--	12	--	4	--	23	--	4	--
Form 2	123	141	23	29	15	20	20	21	18	22	8	9	21	25	1	5
Form 3	107	132	22	23	16	17	17	26	15	22	6	8	20	19	5	5
Mean Score - Form 1	171.2	--	34.4	--	25.5	--	33.7	--	23.1	--	10.0	--	36.2	--	8.3	--
Form 2	171.1	188.3	35.3	39.2	24.6	27.2	31.2	34.9	27.3	29.3	11.2	12.4	34.3	37.3	7.1	8.
Form 3	165.6	161.1	34.4	34.9	23.3	21.5	32.1	32.6	25.0	25.5	11.0	11.6	32.5	27.4	7.3	7.
Median - Form 1	173	--	34	--	25	--	34	--	23	--	9	--	36	--	8	--
Form 2	168	194	34	40	24	27	30	36	27	29	10	12	33	39	6	7
Form 3	163	164	33	36	21	21	30	32	24	24	10	11	32	26	6	7
Std. Deviation - Form 1	27.3	--	6.6	--	4.5	--	6.1	--	5.1	--	2.2	--	5.6	--	1.7	--
Form 2	20.9	22.2	5.6	4.9	4.0	4.0	5.2	5.6	3.6	2.5	1.8	1.8	5.0	5.5	2.0	1.
Form 3	27.7	19.4	6.3	5.7	4.6	3.5	7.2	4.5	4.7	2.5	2.2	1.9	5.8	6.0	1.6	1.
No. Tested - Form 1	53	0	53	0	53	0	53	0	53	0	53	0	53	0	53	0
Form 2	47	25	47	25	47	25	47	25	47	25	47	25	47	25	47	25
Form 3	31	8	31	8	31	8	31	8	31	8	31	8	31	8	31	8

TABLE 4

Summary of Performance on Level III Examinations

	Total Test		Cont.Vent.		Air.Care		Emerg.Care		Inf.Contr.		C-R Pharm.		Pulm.Fnct.		C-R R
	REG.	STU.	REG.	STU.	REG.	STU.	REG.	STU.	REG.	STU.	REG.	STU.	REG.	STU.	REG.
Maximum (All Forms)	250	250	51	51	47	47	38	38	24	24	38	38	28	28	24
Highest Score - Form 1	216	219	48	47	43	44	33	34	18	20	35	35	27	26	22
Form 2	208	195	44	45	42	41	35	34	16	17	33	32	24	22	22
Form 3	203	206	41	42	40	41	32	35	15	18	32	32	26	25	21
Lowest Score - Form 1	169	135	30	25	30	22	25	21	10	8	25	22	16	10	14
Form 2	148	114	29	16	31	22	24	18	9	8	23	16	14	7	13
Form 3	161	144	29	29	32	32	26	26	10	10	24	20	17	14	16
Mean Score - Form 1	194.3	178.6	42.4	39.3	38.4	35.7	29.4	27.0	13.6	12.2	30.7	28.2	21.6	19.6	18.3
Form 2	184.0	161.2	37.9	31.6	38.5	34.2	29.8	26.2	12.8	13.8	28.3	23.5	17.9	16.0	18.7
Form 3	182.2	184.4	36.5	37.0	35.5	37.0	29.8	30.7	13.2	13.2	26.7	27.4	22.0	20.6	18.5
Median - Form 1	194	182	42	39	37	35	29	26	13	11	29	27	20	19	17
Form 2	182	164	38	33	38	35	29	26	11	13	27	24	16	16	19
Form 3	179	187	37	37	34	36	30	30	13	12	25	27	22	20	18
Std. Deviation - Form 1	10.8	20.0	3.8	5.2	3.2	5.1	2.2	3.4	2.3	2.4	2.5	3.6	3.1	3.4	2.3
Form 2	15.3	25.8	3.9	8.0	3.2	4.7	3.1	4.8	1.8	2.6	2.8	4.7	3.4	3.6	2.4
Form 3	13.2	13.9	4.3	3.8	2.8	2.8	2.0	2.5	2.0	1.9	2.6	3.2	2.7	2.5	1.7
No. Tested - Form 1	23	43	23	43	23	43	23	43	23	43	23	43	23	43	23
Form 2	13	20	13	20	13	20	13	20	13	20	13	20	13	20	13
Form 3	6	20	6	20	6	20	6	20	6	20	6	20	6	20	6

Present Employment	Hospital Clinic Service company Other Not employed
Years Experience	Less than 1 year 1 year 2 years 3 or more years
Age	21 or under 22 to 25 years 26 to 30 years 31 to 40 years Over 40 years
Examinee Status	Candidate for Certificate Level II Student Level III Student Registry Candidate Nonhealth Student

For each of the above categories, the tabulations indicated the number and percent of examinees taking that form who fell into each category and their means and standard deviations on the total test and on each of the seven areas within the test. The numbers in each category are reported in Table 5.

Individual Notification

For each participant in the pretest/norming administration, a slip was printed on the computer showing the examinee's name and address, and a message advising the areas in which the scores were above and below the average of the group. This report slip was mailed with a covering memorandum and a check reimbursing the examinee for participating. Samples of the messages sent to Level II and Level III examinees appear in Appendix I.

TABLE 5

Number of Examinees by Form and Identifying Information

Characteristics	LEVEL II			LEVEL III		
	Form 1	Form 2	Form 3	Form 1	Form 2	Form 3
Students	0	25	8	43	20	20
Certificants	53	47	31	0	0	0
Registrants	0	0	0	23	13	6
Total	53	72	39	66	33	26
Grade School	0	1	0	0	0	0
High School	14	17	12	0	0	0
Practical Nurse	5	5	0	0	0	0
Registered Nurse	1	0	0	0	0	0
Allied Health	1	10	1	3	2	0
Technical School	2	3	5	0	0	0
Under 2 years College	15	13	9	16	16	6
Over 2 years College	15	23	12	47	15	20
Hospital	53	70	36	42	32	22
Clinic	0	0	0	1	0	0
Service Company	0	0	0	0	0	0
Other	0	1	0	12	0	0
Unemployed	0	1	3	11	1	4
Under 1 year experience	1	11	4	30	11	1
1 year experience	4	10	2	11	4	6
2 years experience	15	21	11	11	6	11
Over 2 years experience	33	30	22	13	11	8
Age 21 or under	1	9	4	8	8	4
22-25 years	12	28	11	15	14	9
26-30 years	14	20	11	18	8	12
31-40 years	11	8	12	14	3	1
Over 40	14	7	1	10	0	0

Discussion of Results

Because there were so few examinees involved, the results must be interpreted with caution. No conclusions can safely be drawn concerning effects of education, experience, age, or work setting, nor is it possible even to be certain that the three forms at each level are truly equivalent. There were, however, some trends across forms of tests at the two levels, and it is appropriate to comment on these.

1. Item Analyses: From the Summary of the Item Analysis Statistics in Table 2 it can be noted that the tests are highly reliable, indicating that the desired level of internal consistency was attained in each form. Data across forms also suggest that forms may be comparably difficult, and measuring with similar discrimination.

   The mean total raw scores on each of the six forms exceeded 65% of the questions, nearing 75% in the case of Forms 1 and 3 of Level III, although a criterion-related test might have expected to find an even higher level of performance since all of the content had been judged to be essential knowledge at the entry level. From another viewpoint, looking at the difficulty of the test questions themselves rather than at the tests as a whole, one finds that about 80% of the questions on each form were answered correctly by at least half of the examinees.

   Forms 2 and 3 of Level III each contained one question that was not answered correctly by anyone. Since these two forms were administered to only 33 and 26 examinees, respectively, such an occurrence might have occurred by chance, though it seems highly unlikely. It is therefore recommended that any questions answered correctly by fewer than 25% of the tryout sample be reviewed again by content experts before they are readministered.

   Table 2 also summarizes the point biserial correlations between performance on the individual test items and on the tests as a whole. Three statistical axioms must be noted in viewing these figures: (1) In a

criterion-referenced test of this sort, where the objective is to test at the entry level, one expects the questions to be answered correctly by more than 80% of educated and experienced examinees; (2) questions that are answered correctly by more than 80% of a group tend to produce point biserials that fall within the range of +.10 through 0.0 into the negative range; (3) correlations based on small numbers of cases are markedly affected by individual variations. To illustrate, if all examinees answered a question correctly, there would be no variability in performance on the item, and complete lack of variability would result in a correlation of 0.0. If it happened that only one or two examinees answered the question wrong, and they happened to have achieved high scores on the test as a whole, their performance would cause a negative correlation. The data for the individual items on these tests have been reviewed, and the statistical principles stated above serve to explain virtually all of the low and negative correlations. The exceptions lie in the items that were answered correctly by small numbers of examinees, as explained previously, and it has been recommended that these be reviewed by content experts to find the source of the difficulty.

2. Score Distributions: Again the size of the groups tested with each Form limit interpretations. Nevertheless, it was clear that the average scores achieved by Level II students on Form 2 were higher in all areas than those of the certification candidates, and on Form 3, they were higher in five areas, the certificants being higher in two areas and in the total score. On both forms, students' scores were more homogeneous than certificants, both in terms of standard deviations and in terms of ranges. The lowest score achieved by a student was higher than the lowest score obtained by a certificant, and the highest score achieved by a student was lower than the highest score of a certificant.

On the Level III examinations, the average Registry candidate scored at a higher level than the average student on the total test and across major areas on Forms 1 and 2. On Form 3, the student means were slightly

higher. The students generally exhibited greater variability than the registrants, unlike the Level II students when compared with the certificants.

The 10 Registry candidates who were administered the Level II examination in error achieved higher scores and exhibited less variability in their scores than either the Level II students or the certification candidates, as would be expected. This may be viewed as one indication of construct validity in which a hypothesized outcome is demonstrated by the findings.

The 16 nonhealth students who were given the Level III examination in error answered approximately one-third of the questions correctly. Since the test was composed of four-choice questions, one-fourth of the questions might have been answered correctly by chance, or on the basis of guessing. The observed performance is, therefore, slightly better than chance. It is not known whether the nonhealth students had completed biological or physical science courses, or had work experience in health-related occupations. Such background information could serve to explain their performance, if it had been available.

Students, certificants, and registrants all seemed to find the area of Infection Control more difficult than other content areas. This area appeared on all tests at both levels, with twice as much emphasis at Level III as at Level II.

3. Identifying Information: In the administration of proficiency tests, it is always a matter of concern to establish that the tests are not discriminating on irrelevant grounds. It should be possible for those of different ages to demonstrate proficiency, without age serving as a facilitating or limiting variable. Similarly, the location of one's experience should not represent an intervening variable, or, if it is, the users of the test should be cognizant of those influences.

Even with the limited samples available from the pretest, it can be asserted that there is no evidence that the age of the examinees

affected performance on the tests at Level II or Level III. In terms of education, those who had completed only high school or less tended not to do as well on Level II as those who had completed more schooling. On Level III, all examinees had completed more than high school, and the level of education seemed to have no direct bearing on performance. Those who had less than one year of experience did not perform as well on the Level II examinations as those who had more experience. On Level III, the effects of experience were less consistent: on Forms 1 and 3, those with more experience achieved higher scores than those with less experience, but this was not true for Form 2. Since details were not available regarding the types of work experience in which examinees had engaged, it is not possible to interpret these differences.

Most examinees indicated their place of employment as being with a hospital, so that further comparisons on this item of information were not feasible. Data were not gathered with respect to sex and ethnicity, so that analyses in terms of those variables are lacking. Subsequent administrations may wish to consider the advisability of gathering additional background information for purposes of further analyses.

Credentialing Strategy

Following the compilation of the results, all data were reviewed with the Advisory Committee. It was suggested in the concept of criterion-referenced standards that a basic minimum Total Score of 85% of the test's content should be established as well as a minimum score of 70% on each major area of content contained in the total examination. Those achieving passing scores will be deemed qualified in terms of entry level proficiency at the level of the examination passed.

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The Advisory Committee recognized the need for additional data to be gathered to assess the tests' comparability to the present Certification and Registry examinations and to evaluate the results in terms of the background characteristics of various examinees. They, therefore, recommended that procedures be developed to collect additional data. One recommended procedure called for the American Association for Respiratory Therapy to administer the Level II examination with the Certification Examination, and the Level III Examination with the Registry Written Examination, at the earliest available session. It was also recommended that a background questionnaire be administered at the same time, to obtain more complete information regarding the characteristics of those taking the examinations.

Additionally, it was suggested that the examinations be administered to other health workers than respiratory personnel to establish further evidence of their relevance to the field of respiratory therapy as distinct from health sciences in general.

In its discussion of credentialing strategies, the Advisory Committee acknowledged that Level II is not the same as certification and Level III is not the same as registration. They also agreed that the examinations are not testing at the present entry levels, but at desirable entry levels, in view of the objectives which involve admitting personnel to employment on the basis of test-demonstrated proficiency, regardless of the usual education and experience requirements.

On that basis, the Advisory Committee recommended the following credentialing strategies:

1. In order to take the Level II examination and receive the credential resulting from passing that examination, a candidate must meet <u>one</u> of the following three requirements:
   a. Graduate from an approved school for respiratory technicians; or
   b. Have twelve months' experience; or
   c. Be a Certified Respiratory Therapy Technician.

2. In order to take the Level III examination and receive the credential associated with passing that examination, a candidate must meet one of the following four sets of requirements:

   a. Be a graduate of a two-year respiratory therapy program, with six months' experience; or

   b. Be a graduate of a one-year respiratory therapy program, with twelve months' experience; or

   c. Have twelve months' experience, in addition to holding either the CRTT or the Level II credential; or

   d. Hold the credential of the American Registry of Inhalation Therapists.

In each relevant instance, the qualifying experience must be in a respiratory care service in a JCAH approved hospital, or its equivalent. The allowance for equivalent institutions was made to provide for government and foreign institutions which are not approved by the JCAH.

The Advisory Committee recognized that it would be necessary to establish a committee to review the applications of those seeking Level II and Level III credentials in order to provide for the optimum in flexibility while still maintaining a uniform standard.

Recommendations

Various recommendations have been incorporated with the text of this report. Other recommendations emerged in the final meeting of the Advisory Committee. All of these are brought together here for convenience in reviewing them and to facilitate their implementation.

1. Questions on the pretests that were answered correctly by fewer than 25% of the tryout sample should be reviewed by content experts before they are readministered. (Project Staff)
2. A procedure should be developed to collect additional data as seen necessary. (Advisory Committee)

3. The AART should explore possible sources of funds for an additional tryout of the examinations. (Advisory Committee)
4. The Psychological Corporation should maintain control of the security of the examinations for any additional tryout, at least to the point of delivering the printed booklets to the Registry, subject to concurrence of the Government. (Advisory Committee)
5. The AART should administer the Level II examination with the Certification Examination and the Level III Examination with the Registry Written Examination at the first available time with a suitable background questionnaire in order to obtain a larger tryout sample and more information on each examinee. (Advisory Committee)
6. A committee should be formed, with Advisory Committee representation, to review the results of a further tryout of the examinations. (Advisory Committee)
7. Further experience with the examinations should be obtained using health workers other than respiratory personnel. (Advisory Committee)
8. A basic minimum overall score and a lower basic minimum score on each major area should be required to pass the examination. (Advisory Committee)
9. Eligibility to take the Level II examination should be based on graduation from an approved school, <u>or</u> 12 months of approved experience, <u>or</u> the CRTT credential. (Advisory Committee)
10. Eligibility to take the Level III examination should be based on graduation from a two-year school with 6 months of approved experience, <u>or</u> graduation from a one-year school with 12 months of approved experience, <u>or</u> 12 months of approved experience with either the CRTT or Level II credential, <u>or</u> the AART credential. (Advisory Committee)
11. A committee of the Association should be charged with reviewing the results of the proposed credentialing strategy after it has been implemented. (Project Staff)
12. Provision should be made for review and revision of the tests on a regular basis to maintain their content at appropriate levels and to assure their security. (Project Staff)

EVALUATION AND RECOMMENDATIONS ON THE POTENTIAL USE OF AUDIOVISUAL AIDS FOR PROFICIENCY TESTING IN THE FIELD OF RESPIRATORY THERAPY

The following report deals with the two broad areas of inquiry suggested by the Contract.

First, what materials with potential applicability to testing are currently in use in the teaching of respiratory therapy?

Second, what knowledge and skill requirements can most effectively be examined via audiovisuals and related media?

1. MATERIALS WITH POTENTIAL APPLICABILITY TO TESTING

These fall into several categories: film, videotape, slides, color plates, cassettes, tape recordings, models, and combinations of these. As will be seen, one or another of the combinations may well be most effective for testing purposes.

Film (motion pictures) with sound

Perhaps the classic "audiovisual aid", this is also the most expensive, with production cost estimates ranging from $600 to $1000 a minute. The necessity for a darkened room would make testing awkward, and rapid advances in the burgeoning field of respiratory therapy may render a production obsolescent before its completion.

Videotape

This medium, while more difficult than film to edit into final form (since it is a magnetic tape instead of a series of frames), has the advantage of being easy to duplicate. For this reason, many television shows are first filmed, then edited, and finally transferred to videotape. In regard to proficiency testing, however, essentially the same objections apply as to film. Moreover, unless the videotaping equipment is of an exceptionally high (and consequently expensive) standard, detail resolution is apt to be poor.

Film and Videotape Cassettes

These are still in initial stages of development, especially the latter. They have the advantage over their "parent media" of being tailored to individuals and not requiring darkness; on the other hand, they do require a matching projector for each student and hence appear to be excessively costly.

Slides

Another "classic" aid to teaching, these are relatively inexpensive and are available from various professional organizations. They can readily be updated and their sequence changed, enhancing their versatility. However, they are at best merely adjuncts to verbal, taped, or written material. (See following.)

Color Plates

Most practical of all visual presentations for testing groups would be the use of color plates, which could be included in each examinee's test materials. This form of presentation avoids problems associated with varying perceptions from different points in a room, effects of illumination, timing, and opportunity to return to a question, while permitting standardized content at the most reasonable price. Any material capable of slide presentation could be presented in color plates, with one or more questions dealing with a single plate, or with several plates serving as the options for a single question.

Slide-Tape Cassette Combinations

These match the versatility of slides with the "editability" of cassettes, thus making possible the updating and rearrangement of content as required. Once developed, the material may be reproduced relatively inexpensively. Individuals could be tested in this way, free of "examiner bias." Unlike visual cassettes, a single sound cassette could be used for an entire group.

Slide-Written Text Combinations

These are versatile as the preceding, assuming the text is not elaborately presented or otherwise rendered less flexible. These combinations would be somewhat more economical than those involving tape cassettes, although extremely large groups would require a correspondingly large number of texts. Slides of (for example) pathologic conditions could be keyed to brief explanatory paragraphs in the text followed by appropriate test questions. If the slides were timed to advance at intervals, a virtually automatic test administration would result.

Color Plate-Written Text Combinations

These offer the same advantages as the Slide-Written Text Combination, with the added features of individualized presentation at relatively economical cost.

Tape Recordings

Though limited in scope, these are of particular value to the field of respiratory therapy in their ability to reproduce respiratory sound and breathing patterns. Reproduction and equipment, however, must be of the highest quality in order to avoid testee complaints of ambiguous or unclear sound. Even as a teaching method, this medium may be considered to be in a research stage of development.

Models

While respiratory, circulatory, pathologic, and other three-dimensional models have been shown to have great value in teaching (particularly the visually handicapped), their worth in proficiency testing seems marginal, particularly in the case of large groups. Much the same effect can be achieved with slides.

SUMMARY

For reasons of economy, versatility, and efficiency, slides or color plates in combination with written text and/or tape cassettes seem to commend themselves to proficiency testing in the respiratory therapy field. Other media, such as tape-recorded sound patterns, should be watched closely for improvements in "state of the art."

2. RESPIRATORY THERAPY KNOWLEDGE AND SKILL REQUIREMENTS

In the American Association of Respiratory Therapy's 1973 report to the National Institutes of Health, entitled "Delineation of Roles and Functions of Respiratory Therapy Personnel", the following proficiency areas were denoted:

For Entry Level II personnel:

A. Intermittent Positive Pressure Breathing
B. Humidity/Aerosol Therapy
C. Gas Therapy
D. Pulmonary Drainage Procedures
E. Cardiopulmonary Resuscitation
F. Cardiorespiratory Drug Administration
G. Infection Control

For Entry Level III personnel:

A. Continuous Ventilation
B. Airway Care
C. Emergency Care
D. Infection Control (Culturing)
E. Cardiorespiratory Pharmacology
F. Pulmonary Function Testing
G. Cardiorespiratory Rehabilitation

All these areas lend themselves to the slide-tape cassette, slide-written text, and color plate-written text formats. Appropriate subjects, by area, might include the following.

Entry Level II

A. Intermittent Positive Pressure Breathing. Representational and cross-sectional views of IPPB machines commonly encountered, for identification of both entire machines and important components. Color photographs of adverse patient responses (cyanosis, etc.) Anatomical cross-sections for identification of relevant structures.

B. Humidity/Aerosol Therapy. Representational and cross-sectional views of nebulizers, atomizers, and humidifiers. Photographs of adverse patient responses (dehydration, etc.).

C. Gas Therapy. Photographs of cannulae, masks, hoods, enclosures, and other gas administration equipment. Color views of color-coded gas cylinders (for identification of contents).

D. Pulmonary Drainage Procedures. Views of vibrators, percussors, suction machines, and oxygen therapy devices. Photographs of patients lying in various positions (with questions about which segment of the lung is being drained).

E. Cardiopulmonary Resuscitation. Cross-sectional views of the heart and cardiovascular system (to identify sites of obstruction and/or restriction).

F. Cardiorespiratory Drug Administration. Large blowup of physician's order (with associated questions regarding interpretation of physician's instructions). Representational and cross-sectional views of nebulizers.

G. Infection Control. Microscope views of pathogenic organisms (color would aid identification in the case of stained slides).

Entry Level III

A. Continuous Ventilation. Representational and cross-sectional views of standard ventilators and ventilation monitors (spirometers, pressure gauges, etc.). Photographs of adverse patient response. Microscope views of arterial blood, both for identification of components and for pathogenic analysis.

B. Airway Care. Cross-sectional views of tracheobronchial and related areas. Microscope views of pathogens commonly encountered in sputum collected

during tracheobronchial aspiration. Views of patients in various aspiration positions. Photographs of cuffed and uncuffed tracheostomy tubes (related to questions about their component parts and appropriate conditions for use of each).

C. Emergency Care. Photographs of electromechanical monitors (including emergency "readings") and resuscitative and defibrillation devices. Detailed anatomical cross-sections of the head, trachea, and thorax.

D. Infection Control. Microscope views of pathogenic organisms. Blow-ups of clinical laboratory reports (for interpretation of indicated action to be taken).

E. Cardiorespiratory Pharmacology. Representational and cross-sectional views of nebulizers. Blowups of EKG patterns (for interpretation).
NOTE: As mentioned earlier in this report, tape recordings may be of some value in sampling knowledge of chest auscultation procedures, since monitoring of chest sounds is required clinical knowledge in both this area and area G below.

F. Pulmonary Function Testing. Representational and cross-sectional views of spirometers and various flow-measuring devices. Blowups of arterial blood gas readouts (for analysis of oxygen tension, carbon dioxide tension, and pH).

G. Cardiorespiratory Rehabilitation. Representational and cross-sectional views of respiratory therapy equipment for home care. External view of chest for identification of stethoscope application points.
NOTE: Diagnostic analysis might be tested by matching one or a series of application points with tape-recorded chest sounds corresponding to each point, then asking probable diagnosis.

SUMMARY

The above possibilities are listed only to indicate the range of visual material applicable to proficiency testing in respiratory therapy; they are by no means all-inclusive. Virtually all of the options could be presented in the form of diagrams or photographs printed in the test booklet itself. However, slides or color plates seem to be particularly appropriate when color is crucial (as in identification of contents of gas cylinders) or where detail might be lost (as in reproduction of a physician's order or laboratory report). Regardless of medium, the potential for visual presentation in respiratory proficiency testing should be apparent. Continuing attention will be given to possibly useful innovations in the audiovisual field, as well as to the current developments mentioned in this report.

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Outline of Content

PROFICIENCY EXAMINATION FOR LEVEL II RESPIRATORY THERAPY PERSONNEL

Percentage and Number of Questions Recommended

AREA	%	#
A. Intermittent Positive Pressure Breathing	20	50
1. Read/evaluate physician's order and chart.	3	8
2. Prepare,retest IPPB machine.	1	3
3. Prepare/position patient.	2	5
4. Add prescribed medication.	2	5
5. Adjust controls. / 6. Implement IPPB treatment.	3	8
7. Instruct patient to clear airway.	1	2
8. Assess tidal volume.	1	2
9. Assess patient responses.	3	8
10. Modify technique to deal with adverse patient response.	2	5
11. Recheck equipment.	1	2
12. Record therapy	1	2
B. Humidity/Aerosol Therapy	15	38
1. Read/evaluate physician's order and chart.	1.50	4
2. Select equipment.	1.50	4
3. Prepare/retest equipment.	1.50	4
4. Add prescribed medication.	1.50	4
5. Prepare/position patient.	1.50	4
6. Implement therapy.	1.50	4
7. Assess patient response.	2.25	5
8. Modify technique to deal with adverse patient response.	1.50	4
9. Maintain equipment.	.75	2
10. Record therapy.	1.50	3
C. Gas Therapy	20	50
1. Read/evaluate physician's order and chart.	3	8
2. Prepare/retest equipment.	2	5
3. Prepare/position patient.	2	5
4. Observe safety procedures.	2	5
5. Implement therapy.	2	5
6. Assess patient response.	4	10
7. Modify technique to deal with adverse patient response.	3	7
8. Record therapy.	2	5
D. Pulmonary Drainage Procedures	15	38
1. Read/evaluate physician's order and chart.	2.25	6
2. Prepare/position patient.	2.25	6
3. Implement pulmonary drainage procedures.	3.00	7
4. Percuss or vibrate patient.	1.50	4
5. Assess patient response.	2.25	5
6. Modify techniques to deal with adverse patient response.	1.50	4
7. Collect sputum specimens.	.75	2
8. Record procedures.	1.50	4

	%	#
E. Cardiopulmonary Resuscitation	5	12
1. Recognize signs of cardiopulmonary embarassment/ arrest.	.75	2
2. Position patient for cardiopulmonary resuscitation.	.50	1
3. Clear and maintain patient airway.	.50	1
4. Ventilate patient using mouth-to-mouth or other techniques.	1.25	3
5. Initiate external cardiac compression.	1.25	3
6. Evaluate effectiveness of resuscitation.	.50	1
7. Record resuscitation attempt.	.25	1
F. Cardiorespiratory Drug Administration	20	50
1. Read/evaluate physician's order and chart.	3	8
2. Select appropriate nebulizer.	1	3
3. Prepare/retest nebulizer.	1	2
4. Prepare/position patient for therapy.	1	2
5. Add prescribed medication to nebulizer.	2	5
6. Implement treatment.	2	5
7. Assess patient response.	4	10
8. Modify techniques to deal with adverse patient response.	3	8
9. Terminate treatment as prescribed.	1	2
10. Record therapy	2	5
G. Infection Control	5	12
1. Read/evaluate physician's order and chart.	.50	1
2. Select/prepare equipment.	1.50	3
3. Observe isolation procedure.	1.50	4
4. Implement isolation procedures.	1.50	4

Outline of Content

PROFICIENCY EXAMINATION FOR LEVEL III RESPIRATORY THERAPY PERSONNEL

Percentage and Number of Questions Recommended

AREA	%	#
Continuous Ventilation	20	50
1. Standard Procedure	16	40
1. Read/evaluate physician's order and chart.	1.60	4
2. Prepare/retest ventilator.	.32	1
3. Prepare/position patient.	.32	1
4. Adjust controls.	1.28	3
5. Implement ventilation.	.64	1
6. Activate electro-mechanical monitors.	.64	1
7. Draw arterial blood sample and perform gas analysis.	1.12	3
8. Determine cardiorespiratory status.	1.60	4
9. Add prescribed medication.	.64	2
10. Assess patient response.	1.92	5
11. Modify therapy to deal with adverse patient response.	1.60	4
12. Maintain ventilator.	1.12	3
13. Evaluate effectiveness of ventilation.	1.28	3
14. Wean patient from ventilator when prescribed.	1.60	4
15. Record therapy.	.32	1
2. Special Procedures	4	10
1. Read/evaluate physician's order and chart.	.40	1
2. Select equipment.	.20	2
3. Prepare/retest equipment.	.60	
4. Prepare/position patient.	.20	2
5. Implement CPPB.	.40	
6. Activate electro-mechanical monitors.	.20	
7. Assess patient response.	.60	3
8. Modify technique to deal with adverse patient response.	.60	
9. Wean patient from ventilator.	.60	2
10. Record therapy.	.20	
Airway Care	20	50
1. Tracheobronchial Aspiration	10	25
1. Read/evaluate physician/s order and chart.	1	3
2. Select equipment.	.50	1
3. Evaluate patency of airway.	1	3
4. Instill prescribed solution as indicated.	.50	1
5. Prepare/retest equipment.	.50	1
6. Prepare/position patient.	.50	1
7. Hyperinflate and hyperoxygenate patient.	.50	1
8. Implement aspiration procedures.	1.50	4
9. Evaluate characteristics of sputum.	1	3
10. Assess patient response.	1.50	4
11. Modify therapy techniques to deal with adverse patient response.	1	2
12. Record procedure.	.50	1

	%	#
2. Tracheostomy Care	10	25
1. Read/evaluate physician's order and chart.	1.50	4
2. Select/prepare equipment.	.50	1
3. Inflate or deflate cuff.	1	3
4. Implement tracheostomy tube and stoma care.	2	5
5. Change tracheostomy tube, except in a fresh tracheostomy.	1	2
6. Assess patient response.	2	5
7. Modify technique to deal with adverse patient response.	1.50	4
8. Record procedure.	.50	1
Emergency Care	15	38
1. Assess cardiorespiratory status.	4.50	11
2. Intubate the trachea.	1.50	4
3. Defibrillate.	1.50	4
4. Use all types of resuscitators.	3.75	9
5. Evaluate effectiveness of resuscitator.	3	8
6. Record resuscitative attempt.	.75	2
Infection Control	10	24
1. Plan and implement culturing procedures.	2	4
2. Determine if corrective action is required.	4	10
3. Implement corrective action and assess results.	4	10
Cardiorespiratory Drug Administration	15	38
1. Read/evaluate physician's order and chart.	2	6
2. Select appropriate nebulizer.	1	3
3. Prepare/retest nebulizer.	1	2
4. Prepare/position patient for therapy.	1	2
5. Add prescribed medication to nebulizer.	1	3
6. Implement treatment.	1	3
7. Assess patient response.	3	8
8. Modify therapy procedure to deal with adverse patient response.	2	6
9. Terminate treatment as prescribed.	1	2
10. Record therapy.	2	3
Pulmonary Function Testing	10	25
1. Read/evaluate physician's order for test.	2.5	6
2. Read/evaluate patient's chart.		
3. Select/prepare equipment.	1.5	4
4. Observe safety precautions.	1	3
5. Prepare/position patient.	.5	1
6. Implement test/assess patient performance.	2	5
7. Determine test results.	1.5	4
8. Compare test results with normal range values.	1	2

	%	#
Cardiorespiratory Rehabilitation	10	25
1. Read/evaluate physician's order and chart.	1	3
2. Prepare/position patient.		
3. Instruct patient and family in breathing exercises and postural drainage procedures.	2	5
4. Implement cardiorespiratory exercises.	1.5	4
5. Instruct patient in proper use of respiratory therapy equipment in the home.	1	2
6. Assess patient response.	1.5	4
7. Modify techniques to deal with adverse patient response.	1.5	4
8. Activate electro-mechanical monitors.	.5	1
9. Record procedure.	1	2

THE PSYCHOLOGICAL CORPORATION
INCORPORATED IN 1921
304 EAST 45TH STREET
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212 679 7070

The Psychological Corporation has been awarded the Phase II Contract for the Development of Proficiency Examinations for Two Levels of Respiratory Therapy Personnel. This is an extension of the Phase I Contract for the Delineation of Roles and Functions of Respiratory Therapy Personnel carried out by the American Association of Respiratory Therapy (AART). We are at the initial stage of contacting respiratory therapy experts like yourself to engage in writing test questions. Your name was suggested to us by Sr. Bernice Ebner. If you agree to participate, we would like to receive your test questions by the end of October. Due to our contract deadlines our schedule admittedly is a bit rushed but if you could comply with the October deadline, we would be most grateful. You will be paid $5 for each usable item.

I have enclosed excerpts from the AART Final Report which explain in detail each of the areas which will be included in the Level II and the Level III Proficiency Examinations. You may write questions in any area at either level.

When writing test questions, please keep in mind that the examinations are intended for entry level individuals and that the candidates taking these examinations will have no formal training or on-the-job training. The test questions should reflect minimal requirements in all areas.

Please concentrate your efforts on questions related to Clinical Knowledge and Clinical Skills. Areas of General Knowledge, such as anatomy and physiology, should be treated within the context of a clinical procedure. Obviously, there are steps omitted in the outline delineation of Clinical Skills within each area. Your test questions related to a clinical procedure should fill in these gaps. However, please construct general questions related to Clinical Skills so that candidates will be tested on accepted procedures. Avoid reference to specific brands of equipment or procedures that are peculiar to your setting.

The test questions are to be multiple-choice type. If possible, please include some test questions utilizing pictures, graphics, or diagrams of the subject matter. I have enclosed a set of directions and a set of principles on the writing of test questions. These should acquaint you with the necessary format you should follow and the essentials of desirable item writing.

Please mail the enclosed post card to us indicating whether you will (yes) or will not (no) participate by writing test questions. If yes, please indicate the areas for which you will write test questions. Your assistance will be greatly appreciated by us and the American Association of Respiratory Therapy.

Sincerely,

Elaine P. Power
Professional Examinations Division

EPP:dk
4 encl

GENERAL INSTRUCTIONS FOR WRITING TEST QUESTIONS

1. Questions should be written on 5 x 8 cards -- one item per card.

2. Always put the correct answer choice in the first position.

3. Indicate the area which the item was written to cover in the upper right corner of the card.

4. Questions should be multiple-choice items with four answer choices.

5. Questions should be worded as clearly and concisely as possible -- try to keep answer choices as short as possible.

6. Try to pose a specific problem in the stem of the question:

   Undesirable stem: Total lung capacity is
   Undesirable stem: Which of the following is true?

7. Avoid using negatively stated questions.
   For example, Which of the following structures is NOT part of the lungs?

8. When an item calls for a mathematical solution (a) keep the arithmetic simple (b) keep the answer choices in the same units of measure (e.g., all cc or all ml).

9. In your answer choices (a) make them plausible in relation to the problem posed in the stem (b) choose and phrase the best or correct answer choice.

10. Do not use <u>None of the Above</u> or <u>All of the Above</u> as an answer choice.

For additional suggestions on writing test questions please refer to the pamphlet entitled <u>Some Principles For Preparing Multiple-Choice Items.</u>

PROFESSIONAL EXAMINATIONS DIVISION

THE PSYCHOLOGICAL CORPORATION • 304 EAST 45th STREET • NEW YORK, N. Y. 10017

SOME PRINCIPLES FOR PREPARING MULTIPLE-CHOICE ITEMS

The multiple-choice test is the most widely used type of objective examination. It offers so many advantages over other kinds of tests that it is relied upon almost exclusively for testing sizeable groups under standardized conditions.

A multiple-choice test consists of a series of "items." Each item comprises a "stem" and three or more answer choices, or "options." One of the options is correct, while the others ("distracters") are incorrect. The examinee's task is to select the correct option for each item, and his score is based on the number of items he answers correctly.

The preparation of good test items is one of the most exacting and challenging tasks in the field of creative writing. With the possible exception of legal documents, few other words are read with such critical attention to expressed and implied meanings as those in test items. Even experienced item writers have difficulty avoiding serious ambiguities. An editorial review of newly prepared items by at least one other person is almost always necessary.

Two of the most common types of multiple-choice items are illustrated below. They differ only in the construction of their stems. Both ways of writing this particular item are acceptable. Some items, however, may be more amenable to one of these formats than to the other.

Completion Type

Birmingham, Alabama, is sometimes called the "Pittsburgh of the South" because it is

1. a steel production center.
2. an important shipping port.
3. a textile manufacturing center.
4. a leading maker of glass.

Question Type

Why is Birmingham, Alabama, sometimes called the "Pittsburgh of the South"?

1. It is a steel production center
2. It is an important shipping port
3. It is a textile manufacturing center
4. It is a leading maker of glass

The following set of principles and illustrations is intended to help item writers avoid some of the pitfalls that frequently lead to defective items. These principles cannot be applied rigidly, because some of them might have to be sacrificed in favor of others. Nevertheless, they do cover many of the problems commonly encountered in item construction. Defects in items can usually be traced to violation of one or more of these principles. In the sample items accompanying the statements of principles, the correct option is always number 1. In draft form, options should appear in this order to insure that the correct answer intended is readily identifiable to reviewers. Rearrangement of the options is usually left to the final editing stage.

1. The problem or questions should be presented clearly in the stem.

The stem should state the problem or question so clearly that a well-informed examinee should be able to anticipate the appropriate answer before he looks at the options. The examinee should not be required to guess the intent of the item writer.

Poor

Washington was

1. admitted to statehood in 1889.
2. part of the Territory of Oregon until 1912.
3. made a state in 1811.
4. part of the Northwest Territory until 1848.

Improved

In what year did the State of Washington enter the Union?

1. 1889
2. 1811
3. 1848
4. 1912

Note: The stem in the poor item is ambiguous and could have so many correct predicates that the examinee would have to read the options before he could understand what was being asked. "Washington" could be George Washington, Washington, D. C., the State of Washington, or some other Washington.

2. The correct option should be unequivocally correct and the distracters unequivocally wrong.

Poor

Clouded vision is a symptom of

1. cataracts.
2. glaucoma.
3. diabetes.
4. retinal detachment.

Improved

The most common symptom of cataracts is

1. clouded vision.
2. ocular pain.
3. double vision.
4. loss of light perception.

Note: In the poor item, the first three options are all potentially correct.

3. Both the stem and the options should be as brief and straightforward as possible.

A. Avoid complex sentence structures that make comprehension difficult.

Poor

If two thermometers placed in a room both register 70° F when read an hour later and the bulb of one is then completely covered by a piece of wet cloth, then one would expect that, upon reading the temperature of the two thermometers two hours later, the temperature shown by the thermometer whose bulb was covered would be

1. lower than that on the uncovered thermometer.
2. higher than that on the uncovered thermometer.
3. the same as that on the uncovered thermometer.
4. either higher or lower than that on the uncovered one depending upon the condition of the air in the room.

Improved

If the bulb of one of two thermometers in a warm room is completely covered by a wet cloth, the covered thermometer would show

1. a lower temperature than the uncovered one.
2. a higher temperature than the uncovered one.
3. the same temperature as the uncovered one.
4. either a higher or lower temperature depending on the moisture in the air.

B. A positive statement of a problem is preferable to a negative one. Items requiring identification of the option which is NOT in the specified realm or category are undesirable. Examinees may overlook critical terms such as "not" or "except."

Poor

Which of the following countries is not located in Europe?

1. Senegal
2. Greece
3. Poland
4. Finland

Improved

On which continent is Senegal located?

1. Africa
2. Asia
3. Europe
4. South America

C. The stem should be restricted to information directly relevant to the question or the statement of the problem.

Poor

The nomination of Cabinet officers is one of many responsibilities of a United States President. Nominations of Cabinet members are ratified by the

1. Senate.
2. House majority leader.
3. President's advisory board.
4. Congressional Committee on Ways and Means.

Improved

Nominations of United States Cabinet members are ratified by the

1. Senate.
2. House majority leader.
3. President's advisory board.
4. Congressional Committee on Ways and Means.

D. The stem should include any words that otherwise would have to be repeated in each option.

Poor

Water can be changed to steam by

1. heating it to a temperature of 212°F at sea level.
2. heating it to a temperature of 100°F at sea level.
3. heating it to a temperature of 200°F at sea level.
4. heating it to a temperature of 250°F at sea level.

Improved

At sea level, water can be changed to steam by heating it to a Fahrenheit temperature of

1. 212°.
2. 100°.
3. 200°.
4. 250°.

4. **Options should be parallel in construction and content. All the options should fit grammatically with the stem, and they should all plausibly answer only one implied or stated question (how, when, who, where, how many, etc.).**

Poor	*Improved*
Commercial processing of bauxite	The purpose of processing bauxite is to extract
1. produces aluminum.	1. aluminum.
2. requires oil-fired blast furnaces.	2. zinc.
3. occurs mostly in Canada.	3. plastics.
4. is impractical and unprofitable.	4. asbestos.

Note: Nonparallel options most often follow stems which fail to set forth the problem or question clearly in accordance with Principle 1.

5. **Items should not contain cues that might give away the correct answer on extraneous grounds. This type of error includes:**

   A. Unusually long, qualified correct options contrasting with short, vague distracters

   B. Distracters which fail to complete the stem in good grammatical form

   C. Key words appearing in stem and correct option but not in distracters

6. **All the options should be plausible to the intended examinee group.**

   A. An option that draws no responses makes no contribution to measurement, and one that draws only a few responses may contribute to errors in measurement.

   B. An item should not set forth a condition contrary to known facts thus leaving the examinee in the dilemma of ignoring erroneous statements or not choosing the desired answer.

7. **Attention should be given to the relative inclusiveness of the stem and the options.**

Poor	*Improved*
What state is largest?	Which of the following states has the largest area?
1. Maryland	1. Maryland
2. New Jersey	2. New Jersey
3. Connecticut	3. Connecticut
4. Delaware	4. Massachusetts

Note: The poor item neither provides necessary limitations in the stem nor provides the correct answer to a literal reading of the stem. The improved item provides the necessary limitation in the stem, but as in any item of the "Which of the following . . ." variety, it has the defect that the answer cannot be anticipated without referral to the options.

8. **The use of "none of these" as an option is rarely justified.**

   A. If "none of these" is used as a distracter, the correct option should be exactly correct.

Poor	*Improved*
What is the decimal equivalent of 1/16?	What is the decimal equivalent of 1/16?
1. .063	1. .0625
2. .125	2. .1250
3. .160	3. .1600
4. None of these	4. None of these

Note: In the poor item, the first option is not exactly correct, therefore "none of these" is defensible as a correct option.

   B. "None of these" should not be used if the other options have exhausted the logical possibilities. The item should be discarded or revised instead.

9. **"All of these" should never be used as an option. If "all of these" were used as a correct option, all the options for that item could be defended as being correct. As a distracter, it is inconsistent with directions that there is only one correct answer.**

10. **In an item calling for a judgment, the authority or criterion that is the basis for the correct option should be specified.**

Poor	*Improved*
The men best suited to rule the state are the	According to Plato, the men best suited to rule the ideal state are the
1. philosophers.	1. philosophers.
2. soldiers.	2. soldiers.
3. teachers.	3. teachers.
4. businessmen.	4. businessmen.

Note: This principle is particularly important for items concerned with mastery of "good" practices in a technical or professional field. Items of the form "What would you do?" should be avoided, because the correctness of any response could be defended. First- and second-person pronouns should not be used, principally because the referent may be unclear.

11. **The answers to items should not be subject to change within a short time.**

Poor	*Improved*
Who was the Premier of the Union of Soviet Socialist Republics five years ago?	Who was the Premier of the Union of Soviet Socialist Republics in 1961?
1. Khrushchev	1. Khrushchev
2. Suslov	2. Stalin
3. Malenkov	3. Suslov
4. Brezhenev	4. Malenkov

12. **Items should be directed toward important learning objectives. While the evaluation of knowledge of specific facts is often a legitimate measurement goal, testing of trivial knowledge should be avoided.**

Poor	*Improved*
The treaty of Brest-Litovsk was signed by Russia on	The treaty of Brest-Litovsk concerned Russia's territory following
1. March 3, 1918.	1. World War I.
2. March 4, 1918.	2. World War II.
3. April 3, 1918.	3. the Crimean War.
4. April 4, 1918.	4. the Russo-Japanese War.

Many texts and pamphlets contain more detailed discussions of the theory and practice of test construction. Several of them should be studied by anyone attempting to design and write tests. Following are three good sources.

Ebel, Robert L. *Measuring educational achievement.* Englewood Cliffs, N. J.: Prentice-Hall, 1965.

Gronlund, Norman E. *Measurement and evaluation in teaching.* New York: Macmillan, 1965.

Thorndike, Robert L. and Hagen, Elizabeth P. *Measurement and evaluation in psychology and education.* New York: Wiley, 1961.

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THE PSYCHOLOGICAL CORPORATION
INCORPORATED IN 1921
304 EAST 45TH STREET
NEW YORK, N.Y. 10017
(212) 679-7070

TO: Prospective Participants in Respiratory Therapy Pretest Group

Under the auspices of the Public Health Service of the Department of Health, Education and Welfare, The Psychological Corporation is responsible for developing Proficiency Examinations for Respiratory Therapy Personnel. The examinations are designed to measure the knowledge and skills possessed by respiratory therapy personnel.

As part of this process, The Psychological Corporation will be administering the examinations to a pretest group on Saturday, May 4, 1974. This group is to be made up of a sampling of both respiratory therapy students and technicians eligible for certification at the technician level. Each person included in the pretest group will receive $25 for his participation along with a report of his results.

We would greatly appreciate your cooperation in taking this examination, the results of which will be used to provide information on test performance. No participant's test results will be reported to anyone other than that individual. Testing centers will be located in San Francisco, Miami, Chicago, Boston, New York City, and Seattle. If you agree to participate in this testing, an admission card to the testing center nearest your location will be sent to you indicating the exact address of the center and the time you are to report.

The examination will consist of two parts containing a total of 250 multiple-choice items covering the following areas: IPPB, Humidity/Aerosol Therapy, Gas Therapy, Pulmonary Drainage Procedures, Cardiopulmonary Resuscitation, Cardiorespiratory Drug Administration, and Infection Control. The test will begin at 8:30 A.M. and lasts approximately 4 hours.

If you would care to be included in this pretest group, please fill in the enclosed questionnaire and print your name, address, and choice of testing center in the spaces indicated. These are to be returned to The Psychological Corporation in the return envelope provided by April 13.

Your interest and cooperation in the development of the proficiency examinations is greatly appreciated.

PROFESSIONAL EXAMINATIONS DIVISION

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The examination will consist of two parts containing a total of 250 multiple-choice items covering the following areas: Continuous Ventilation, Airway Care, Emergency Care, Infection Control, Cardiorespiratory Pharmacology, Pulmonary Function Testing, and Cardiorespiratory Rehabilitation. The test will begin at 8:30 A.M. and last approximately 4 hours.

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I understand that I will receive a check for $25 for my participation in the Respiratory Therapy Pretest group and, at a later date, a report of my test results.

Name _____

Address _____

_____

Choice of Testing Center _____

What is the most advanced level of education you have completed? (Check one)

1. Less than high school ___
2. High school graduate ___
3. Practical nursing ___
4. Registered nursing ___
5. Other allied health school ___
6. Technical school ___
7. 2 years or less of college ___
8. More than 2 years of college ___

In what type of facility are you presently employed? (Check one)

1. Hospital ___
2. Clinic ___
3. Service company ___
4. Other ___
5. Not employed ___

How many years of experience have you had?

1. Less than 1 year ___
2. 1 year ___
3. 2 year ___
4. 3 or more years ___

Date of Birth _____

Signature _____

.....

In the space below, print your name and the address to which you wish your Test Admission Card sent and return this form to The Psychological Corporation at the address indicated above.

Name: _____

Address: _____

_____

_____

IN THE BOXES PROVIDED BELOW, PRINT YOUR LAST NAME, SKIP A BOX, THEN PRINT YOUR FIRST NAME, SKIP A BOX, THEN PRINT YOUR MIDDLE INITIAL. THEN BLACKEN THE LETTER BOX BELOW THAT MATCHES EACH LETTER IN YOUR NAME.

LAST NAME THEN FIRST NAME

ALPHABETICAL

IN THE BOXES PROVIDED BELOW PRINT YOUR MAILING ADDRESS, SKIPPING A BOX BETWEEN NUMBER AND STREET. THEN BLACKEN THE LETTER OR NUMBER BOX BELOW, THAT MATCHES EACH LETTER OR NUMBER OF YOUR MAILING ADDRESS.

NUMBER AND STREET

CITY

STATE

ZIP CODE

USE ONE OF THE FOLLOWING TWO LETTER ABBREVIATIONS FOR CODING THE STATE IN YOUR MAILING ADDRESS

NUMERICAL

Alabama	AL	Nebraska	NB
Alaska	AK	Nevada	NV
Arizona	AZ	New Hampshire	NH
Arkansas	AR	New Jersey	NJ
California	CA	New Mexico	NM
Colorado	CD	New York	NY
Connecticut	CT	North Carolina	NC
Delaware	DE	North Dakota	ND
Dist. of Columbia	DC	Ohio	OH
Florida	FL	Oklahoma	OK
Georgia	GA	Oregon	OR
Hawaii	HI	Pennsylvania	PA
Idaho	ID	Puerto Rico	PR
Illinois	IL	Rhode Island	RI
Indiana	IN	South Carolina	SC
Iowa	IA	South Dakota	SD
Kansas	KS	Tennessee	TN
Kentucky	KY	Texas	TX
Louisiana	LA	Utah	UT
Maine	ME	Vermont	VT
Maryland	MD	Virginia	VA
Massachusetts	MA	Washington	WA
Michigan	MI	West Virginia	WV
Minnesota	MN	Wisconsin	WI
Mississippi	MS	Wyoming	WY
Missouri	MD	Canada	CN
Montana	MT	Foreign	FR

FOR OFFICE USE ONLY

ANSWER SHEET NUMBER

69032

DO NOT WRITE BELOW THIS LINE

FOR OFFICE USE ONLY

SOCIAL SECURITY NUMBER _____

DATE _____

TESTING CENTER _____
CITY STATE

SIGNATURE _____

THE PSYCHOLOGICAL CORPORATION

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27	☐	☐	☐	☐	55	☐	☐	☐	☐	83	☐	☐	☐	☐	111	☐	☐	☐	☐	139	☐	☐	☐	☐	167	☐	☐	☐	☐	195	☐	☐	☐	☐	223	☐	☐	☐	☐	251	☐	☐	☐	☐
28	☐	☐	☐	☐	56	☐	☐	☐	☐	84	☐	☐	☐	☐	112	☐	☐	☐	☐	140	☐	☐	☐	☐	168	☐	☐	☐	☐	196	☐	☐	☐	☐	224	☐	☐	☐	☐	252	☐	☐	☐	☐

DC 8147

MANUAL OF DIRECTIONS

LEVEL II AND LEVEL III EXAMINATION

SCHEDULE

8:30 A.M. - Candidates report to center

9:00 A.M. - Examination begins

1:00 P.M. - Approximate time testing ends

Professional Examinations Division
The Psychological Corporation
304 East 45th Street
New York, N. Y. 10017
212-679-7070

GENERAL INSTRUCTIONS

1. The procedures indicated in this Manual should be followed strictly in order to insure comparability of testing at all testing centers. The Examiner and Proctors should therefore be thoroughly familiar with these instructions before the testing date and should observe them exactly.

2. The chief responsibilities of the Examiner are to safeguard the security of the tests, to conduct the examination efficiently and quietly, to protect candidates from disturbances, and to return the test materials promptly.

3. If no wall clock is available in the testing room, the amount of time remaining in a given part should be posted at various intervals.

4. The use of books, scratch paper, slide rules, etc., is prohibited. Only the candidate's pencil, Admission Card, test booklet, and answer sheet may be on his desk at any time during the examinations.

EXAMINER'S REPORT

The Examiner is to fill in the Examiner's Report on the back of this Manual, detach it from the Manual, and return it with the used answer sheets. This Report includes:

1. Testing center city and state
2. Examiner's name and address
3. Number of candidates tested
4. Serial numbers of booklets received
5. Any irregularities in the testing session such as cheating, illness, late arrival, etc.
6. Additional comments, if any
7. Examiner's signature

TEST SECURITY

Security of test materials is so important that it cannot be overemphasized. The security of all tests is the direct responsibility of the Examiner from the time of receipt until they are returned to The Psychological Corporation. This means NO ONE, including Proctors, is to have the opportunity to examine any test booklet or answer sheet AT ANY TIME except the candidate as he takes his test. ANY BREACH OF SECURITY, HOWEVER MINOR, MUST BE REPORTED TO THE PSYCHOLOGICAL CORPORATION AT ONCE.

PROCTORS

1. If more than 25 candidates are scheduled for the Examination, the Examiner should arrange for a Proctor to assist in administration. For 26 - 60 candidates there should be one Proctor in addition to the Examiner; for 61 - 95 candidates two Proctors; for 96 - 130 candidates, three Proctors; etc.

2. The Examiner or Proctor should walk around the room frequently during the examination to guard against irregularities.

3. If a candidate has a defective booklet, the Examiner should replace it and direct the candidate to continue work. Use of the extra booklet should be noted on the Examiner's Report.

ADMISSION OF CANDIDATES

1. Each candidate who is properly registered for the examination should present an Admission Card or written authorization from The Psychological Corporation. The Admission Cards should be inspected to make sure they are for the correct date and correct center. Admission Cards should be collected by the Examiner and returned with the test materials.

2. If a candidate has no Admission Card or written authorization from The Psychological Corporation, he may still be admitted to the examination if he presents sufficient personal identification.

3. Candidates arriving late may be admitted to the examination but should not be permitted to write beyond the time scheduled for completion of the examination. All such irregular admissions should be noted on the Examiner's Report.

4. Visitors are not to be admitted to the room under any circumstances while the test is in progress.

DIRECTIONS FOR ADMINISTRATION

(The Examiner should read verbatim all directions appearing in the boxes.)

When all candidates have assembled in the testing room, seating has been arranged, and introductory remarks made, say to the candidates:

> Use only a pencil throughout this examination. Do NOT use a fountain pen or a ball point pen. Put away any pen so that you will not make the mistake of using it. If you did not bring a pencil to the examination, or if your pencil breaks during the examination, raise your hand and you will be given another one.

Distribute the answer sheets to the candidates. Then say:

> Turn your answer sheet to the front side (page 1) so that the words "LAST NAME THEN FIRST NAME" appear in the upper left corner. (Pause) Note that there is a row of empty boxes running across the top of the answer sheet. Now look at the instructions just above the words, "LAST NAME THEN FIRST NAME" as they are being read aloud, but make NO entries on your answer sheet until you are told to do so.
>
> "In the boxes provided below, print your last name, skip a box, then print your first name, skip a box, then print your middle initial. Then blacken the letter box below that matches each letter in your name."
>
> Now, beginning with the first empty box to the right of the arrow, print your last name, one letter in each box, skip a box, then print your first name, skip a box, then print your middle initial. Use only the name boxes to print your name; do not extend your name into the address boxes. (Pause) Now, look under the first letter of your last name; you will find an alphabetical column listing A down through Z. In that column find the letter corresponding to the letter you have printed in the box. Make a single, HEAVY line within the brackets around that letter so that you cover the letter entirely. Do not go into other spaces or into the next column; do not make X's, dots, crosses, or circles. Make only a single, HEAVY line covering the corresponding letter and nothing more. Now find the second letter that you have printed in the boxes. Again, find the corresponding letter in the alphabetical column below it. Mark the letter with a single, HEAVY line. Do this for all the letters in your name.
>
> (Pause)
>
> Now look at the directions in the very top center of the answer sheet for filling in your present address. This is the exact address to which the report of your examination results will be sent so be sure that it is filled in carefully and that it will be accurate for the next four weeks. Again, make no entries until you are told to do so but read the instructions silently as they are read aloud.
>
> "In the boxes provided below print your mailing address, skipping a box between number and street. Then blacken the letter or number box below that matches each letter or number of your mailing address."

Now, in the row of empty boxes under "NUMBER AND STREET" and beginning with the first empty box directly after the heavy line, print your mailing address. Be certain to skip a box between number and street name. Use only these boxes for the street address. (Pause) Now, find the letter or number in the column directly below the letter or number that you have printed and mark it with a single, HEAVY dark line. Do this for number and street, city, state, and zip code. Be certain that you begin each one in the first box and column provided for that section. Abbreviate wherever necessary. Use the appropriate abbreviation for your state that appears directly below the city grid.

NOTE: The Examiner should allow sufficient time for the candidates to print their names and addresses and to blacken the corresponding letter boxes below. The Examiner and Proctors should check to be sure that every candidate has filled in his name grid and mailing address grid correctly.

After all candidates have filled in their name and address grids, say

Now in the lower middle of your answer sheet, next to the words "Social Security Number", write your Social Security Number. Be sure this number is correct (Pause). (If the candidate does not know his number, the space should be left blank.)

Directly below your Social Security Number, write today's date which is_____. Directly below the date next to the words "TESTING CENTER" print the name of the city and state in which you are taking this test (Examiner should indicate the city and state). On the last line write your signature.

After answer sheets are filled out completely, distribute the "PART I" booklets to the candidates. Then say:

In the upper left corner of your test booklet, write your signature. Now read the Directions on the front cover of your booklet as I read them aloud.

"Each question in this examination will be followed by four choices for an answer. Only one of these four choices is the correct answer. There is a number in front of every choice. For each question, notice the number in front of it. On the separate answer sheet find the row corresponding to the question you are answering. In that row, blacken the space in the box below the number that is the same as the one in front of the answer you choose.

Look at the example below: (Pause)

Since the right answer is number 3, you would blacken the space in the box under the number 3 on the separate answer sheet as shown in the sample above.

This examination will be scored by machine, so be sure that your answers are on the separate answer sheet and not in the test booklet. Make your marks with a single, HEAVY, dark line. Be sure to fill in the box completely. If you make a mistake, erase completely the

answer you wish to change. Use only a pencil in marking your answer sheet. Any scratch work should be done directly in the test booklet.

You will have as much of two hours as you need to finish this part, so you should have time to work on every question. Try to answer all of the questions. If you are not sure of an answer, guess. Make certain that all requested information is included on your answer sheet."

Are there any questions?

After answering questions, say:

> Turn your answer sheet over to the other side. Now, open your booklet and begin work starting with question 1 to be marked on your answer sheet starting with number 1.

Time 2 hours. The Examiner and Proctors should check to be sure all candidates are marking their answer sheet correctly. The Examiner should notify candidates when there is approximately 30 minutes of testing time remaining.

If a candidate finishes before time is up, collect his Part I test booklet and let him take a break until time to start Part II.

When the 2 hours are up (or before if everyone has finished Part I), say:

> Close your test booklet. Make sure your signature appears in the upper left corner of your booklet.

The Examiner should then collect all Part I booklets. Be sure every booklet is accounted for. Do NOT collect the answer sheets.

Then say:

> You may now have a short break.

After the break (approximately 10 minutes) distribute the Part II booklets to the candidates. Then say:

> In the upper left corner of your booklet write your signature. (Pause.)
>
> Now open your test booklet and begin work starting with question 126 to be marked on your answer sheet starting with number 126. You will have up to 2 hours to work on Part II.

Time 2 hours. The Examiner and Proctors should check to be sure all candidates are marking their answer sheets correctly. The Examiner should notify candidates when there is approximately 30 minutes of testing time remaining.

If a candidate finishes before time is up, collect his Part II test booklet and answer sheet, and permit him to leave the testing room.

When the 2 hours are up, say:

> Close your test booklet. Make sure your signature appears in the upper left corner of your booklet and that you have filled in all requested information on your answer sheets.

The Examiner should then collect all Part II booklets and answer sheets. Be sure every booklet and answer sheet are accounted for. Then say:

> The examination is over. You may now leave.

NO ONE is permitted to examine the test booklets or answer sheets after they have been returned to the Examiner. This rule must be strictly enforced.

RETURN OF TEST MATERIALS

1. Immediately after the examination, all used answer sheets with Examiner's Report attached should be returned in the Business Reply Envelopes provided.

2. All other test materials (used and unused booklets, unused answer sheets, Admission Cards, and Manual of Directions) should be mailed via "Special Fourth Class Rate - Objective Test Materials", using the label provided, to:

Professional Examinations Division
The Psychological Corporation
304 East 45th Street
New York, N.Y. 10017

Be sure to fill in the return address on the label.

EXAMINER'S REPORT

LEVEL II AND LEVEL III Examination

Fill in this Report, sign in the space provided, and attach it to the used answer sheets.

TESTING CENTER _____ DATE _____
City State

EXAMINER'S NAME AND TITLE _____

ADDRESS _____

_____

_____

ACCOUNT OF TEST MATERIALS

TEST BOOKLET NUMBERS: PART 1: _____ to _____

PART 2: _____ to _____

NUMBER OF ANSWER SHEETS ATTACHED _____

ADDITIONAL COMMENTS OR IRREGULARITIES:

_____
Examiner's Signature

The Psychological Corporation
304 East 45th Street
New York, New York 10017

THE PSYCHOLOGICAL CORPORATION
INCORPORATED IN 1921
304 EAST 45TH STREET
NEW YORK, N.Y. 10017
(212) 679 7070

TO: PARTICIPANTS IN THE PROFICIENCY EXAMINATION FOR RESPIRATORY THERAPY PERSONNEL PRETEST GROUP

Enclosed please find a check in the amount of $25 in payment for your participation in the Pretest Group which was administered the Proficiency Examination for Respiratory Therapy Personnel on May 4, 1974.

Your cooperation in this testing process is greatly appreciated.

PROFESSIONAL EXAMINATIONS DIVISION

PROFESSIONAL EXAMINATIONS DIVISION

THE PSYCHOLOGICAL CORPORATION • 304 EAST 45th STREET • NEW YORK, N. Y. 10017

YOUR OVERALL RESULTS ON THE MAY 1974 LEVEL II PROFICIENCY TEST FOR RESPIRATORY THERAPY PERSONNEL COMPARED TO OTHERS PARTICIPATING IN THE TESTING ARE BELOW AVERAGE. SPECIFIC AREAS COMPARE AS FOLLOWS -

I P P B	- ABOVE AVERAGE
HUMIDITY/AEROSOL	- ABOVE AVERAGE
GAS THERAPY	- BELOW AVERAGE
PULMONARY DRAIN	- ABOVE AVERAGE
CARDIOPULM RESUS	- BELOW AVERAGE
CARDIORESP DRUG	- BELOW AVERAGE
INFECTION CONTRL	- BELOW AVERAGE

PROFESSIONAL EXAMINATIONS DIVISION

THE PSYCHOLOGICAL CORPORATION • 304 EAST 45th STREET • NEW YORK, N. Y. 10017

YOUR OVERALL RESULTS ON THE MAY 1974 LEVEL III PROFICIENCY TEST FOR RESPIRATORY THERAPY PERSONNEL COMPARED TO OTHERS PARTICIPATING IN THE TESTING ARE ABOVE AVERAGE. SPECIFIC AREAS COMPARE AS FOLLOWS -

CONT VENTILATION	- ABOVE AVERAGE
AIRWAY CARE	- BELOW AVERAGE
EMERGENCY CARE	- BELOW AVERAGE
INFECTION CONTRL	- ABOVE AVERAGE
CARDIORESP PHARM	- ABOVE AVERAGE
PULMONARY FUNCTN	- ABOVE AVERAGE
CARDIORESP REHAB	- ABOVE AVERAGE