Canadian Midwifery Registration Exam: 2024 Technical Report

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EXECUTIVE SUMMARY

The Canadian Midwifery Regulatory Council (CMRC) collaborates with Meazure Learning (ML) to construct, deliver, and score the Canadian Midwifery Registration Exam (*CMRE*). The *CMRE* is designed to assess the competence of new Canadian-educated and internationally-educated midwives seeking registration as a midwife in Canada. ML uses test development activities, rigorous validation, and best practices for exam administration to determine if *CMRE* candidates meet entry-to-practice competency standards set out in the *Canadian Competencies for Midwives*. The following report describes all 2024 activities related to *CMRE* development, administration, and scoring.

Throughout 2024, the CMRC and ML engaged in several exam development activities to ensure that the *CMRE* remains up-to-date with current practice standards and to support the overall quality and validity of test content. Item writing occurred in April, with 9 subject matter experts (SMEs) contributing their expertise to the creation of new items based on a gap analysis of the CMRE testing blueprint. In August, these new items were reviewed by a panel of 5 SMEs who made suggestions on items to improve clarity, fairness, and accuracy to modern midwifery. Once items were reviewed and approved, they were then considered by a committee of 7 SMEs in December to set a cut score for each item through the standard setting process. Overall, the 2024 exam development process resulted in 45 new items approved for active use in the CMRE and 7 other items that require further review in 2025.

The 2024 *CMRE* was delivered in May and October using ML's secure computer-based testing platform. Unique test forms consisting of 180 items were used for each delivery to ensure that no candidate could reveal test content to future candidates. 120 candidates took the exam in May and 14 took it in October. For each testing period, a group of SMEs reviewed the final test key to ensure that questions and their correct answers were appropriate and valid. ML then performed final scoring and reporting which was then approved by the CMRC exam committee. Candidates were informed of their results through the CMRC following each administration.

The following technical report provides additional details on the 2024 *CMRE* activities described above. ML looks forward to continuing its collaboration with the CMRC in 2025 and beyond to ensure that the *CMRE* continues to be a fair, valid, and reliable assessment for entry-level midwives in Canada.

Introduction to 2024 *CMRE* Exam Activities

The Canadian Midwifery Regulators Council (CMRC) guides the development and administration of the Canadian Midwifery Registration Exam (*CMRE*) in collaboration with the Assessment, Development, and Psychometrics department of Meazure Learning (ML). The *CMRE* is designed to assess applicants for Canadian midwifery registration to ensure they meet entry-level competency standards set out in the *Canadian Competencies for Midwives*[1]. Candidates are assessed for midwifery knowledge, application of that knowledge, and their ability to think critically when applying their midwifery knowledge and skills. The goal of the *CMRE* is to ensure that registered midwives in Canada are competent practitioners that provide a consistent standard of care across Canada.

This technical report outlines the key activities conducted by the CMRC and ML for the 2024 *CMRE*. Activities for 2024 included gap analysis, item writing, item review, standard setting, exam form construction, exam administration, key validation, and 2025 planning. Sections of this report provide additional details on each activity, subject matter experts (SMEs) involved in each step of exam development and administration, and information on exam construction and scoring to support the reliability and validity of the *CMRE* according to best practices of professional testing[2].

2024 CMRE Exam Development

During 2024, ML and the CMRC organized a range of exam development activities to meet the needs of the *CMRE* for the future. The following sections describe each of these activities in detail, providing relevant information on the process and outcomes of these activities.

Item Bank Gap Analysis

Test content for the *CMRE* is based on the current *Canadian Competencies for Midwives*[1], with each question linked to a particular competency category. The construction of each exam form is based on the *CMRE* testing blueprint, a document created in collaboration with CMRC SMEs that specifies the distribution of exam content according to a set of structural variables[3]. Initial exam forms contain 180 multiple choice items drawn from the existing pool of validated and approved CMRE exam questions that align with the blueprint specifications.

The blueprint stipulates that the examination will consist of multiple-choice questions, presented as either case-based or independent questions. Case-based questions include a set of three to six questions associated with a brief healthcare scenario. Independent questions contain all the information necessary to answer the question without reference to other questions. Questions are also classified by cognitive level, or the overall cognitive demand that the item places on a candidate. Knowledge questions ask a candidate to recall information, application questions require the selection of an appropriate action, and critical thinking questions involve weighing options and parsing information to arrive at a conclusion. Finally, questions include contextual variables, such as health care setting (i.e., hospital or out-of-hospital) and healthcare situation (i.e., normal or abnormal). Table 1 provides a summary of the structural variables and their recommended test proportions specified in the *CMRE* blueprint.

Before beginning exam development activities for 2024, ML completed a gap analysis of the existing *CMRE* item bank. Table 2 identifies areas that had less content than others based on the proportions of items specified by the blueprint. Areas with more content than needed present a negative discrepancy between the existing and ideal bank, while positive discrepancy represents areas that could use additional content. Areas with positive discrepancy were the focus of item writing and review sessions for 2024. This analysis resulted in item writing for case-based questions with an emphasis on application and critical thinking questions. Target competencies included Decision-Making, Care Planning, Population Health, Advocate, Communicator, Collaborator, and Leader.

Table 1. CMRE Blueprint

STRUCTURAL VARIABLES		
Examination length	180 items	
Item format	Multiple-choice questions	
Item type	Independent: 40 – 60%; Case-based: 40 – 60%	
Cognitive Level	Knowledge: 10-20%; Application: 45-65%; Critical Thinking: 20-30%	
COMPETENCY CATEGORIES	**Target %**	**% Range**
1. Primary Care Provider	60% minimum	
1.A. Assessment	12%	10 – 14%
1.B. Decision-Making	12%	10 – 14%
1.C. Care Planning	12%	10 – 14%
1.D. Implementation	15%	10 – 14%
1.E. Population Health	6%	10 – 14%
1.F. Reproductive Health	6%	13 – 18%
2. Advocate	10%	5 – 8%
3. Communicator	10%	5 – 8%
4. Collaborator	6%	8 – 12%
5. Professional	3%	8 – 12%
6. Life-long Learner	3%	4 – 8%
7. Leader	8%	2 – 4%

Table 2. 2024 CMRE Item Bank Gap Analysis

		Initial Item Bank (N=737)		Ideal Bank (N = 845)	Discrepancy
***Meaningful discrepancies are italicized**		**N**	**%**	**N**	**N**
Item Type	Independent	440	60%	Min of 338	-102
	Case-based	282	38%		*56*
Cognitive Level	Knowledge/Comprehension	310	42%	150	-160
	Applying	287	39%	465	*178*
	Critical Thinking	134	18%	232	*98*
Competency Categories	1. Primary Care Provider				
	1.A. Assessment	150	20%	93	-57
	1.B. Decision-Making	67	9%	93	*26*
	1.C. Care Planning	60	8%	93	*33*
	1.D. Implementation	209	28%	127	-82
	1.E. Population Health	15	2%	51	*36*
	1.F. Reproductive and Sexual Health	58	8%	51	-7
	2. Advocate	32	4%	85	*53*
	3. Communicator	47	6%	85	*38*
	4. Collaborator	23	3%	51	*28*
	5. Professional	32	4%	25	-7
	6. Life-Long Learner	27	4%	25	-2
	7. Leader	17	2%	68	*51*

MEAZURE LEARNING

Item Writing

An item writing session took place on April 15th-19th, 2024. The goal of the item writing session was to generate new items for the different target areas identified in the gap analysis. The CMRC actively recruits SMEs throughout the year for participation in the different stages of exam development. 9 SMEs participated in the item writing, with 5 writers representing Ontario, 3 representing BC, and 1 representing New Brunswick. Writers were trained in best practice for writing valid test content and had opportunities to practice test-writing before beginning the writing process. A total of 57 new questions were generated during this session. All questions were associated with a case, and the majority of target competency and cognitive level areas from the gap analysis received new items. Table 3 presents the number of newly written items by competency and cognitive level.

Table 3. 2024 CMRE Item Writing Session Outcomes

Competency	N of items written
1.Primary Care Provider (General)	2
1.A. Assessment	4
1.B. Decision-Making	8
1.C. Care Planning	3
1.D. Implementation	1
1.E. Population Health	5
2. Advocate	13
3. Communicator	11
4. Collaborator	4
7. Leader	6

Cognitive Level	N of items written
Application	27
Critical Thinking	25
Knowledge	5

Item Review

An item review session was held on August 21st-23rd, 2024. The purpose of the session was to review newly written items and previously authored items that required additional review due to statistical or content concerns. Item reviewers were trained in best practice in item writing, item review, and item statistics, and were given the opportunity to practice reviewing as a group before beginning the formal review process. All review occurred as a group, and for an item to be accepted to move to the next stage of development, an approval consensus was required of all item review members. 7 SMEs participated in the item review session, including 3 from Ontario, 2 from British Columbia, 1 from Quebec, and 1 from Northwest Territories. The reviewers considered 70 total items and discussed their validity, accuracy, fairness, and reflection of current midwifery practice. The group approved 45 items for the standard setting stage of development, rejected 15, and retained 7 for future review.

Standard Setting

Following item writing and review, a standard setting meeting was held on December 5th & 6th. 7 SMEs participated in the standard setting, including 4 from Ontario, 2 from British Columbia, and 1 from Northwest Territories. During standard setting, all newly developed items are assigned a rating based on the level of challenge presented for an entry-level candidate who meets the minimum competence required for midwife registration in Canada. These ratings are then used to determine the cut score percentage for the *CMRE.* ML applies the modified Angoff technique of standard setting, an empirical method that combines individual ratings and group discussion to reach alignment around item standards[4].

All standard setting members received training on the modified Angoff method, including panel discussion that focused on behaviours and skills exhibited by the minimally competency entry-level midwife. SMEs then practiced several ratings and had group discussions before beginning the standard setting process. Two rounds of rating and discussion were completed, and final cut scores were assigned based on the average of the final rating of judges following the second round of discussion. Final Angoff ratings are presented in Table 4, and the final inter-rater reliability was excellent (>0.9)

Table 4. 2024 CMRE Standard Setting Results

Item (N = 45) / Final Angoff Rating					
1	78.3	16	78.3	31	80.8
2	80.8	17	85.0	32	75.8
3	80.8	18	76.7	33	76.7
4	75.8	19	75.8	34	75.8
5	71.7	20	72.5	35	79.2
6	69.2	21	83.3	36	79.2
7	75.0	22	79.2	37	76.7
8	70.8	23	72.5	38	86.7
9	62.5	24	74.2	39	75.0
10	75.0	25	72.5	40	76.7
11	70.0	26	75.8	41	83.3
12	77.5	27	69.2	42	75.0
13	82.5	28	68.3	43	78.3
14	73.3	29	70.8	44	77.5
15	75.8	30	75.8	45	70.8
Inter-rater reliability (Hoyt's): 0.96					

2024 CMRE Examination Administration

The *CMRE* was delivered during two periods in 2024. The first exam period was on May 2nd, 2024, and included 120 candidates. The second period occurred on October 30th-31st, 2024 and included 14 candidates. Additional details on the construction, administration, scoring, and statistical outcomes of these exams are provided in the following sections.

Exam Form Generation

The *CMRE* examination consists of 180 multiple-choice items. A unique combination of questions, or exam form, is generated for each administration of the *CMRE*. Exam forms are constructed to align with the structural variable proportions established in the *CMRE* exam blueprint. Table 5 presents the initial composition of the two test forms in relation to the blueprint before scoring and key validation.

Table 5. Initial 2024 CMRE Blueprint Alignment per Form

Competency	Blueprint %	May 2024 %	Oct 2024 %
1. Primary Care Provider	(min. 60%)	63.3%	65.0%
1.A. Assessment	10 – 14%	12.7%	17.2%
1.B. Decision-Making	10 – 14%	11.7%	11.1%
1.C. Care Planning	10 – 14%	10.6%	10.0%
1.D. Implementation	13 – 18%	17.7%	16.7%
1.E. Population Health	5 – 8%	5.0%	5.0%
1.F. Reproductive Health	5 – 8%	5.6%	5.0%
2. Advocate	8 – 12%	8.9%	7.8%
3. Communicator	8 – 12%	9.4%	9.4%
4. Collaborator	4 – 8%	6.7%	4.4%
5. Professional	2 – 4%	3.3%	3.9%
6. Life-long Learner	2 – 4%	2.8%	3.9%
7. Leader	6 – 10%	5.6%	5.6%
Item Type	**Blueprint %**	**May 2024 %**	**Oct 2024 %**
Case-Based	40 – 60%	47.2%	40.0%
Independent	40 – 60%	52.8%	60.0%

CMRE Administration

All exams were administered using computer-based testing. For the May administration, 86 candidates wrote their exam online with remote proctoring, while 34 candidates chose to write their exams at a test centre. During the October administration, 10 exams were completed online, while 4 were completed in-person at testing centres. Online proctoring was offered through ML's ProctorU testing platform, a secure and standardized online testing environment using virtual proctors. ML selects and trains proctors to maintain compliance with test administration standards[2] and to identify unacceptable candidate behaviours (cheating, posing as test taker, etc.). Proctors do not have access to test content and only authorized ML staff are granted access to exam content or results. Candidates were provided 4 hours 45 minutes to complete the exam, with a break of 30 minutes.

Scoring and reporting

Following examination administration, item analyses were conducted using Classical Testing Theory techniques to identify and flag potential items for removal from final scoring. Items are flagged when they are too difficult (<35% of candidates answer correctly), unable to distinguish between candidates based on overall exam performance (item-total correlation of <0.1), or when candidates choose an incorrect answer more frequently than the correct answer. For the May administration, 15 items were flagged, and 3 items were removed from final scoring following a key validation panel with SMEs. For the October administration, 32 items were flagged and 16 were removed following key validation.

After key validation and final scoring, ML provided final pass/fail recommendations to the CMRC along with scores for the *CMRE* as a whole and scores for individual competencies. The CMRC prepares individual reports for each candidate and this information is distributed individually with a notification of Pass or Fail. Candidates who do not pass are provided additional information on their performance per competency to help them prepare to take the exam again in the future. Table 6 presents descriptive statistics for the final sets of items used to determine pass/fail for the May and October 2024 *CMRE*.

Table 6. Descriptive Statistics for the 2024 CMRE

Descriptive Statistics	May 2024	October 2024
Total item count for scoring	177	164
Number of items excluded from scoring	3	16
Lowest obtained score (raw/%)	117 (66.1%)	106 (64.6%)
Highest obtained score (raw/%)	169 (95.5%)	149 (90.9%)
Average score (raw/%)	154.03 (87.0%)	132 (80.5%)
Median score	156	134
Standard deviation	9.59	13.9
Average proportion correct per item	87.00%	80.50%
Average item-total correlation	0.15	0.17
Reliability coefficient (*KR-20*)	0.82	0.9
Pass mark and Pass rate		
Pass mark (raw/%)	131 (74.01%)	121 (73.8%)
Number of candidates writing the exam	120	14
Passing candidates (#/%)	116 (96.7%)	11 (78.6%)
Failing candidates (#/%)	4 (3.3%)	3 (21.4%)

CMRE Reliability and Validity

Reliability and validity are interconnected concepts that are the foundation for asserting that a test is accurately and fairly measuring what it claims to measure. Reliability is a statistical measure of the consistency of a measuring instrument[5]. In other words, a reliable instrument will consistently make the same judgment regarding a candidate's ability. Validity is the degree to which empirical evidence and theory support that a test is measuring what it claims to measure[6]. Reliability is necessary for a test to be considered valid, but comprehensive validation is recommended to support the overall alignment between a test and the competencies it assesses[7].

The reliability coefficients for the 2024 *CMRE* were 0.82 for the May administration and 0.90 for the October administration. For certification exams such as *CMRE*, a reliability value above 0.75 is recommended. Therefore, both test administrations were considered reliable for use in professional testing.

Validity was established through blueprint alignment and the extensive participation of SMEs across the exam development lifecycle. As described in the exam development section, all items are developed according to the established blueprint and approved for the *CMRE* through a rigorous writing and review process with trained SMEs. Items statistics are also reviewed to ensure that items have adequate statistical performance. Thus, through extensive subject matter expert involvement, efforts to control the constructs under representation, and limiting construct-irrelevant variance through analyses, the 2024 *CMRE* met testing industry standards for content validity[2].

Conclusion

2024 was another successful year for the *CMRE*. Exam development activities resulted in significant progress towards filling in gaps in the item bank to better support the alignment of future exam forms with the exam blueprint. Both test forms were shown to be reliable, and their validity was established through rigorous exam development and administration procedures involving CMRC SMEs in partnership with ML's Assessment, Development, and Psychometrics team.

Looking ahead to 2025, ML is excited to continue to collaborate with the CMRC to make the *CMRE* the best it can be. Plans are in place for item review sessions that focus on advocacy and cultural humility with a special emphasis on shaping more appropriate questions related to BIPOC clients. ML will also continue to monitor the item bank and make exam development recommendations as needed. Additionally, new exam form generation will draw heavily on newly created items to ensure that questions are appropriate, up-to-date, and approved for final scoring.

If you have any questions about this report or would like to discuss any other aspects of *CMRE* exam development or administration, feel free to email the author (amanier@meazurelearning.com).

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