Medical Council
of Canada
Evaluating
Examination
(MCCEE)

2018 MCCEE Annual Technical Report

1912

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PREFACE

This report summarizes the main characteristics of the Medical Council of Canada Evaluating Examination (MCCEE) and candidate performance on the exam in 2018. Sections 1 to 5 describe the exam's purpose, format, content development, administration, scoring and score reporting. These sections also provide validity evidence in support of score interpretation, reliability and errors of measurement, and other psychometric characteristics. Section 6 summarizes candidate performances for the five administrations in 2018 and includes historical data for reference purposes. The report is intended to serve as technical documentation and reference materials for the Evaluating Examination Committee (EEC), test committee members, Medical Council of Canada (MCC) staff, MCC stakeholders, and members of the public.

SECTION 1: PURPOSE OF THE MCCEE

The MCCEE is a four-hour, computer-based exam offered in both English and French in over 80 countries worldwide. Beginning in 2018, the MCCEE was no longer a prerequisite for International Medical Graduates (IMGs) to challenge the MCCQE Part I and the National Assessment Collaboration (NAC) Examination. This change to candidate eligibility for the MCCQE Part I and NAC Examination was in advance of the elimination of the MCCEE and in anticipation of the international launch and delivery of the MCCQE Part I in 2019. As of January 2019, the MCCEE will no longer be offered and international medical graduates and students will be able to apply to the MCCQE Part I and NAC Examination directly without first having to take the MCCEE.

The MCCEE is a screening examination that assessed the basic medical knowledge and problem solving of a candidate at a level comparable to a minimally competent medical student completing his or her medical education in Canada and about to enter supervised practice.

The EEC, formally named the Evaluating Examination Composite Committee (EECC) prior to 2018, was responsible for overseeing the MCCEE, including the development of the exam, the maintenance of its content, ruling on special cases and reconsiderations, and the approval of results.

SECTION 2: EXAM DEVELOPMENT

2.1 Exam format

The MCCEE consisted of 180 Multiple-Choice Questions (MCQs) including 150 operational items[1] (scored items) and 30 pilot items (new, non-scored items pretested for future use). The items covered child health, maternal health, adult health (including gynecology, medicine, and surgery), mental health and population health and ethics. A number of items in the exam also focused on general practice.

Each item listed five possible answers of which only one was correct. The MCCEE was administered using a computer-based, Linear-On-the-Fly-Test (LOFT) model and was delivered by Prometric, a test delivery provider. With the LOFT design, a unique exam form was assembled in real-time where items were selected from a large pool of operational items based on exam specifications for each candidate. More detailed explanations of the LOFT design are provided in Section 5.3.

2.2 Exam specifications

The exam specifications for the MCCEE defined the content and psychometric specifications for each exam form. The content specifications included the content domains to be tested, a sampling plan for the content domains (the proportion of items per content area) and total exam length (total number of items). The psychometric specifications included the desired psychometric properties of the items (number of items for each level of difficulty), target standard error of ability estimates and an overall target test information function for each exam. The exam specifications were created and adopted by the EECC between 2008 and 2009 during a one-week retreat of the EECC and the Australian Medical Council (AMC). During the workshop, the EECC and the AMC devised a realistic representation (percentage-wise) by health group and clinician task, of what physicians would encounter in their practice on a daily basis, which, in turn, became the exam specifications.

Table 1 outlines the content specifications, including the definitions of the various health groups and clinician tasks.

[1] The term “question” and “item” are used interchangeably in this report and should be treated synonymously.

Table 1: Exam content specifications for the MCCEE – Number of items per health group and clinician task

	HEALTH GROUP										
	Child Health		Maternal Health		Adult Health		Mental Health		Population Health & Ethics		
CLINICIAN TASK										TOTAL	
Data gathering	7	**16**	4	**8**	20	**46**	7	**16**	**13**	45	**99**
Data interpretation and synthesis	9		4		26		9			54	
Management		**9**		**5**		**28**		**9**	**-**		**51**
TOTAL		**25**		**13**		**74**		**25**	**13**		**150**

HEALTH GROUPS

Child health

Issues particular to individuals up to the end of adolescence

Maternal health

Issues related to pregnancy and childbirth

Adult health

Issues specific to individuals after the end of adolescence in medicine, surgery and gynecology

Mental health

Biopsychosocial/cognitive issues related to mental health in all age groups

Population health and ethics

Issues related to groups and ethical behaviour. This includes population issues such as immunization, disease outbreak management, population screening and surveillance, health promotion strategies, epidemiology and relevant statistics. Ethical issues include boundary issues, impairment of doctors and informed consent.

CLINICIAN TASKS

Data gathering

History taking, mental status examination, physical examination, laboratory testing, other modalities (e.g. imaging, EKG, EEG, etc.)

Data interpretation and synthesis

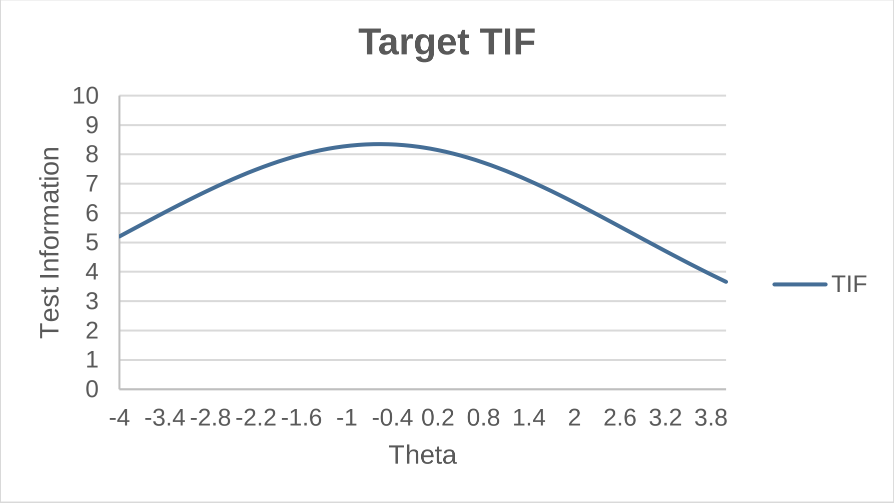
Interpretation and synthesis of gathered data. Problem identification, setting priorities, risk stratification and the formulation of differential and specific diagnoses.

Management

Education and health promotion, counselling, psychotherapy, drug and non-drug therapy (includes fluid and electrolyte therapy, etc.), surgical interventions, radiological interventions, cessation of therapy, rehabilitation, palliative care, interdisciplinary management, family and community care.

The psychometric specifications set out the desired statistical properties for the exam and the items in each exam form. They included the target Test Information Function (TIF) across the ability range as indicated in Figure 1. For the MCCEE, each candidate received a different exam form. The target TIF was used to balance multiple forms and to ensure that precision of measurement across the ability scale was highly comparable from one test form to another. The MCCEE was designed to provide maximum information (precision of measurement or reliability) and minimum error near the cut score (θ=-.490) to achieve optimal precision at the cut score and consequently, maximize pass or fail decision consistency and accuracy. Section 5.4 explains how the cut score was established.

Figure 1: Exam psychometric specifications for the MCCEE – Target Test Information Function



2.3 Item development

Starting in 2018, content development and review has been the responsibility of the Evaluating Examination Test Committee (EETC) with 12 physicians across Canada. With the MCC's decision to remove the MCCEE as an exam requirement for IMGs, the committee has not been required to develop content. The committee remains in place however, in the event that examination content issues arise requiring subject matter expertise.

Previously, MCCEE items were developed by six specialty area MCCEE test committees: medicine, obstetrics and gynecology (OBGYN), pediatrics, population health and ethics, psychiatry, and surgery. Each committee was composed of eight to ten physicians from across Canada who were Subject Matter Experts (SMEs) in their fields and experienced in medical education and assessment. SMEs were recommended by test committee members or by the MCC Selection Committee. The MCC Selection Committee then presented the test committee membership to Council at the annual general meeting for Council approval.

In the past, test committee membership included representation from both official language groups (English and French), number of years teaching and practicing, and geographic representation from across Canada. Test items were developed and reviewed in accordance with professional standards (American Educational Research Association [AERA], American Psychological Association [APA] & National Council on Measurement in Education [NCME], 2014; Linn, 2006) and rigorous Quality Assurance (QA) processes. Each test committee convened once per year in Ottawa at which time MCQs were written, classified, peer-reviewed and approved for piloting. The MCC's Test Development Officer (TDO), in conjunction with the Test Committee Chair, offered guidance to test committee members as they developed items to address known content gaps. Development was focused on creating items with a range of difficulty levels, updating items to reflect new medical terminology (e.g., DSM-5, new medical practice/treatments, etc.), adding items required to meet exam specifications and/or creating items to fill content gaps in the item bank.

All new and approved items from each test committee were reviewed and approved for piloting by the EECC (a multi-disciplinary committee composed of the chairs and vice-chairs of the six discipline test committees). The EECC conducted an overall review of items for bias and sensitivity to ensure the test items and stimuli were fair for the candidates. Once all content was approved, all items were sent for editorial review by MCC's examination content editors prior to being sent for translation. Approved pilot items were then included on a pilot form. Newly-created items were piloted before they were used as operational items on any examination form. Each pilot form contained 30 items, with five items from each discipline.

Though all pilot items were embedded in the operational exam, they did not count toward the candidate's final score. Pilot items were analyzed and calibrated when enough data had been collected. Items that did not perform as expected were returned to the test committee for review/revision and were later re-pilotedApproximately 400 to 500 items were piloted across the five MCCEE administrations each year.

2.4 Establishing operational item pools

Typically, the EEC met yearly to establish and approve a pool of 1,500 operational items drawn from the MCCEE item bank (see Section 5.2). This year, the committee did not meet as the decision was made to use the same operational pool for the final three MCCEE administrations of 2018.

For the operation item pool, the TDO, using the item pool assembly tool in the item bank, selected all items not used in the prior pool and added them to a pool of available items for establishing a new operational item pool using the exam specifications. The goal was to create a unique pool each time, however, to meet the content and psychometric specifications, the MCC allowed for some overlap across pools.

The EEC then performed a final medical proofing and QA check of all item content and ensured that the scoring key was correct. If an item was no longer valid, a replacement item was chosen from a pre-selected set of potential replacements from the item bank. Each replacement item met the specifications of the discarded item with respect to content area (e.g., health group, clinician task, etc.) and difficulty level.

SECTION 3: EXAM ADMINISTRATION

3.1 Exam delivery and exam centres

In 2018, the MCCEE was offered in January, March, May, September and October/November. Each session consisted of a two- to three-week testing window. Prometric was the vendor sourced by the MCC to deliver the MCCEE globally.

Eligible candidates were able to self-schedule their exams through the Prometric website. There are more than 500 Prometric test centres in approximately 80 countries. Scheduling was done on a first-come, first-served basis.

A list of countries where the MCCEE was offered appears in ***Appendix A***.

3.2 Exam security

"Security is a major concern for test administration" (Downing, 2006, p.1). The MCC has a comprehensive approach to address exam security. This includes: registration, content development, content transfer, test publishing and delivery, exam sites, the secure transfer of results back to the MCC for scoring, and results analysis. This "chain of security" is required during test production and widens even more during larger-scale test administrations (Downing, 2006, p.15).

Registration:

In physiciansapply.ca, MCC's online registration portal, only authenticated and eligible candidates were permitted to register for the exam. Once registered, candidates received an "Authorization To Test" (ATT) identification number that was required by Prometric to schedule an exam. These initial registration processes validated that only approved test takers could register and attempt an exam.

Content development:

The MCC communicated regularly with SMEs about the importance and priority of exam content security. All SMEs were required to sign a Code of Business Conduct with the MCC. Examination content was developed during on-site meetings at the MCC's headquarters through a secure item banking software developed and stored internally. Content writers, when required to work remotely, logged onto the MCC servers using a secure two-step authentication process.

Secure test publishing processes and protocols have been well established with Prometric and test centre guidelines (test delivery) and were reviewed with them prior to each testing window to ensure that results were processed in a secure environment.

Content transfer:

Content was transferred between the MCC and Prometric using a secure File Transfer Protocol (FTP). The content resided in the secure Prometric environment while staff ran necessary analysis testing the delivery algorithms and reporting on any blueprint inconsistencies revealed during this simulation.

The MCC staff logged into a secure Prometric system to review the content for any errors or formatting issues. When all content issues were resolved and blueprint simulations validated, the examination became ready for delivery on Prometric's secure platform.

Test publishing and delivery:

Test publishing processes, using the LOFT delivery method, limited the exposure of the entire MCCEE item bank. From a test security perspective, this delivery method administered only a portion of the pre-selected item pool and a unique form to each candidate.

Exam sites:

The uniform design of the Prometric labs worldwide delivered a consistent exam environment where security is of highest priority. Upon arrival, each candidate was asked to secure their personal belongings (including smartphones and other transmitting devices) in a locker prior to entering the testing room. All candidates were required to provide government issued identification to confirm their identity. As the candidate was checked into the Prometric registration system, site staff was required to confirm that the presented candidate matched the photo identification supplied by the MCC. All candidates were then screened for electronic devices, either with a physical wand or by passing through a full-body scanner. Additionally, candidates were monitored throughout the exam by site staff, passing through the exam centre and through video surveillance.

Proctors at every Prometric testing centre have been professionally trained to identify potential test security breaches and each location is monitored with advanced security equipment, and subject to multiple random security audits.

During an active examination session, daily Centre Procedure Reports (CPRs) were sent to the MCC for evaluation and investigation, along with the appropriate investigative materials available from Prometric (videos, documentation from the proctor, etc.).

Exam results and analysis:

At the conclusion of an examination, candidate results were transferred to the MCC via a secure FTP and processed in the MCC's secure scoring environment.

The MCC staff analyzed candidate performance by exam date over each testing window, searching for evidence of any content exposure and/or security breaches. In addition, the MCC monitored various social media websites in search of disclosure of test content and investigated if any security breach was identified.

3.3 Exam preparation

Online materials have been available to help candidates prepare for the MCCEE. These resources included a demonstration of exam format, computer navigation, self-assessment tools, a list of reference manuals by specialty area, and the MCC Objectives. Candidates could access all resources on the MCC's website at *mcc.ca/examinations/mccee/preparation-resources*. Since the last MCCEE took place on November 11, 2018, resources on this page are being offered for information/reference purposes only.

3.4 Scoring and quality control

The Evaluation Bureau (EB) used a number of technological systems and scoring applications to perform an initial QA and data validation. Once it was determined the data met the established QA requirements, the final scoring was completed by the EB and exam results were analyzed and summarized in a report by Psychometrics and Assessment Services (PAS).

The MCCEE results were reported on a standard score scale ranging from 50 to 500. The pass score was 250 before May 2017 and has been 261 beginning with the May 2017 administration (please refer to Section 5.4 for details regarding standard setting). Before scores were released, exam results were reviewed and approved by the EEC.

3.5 Release of results

Approximately six to eight weeks following the last day of the exam session, the EEC met to review performance on the exam, address administrative issues, rule on special candidate cases and approve exam results. Starting in September 2017, this committee has deemed exam results auto-approved if exam psychometric performance fell within the established parameters for auto-approval. Any special cases that required the EEC's review were brought to the EEC for discussion and decision. The MCC then granted candidates access to their final result (pass or fail) and total score through their physiciansapply.ca accounts. Shortly thereafter, each candidate had access to the Statement of Results (SOR), the official results document, and the Supplemental Feedback Report (SFR), providing information on their relative strengths and weaknesses by health group, clinician task, and specialty area.

Samples of an SOR and an SFR are available in ***Appendix B and C***, respectively.

SECTION 4: VALIDITY

“Validity refers to the degree to which evidence and theory support the interpretation of test scores entailed by proposed uses of tests” (American Educational Research Association [AERA], American Psychological Association [APA] & National Council on Measurement in Education [NCME], 2014). Test validation requires gathering and integrating evidence from multiple sources to develop a validity argument that supports intended uses and interpretations of scores and to rule out threats to validity (Messick, 1989, 1994).

The validation of the MCCEE has been an ongoing process of gathering evidence in support of the interpretation of exam scores as one of the indicators of a candidate’s basic medical knowledge in the principal specialty areas of medicine. Validity considerations have been incorporated into exam design, exam specifications, item development, exam assembly, psychometric quality, exam administration, and results reporting.

4.1 Evidence based on exam content

During the course of exam content development, care was taken to ensure the exam was relevant to Undergraduate Medical Education (UGME) and to the requirements for entry into postgraduate training in Canada. As indicated in Section 2, the MCCEE items were developed based on exam content specifications carefully defined by committee members who ensured the exam content reflected the basic medical knowledge and problem solving of a candidate at a level comparable to a minimally competent medical student completing his or her medical education in Canada and about to enter supervised practice. As the MCCEE was designed for IMGs who may be less familiar with the Canadian practice environment, particular attention was paid to ensuring the exam was free of content such as medical practice, therapeutics, and legal/ethical issues specific to Canada.

Various test committees in the MCC are involved in developing test items. Regular content development workshops are conducted to train committee members on professional test development guidelines and on drafting items that reflect the knowledge and skills emphasized in the exam specifications for each content area. The draft items are reviewed, edited, and finalized by test committee members, TDOs, and editors. The items are initially developed in English and then translated into French by professional translators whose work is vetted by TDOs and editors. In addition, an analysis is performed after each exam administration to ensure that all exam forms assembled during an administration comply with the exam content specifications. These rigorous approaches all helped ensure content validity of the MCCEE.

4.2 Evidence based on internal structure

As each candidate received a different (but comparable) set of items, a factor analysis could not be conducted to examine the factor structure of the exam. However, the internal structure of the

MCCEE could be revealed, to some degree, through the evaluation of the correlations among subscores of health groups, clinician tasks and specialty areas. This can help one understand how closely the exam conformed to the construct of interest. Correlations among subscores were examined using the data from 3,811 candidates who took the MCCEE in 2015

Tables 2, 3 and 4 present the correlation matrices among subscores in the five health groups, three clinician tasks and six specialty areas, respectively. Since 2017, "specialty area" has been used to replace the term "discipline", which referred to an old classification system no longer used to assemble the MCCEE forms.

As indicated in each table, all subscores classified by either health group, clinician task or specialty area were found to be significantly, positively correlated with one another. This suggests that the MCCEE seemed to measure an essentially single dominant underlying construct (basic medical knowledge and clinical skills that it is designed to measure). Furthermore, this provided some preliminary evidence to support the assumption of unidimensionality underlying the use of the item response theory (IRT) model (see Section 5) used to assemble the exam. It should be noted that the magnitude of correlations was affected by the number of items in each domain. For example, the higher correlations among the three clinician tasks were likely due to the larger number of items in these domains. Conversely, since there were fewer items in Population Health & Ethics, its correlations with other domains were affected.

Table 2: Correlations among subscores in health groups (N = 3,811)

	Child health	Maternal health	Adult health	Mental health
Maternal health	0.45*			
Adult health	0.68*	0.52*		
Mental health	0.53*	0.38*	0.60*	
Population health & ethics	0.41*	0.31*	0.50*	0.48*

**significant at p<0.0001*

Table 3: Correlations among subscores in clinician tasks (N = 3,811)

	Management	Data gathering
Data gathering	0.69*	
Data interpretation and synthesis	0.74*	0.73*

** significant at p<0.0001*

Table 4: Correlations among subscores by specialty area (N = 3,811)

	Medicine	OBGYN	Pediatrics	Surgery	Psychiatry
OBGYN	0.56*				
Pediatrics	0.61*	0.56*			
Surgery	0.62*	0.53*	0.56*		
Psychiatry	0.55*	0.51*	0.53*	0.48*	
Population health & ethics	0.45*	0.41*	0.41*	0.40*	0.48*

** significant at p<0.0001*

4.3 Evidence based on relations to other variables

The relationships between scores on the MCCEE, the Medical Council of Canada Qualifying Examination (MCCQE) Part I and the NAC Examination were reviewed for convergent validity evidence. The MCCEE assessed essential medical knowledge and skills at the level of new medical graduates about to enter the first year of postgraduate training as the MCCQE Part I does. The NAC Examination uses an OSCE format to assess the readiness of an IMG for entry into a Canadian residency program.

Correlations between scores on the MCCEE, the MCCQE Part I and the NAC examination are presented in Table 5. A significant correlation (r=.70, p<.0001) was obtained between scores on the MCCEE and the MCCQE Part I based on a sample of 2,071 candidates for whom the data between the two exams were matched[2]. This provides evidence of high convergent validity between the two exams. A significant correlation (r=.38, p<.0001) was also obtained between scores on the MCCEE and the NAC Examination based on a sample of 1,711 candidates whose scores on both exams were matched. The correlation is strong enough to provide some evidence of convergent validity between the two MCC exams, but not too high to indicate redundancy as the MCCEE assessed different aspects of clinical knowledge and skills than those assessed by the NAC Examination. The correlations between the MCCEE and the other two exams could have been higher if not due to range restriction on the former. Table 5 also presents disattenuated correlations between the MCCEE and the other two exams. The disattenuated correlation between two exams is based on their observed correlation adjusted for reliability of the exams and it indicates what their correlation would be after correction for measurement error.

[2] This correlational study was based on MCCQE Part I data prior to the launch of the New Blueprint in 2018.

Table 5: Correlations between scores on the MCCEE and other MCC exams

	MCCEE		
	Observed Correlation	Disattenuated Correlation	N
MCCQE Part I	0.70*	0.78*	2071
NAC Examination	0.38*	0.47*	1711

**p<.001*

4.4 Minimizing construct-irrelevant factors

Another way to enhance validity is through the minimization of construct-irrelevant variance (error variance unrelated to the construct measured by the exam). During development, items were reviewed by SMEs and TDOs to ensure they met the exam specifications. SMEs and TDOs also reviewed items for appropriateness of language and potential bias against certain language or culture groups. In addition, empirical evidence from item and distractor analysis was used to further investigate potential sources of construct irrelevance. For example, distractors with positive point-biserial correlations may indicate that an item is assessing a construct that is unrelated to the one intended to be measured. Test completion rates, candidate item response times and overall test times were also analyzed to ensure the time allotted to complete the exam was adequate and that speededness was not a factor affecting candidate performance. Through Prometric, the MCC ensured that testing conditions across all test centres were standardized so that candidates had equal opportunities to demonstrate their abilities. Finally, detailed test information and links to resources were provided on the MCC's website to help candidates prepare for the exam and alleviate test anxiety.

SECTION 5: PSYCHOMETRIC ANALYSIS

5.1 Item analysis

The MCCEE items were analyzed using both Item Response Theory (IRT) and Classical Test Theory (CTT) frameworks. As described in Section 2, each exam form consisted of 180 multiple-choice items including 150 scored operational items and 30 non-scored pilot items. The exam forms were assembled online in real-time by drawing items from a large, operational item pool built from the MCCEE item bank (see Sections 2.4 and 5.3). All items in the bank had been field tested and between 400 and 500 new items were created and piloted each year. Before pilot items were uploaded into the item bank, they were assessed for quality, analyzed and calibrated to the common scale of the item bank (see Section 5.2). Item analysis involved computing a set of statistics based on both IRT and CTT. These statistics provided information about item difficulty, item discrimination and distractor performance (incorrect answer choice). Problematic items were identified and sent back to appropriate test committees for evaluation and revision, if required.

The IRT item analysis was performed using the one-parameter (1-PL) logistic model. The 1-PL model describes the probability that candidates with a given ability level will respond correctly to an item as a function of item difficulty and their ability as measured by the exam in its entirety. Candidates with lower ability stand a lesser chance of answering the item correctly, while those with more ability are more likely to answer correctly. The mathematical expression for the 1-PL model is: (Hambleton, Swaminathan & Rogers, 1991):

$$P_i(\theta) = \frac{e^{(\theta - b_i)}}{1+e^{(\theta - b_i)}} \qquad i = 1, 2, \ldots, n \quad ,$$

where

$P_i(\theta)$ is the probability that a randomly chosen candidate with ability *θ* answers item *i* correctly

b_i is the item *i* difficulty parameter

n is the number of items in the exam

e is a constant approximately equal to 2.718

The IRT analysiswas performed using the Bilog-MG3 software (Zimowski et al, 1996). The statistic examined included:

- *Item b-parameter estimate:* This estimate indicates the point on the IRT ability scale where the probability of a correct response is 0.5. The greater the value of the *b*-parameter estimate, the more difficult the item.

CTT analysis was performed using the Statistical Analysis System (SAS) and Bilog-MG3. The statistics examined included:

- *Item p-value:* This statistic indicates the proportion of candidates in the sample that answered the item correctly. The *p*-value ranges from 0.0 to 1.0. The higher the *p*-value, the easier the item.
- *Item-total correlation (point-biserial):* This statistic is the correlation between the item score and the total test score and describes the relationship between performance on the specific item and performance on the total test. It indicates an item’s discrimination power and its value ranges from -1.0 to +1.0. The higher the correlation, the better the item is at discriminating high-ability candidates from low-ability candidates. Items with negative correlations may point to serious problems with the item content (such as multiple correct answers or unusually complex content).

- The proportion of candidates choosing each answer option, including both the correct answer and incorrect answers (distractors) is also provided. It is desirable to have each answer option chosen by at least a few candidates.
- *Distractor-total correlation:* This statistic is the correlation between a distractor and the total test, and describes the relationship between selecting an incorrect response for a specific item and performance on the entire test. A very low or negative value is desirable as more low ability candidates are expected to select these incorrect responses.

Each statistic provides some information about the characteristics of an item from an empirical perspective. These statistics were used to evaluate each item's psychometric quality and help detect any potential content-related issues. Items that fell into the following categories were not included in an item pool and were flagged for further review:

- *p*-value < .05 or p-value > .95
- Point-biserial < .05
- *b*-parameter < -5.5, or b-parameter > 5.5

5.2 Item bank calibration

The MCCEE item bank was calibrated and scaled using the 1-PL IRT model described above. Prior to 2013, the items in the bank were calibrated using the item responses of all test takers gathered up to the time when the calibration was performed. In April 2013, following best practice, the item bank was recalibrated using only the item responses of first-time test takers between 2008 and 2012 (repeaters were excluded from the calibration sample). For the purpose of establishing a new scale for the bank, a concurrent calibration was implemented where *b*-parameters for all items (previously banked items and pilot items) were estimated simultaneously using the Bilog-MG3 software (Zimowski et al, 1996). Concurrent calibration places item parameters on a common scale so that ability estimates from different administrations are comparable (Kang & Peterson, 2009; Kim, 2006; Kim, 2007). In 2016, the item bank was updated and recalibrated using candidate response data from January 2013 to May 2016. A Fixed-Parameter Calibration (FPC) with Simple Transformation Prior Update (STPU) method (Kim, 2006) was used to link the scale of the new bank to the scale of the previous bank of items. Some items were excluded due to low discrimination power and/or because they were too easy or too difficult. The remaining items, along with their statistics, were uploaded to the bank.

In the past, pilot items needed to be calibrated and scaled to the common bank scale once adequate data became available for these items. Due to the LOFT design, item exposure rates vary widely across items. To obtain an adequate sample size for the purposes of IRT calibration and scaling of pilot items, item responses from multiple administrations were combined excluding:

- Items with fewer than 100 responses as these may result in unstable parameter estimates
- Items with a *p*-value equal to zero (nobody answered the item correctly) or a *p*-value equal to one (everybody answered the item correctly) as parameters cannot be estimated (no variance)

A common-item, non-equivalent groups design was used, where all the operational items (i.e., counting items) were treated as anchor items to link the pilot items to the bank. Bilog-MG3 was first used to estimate *b*-parameter estimates for all items in separate calibrations. The new and banked *b*-parameter estimates for the anchor items were then used to estimate slope and intercept values using the IRT Mean-Mean (Kolen & Brennan, 2004) method to enable a linear transformation to put the *b*-parameter estimates of the pilot items on the scale of the bank. After scaling, pilot items that met psychometric criteria were added to the item bank for future use.

For the purpose of LOFT test delivery as described in Section 5.3, items in the bank were classified into four difficulty levels based on their *b*-parameter estimates, with level 1 representing the easiest level and level 4 the most difficult level:

- Level 1: $b \leq -2.25$
- Level 2: $-2.25 < b \leq -0.75$
- Level 3: $-0.75 < b \leq 0.75$
- Level 4: $b > 0.75$

5.3 LOFT delivery

As indicated in Section 1, the MCCEE was administered using a computer-based, LOFT design and was delivered securely by Prometric, a test service provider. With the LOFT design, an exam form was constructed in real-time by selecting items from a large pool of operational items each time a candidate took the exam. Test security was enhanced because of the large number of forms the LOFT process can assemble. Each form was constrained by exam content specifications and psychometric criteria (test information target, item difficulty, and item exposure parameters). Although each candidate received a unique set of items, scores from all exams were comparable as all items in the pool were pre-calibrated and linked to a common scale established for the item bank from which the operational pool was drawn. The cut score was equivalent across exam forms.

When submitting items to Prometric to be used on an exam, the MCC provided the following information:

- The exam specifications including the upper and lower boundaries for each content category (minimum and maximum number of items allowed per content category), plus a weight (0-1.00) for each category. The weight value represents the proportion of the items from that category that should be included on the exam.

- A large pool of items with IRT *b*-parameter estimates and their associated content categories
- The classification of item difficulty level ranging from one to four
- A list of enemy items (list of any two items that should not be included on the same exam form because their content overlaps or could provide answer clues to each other)
- A psychometric target for test information and standard errors of ability estimates (see Section 2.2, Figure 1)
- A list of pilot items assembled in six to seven packets of 30 items to be presented along with the operational items
- The length of the exam including the number of operational items and the number of non-scored pilot items

Based on this information, Prometric calculated an exposure control parameter for each operational item in the pool. The exposure control parameter represents the probability that an item will be selected for an exam. Items that best meet both the content specifications and the psychometric targets will have higher exposure control parameters than items that are less optimal at meeting these constraints. Items are selected for a candidate's exam from a large pool of items through randomization and optimization procedures. Items with higher exposure control parameters have a higher likelihood of being included in an exam form.

It is possible for some items to be exposed more often. This occurs especially in smaller categories in which certain items may have higher values toward meeting the psychometric target than other items in that category. To avoid overexposure of items, it is important that there be a sufficient number of items in all categories to prevent oversampling and overexposing some items.

The MCC monitored item exposure for each administration of the MCCEE and worked closely with Prometric to address any related issues. For a given administration, items were considered:

- "Overexposed" when seen by more than 50 per cent of candidates
- "Underexposed" when seen by at least one candidate but less than 5 per cent of candidates
- "Not exposed" when not seen by any candidates

5.4 Standard setting

Every few years, the MCC brought together a panel of Canadian physicians to define an acceptable level of performance and establish the pass score for the MCCEE through a standard-setting exercise. The panel then recommended its pass score to the EECC for approval.

In November 2016, the MCC conducted a rigorous standard-setting exercise with a diverse panel of 21 physicians from across the country. The method used is called the Bookmark Method, which has been widely used for MCQ exams. Following the standard-setting exercise, the panel recommended a pass score of 261 on the most recent reporting scale of 50-500. This pass score was reviewed and approved by the EECC.

The pass score of 261 was applied starting with the May 2017 session of the MCCEE and remained in place until the last session of the MCCEE.

Prior to May 2017, the pass score for the MCCEE was 250 on the reporting scale ranging from of 50 to 500. For candidates who took the MCCEE prior to May 2017, their final result (pass or fail) remains valid.

5.5 Scoring and score reporting

The 150 operational items that each candidate answered on the MCCEE were scored, but the 30 pilot items included in exam forms were not. The candidate ability θ was estimated using a 1-PL IRT model with a Bayes Expected A Posteriori (EAP) procedure. Proficiency estimates were scaled to have a mean of 0 and standard deviation of 1.0. The banked *b*-parameter estimates were used to estimate each candidate's ability score θ along with their item response patterns.

Theoretically, the values of θ can range from $-\infty$ to $+\infty$, but practically, most of the θ values typically ranged from -3.0 to +3.0. To make it easier to communicate exam scores to candidates and other test users, the estimated θ score was linearly transformed onto a reporting scale to eliminate decimals and negative numbers. The reporting scale used for the MCCEE ranged from 50 to 500 with a standard deviation of 50. Transformed scores that were below 50 were adjusted to 50 and scores above 500 were adjusted to 500.

The θ cut score of -0.490 converted to a reported scale score of 261. Each candidate's estimated θ score was converted to a reported score using the following equation:

$$\text{Reported score (rounded)} = 50 * (\theta + 0.490) + 261$$

In addition to providing candidates with their total score in the SOR, the MCC also provided supplemental graphical feedback via the SFR on the candidates' performance on the health group, clinician task and specialty area sub-categories to help them understand their strengths and weaknesses as assessed by the MCCEE. It is important to note that subscores had lower measurement precision than total scores as there were fewer items. The subscores were provided to individual candidates for feedback only and were not meant to be used by organizations for selection decision-making.

SECTION 6:
EXAM RESULTS

Candidate performances for the five administrations in 2018 are summarized in this section. When applicable, historical data from previous years are included for reference purposes.

6.1 Candidate cohorts

In 2018, the MCCEE was administered in January, March, May, September and October/November to a total of 3,165 candidates in 166 cities in 54 countries. Table 6 summarizes the distribution of candidates per region and per cohort for the 2018 administrations.

Table 6: Distribution of candidates in 2018 by region

	REGION						
	Canada		USA		International		Total
Administration	N	%	N	%	N	%	N
Jan.	182	51	10	3	168	47	360
March	228	37	39	6	354	57	621
May	446	44	77	8	488	48	1,011
Sept.	276	59	48	10	143	31	467
Oct. / Nov.	269	38	19	3	418	59	706
TOTAL 2018	**1,401**	**44**	**193**	**6**	**1,571**	**50**	**3,165**
2017	1,471	45	325	10	1,486	45	3,282
2016	1,624	47	326	10	1,486	43	**3,436**
2015	1,770	46	356	9	1,690	44	**3,816**
2014	1,857	48	384	10	1,595	42	**3,836**
2013	1,835	50	422	12	1,412	38	**3,669**

** Percentages may not total 100% due to rounding.*

Table 7 presents the distribution of candidates who attempted the exam in various test centres in Canada in 2018.

Table 7: Distribution of candidates in Canadian test centres in 2018 by administration

	January		March		May		September		Oct./Nov.		2018 Total	
CENTRE	N	%	N	%	N	%	N	%	N	%	N	%
Calgary	15	8	25	11	44	10	10	4	9	3	**103**	**7**
Dartmouth	4	2	5	2	8	2	6	2	3	1	**26**	**2**
Edmonton	15	8	20	9	33	7	7	3	40	15	**115**	**8**
Hamilton	7	4	10	4	11	2	16	6	11	4	**55**	**4**
London	10	5	9	4	18	4	18	7	9	3	**64**	**5**
Mississauga	17	9	20	9	40	9	34	12	17	6	**128**	**9**
Montreal	18	10	28	12	58	13	28	10	60	22	**192**	**14**
Ottawa	9	5	15	7	19	4	11	4	15	6	**69**	**5**
Regina	0	0	1	0	5	1	3	1	1	0	**10**	**1**
Saskatoon	3	2	4	2	11	2	3	1	3	1	**24**	**2**
St. John's	2	1	0	0	0	0	0	0	2	1	**4**	**0**
Toronto	45	25	56	25	144	32	95	34	65	24	**405**	**29**
Vancouver	31	17	28	12	43	10	37	13	25	9	**164**	**12**
Winnipeg	6	3	7	3	12	3	8	3	9	3	**42**	**3**
TOTAL N	**182**		**228**		**446**		**276**		**269**		**1,401**	**100**
%	**13**		**16**		**32**		**20**		**19**			

** Percentages may not total 100% due to rounding.*

Table 8 presents the distribution of candidates within major groups for each administration in 2018 as well as the total for the year.

Table 8: Distribution of candidates in 2018 by group and administration

Candidate Group		Jan.		March		May		Sept.		Oct./Nov		2018 Total	
		N	%	N	%	N	%	N	%	N	%	N	%
First-time test takers		281	78	537	86	838	83	397	85	560	79	**2,613**	**17**
Repeat test takers		79	22	84	14	173	17	70	15	146	21	**552**	**83**
English		352	98	606	98	974	96	454	97	661	94	**3,047**	**96**
French		8	2	15	2	37	4	13	3	45	6	**118**	**4**
TOTAL	N	360		621		1011		467		706		**3,165**	**100**
	%	11		20		32		15		22			

** Percentages may not total 100% due to rounding.*

6.2 Overall Exam Results

Table 9 summarizes the descriptive statistics for the total score and pass rates for each cohort in 2018 as well as for the whole year. The scores are presented on the reporting scale ranging from 50 to 500, with a pass score of 261.

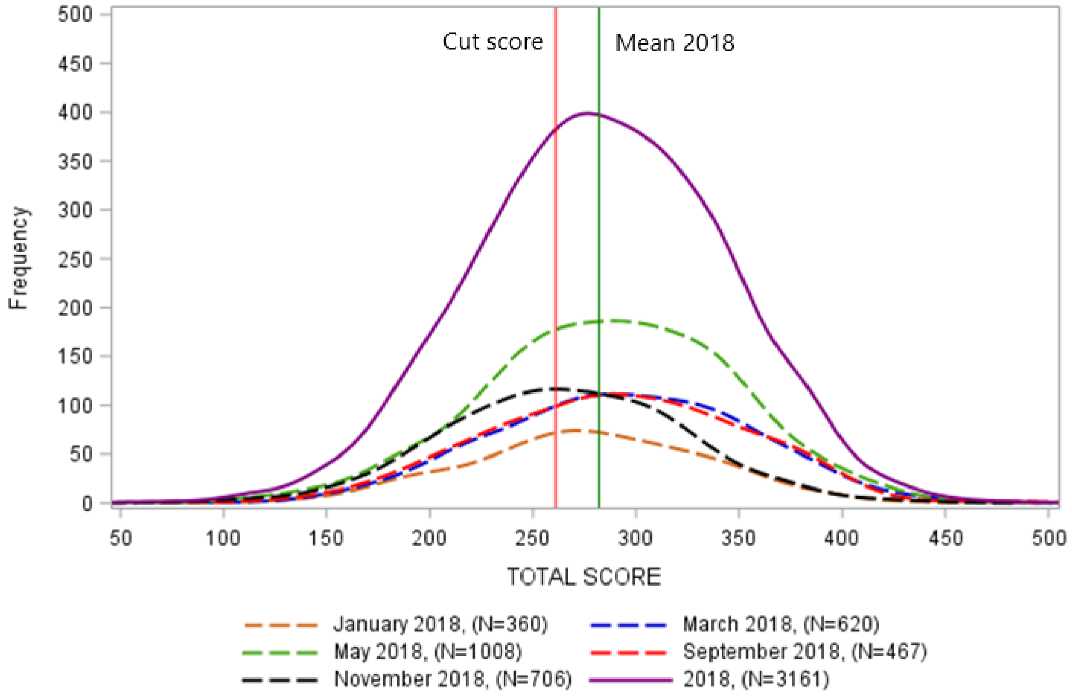
Table 9: Descriptive statistics for the total score and pass rates in 2018 by administration

						PASS	
Administration	N	Min.	Max.	Mean	SD	N	%
Jan.	360	113	450	277	57	**224**	**62**
March	620	67	456	292	61	**438**	**71**
May	1008	50	470	286	60	**673**	**67**
Sept.	467	80	490	290	61	**322**	**69**
Oct. / Nov.	706	87	439	265	56	**380**	**54**
Total	**3,161**	**50**	**490**	**282**	**60**	**2037**	**64**

** Excluding candidates whose status were 'denied standing' or 'no standing'. The 'denied standing' and 'no standing' status are included in Tables 6, 7 and 8 as these tables did not report performance statistics.*

Figure 2 displays the total score distributions on the reporting score scale for each cohort as well as for all candidates in 2018. The red vertical line represents the cut score and the green vertical line, the average performance in 2018.

Figure 2: Total score distributions in 2018



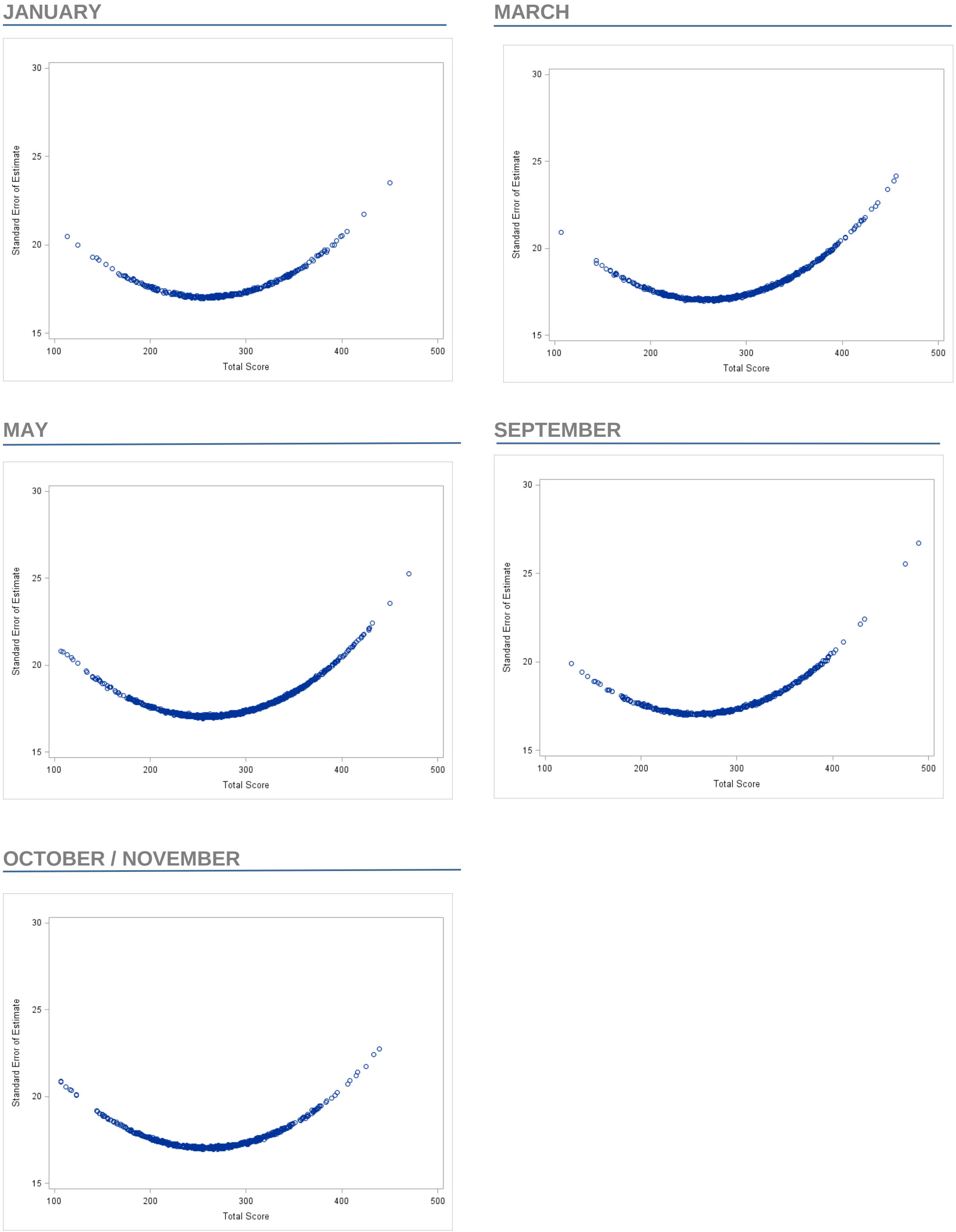
** Excluding candidates whose status was 'denied standing' or 'no standing'.*

6.3 Reliability of exam scores and classification decisions

Test reliability refers to the extent to which the sample of items that comprises any exam accurately measures the intended construct. Reliability of the MCCEE can be assessed by examining the Standard Error of Estimate (SEE) along the ability scale. The SEE indicates the precision with which ability is estimated at a given point on the ability scale and is inversely related to the amount of information provided by a test at that point (see Section 2.2 for an explanation of the test information function). The SEE values should be as small as possible so that measurement of the candidate's ability is as accurate as possible. In the IRT framework, the SEE serves the same purpose as the Standard Error of Measurement (SEM) in CTT (Hambleton, Swaminathan & Rogers, 1991) except that the SEE varies with ability level in IRT whereas in CTT, one SEM is used to indicate overall measurement error.

Figure 3 displays the scatter plots of the SEE values along the ability scale (converted to the MCCEE reporting score scale) for the five cohorts in 2018. For each cohort, the plot shows that the ability estimates are less accurate towards the lower and higher ends of the score scale but more accurate in the middle range of the scale where the majority of the scores fall. The SEE is the lowest near the cut score, which indicates the highest precision of ability estimates, thus supporting more accurate and consistent pass or fail decisions.

Figure 3: Distributions of standard errors of the ability estimates for 2018 cohorts



JANUARY

MARCH

MAY

SEPTEMBER

OCTOBER / NOVEMBER

** Excluding candidates whose status was ‘denied standing’ or ‘no standing’.*

A critical concern for a high-stakes exam such as the MCCEE is the pass or fail decision. Reliability of the MCCEE can also be assessed by examining the consistency and accuracy of pass or fail decisions based on exam scores. Decision consistency and decision accuracy can be estimated using the Livingston and Lewis (1995) procedure, which is used in many high-stakes testing programs. Decision consistency is an estimate of the agreement between the pass or fail classifications on potential parallel forms of the exam. Decision accuracy is an estimate of the agreement between the pass or fail classifications based on observed exam scores and those that would be based on their true score (expected average score if the candidate could be tested an infinite number of times).

Table 10 shows the decision consistency and decision accuracy estimates along with the associated false positive and false negative rates. The estimated false positive rate indicates the expected proportion of candidates who pass based on their observed score but who should fail based on their true ability. The estimated false negative rate indicates the expected proportion of candidates who fail based on their observed score but who should pass based on their true ability. As indicated in Table 10, both the decision consistency and the decision accuracy estimates for the five 2018 administrations were very high; false positive and false negative rates were within an acceptable range.

Table 10: Estimates of decision consistency and decision accuracy in 2018

	Jan.	March	May	Sept.	Oct. / Nov.
Decision consistency	0.85	0.87	0.86	0.86	0.85
False positive	0.08	0.07	0.07	0.07	0.08
False negative	0.07	0.06	0.07	0.07	0.07
Decision accuracy	0.89	0.91	0.90	0.90	0.89
False positive	0.05	0.04	0.04	0.05	0.05
False negative	0.05	0.05	0.05	0.05	0.05

** Excluding candidates whose status was ‘denied standing’ or ‘no standing’.*

6.4 Candidate performance by sub-category

In Table 11, descriptive statistics are presented for total exam scores as well as for subscores based on three different but inter-related classification systems: health groups, clinician tasks and specialty areas for the 2018 candidates. Each domain within each classification system was sampled a number of times, with some having been measured by a large number of questions and others by a smaller number of questions. Note that the questions overlapped across the three classification systems.

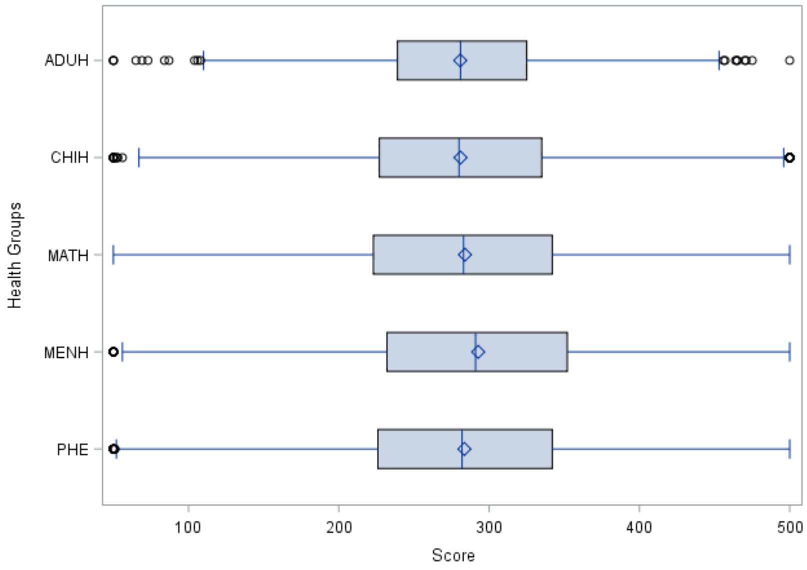
Table 11: Descriptive statistics for the total score and subscores in 2018

		Min	Max	Mean	SD
TOTAL SCORE		**50**	**478**	**282**	**60**
Health groups	Adult Health	50	500	281	62
	Child Health	50	500	281	80
	Maternal Health	50	500	284	92
	Mental Health	50	500	293	88
	Population Health and Ethics	50	500	284	91
Clinician tasks	Data gathering	50	500	281	70
	Data interpretation and synthesis	50	500	283	69
	Management	50	500	284	62
Specialty areas	Medicine	50	500	281	78
	Obstetrics & Gynecology	50	500	282	72
	Surgery	50	500	281	69
	Pediatrics	50	500	281	80
	Psychiatry	50	500	293	88
	Population Health and Ethics	50	500	284	91

** Adult Health includes Medicine, Surgery, and Obstetrics and Gynecology*
*** Excluding candidates whose status was 'denied standing' or no standing'.*

Figures 4 through 6 show subscore distributions and the profiles of candidate performances in the health group, clinician task and specialty area domains respectively for 2018. The box for each domain indicates the range for the middle 50 per cent of candidate scores. The vertical line represents the median or 50th percentile score for that domain. Each line to the right or left of the box represents the remaining 25 per cent of the domain score above or below the middle 50 per cent. The mean domain score is shown by the diamond. Overlap between the boxes indicates that candidate performances in those domains did not differ significantly.

Figure 4: Subscore distributions for health groups in 2018



Box contains 50% of scores. Vertical line is median score (50th percentile)

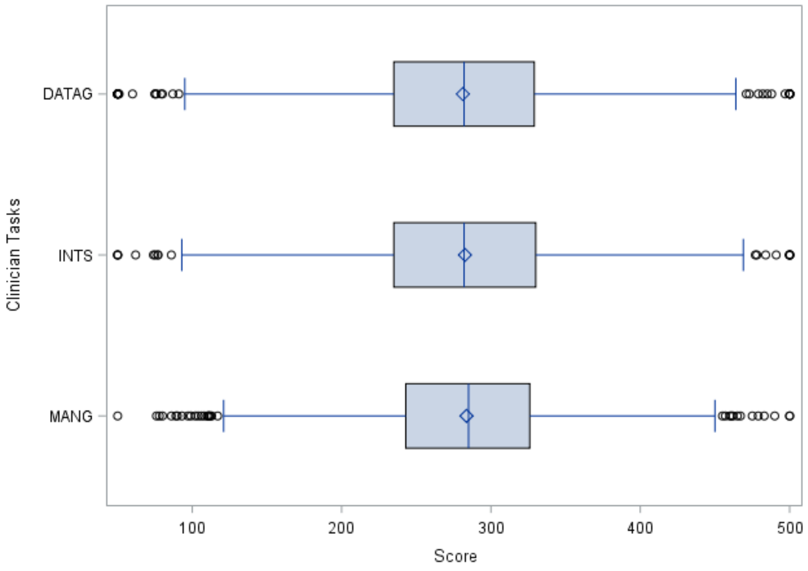
Whisker shows 25% of values above and below Box

Mean score

ADUH: Adult Health
CHIH: Child Health
MATH: Maternal Health
MENH: Mental Health
PHE: Population Health and Ethics

** Excluding candidates whose status was 'denied standing' or 'no standing'.*

Figure 5: Subscore distributions for clinician tasks in 2018



Box contains 50% of scores. Vertical line is median score (50th percentile)

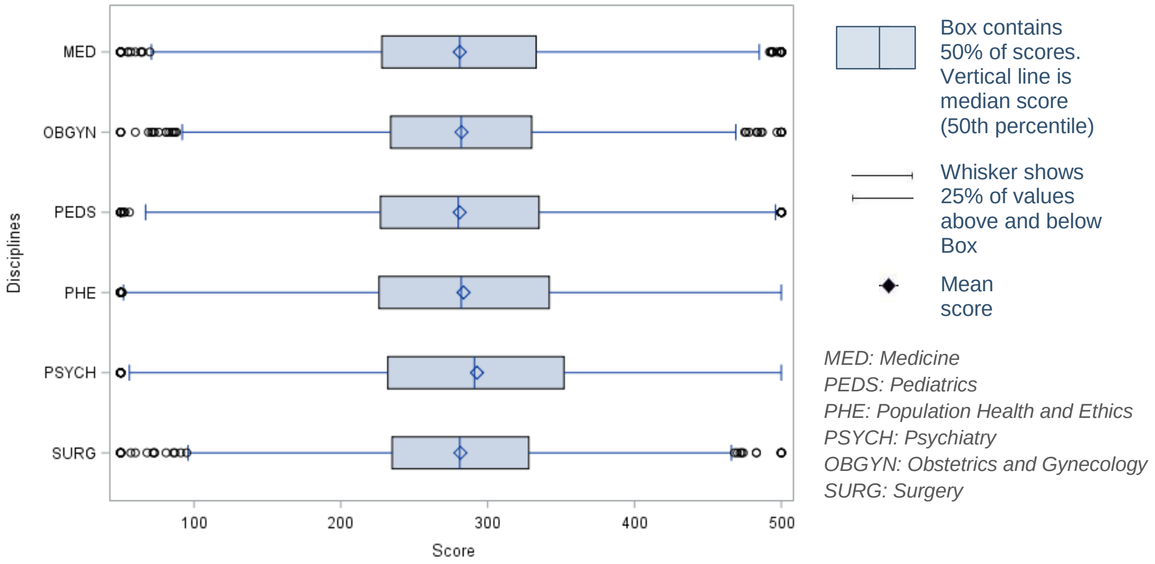
Whisker shows 25% of values above and below Box

Mean score

DATAG: Data gathering
INTS: Data interpretation and synthesis
MANG: Management

** Excluding candidates whose status was 'denied standing' or 'no standing'.*

Figure 6: Subscore distributions for specialty areas in 2018



** Excluding candidates whose status was 'denied standing' or 'no standing'.*

6.5 Exam results by candidate group

Table 12 presents descriptive statistics and pass rates for each candidate group in 2018: first-time test takers, repeat test takers, and candidates who took the exam in English or French.

Table 12: Descriptive statistics and pass rates in 2018 by candidate group

	N		Min.	Max.	Mean	SD	PASS	
GROUP	**N**	**%**					**N**	**%**
All candidates	**3,161**	**100**	**50**	**490**	**282**	**60**	**2,037**	**64**
First-time test takers	2,609	83	50	490	290	60	1,839	70
Repeat test takers	552	17	87	392	244	41	198	36
English	3,043	96	50	490	284	60	1,990	65
French	118	4	119	357	242	49	47	40

** Excluding candidates whose status was 'denied standing' or 'no standing'.*

** Percentages do not total 100% due to rounding.*

6.6 Comparison of prior exam performance

Table 13 presents pass rates of each cohort in 2018 and those of the previous years.

A pass score of 250 on the reporting scale (θ =-0.704 on the IRT ability scale) was applied prior to May 2017. As of May 2017, a pass score of 261 on the reporting scale (θ =-0.490) was applied. It should be noted that in the summer of 2016, the item bank was re-calibrated using first-time takers only. Starting in May 2017, the new IRT parameters have been applied to the scoring of MCCEE candidate performance following the recalibration of the items in the MCCEE item bank.

Table 13: Pass rates of each 2018 administration and the previous four years

Year	Administration	N	Overall Pass Rate (%)	First-Time Taker Pass Rate (%)
2018	January	360	62	69
	March	620	71	76
	May	1,008	67	72
	September	467	69	74
	November	706	54	60
	TOTAL	**3,161**	64	**70**
2017	January	342	69	78
	March	1,188	82	86
	May	757	59	68
	September	384	58	68
	November	606	63	72
	TOTAL	**3,277**	69	**77**
2016	January	393	70	76
	March	1243	82	85
	May	826	66	73
	September	409	67	73
	November	562	66	73
	TOTAL	**3,433***	**72**	**78**
2015	January	436	66	72
	March	1,259	80	85
	May	992	63	70
	September	493	71	80
	November	631	63	69
	TOTAL	**3,811**	**70**	**77**
2014	January	379	64	70
	March	1,168	78	83
	May	1,072	67	74
	September	529	68	74
	November	689	65	72
	TOTAL	**3,837**	**70**	**76**

** Excluding candidates whose status was 'denied standing' or 'no standing'.*

6.7 Item exposure analysis

As mentioned in Section 5.3, the items in each exam form for each candidate were selected based on item exposure control parameters that reflected how well an item met exam specifications and the psychometric target. As items in an exam form were delivered through randomization and optimization procedures, some items may have been more highly exposed than others. The MCC monitored each administration for item exposure and addressed the issue together with Prometric.

Table 14 presents the items for the five administrations in 2018.

Table 14: Item exposure in 2018

Administration	Overexposed	Underexposed	Unexposed	Number of candidates
Jan. (Pool 8)	0	89	210	360
March (Pool 8)	0	120	178	621
May (Pool 8)	0	174	123	1,011
Sept. (Pool 8)	0	92	205	467
Nov. (Pool 8)	0	129	165	706

6.8 Candidate survey

At the end of the exam, every candidate was invited to complete a survey on the exam experience. The MCC monitored candidate feedback and used it for quality improvement purposes both internally, and with the vendor, Prometric. Table 15 represents 2,312 candidates who responded to the survey in 2018. The percentage in brackets represent survey data from 2017.

Table 15: Candidate Survey Results (2018)

Q 1. How satisfied are you with the staff's helpfulness at this centre?

A – Very Satisfied	B – Satisfied	C – Dissatisfied	NR[1]
70% (72%)	28% (27%)	2% (1%)	840

Q 2. How satisfied were you with the performance of the testing system during your examination?

A – Very Satisfied	B – Satisfied	C – Dissatisfied	NR[1]
50% (51%)	46% (44%)	5% (5%)	839

Q 3. How satisfied are you with the total experience of taking your examination at this Prometric testing centre?

A – Very Satisfied	B – Satisfied	C – Dissatisfied	NR[1]
49% (52%)	47% (45%)	4% (3%)	839

Q 4. Overall, how would you rate the format of the examination (including such factors as screen layout, and ease of use)?

A – Very Satisfied	B – Satisfied	C – Dissatisfied	NR[1]
34% (40%)	49% (54%)	18 (6%)	890

Q 5. How would you rate the time allotted to complete the examination?

A – Far too little	B – Too little time	C – About the correct amount of time	D – Time to spare	E – Much time to spare	NR[1]
5% (4%)	20% (24%)	56% (62%)	16% (8%)	3% (2%)	815

Q 6. How would you rate the quality of the images presented with the questions?

A – Very Satisfied	B – Satisfied	C – Dissatisfied	NR[1]
38% (39%)	51% (50%)	11% (11%)	861

Q 7. How would you rate the clarity of the instructions you were provided on completing this examination?

A – Very Satisfied	B – Satisfied	C – Dissatisfied	NR[1]
44% (53%)	52% (45%)	4% (2%)	874

Q 8. How would you rate this examination as an appropriate test of your medical knowledge?

A – Very Satisfied	B – Satisfied	C – Dissatisfied	NR[1]
25% (19%)	59% (62%)	15% (18%)	869

[1] *NR refers to the number of surveys without a response to that question. The percentage represents the calculated average of the four sessions with rounding, therefore, some may not total 100.*

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APPENDIX A:
LIST OF COUNTRIES WHERE THE MCCEE IS OFFERED

NORTH AMERICA

Country	# of Entres
Canada	13
United States	336
Mexico	4

EUROPE

Country	# of Centres
Armenia	1
Austria	1
Bulgaria	1
Croatia	1
Czech Republic	1
Finland	1
France	4
Georgia	1
Germany	5
Greece	2
Hungary	1
Ireland	1
Italy	3
Kazakhstan	1
Latvia	1
Lithuania	1
Luxembourg	1
Netherlands	1
Poland	1
Portugal	1
Romania	1
Russia	2
Slovenia	1
Spain	2
Switzerland	1
Turkey	4
Ukraine	1
United Kingdom	13
Uzbekistan	1

SOUTH AMERICA

Country	# of Centres
Argentina	2
Bolivia	1
Brazil	7
Chile	1
Colombia	2
Dominican Republic	1
Guatemala	1
Peru	1
Venezuela	1

ASIA PACIFIC

Country	# of Centres
Australia	2
Bangladesh	1
China	17
Hong Kong	2
Indonesia	2
India	19
Japan	9
Korea	7
Malaysia	1
Nepal	1
Pakistan	3
Philippines	3
Singapore	1
Taiwan	3
Thailand	1

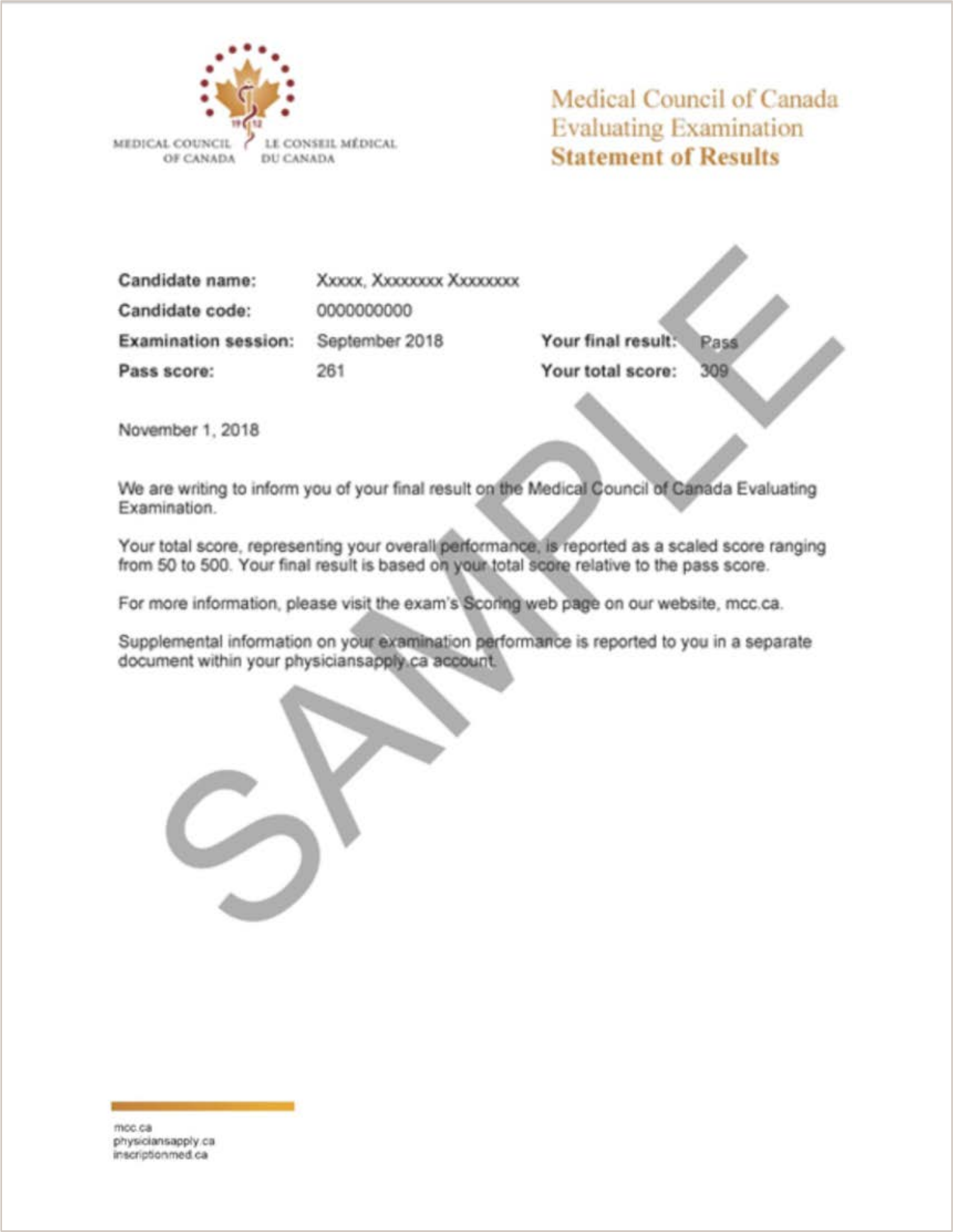
AFRICA

Country	# of Centres
Botswana	1
Ghana	1
Kenya	1
Mauritius	1
Nigeria	(closed)
South Africa	2
Tanzania	1
Uganda	1
Zimbabwe	1

MIDDLE EAST

Country	# of Centres
Egypt	2
Israel	2
Jordan	1
Kuwait	1
Lebanon	2
Saudi Arabia	3
United Arab Emirates	1
West Bank	1

APPENDIX B: STATEMENT OF RESULTS (SOR) EXAMPLE



MEDICAL COUNCIL OF CANADA
LE CONSEIL MÉDICAL DU CANADA

Medical Council of Canada
Evaluating Examination
Statement of Results

Candidate name:	Xxxxx, Xxxxxxxx Xxxxxxxx		
Candidate code:	0000000000		
Examination session:	September 2018	**Your final result:**	Pass
Pass score:	261	**Your total score:**	309

November 1, 2018

We are writing to inform you of your final result on the Medical Council of Canada Evaluating Examination.

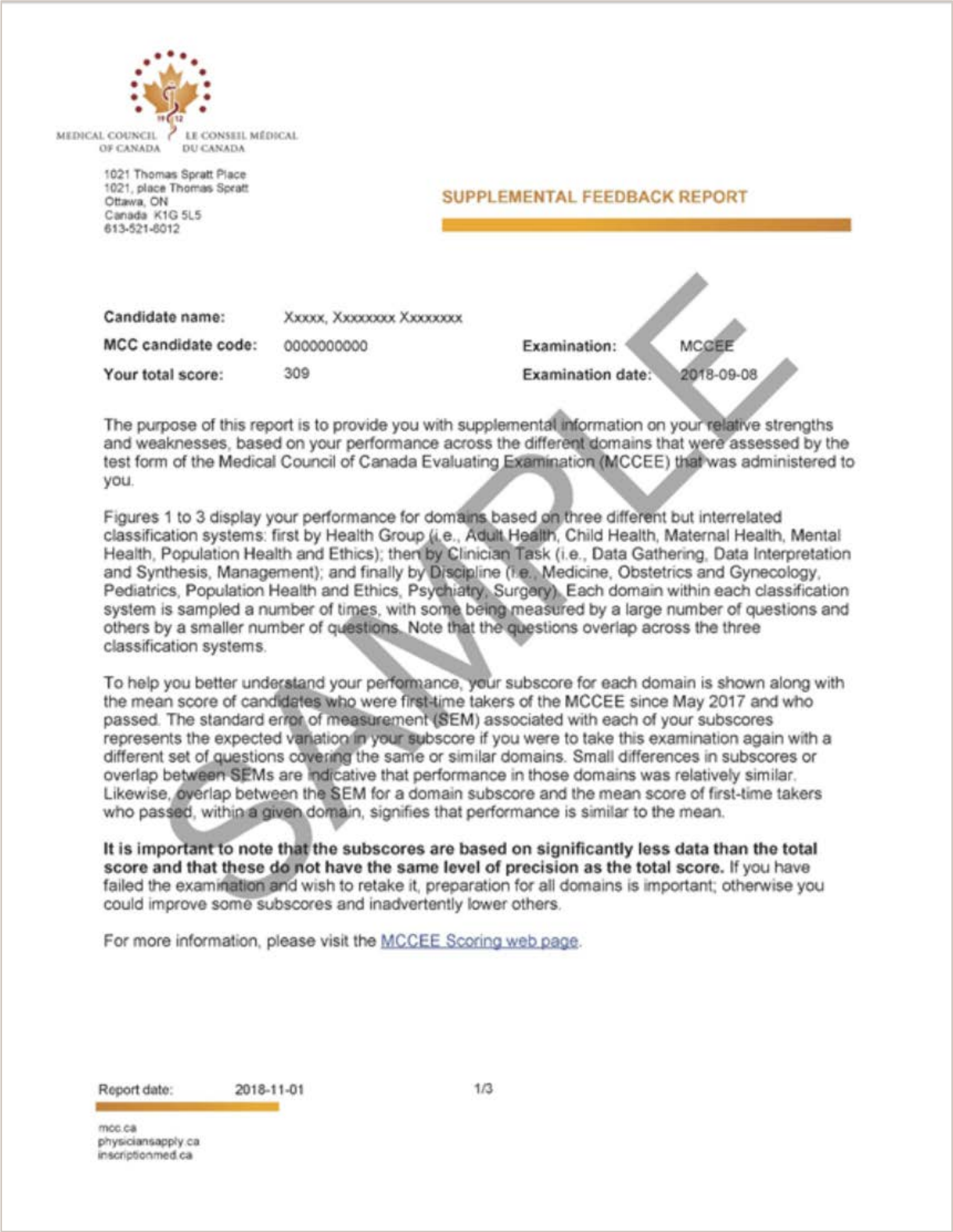
Your total score, representing your overall performance, is reported as a scaled score ranging from 50 to 500. Your final result is based on your total score relative to the pass score.

For more information, please visit the exam's Scoring web page on our website, mcc.ca.

Supplemental information on your examination performance is reported to you in a separate document within your physiciansapply.ca account.

mcc.ca
physiciansapply.ca
inscriptionmed.ca

APPENDIX C:
SUPPLEMENTAL FEEDBACK REPORT (SFR) EXAMPLE



MEDICAL COUNCIL OF CANADA | LE CONSEIL MÉDICAL DU CANADA

1021 Thomas Spratt Place
1021, place Thomas Spratt
Ottawa, ON
Canada K1G 5L5
613-521-6012

SUPPLEMENTAL FEEDBACK REPORT

Candidate name:	Xxxxx, Xxxxxxxx Xxxxxxxx		
MCC candidate code:	0000000000	**Examination:**	MCCEE
Your total score:	309	**Examination date:**	2018-09-08

The purpose of this report is to provide you with supplemental information on your relative strengths and weaknesses, based on your performance across the different domains that were assessed by the test form of the Medical Council of Canada Evaluating Examination (MCCEE) that was administered to you.

Figures 1 to 3 display your performance for domains based on three different but interrelated classification systems: first by Health Group (i.e., Adult Health, Child Health, Maternal Health, Mental Health, Population Health and Ethics); then by Clinician Task (i.e., Data Gathering, Data Interpretation and Synthesis, Management); and finally by Discipline (i.e., Medicine, Obstetrics and Gynecology, Pediatrics, Population Health and Ethics, Psychiatry, Surgery). Each domain within each classification system is sampled a number of times, with some being measured by a large number of questions and others by a smaller number of questions. Note that the questions overlap across the three classification systems.

To help you better understand your performance, your subscore for each domain is shown along with the mean score of candidates who were first-time takers of the MCCEE since May 2017 and who passed. The standard error of measurement (SEM) associated with each of your subscores represents the expected variation in your subscore if you were to take this examination again with a different set of questions covering the same or similar domains. Small differences in subscores or overlap between SEMs are indicative that performance in those domains was relatively similar. Likewise, overlap between the SEM for a domain subscore and the mean score of first-time takers who passed, within a given domain, signifies that performance is similar to the mean.

It is important to note that the subscores are based on significantly less data than the total score and that these do not have the same level of precision as the total score. If you have failed the examination and wish to retake it, preparation for all domains is important; otherwise you could improve some subscores and inadvertently lower others.

For more information, please visit the MCCEE Scoring web page.

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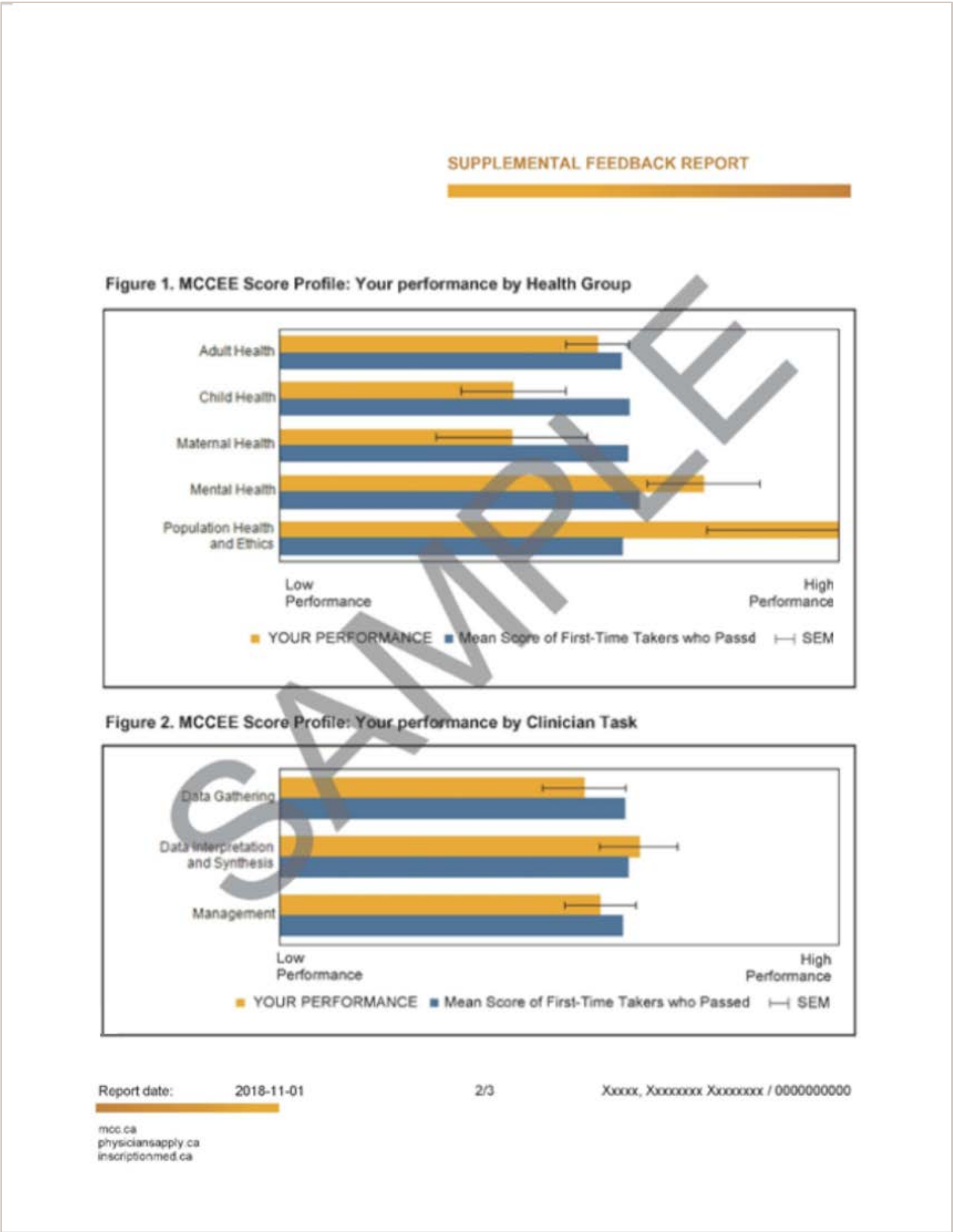

SUPPLEMENTAL FEEDBACK REPORT

Figure 1. MCCEE Score Profile: Your performance by Health Group

Adult Health
Child Health
Maternal Health
Mental Health
Population Health and Ethics
Low Performance
High Performance
■ YOUR PERFORMANCE
■ Mean Score of First-Time Takers who Passd
⊢⊣ SEM

Figure 2. MCCEE Score Profile: Your performance by Clinician Task

Data Gathering
Data Interpretation and Synthesis
Management
Low Performance
High Performance
■ YOUR PERFORMANCE
■ Mean Score of First-Time Takers who Passed
⊢⊣ SEM

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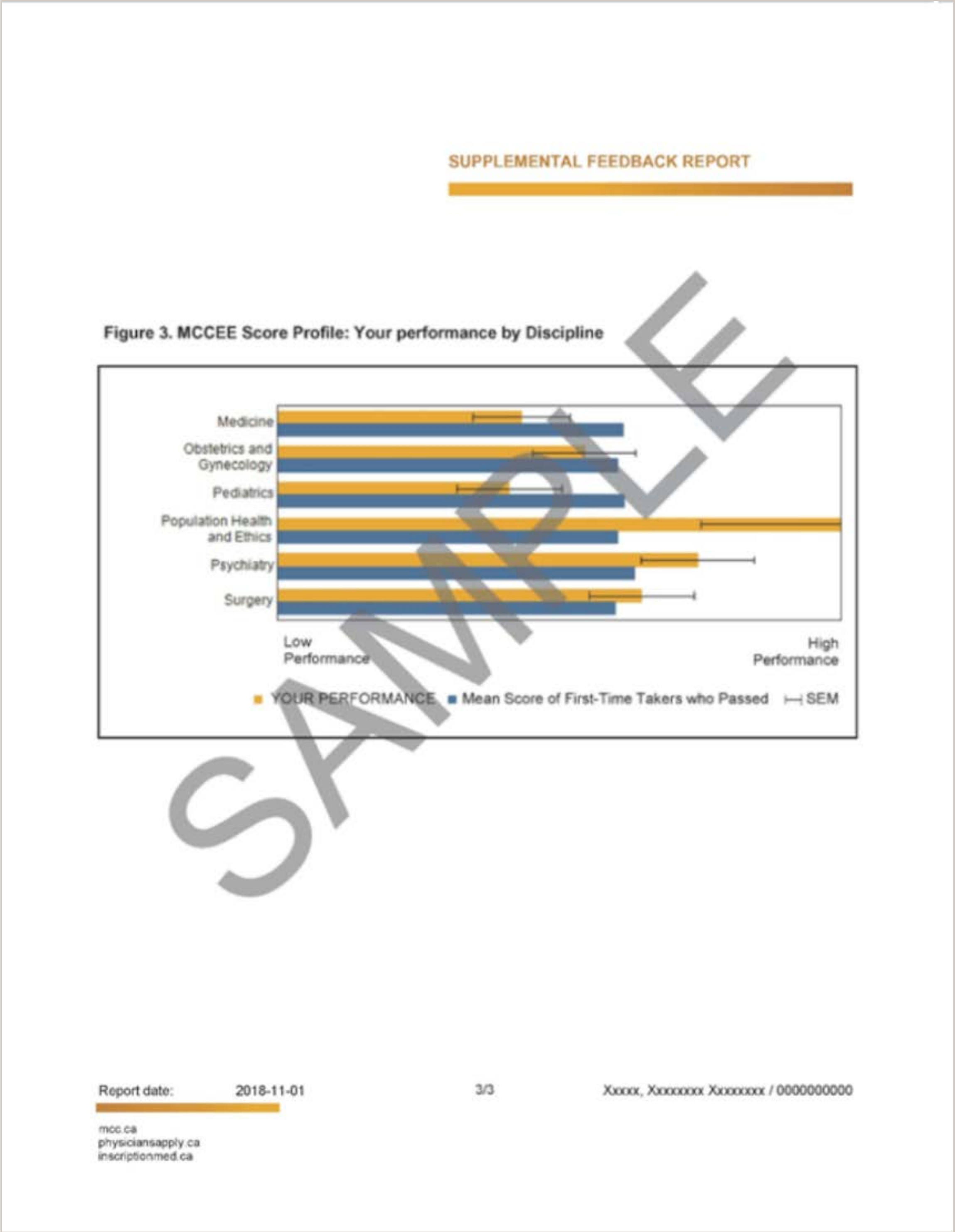

SUPPLEMENTAL FEEDBACK REPORT

Figure 3. MCCEE Score Profile: Your performance by Discipline

Medicine
Obstetrics and Gynecology
Pediatrics
Population Health and Ethics
Psychiatry
Surgery
Low Performance
High Performance
YOUR PERFORMANCE
Mean Score of First-Time Takers who Passed
SEM

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