CSAO

CANADIAN STANDARD ASSESSMENT IN OPTOMETRY

Summary Report

2007 Administrations

Prepared for

Canadian Examiners in Optometry

By

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The purpose of this report is to provide Canadian Examiners in Optometry with annual statistical insight and a psychometric analysis and summary related to the Canadian Standard Assessment in Optometry (CSAO) as a source of reference for ongoing assessment maintenance and development and communication to stakeholders. Please note that this report focuses solely on data related to CSAO candidates that have initiated the CSAO process during the 2007 calendar year. The results analysis contained herein does not include results data related to those candidates that participated during 2007, but initiated the CSAO process during the prior calendar year. Nor does it project overall data or "pass rates" for those candidates that initiated the CSAO process during the current calendar year but are eligible to complete that process during the subsequent year.

OVERVIEW

During 2007, there were two CSAO administrations scheduled. In the Spring of 2007, administrations were held in both Waterloo and Montreal, where the assessments were available in English at Waterloo and the Montreal site offered both French and English examinations. In the Fall of 2007, the CSAO was administered in Waterloo only and was available in both French and English. In total, 195 '2007' (*those candidates having initiated the CSAO process during the 2007 calendar year*) candidates presented for the Spring and Fall CSAO administrations. Of the 195 candidates, 170 (87.2%) presented as initial attempts (.1), while the remaining 25 (12.8%) were first attempt reassessment candidates (.2) from this same group. The characteristics of the new (.1) candidate pool were consistent with previous years with the single largest pool of candidates coming from the two Canadian schools (n=88, 51.7%). In fact, the Canadian schools increased their participation by approximately 5% over 2006, with the Waterloo school sending 9 more candidates and the Montreal school sending 13 more new candidates. The participation rate for the new (.1) US educated pool (n=70, 41.2%) was consistent with last year while participation by new (.1) international candidates was slightly lower in 2007 (n=12, 7.1%).

***Figure 1**: Distribution of Candidates by Country*

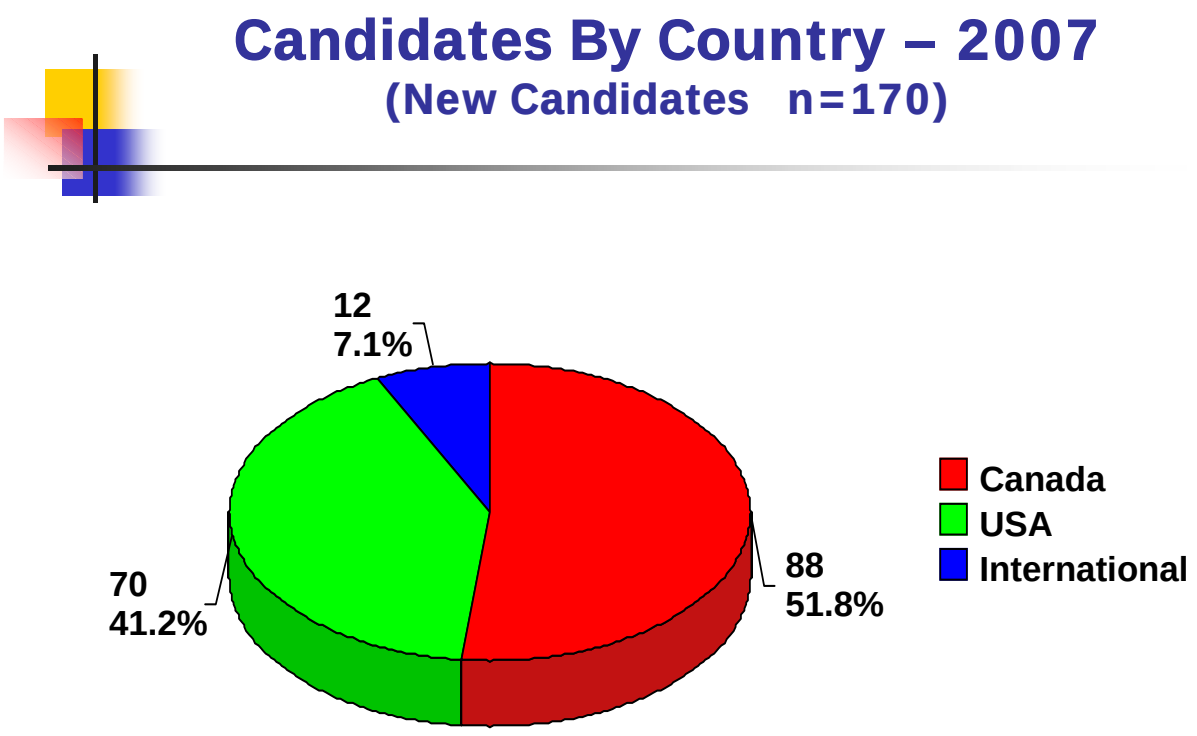


Table 1 presents the distribution of new (.1) candidates across all schools represented at the 2007 administrations.

DISTRIBUTION OF NEW (.1) CANDIDATES ACROSS SCHOOLS

School of Optometry	Number & Percentage of Candidates	
Waterloo	72	42.4
Montreal	16	9.4
Pennsylvania	11	6.5
Pacific University	4	2.4
SUNY	4	2.4
Illinois	22	12.9
Indiana University	3	1.7
New England	15	8.8
Southern College	3	1.7
Southern California	3	1.7
U. of Manchester	1	.6
Int. Am. Puerto Rico	3	1.7
Nova South Eastern U.	1	.6
Shahid Beheshti (Iran)	1	.6
Autonomous National Nicaragua	1	.6
Iran, Tehran University	1	.6
Cuba-Superior Institute	1	.6
Institute of Advanced Studies India	1	.6
Kuvempu University, India	1	.6
Nysong Medical College, India	1	.6
Polytech University Catalonia, Spain	1	.6
Shanghai Medical University	1	.6
Shanxi Medical College, China	1	.6
University of Belgrade, Serbia	1	.6
University of Missouri	1	.6
Total	**170**	**100 %**

STRUCTURE OF THE CSAO COMPONENTS

For the 2007 administrations, the CSAO represents a modified assessment component structure.

Previous to this administration, the assessment included:

- **Biological & Health Sciences** consisting of 282 items and made up of the following sections; A) Human Biology, B) Ocular & Visual Biology C) Systematic Conditions D) Ocular Disease & Trauma.

  Ocular Therapeutics was derived from subsections of the Biological and Health Sciences and consisted of 90 items made up of the following sections: General Microbiology/Immunology/Pharmacology and Pathology/, Ocular Physiology/Neurophysiology/Pharmacology/ Systemic Conditions and Ocular Disease/Trauma.
- The **Visual Sciences** component consisted of 218 items from the following sections of the test blueprint, E) Radiation, Light and Optics, F) Vision, G) Human and Visual Development and Aging and H) Public Health and Safety.

In total, these components combined represented 500 multiple-choice test items.

The modified structure for 2007, introduced an **Optometric Knowledge Component** containing 380 multiple-choice items. The purpose of this new component was to combine the previous Biological & Health Sciences and the Visual Science components into one assessment component. Optometric Knowledge questions are designed to reflect areas from the Biological & Health Sciences and Visual Science and specifically address the following topics; Human Biology, Systemic conditions, Human & Visual Development & Aging, Ocular Visual Biology, Ocular Disease/Trauma, Radiation, Light & Optics, Vision and Public Health & Safety.

This administration also introduces an independent **Ocular Therapeutics Component**, which had previously been imbedded within the Biological & Health Sciences component. The revision to a new stand-alone exam has also involved moving from 90 multiple-choice items to 120 items. The Ocular Therapeutics component is administered in 1 three hour session and includes the following; General Microbiology, General Immunology, General Pharmacology, Ocular Pharmacology, Ocular Disease/Trauma (treatment, management and prognosis).

While the structure of the assessment related to Biological & Health Science, Visual Science and Ocular Therapeutics has changed, the total number of assessment questions (500) of these combined components remains the same within the restructured Optometric Knowledge and Ocular Therapeutics.

The structure of the **Clinical Judgment Component** remains unchanged in 2007. The Clinical Judgement component continues to include 100 multiple-choice (MCQ) items, consisting of clinical cases drawing from the following areas: Oculomotor, (4 cases,) Sensory-integrative, (3 cases) Systemic disease (4 cases), Refractive Error, (6 cases) Ocular Disease – Treatment & Mgmt (6 cases) and Accommodation (2 cases).

The **Clinical Skills Component**, also consistent with previous administrations, is made up of four sessions; each requiring candidates to perform a number of clinical skills. The four sessions include:

S1. Skills and Techniques in Interviewing and Assessing Refractive and Accommodative Conditions
S2. Skills and Techniques in Assessing Oculomotor and Sensory-Integrative Functions
S3. Skills and Techniques in Assessing Oculomotor and Systemic Disease
S4. Skills and Techniques in Assessing Ophthalmic Appliances

SUMMARY OF NEW (.1) CANDIDATE PERFORMANCE FOR 2007

Figure 2 represents the cumulative pass rate for all new (.1) 2007 candidates that successfully completed all 7 components of the CSAO – within either one or two attempts/administrations available to them during 2007 (*note that, as per the 2007 CSAO Reassessment Policy, any remaining unsuccessful candidates are entitled to a third opportunity for reassessment during the Spring 2008 administration*). Based on two attempts, the pass rate for this 2007 group was 95.9% (*Note: 4 initial attempt failures did not present for reassessment and were therefore considered unsuccessful*). For candidates who sat both the CSAO and the NBEO, it may be of interest to note that this interim cumulative pass rate for the CSAO is comparable to the NBEO 2007 Ultimate Pass Rate, Parts I-III at graduation, which is reported to be 91.6% (http://optometry.berkeley.edu /opt_txtpp/admissions/admitnbeo.html).

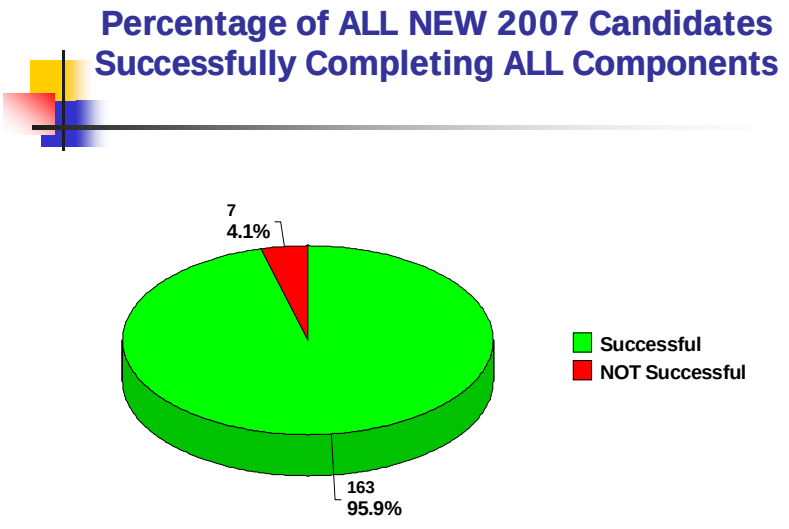


Figure 2: *Percentage of All New (.1) Candidates Successfully Completing All CSAO Components within two consecutive attempts during 2007*

PERFORMANCE BY COMPONENT

Figure 3 represents the pass rate for each of the 7 CSAO assessment components based on new (.1) candidates entering the CSAO assessment process in 2007. For the purpose of interpreting the results of figures displaying component performance, the following legend is provided:

KNOWLEDGE COMPONENTS
***OK**: Optometric Knowledge*
***OT**: Ocular Therapeutics*

CASE MANAGEMENT COMPONENT
***CJ**: Clinical Judgement*

CLINICAL SKILLS COMPONENTS
***S1**: Interviewing/Assessing Refrac tive & Accommodative Conditions*
***S2**: Assessing Oculomotor & Sensory-Integrative Functions*
***S3**: Assessing Oculomotor & Systemic Disease*
***S4**: Assessing Ophthalmic Appliances*

***Figure 3**: Pass Rate for new (.1) candidates only for each of the 7 CSAO components*

As Figure 3 suggests, performance across all components for all new (.1) candidates was strong. Consistent with previous administrations Clinical Judgment proved slightly more challenging. Performance across the Practical Skills section was uniformly strong.

Figure 4 compares the performance of new (.1) candidates across the 3 groups (Canadian, American and International schools). As the data suggests, performance for all 3 groups is fairly strong. An improvement in the showing for the International candidates is also apparent in this figure with this group demonstrating a slightly increased performance in all components as compared to recent years.

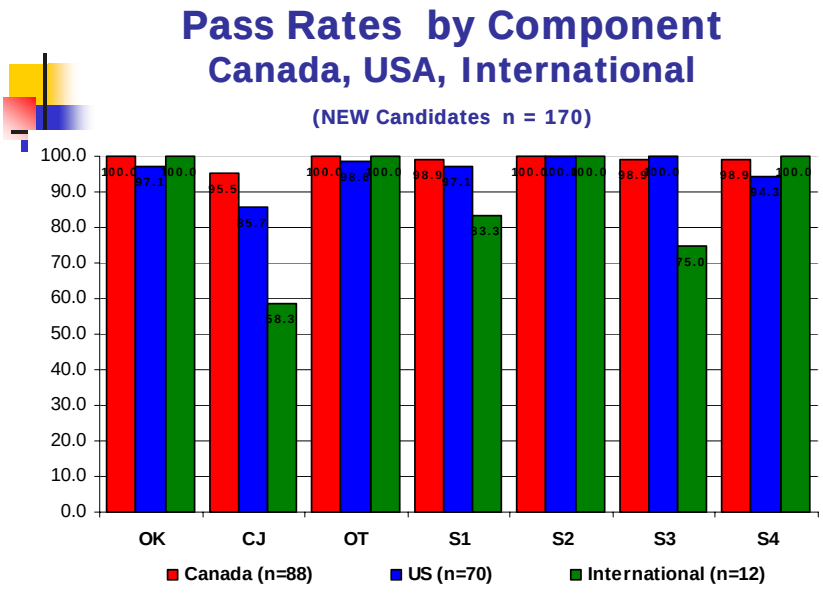


***Figure 4**: Pass Rates by component by group*

Figure 5 represents a comparison of the overall mean for each institution by component with the overall population mean for each component of the CSAO. The analysis attempts to identify which institutions scored above or below the overall population mean for the component. As the scores indicate, the results for Clinical Judgment were lower for all institutions while performance in Ocular Therapeutics was a relative strength for all schools. Performance across the four clinical sessions was more uniform.

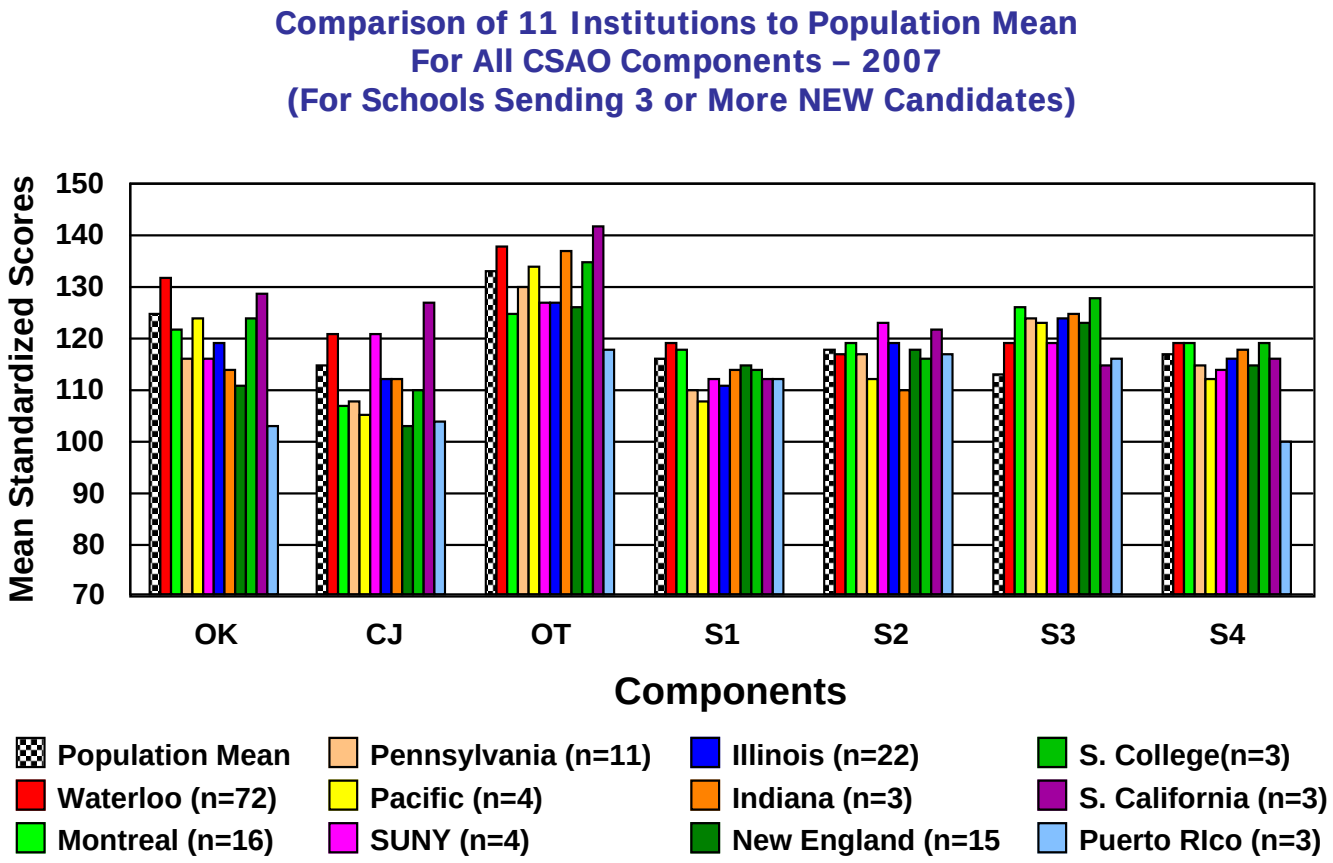


Figure 5: *Comparison of Institutions to Population Mean*

An analysis to determine which of the Institutions differed statistically significantly from the Population Mean (PM) for each of the 7 components follows below. Those Institutions not reported did not score significantly higher or lower from the population mean for a specific component.

Caution regarding sample size for some Institutions is relevant in interpreting the results.

Figure 6 reports results for the written components while Figure 7 provides the results for the clinical skills components of the CSAO.

Written Components - 2007

Comparison By Institution To Population Mean (PM)

If College not mentioned, NO significant difference from (PM)

- **Optometric Knowledge:** Significantly higher than PM: Waterloo
  Significantly lower than PM:
  New England, Pennsylvania, Illinois
- **Clinical Judgment:** Significantly higher than PM:
  Waterloo and Southern California
  Significantly lower than PM:
  Montreal and New England
- **Ocular Therapeutics:** Significantly higher than PM: Waterloo
  Significantly lower than PM: New England

Figure 6: *Results of Institutional comparison to the Population Mean for the written component*

Skills Components -2007

Comparison By Institution To Population Mean (PM)

If College not mentioned, NO significant difference from (PM)

- **Session 1:** Significantly higher than PM: Waterloo
  Significantly lower than PM:
  Pennsylvania, Pacific, Illinois
- **Session 2 :** Significantly higher than PM: SUNY
- **Session 3 :** No institution significantly higher or lower than the PM
- **Session 4 :** Significantly higher than PM: Waterloo

Figure 7*: Results of Institutional comparison to the Population Mean for the Skills component*

As the results of Figure 7 suggest, the performance across the 11 Institutions for each of the 4 Skills areas was considerably more homogenous. These results may reflect the fact the teaching of specific practical skills in the various schools may have greater commonality than material related to optometric knowledge, clinical judgment and/or ocular therapeutics.

RESULTS FOR REASSESSMENT CANDIDATES

The 2007 CSAO Reassessment Policy provided for an initial opportunity to attempt the CSAO in its entirety (all 7 components) and two subsequent reassessment opportunities to re-attempt only those failed components within two consecutive administrations (1 year).

Although the focus of this analysis report is new (.1) 2007 CSAO candidates, during 2007, many (51) reassessment candidates presented for a second (.2) and/or third (.3) attempt at only those failed components. Of these reassessments, 25 were new (.1) candidates entering the CSAO process during the Spring of 2007 and attempting their first reassessment (.2) during the Fall 2007 administration. Of the 25, 22 were successful. The remaining unsuccessful reassessment candidates are eligible for a second reassessment (.3) during the Spring 2008 administration(s).

A further breakdown by country revealed that 6 Canadian educated, 9 American trained and 7 international candidates made up the successful reassessment group. Of those new 2007 reassessment (.2) candidates that were unsuccessful, all 3 were American trained.

RELIABILITY COEFFICIENTS FOR CSAO COMPONENTS

Reliability coefficients for the examination components are reported in Table 2 and range from .71 to .90 across the written components. Reliabilities for the Skills components ranged from .52 to .78. The differences noted between the written and skills components related to reliability are consistent with examinations of this kind with written components generally producing higher coefficients than clinical skill measures.

Reliability Coefficients For CSAO Components 2007

Components	Standardized Cronbach's alpha
OK	.90
CJ	.71
OT	.81
S1	.73
S2	.70
S3	.78
S4	.52

Table 2: *Reliability Coefficients for each of the 8 CSAO components*

KR 20 a measure of internal consistency reliability (calculated on the basis of the June 2007 administration N= 151 candidates completing all 7 components of the CSAO)

ITEM ANALYSIS AND DELETION

Item analysis is undertaken after the completion of each administration of the CSAO. Subsequent to the compilation of performance results data, members and/or delegates of the CSAO Committee identify items for review. Any item(s) demonstrating anomalous results data based on the group performance data is eliminated from scoring for all candidates. Item deletion data for 2007 administrations is provided below.

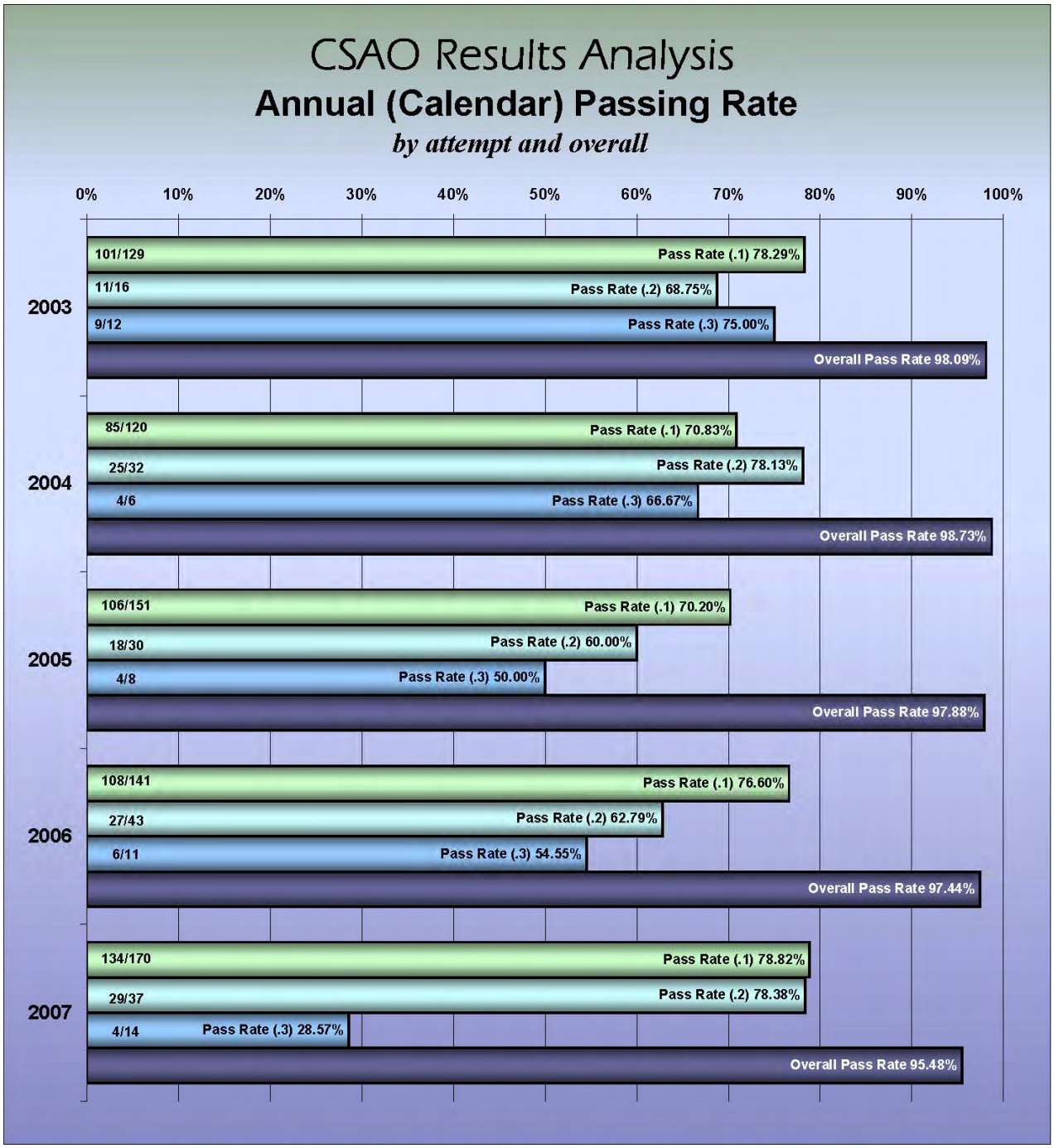
Table 3 identifies a further breakdown of item deletion decisions across all CSAO components.

EXAMINATION	# OF ITEMS DELETED FROM SCORING	
	Spring	Fall
Optometric Knowledge	**16**	**7**
Ocular Therapeutics	**5**	**4**
Clinical Judgment	**6**	**2**

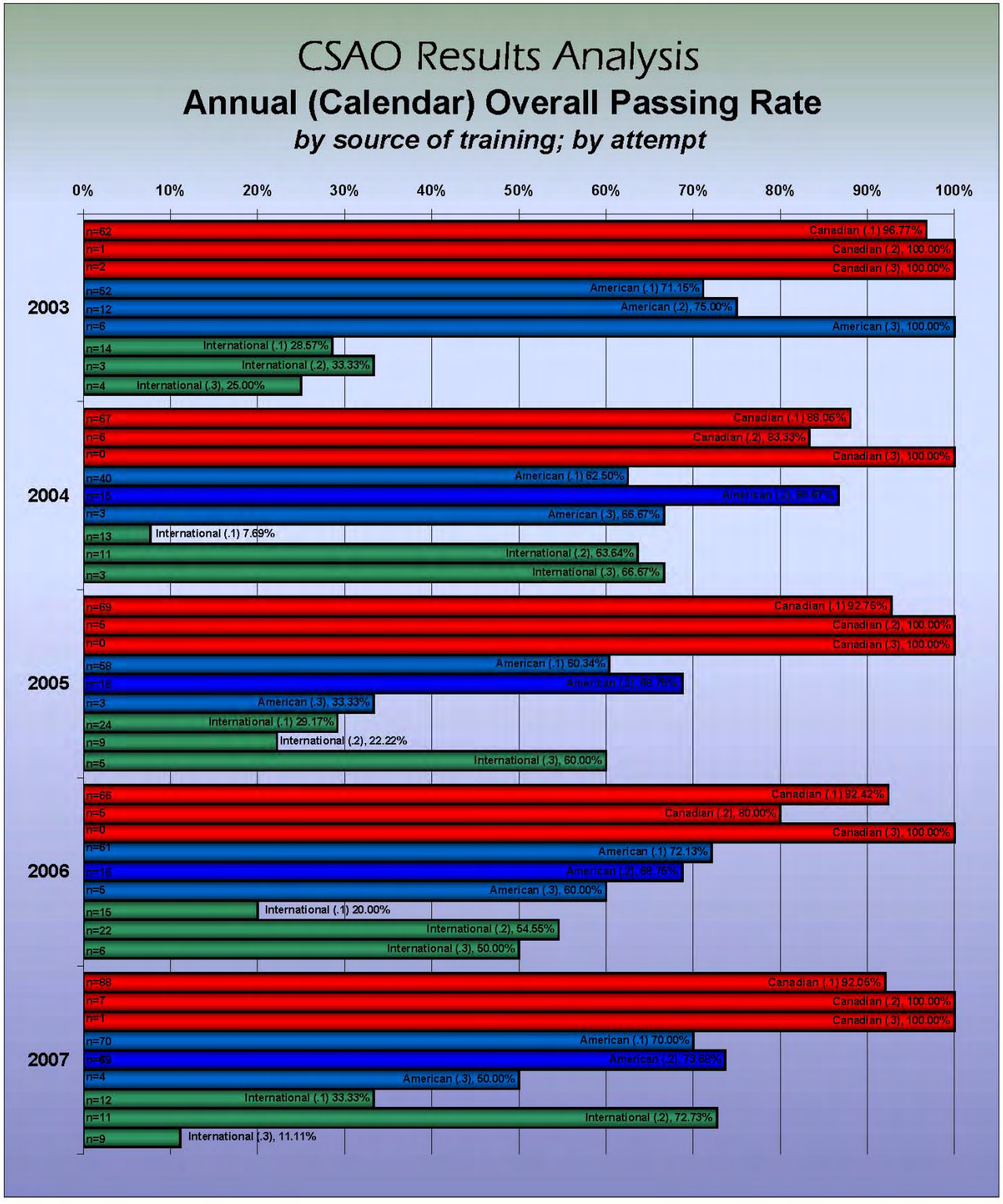
All items identified are referred to the Questions Committee for evaluation and potential redevelopment. Revised items are then subject to the established rigour and quality assurance that is the focus of the questions development process.

Consistent with previous administrations no Practical Skills items were identified for deletion across all candidates for 2007 administrations.

The following statistical charts were prepared by CEO to provide a comprehensive report of CSAO cumulative and overall performance by annual calendar year as it relates to assessment and reassessment results data:



Annual "Overall Pass Rate" is based on those candidates that were unsuccessful on their third attempt within a given year. *Note: this figure does not reflect those failing candidates that chose not to complete the entitled two reassessment opportunities. However, the reassessment rate for each consecutive attempt is relatively consistent with each prerequisite failure rate, which indicates that the "dropout" rate is negligible.*



Note: for the purpose of these reports, failure of the OT component does not constitute an "overall pass" of the CSAO but also may not have been required for license to practice within provincial jurisdictions without TPA legislation at the time of assessment, resulting in untried reassessments within a given calendar year.