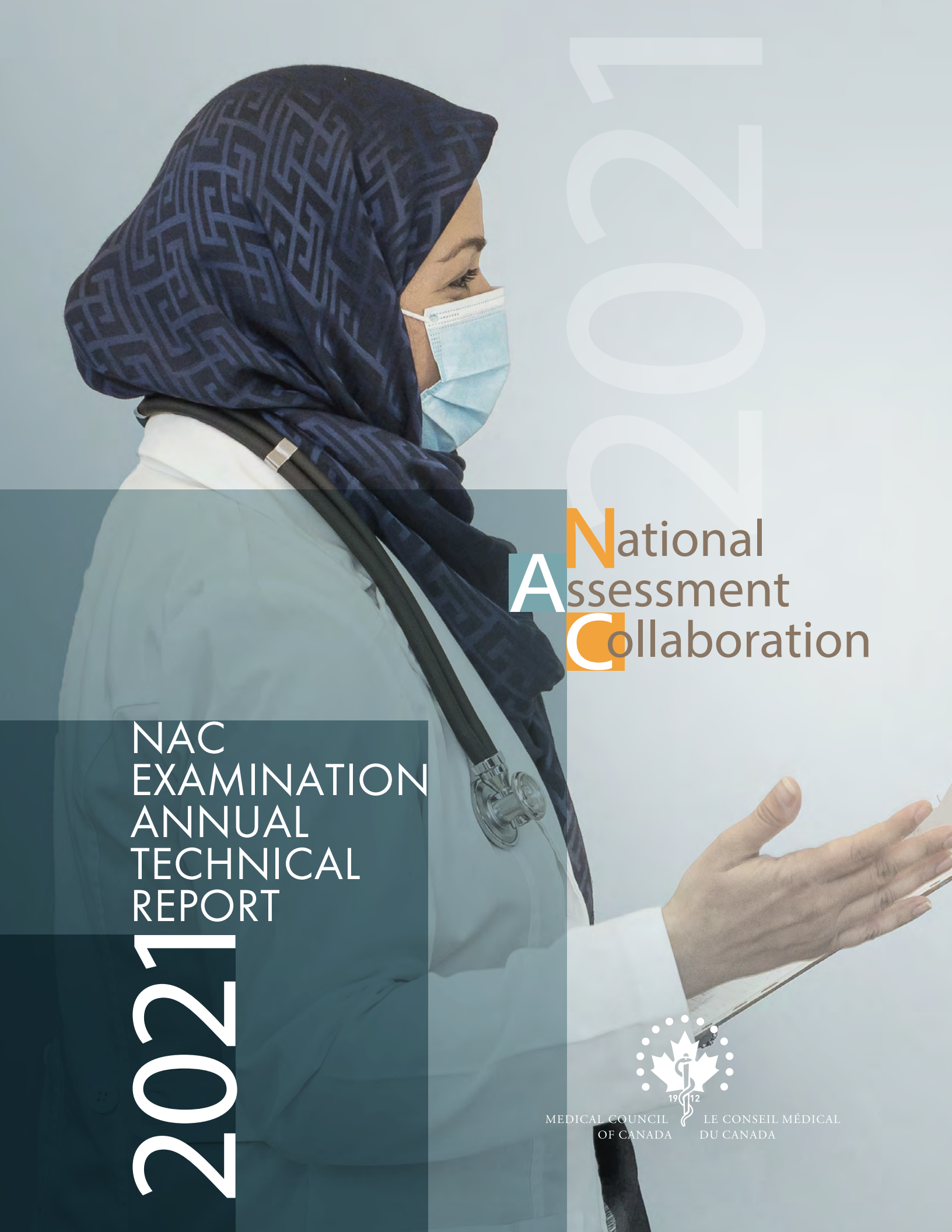

National Assessment Collaboration

# NAC EXAMINATION ANNUAL TECHNICAL REPORT

2021

MEDICAL COUNCIL OF CANADA
LE CONSEIL MÉDICAL DU CANADA

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# OVERVIEW

In response to the 2004 *Report of the Canadian Task Force on Licensure of International Medical Graduates* (Federal/provincial/territorial Advisory Committee on Health Delivery and Human Resources, 2004), the Medical Council of Canada (MCC) began a series of related initiatives to support the assessment and training of International Medical Graduates (IMGs) in Canada. A steering committee was created and convened from 2005 to 2009 to develop a framework and governance structure for a National Assessment Collaboration (NAC).

The NAC is an alliance of Canadian organizations that are streamlining the evaluation process for international medical graduates (IMGs) seeking a licence to practise medicine in Canada. A significant development of the NAC program is the pan-Canadian objective structured clinical examination (OSCE), known as the NAC Examination ("NAC exam"). The purpose of the NAC exam is to assist the clinical residency programs of Canadian medical schools in selecting IMGs into the first year of postgraduate training. The intent of this national exam is to avoid duplication of assessments performed by provincial IMG assessment programs. Residency program directors are able to use candidate results to assist in making decisions about which IMG candidates are best qualified for entry into their programs. In 2021, the NAC exam was delivered in eight sites in Alberta, Manitoba, Nova Scotia, Ontario, and Saskatchewan, and it was mandatory for application to the Canadian Resident Matching Service (CaRMS) in all provinces.

The NAC Examination Committee (NEC)[1] oversaw the creation and maintenance of the NAC exam content. The NEC ensured that all content adheres to the NAC exam Blueprint, and that the overall exam content and format meet NAC guidelines. The Examination Oversight Committee (EOC) approved the release of results.

Policies and procedures have been established to ensure comparability of results from year

[1] The NEC was amalgamated with another MCC committee, the Central Examination Committee, in 2021, called the Exam Oversight Committee.

to year, faster release of results over time, and uniform quality control and quality assurance across exam dates and jurisdictions. To this end, the MCC has developed and continues to update a library of structured procedures that help maintain uniformity in administration across regions and sites, as well as provide the basis for support materials for standardized participants (SPs) and examiners[2]. The standardization of procedures is necessary to support the validity argument that differences in test scores are due to differences in candidates' abilities as assessed by the NAC exam and not to extraneous differences. Additionally, these policies and procedures are necessary for high-volume testing programs, such as the NAC, where the exam sessions may be geographically distributed, and results must be comparable and uniform in quality.

This report summarizes exam administration aspects as well as key psychometric properties of the four test forms for the NAC exam that took place in 2021.

Due to the COVID-19 pandemic, changes to the structure of the content, format and delivery were made to the September 2020 NAC exam to ensure the safety of all involved in the exam. The changes due to COVID-19 were also implemented for 2021.

[2] In all stations, an examiner marks the candidate while interacting with the SP. In most cases, the examiner will be a physician. However, in some cases the examiner may be another medical professional. All examiners are trained to use standardized scoring tools to observe and assess candidate performance.

# 1. EXAM DEVELOPMENT

This section describes the Blueprint and test specifications for the NAC exam, the format of the exam, how exam content is developed, and the scale and criteria used to rate competencies.

## Blueprint and test specifications

The NAC Blueprint was drafted over a series of meetings between 2009 and 2010 by a group of assessment experts and ratified by the NAC Steering Committee in 2010. From 2011 to 2018, the NAC Steering Committee's successor group, the NEC, maintained the original blueprint except for the testing of therapeutic knowledge. In 2014, the NAC Therapeutics Examination (a written exam) was removed from the Blueprint, and the testing of this knowledge was incorporated into the testing of clinical management skills to create a revised Management & Therapeutics competency. In 2015, the NEC struck a subcommittee to consider and recommend updates to the NAC exam, and in 2019 those changes, which include the removal of Language Fluency and Organization as measured competencies, the use of key featured checklist items, and the introduction of a more streamlined scoring process, took effect. See **Table 1** for the updated Blueprint and test specifications.

Test specifications were developed for the NAC exam and approved by the NEC to meet the Blueprint and ensure that similar content is measured on each of the test forms. Adhering to a Blueprint and test specifications ensures that candidates are measured on similar content across different test forms of the exam. All exam test forms are constructed by selecting OSCE cases/stations to best represent NAC test specifications.

**Table 1** outlines the test specifications for the NAC exam and provides a summary of the required content and skills to be assessed in a test form, including clinical competencies, systems, disciplines, and patient age groups. An additional constraint of gender is also included to ensure the proportional distribution of patient gender across stations.

***Table 1**: Test specifications for October 2021 NAC Examination*

| DISCIPLINE | Recommended stations, No. | SYSTEM | Recommended stations, No. |
|---|---|---|---|
| Medicine | 2–4 | Respiratory | ≥ 1 |
| Surgery | 2–4 | Cardiovascular | ≥ 1 |
| Psychiatry | 1–2 | Gastrointestinal | ≥ 1 |
| OB/GYN [a] | 1–2 | Musculoskeletal | 2–3 |
| Pediatrics | 1–2 | Genitourinary | |
| Geriatric medicine | 1–2 | Endocrine | |
| Urgent care | 1 | Neurologic | |
| [a] *OB/GYN: Obstetrics and Gynecology* | | Mental health | 2–3 |
| | | Reproductive Health | |
| | | Multisystem | |
| **CLINICAL COMPETENCY** | **Recommended stations, No.** | **AGE [b]** | **Recommended stations, No.** |
| History taking | 6–7 | 0–2 mo (newborn) | 1–2 |
| Physical examination | 1 | 2–23 mo (infant) | |
| Combined history and physical examination | 2–3 | 2–5 yr (preschool child) | |
| Communication skills | ≥ 6 | 6–12 yr (child) | |
| Diagnosis | ≥ 3 | 13–17 yr (adolescent) | 1–2 |
| Data interpretation | ≥ 3 | 18–44 yr (young adult) | 4–5 |
| Investigations | ≥ 3 | 45–64 yr (adult) | |
| Management [c] | ≥ 3 | ≥ 65 yr (older adult) | 2–3 |
| | | **GENDER [d]** | |
| | | Of 10 stations, no more than 60% should be male or female | |

[b] *AGE of actual participant, not necessarily the SP's age*
[c] *Up to 20% must be therapeutics-specific*
[d] *GENDER of actual participant, not necessarily the SP's gender*

## Content changes due to COVID-19 protocols

Under normal circumstances, in addition to completing ten operational stations, candidates would complete two pilot stations that did not count towards the final score. However, the pilot stations were replaced with wait stations for the October 2021 exam session.

Additionally, stations that included a physical examination, where the candidates would normally demonstrate their skills by physically examining the SP, were adjusted to a "described" or "verbalized" physical examination. Candidates were asked to tell the examiner

what physical examination manoeuvres they would perform and describe what they were examining and why. Then the examiner would verbally provide physical examination findings as appropriate. The “normal” blueprint constraints call for one station with a physical examination only (no history-taking component), and for the purposes of the October 2021 NAC, that station was removed and replaced by a combined history-physical station.

### Exam content

NAC exam content is developed by a panel of clinical subject matter experts along with experts in medical education and assessment. In this reporting year, there were several content development workshops where OSCE cases/stations were written, peer-reviewed and approved for use.

To ensure that all NAC exams are comparable, each test form or iteration of the exam must meet specific testing criteria (see **Table 1** for test specifications).

### Content validity

Measuring how well a test form matches the test specifications is one piece of evidence supporting the validity of score interpretations for the intended purpose of the examination (Kane, 2006; 2013). This section highlights the test specifications and how well each test form measures the required content and skills.

The NEC works with MCC staff to select and approve the stations for a given test form. The test forms are drafted by the NAC test development officer (TDO) in accordance with the test specifications. The NEC then reviews the test forms, including individual stations, to ensure that test specifications are met and that content is at the appropriate assessment level—that of a recent graduate from a Canadian medical school. The NEC approves the final version of the content for each test form. For security reasons, each exam sitting uses a different test form.

**Table 2** shows the sampling of test specification characteristics, clinical competencies, and number of stations for each form. The “Recommended Stations” column specifies the desired number of stations for each test form for each clinical competency, discipline, gender, system, and age group. There were four test forms administered in October (Forms 1 to 4).

*__Table 2__: Sampling of OSCE content by test specifications for October 2021 test forms*

| | | Recommended stations, No. | Form 1 | Form 2 | Form 3 | Form 4 |
|---|---|---|---|---|---|---|
| **CLINICAL COMPETENCY** | History taking | 6–7 | 7 | 7 | 7 | 7 |
| | Physical examination | 1 | 0 | 0 | 0 | 0 |
| | Combined history taking and physical examination | 2–3 | 3 | 3 | 3 | 3 |
| | Communication skills | ≥ 6 | 10 | 10 | 10 | 10 |
| | Diagnosis | ≥ 3 | 7 | 7 | 6 | 7 |
| | Data interpretation | ≥ 3 | 4 | 6 | 3 | 3 |
| | Investigations | ≥ 3 | 3 | 4 | 5 | 5 |
| | Management [a] | ≥ 3 | 8 | 8 | 7 | 9 |
| **DISCIPLINE** | Medicine | 2–4 | 5 | 6 | 5 | 3 |
| | Surgery | 2–4 | 2 | 2 | 3 | 3 |
| | Psychiatry | 1–2 | 2 | 1 | 1 | 2 |
| | OB/GYN [b] | 1–2 | 1 | 1 | 1 | 2 |
| | Pediatrics | 1–2 | 1 | 2 | 3 | 3 |
| | Geriatric medicine | 1–2 | 1 | 1 | 1 | 2 |
| | Urgent care | 1 | 3 | 1 | 1 | 2 |
| **GENDER [c]** | Of 10 stations, no more than 60% should be female or male | | M = 6<br>F = 4 | M = 4<br>F = 6 | M = 5<br>F = 4<br>E = 1 | M = 5<br>F = 5 |
| **SYSTEM** | Respiratory | ≥ 1 | 2 | 1 | 1 | 1 |
| | Cardiovascular | ≥ 1 | 1 | 1 | 2 | 1 |
| | Gastrointestinal | ≥ 1 | 2 | 2 | 1 | 1 |
| | Musculoskeletal | 2–3 | 3 | 4 | 3 | 3 |
| | Genitourinary | | | | | |
| | Endocrine | | | | | |
| | Neurologic | | | | | |
| | Mental health | 2–3 | 7 | 6 | 4 | 4 |
| | Reproductive health | | | | | |
| | Multisystem | | | | | |
| **AGE [d]** | 0–2 mo. (newborn) | 1–2 | 1 | 2 | 2 | 1 |
| | 2–23 mo. (infant) | | | | | |
| | 2–5 yr. (preschool child) | | | | | |
| | 6–12 yr. (child) | | | | | |
| | 13–17 yr. (adolescent) | 1–2 | 1 | 1 | 1 | 2 |
| | 18–44 yr. (young adult) | 4–5 | 6 | 5 | 5 | 5 |
| | 45–64 yr. (adult) | | | | | |
| | ≥ 65 yr. (older adult) | 2–3 | 2 | 2 | 2 | 2 |

*[a] Up to 20% must be therapeutics-specific*

*[b] OB/GYN: Obstetrics and Gynecology*

*[c] GENDER of actual participant, not necessarily the SP's gender*

*[d] Age of actual participant, not necessarily the SP's age*

## Exam format

For each administration, the NAC exam test forms comprised 10 operational 11-minute OSCE stations and two wait stations. The overall exam is designed to assess seven clinical competencies: communication skills, data interpretation, diagnosis, history taking, investigations, physical examination, and management.

In each station, a standardized participant (SP) portrayed the clinical scenario, and each candidate's performance was evaluated by an examiner. Each station measured up to seven clinical competencies.

Standardized procedures, including training for examiners and SPs and data analyses, were followed to ensure that the NAC exam results were comparable across test forms for all candidates.

## Scoring candidate performance

Examiners rated candidate performance relative to the standard of a recent graduate from a Canadian medical school. The scoring tools use a combination of short, key-featured checklists and rating scales.

The key features methodology gives score points to only the critical or key steps a physician must take to manage the patient's case effectively. Both the patient interaction component and the oral question component (if applicable by station) are scored in this key-featured format.

Examiners also scored the candidates' proficiency on a number of competencies on a five-point Likert-type scale. The five rating points, along with a description of the acceptable performance level for each competency, are described in **Appendix A** and **Appendix B**.

Orientation and training materials were given to examiners to provide more specific context for these scoring tools.

Each station had one examiner and, by the conclusion of the exam, each candidate had been evaluated by examiners on 10 operational stations. The scores from the 10 operational stations provided by each examiner were used to calculate all scores as described in the Exam Scoring section.

# 2. EXAM ADMINISTRATION

This section describes procedures to standardize exam administration, including candidate orientation, responsibilities of exam administration staff, SP training, role of CEs, and examiner recruitment and training.

### Exam sites and candidate numbers

The exam sites and number of candidates for each test form in October 2021 are depicted in **Table 3**.

*__Table 3__: NAC candidate numbers by test form for the October 2021 administration*

| | SITES | Total candidates, No. | First-time test takers, No. | Repeat test takers, No. |
|---|---|---|---|---|
| **Test form 1** | AB – Calgary | 385 | 294 | 91 |
| | – Edmonton | | | |
| | MB – Winnipeg | | | |
| | ON – Ottawa | | | |
| | – Sudbury | | | |
| | – Toronto | | | |
| **Test form 2** | AB – Calgary | 338 | 272 | 66 |
| | – Edmonton | | | |
| | MB – Winnipeg | | | |
| | NS – Halifax | | | |
| | ON – Ottawa | | | |
| | – Sudbury | | | |
| | – Toronto | | | |
| **Test Form 3** | AB – Edmonton | 313 | 220 | 93 |
| | ON – London | | | |
| | – Ottawa | | | |
| | – Toronto | | | |
| | SK – Saskatoon | | | |
| **Test Form 4** | AB – Edmonton | 271 | 196 | 75 |
| | ON – London | | | |
| | – Ottawa | | | |
| | – Toronto | | | |
| | SK – Saskatoon | | | |
| **Total** | | **1,307** | **982** | **325** |

## Candidate orientation

The MCC provides detailed information about the NAC exam for candidates on the MCC website. Topics include what to expect on exam day, scoring and results, and registration information.

For the October 2021 exam sessions, candidate orientations were online. Candidates were not given a face-to-face orientation but were given exam-day reminders and a chance to ask questions before the exam.

## NAC administration under COVID-19 protocols

The MCC worked closely with the examination sites throughout the summer and fall of 2021. The sites continued to enforce the COVID-19 changes made to the delivery and administration of the September 2020 NAC examination to ensure the health and safety of all exam participants.

Social distancing measures and proper usage of personal protective equipment (PPE) were enforced on exam day, including all encounters. All participants wore face masks covering their nose and mouth, adhered to sanitizing protocols, and signed and passed a COVID-19 screening questionnaire. Hand sanitizer was placed in each station and strategically placed throughout the exam sites, and support staff would sanitize items that were regularly touched, such as doorknobs and pencils.

To limit the number of people at the exam sites, SP rotations were removed, sites issued staggered track arrival times, candidate catering services and sequestering were removed, orientations and training were implemented online, and groups were registered and deregistered individually to avoid contact.

To follow local public health and institutional guidelines, proof of vaccination (POV) protocols were implemented in all nine (9) exam sites. Since all sites had different policies and requirements, the MCC sent tailored communications to each candidate, based on their assigned exam site, to ensure that they were aware of the POV requirements, or alternatives, well ahead of their exam day.

### Exam administration staff

Each exam site is responsible for recruiting and supervising exam administration staff, who work with the MCC to ensure the security of exam materials and the quality of performance of all people involved in the exam (SP trainers, SPs, CEs, examiners, exam day staff, caterers). NAC policies and procedures provided by the MCC ensure the standardization of the exam administration. On exam days, MCC staff oversees site staff across the country, either in person or via electronic communication. MCC also offers an assistance line.

### Standardized participant training

Each site is responsible for hiring and supervising the SP trainers who, in turn, oversee the SPs and assure the quality of their standardized performance on exam days. SPs are trained at each site using standardized NAC training material provided by the MCC. Training support is provided centrally to SP trainers by MCC staff, primarily by the NAC training officers.

For the October 2021 sessions of the exam, SPs were trained and the dry runs were conducted online.

### Chief examiners

All NAC exam sites employ physicians as CEs. The role of the CE depends on exam site size and on how the site administrator chooses to delegate tasks.

Each CE is responsible for the following:

- Assisting with examiner recruitment and training if needed
- Assisting with the dry runs of SPs before exam day, including a final assessment of SPs' readiness to perform in a standardized manner according to their patient scripts on exam day
- Overseeing examiners and candidates on exam day
- Addressing, where appropriate, candidates' questions, concerns, and complaints on exam day
- Reviewing and signing all incident reports recorded on exam day

**Note:** One exam site, Nova Scotia, also hires a deputy registrar to share responsibilities with the CE.

### Common examiner recruitment requirements for all MCC exams

Requirements are as follows:

- Examiners or markers must be registered and in good standing with a medical regulatory authority in Canada
- Examiners or markers may be retired, but they must have an active licence with a medical regulatory authority in Canada
- Examiners or markers must be practising in Canada or they must have practised in Canada within the last 5 years
- All examiners and markers must adhere to the MCC Code of Business Conduct
- Examiners or markers must have the ability and stamina to complete the task (e.g., uncorrected hearing loss can seriously affect the ability to score an exam)

All exceptions must be approved by the examination manager.

### NAC exam recruitment requirements for examiners

Examiners must meet **all** of the common examiner recruitment requirements for all MCC exams. Additionally, examiners for the NAC exam must meet the following requirements:

Physicians must have the Licentiate of the Medical Council of Canada (LMCC) and must provide their LMCC registration number. Other physician examiner requirements are as follows:

- Physicians must have recent experience supervising clerks and/or postgraduate training year 1 residents, and/or they must have experience as an examiner at this level of training
- Physicians may be community physicians (i.e., they do not need to be faculty members if all other criteria are met)
- Physicians must be currently practising medicine in Canada; if they are a resident physician, they must be postgraduate training year 3 or higher or have CFPC certification at the time of the examination
- If retired, physicians must be within three years of practising in Canada

Physicians who do not have their LMCC will be accepted as examiners under the following conditions:

- Non-licentiate examiners must be faculty members (e.g., faculty lecturer, assistant professor, associate professor, professor);

  **and**

- non-licentiate examiners must be certified by and provide their certification number for one of the following:
  - Royal College of Physicians and Surgeons of Canada
  - Collège des médecins du Québec
  - The College of Family Physicians of Canada (CFPC);

  **and**

- non-licentiate examiners must sign a waiver indicating that they have no intention of taking the NAC Examination.

The MCC provides training to standardize examiner scoring to the exam standard using a scoring exercise with guided discussions. It provides pre-exam online training for all new and returning examiners.

For the October 2021 exam sessions, the examiner orientations were modified to be completed online. Examiners were given exam-day reminders and had an opportunity to ask questions before the exam.

# 3. EXAM SCORING

In this section, we describe the quality assurance and quality control procedures related to the scoring of the NAC exam as well as what scores are reported and how they are calculated.

### Standard quality assurance and quality control procedures

To ensure the accuracy and integrity of the candidates' exam day electronic records, a number of data quality assurance steps are performed as outlined below. Examiners complete a score sheet for every candidate seen in their OSCE station. These score sheets are scanned at the exam sites and transmitted securely to the MCC. The MCC staff import the score sheets into OpenText's TeleForm, a form-processing program, where they are reviewed. Scanning anomalies are identified (for example, an unreadable candidate barcode, examiners' pencil marks that are too faint) and corrections are made. The data are then exported electronically into a scoring application for preliminary scoring and the results are used to generate a list of candidates who fall within 10 points above and below the pass score. Once the paper copies of the score sheets arrive at MCC, all the sheets for this candidate group are reviewed by staff for discrepancies against the electronic data reports. Although rare, any differences are corrected in the electronic data files to reflect the paper score sheets. The updated electronic files are then reimported into the scoring application for final scoring and scale score transformation for all candidates. All scores are also calculated independently in parallel using the statistical analysis system (SAS) and compared to the results from the scoring application. All values must match before results are released to candidates.

### Exam result approval

NAC exam results are reviewed by the EOC, which approves the release of results after each administration, including reconsiderations. Once approved by the EOC, results are imported to physiciansapply.ca and released to candidates.

When an incident occurs during the exam that may impact a candidate's performance, it is reviewed as a reconsideration as per the processes and policies ratified by the EOC. Depending on the nature of the incident (e.g., illness, fire alarm, SP misportrayal, a candidate's inappropriate behaviour), a decision may be made to remove a station from a

candidate's exam or award a candidate a No Standing or a Denied result.

A No Standing result indicates that procedural irregularities in the exam process may have seriously affected the performance of the candidate and/or may have prevented a reliable assessment of the candidate's knowledge and abilities. A No Standing result does not count towards a candidate's number of attempts.

A Denied result indicates that a candidate has been found to have committed an infraction related to the MCC's examination process and/or breached confidentiality of the exam. A Denied result counts as an attempt towards a candidate's total number of attempts. Additionally, candidates that are given a Denied result may be denied eligibility to one or more future MCC exams for a specified period.

### Exam result reporting

About one week after results are released to candidates, the MCC issues a Statement of Results (SOR) and a Supplemental Information Report (SIR) to each candidate through their physicianapply.ca account (see **Appendix C** for an SOR example and **Appendix D** for an SIR example). The SOR includes the candidate's final result and total score, as well as the pass score. The SIR includes the candidate's final result, total score and additional information in graphic display about the candidate's domain subscores and comparative information.

The total score is reported on a standard-score scale ranging from 1300 to 1500. In contrast, the score profile in Figure 1 of the sample SIR in **Appendix D** displays a candidate's domain subscores in terms of a percentage. As a result, total scores cannot be compared to domain subscores in the SIR as they are reported on different scales. Additionally, it is important to note that because subscores have fewer items than total scores, subscores have less measurement precision. Subscores are provided to individual candidates for feedback only and are not meant to be used by organizations for selection.

The following sections outline the steps in creating the results reported to candidates, IMG programs and the CaRMS.

### Scale scores

The scale score is a candidate's total score reported on a scale that ranges from 1300 to

1500 (as opposed to a candidate's total raw score that is on a percentage metric). Deriving the scale score for the October 2021 NAC exam involves three steps.

***Step 1: Calculate total raw scores***

The first step in deriving a total raw score is to calculate the station score for each OSCE station with the following formula:

$$station\ score = \frac{sum\ of\ a\ candidate's\ item\ scores}{sum\ of\ maximum\ possible\ item\ scores} * 100$$

where the numerator is the sum of each candidate's scores on each item i for that station and the denominator is the sum of the maximum possible score for each item for that station. For example, a station with several checklist items, oral questions, and competency rating scales could result in the following score:

$$station\ score = \frac{1+0+1+1+4+0+3+2+3}{1+1+1+1+4+4+4+4+4} * 100 = \frac{15}{24} * 100 = 62.5$$

The station scores are then used to calculate the total raw score for each candidate using the following formula:

$$total\ raw\ score = (\text{sum of } 10 \text{ station scores})/10$$

Since station scores are based on the sum of the candidate's item scores for that station, missing data needs to be taken into account so that it does not negatively impact a candidate's score. Missing data occurs when the examiner does not provide a score for an oral question or does not provide a rating for a competency for a given candidate on the score sheet. When this occurs, the station score is based on the item scores provided by the examiner.

In the above example, if the last item is missing from a candidate's score sheet, it is excluded from both numerator and denominator when calculating this candidate's station score as shown below.

$$station\ score = \frac{1+0+1+1+4+0+3+2}{1+1+1+1+4+4+4+4} * 100 = \frac{12}{20} * 100 = 60$$

The station score would have been 50% if the missing item were treated as zero and the adjustment not applied. However, to be fair to the candidate, we exclude the missing item

from the calculation of the station score and would use a station score of 60% instead.

***Step 2: Linking***

This step is to link through common stations the scores from the October 2021 test forms to scores from previous test forms through a chain of linking steps dating back to a test form in September 2020 that was used for setting the cut score and establishing the scale.

As described in Section 1, Exam Development, multiple test forms are used each year for security reasons. All test forms are assembled based on the same Blueprint and test specifications, so they are as similar as possible in terms of content coverage. However, they may slightly differ in difficulty due to variations in clinical scenarios and tasks sampled on each test form.

The process of linking total scores statistically takes into account small differences in test form difficulty and adjusts total scores for the test form being linked so that all scores are on the same metric and can be compared. Linking also provides a way to apply the same pass score to candidates who take different test forms.

One method to link test forms is to have a subset of content appear identically across test forms. This is a common-item non-equivalent anchor test (NEAT) design. The subset of content that is presented identically is called an anchor set. The rule of thumb for determining the number of items in an anchor set for a multiple-choice exam is 20% of the total test or 20 items, whichever is greater, to ensure that the anchor set is representative of the total test in terms of content and difficulty. Since the NAC exam is an OSCE with a small number of stations (less than 20), we use a 30% rule. The anchor set is used to statistically estimate the overall ability of candidates that took each test form and the difficulty of each test form into account.

For the October 2021 NAC exam test forms, an anchor set was based on three stations. A reference group of first-time test takers was used for all linking calculations. The linking calculations from this reference group is applied to all candidates to calculate each candidate's linked score. This linked score is then transformed as described in Step 3 below. For the linking steps, the Tucker observed-score method was employed (Kolen & Brennan, 2004). Full details of the method can be found in *Test equating, scaling, and linking: methods and practice* (3rd ed.) authored by Kolen and Brennan (2014).

***Step 3: Scale score transformation***

This step is to convert the linked total scores for the October 2021 test forms to scale scores that are reported to candidates and IMG programs. Once total scores are calculated and linked to the base test form, the linked scores are transformed into scale scores ranging from 1300 to 1500 for reporting purposes. The score scale was established using the September 2020 session results to have a mean of 1400 and a standard deviation (SD) of 25. This final transformation ensures that any differences in scale score means and SDs on the current test forms can be directly compared to the test form of September 2020 for which the pass score was established. The final score transformation formula is as follows:

$$ScaleScore_X = (slope)(LinkedScore_X) + (intercept)$$

where

> $ScaleScore_X$ is defined as the linear function to calculate the scale score for candidate *X*, $slope$ is equal to 2.53 based on the transformation of the October 2021 NAC exam, $intercept$ is equal to 1246.28 based on the transformation of the October 2021 NAC exam, and $LinkedScore_X$ is the linked score for candidate *X*.

All scale scores are rounded to a whole number between 1300 and 1500. The reported scale scores as seen by candidates are these rounded values. For example, a passing candidate with a linked score of 83.5 would have a scale score of 1458:

$$ScaleScore_X = (2.53) * (83.50) + (1246.28) = 1457.54 \text{ rounded to } 1458$$

A failing candidate with a linked score of 34.77 would result in a scale score of 1334:

$$ScaleScore_X = (2.53) * (34.77) + (1246.28) = 1334.25 \text{ rounded to } 1334$$

## Pass/fail status

The pass score for this exam was set by a panel of 21 physicians from across the country, representing various specialties, demographics, and years of experience supervising students and residents. The panel recommended the pass score of 1374 through a rigorous standard-setting exercise in October 2020. It was subsequently approved for implementation by the NEC in November 2020. A test form from September 2020 was used to establish the pass score, and a contrasting group method was used for standard setting. Full details of the

standard-setting exercise can be found in the *Technical report on the standard-setting exercise for the NAC Examination* (July 2019). The established pass score of 1374 was used to assign each candidate either a pass or fail status[3].

### Domain subscores

Domain subscore calculations are used to create the figure in the candidates' SIRs. For each domain subscore, the associated items are converted to a percentage ranging from 0 to 100, where the total number of score points obtained by a candidate is divided by the maximum score points per domain, multiplied by 100.

For example, if a candidate received scores of five, seven, eight and one on a domain with associated maximum scores of 10, 10, nine and one, the total number of score points obtained by the candidate is 21, the maximum number of score points for this domain is 30. The domain subscore is 21/30 × 100 or 70.0. There are three subscores (reflecting three broad domains of physician activities) that are presented to candidates in their SIRs: Assessment & Diagnosis, Management, and Communication.

As a reminder, domain subscores should not be compared to scale scores as they are reported on different scales, and because they have fewer items than the scale scores, they have less measurement precision than scale scores. Domain subscores are intended to provide general feedback to candidates on their relative strengths and weaknesses in their performance on the NAC exam.

[3] A second cut score was used for September 2020 to differentiate between *pass* and *pass with superior performance*. This was only used for the September 2020 session.

# 4. PSYCHOMETRIC RESULTS

This section includes summary statistics for scale scores and pass rates, estimates of reliability, classification decisions, and a summary of station quality and domain subscore profiles. Results reviewed and approved by the EOC following the October 2021 administration are used in this section, excluding candidates whose status is No Standing or Denied.

## Scale scores

Summary statistics and pass rates from the October 2021 session are presented in **Table 4**. The score distribution is displayed in **Figure 1**. These statistics are based on the scale scores reported to candidates. The minimum, maximum, and SD are indicators of the variation in scale scores.

***Table 4**: Summary statistics of scale scores by test form for the October 2021 NAC Examination*

| | Candidates, No. | Min. score | Max. score | Mean score | Median score | SD[a] | Pass rate, % |
|---|---|---|---|---|---|---|---|
| **Test form 1[b]** | 384 | 1317 | 1461 | 1400.4 | 1403 | 26.3 | 84.1 |
| **Test form 2** | 338 | 1306 | 1452 | 1399.3 | 1402 | 23.8 | 87.0 |
| **Test form 3[b]** | 312 | 1300 | 1466 | 1394.0 | 1395 | 25.8 | 79.8 |
| **Test form 4** | 271 | 1300 | 1454 | 1395.6 | 1399 | 28.5 | 77.5 |
| **TOTAL** | **1305** | **1300** | **1466** | **1397.6** | **1400** | **26.1** | **82.5** |

*a SD: standard deviation*
*b One No Standing case was excluded from all calculations*

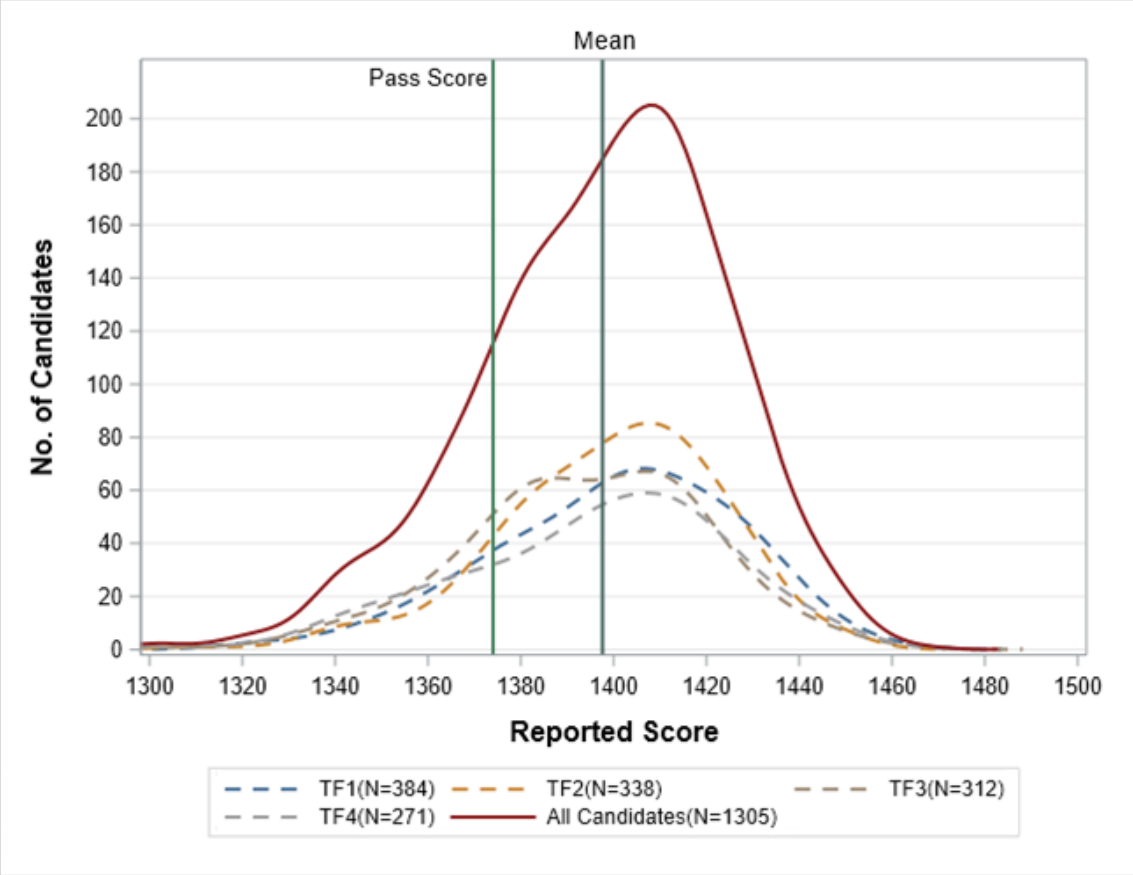



***Figure 1**. Score distribution by test form for the October 2021 NAC Examination*

## Estimates of score reliability and classification decisions

**Table 5** shows the reliability estimates, the standard error of measurement (SEM), the decision consistency and decision accuracy estimates along with the associated false positives and false negatives by test form.

## Cronbach's alpha

Cronbach's alpha was used to estimate score reliability for the NAC exam. A score reliability estimate indicates the desired consistency (or reproducibility) of exam scores across replications of measurement (Crocker & Algina, 1986; Haertel, 2006). Scores that are highly reliable are reproducible and consistent from one testing occasion to another. In other words, if the testing process was repeated with a group of test takers, essentially the same results

would be obtained. This reliability estimate is described in Educational Measurement by Haertel in section 2.4.4 (Haertel, 2006). The formula for Cronbach's alpha is:

$$_{\alpha}\rho_{XX'} = \frac{n}{n-1}\left(1 - \frac{\sum \sigma_{X_i}^2}{\sigma_X^2}\right)$$

where $n$ is the number of stations, $\sigma_{X_i}^2$ is the score variance for station *i*, and $\sigma_X^2$ is the variance of the total scores (Haertel, 2006, p. 74). As a rule, a reliability estimate greater than 0.80 on an OSCE is desirable. The reliability estimate in conjunction with the total exam standard error of measurement provides further evidence of the reliability of the candidate's scale score.

### Standard error of measurement

The standard error of measurement (SEM) provides a value that can be used to construct a confidence range (for example, +/- 1 SEM and +/- 2 SEM represent 68% and 95%, respectively) within which a candidate's observed score is expected to fluctuate if the candidate was to repeat the exam over and over again. The SEM value should be as small as possible so that the measurement of the candidate's ability contains as little error as possible. The SEM is calculated as follows:

$$SEM = \sigma_X\sqrt{1 - {}_{\alpha}\rho_{XX'}},$$

where $\sigma_X$ is defined as the SD for the total score (square root of the variance), and $_{\alpha}\rho_{XX'}$ is defined as the reliability estimate as shown above.

### Decision accuracy and decision consistency

Estimates indicating the consistency and accuracy of pass/fail decisions are important in providing validity and reliability evidence for candidate scores on one test form with possible equivalent test forms. To this end, the NAC exam uses the Livingston & Lewis (1995) procedure. Decision consistency is an estimate of the agreement between classifications on potential parallel test forms, and decision accuracy is the estimate of agreement between the observed classifications of candidates and those based on their true score (i.e., observed score ± measurement error). Ideally, both values should be high, such as 0.80 and above, suggesting reliable and valid pass/fail classifications.

**Table 5** shows the decision consistency and accuracy values along with associated false positive and false negative rates, reliability estimates, and the SEM for each test form for October 2021. The estimated false positive rates indicate 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 scores but who should pass based on their true ability.

*__Table 5__: Decision consistency, decision accuracy, reliability estimate, and SEM[a] by test form for the October 2021 NAC Examination*

| | Form 1[b] | Form 2 | Form 3[b] | Form 4 |
|---|---|---|---|---|
| Decision consistency | 0.88 | 0.90 | 0.84 | 0.86 |
| False-positive | 0.06 | 0.05 | 0.08 | 0.07 |
| False-negative | 0.06 | 0.05 | 0.08 | 0.07 |
| Decision accuracy | 0.92 | 0.93 | 0.89 | 0.90 |
| False-positive | 0.03 | 0.02 | 0.04 | 0.03 |
| False-negative | 0.05 | 0.04 | 0.07 | 0.07 |
| Reliability estimate | 0.72 | 0.71 | 0.68 | 0.69 |
| SEM* (scale score) | 13.86 | 12.88 | 14.55 | 15.96 |

[a] *SEM: standard error of measurement*

[b] *One No Standing case from test form 1 and one No Standing case from test form 3 were excluded from calculations*

Reliability is impacted both by the amount of variability in scores among candidates taking a particular test form and the number of items or stations included in any given exam. It is more difficult to obtain reliability estimates above 0.80 given the restricted number of stations that can be administered in any OSCE test form.

## OSCE station statistics

Summary statistics for each of the OSCE stations for each test form for October 2021 are provided in **Table 6**. The percentage of missing data, average station scores or p-values, SD of station scores and station total correlations (STCs) are presented. Please refer to Section 3, Exam Scoring, for calculation of station scores.

P-values are the average station scores that candidates achieved on each of the stations. In general, p-values indicate station difficulty and range between 0 and 1. Station p-values that

are low (< 0.20) indicate a difficult station and those that are high (> 0.90) indicate an easy station. P-values are sample dependent. That is, comparisons of p-values across different samples of candidates do not take into account potential differences in overall candidate ability. As such, p-values should not be overinterpreted or used as the only indicator of difficulty. Rather, p-values provide a general sense of the range of difficulty of stations on a particular test form.

SDs indicate the general variability of scores on any given station. STCs are indicators of discrimination between low- and high-ability candidates for a given station. A low positive or negative STC (< 0.30) indicates that there is a weak or negative relationship between the station score and the overall exam score. Along with the p-values, this information is useful in flagging stations that should be reviewed by content experts and possibly removed from scoring. A moderate to high STC (≥ 0.30) indicates that high-ability candidates are performing well on a given station. Flagged and reviewed stations may still be included on an exam when the content is deemed relevant, important and verified to be correct.

***Table 6**: Summary statistics for OSCE stations for each test form for the October 2021 NAC Examination*

| | Form 1[a] | | | | Form 2 | | | |
|---|---|---|---|---|---|---|---|---|
| **STATION[b]** | **Missing data, %** | **Mean p-value** | **SD[c]** | **STC[d]** | **Missing data, %** | **Mean p-value** | **SD[c]** | **STC[d]** |
| 1 | 0.26 | 0.59 | 0.21 | 0.41 | 0.10 | 0.63 | 0.16 | 0.36 |
| 2 | 5.30 | 0.65 | 0.22 | 0.39 | – | 0.78 | 0.15 | 0.40 |
| 3 | – | 0.60 | 0.24 | 0.38 | 0.18 | 0.66 | 0.15 | 0.35 |
| 5 | – | 0.65 | 0.19 | 0.39 | 0.12 | 0.64 | 0.17 | 0.38 |
| 6 | – | 0.60 | 0.15 | 0.37 | – | 0.44 | 0.19 | 0.31 |
| 7 | 0.26 | 0.63 | 0.21 | 0.35 | 0.30 | 0.65 | 0.17 | 0.32 |
| 8 | 0.30 | 0.71 | 0.18 | 0.41 | 0.21 | 0.69 | 0.16 | 0.29 |
| 10 | 0.47 | 0.67 | 0.22 | 0.51 | 0.36 | 0.67 | 0.21 | 0.42 |
| 11 | 0.10 | 0.65 | 0.21 | 0.34 | 0.06 | 0.67 | 0.19 | 0.42 |
| 12 | – | 0.51 | 0.18 | 0.27 | – | 0.59 | 0.20 | 0.31 |
| **Mean** | **0.67** | **0.63** | **0.20** | **0.38** | **0.13** | **0.64** | **0.18** | **0.36** |

[a] *One No Standing case from test form 1 and one No Standing case from test form 3 were excluded from calculations*

[b] *Stations 4 and 9 were wait stations (no encounters)*

[c] *SD: standard deviation*

[d] *STC: station total correlation*

*Table 6 (cont.): Summary statistics for OSCE stations for each test form for the October 2021 NAC Examination*

| | Form 3[a] | | | | Form 4 | | | |
|---|---|---|---|---|---|---|---|---|
| STATION[b] | Missing data, % | Mean p-value | SD[c] | STC[d] | Missing data, % | Mean p-value | SD[c] | STC[d] |
| 1 | – | 0.60 | 0.16 | 0.39 | 0.09 | 0.62 | 0.21 | 0.30 |
| 2 | 0.27 | 0.54 | 0.17 | 0.34 | 0.19 | 0.53 | 0.19 | 0.41 |
| 3 | 0.24 | 0.69 | 0.20 | 0.40 | 0.85 | 0.58 | 0.23 | 0.29 |
| 5 | 0.26 | 0.60 | 0.19 | 0.46 | 1.42 | 0.61 | 0.16 | 0.37 |
| 6 | – | 0.43 | 0.20 | 0.30 | – | 0.66 | 0.24 | 0.26 |
| 7 | 0.40 | 0.51 | 0.22 | 0.33 | 0.12 | 0.58 | 0.15 | 0.34 |
| 8 | – | 0.63 | 0.16 | 0.29 | 0.12 | 0.62 | 0.19 | 0.42 |
| 10 | 0.32 | 0.70 | 0.20 | 0.33 | – | 0.59 | 0.28 | 0.38 |
| 11 | – | 0.68 | 0.21 | 0.30 | 0.37 | 0.53 | 0.18 | 0.34 |
| 12 | 0.19 | 0.53 | 0.22 | 0.30 | 1.85 | 0.55 | 0.22 | 0.39 |
| **Mean** | **0.17** | **0.59** | **0.19** | **0.35** | **0.50** | **0.59** | **0.20** | **0.35** |

[a] *One No Standing case from test form 1 and one No Standing case from test form 3 were excluded from calculations*
[b] *Stations 4 and 9 were wait stations (no encounters)*
[c] *SD: standard deviation*
[d] *STC: station total correlation*

**Table 6** shows the means p-values for each test form for October 2021. There were no stations flagged as being too difficult (p-value < 0.30) or too easy (p-value > 0.90). Stations with an STC < 0.30 were reviewed for content appropriateness. All of the reviewed stations were deemed to be important and acceptable from a content perspective.

## Examiner analyses

Examiner analyses are conducted routinely for each of the OSCE stations. The examiner analyses are based on the method outlined by Bartman, Smee and Roy (2013). For the examiner analyses, the following three steps are followed.

### *Step One*

For each examiner and station scored by the examiner, the average across the candidates' station scores is calculated. This average is the examiner average for that station. Then the average of the examiner averages is calculated along with the SD. Examiners that scored

fewer than 10 candidates on a station are excluded from these analyses as they have observed too few candidates to be compared to other examiners. Examiners are flagged as being a “dove” if their station score is higher than three times the station SD from the station average. Examiners are flagged as being a “hawk” if their station score is lower than three times the station SD from the station average. For example, if the average across examiner averages was 72.5 and the SD across examiners was 6.5 and an examiner had an average of 50.7 (difference of 21.8, which is more than three SDs [6.5*3=19.5]) then they are flagged as a hawk.

***Step Two***

For each examiner flagged in step one, the station distribution (histogram) for the examiner is compared to the distribution of station scores from other examiners across the country. This is a visual check to evaluate whether the examiner is providing a range of scores that looks somewhat normally distributed (not providing all high or low scores). If an examiner’s distribution looks reasonable, they are no longer flagged at this step as being either a dove or hawk.

***Step Three***

For each examiner flagged in steps one and two, the scale-score distribution (histogram) for the cohort they scored is compared to the distribution of scale scores based on the candidates across the country. This is a check that the cohort’s average scale-scores and pass rate based on all 10 examiners is higher or lower than the values across the country. In this step, we evaluate if a cohort may be higher or lower in ability that may explain a dove or hawk flag in step one. For example, an examiner may be flagged as being a hawk in steps one and two, but the candidates’ scale-scores based on all 10 stations may be lower, indicating a weaker cohort. Thus, the examiner would not be flagged as a hawk at step three.

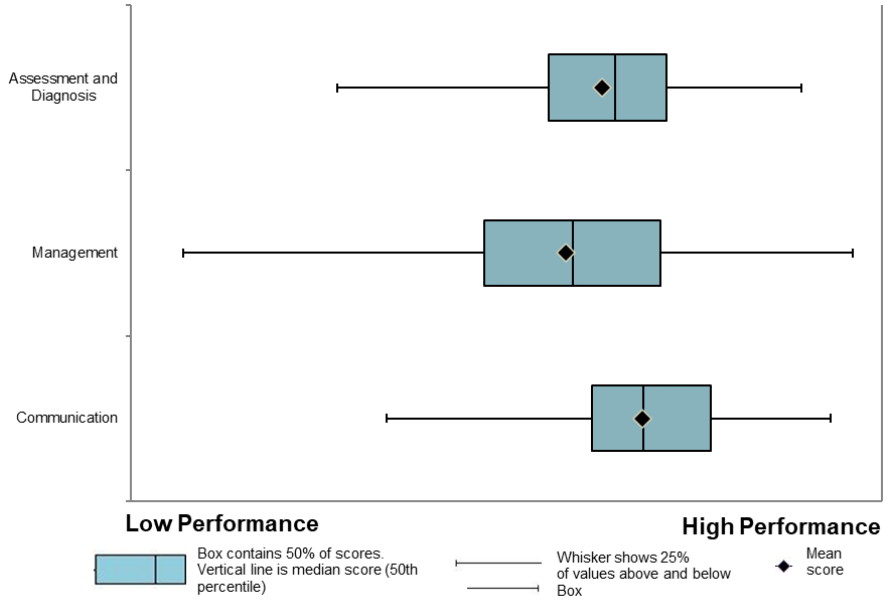
There was one examiner flagged across all three steps for October 2021 and feedback was provided to this examiner.

## Domain subscore profiles

The purpose of the domain subscore profile is to provide general feedback to candidates by highlighting their relative strengths and weaknesses on three broad categories of physician

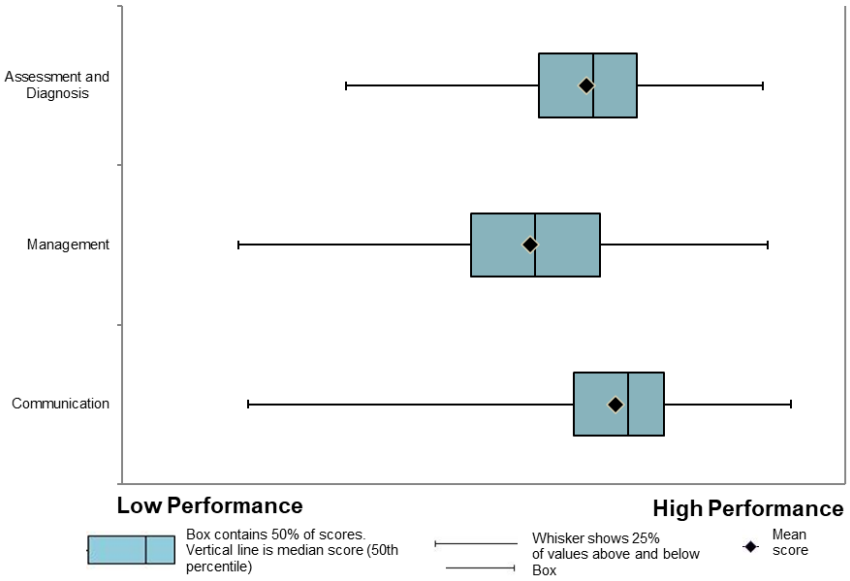
activities assessed by the NAC exam. A domain subscore profile is presented in the form of a graph to each candidate in the SIR (see **Appendix D** for a sample SIR). The graph shows the domain subscore for each of the three domains and the SEM around the domain subscore. The calculation of the domain subscores for each candidate is outlined in Section 3, Exam Scoring, of this report.

This section provides domain subscore profiles for October 2021. The range of domain subscores is shown graphically in **Figure 2** through **Figure 5**. The boxes for each domain indicate the range for 50% of candidates' domain subscores. The vertical line represents the median or 50th percentile domain subscore. The remaining 25% of domain subscores are shown to the right or left of the box as a line (25% to the right and 25% to the left). The mean domain subscore is indicated by the diamond.



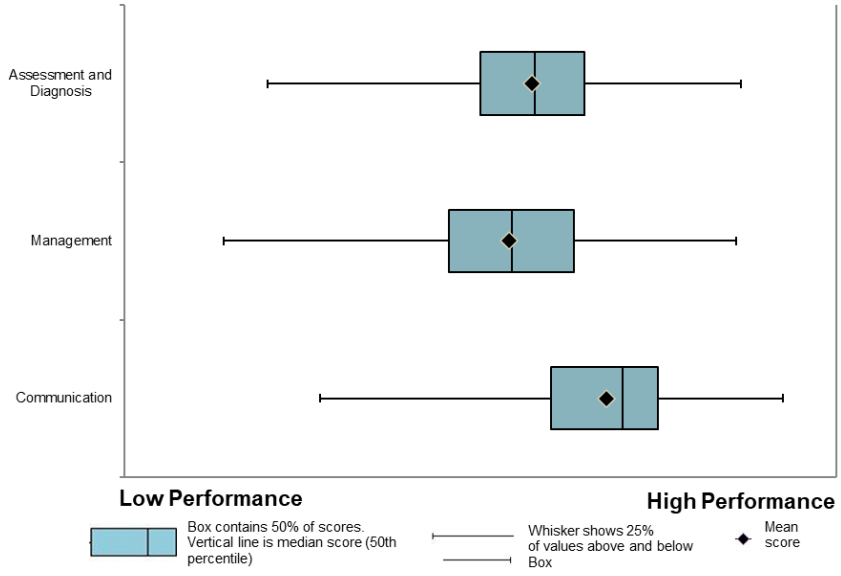

*The whiskers indicate 25% of values above and below the box. The left and right ends of the boxes indicate the interquartile range. A box contains 50% of subscores. The vertical line inside the boxes is the median subscore (50th percentile). The diamond indicates the mean subscore.*

***Figure 2.*** *Domain subscore profile for test form 1 for the October 2021 NAC Examination*



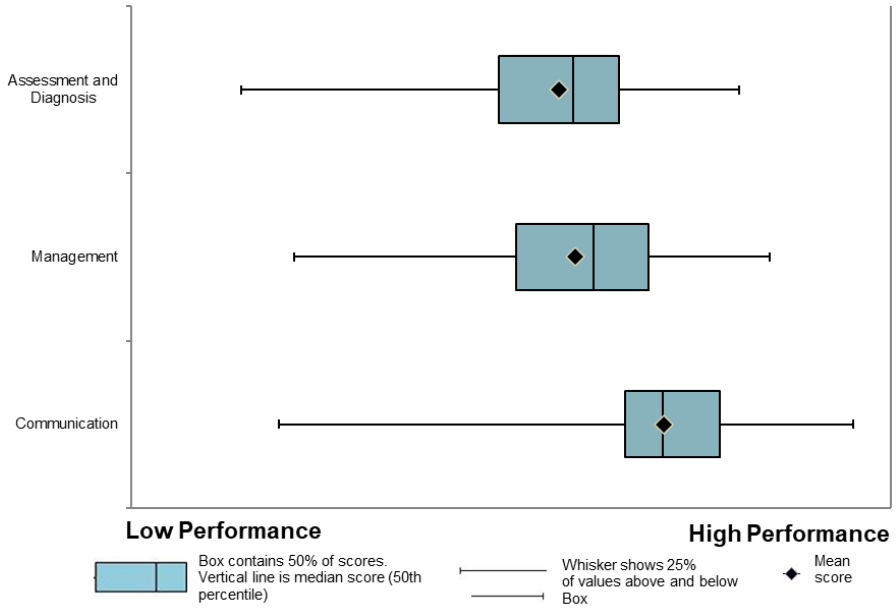

*The whiskers indicate 25% of values above and below the box. The left and right ends of the boxes indicate the interquartile range. A box contains 50% of subscores. The vertical line inside the boxes is the median subscore (50th percentile). The diamond indicates the mean subscore.*

***Figure 3**. Domain subscore profile for test form 2 for the October 2021 NAC Examination*




*The whiskers indicate 25% of values above and below the box. The left and right ends of the boxes indicate the interquartile range. A box contains 50% of subscores. The vertical line inside the boxes is the median subscore (50th percentile). The diamond indicates the mean subscore.*

***Figure 4**. Domain subscore profile for test form 3 for the October 2021 NAC Examination*




*The whiskers indicate 25% of values above and below the box. The left and right ends of the boxes indicate the interquartile range. A box contains 50% of subscores. The vertical line inside the boxes is the median subscore (50th percentile). The diamond indicates the mean subscore.*

***Figure 5**. Domain subscore profile for test form 4 for the October 2021 NAC Examination*

## Historical comparisons

**Table 7** presents candidate performance data for the total group, first-time test takers and repeat test takers since March 2019 when the new blueprint was implemented. A different score scale was implemented September 2020 through October 2021 due to COVID-19 changes to physical exam and PPE adjustments, though the same blueprint and scoring approach were implemented. Data before 2019 are not included as the previous NAC exam was very different in terms of blueprint, format, scoring approach, pass score, and score scale. For historical data on the NAC exam before 2019, please see the *2018 NAC Annual Technical Report*.

*__Table 7__: NAC Examination candidate performance data for March 2019 to October 2021*

| Session | First-time test takers | | Repeat test takers | | Total test takers | |
|---|---|---|---|---|---|---|
| | Candidates, No. | Pass rate, % | Candidates, No. | Pass rate, % | Candidates, No. | Pass rate, % |
| March 2019 | 342 | 53.5 | 70 | 61.4 | 412 | 54.9 |
| Sept. 2019 | 939 | 67.7 | 354 | 68.6 | 1293 | 68.0 |
| **Total 2019** | 1281 | 63.9 | 424 | 67.5 | 1705 | 64.8 |
| March 2020[a] | 315 | 60.6 | 119 | 71.4 | 434 | 63.6 |
| Sept 2020[a] | 916 | 82.2 | 322 | 86.6 | 1238 | 83.4 |
| **Total 2020** | 1231 | 76.7 | 441 | 82.5 | 1672 | 78.2 |
| **2021[a]** | **982** | **83.5** | **323** | **79.2** | **1305** | **82.5** |

[a] *Two No standing cases were excluded from the calculation.*

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# APPENDIX A:
# NAC Examination competency ratings

National Assessment Collaboration

## COMPETENCY RATINGS

Based on this interaction, please rate ***this candidate's performance in the following competencies*** as compared to a recent Canadian graduate accepted into postgraduate training (for rating scale anchors, refer to RATING SCALE CRITERIA page).

**QUALITY OF HISTORY TAKING**

| UNACCEPTABLE | BORDERLINE UNACCEPTABLE | BORDERLINE ACCEPTABLE | ACCEPTABLE | ABOVE |
|---|---|---|---|---|
| O | O | O | O | O |

Acquires from the patient, family or other source a chronologic, medically logical description of pertinent events, including questioning about onset, location, duration, character, severity, etc., as appropriate to the case. Gathers information efficiently in sufficient breadth and depth to permit a clear definition of the patient's problem(s).

**DIAGNOSIS**

| UNACCEPTABLE | BORDERLINE UNACCEPTABLE | BORDERLINE ACCEPTABLE | ACCEPTABLE | ABOVE |
|---|---|---|---|---|
| O | O | O | O | O |

Discriminates important from unimportant information and reaches a reasonable differential diagnosis and/or diagnosis.

**MANAGEMENT**

| UNACCEPTABLE | BORDERLINE UNACCEPTABLE | BORDERLINE ACCEPTABLE | ACCEPTABLE | ABOVE |
|---|---|---|---|---|
| O | O | O | O | O |

Discusses therapeutic management, including but not limited to pharmacotherapy, adverse effects and patient safety, disease prevention and health promotion when appropriate. Selects appropriate treatments (including monitoring, counselling, follow-up); considers risks and benefits of therapy and instructs the patient accordingly. Identifies medication classes, except when specific drugs and dosages would reasonably be expected in the context of the clinical problem.

**COMMUNICATION SKILLS**

| UNACCEPTABLE | BORDERLINE UNACCEPTABLE | BORDERLINE ACCEPTABLE | ACCEPTABLE | ABOVE |
|---|---|---|---|---|
| O | O | O | O | O |

Uses a patient-centred approach: establishes trust and respect and shows sensitivity to the patient's needs. Provides clear information and confirms patient's understanding: encourages questions and uses repetition and summarizing to confirm and/or reinforce understanding. Respects confidentiality when appropriate. Avoids use of jargon/slang and uses tone and vocabulary appropriate to the patient. Demonstrates appropriate non-verbal communication (e.g., eye contact, gesture, posture and use of silence).

**QUALITY OF PHYSICAL EXAMINATION**

| UNACCEPTABLE | BORDERLINE UNACCEPTABLE | BORDERLINE ACCEPTABLE | ACCEPTABLE | ABOVE |
|---|---|---|---|---|
| O | O | O | O | O |

Elicits physical findings in an efficient logical sequence that documents the presence or absence of abnormalities and supports a definition of the patient's problem(s). Demonstrates sensitivity to the patient's comfort and modesty; explains actions to the patient.

**INVESTIGATIONS**

| UNACCEPTABLE | BORDERLINE UNACCEPTABLE | BORDERLINE ACCEPTABLE | ACCEPTABLE | ABOVE |
|---|---|---|---|---|
| O | O | O | O | O |

Selects suitable laboratory or diagnostic studies to elucidate or confirm the diagnosis; takes into consideration associated risks and benefits.

**DATA INTERPRETATION**

| UNACCEPTABLE | BORDERLINE UNACCEPTABLE | BORDERLINE ACCEPTABLE | ACCEPTABLE | ABOVE |
|---|---|---|---|---|
| O | O | O | O | O |

Interprets investigative data appropriately in the context of the patient's problem(s).

# APPENDIX B:
# NAC Examination competency descriptors

National Assessment Collaboration

COMPETENCY DESCRIPTORS

Based on this interaction, please rate ***THE QUALITY OF THIS CANDIDATE'S PERFORMANCE IN THE FOLLOWING COMPETENCIES*** as compared to a recent Canadian graduate accepted into post-graduate training (for rating scale anchors, refer to RATING SCALE CRITERIA page).

| **UNACCEPTABLE** as compared to a recent Canadian graduate accepted into postgraduate training | **BORDERLINE UNACCEPTABLE** as compared to a recent Canadian graduate accepted into postgraduate training | **BORDERLINE ACCEPTABLE** as compared to a recent Canadian graduate accepted into postgraduate training | **ACCEPTABLE** as compared to a recent Canadian graduate accepted into postgraduate training | **ABOVE** the level expected of a recent Canadian graduate accepted into postgraduate training |
|---|---|---|---|---|
| ○ | ○ | ○ | ○ | ○ |

**QUALITY OF HISTORY TAKING**

Acquires from the patient, family or other source a chronologic, medically logical description of pertinent events, including questioning about onset, location, duration, character, severity, etc. as appropriate to the case. Gathers information efficiently in sufficient breadth and depth to permit a clear definition of the patient's problem(s).

**DIAGNOSIS**

Discriminates important from unimportant information and reaches a reasonable differential diagnosis and/or diagnosis.

**MANAGEMENT**

Discusses therapeutic management, including but not limited to pharmacotherapy, adverse effects and patient safety, disease prevention and health promotion when appropriate. Selects appropriate treatments (including monitoring, counselling, follow-up); considers risks and benefits of therapy and instructs the patient accordingly. Identifies medication classes, except when specific drugs and dosages would reasonably be expected in the context of the clinical problem.

**COMMUNICATION SKILLS**

Uses a patient-centered approach: establishes trust and respect and shows sensitivity to the patient's needs. Provides clear information and confirms patient's understanding: encourages questions and uses repetition and summarizing to confirm and/or reinforce understanding. Respects confidentiality when appropriate. Avoids use of jargon/slang and uses tone and vocabulary appropriate to the patient. Demonstrates appropriate non-verbal communication (e.g., eye contact, gesture, posture and use of silence).

**QUALITY OF PHYSICAL EXAMINATION**

Elicits physical findings in an efficient logical sequence that documents the presence or absence of abnormalities and supports a definition of the patient's problem(s). Sensitive to the patient's comfort and modesty; explains actions to the patient.

**INVESTIGATIONS**

Selects suitable laboratory or diagnostic studies to elucidate or confirm the diagnosis; takes into consideration associated risks and benefits.

**DATA INTERPRETATION**

Interprets investigative data appropriately in the context of the patient's problem(s).

# APPENDIX C:
# NAC Examination statement of results (SOR)

National Assessment Collaboration

National Assessment Collaboration Examination
**Statement of Results**

| | | | |
|---|---|---|---|
| **Candidate name:** | XXXXXXXXXX | | |
| **Candidate code:** | XXXXXXXXXX | | |
| **Examination session:** | October 2021 | **Your final result:** | Pass |
| **Pass score:** | 1374 | **Your total score:** | 1411 |

November 3, 2021

We are writing to inform you of your final result on the National Assessment Collaboration Examination.

Your total score is reported as a scaled score ranging from 1300 to 1500 with a mean of 1400 and a standard deviation of 25. The mean and standard deviation were set using the results from the September 2020 session.

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 D:
# NAC Examination supplemental information report (SIR)

National Assessment Collaboration

National Assessment
Collaboration Examination
**Supplemental Information Report**

**Candidate name:** XXXXXXXXXX

**Candidate code:** XXXXXXXXXX **Your final result:** Pass

**Examination session:** October 2021 **Your total score:** 1411

This report provides you with supplemental information on your performance on the National Assessment Collaboration (NAC) Examination.

The NAC Examination assesses core abilities to apply medical knowledge, demonstrate clinical skills, develop investigational and therapeutic clinical plans, as well as demonstrate communication skills at a level expected of a medical graduate entering into postgraduate training in Canada.

The exam assesses your performance across three broad domains that reflect a physician's scope of practice as indicated in the following table. Each domain is assigned a weighting on the exam and the content weights are expressed as percentages.

| Domains | Weighting (%) |
|---|---|
| Assessment and Diagnosis | 70 ± 5 |
| Management | 15 ± 5 |
| Communication Skills | 15 ± 5 |

See p. 2 of this report for the domain definitions.

Figure 1 displays your performance in each domain. We provide your subscores along with the mean subscore of first-time takers who passed the same exam. We also provide the standard error of measurement (SEM) for each of your subscores. It represents the expected variation in your subscore if you were to take this exam again with a different set of questions covering the same domains.

Small differences in subscores or overlap between SEMs indicate that performance in those domains was somewhat similar. Overlap between the SEM and the mean score of first-time takers who passed signifies that performance is similar to the mean.

**Subscores are based on less data than the total score and have less precision. Your total score and subscores cannot be compared as they are calculated differently. The pass score cannot be applied to Figure 1.**

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

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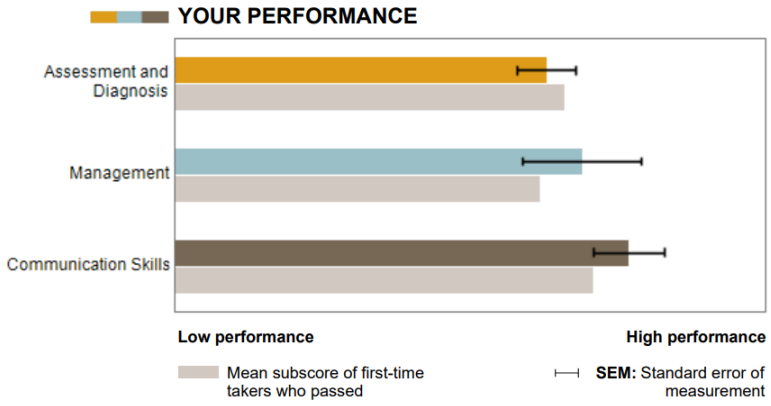
Figure 1: NAC Examination score profile




The following defines the three domains assessed by the exam:

- **ASSESSMENT AND DIAGNOSIS** covers the following physician activities:
  - **History Taking:** Acquires from the patient, family or other source a chronologic, medically logical description of pertinent events; gathers information in sufficient breadth and depth to permit a clear definition of the patient's problems.
  - **Physical Examination:** Elicits physical findings in an efficient logical sequence that documents the presence or absence of abnormalities, and supports a definition of the patient's problems; sensitive to the patient's comfort and modesty; explains actions to the patient.
  - **Diagnosis:** Discriminates important from unimportant information and reaches a reasonable differential diagnosis and/or diagnosis.
  - **Data Interpretation:** Interprets investigative data appropriately in the context of the patient's problems.
  - **Investigation:** Selects suitable laboratory or diagnostic studies to elucidate or confirm the diagnosis; takes into consideration associated risks and benefits.
- **MANAGEMENT:** Discusses therapeutic management, including but not limited to pharmacotherapy, adverse effects and patient safety, disease prevention and health promotion, when appropriate; selects appropriate treatments (including monitoring, counseling, follow-up); considers risks and benefits of therapy and instructs the patient accordingly.
- **COMMUNICATION SKILLS:** Uses a patient-centered approach; establishes trust and respect, and shows sensitivity to the patient's needs; provides clear information; confirms patient's understanding (encourages questions, and uses repetition and summarizing to confirm and/or reinforce understanding); respects confidentiality when appropriate; speaks clearly (volume and rate); avoids use of jargon/slang and uses vocabulary appropriate to the patient; demonstrates appropriate non-verbal communication (e.g., eye contact, gesture, posture and use of silence).