Professional Examination Service
475 Riverside Drive
New York, NY 10115-0089
212.367.4200
Fax 212.367.4266
www.proexam.org

P·E·S

We see the wisdom
of credentialing

PRESIDENT & CEO
I. Leon Smith, PhD

Memorandum

To: Cathy Carter, Executive Director, ABC
Steve Fletcher, Director of Clinical Resources, ABC

From: Cynthia Kim, Program Director, PES

Date: February 24, 2011

Subject: Passing Point Results for the Orthotic (6588301) and Prosthetic (6581301) Practitioner Written Simulation Certification Examinations

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On November 6, 2010, the American Board for Certification in Orthotics, Prosthetics and Pedorthics, Inc (ABC) commissioned a passing point study for the Orthotic (6588301) and Prosthetic (6581301) Practitioner Written Simulation Certification Examinations. These examinations were administered for the first time during the February 2011 test window at Prometric test centers.

Selection of the Certification Standard Setting Method

Standard setting activities in most credentialing examination programs are governed by two general types of approaches: norm-referenced procedures, which yield a **relative** test standard; and criterion-referenced procedures, which yield an **absolute** test standard.

The norm-referenced approach sets the passing point on the test-score distribution to achieve a predetermined percentage of passing candidates (passing rate). The "relative" nature of the standards derives from the fact that the passing point on different forms of a given examination shifts in relationship to the proficiency level of the candidate cohort sitting for the test, while the percentage of successful candidates remains constant.

In contrast, criterion-referenced procedures determine the passing point based on a predetermined (i.e., "absolute") level of mastery required to achieve a passing score. Thus, the level of proficiency associated with the passing point remains constant across different forms, while the passing rate varies in relation to the ability level of the candidate cohort.

A serious shortcoming associated with the norm-referenced technique is that, due to shifts in candidate ability from one form of an examination to the next, there is a significant probability of granting a credential to an individual whose proficiency level is below the minimum standard. Since the passing rate for examinations scored under this approach remains constant over time, a decline in the proficiency level of candidates would fail to produce a concomitant decrease in the percentage of examinees being granted the credential.

Criterion-referenced passing point methods, by contrast, are not subject to the shortcoming described above. For this reason, as well as in consideration of the public-protection aspect of credentialing examinations, criterion-referenced methods are favored in certification and licensure testing.

Selection of Judges to Serve as Certification Standard Setting Judges

Of the available criterion-referenced standard setting techniques, the Direct Consensus Method was applied for the Orthotic and Prosthetic Practitioner Written Simulation Certification Examinations. The subject matter experts (SMEs) that participated were:

Prosthetic SMEs	Orthotic SMEs
Todd Allen	Kevin Field
Bill Beiswenger	Steve Fletcher
Chris Fairman	Carol Hentges
Tim Miller	Ava Herbrick
Don Virostek	Steve Whiteside

Implementation of the Certification Standard Setting Method

The steps of the procedure used at the standard setting meeting were as follows:

1. The SMEs were presented with an overview of considerations taken into account when determining passing points and then the direct consensus procedure was outlined.

2. The SMEs discussed the eligibility requirements for the Orthotic/ Prosthetic Practitioner Written Simulation Certification Examination and developed a profile of a typical entry-level, barely qualified orthotic/prosthetic practitioner.

3. The SMEs developed a list of job-related behaviors that distinguish an orthotic/prosthetic practitioner who is minimally competent (i.e., barely qualified) from an individual who is below certification level. The SMEs were encouraged to rely on this list when making estimates for each section of the test.

4. For the Orthotic/Prosthetic Practitioner Written Simulation Certification Examinations, the SMEs reviewed as a group one (1) of the six simulation problems on the test and then, independently rated all the remaining sections on the test. The SMEs considered each section as a "mini-test" focusing on the importance, criticality, and difficulty of each section. The SMEs estimated the percentage of points the just barely qualified candidate **would** obtain on each section of the simulation problem. Each SME entered his/her ratings on the scannable rating sheet provided. The SMEs used a scale of 10% to 100% for each section on the test. For i.e., a rating of 6 indicated that 60% - 69% of points allocated for that section would be obtained by the just barely qualified candidate.

Data Analysis Results

In order to compute the passing score for the direct consensus rating session, the following procedure was used. First, each SMEs section rating was multiplied by the total points that could be earned for that section. The points were summed across sections, and then a grand total was computed by summing across judges. The grand total was divided by the number of judges in the

group. Since a passing point must be equaled or exceeded to receive a passing score, it is customary to round a passing point up to the next integer value.

The results of the Direct Consensus Method are presented in the table below:

	Orthotic (6588301)	Prosthetic (6581301)
Number of Sections	31	38
Number of Raters	5	5
Inter-rater Consistency of Ratings	0.88	0.89
Direct Consensus Raw Score Passpoint	**226.60 = 227**	**279.00= 279**
One Standard Error* above the Passpoint (Rater Based)	227.77= 228	281.74 = 282
One Standard Error* below the Passpoint (Rater Based)	225.43= 226	276.26 = 277

*The standard error used here is the rater-based 1.17 for 6588301 and 2.74 for 6581301. The inter-rater consistency (consistency across raters) was also high and within an acceptable range.

Historical Information

Below are the historical trends for your review.

Orthotic Practitioner Written Simulation Examination

Test Form	P&P/CBT	Administration	# Tested	# Passed	Passing Rate	Mean	Passing point(raw)
6587801	P&P	nov05-may06	126	85	67.46%	334.58	292/600
6587811	P&P	nov06	97	69	71.13%	340.12	292/600
6587901	CBT	may/aug/nov07	158	112	70.89%	315.10	265/600
6588001	CBT	may/aug/nov08	153	110	71.90%	333.87	271/600
6588101	CBT	may/aug/nov09	193	140	72.54%	348.09	289/600
6588201	CBT	may/aug/nov10	231	166	71.86%	321.16	260/600

Prosthetic Practitioner Written Simulation Examination

Test Form	P&P/CBT	Administration	# Tested	# Passed	Passing Rate	Mean	Passing point (raw)
6589801	P&P	nov05-may06	150	104	69.33%	400.96	372/600
6589811	P&P	nov06	91	83	91.21%	418.30	356/600
6589901	CBT	may/aug/nov07	151	114	75.50%	416.58	379/600
6581001	CBT	may/aug/nov08	183	133	72.68%	410.62	382/600
6581101	CBT	may/aug/nov09	184	142	77.17%	404.63	356/600
6581201	CBT	may/aug/nov10	170	138	81.18%	420.81	369/600

The Passpoint Decision

Determining a pass point for an examination is not just a result of an analysis of data. Historical trends, some fallibility of the judges and policy considerations must be factored in as well.

Below are the pass rates based on the February 2011 test window based on the results of the Direct Consensus Method:

Pass Points Applied to the February 2011 Test Window for the Orthotic Practitioner Written Simulation Exam (6588301) N= 34		
	Pass Points	% Pass (# Pass)
Direct Consensus Raw Score Passing Point	227	91% (31)

Pass Points Applied to the February 2011 Test Window for the Prosthetic Practitioner Written Simulation Exam (6581301) N= 22		
	Pass Points	% Pass (# Pass)
Direct Consensus Raw Score Passing Point	279	100% (22)

Also below are the pass rates based on the application of the Direct Consensus passing points and *hypothetically* applied to all candidates that tested on the 2010 Orthotic and Prosthetic Practitioner Written Simulation Certification Examination forms:

Direct Consensus Pass Points Applied to All candidates that tested in 2010 for the Orthotic Practitioner Written Simulation Exam (6588201) N= 231		
	Pass Points	% Pass (# Pass)
Direct Consensus Raw Score Passing point	227	81% (186)

Direct Consensus Pass Points Applied to All candidates that tested in 2010 for the Prosthetic Practitioner Written Simulation Exam (6581201) N= 170		
	Pass Points	% Pass (# Pass)
Direct Consensus Raw Score Passing point	279	97% (165)

This information is provided to assist ABC in setting the passing points for the Orthotic and Prosthetic Practitioner Written Simulation Certification Examinations. It is estimated that using these Direct Consensus passing points would yield a higher passing rate than the passing rate on the 2010 Orthotic and Prosthetic Practitioner Written Simulation Certification Examinations. PES cannot conclude here what final form difficulties will be until the end of the year in 2011.

Please feel free to contact me at (212) 367-4257 or ckim@proexam.org to discuss these results including the pass point recommendations for these examinations.

Based on PES' recommendation, ABC adopted the 2010 exam form (6588201) raw pass point of **260** for the Orthotic Practitioner Written Simulation Certification Examination because four (4) common set of problems were used on both the 2010 form (6588201) and the 2011 form (6588301). In addition, the two unique problems that appear on the forms are similar in difficulty.

For the Prosthetic Practitioner Written Simulation Certification Examination, ABC adopted the 2009 exam form (6581101) raw pass point of **356** because four (4) common set of problems were used on both the 2009 form (6581101) and the 2011 form (6581301). In addition, the two unique problems that appear on the forms are similar in difficulty.

All subsequent exam forms developed will use the same pre-set passing point of **260** for the Orthotic Practitioner Written Simulation Certification Examination and **356** for the Prosthetic Practitioner Written Simulation Certification Examination by maintaining similar difficulty levels for each new test form.

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PRESIDENT & CEO
I. Leon Smith, PhD

Memorandum

To: Cathy Carter, Executive Director, ABC
Steve Fletcher, Director of Clinical Resources, ABC

From: Cynthia Kim, Program Director, PES

Date: November 17, 2011

Subject: Passing Point Results for the Orthotic (6580811) and Prosthetic (6585811) Practitioner Written Certification Examinations

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On November 5, 2011, the American Board for Certification in Orthotics, Prosthetics and Pedorthics, Inc. (ABC) commissioned a passing point study for the Orthotic (6580811) and Prosthetic (6585811) Practitioner Written Certification Examinations. These examinations will be administered for the first time in February 2012 at Prometric test centers.

Guiding Principles

The design and execution of the certification Pass Point Study were consistent with procedures adopted in the *Standards for Educational and Psychological Testing* (AERA, APA, NCME; 1999) and with standards published by the National Commission for Certifying Agencies (NCCA) and by ANSI/ISO/IEC 17024 - General requirements for bodies operating certification schemes for persons. Relevant practices recommended in these documents were applied to study activities relating to the selection and training of Judges, selection and implementation of the standard setting methods, provision of feedback to Judges, and documentation of the findings.

Selection of the Certification Standard Setting Method

Standard setting activities in most credentialing examination programs are governed by two general types of approaches: norm-referenced procedures, which yield a **relative** test standard; and criterion-referenced procedures, which yield an **absolute** test standard.

The norm-referenced approach sets the passing point on the test-score distribution to achieve a predetermined percentage of passing candidates (passing rate). The “relative” nature of the standards derives from the fact that the passing point on different forms of a given examination shifts in relationship to the proficiency level of the candidate cohort sitting for the test, while the percentage of successful candidates remains constant.

In contrast, criterion-referenced procedures determine the passing point based on a predetermined (i.e., “absolute”) level of mastery required to achieve a passing score. Thus, the level of proficiency associated with the passing point remains constant across different forms, while the passing rate varies in relation to the ability level of the candidate cohort.

A serious shortcoming associated with the norm-referenced technique is that, due to shifts in candidate ability from one form of an examination to the next, there is a significant probability of granting a credential to an individual whose proficiency level is below the minimum standard. Since the passing rate for examinations scored under this approach remains constant over time, a decline in the proficiency level of candidates would fail to produce a concomitant decrease in the percentage of examinees being granted the credential.

Criterion-referenced passing point methods, by contrast, are not subject to the shortcoming described above. For this reason, as well as in consideration of the public-protection aspect of credentialing examinations, criterion-referenced methods are favored in certification and licensure testing.

Selection of Judges to Serve as Certification Standard Setting Judges

It is critical that Judges be expert in the construct of the test and familiar with the population of examinees. Jaeger and other experts suggest that Judges in certification standard setting studies should be content experts who either supervise or train entry-level professionals, or, who have obtained the certification themselves in the past five years. ABC followed these suggestions in the identification of qualified individuals to serve as Judges in this study.

Judge totals provide confidence concerning panel size. It has been demonstrated that acceptable results have been obtained with as few as five Judges. ABC had six members participate for the Orthotic and Prosthetic Practitioner Written Certification Examination.

The judges that participated were:

Prosthetic	Orthotic
Todd Allen	Curt Bertram
Bill Beiswenger	Kevin Field
Chris Fairman	Steve Fletcher
John Kenney	Carol Hentges
Tim Miller	Ava Herbrick
Don Virostek	Steve Whiteside

Implementation of the Certification Standard Setting Methods

The steps of the procedure used at the standard setting meeting were as follows:

1. The Judges were presented with an overview of considerations taken into account when determining passing points.

2. The Judges discussed the eligibility requirements for the Orthotic/ Prosthetic Practitioner Written Certification Examinations and developed a profile of a typical entry-level, barely qualified prosthetic /orthotic practitioner.

3. The Judges developed a list of job-related behaviors that distinguish a prosthetic/orthotic practitioner who is minimally competent (i.e., barely qualified) from an individual who is below certification level. The Judges were encouraged to rely on this list when making estimates of item performance of barely qualified practitioners.

4. The Judges received training on the Modified-Angoff procedure. For the Prosthetic/Orthotic Practitioner Written Certification Examinations, the Judges independently rated and then reviewed as a group (5) sample items to make certain that each content expert held a similar view of the

standard of barely qualified individuals i.e., those with the minimum amount of knowledge and skill necessary to receive certification. Each practice item was chosen to represent different domains and varying levels of difficulty. Then, the Judges independently reviewed each item on the examination, and estimated the percentage of just barely qualified candidates who **would** answer the item correctly. Each content expert independently entered his/her ratings on the scannable rating sheet provided. The Judges used a 10-point scale for its estimates. For example, a rating of 1 indicated that 10% to 19% of the barely qualified group would answer the item correctly, up to a rating of 10 which indicated that 100% of the barely qualified group would answer the item correctly.

5. The Judges then received training in the Direct Consensus Method. The Direct Consensus Standard Setting is an Angoff-type methodology designed to address two frequent criticisms of the Angoff method. It is less time consuming than the traditional Angoff, and it gives Judges more direct control in recommending where the passing point is set. The test form was organized by domain. Judges reviewed each item and answered the question **"Would an entry-level candidate who is just barely qualified for certification will answer this item correctly?"** A yes or no response is provided for each item, and Judges are asked to carefully tally the number of "Yes" responses for each domain; this translates into a passing point recommendation. The Judges Domain sums were entered into a chart, which totals the sums by domain and by rater. Then, this chart was shared with the Judges and a discussion concerning outliers and the perceived appropriateness of the part and total recommendations were reviewed. Individuals with outlying scores were asked to explain rationales for ratings. Judges were given a second opportunity to revise ratings.

Data Analysis Results

In order to compute the passing score for the modified Angoff rating session, the following procedure was used. First, each SMEs item ratings were summed across items, and then a grand total was computed by summing across judges. The grand total was divided by the number of judges in the group. To calculate passing points, the average percentages were multiplied by the number of items in the test. Since a passing point must be equaled or exceeded to receive a passing score, it is customary to round a passing point up to the next integer value. Only scored items were analyzed to produce the modified Angoff results.

Modified-Angoff. The results of the modified Angoff are presented in the table below:

Modified-Angoff	Orthotic (6580811)	Prosthetic (6585811)
Number of Items	150	150
Number of Raters	6	6
Inter-rater Consistency of Ratings	0.88	0.94
Intra-rater Consistency of Ratings	0.99	0.98
Modified Angoff Raw Score Passing point (%)	**71.12% = 107 raw**	**68.83% = 104 raw**
One Standard Error* above the Passpoint (Rater Based)	73.46% = 111 raw	69.92% = 105 raw
One Standard Error* below the Passpoint (Rater Based)	68.78% = 104 raw	67.74% = 102 raw

*The standard error used here is the rater-based 2.34 for 6580811 and 1.09 for 6585811. When computing passpoints, one always rounds up.

The inter-rater consistency (consistency across raters) and the intra-rater consistency (the degree to which judges used the entire range of the Angoff scale) were acceptable results.

Direct Consensus. The results of the Direct Consensus were compiled onsite at the meeting and are presented in the table below:

Orthotic Direct Consensus Results

Content Areas	Rater ID, With # of Items that the Just Barely Qualified Candidate Would Answer Correctly							Domain Mean	# to Pass as a % of Items in Each Domain Area
	Steve	Kevin	Carol	Ava					
01. Patient Assessment	28	24	24	26				25.5	64%
02. Formulation of the Treatment Plan	21	15	21	24				20.25	72%
03. Implementation of the Treatment Plan	29	26	20	32				26.75	62%
04. Follow-up Treatment Plan	19	17	16	18				17.5	73%
05. Practice Management	13	8	10	15				11.5	77%
Raters Mean	110	90	91	115	0	0	0	101.5	68%

Orthotic Direct Consensus Passing Point = 102 Raw or 68%

Prosthetic Direct Consensus Results

Content Areas	Rater ID, With # of Items that the Just Barely Qualified Candidate Would Answer Correctly							Domain Mean	# to Pass as a % of Items in Each Domain Area
	Todd	Bill	Chris	Tim	Don				
01. Patient Assessment	23	21	24	18	18			20.8	69%
02. Formulation of the Treatment Plan	18	15	18	14	16			16.2	70%
03. Implementation of the Treatment Plan	43	34	45	36	32			38	70%
04. Follow-up Treatment Plan	19	9	24	15	11			15.6	56%
05. Practice Management	14	11	13	12	10			12	80%
Raters Mean	117	90	124	95	87	0	0	102.6	68%

Prosthetic Direct Consensus Passing Point = 103 Raw or 68%

Summary and Recommended Passing Points

Data	Orthotic	Prosthetic
Modified Angoff	107	104
Direct Consensus	102	103
Average pass point- last 5 years	105	102

This information is provided to assist ABC in setting the passing points for the Orthotic and Prosthetic Practitioner Written Certification Examinations. While the procedures we have used here are designed to set a standard, not a pre-set passing rate, it is prudent to consider the impact of the standard on both the passing rate and stakeholder expectations.

Based on the analysis of all the information presented above, it is PES's recommendation that you adopt the modified Angoff passing point of **107 for the Orthotic Practitioner Written Exam**. It is estimated that applying the recommended passing point of 107 would yield a passing rate higher than the passing rate on the current exam but within historical pass rate trends.

It is PES's recommendation that you adopt the modified-Angoff passing point of **104 for the Prosthetic Practitioner Written Exam.** It is estimated that applying the recommended passing point of 104 would yield a passing rate higher than the passing rate on the current exam but within historical pass rate trends.

If the recommended passing points are adopted, please be advised that cumulative pass/fail rates will not be known until the end of the year in 2012.

Please let me know **no later than Friday, November 18th** if you wish to adopt these recommended passing points so I can provide the information to Prometric. Please feel free to contact me at (212) 367-4257 or ckim@proexam.org should you require additional information.

American Board for Certification in Orthotics, Prosthetics, & Pedorthics, Inc.

Results of 2009 Standard Setting for Orthotics and Prosthetics Clinical Patient Management Exams

In November 2009, the American Board for Certification in Orthotics, Prosthetics, & Pedorthics, Inc. (ABC) convened a meeting of the examination committees for the Orthotics and Prosthetics certification examinations for the purpose of setting new passing standards for the Clinical Patient Management (CPM) examinations for Orthotics and Prosthetics Practitioners.

A two-day face-to-face meeting was held in Chicago, IL on November 8-9, 2009. Professional Examination Service (PES) personnel facilitated the meeting. A modified Angoff procedure was employed. All committee members worked together to define a "minimally competent practitioner" in orthotics and prosthetics at the point of certification. The committee then broke into sub-groups—six from the Orthotics discipline, and five from the Prosthetics discipline. Each person independently estimated the percentage of the practitioners defined above who would correctly answer each question in all the examination modules of the orthotics and prosthetics CPMs. Using a version of the modified Angoff that took into consideration the value of partial credit questions and questions that had different point values, PES calculated a first round of standards—the absolute cut point for making a pass/fail decision for each CPM examination. The modules were not considered in isolation; the expected pass point was summative for all modules in each discipline (eight for Orthotics, seven for Prosthetics, in each administration). Committee members were debriefed, and a second round of standard setting ratings were completed. PES calculated the standards after the meeting, and convened a teleconference with ABC's Executive Director and Director of Clinical Resources to discuss results.

That discussion considered the following issues in setting the new passing standards for the exams:

- The use of scale scores. ABC determined that it did not wish to implement scaled scores.

- The determination of passing standards. ABC determined that the passing standards obtain in Round 1 of the exercise would be used for both exams. In part, this was decided because of confusion arising within each sub-committee after Round 1 de-briefing concerning the implications of the re-rating exercise. In the Prosthetics exams in particular, the inclusion of two alternate forms for the Upper Extremity modules was confusing. It was determined that the pass points obtained in Round 1 were more reflective of the perspectives of the participants.

- The use of a single passing score for the Prosthetic CPM examinations. In the case of the Prosthetic CPMs, two forms of the Upper Extremity module are alternated—Transradial and Transhumeral. Small average differences between the scores on each form were noted. However, ABC subject-matter experts determined that the tasks involved in the two forms of the Upper Extremity exam measured virtually identical skills and assessed

the same core abilities. Therefore the same passing standard would be used regardless of the form administered.

The new passing standards for each CPM were set as follows:

Orthotics—218 (previous passing point 213)
Prosthetics—217 (previous passing point 218)

PES made the following recommendations:

- That ABC carefully review the test statistics obtained in the next administration of each set of CPM exams to review the reliability and pass rates as compared to previous administrations.

- That adjustments in the pass point be carefully considered based on this review.

National Commission For Certifying Agencies

The Accreditation Body of the National Organization for Competency Assurance

2025 M STREET, N.W., SUITE 800, WASHINGTON, D.C. 20036-3309
PH. (202) 367 1165 FAX (202) 367-2165

September 10, 2007

Ms. Catherine Carter
Director, Professional Credentialing Programs
American Board for Certification in Orthotics, Prosthetics, and Pedorthics
330 John Carlyle Street
Suite 210
Alexandria, VA 22314

Dear Ms. Carter:

Thank you for submitting your response to the National Commission for Certifying Agencies' (NCCA) on behalf of the American Board for Certification in Orthotics & Prosthetics (ABC) Certified Orthotist (CO), Certified Prosthetist (CP), and Certified Prosthetist-Orthotist (CPO) certification programs. Your response was reviewed by the Commission during their August meeting.

The NCCA Commission is pleased to report that their decision was to grant accreditation to the ABCOP CO, CP, and CPO programs for a period of five years through August 30, 2012.

Your organization may advertise that the ABCOP CO, CP, and CPO programs are accredited by the NCCA, and the NCCA logo may be used to attest to accreditation of these credentialing programs. A certificate denoting the programs' accreditation will be mailed to you within four weeks.

Please remember that your organization is responsible for maintaining continuous compliance with the accreditation *Standards*. The Commission must be notified when significant changes are implemented for your certification programs. ABCOP will receive an annual report form each year that must be completed and returned to the NCCA executive office.

The NCCA appreciates the continued interest of ABCOP in providing high quality certification programs. Please contact the NCCA executive office if we can be of assistance to you or your organization.

Sincerely,

Lawrence J. Fabrey, Ph.D.
NCCA Chair

cc: James Kendzel, MPH, SPHR
NCCA Executive Director