

Canadian Midwifery Registration Examination

Technical Report 2005-06

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For the Canadian Midwifery Regulators Consortium
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INTRODUCTION

Each province and territory is responsible for ensuring that all applicants for registration as midwives meet an acceptable level of competence before they begin to practise in Canada. This level of competence is measured, in part, by the Canadian Midwifery Registration Examination (CMRE).

The CMRE is a national written examination designed to assess internationally-educated and Canadian-educated applicants for midwifery registration to ensure that they meet entry-level competency standards set out in the *Canadian Competencies for Midwives*. Its goal is to ensure that midwives gaining registration are competent and safe practitioners providing a consistent standard of care across Canada.

Examination Format

The examination consists of between 210-230 questions of which 165-175 are multiple-choice questions and 45-55 are short-answer questions. The majority of questions on the exam are case-based.

Exam questions come from the CMRE exam databank according to the *CMRE Blueprint*. The exam content is based on the *Canadian Competencies for Midwives*. Both documents are available in the appendix. In order to represent the range of care a Canadian midwife is expected to provide, slightly more than half of the questions are set in an out-of-hospital setting with the remainder in a hospital setting. Slightly more than half of the questions represent normal midwifery situations and the remainder, abnormal situations.

Overview of Examination History

In 2003, the Canadian Midwifery Regulators Consortium launched the HRSDC-funded National Midwifery Assessment Strategy (NAS) project, an initiative designed to determine the best strategy for assessing the skills and abilities of internationally-educated midwives applying for registration in Canada. NAS research involved consultation with a wide variety of stakeholders. One of its results was a clear directive to create a national registration exam to ensure a consistent evaluation of midwives' competence to practise in Canada.

Initial development of the examination took place in 2005 and 2006. It was led by the exam committee (also known as the NAS project steering committee) with support and guidance from the NAS project coordinator and Assessment Strategies Inc. More than 45 content experts (mostly practicing midwives) participated directly in the development activities outlined below in this report. This represents approximately 8% of the registered midwives in Canada.

The exam was first offered to internationally-educated applicants in some provinces in May and September 2006. It is expected to be offered to internationally-educated applicants in most regulated provinces in 2007, and from 2008 it will be required for registration in Canada, both of Canadian graduates and internationally-educated applicants in all jurisdictions where legislation permits.

Examination Committee

The Exam Committee was launched initially as the NAS Steering Committee. It includes representatives of midwifery regulators in the five jurisdictions that assess applicants for registration directly. (The Northwest Territories accepts registrants who have been assessed in the other Canadian regulated jurisdictions). Committee members were appointed by their provincial regulatory authority and they have worked closely together since 2003.

The committee reports to the larger CMRC where all major decisions are made, sometimes after explicit consultation with boards and councils of each regulatory authority. The committee provided guidance to the project coordinator and to Assessment Strategies Inc., and is the decision-making authority for issues related to the specifics of exam development and implementation.

Confidentiality and Security

The examination and all associated materials are protected by copyright law. Stringent measures were in place throughout examination development to protect the examination before, during, and after the administration. All those with access to exam materials (e.g. item writers, pilot participants, and others) were required to sign affidavits of non-disclosure. Exam materials were kept locked and/or password protected at all times when not in use. Additional security measures were used during the administration and marking of the exam in order to ensure its protection.

Examination Standards

The CMRE development was guided by research into exam standards and the resulting exam adheres as much as is feasible to generally accepted examination standards. These standards can be found in resources such as *Standards for educational and psychological testing; Development, Administration, Scoring, and Reporting of Credentialing Examinations;* and *Principles of Fairness: An Examination Guide for Credentialing Boards*. These and other reference materials consulted during the development of the CMRE can be found in the appendix.

EXAM DEVELOPMENT ACTIVITIES

Canadian Competencies for Midwives

Standards dictate that a credentialing examination must be based on clearly defined competencies that fit the purpose of the exam. In keeping with this, the exam committee started exam development in 2004 with the creation of a document that details the knowledge and skills expected of an entry-level midwife in Canada.

The first step in this process was a comparative analysis of provincial competency documents resulting in a spreadsheet providing a detailed comparison competency-by-competency. The first draft of the *Canadian Competencies for Midwives* document was then created based on common competencies. A 12-person working committee composed of CMRC representatives and midwifery educators from 6 jurisdictions reviewed these documents extensively at an all-day in-person meeting in Calgary, Alberta. While the group functioned mainly in English, whisper interpretation was available and the French translation was reviewed as well. Extensive revisions were made to both English and French versions based on feedback from the meeting and this revised draft was circulated to the working group for confirmation. Feedback was then solicited from the CMRC representatives and from board/council members of each midwifery regulator. After several more drafts, the final document was approved in May 2005.

In carrying out this work, it became clear that there was a high degree of commonality in midwifery practice across Canada. In fact, the group identified only a short list of competencies required in only one or some of the provinces – this list became known as “advanced competencies” since they were specialized to specific regions. It was confirmed that the basic model of midwifery practice is the same across Canada, thus the approved *Canadian Competencies for Midwives* includes a brief description of the Canadian model of midwifery practice as well as the detailed list of competencies required for safe practice.

CMRE Blueprint

It is critical that a credentialing exam be standardized in format and content. Assessment Strategies Inc. (ASI), a high stakes exam development consulting firm, was contracted to coordinate exam development, including the development of the *CMRE Blueprint*. A written survey sent to exam committee members enabled ASI to identify the relative importance of each competency so that the blueprint could define the number of questions on each competency. Several teleconferences with the exam committee were held to discuss and refine survey results and to make decisions regarding the exam structure (e.g. item type, length

of exam), contextual issues (e.g. the fact that both hospital and out-of-hospital settings should be included), and standards to be used (e.g. metric measurement).

The resulting exam blueprint approved in June 2005 provides a detailed description of the CMRE.

Item Writing

In order to create as many questions as possible for the CMRE, regulators and educators were asked if they would contribute questions from provincial examinations that the CMRE would be replacing. The CMBC, the CMO, and the Alberta MHDC contributed their PLEA written examinations to the process.

Assessment Strategies Inc coordinated and facilitated the process of revising and creating questions in two item-writing workshops. The first step was to map all the questions from previous exams to the competencies; this was accomplished by an experienced midwife who received training and direction from ASI.

Next, item-writing workshops were organized. Research indicates that for a truly bilingual exam, it is best to create questions in both languages, rather than creating questions all in one language and then translating them. Thus one workshop took place in English and one in French. Participants were selected by provincial regulators based on the following criteria: amount and type of experience practising in Canada, knowledge of provincial standards, past experience writing or marking exams, and ability to work well as part of a team. Item writing teams included participants from as many jurisdictions as possible and ensured a balance of experience and perspectives.

The English-language workshop took place in August 2005 in Ottawa, Ontario and involved five experienced, practising midwives from four jurisdictions. This five-day workshop commenced with training by ASI staff on the process of item-writing as well as pointers on how to create good exam questions. Participants began by revising the “old” questions, ensuring that each question was up-to-date, relevant in all jurisdictions, accurate, followed CMRE standards, and was referenced to two appropriate reference sources (e.g. midwifery textbook). The last few days of this workshop consisted of writing new items. Participants wrote and revised items independently and then reviewed each one as a full group to further refine it. The workshop resulted in 128 potential questions for the CMRE.

The French-language workshop took place in October 2005 in Laval, Quebec and involved five midwives from two jurisdictions. This three day workshop was facilitated by ASI and it focused on the creation of new questions. The workshop commenced with training and then involved independent item-writing and group review of each question. It was challenging to find appropriate reference texts in French so participants were asked to use at least one French and one English reference (unless two French references were readily available). As in the

English workshop, items had to be reflective of current practice across Canada and adhere to standards laid out in the CMRE blueprint and by the ASI facilitator. Forty-seven questions were developed in this workshop.

Pilot

Due to the small numbers of potential participants in the exam pilot, ASI recommended a qualitative, rather than quantitative, pilot of the exam. In addition to being more valid than interpreting statistics from a pilot with small numbers of participants, it allowed for detailed feedback to be received on each question.

A posting was circulated to registered midwives in all regulated jurisdictions for twenty volunteers to take part in the pilot for a small honorarium. More than twenty expressions of interest were received. The committee selected twenty applicants that together ensured a balance of types of midwifery experience (e.g. rural/remote, urban), education (e.g. internationally-educated, Canadian-educated), length of time working as a midwife, and first language. As well, the committee ensured there were as many participants with backgrounds in exam development/marking as possible and that each regulated jurisdiction was well represented.

Eighteen participants took part in the exam pilot in November 2005 in Halifax, Nova Scotia. The pilot took place in English and all questions that had been created in French were translated by ASI's professional translation team into English in preparation for this pilot. The pilot was organized by ASI and facilitated by the NAS Project Coordinator. There were two sittings of four hours each.

Each participant reviewed half of the more than 250 questions that were available to the CMRE. Participants were asked to answer each question without reference to the answer key, and then to review the answer key and provide written feedback on each question regarding its clarity, currency, and accuracy. Participants were asked to pay special attention to ensuring the question represented current practice in their community and province or territory.

Following the pilot, the written feedback was incorporated into the LXR-Test exam databank by ASI staff in preparation for the validation meeting.

Validation

A four-day in-person exam committee meeting was held in English in November 2005 to review the feedback from the exam pilot and to confirm the exam questions. This "validation meeting" was facilitated by an ASI staff member and it involved reviewing each question and revising them as appropriate.

Translation

ASI's professional translation team translated the final questions into French. In order to ensure that the midwifery language used in the translation is correct, a team of two bilingual midwives then reviewed each question in detail in a three day in-person meeting in Ottawa, Ontario. This session was organized and facilitated by ASI staff and translators.

Cutscore Setting

It is critical that the pass score set for a credentialing exam be done through careful analysis to determine the level of skills and knowledge needed for safe, entry-level practice. In order to accomplish this, a cutscore (pass score) setting process was organized and facilitated by the NAS project coordinator. Based on a recommendation from ASI and further research, the Angoff method was used.

Six participants from four jurisdictions participated in this four-day workshop held in Winnipeg, Manitoba. Due to funding limitations participants included exam committee members from four jurisdictions (who were meeting for other reasons as well) plus two local, experienced midwives. Participants reviewed each exam question to estimate the probability that an entry-level candidate would get it correct. Several "rounds" ensured that the group considered all aspects (e.g. how often the competency is used, type of language used in the questions, quality of distractors, etc.). A provisional cutscore resulted from this workshop. The group also confirmed that cutscores for the CMRE will range from 70-80%.

A follow-up teleconference with the exam committee was held to review item statistics following the first offering of the exam. Five questions were deleted and the cutscore was revised accordingly before being approved as the final cutscore for the first version of the CMRE.

Policies & Procedures

The NAS Project Coordinator engaged in research to determine the policies and procedures that would best protect the security of the exam, ensure the effectiveness of the exam, and be most fair to exam candidates. Based on this research, the Coordinator drafted policies, procedures, manuals, and forms for review by exam committee members and other relevant stakeholders.

This process resulted in the following documents available in both English and French that outline approved policies and procedures:

- Candidate information sheets posted to the website (and available by PDF to candidates).
- Proctor Manual, and associated forms.
- Marker Manual, and associated form.

EXAM ADMINISTRATION

Administration

The CMRE was administered in a paper-based format to eleven candidates in three provinces on May 23, 2006 and to 5 candidates in two provinces on September 13, 2006. All candidates were internationally-educated midwives taking part in provincial PLEA processes. No special accommodations were requested or provided.

Administration was managed by the NAS Project Coordinator and assisted by CMBC staff.

Marking

Multiple choice exam questions were double-marked by hand by administrative staff at CMM and at CMBC. Any discrepancies were checked and corrected, and then marks were manually entered into the LXR-Test database question-by-question. This system ensured that no errors could be made.

In May, short answer questions were double-marked by hand by expert-midwives who had been oriented to the specific marking procedures and standards for the CMRE. Following independent marking, a marker teleconference, facilitated by the NAS project coordinator, was held to review each question where a different mark was given by each marker.

In September, short answer questions were marked by hand by one of the experienced markers. During the marking process, the marker consulted with the other experienced marker whenever questions came up. Following the marking, a marker meeting was held with the NAS project coordinator and other relevant staff to review each question and ensure that marking was clear and consistent with previous marking.

Both of the latter procedures resulted in an agreed and consistent mark for each question. These short answer question marks were then manually entered into the LXR-Test database question-by-question. This system ensured that no errors could be made.

Statistical Analysis

Statistics based on results from each exam sitting (per sitting and combined) were generated from the LXR-Test software.

Combined exam statistics generated included high and low scores, mean score, number of candidates passing and failing the entire exam and each sub-section; standard error of measurement, standard deviation, and test reliability.

Item statistics generated included p-values (index of item difficulty), point-biserial correlation (measure of validity), number of candidates responding to the question; percentage of candidates who passed/failed the question; percentage who chose each option on multiple choice questions.

Exam committee teleconferences were held to review statistics, with particular attention to item statistics. In May, five questions were identified as not working as intended and these were deleted from scoring. Candidate scores were adjusted accordingly.

Reporting

CMRE results were reported to provincial regulators and all correspondence with candidates was via their provincial regulator. Regulators received information regarding their candidates' pass/fail status and general weak areas, as well as summary comparisons with other candidates at this sitting (without candidate names).

Candidates received reports with their pass/fail status, and with general feedback of strong and weak areas vis-à-vis the competency categories (e.g. intrapartum, newborn, etc.).

2006 Exam Results

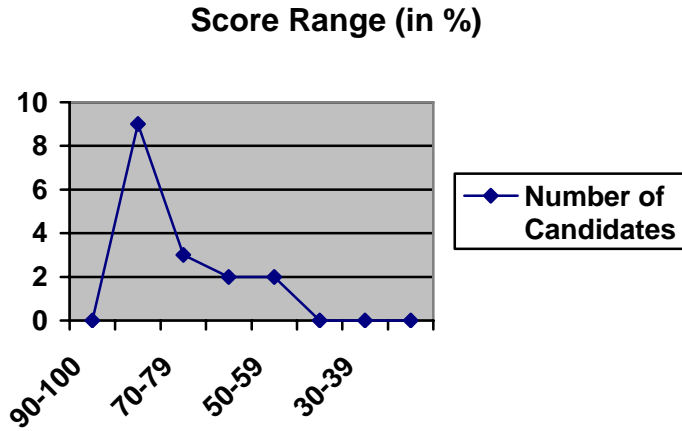
Sixteen internationally-educated candidates from BC, Alberta, and Manitoba took the CMRE in 2006. Candidates were educated in a variety of countries and had a range of experience working as a midwife.

As the statistics below indicate, there was a wide range of candidate scores as would be expected with such a diverse group of candidates. The scores of the majority of candidates were within the passing range.

Please note **that due to the small numbers of candidates, most quantitative statistics are not statistically significant.** The Consortium will continue to accumulate statistics to monitor the exam over time.

Descriptive Data

Maximum Points:	227
Mean Score:	175
Median Score:	185
Score Range:	76



Score Range Table	
Score in %	Number of Candidates
90-100	0
80-89	9
70-79	3
60-69	2
50-59	2
40-49	0
30-39	0
20-29	0
10-19	0
0-9	0

Pass-Fail Data

Candidates Passing: 11

Candidates Failing: 5

Note: Several candidates were on their second attempt to pass a midwifery registration exam. One candidate took the CMRE twice in 2006.

Aggregate Performance on Competency Areas

<i>Competency area</i>	<i>% of items</i>	<i>Mean Score</i>
General Competencies	5-10%	77%
Education & Counselling	5-10%	79%
Antepartum	25-30%	76%
Intrapartum	25-30%	79%
Postpartum	10-15%	75%
Newborn	10-15%	76%
Well woman care	1-5%	73%
Legal, Inter-professional, Other	1-3%	94%
Professional Development	1-3%	88%

APPENDICES

List of Reference Materials on Exam Development

Below is a list of the key reference materials consulted by the NAS project coordinator and/or the exam committee during the development of the CMRE. Additional materials were used by Assessment Strategies Inc, the consulting firm that was contracted to guide the development of this exam.

Bugbee Jr., Alan, Anne H. Browning, Meredith Mullins (Editors). *Certification: A NOCA Handbook*. National Organisation for Competency Assurance, 1996.

Bunch, Michael, Gregory Cizek, and Heather Koons “Setting Performance Standards: Contemporary Methods”. An NMCE Instructional Module, Winter 2004. Madison, USA: National Conference on Measurement for Education, 2004.

Carlson, Janet and Kurt F. Geisinger. *Testing Students with Disabilities ERIC Digest*. Educational Resources Information Center, 1995. Accessed via the ERIC website in March 2006.

Cizek, Gregory J. *Setting Performance Standards: Concepts, Methods, and Perspectives*. Mahwah, USA: Lawrence Erlbaum Associates, Inc., 2001.

CLEAR Exam Review. Summer 2005, Winter 2005, and Winter 2006 editions. Lexington, USA: Council on Licensure, Enforcement, and Regulation, 2005 & 2006.

Cohen , A., T. Crooks and M. Kane. “Justifying the Passing Scores for Licensure and Certification Tests”. Paper presented at Annual Meeting of American Educational Research Association. March 1997. Downloaded from the Educational Resources Information Center website, March 2006.

Committee on Conformity Assessment. *International Standard 17024: Conformity assessment – General requirements for bodies operating certification of persons*. International Organisation for Standardization, 2003.

Gao, Yong and Weimo Zhu. “The Angoff Method and Its Extensions for Setting Cut-off Scores. Powerpoint presentation slides. Kinesmetrics Laboratory, UIUC (undated).

Gross, Leon, Barbara Showers and Cynthia Woodley. *Principles of Fairness: An Examination Guide for Credentialing Boards*. USA: Council on Licensure, Enforcement, and Regulation (CLEAR) and National Organisation of Competency Assurance (NOCA), 2002.

Examination Resources and Advisory Committee (CLEAR). *Development, Administration, Scoring, and Reporting of Credentialing Examinations: Recommendations for Board Members*. USA: Council on Licensure, Enforcement and Regulation, 2004.

Joint Committee on Testing Practices. *Rights and Responsibilities of Test Takers: Guidelines and Expectations*. Washington, DC: American Psychological Association, 1998. Accessed January 2006. www.apa.org/science/ttrr.html.

Joint Committee on the Standards for Educational and Psychological testing. *Standards for educational and psychological testing*. American Educational Research Association, the American Psychological Association, and the National Council on Measurement in Education. Washington, DC: American Educational Research Association, 1999.

Lunz, Mary E. *Examination Development Guidelines*. Chicago: Measurement Research Associates (undated). Downloaded in March 2006.

Newman, Larry S., Ning Wang and Randall F. Wisler. *Setting Passing Standards for Performance-Based Certification and Licensure Examinations*. Washington, DC: National Association for Competency Assurance, © 2000.

Perie, Marianne and Michael Zieky. *A Primer on Setting Cutscores on Tests of Educational Achievement*. USA: Educational Testing Service, 2006.

Perrie, Marianne, Mary Pitoniak and Michael Zieky. "Setting Cutscores", Powerpoint presentation slides. National Conference on Measurement for Education, 2006.

List of Reference Materials on Midwifery

Item writers used the following reference materials as key resources when creating and revising questions. These texts were also consulted by the exam committee when validating questions.

Alberta Midwifery Health Disciplines Committee. *Registrants Handbook*. MHDC, 2005.

Association of Ontario Midwives. *Emergency Skills Workbook*. AOM, 2004.

Bickley, Lynn S. *Bates' Guide to Physical Examination & History Taking* (8th Edition), Lippincott, Williams and Wilkens Publishers, 2002.

Canadian Pharmacists Association. *Compendium of Pharmaceutical and Specialties: The Canadian Drug Reference for Health Professionals*. Canadian Pharmacists, 2005. Association

College of Midwives of British Columbia. *Registrant's Handbook*. CMBC, 2005.

College of Midwives of Manitoba. *Registrants Handbook*. CMM, 2005.

College of Midwives of Ontario. *Registrants Handbook*. CMO, 2005.

Cunningham, F. et al. *Williams Obstetrics* (22nd Edition). McGraw-Hill Professional Publishers, 2005.

Enkin, M., Keirse, M., Neilson, J., Crowther, C., Duley, L., Hodnett, E., Hofmeyr, J. A *Guide to Effective Care in Pregnancy and Childbirth* (3rd Edition). Oxford University Press, 2000.

Fraser, Diane M., Cooper, Margaret A., eds. *Myles Textbook for Midwives* (14th Edition). Churchill Livingstone Publishers, 2003.

Francoual, C., Bouillié, J., & Huraux-Rendu, C. *Pédiatrie en maternité* (3^{ième} édition). Paris: Flammarion Médecine-Sciences, 1999.

Henderson, Chris, Macdonald, Sue, eds. *Mayer's Midwifery: A Textbook for Midwives* (13th Edition). Bailliere Tindall Publishers, 2004.

Kattwinkel, John, ed. *Neonatal Resuscitation Textbook* (4th Edition). American Academy of Pediatrics and American Heart Association, 2000.

Mohrbacher, N., & Stock, J. *Traité de l'allaitement maternel*. St-Hubert, Québec : Ligue La Leche, 1999.

Newman, J., Pitman, T.. *Dr. Jack Newman's Guide to Breastfeeding* (Revised Edition). Harper Collins Publisher, 2003.

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Regroupement les sages-femmes du Québec. *Formation en urgences obstétricales*. RSFQ, 2004.

Riordan, J. *Breastfeeding and Human Lactation* (3rd Edition). Jones & Bartlett Publishers, 2005.

Sawchuk, Diane et al., eds. *Fetal Health Surveillance in Labour* (3rd Edition). BCRCP, 2002.

Sinclair, C. *A Midwife's Handbook*. Saunders Publishing, 2004.

Society of Obstetricians and Gynaecologists of Canada. *SOGC Clinical Practice Guidelines*. SOGC, 2005.

Tappero, E.P., Honeyfield, M.E. *Physical Assessment of the Newborn* (3rd Edition). NICUInk Publishers, 2003.

Tortora, G.J., & Grabowski, S.R. *Principes d'anatomie et de physiologie*. Saint-Laurent, Québec : Éditions du renouveau pédagogique, 2001.

Tucker, Blackburn S. *Maternal, Fetal, & Neonatal Physiology: A Clinical Perspective*. Saunders Publishing, 2003.

Varney, Helen, Kriebs, Jan M., Gegor, Carolyn L. *Varney's Midwifery* (4th Edition). Jones & Bartlett Publishers, 2004.

Participants Involved in Exam Development

NAS Project Coordinator

Wendy Martin

Exam Committee

Jane Kilthei, BC

Joanna Greenhalgh, Alberta

Janice Erickson, Manitoba

Robin Kilpatrick, Ontario

Maggy Moise, Quebec

Competencies Working Group

BC – 3

Alberta – 1

Manitoba – 1

Ontario – 3

Quebec – 3

NWT – 1

Item Writers (numbers per province)

BC – 1

Alberta – 1

Manitoba – 2

Ontario – 2

Quebec - 4

Pilot Participants (numbers per province)

BC – 4

Alberta – 1

Manitoba – 2

Ontario – 8

Quebec – 2

NWT – 1

Translation Team

Quebec - 2

Cut-score Setting Panelists (numbers per province)

BC – 1

Alberta – 1

Manitoba – 3

Ontario – 1

Quebec - 1

Canadian Competencies for Midwives

(see attached)

CMRE Blueprint

(see attached)