

EVALUATION OF PERINATAL CLINICAL PRACTICE  
GUIDELINES IN BRITISH COLUMBIA

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## ABSTRACT

The purpose of this study was to evaluate processes and outcomes of the perinatal guideline program at the British Columbia Reproductive Care Program (BCRCP). The study was conducted in two parts to determine the level of awareness and utilization of perinatal guidelines in British Columbia and to examine population outcomes between April 1, 2000, and March 31, 2003, related to specific guidelines.

In the first part, a survey was developed and distributed by mail to a random sample of hospital and community health nurses, and a convenience sample of managers, registered midwives, and physicians providing perinatal care in British Columbia. The degree to which care providers were aware of perinatal guidelines and used them in their practice, and the extent to which policies and mechanisms related to supporting the implementation of these guidelines within organizations was examined. In addition, the facilitators and barriers to guideline implementation at both the individual and the organizational level were examined, and predictors of guideline use were explored.

The second part of this research project consisted of a retrospective cohort study using maternal and fetal/newborn outcome indicators derived from the BCRCP Perinatal Database Registry for the period between April 1, 2000 and March 31, 2003. Specific maternal and fetal/newborn outcome indicators were examined for five guidelines including (1) Vaginal Birth after Previous Caesarean Birth, (2) Postterm Pregnancy (3) Induction of Labour, (4) Fetal Health Surveillance in Labour, and (5) Delivery of Singleton Term Breech. This study examined perinatal outcomes that would be expected if clinical practitioners were following the guideline, and did not measure significant relationships between guideline use and population outcomes.

Results were compiled from 313 of the 1,206 surveys circulated (response rate 26%) and indicated a very high level of awareness of the guidelines (92% of respondents) and supportive, positive attitudes towards the current guideline program. Over 50% of the respondents indicated that they used the guidelines at least every 3 months, and use varied between professional groups and between guideline topic areas. Three significant predictors of guideline use emerged: guidelines being readily available (OR, 7.8; 95% CI, 2.9-21.1), an eagerness for the uptake of new information (OR, 3.2; 95% CI, 1.8-5.7), and time to read guidelines (OR, 1.9; 95% CI, 1.1-3.5). Recommendations from respondents to improve utilization of perinatal guidelines included making guidelines more readily accessible, making the guideline binder more user-friendly, and facilitating guideline awareness and use among the physician group. The majority (85%) of facilities where respondents worked had aligned their facility policies and procedures with guideline content. However, facilities with <500 births/year had a greater probability of not adopting guidelines into their facility policies and procedures (RR, 2.4; 95% CI, 1.25-4.73) and were more likely to not have guidelines readily available, compared to facilities with >500 births/year (RR, 2.7; 95% CI, 1.07-4.47).

The findings for two guidelines: Fetal Health Surveillance in Labour and Delivery of Singleton Term Breech suggested outcomes as would be expected with appropriate guideline use. For the guidelines Vaginal Birth after Previous Caesarean Birth, Postterm Pregnancy, and Induction of Labour, the maternal-newborn findings were not in the direction suggested with appropriate guideline use. The findings emphasize the need for guidelines to contain clear outcome objectives and baseline measures so that they may be effectively utilized in evaluating population health outcomes.

## TABLE OF CONTENTS

Abstract.....	ii
Table of Contents.....	iv
List of Tables.....	xii
List of Figures.....	xv
Acknowledgments.....	xvi
CHAPTER ONE INTRODUCTION	
1.1 Background to the Problem.....	1
1.1.1 Overview of the BCRCP Guideline Program.....	2
1.2 Research Problem.....	4
1.3 Research Purpose.....	8
1.4 Research Questions.....	8
1.4.1 Part 1: Process Evaluation.....	9
1.4.2 Part 2: Outcome Evaluation.....	9
1.5 Rationale for Guidelines Selection.....	11
1.5.1 Vaginal Birth after Caesarean Birth.....	11
1.5.2 Postterm Pregnancy.....	12
1.5.3 Induction of Labour.....	13
1.5.4 Fetal Health Surveillance in Labour.....	13
1.5.5 Singleton Term Breech.....	14
1.6 Significance of the Study.....	15
1.7 Overview of the Dissertation.....	16



## CHAPTER TWO LITERATURE REVIEW

2.1	Evidence Based Practice.....	17
2.2	Research Utilization in Nursing.....	22
2.2.1	The Research Utilization Process.....	23
2.2.2	Barriers to Research Utilization.....	26
2.2.3	Facilitators to Research Utilization.....	28
2.3	Clinical Practice Guidelines.....	28
2.3.1	Guidelines and Nursing.....	30
2.3.2	Guideline Development.....	31
2.3.3	Guideline Dissemination and Implementation.....	32
2.3.4	Guideline Evaluation.....	37
2.3.5	Summary.....	44
2.4	Innovation-Diffusion Theory.....	45
2.4.1	Innovation.....	46
2.4.2	Communication.....	47
2.4.3	Time.....	47
2.4.4	Social Systems.....	48
2.5	Summary.....	49

## CHAPTER THREE METHODS

3.1	Study Setting.....	51
3.2	Study Design.....	52
3.2.1	Part 1, Process Evaluation.....	52
3.2.2	Part 2, Outcome Evaluation.....	52

3.3	Sampling.....	53
3.3.1	Part 1, Process Evaluation.....	53
3.4.2	Part 2, Outcome Evaluation: Data Source.....	54
3.4	Part 1, Process Evaluation: Survey Instrument.....	58
3.4.1	Content Validity.....	59
3.4.2	Internal Consistency and Factor Analysis.....	61
3.5	Data Collection Procedures.....	61
3.5.1	Part 1, Process Evaluation.....	61
3.5.2	Part 2, Outcome Evaluation.....	62
3.6	Ethical Considerations.....	63
3.7	Data Screening.....	64
3.7.1	Part 1, Process Evaluation: Data Screening.....	64
3.7.2	Part 1, Process Evaluation: Non Applicable Data.....	65
3.7.3	Part 1, Process Evaluation: Missing Data.....	65
3.7.4	Part 2, Outcome Evaluation: Data Screening.....	66
3.8	Data Analysis.....	67
3.8.1	Part 1, Process Evaluation.....	67
3.8.2	Part 2, Outcome Evaluation.....	69
3.9	Summary.....	69

## CHAPTER FOUR FINDINGS

4.1	Part 1, Process Evaluation: Findings.....	71
4.1.1	Response Rates.....	71
4.1.2	Demographic Data.....	72

4.1.3.	RQ 1.1: Attitudes and Level of Awareness.....	74
4.1.4	RQ 1.2: Practitioner Use of BCRCP Guidelines.....	79
4.1.5	RQ 1.3: Alignment of Facility Policies/ Procedures/Quality Assurance Programs with BCRCP Perinatal Guidelines.....	87
4.1.6	RQ 1.4 & 1.5: Factors that Facilitate or Inhibit Use of Guidelines at the Individual and/or Organizational Levels.....	89
4.1.7	RQ 1.6: Predictors of Guideline Use.....	92
4.1.8	RQ 1.7: Hospital Size and Influence on Attitudes, Awareness, Alignment of Policies & Procedures, and Facilitators/Barriers....	93
4.1.9	RQ 1.8: Suggested Changes to the BCRCP Guideline Program for the Future.....	94
4.1.10	Part 1, Process Evaluation: Summary of Findings.....	100
4.2	Part 2, Outcome Evaluation Findings.....	101
4.2.1	Vaginal Birth after Caesarean.....	101
4.2.2	RQ 2.1: Rates of Attempted and Successful VBAC.....	101
4.2.3	RQ 2.2: Rates of Oxytocin Induction and Augmentation.....	104
4.2.4	RQ 2.3: Rates of Prostaglandin Induction and Augmentation....	105
4.2.5	RQ 2.4: Rates of Uterine Rupture for Women Attempting VBAC.....	106
4.2.6	RQ 2.4: Rates of Uterine Rupture for Women Attempting VBAC and Having Induction vs. Spontaneous Labour.....	107
4.2.7	RQ 2.5: Fetal/Newborn Outcomes.....	107
4.3	Postterm Pregnancy.....	110

4.3.1	RQ 3.1: Rate of Postterm Pregnancy.....	111
4.3.2	RQ 3.2: Rate of Induction for Postterm Pregnancy.....	111
4.3.3	RQ 3.3: Fetal/Newborn Outcomes.....	112
4.4	Induction of Labour.....	113
4.4.1	RQ 4.1: Rate of Induction.....	113
4.4.2	RQ 4.2: Rates of Complication.....	114
4.4.3	RQ 4.3: Fetal/Newborn Outcomes.....	116
4.5	Fetal Health Surveillance in Labour.....	117
4.5.1	RQ 5.1: Rate of Electronic Fetal Monitoring.....	117
4.5.2	RQ 5.2: Fetal/Newborn Outcomes.....	118
4.6	Singleton Term Breech.....	120
4.6.1	RQ 6.1: Rate of Caesarean Delivery.....	120
4.6.2	RQ 6.2: Fetal/Newborn Outcomes.....	120
4.7	Part 2, Outcome Evaluation: Findings Summary.....	121
CHAPTER FIVE DISCUSSION OF FINDINGS		
5.1	Part 1, Process Evaluation: Discussion of Findings.....	123
5.1.1	Response Rate.....	123
5.1.2	RQ 1.1: Attitudes and Level of Awareness.....	124
5.1.3	RQ 1.2: Practitioner Use of BCRCP Guidelines.....	127
5.1.4	RQ 1.3: Alignment of Facility Policies/ Procedures/Quality Assurance Programs with BCRCP Perinatal Guidelines.....	129
5.1.5	RQ 1.4 & 1.5: Factors that Facilitate or Inhibit Use of Guidelines at the Individual and/or Organizational Levels.....	131

5.1.6	RQ 1.6: Hospital Size and Influence on Attitudes, Awareness, Alignment of Policies & Procedures, and Facilitators/Barriers.....	133
5.1.7	RQ 1.7: Suggested Changes to the BCRCP Guideline Program for the Future.....	135
5.2	Part 2, Outcome Evaluation: Discussion of VBAC Findings.....	135
5.2.1	RQ 2.1: Rates of Eligible, Attempted and Successful VBAC....	136
5.2.2	RQ 2.2: Rates of Oxytocin Induction and Augmentation.....	137
5.2.3	RQ 2.3: Rates of Prostaglandin Augmentation and Induction....	138
5.2.4	RQ 2.4 & 2.5: Rates of Uterine Rupture.....	139
5.2.5	RQ 2.6: Fetal/Newborn Outcomes.....	140
5.2.6	Practitioner Response Rates for the VBAC Guideline.....	141
5.3	Part 2, Outcome Evaluation: Discussion of Postterm Pregnancy Findings.....	141
5.3.1	RQ 5.1: Rate of Postterm Pregnancy and Induction.....	141
5.3.2	RQ 5.3: Fetal/Newborn Outcomes.....	142
5.3.3	Practitioner Response Rates for the Postterm Guideline.....	142
5.4	Part 2, Outcome Evaluation: Discussion of Induction of Labour Findings.....	143
5.4.1	RQ 3.1: Rate of Induction.....	143
5.4.2	RQ 3.2: Rates of Complications.....	143
5.4.3	RQ 3.3: Fetal/Newborn Outcomes.....	144
5.4.4	Practitioner Response Rates for the Induction Guideline.....	145

5.5	Part 2, Outcome Evaluation: Discussion of Fetal Health	
	Surveillance in Labour Findings.....	145
5.5.1	RQ 4.1: Rate of Electronic Fetal Monitoring.....	145
5.5.2	RQ 4.2: Fetal/Newborn Outcomes.....	146
5.5.3	Practitioner Response Rates for the FHS Guideline.....	146
5.6	Part 2, Outcome Evaluation: Discussion of Singleton	
	Term Breech Findings.....	147
5.6.1	RQ 6.1: Rate of Caesarean Delivery.....	147
5.6.2	RQ 6.2: Fetal/Newborn Outcomes.....	147
5.6.3	Practitioner Response Rates for the Breech Guideline.....	148
5.7	Summary, Part 2, Outcome Evaluation Findings.....	148
5.8	Summary of Discussion of Findings.....	150
CHAPTER SIX      IMPLICATIONS OF FINDINGS AND RECOMMENDATIONS		
6.1	Study Limitations.....	152
6.2	Study Conclusions.....	154
6.3	Recommendations.....	156
6.3.1	Guideline Development.....	156
6.3.2	Guideline Dissemination.....	158
6.3.3	Guideline Implementation and Evaluation.....	160
6.4	Nursing and Interdisciplinary Education.....	162
6.5	Nursing, Quality Assurance, and Policy Development.....	163
6.6	Nursing and Interdisciplinary Research.....	164
6.7	Summary.....	166

REFERENCES.....	171
APPENDIX A: BCRCP Protocol for Guideline Development.....	184
APPENDIX B: Vaginal Birth after Previous Caesarean Birth Guideline.....	186
APPENDIX C: Postterm Pregnancy Guideline .....	192
APPENDIX D: Induction of Labour Guideline .....	195
APPENDIX E: Fetal Health Surveillance Guideline.....	205
APPENDIX F: Singleton Term Breech Guideline.....	214
APPENDIX G: Survey Instrument.....	216
APPENDIX H: Content Validity Rating Scale and Form.....	223
APPENDIX I: Data Parameters.....	228
APPENDIX J: Survey Cover Letter.....	236

## LIST OF TABLES

Table 1: Top 10 File Downloads for BCRCP Website, January 1 <sup>st</sup> 2005 to May 31 <sup>st</sup> 2005.....	6
Table 2: Number of Hospitals Providing Planned Maternity Services, April 1, 2000 to March 31, 2004.....	51
Table 3: Singleton Live Births in B.C. for Fiscal Years April 1, 2000, to March 31, 2003.....	57
Table 4: Singleton Live Births and Stillbirths in B.C. for Fiscal Years April 1, 2000, to March 31, 2003.....	58
Table 5: Content Domains of the Survey .....	59
Table 6: Response Rates by Professional Designation.....	72
Table 7: Demographic Data of 313 Respondents.....	73
Table 8: Attitudes towards Current BCRCP Guidelines.....	78
Table 9: Use and Awareness of Individual Guidelines by All Practitioners.....	81
Table 10: Percentage of Practitioners who have Used Individual Guidelines within the Past 3 Years, by Practitioner Designation.....	85
Table 11: Factors that Facilitate and Inhibit Guideline Use: Narrative Responses.....	92
Table 12: Final Model for Predictors of Guideline Use.....	93
Table 13: Recommended Changes to the BCRCP Guideline Program to Increase Practitioner Use.....	95
Table 14: Ways to Improve the BCRCP Guideline Program: Narrative.....	98
Table 15: Identified Strengths of the BCRCP Guideline Program: Narrative.....	99
Table 16: Rate of Attempted VBAC in Women Eligible, by Fiscal Year.....	102



Table 17: Rate of Successful VBAC, by Fiscal Year.....	103
Table 18: Rate of Induction by All Methods with Attempted VBAC by Fiscal Year.....	104
Table 19: Rate of Oxytocin Augmentation & Induction with VBAC, by Fiscal Year.....	105
Table 20: Rate of Prostaglandin Augmentation & Induction with VBAC by Fiscal Year.....	106
Table 21: Risk of Fetal/Newborn Morbidity & Mortality for VBAC Eligible Women vs. Not Attempting VBAC (Live Births and Stillbirths).....	109
Table 22: Risk of Fetal/Newborn Morbidity & Mortality for VBAC Eligible Women vs. Not Attempting VBAC (Live Births).....	110
Table 23: Gestational Age at Delivery, for Live Singleton Births, by Fiscal Year.....	111
Table 24: Rate of Induction for Gestational Age $\geq$ 41 weeks.....	111
Table 25: Fetal/Newborn Outcomes for Women Delivering at 40 weeks vs. 41 weeks .....	113
Table 26: Rate of Induction by Fiscal Year.....	114
Table 27: Risk of Caesarean Section for Nulliparous Women: Induced vs. Spontaneous Labour, 2000-2003.....	115
Table 28: Risk of Caesarean Section for Multiparous Women: Induced vs. Spontaneous Labour, 2000-2003.....	115
Table 29: Risk of Tetanic Contractions: Induced vs. Spontaneous Labour, 2000-2003.....	116

## Table 30: Fetal/Newborn Outcomes for Women Induced vs. Spontaneous

Labour, 2000-2003.....117

## Table 31: Rate of Electronic Fetal Monitoring and Intermittent

Auscultation, by Fiscal Year.....118

## Table 32: Rate of 1-Minute Apgar Scores for Live Singleton Births,

by Fiscal Year.....119

## Table 33: Rate of Intrapartum Asphyxia for Live Singleton Births,

by Fiscal Year.....119

## Table 34: Fetal/Newborn Outcomes for Singleton Term Breech.....121

## LIST OF FIGURES

Figure 1: Major Ways Practitioners Became Aware of the BCRCP	
Guidelines Manual.....	76
Figure 2: Self-Perception re: Uptake of New Information	
by Professional Designation.....	77
Figure 3: Frequency of Guideline Use by Perinatal Practitioners.....	80
Figure 4: Facility Perinatal Policies Generally Reflect BCRCP	
Guideline Content.....	88
Figure 5: Factors Facilitating Guideline Use: Frequency of Occurrence.....	91
Figure 6: Ways in which the BCRCP Might Increase Awareness of	
Guidelines in Future.....	97
Figure 7: Number of Women VBAC Eligible and VBAC Attempted,	
by Fiscal Year.....	103

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## CHAPTER ONE: INTRODUCTION

### Background to the Problem

Clinical practice guidelines have come to be associated with best clinical practice, evidence-based practice, and best patient outcomes. Clinical practice guidelines are defined as systematically developed statements that assist practitioners in making decisions about appropriate health care for specific clinical circumstances (Field & Lohr, 1990). As such, guidelines provide the practitioner with a synthesis of the best available empirical evidence about specific clinical situations, and where such evidence may be lacking, with professional consensus opinion. Guidelines have been advanced to assist in continuous quality management, to promote appropriate and effective utilization of health care resources, to improve health outcomes, and to minimize inappropriate variation in clinical practice (Conroy & Shannon, 1995; Zimlichman & Meilik-Weiss, 2004).

The past two decades have seen the widespread proliferation of guidelines as one means to implement evidence-based practice; however, rigorous evaluation of guidelines is lacking and there is limited evidence of their impact on clinical practice patterns and patient outcomes (Graham, Beardall, Carter, Tetroe, & Davies, 2003; Grimshaw, Watson, & Eccles, 1998). This is reportedly due to the lack of resources and expertise required to complete thorough guideline evaluation, limitations such as researcher access to database information for measurement of health outcomes, complex methodological issues, and the lack of consensus about guideline objectives within stakeholder groups (Carter, Battista, Hodge, Lewis, & Haynes, 1995).

Many professional international, national, and provincial organizations have been involved in guideline development and distribution, including the Canadian Institute of Child Health, the Registered Nurses Association of Ontario (RNAO), the College of

Registered Nurses of British Columbia (CRNBC), the Society of Obstetricians and Gynaecologists of Canada (SOGC), the Alberta Medical Association, the United States Agency for Healthcare Research and Quality (formerly the Agency for Health Care Policy and Research), and the British Columbia Reproductive Care Program (BCRCP).

The BCRCP came into existence in 1988, its overall goal to optimize maternal, fetal, and newborn health throughout the province. The program consists of three distinct parts including maintenance of a Perinatal Database Registry, provision of interdisciplinary outreach education and support for perinatal care practitioners, and provision of interdisciplinary perinatal clinical practice guidelines. This researcher has worked with the BCRCP and has coordinated the clinical practice guidelines program since 1998. An overview of the guideline program, including guideline development, distribution, implementation, and evaluation, is provided below.

#### *Overview of the BCRCP Guideline Program*

The BCRCP has developed and disseminated obstetric and newborn interdisciplinary guidelines to all acute perinatal care facilities in British Columbia (B.C.) since 1990 and to community perinatal care facilities since 1997. The purpose of the BCRCP guidelines is to recommend practice parameters based on current research, expert opinion, and “best practice” methods. As outlined by the BCRCP, the guideline program objectives are (a) to provide a measure of the knowledge, skills, attitudes, and judgments required to practice safely in a given situation; (b) to ensure that guidelines are applicable to the appropriate practice setting, e.g., hospital, office, or community; (c) to provide (interdisciplinary) guidance to the appropriate care provider; (d) to provide an objective basis for evaluation and quality management strategies; and (e) to facilitate policy development by facilities and stakeholders. The BCRCP supports a philosophy of

interdisciplinary education and all perinatal guidelines have been developed, distributed, and implemented within a multidisciplinary context.

It is important to recognize that substantial financial and human manpower resources are required to develop and distribute guidelines. The BCRCP protocol addressing guideline development requires the involvement of a variety of stakeholders including nursing, midwifery, and medical consultants who participate on a number of BCRCP guideline working groups, advisory committees, and program committees (see Appendix A). Technical assistance is required for web-based information, and this contributes further to the overall cost of guideline development and distribution. It is difficult to estimate the precise cost of developing individual guidelines, but considering the manpower time, photocopying, printing, and distribution expenses, it could range between \$3000 and \$5000 per guideline. To date, the Ministry of Health has allocated approximately \$100,000.00 for development and distribution of two specific sets of perinatal guidelines. It is apparent that considerable resources are required to develop and implement credible perinatal guidelines.

The process for guideline development at the BCRCP is as follows: The BCRCP medical consultants and the guidelines coordinator establish the rationale and evidence supporting the development of a new guideline. Their proposal is submitted to the Interdisciplinary Support and Education Committee (ISEC) for discussion and approval. A Guideline Working Group is then identified to draft the guideline. Once the Working Group has accepted the final draft, the guideline is circulated to the Clinical Practice Advisory Group for comment. The Working Group then reviews the suggested changes and revisions are agreed upon. The final draft is circulated to ISEC for review, revisions are completed as necessary, and the guideline is printed. The guideline is then distributed

to all hospitals in B.C. providing perinatal care, all health units, the BCRCP Steering Committee, and to the Guideline Working Group. All guidelines are posted on the BCRCP website and may be downloaded in PDF format (BCRCP, 2005). Guidelines for revision follow a similar process and the intent is to update guidelines every three years or subsequent to the publication of new evidence.

The goal of guideline implementation is to educate care providers on the content of a guideline and to enhance their understanding of the research supporting the recommendations in order to effect changes in clinical practice patterns. While the majority of guidelines do *not* have a standardized implementation process, educational workshops to facilitate implementation are available as required. For instance, half-day and full-day workshops have been developed for the following guidelines: Substance Use during the Perinatal Period, Reproductive Mental Health, Fetal Health Surveillance in Labour, and Breastfeeding the Preterm Infant. These workshops are provided anywhere in B.C. upon request, but to date no regimented, structured program of province-wide education has been established. It would be fair to state that there has been a lack of structured, objective-based educational implementation strategies for guidelines, and this lack persists.

### Research Problem

Compared to the plethora of resources that have been dedicated to guideline development, distribution, and to a far lesser extent implementation, relatively few resources have been directed towards their systematic evaluation. The impact of BCRCP guidelines on perinatal outcomes at the institutional, regional, or provincial level in B.C. has never undergone a formal evaluation, and hence it has never been determined whether or not guideline practice recommendations have in fact been successfully



implemented.

Limited information about the utilization of guidelines by individual facilities in B.C. has been obtained. The BCRCP has conducted a Perinatal Services Survey biannually since the early 1990's, involving all hospitals in the province providing planned perinatal services, and in 1999 the first survey of community health facilities was conducted. For the 1999 Perinatal Services Survey (BCRCP, 1999), 63 of the 73 facilities providing obstetrical services in B.C. completed the survey, giving a response rate of 83%. Of those 63 facilities, all but two (97%) indicated that they used the BCRCP Clinical Practice Guideline binder in clinical practice and in formulating policies, and over 90% of respondents considered the guidelines to be "useful."

Further information regarding user frequency of electronic guidelines has recently become available via the BCRCP website (P. Johal, Linus Software Inc., personal communication, June, 2005). The entire BCRCP Guideline binder was placed on the BCRCP website in late 2001 (BCRCP, 2005). For the 5 months from January 1<sup>st</sup> 2005 to May 31<sup>st</sup> 2005, utilization data indicate that the top 10 file downloads for the entire website were guidelines. These 10 guidelines had 21% of the total website hits and are rank-ordered from highest to lowest total hits over the 5-month period (Table 1).

Although specific hits on the guidelines have not been traced to geographic location, the total hits by geographic location on the website are known. Approximately 30% are from within B.C., approximately 20% are from other Canadian provinces, and the remaining 50% are from international locations.

Table 1.

*Top 10 File Downloads for BCRCP Website: January 1<sup>st</sup> 2005 to May 31<sup>st</sup> 2005*

Guideline	Total number of hits	Average hits per day
Breastfeeding the Healthy Preterm Infant	7,042	47
Jaundice in the Healthy Term Newborn	6,972	46
Neonatal Thermoregulation	5,217	35
Induction of Labour	3,264	22
Preterm Labour	3,158	21
Neonatal Hypoglycaemia	3,117	21
Surfactant Replacement Therapy in Neonates	3,040	20
Bulletin: Drugs in Breast Milk	2,566	17
Intimate Partner Violence in the Perinatal Period	2,460	16

The BCRCP has received only anecdotal information regarding the utilization of guidelines in clinical practice by individual physicians, midwives, and community and hospital nurses. The BCRCP has obtained no information either anecdotally or systematically regarding the factors that facilitate or the barriers that inhibit utilization and application of BCRCP guidelines by health care providers in B.C. Similarly, individual guidelines have not yet undergone a systematic evaluation to determine their effectiveness in impacting patient outcomes. Because of this, their degree of use among perinatal health care providers, their role in measuring perinatal health outcomes, and their impact on and contribution to achieving optimal maternal, fetal, and newborn health in terms of affecting maternal and newborn morbidity are unknown. For instance, the guideline entitled Fetal Health Surveillance in Labour was developed to disseminate information regarding the 1996 SOGC recommendations for intermittent auscultation and electronic fetal surveillance and has undergone an extensive implementation process province-wide. To date, however, the degree of guideline uptake and its effect(s) on

maternal and newborn outcomes remain largely unknown. In the absence of systematic evaluation, it is impossible to determine the effectiveness of a guideline program.

The possible repercussions of *not* determining the effectiveness of a perinatal guideline program for health care practitioners in B.C. should also be considered. Without an effective guideline program, one may assume broader variation in practice patterns and potentially a consequent negative impact on newborn outcomes. The delivery of a newborn with a disability is a catastrophic event, and the impact on the individual families and costs to society are tremendous. Obstetrical practice, especially related to the intrapartum period, is recognized as one of the highest areas of medical-legal risk and subsequent medical litigation. The Canadian Medical Protective Association (CMPA) reviewed 282 obstetrical litigation cases in Canada between 1997 and 2001. They found that 50% of the cases, due to permanent brain damage of the neonate, consumed 92% of the CMPA program fiscal expenditures (CMPA, 2002). Given both the catastrophic outcomes and major costs associated with neonatal disability, it behooves professional practice organizations to have the most effective guideline program possible in place. In order to determine program effectiveness, program evaluation must be completed.

The lack of formal and systematic evaluation of the BCRCF Guideline Program is consistent with the lack of guideline evaluation in perinatal care across Canada. During informal discussions with the Associate Executive Vice-President, SOGC (Dr. Ken Milne, personal communication, May 2004), the Program Coordinator of the Nova Scotia Reproductive Care Program (Becky Attenborough, personal communication, May 2004) and the Coordinator for Clinical Practice Guidelines at the Alberta Medical Association (Grace Gyon, personal communication, May 2004), it became apparent that there has not

been, nor were there any immediate plans for, formal guideline evaluation in any of these programs.

### Research Purpose

The purpose of this study was to evaluate processes and outcomes of the BCRCP Guideline Program to determine the level of awareness and utilization of BCRCP perinatal guidelines in B.C. and to examine whether change in rates of population outcomes between April 1, 2000, and March 31, 2003, appear to be related to specific guidelines.

The study utilized the theoretical underpinnings of process evaluation and innovation-diffusion theory to determine the degree to which individuals such as hospital nurses, community health nurses, managers, registered midwives, and physicians were aware of perinatal guidelines and used them in their practice, and the degree to which organizations had developed policies and mechanisms related to supporting the implementation of these guidelines. In addition, the facilitators and barriers to guideline implementation at both the individual and the organizational level were examined.

In terms of population outcomes, the study examined those changes in specific maternal and newborn outcome indicators from April 1, 2000, to March 31, 2003, that would be expected for five specific guidelines, were the guidelines being followed by practitioners. The five guidelines evaluated were (1) Vaginal Birth after Previous Caesarean Birth (VBAC), (2) Postterm Pregnancy, (3) Induction of Labour, (4) Fetal Health Surveillance in Labour, and (5) Delivery of Singleton Term Breech.

### Research Questions

The purpose of this study was to utilize process and outcome evaluation to determine the level of awareness and utilization of BCRCP perinatal guidelines in B.C.

and to report specific perinatal outcomes in B.C. between fiscal years April 1, 2000, and March 31, 2003, related to the five specific perinatal guidelines.

*Research Questions, Part 1: Process Evaluation*

1.1. What are the attitudes and level(s) of awareness of community health nurses, hospital nurses, managers, midwives, and physicians towards guidelines?

1.2. To what degree do community health nurses, hospital nurses, managers, midwives, and physicians use guidelines in general, and selected guidelines in particular, in their clinical practice?

1.3. To what degree have community and hospital perinatal care facilities aligned their policies, procedures, and quality assurance programs with guidelines?

1.4. What factors facilitate use of guidelines at both the individual and organizational levels?

1.5. What barriers impede use of guidelines at both the individual and organizational levels?

1.6. What factors predict guideline use?

1.7. To what degree does hospital size influence attitudes, awareness and use, alignment of policies and procedures and quality assurance programs, and facilitators and barriers of guidelines?

1.8. What changes might be made to the BCRCP Perinatal Clinical Practice Guideline program to increase use of guidelines?

*Research Questions, Part 2: Outcome Evaluation*

*Vaginal Birth after Caesarean Section*

2.1. Was there an increase in the rate of attempted and successful VBAC?

2.2. What was the rate of oxytocin induction and augmentation in women attempting VBAC?

2.3. Did the rate of prostaglandin induction and augmentation decrease in women attempting VBAC, consistent with guideline cautions and research published in 2001 (Lyndon-Rochelle, Holt, Easterling, & Martin, 2001)?

2.4. Was the rate of uterine rupture in women attempting VBAC within the 0.1% – 0.5% range reported in the guideline, and how did it compare with women eligible for but not attempting VBAC?

2.5. What was the risk of uterine rupture in women attempting VBAC and having induction vs. those having spontaneous labour?

2.6. Were fetal/newborn outcomes (1-minute Apgars 0-3 and 4-6, 5-minute Apgars 0-3 and 4-6, and intermittent positive pressure ventilation [IPPV] by mask) for women attempting VBAC comparable to women eligible for but not attempting VBAC?

#### *Postterm Pregnancy*

3.1. Has the rate of postterm pregnancy decreased?

3.2. What was the rate of induction for postterm pregnancy?

3.3. Were fetal/newborn outcomes (1-minute Apgars 0-3 and 4-6, 5-minute Apgars 0-3 and 4-6, IPPV by mask, meconium, meconium aspiration, shoulder dystocia and fetal trauma) for infants born at 41 weeks comparable to those for infants born at 40 weeks?

#### *Induction of Labour*

4.1. Was there an increase in rate(s) for induction of labour?

4.2. What were the rates of Caesarean delivery and tetanic contractions in women with induced labour, and how did they compare to those for women with spontaneous labour?

4.3. Were fetal/newborn outcomes (1-minute Apgars 0-3 and 4-6, 5-minute Apgars 0-3 and 4-6, IPPV by mask, and shoulder dystocia) of women with induced labour comparable to those for women with spontaneous labour?

#### *Fetal Health Surveillance in Labour*

5.1. Was there a decrease in the rate of use of electronic fetal monitoring in B.C.?

5.2. Have fetal/newborn outcomes (1-minute Apgars 0-3, 4-6, and 7-10; 5-minute Apgar 0-3, and newborn seizures) remained unchanged?

#### *Singleton Term Breech*

6.1. What was the rate of singleton term (> 37 weeks) breech delivery by caesarean section?

6.2. Did singleton term breech infants delivered by caesarean demonstrate better newborn outcomes (1-minute Apgars 0-3 and 4-6, 5-minute Apgars 0-3 and 4-6, IPPV by mask, birth trauma, perinatal death, stillbirth, and neonatal death) than those delivered vaginally?

### Rationale for Guidelines Selection

The rationales for selecting these particular guidelines for evaluation are outlined below.

#### *Vaginal Birth after Previous Caesarean Birth (VBAC)*

The guideline entitled Vaginal Birth after Previous Caesarean Birth (Appendix B) was originally published by the SOGC in 1997, and distributed by the BCRCP in May 2000. The guideline distributed by the BCRCP incorporated the SOGC Clinical Practice Guideline Policy Statement No. 68, December 1997, verbatim, with the additional inclusion of an appendix developed by the BCRCP, which listed the signs that may occur with a complete or partial uterine rupture, or impending rupture. This guideline was in

effect during the period for guideline evaluation, April 1, 2000, to March 31, 2003, and superseded the previous BCRCP guideline for VBAC that was originally developed in 1992 and revised in 1994. There were no major changes in recommendations for VBAC management between the previous guideline and the one in effect during the evaluation period that would affect this evaluation or suggest different expected outcomes for the indicators being measured. However, despite general consistency within the guidelines, anecdotal evidence suggests that the rate of VBAC in B.C. has been steadily decreasing. It was therefore deemed important and timely to examine VBAC-related population outcomes in B.C.

### *Postterm Pregnancy*

The BCRCP Postterm Pregnancy guideline (Appendix C) was revised in 1993 and was in effect during the period of this study, April 1, 2000, to March 31, 2003. While “postterm” has historically been defined as “beyond 42 weeks,” clinical management is currently such that postterm pregnancy beyond 42 weeks is avoided. The 1993 BCRCP guideline suggested that management at 41 weeks should include offering the mother induction of labour where there is evidence of inadequate fetal growth, an abnormal non stress test, or maternal disease affecting fetal well being. The guideline stated that if the mother and fetus were both healthy labour should be induced at 42 weeks.

In 1997 the SOGC published a guideline on management of postterm pregnancy that recommended induction at 41 3/7 weeks in a healthy mother and fetus to avoid newborn morbidity, because evidence suggested that adverse perinatal outcome may occur as early as 41 weeks. Although the BCRCP guideline on postterm pregnancy was not updated until 2004, clinical practice would be expected to reflect the recommendations of the SOGC guideline, rather than the outdated BCRCP guideline that



was in effect during the evaluation. If this were true, one would expect to find the rate of postterm pregnancy decreasing in B.C. It was therefore deemed important and timely to examine postterm-related population outcomes in B.C.

### *Induction of Labour*

The BCRCP Induction of Labour guideline (Appendix D) was revised in 1999 and in effect during the time of this study, from April 1, 2000, to March 31, 2003. Induction of labour is defined as the initiation of labour prior to spontaneous onset, for the purpose of accomplishing delivery of the fetal/placental unit. The goal of induction is to simulate normal labour with the use of oxytocin, prostaglandin, and/or artificial rupture of membranes without causing uterine hyperstimulation. The rates of labour induction have risen steadily across Canada, increasing from 12.9% in 1991 to 27.2% in 2000 (Health Canada, 2003), and have been a focus of attention and discussion by clinicians providing perinatal care. This increase is currently causing concern because of the greater hospital resources required for inductions (including one-to-one nursing care for oxytocin inductions), and because of the higher rate of complications associated with induction, especially for caesarean section for nulliparous women. It was therefore deemed important and timely to examine population outcomes in B.C. related to induction of labour.

### *Fetal Health Surveillance in Labour*

The BCRCP Fetal Health Surveillance in Labour guideline (Appendix E) was revised in 1997 and was in effect during the period of this study, April 1, 2000, to March 31, 2003. In late 1995 and early 1996 the SOGC published evidence suggesting that intermittent auscultation was the preferred method of fetal surveillance for healthy women without risk factors for adverse perinatal outcome, and that electronic fetal

monitoring should be reserved for women with non-reassuring auscultation findings and women with risk factors for adverse perinatal outcome (SOGC, 1995, 1996). The evidence indicated that when comparing outcomes for electronic fetal monitoring vs. intermittent auscultation in healthy women, maternal morbidity increased with the use of electronic fetal monitoring. This was related to the increased likelihood of operative delivery as non-reassuring fetal status has poor predictive value, i.e., a high false positive rate leading to increased operative deliveries. Despite this high operative intervention rate, associated perinatal morbidity and mortality showed no improvement over those mothers receiving intermittent auscultation during labour (SOGC, 1995, 1996).

Since the late 1990's the BCRCP has had an active educational program in place for the implementation of the Fetal Health Surveillance in Labour guideline, with the specific goal of decreasing the inappropriate use of electronic fetal monitoring in B.C. This educational program included the provision of one-day fetal health surveillance workshops throughout B.C., and the education of approximately 80 fetal health surveillance instructors to implement education sessions within their own facilities and communities. To date, there had been no formal evaluation of the effects of the Fetal Health Surveillance in Labour guideline implementation strategies on population outcomes. It was therefore deemed important and timely to examine population outcomes in B.C. related to fetal health surveillance in labour.

#### *Singleton Term Breech*

In the spring of 2000, the results of a randomized controlled trial were published in *The Lancet* that concluded that planned caesarean section was the best method for delivering a term frank or complete breech singleton fetus at term (Hannah et al., 2000). The researchers found that this approach resulted in significantly lower, although not

absent, risk of infant morbidity, compared to planned vaginal birth. Following publication of the research, the SOGC issued a guideline indicating that term singleton breeches should be delivered by planned caesarean section (SOGC, 2001). The BCRCP adopted and distributed the guideline in 2000 (Appendix F). It was deemed important and timely to examine population outcomes in B.C. related to delivery management of infants that present as singleton breeches at term gestation.

### Significance of the Study

Nurses form the largest group of health care professionals, and are consequently the most likely group to be working with clinical practice guidelines. The information gained from this study is important for several reasons. First, it was not known to what extent nurses and other professional groups were aware of, and using, perinatal guidelines within B.C. Second, the barriers impeding guideline use and the facilitators encouraging their use were also unknown. Third, because the guidelines have never undergone a formal evaluation, it was not known whether the guideline format actually met the needs of health care providers. Finally, patient outcomes expected of specific guidelines had never undergone formal review.

The answers obtained to these research questions will in part determine the future direction of the BCRCP Perinatal Guideline program. Evaluation of population outcomes for specific guidelines could provide a prototype of evaluation methodology for all guidelines published by the BCRCP. Given the ready accessibility of the BCRCP Perinatal Database Registry, the BCRCP could conduct ongoing guideline evaluation at the provincial, regional, and facility levels. Aggregate evaluation findings on specific guideline outcomes could be made available to health care providers for the purpose of improving the quality of perinatal care in B.C. and could also be used to plan provincial

education strategies. This study presents leading recommendations for provincial reproductive care programs utilizing the interface between the program components of guidelines and the database registry. Finally, this study contributes unique findings and knowledge in the field of guideline evaluation within the area of interdisciplinary perinatal care.

### Overview of the Dissertation

This dissertation is composed of six chapters. Chapter One contains the background to the research problem, the research problem, the purpose and significance of the research, and the research questions. Chapter Two contains an overview of existing literature in the fields of evidence-based practice, research utilization in nursing, clinical practice guidelines, program evaluation, and innovation-diffusion theory. Chapter Three contains the study methods used, including the study setting, study design, sampling methods, data collection procedures, ethical considerations, data cleaning methods, and data analysis. Chapter Four contains the study findings for the survey and the outcome evaluation findings for each of the five guidelines. Chapter Five contains a discussion of the study findings as they interface with the literature. Chapter Six contains a summary of the research project, study limitations, study conclusions, and the implications of the findings and recommendations for the BCRCPP Perinatal Guideline Program, nursing practice, education, administration, education, and research.

## CHAPTER TWO: LITERATURE REVIEW

In this chapter, a survey of the literature related to clinical practice guidelines is presented. The chapter is divided into five sections. First, an overview of evidence-based practice is presented. This area provides the foundation for guideline development and contextualizes the research within current professional norms and standards. Second, a review of research utilization in nursing, including the barriers and facilitators to research utilization, is presented. This area provides an overview of the theories and challenges inherent within the knowledge translation of research into practice. Third, the literature related to guidelines, specifically guidelines and evidence-based practice, guidelines and nursing, guideline development, guideline dissemination and implementation, and guideline evaluation, is examined. Fourth, the theoretical underpinnings of program evaluation are considered, as these formed the foundation of the research methodology. Fifth, a summary of innovation-diffusion theory is presented as this guided development of the survey tool used in the process evaluation component of this research.

### Evidence-Based Practice

The literature contains several definitions of evidence-based practice (French, 2002), the majority of which include reference(s) to best evidence, primary and systematic research, individual clinical expertise, and adoption of guidelines for the individual patient based on clinical judgment. According to one textbook on evidence-based medicine (Sackett, Straus, Richardson, Rosenberg, & Haynes, 2000), evidence-based medicine (practice) is “the integration of best research evidence with clinical expertise and patient values” (p.1). The authors highlight the importance of considering integration of the best clinical evidence from systematic research, individual clinical expertise, and the patient’s individual needs when making clinical decisions. Within this

context, evidence-based practice may be considered a formal process of health care decision-making.

Several concurrent international initiatives from organizations such as the Agency for Healthcare Research and Quality in the U.S. and McMaster University in Canada have developed and promoted evidence-based practice over the past 20 years. In the early 1980's, a group known as the Evidence-Based Medicine Working Group of the Department of Clinical Epidemiology and Biostatistics at McMaster University began writing articles to teach clinicians how to critically appraise research literature (Gray, 2002). In 1992 the term "evidence-based medicine" was described in the Journal of the American Medical Association (Evidence-Based Medicine Working Group, 1992), and the group subsequently published a 25-part series of articles on evidence-based practice in JAMA from 1993 to 2000. In 1997, the National Forum on Health (NFH) published recommendations for the development of a culture of evidence-based decision-making within the Canadian health care system (NFH, 1997), with specific recommendations to identify mechanisms to promote analysis, translation, dissemination, and uptake of information for decision-making.

A concurrent development that facilitated the implementation of evidence-based practice was the establishment of the Cochrane Collaboration under the initiative of Dr. Archie Cochrane, a British obstetrician. The Cochrane Collaboration is a world-wide network of professionals who work together to compile knowledge from randomized controlled trials and who prepare and maintain systematic reviews on specific topics (McKibbin, Eady, & Marks, 1999). The Cochrane Library maintains an electronic collection of systematic reviews, randomized controlled trials, and abstracts of methodology papers related to the review methods. Easily accessible evidence-based

literature from the Cochrane Library, in combination with publications, have facilitated the proliferation of evidence-based practice over the past decade and promoted its expansion beyond the medical realm to other health care professionals.

The medical profession has led the evidence-based practice movement, which is founded upon an epistemological philosophy of logical positivism where explanatory knowledge justified by empirical investigation is considered the gold standard. The premise of evidence-based medicine is that clinical decisions should be based on the results of peer-reviewed randomized controlled trials (RCTs) whenever possible. Evidence-based practice is a systematic method of guiding clinical practice decisions, composed of five steps (McKibbon et al., 1999). First, the question of interest is formulated; this may be based on a clinical problem, an intervention of interest, an alternative treatment of interest, or an outcome of interest. Second, a review of the literature is completed for both primary publications such as research studies and secondary publications such as systematic review articles and meta-analysis. Systematic reviews are particularly useful because they include a comprehensive search strategy, synthesis, and appraisal of research evidence, and eliminate the need for review of individual research articles. Third, the literature is critically appraised and the level of evidence graded to determine its strength and quality. Fourth, if the results of the review appraisal are found to be valid and clinically significant, the evidence is appropriately integrated with the individual patient circumstances. Fifth and lastly, patient outcomes and the evidence-based practice process are evaluated.

There are various methods for defining the quality of evidence. The definition provided by the Canadian Task Force on the Periodic Health Exam (Canadian Task Force on the Periodic Health Exam, 1998, p. 618; Woolf, Battista, Angerson, Logan, & Eel,

1994) is used by many professional organizations in Canada, including the Alberta Medical Association and the SOGC. The assessment of the quality of evidence is based on a hierarchy: The closer a study is to Level I, the higher the quality of its evidence. The assessment levels include

- I: Evidence obtained from at least one properly randomized controlled trial.
- II-I: Evidence from well-designed controlled trials without randomization.
- II-2: Evidence from well-designed cohort (prospective or retrospective) or case-controlled studies, preferably from more than one centre or research group.
- II-3: Evidence obtained from comparisons between times or places with or without the intervention. Dramatic results in uncontrolled experiments could also be included in this category.
- III: Opinions of respected authorities, based on clinical experience, descriptive studies, or reports of expert committees.

The proliferation of mechanisms to facilitate the implementation of evidence-based practice, such as the Cochrane Collaboration, and the formation of evidence-based practice centres in Canada at McMaster University and at the Universities of Alberta and Ottawa (Agency for Healthcare Research and Quality, 2003), have contributed to the establishment of a culture of evidence-based practice in Canada.

Sackett et al's (2000) definition of evidence-based practice as "the integration of best research evidence with clinical expertise and patient values" (p.1) is relevant in terms of its applicability to nursing. Ever since Florence Nightingale began promoting a sound understanding of basic sciences, anatomy, and hygiene, nursing epistemology has been grounded in the empirical biomedical model. The biomedical model, dominant for



the last half of the nineteenth century and the first half of the twentieth century, is largely embedded in the philosophy of logical positivism.

In the second half of the twentieth century, the epistemological foundation of nursing broadened, largely due to the development of nursing models and the acknowledgement of multiple sources of knowledge. For example, Schultz and Meleis (1998) outlined three types of nursing knowledge: clinical, conceptual, and empirical. Clinical knowledge is explained as the manifestation of multiple ways of personal knowing combined with empirical knowledge in the acts of practising nurses to solve patient care problems. Conceptual knowledge is abstracted beyond personal experience and results from the interplay between empirical knowledge and theorizing. Empirical knowledge results from empiricist, historical, phenomenological, interpretative, and critical theory approaches to research. Considering the broad scope of qualitative inquiry in nursing practice, nursing has proactively examined criteria for rigor that are appropriate for these methodologies (Beck, 1993; Good, 2000; Sandelowski, 1986, 1993, 1997; Streubert & Carpenter, 1995). The justification of knowledge through integration of both quantitative and qualitative evidence may have been led by nursing practice. However, in its grading of scientific evidence, the Canadian Task Force on the Periodic Health Exam (Woolf et al., 1994) considers evidence derived from descriptive studies to be the weakest of all.

The challenge for nurses striving toward evidence-based practice is finding evidence to substantiate and complement multiple forms of knowledge such as tacit and intuitive knowledge. In order to meet this challenge nurses must develop critical appraisal skills, keep abreast of current research literature, maintain a healthy thirst for knowledge in the presence of resource-challenged clinical routine, and examine the context in which

new knowledge derived from research may be appropriate to a particular clinical situation.

Banning (2005) explored nurses' concepts of evidence-based practice and how evidence was used in clinical practice, using data collected in focus group interviews and questionnaires involving 16 independent nurse prescribers in the United Kingdom. Banning found a diversity of opinion regarding the concept of evidence, and noted that only a limited number of nurses equated evidence with RCTs. However, he also found that nurses were able to *describe* the research process more easily than they could conceptualize examples of evidence-based practice.

Despite the controversies surrounding evidence-based practice in nursing, there is considerable commitment within the nursing profession to strive towards attaining best practices. Various initiatives have been put in place to achieve this, including courses in critically appraising research evidence, the development of evidence-based nursing practice committees, the development of clinical practice guidelines, and courses on how to teach evidence-based clinical practice (DiCenso, 2003). As nursing takes definitive steps to embrace a culture of evidence-based practice, many questions regarding evidence-based nursing remain (Estabrooks, 1998). These include whether any forms of research other than scientific research can be considered legitimate evidence, how research using different methodologies may be synthesized, and how a hierarchy of nursing research evidence might be defined. These issues will undoubtedly remain the topic of academic debate in years to come.

#### Research Utilization in Nursing

"Research utilization" is described as the use of research to guide practice (Estabrooks, 1998), and may be considered a sub-category of evidence-based practice

(Estabrooks; Stetler et al., 1998). This position rests on the premise that evidence-based practice includes a broader conceptualization of evidence than research evidence alone. This broader conceptualization of evidence is reflected in the Canadian Task Force on the Periodic Health Exam's definition of evidence (cited in Woolf et al., 1994), which classifies Level III evidence as including the opinions of respected authorities, clinical experience, descriptive studies, and the reports of expert committees. Estabrooks's view contrasts with that of French (2002), who contends that there is no evidence to support evidence-based practice as a new construct different from research-based nursing. French completed a frequency analysis of relevant key words containing the term "evidence" in a publications database and found that from 1995 to 2001 there was an increase in the number of papers using the term "evidence-based" and a decrease in the number of papers using the term "research." French concluded that evidence-based practice is only "a euphemism for information management, clinical judgement, and professional practice development" (p.250) that cannot be distinguished from the traditions of research-based practice and quality assurance.

Research utilization implies a specific form of knowledge utilization in which the research findings and/or the research processes are incorporated into clinical practice (Stetler, 1985). This process may be understood in the context of Rogers's theory of diffusion of innovation as research utilization involves both a cognitive application (change in thinking) and a behavioural application (change in practice) of the innovation (research finding) through organized processes.

#### *The Research Utilization Process*

The concept of research utilization emerged in nursing in the early 1970's as a highly complex process involving the transfer of research-specific knowledge into

individual clinical practice within organized procedures (Stetler, 2001; Stetler & Marram, 1976). Research utilization models were founded on models of individual assimilation, innovation diffusion, and facilitation. These processes have been clearly delineated in various models and nursing research utilization projects including the Stetler Model (Stetler, 2001), the Conduct and Utilization of Research in Nursing (CURN) Project, and the Iowa Model of Research in Practice (White, Leske, & Percy, 1995), to name a few.

The Stetler Model reflects a practitioner-oriented or individual assimilation model approach to research utilization. It requires that an individual or individuals operating within a group critically address a series of utilization-related issues. Stetler (2001) conceptualized and described two processes related to research utilization: (a) the use of research findings in clinical practice, and (b) the use of individual components of the research process for routine clinical problem solving. While Stetler maintains that the model addresses both facets of research utilization, the primary focus, in fact, is utilization of research findings in individual clinical practice. Individual nurses, educators, or policy makers summarise research and apply the knowledge to influence educational programs, make practical decisions, and impact policy decisions. The model originally included a series of six critical-thinking and decision-making steps to assist the individual practitioner in utilizing research findings in clinical practice and hence bridging the chasm between research and practice. Stetler's most recent model (2001) consists of five steps: (a) the preparatory phase, during which the purpose of the research review is specified and the outcomes identified; (b) validation and review of utilization review tables (versus traditional research critique of evidence) to determine whether the information is applicable and relevant to the specific problem; (c) synthesis of research findings, a decision regarding which findings to use or eliminate and/or whether or not to

conduct a research study; (d) application of the research findings; and (e) evaluation. Stetler's latest model guides the nurse through cognitive application of research findings and provides explicit dissemination and change strategies for individuals and groups. Although Stetler first published the conceptual model of research utilization as early as 1985, it does not appear that the theoretical components of the model have undergone scientific testing or scrutiny.

Other models, including the CURN Project and the Iowa Model of Research, incorporate innovation-diffusion theory and are designed to facilitate research utilization and planned change in clinical practice at the organizational level. The CURN Project outlines a seven-step process and the Iowa Model outlines a nine-step process of research utilization (White et al., 1995). These models incorporate dissemination strategies including continuing education and networking opportunities.

Despite minor differences, all these models outline a linear prescriptive research utilization process that suggests an orderly progression from start to finish. They also share the ultimate goal of application of research findings at the practitioner level, with responsibility placed on the individual nurse. These models differ somewhat from facilitation models of research utilization described by Kitson, Harvey, and McCormack (1998), who suggested that the research utilization process is not linear but must take into consideration key variables such as staff roles, team functioning, and effective leadership for research utilization to be successful.

Despite the development of research utilization models in theory, it is widely acknowledged that a wide degree of variability remains between the time at which evidence is obtained, and the time at which changes are made in clinical practice (Barta, 1995; Coyle & Sokop, 1990). Studies in both the United States and the Netherlands have

estimated that 30% -40% of patients do not receive care based on current research evidence, and that approximately 20-25% of care provided is superfluous or potentially harmful (Grol & Grimshaw, 2003). Mead (2000) suggests that corresponding changes in clinical practice have not always accompanied apparently rigorous evidence, and that the availability of evidence has not, per se, proved sufficient to change clinical practice. Bostrom and Newton Suter (1993) contend that "a large gap exists between research and practice" (p.28) and indicate that although there are many reasons why research is not utilised, solutions must be found to strengthen the application of research in clinical practice. It is therefore necessary to examine factors which constitute barriers and facilitators to research utilization in clinical practice.

#### *Barriers to Research Utilization*

Numerous barriers exist that effectively prevent the uptake of research knowledge in clinical practice. Funk, Champagne, Wiese, and Tornquist (1991) conducted pioneering work in the identification of barriers to research utilization. They developed a survey tool on barriers to research utilization and circulated it to 5,000 members of the American Nursing Association; 1,948 questionnaires were returned. Factor analysis revealed four factors relating to (1) the characteristics of the adaptor of the research, (2) the characteristics of the organization, (3) the characteristics of the innovation or the research itself, and (4) the characteristics of the communication of the research.

These themes correspond to themes identified by Rogers in his innovation-diffusion theory. The characteristics of the adopter of the research related to the nurse's skills, awareness, and values relating to research. Nurses reported that they were not aware of research findings and/or did not feel capable of appraising research findings. Organizational characteristics identified as barriers included insufficient time to read

research and implement findings, inadequate support from administration, and lack of cooperation from physicians to implement new ideas. Certain characteristics of the research and communication of the research were also perceived as barriers, including conflicting results in the literature, incomprehensible statistical analysis, and literature not being readily available in one consistent location. Similar barriers to research utilization have been identified by others (Pettengill, Gillies, & Clark 1994; Webb & Mackenzie, 1993). These researchers found that nurses were unable to obtain research articles, lacked time to read research, lacked understanding of research terminology and statistics, and had a feeling of inadequacy regarding effecting changes in procedures.

Lacey (1994) found that the greatest barriers to research utilization for nurses in the United Kingdom were perceived lack of autonomy and perceived inability to challenge senior colleagues, managers, and medical staff with new research information. Parahoo (2000) surveyed 1,368 nurses to examine barriers and facilitators for research utilization among nurses in Northern Ireland and found that the most frequently cited barrier was that the nurse did not feel she/he had enough authority to change patient care procedures. Parahoo's results are consistent with those observed by Lacey (1994), Pettengill, Gillies, and Clark (1994), and Webb and Mackenzie (1993). Parahoo found that the next most frequently cited barriers to implementing research were that statistical analyses were incomprehensible and nurses did not feel capable of evaluating the quality of the research. These findings echo Renner's (1989), which identified a general concern among practicing nurses that research processes were unfamiliar and that new strategies were required to assist them in identifying and evaluating appropriate research literature, and then applying research findings.

### *Facilitators to Research Utilization*

Numerous individual and organizational facilitators to research utilization have been identified in the literature. Parahoo (2000) found that the most important facilitators for implementing research were support from managers and colleagues, and time for reading research journals. In a correlation study, Champion and Leach (1989) examined factors that facilitate research utilization and found that positive attitudes to research and innovation, perceived availability of research information, and support from managerial staff, were all positively correlated with research utilization. Hatcher and Tranmer's (1997) study findings supported these results and found that the nurse's positive attitudes, the availability of research findings, and supports inherent in the work environment were the most significant variables positively correlated with research utilization. Mulhall (1995) suggested that successful research utilization depends on the presence of a supportive administration, adequate time, and financial resources to enable nurses to visit the library, assimilate research reports, and attend continuing education courses.

It is apparent that there are several barriers and challenges inherent in the process of incorporating new knowledge derived from research into clinical practice. While one solution to overcoming many of these barriers is to teach nurses an appreciation and understanding of research literature, another is the development and implementation of clinical practice guidelines. Indeed, guidelines are viewed as a critical link between available research evidence and clinical nursing practice (Cheater & Closs, 1997).

### *Clinical Practice Guidelines*

Clinical practice guidelines are defined as systematically developed statements that assist practitioner and patient decisions about appropriate health care for specific clinical circumstances (Field & Lohr, 1990). Guidelines undergo a common process of



development that includes (a) selection of the clinical problem, (b) synthesis of the data, (c) development of the guideline, (d) endorsement of the guideline, (e) dissemination of the guideline, (f) encouragement to implement the guideline, and (g) monitoring and evaluation of the impact of the guideline (Davis & Taylor-Vaisey, 1997).

Guidelines are one of the tools available to operationalize research evidence into clinical practice in order to affect clinical outcomes. To date, guidelines have been more predominant in the medical literature than in the nursing literature. Guidelines require scientific rigor and are likely to be boycotted by physicians unless strong empirical evidence underpins each guideline and physicians are persuaded by their scientific justification (Day, Klein, & Miller 1998). From a professional cultural perspective, evidence-based practice and clinical practice guidelines may have effectively replaced the epistemological foundations of medical knowledge, shifting them from pathophysiology towards epidemiology (Timmermans & Kolker, 2004). Academic debate has ensued not only about the effects of guidelines on professional medical autonomy, but also about the influence of guidelines on the demise of exclusionary professional knowledge, and on traditional and culturally embedded medical power structures (Timmermans & Kolker). Despite the scientific rigor of guidelines, there is considerable controversy within the medical community regarding their utility. Berg (1997) suggests that critics of guidelines fear they will lead to “cookbook medicine” and “de-skilling” (p.1081), with a possible reduction in clinical freedom and practitioner autonomy. Harrison and Ahmad (2000) contend that, in the United Kingdom, medical autonomy has been eroded and replaced with “scientific-bureaucratic medicine,” in which clinical practice guidelines are equated with “bureaucratic rules” (p. 38). Alternatively, Sackett (1996) defends guidelines and states,

External clinical evidence can inform, but can never replace, individual clinical expertise, and it is this expertise that decides whether the external evidence applies to the individual patient at all and, if so, how it should be integrated into a clinical decision (p.1).

While the debate over the utility and impact of guidelines in medical practice continues, it is clear that their ready availability in electronic format has already revolutionized access to empirical research and information.

### *Clinical Practice Guidelines and Nursing*

Over the past decade, the nursing profession has become more cognizant of the movement towards clinical practice guidelines at both the international and national levels. For example, the Association of Women's Health, Obstetric, and Neonatal Nurses (AWHONN) has established a process for guideline development based on the American Nurses' Association and the Agency for Healthcare Research and Quality's frameworks for evidence-based guideline development. The Registered Nurses Association of Ontario (RNAO) has a best practice guideline program that has been funded by the Government of Ontario since 1999. To date, the RNAO has developed 25 guidelines that have gone through the stages of planning, development, pilot implementation, evaluation, dissemination, and uptake. The RNAO recently solicited research partnerships for guideline evaluation in provinces outside of Ontario.

While nursing guidelines are more readily available now than even a few years ago, there is limited research on nurses' attitudes towards guidelines. Harrison, Dowswell, and Wright (2002) interviewed 29 practice nurses in England to examine their attitudes towards guidelines and to investigate the impact of guidelines on nurse-physician relationships. "Practice nurses" were not defined, but are assumed to work with

physicians in primary practice. Harrison et al. found that all nurses rated the guidelines as “useful” for various reasons, perceiving them as medical-legal protection for themselves, as a tool for consistency of practice, and as a mechanism for increased independent clinical decision making and autonomy. Harrison et al. concluded that guidelines had implications for inter-professional power relationships, and their findings support Berg’s (1997) argument that guidelines may be effective in weakening the dominance of medicine over nursing.

### *Clinical Practice Guideline Development*

The production of guidelines follows a methodical process that involves six steps: (1) definition of the problem and the target population for whom the guideline is intended, (2) a systematic review of the literature and grading of the quality of research evidence, (3) consideration of resources for guideline development, (4) development of recommendations and linkages to scientific evidence, (5) writing the guideline; and (6) external review of the guideline (McKibbin et al., 1999).

The majority of the existing literature on guideline development has been written by physicians and targeted at their medical colleagues. However, many organizations, such as the Scottish Intercollegiate Guidelines Network (SIGN) and The National Guideline Clearing House of the U.S. Agency for Health Care Research and Quality, recommend guideline development and use for multidisciplinary care providers (Pagliari & Grimshaw, 2002; SIGN, 2004; The National Guideline Clearing House, 2000). Unfortunately, based on the scarcity of literature currently available on interdisciplinary guidelines, it would appear that this recommendation has not yet been effectively implemented. In a non-participant observational study, Pagliari and Grimshaw (2002) examined the extent to which professional roles and status of group members influenced

group members' participation in the guideline development process. They demonstrated a relationship between status hierarchies and contribution to discussion and decision making in guideline development meetings. They found a marked difference in the number of contributions made by consultants and experts, compared to general practitioners and nurses, with the greatest number of contributions coming from consultants and experts. While it is not possible to generalize the findings of an observational study, it seems worth noting that hierarchical power structures and dynamics may inhibit effective nursing contributions to guideline development.

Recently, more attention has been paid to the effect of guideline format on guideline utilization. Goering and Wilson (2002) found that user-friendly formats with simpler algorithms tend to be preferred, and concluded that this contributed to the successful implementation of guidelines. Michie and Johnston (2004) suggested that the simplicity and specificity of the recommendations included in guidelines might be a factor in successful implementation. Given the methodical process required for guideline development, adequate resources must be allocated for this process.

#### *Clinical Practice Guideline Dissemination and Implementation*

Research findings suggest that dissemination of guidelines alone is ineffective in impacting change in clinical practice and that implementation strategies are required for effective utilization (Oxman, Thomson, & Davis, 1995). The goals of guideline implementation are (a) increasing practitioner knowledge, (b) changing practitioner attitudes so that the practitioner accepts the guideline as an improved standard of care, (c) changing behaviour so that clinical practice conforms to the guideline, and (d) ultimately changing patient outcomes by improving quality of care (Conroy & Shannon, 1995).

In late 1999, a group of guideline experts met in England to examine evidence-based implementation of guidelines (Gross et al., 2001). The group reviewed evidence from three Cochrane systematic reviews that examined the role of professional, regulatory, financial, and organizational interventions in effecting best practices (Bero, Grilli, & Grimshaw 1998; Freemantle, Harvey, & Wolf, 2000; Thomson, Oxman, & Haynes 2000). The group formulated four conclusions: (1) passive educational approaches such as guideline dissemination and publication of research findings were generally ineffective in changing behaviour; (2) physician profiling, audit, and feedback had variable success as implementation strategies to effect behaviour change; (3) interactive educational outreach was effective in facilitating physician behaviour change; and (4) the implementation of multi-faceted strategies was most effective for facilitating physician behaviour change. The authors suggested that guideline implementation should be multi-faceted, including enlisting local opinion leaders to assist in implementation, facilitating widespread dissemination to all stakeholders, providing interactive education via local conferences, and providing academic detailing (one-on-one education) as necessary.

In 2004, Grimshaw et al. conducted a systematic review of randomized controlled trials, controlled clinical trials, controlled before and after studies, and interrupted-time-series studies, on the effectiveness and efficiency of guideline dissemination and implementation strategies. The researchers reported on 235 studies but stated that the overall quality of these studies was poor. They concluded that there was imperfect evidence to determine which guideline implementation strategies were likely to be most efficient and recommended that decision makers use careful judgment in the allocation of resources. Departing from their 1998 recommendations, Grimshaw et al. now suggested

that multi-faceted interventions were not necessarily more effective than single interventions for facilitating physician behaviour change.

Other researchers, such as Cabana et al. (1999), have examined barriers that inhibited physicians from implementing and/or adhering to guidelines. Cabana et al. conducted a systematic review of 76 articles published between 1966 and 1998, which examined barriers to guideline adherence. They defined a barrier as “any factor that limits or restricts complete physician adherence to a guideline” (p.1459). The 76 articles included 5 qualitative studies and 120 surveys addressing possible barriers to physician guideline compliance. The researchers concluded that a variety of factors contributed to lack of physician adherence to guidelines, including lack of awareness of and lack of familiarity with specific guidelines, lack of agreement with specific guidelines, lack of agreement with guidelines generally, lack of outcome expectancy (physician believes adherence to the guideline will not lead to the desired outcome), lack of self-efficacy (physician believes that he/she cannot perform the recommendation), and external factors such as an inability to reconcile patient preferences with guideline recommendations.

In their study exploring doctors’ perception(s) of clinical practice guidelines, Borkowski and Allen (2003) compiled the results of 58 completed questionnaires by physicians from two for-profit hospitals in South Florida. They found that although physicians theoretically perceived guidelines as effective educational tools, they frequently lacked confidence in the guidelines’ developer(s), and therefore ultimately considered them a threat to physician autonomy in terms of their potential use for the purposes of quality assurance review and/or disciplinary action.

Barriers to guideline implementation have also been researched from an interdisciplinary perspective. In a study conducted in Australia, Brand et al. (2005)

distributed a survey to all medical and nursing staff at Melbourne Health Service. A total of 3,682 surveys were distributed, and 183 completed surveys were returned for a response rate of 8.3% for the medical staff, and 2% for the nursing staff. Although the findings are of interest, considering the low survey response rate, particularly among the nursing staff, they cannot be considered truly representative of the staff at Melbourne Health Service. The survey respondents reported that the most frequently indicated barriers to guideline use included (a) difficulty in locating the guideline, (b) poor indexing, (c) guidelines being too prescriptive and not allowing for individual variation in clinical practice, (d) guidelines not being evidence-based, (e) a lack of time to read guidelines, and (f) guidelines being too general. The most frequently indicated facilitators to guideline use included (a) guidelines being evidence-based; (b) easy accessibility of guidelines; (c) a guideline format that facilitated expedited decision making; and (d) guidelines that were concise, supported treatment decisions, and were helpful for unusual clinical problems. The researchers also conducted focus groups with a total of 30 participants, and factors facilitating guideline use were identified as follows: the need for senior medical and nursing staff to support guidelines, the integration of guidelines into staff orientation and continuing education, the integration of guidelines into formal hospital quality assurance processes, and the existence of effective processes for ensuring appropriate review and revisions.

The Registered Nurses Association of Ontario (RNAO) has completed extensive work on guideline implementation (RNAO, 2002) and identified six steps for success: (1) a systematic process should be used to identify a well-developed, evidence-based guideline; (2) appropriate stakeholders should be identified and engaged; (3) an assessment of environmental readiness for guideline implementation should be

conducted; (4) evidence-based implementation strategies should be used that address the issues raised through the environmental readiness scan; (5) an evaluation of the implementation should be planned and conducted; and (6) consideration of resource implications to carry out these activities should be adequately addressed (p. 6). Based on the results of three published systematic reviews (Bero et al., 1998; Grimshaw et al., 1995; Thomas et al., 1999), the RNAO suggests that “evidence-based implementation strategies,” as outlined above in (4), that are “generally effective” include (a) educational outreach visits; (b) reminders; (c) interactive educational meetings; and (d) multifaceted interventions such as audit and feedback, reminders, local consensus process and guideline marketing. Guideline implementation strategies deemed “sometimes effective” by the RNAO include (a) audit and feedback, (b) local opinion leaders, (c) local consensus processes, and (d) patient mediated interventions. Those strategies considered to have “little or no effect” include educational materials and didactic educational meetings (RNAO, 2002, p. 50). For an overall successful implementation plan for a specific guideline, the RNAO further recommends that (a) the results of the environmental scan and stakeholder analysis be used to identify barriers and enabling factors, (b) local champions and those with authority help supply resources, (c) strategies for implementation be carefully chosen and supported by research in order to have demonstrated effectiveness, (d) implementation strategies take advantage of available resources and supports, (e) the implementation be piloted at a starting point with a high chance of success, (f) implementation strategies be adjusted to practice realities, and (g) ongoing support and monitoring be provided during the trial period to help users over the learning curve (p. 51).



The RNAO's (2002) publication, as outlined above, provides an extensive, interdisciplinary, and evidence-based resource for health-care organizations involved in guideline implementation. While guideline implementation is a critical step in a successful guideline program, the effectiveness of that implementation should be monitored and measured by means of guideline evaluation.

### *Clinical Practice Guideline Evaluation*

Although the evaluation of guidelines is an integral component of the guidelines process, it remains the most neglected aspect of guideline programs (Carter et al. 1995). The RNAO suggests that guideline implementation could be considered a program, so that program evaluation principles might be applied to the assessment of guidelines (RNAO, 2002, p. 57). Process and outcome evaluation could then be conducted as components of program evaluation, along with structure evaluation or evaluation of program material and human resources (p. 58). Program evaluation may be performed for the following reasons: (a) to determine the effectiveness of a program for the participants, (b) to document that program objectives have been met, (c) to provide information about service delivery that may be beneficial to program staff, (d) to decide if programs should be expanded or curtailed to improve effectiveness, and (e) to assess the appropriateness of program changes (Chelimsky, 1978). Both aspects of program evaluation – process evaluation and outcome evaluation – are described separately below.

Process evaluation is the assessment of program delivery by analysis of empirical data (Scheirer, 1994). Process evaluation is used to determine the extent to which a program has been implemented and the degree to which it is operating as expected (Posavac & Carey, 2003). Data measuring program implementation may be used to monitor current program activities and identify problems in implementation, to determine

variability in program delivery, and to determine why program delivery has not been carried out as intended (Scheirer). Process evaluation helps to foster accountability and provide program staff/administration with the information required to improve services. It is important to note that effective process evaluation does not ensure that program outcome objectives have been met; outcome evaluation measures this aspect of programs.

The purpose of outcome evaluation is to determine whether the recipients of the program are performing as would be expected according to the program outcome objectives (Posavac & Carey, 2003). Evaluating program outcomes is a complex process. A major challenge in outcome research related to guidelines is determining the extent to which maternal and newborn outcomes are actually related to guidelines and not attributable to confounding variables or other factors. It is almost impossible to control the number of variables that might contribute to positive or negative perinatal outcomes, and therefore rigorous inferences about the specific effects of guidelines on outcomes are limited. Maternal and newborn outcome data may only suggest whether or not specific guideline practice recommendations have been utilized. The challenge involved in evaluating population outcome data is further complicated by the fact that for many outcomes, benchmark figures do not necessarily exist. Howard (2002), noting the limitations of outcome research related to guidelines, suggested that such research should be limited to evaluating changes in knowledge about guideline recommendations, changes in attitudes about guidelines, and changes in clinical practice.

Despite the challenges associated with evaluation of a clinical practice guideline program, Basinski (1995) emphasised the value of guideline evaluation and suggested that it be granted the same importance as guideline development and implementation. He also suggested that research into the effectiveness of guidelines in improving patient

outcomes should be conducted because guidelines are the main tool used to operationalize evidence-based medical practice. However, as with medical technologies for which implementation and widespread application occurred prior to effective evaluation (e.g., electronic fetal monitoring), clinical practice guidelines have generally been adopted within the health care community in the absence of critical program evaluation (Worrall, Chaulk, and Freake, 1997). Documented reasons for the lack of guideline evaluation conducted during the mid 1990's included (a) a lack of resources and expertise required to complete thorough evaluation, (b) data restrictions such as limited access to databases, (c) complex methodological issues, and (e) lack of consensus about guideline objectives within stakeholder groups (Basinski; Carter et al. 1995). At the 1994 Canadian Clinical Practice Guidelines Network Workshop, it was recognised that current methods of guideline evaluation and the data used for evaluation were inadequate. These inadequacies, in fact, constituted effective barriers to outcome evaluation (Carter et al, 1995). In the Workshop Proceedings, the authors indicated that large databases were required to evaluate outcome measures such as functional health status, rates of morbidity and mortality, and patient satisfaction and quality of life measures. Furthermore, in recognition of existing barriers, the authors recommended that voluntary self-audit be part of quality assurance programs, with a focus on patient outcomes as the method for guideline assessment, rather than evaluation of simple adherence to a guideline per se.

Basinski (1995) proposed a theoretical framework for guideline evaluation that incorporated three types of evaluation and paralleled the theoretical principles of general program evaluation. These include clear identification of program and guideline objectives, evaluation objectives, and the methodological design for evaluation, such as process and outcome measurements using data sources. Basinski proposed the evaluation

of individual guidelines to establish the face and content validity before embarking on guideline program evaluation.

A major international collaboration recently developed the Appraisal of Guidelines for Research and Evaluation (AGREE) instrument (AGREE Collaboration, 2001) to evaluate the quality of individual clinical practice guidelines. The AGREE instrument was designed to assess new, existing, and revised guidelines in terms of internal and external validity of the guideline recommendations; benefits, harms, and costs of recommendations; methods used to develop the guideline; and the content of the final recommendations. The AGREE instrument was developed in London, England, and consists of 23 items divided into 6 domains. The six domains include (a) the scope and purpose of the guidelines, (b) stakeholder involvement, (c) rigor of development, (d) clarity of presentation, (e) applicability, and (f) editorial independence. The AGREE instrument has gained both international and interdisciplinary recognition as a valid evaluation instrument pertaining to medical care (AGREE Collaboration, 2003), and has recently been tested and found to be reliable and valid as a tool for assessing the quality of guidelines pertaining to physical therapy health services (MacDermid et al., 2005). A systematic review of appraisal tools for clinical practice guidelines was conducted to identify a critical appraisal tool for guidelines that could serve as a basis for the development of an appraisal tool for clinical pathways (Vlayen, Aertgeerts, Hannes, Sermeus, & Ramaekers, 2005). Of the total 24 appraisal tools for guidelines identified, the AGREE instrument was the only validated instrument found that uses a numerical scale. As such, it was the only guideline evaluation instrument identified that could serve as a basis for the development of an appraisal tool for clinical pathways.

Despite the factors identified in the literature that make rigorous guideline evaluation challenging, studies evaluating the effect of guidelines on patient outcomes exist. Grimshaw and Russell (1993) and Worrall et al. (1997) completed systematic reviews to examine the effectiveness of guidelines in improving patient outcomes. Grimshaw and Russell identified nine studies that met their criteria for scientific rigor and that reported significant improvements in patient outcomes after introduction of the guideline. Based on the researcher's evaluation, it was concluded that explicit guidelines *did* improve clinical practice.

To determine how Grimshaw and Russell (1993) came to their conclusions, 3 of the 9 studies included in their systematic review were randomly chosen for detailed review by this investigator. It was noted that, although these three studies were completed in the United States, none of them appeared to meet the definition of guidelines as stated by Grimshaw and Russell (1993) in their systematic review. This definition fits with the standard accepted description of guidelines as systematically developed statements that assist practitioners in making decisions about appropriate health care for specific clinical circumstances.

In the first study, Hopkins et al. (1980) evaluated a protocol for the management of hypertensive shock in a U.S. emergency room. The researchers themselves acknowledged that they were *not* evaluating a guideline but an algorithm, which was more methodical and prescriptive than a guideline. It would therefore appear that Grimshaw and Russell (1993) had overstated their results in terms of this study being generalizable to guidelines when concluding that explicit guidelines *did* improve clinical practice.

In a second study, Linn (1980) evaluated the impact of an educational intervention (as opposed to guidelines) on the process and outcome of care in a controlled study involving 20 hospitals. Emergency room burn care was provided by 298 physicians to 2,492 treated and released patients, and to 172 admitted patients. The educational program included use of an algorithm, 16 hours of training seminars, a manual, a hotline, and a feedback system. The experimental hospitals that used the program showed significantly improved mortality, morbidity, compliance with medical regimes, and satisfaction with care compared to the control hospitals. Again, however, Grimshaw and Russell's (1993) conclusions appear overstated in that these interventions did not meet the definition of guidelines as stated in their inclusion criteria.

In a third study, Barnett, Vinickoff, Morgan, and Zielstorff (1983) observed the effects of computer-generated reminders on the management of poorly followed up hypertensive patients in a U.S. health centre. 52 control patients and 63 experimental patients were followed over a 24-month period. Follow-up was significantly improved for patients with reminders in terms of follow-up rates, repeat recording of blood pressures, and diastolic blood pressures < 100. However, Barnett et al. evaluated an automated surveillance system utilizing computer-based medical records; nowhere in the study do they refer to this system as a guideline, and it appears unlikely that this study even met the guideline inclusion criteria as defined by Grimshaw and Russell (1993). Grimshaw and Russell's conclusion that explicit guidelines do improve clinical practice appears unjustified given that one study examined the impact of prescriptive clinical algorithms, a second study examined the impact of a multidimensional educational program, and a third study examined the impact of a computer-based automated surveillance system.

Worrall et al. (1997) also completed a systematic review to evaluate the evidence for the impact of guidelines on patient outcomes. They identified 91 trials from the literature, but found that only 13 trials met the inclusion criteria, which consisted of randomized experimental or quasi-experimental methods to examine patient outcomes in primary care. It should be noted that Worrall et al. do not cite the three studies included in the review by Grimshaw and Russell (1993). Worrall et al. found that only 5 of the 13 studies produced statistically significant results in impacting patient outcome(s) (four randomized controlled trials, and one retrospective cohort study), and concluded that there was little evidence to suggest that guidelines improved patient outcomes in primary care. They suggested that guideline evaluation to date tended to focus on the process of implementation rather than the evaluation of patient outcomes.

Both these systematic reviews verified the lack of effective outcome evaluation for guideline programs. It is apparent that more research is needed to determine whether evidence-based guidelines impact patient outcomes.

Current literature suggests that the impact of guidelines on population outcomes can be determined using sophisticated research methodology. In a time-series study, Gibson et al. (1998) examined the effect of the American Academy of Paediatrics' (AAP) recommendation that infants be placed on their back to sleep (known as "back to sleep") to prevent sudden infant death syndrome (SIDS). Gibson et al. hypothesized that Rogers's innovation-diffusion theory (Rogers, 1995), would reflect paediatricians' "time-related rate of adoption" (p. 938), as measured by changes in SIDS rates. The rates of SIDS were evaluated over an 8-year period. Data were collected for 5.5 years prior to the intervention and for 2.5 years following the intervention and analysed using Box and Tiao time-series intervention methodologies. SIDS rates in four samples of subjects

before and after implementation of the guideline showed that the effects of the SIDS guideline were “abrupt and temporary” or “abrupt and permanent” (Gibson et al., p. 940), based on significant delta values. For the abrupt and temporary groups, SIDS rates in Philadelphia decreased by 62.3% for the white population and 35.8% for the black population in the first quarter following the intervention, and by 5% for the white population and 9.4% for the black population in the last quarter following the intervention. In the abrupt and permanent groups, SIDS rates in Chicago decreased by 26.7% for the white population and 16.5% for the black population “in quarters subsequent to the intervention” (Gibson et al., p. 940). The relevance of this study lies in its application of a time-series methodology to evaluate health outcomes, which is relatively new for health care researchers. This methodology could be appropriate to evaluate the impact of guidelines on patient outcomes, providing that data were available both pre- and post-guideline implementation and that resources were available to conduct time-series research.

### *Summary of Literature on Guidelines*

In summary, it is apparent from the literature that many questions regarding practice guidelines remain unanswered. We do know that they have become a widely accepted form of operationalizing research evidence into clinical practice. We also know that guidelines are based on an epistemological philosophy of logical positivism, reflecting the predominant value of the biomedical model of health care practice. There has been some controversy within the medical profession regarding the acceptance of guidelines and various barriers to utilization have been identified for both medicine and nursing. Issues that still require considerable exploration include whether multi-disciplinary guidelines are effective for all the target groups they are designed for,



whether guidelines are recognized as a facilitator to research utilization in nursing communities, whether guidelines contribute to hospital policies and quality assurance programs, and, most importantly, whether guidelines affect patient outcomes. These are broader questions that have not yet been addressed in the literature; they are also questions relevant and timely to the evaluation of the perinatal guideline program at the British Columbia Reproductive Care Program.

### Innovation-Diffusion Theory

Because research utilization theory encompasses the principles of innovation-diffusion theory, and clinical guidelines are a relatively new phenomenon in the health care environment, innovation-diffusion theory was chosen to guide this study. Innovation and diffusion constitute a process whereby new ideas are communicated among members of a social system through certain channels over a period of time. The conceptual model consists of four main components including (a) the innovation, (b) communication, (c) time, and (d) social systems. Although Everett Rogers wrote the first book on innovation-diffusion theory in 1962, the diffusion and innovation paradigm was in place long before that and actually dates back to 1903, when Gabriel Tarde first recognized that the rate of adoption of new ideas by a group of people generally followed an S-shaped curve over time (Rogers, 1995). Although Tarde published his observations at the time, it was not until 1943 that seminal research empirically testing the theory was completed by sociologists Bryce Ryan and Neal Gross, who examined the diffusion and adoption of the agricultural innovation of hybrid-seed corn among Iowa farmers (Rogers). They found that over the 13 years it took for the farmers to adopt the innovation, the rate of adoption followed the S-shaped curve previously described by Tarde. The hybrid-seed-corn study marked the beginning of a plethora of innovation-diffusion research in the fields of

sociology, education, public health, communications, and marketing, to name a few. The concept of innovation-diffusion has received empirical support in nursing within the context of incorporation of nursing research findings into practice (Coyle & Sokop, 1990).

Innovation-diffusion theory provided a theoretical foundation for the survey used in this study that examined the uptake and use of perinatal guidelines by perinatal practitioners. This theory was also considered in the discussion of survey findings, specifically related to adopter characteristics and potential response bias related to guideline awareness. An examination of each component of innovation-diffusion theory is presented below.

### *Innovation*

An innovation is any idea that an individual perceives as new. Rogers (1995) identified five key perceived attributes about innovations that affect their rates of adoption: (1) the relative advantage of the innovation, (2) the compatibility of the innovation with the social system's existing values and norms, (3) the complexity of the innovation or the perceived difficulty in using the innovation, (4) trialability or the degree to which the innovation is considered experimental, and (5) observability or the degree to which the benefits and outcomes of the innovation are visible to others. The more compatible each of these attributes is with the existing beliefs, knowledge, and values of the user, the more rapidly a change will be adopted. Rogers found that between 49 to 87% of the variance in the rate of adoption of a new idea can be explained by these five attributes.

### *Communication*

The second component, communication, is the process by which an idea is spread from one person to another. Communication channels may include mass media and/or interpersonal channels that involve face-to-face exchange. Effective communication channels facilitate the rate of adoption of the innovation and require effective change agents to facilitate and utilize the communication network.

### *Time*

The third component, time to adoption of the innovation, depends on the process by which an innovation is adopted or rejected and this varies between individuals. Rogers (1995) refers to those individuals towards whom the innovation is targeted as "adopters." There are four categories of adopters, each with certain characteristics and each identified by how quickly or slowly they adapt to the innovation compared to other members of their social system. The first category consists of the innovators, who have a high tolerance for risk and uncertainty, and who are on the cutting edge of the innovation. Innovators account for approximately 2.5% of the population. The second category consists of the early adopters, who are usually opinion leaders and respected role models in their field. This group changes early as the system changes to support the new practice, and represents approximately 13.5% of the population. The third category consists of the early majority (approximately 34% of the population), who seldom lead but who interact with their peers, and are deliberate in adopting new ideas. The fourth category consists of the late majority (approximately 34% of the population), who remain sceptical and cautious but eventually respond to peer pressure. The remainder, the laggards (approximately 16% of the population), are those who are particularly resistant to change and slow to adapt to new ideas.

The rate of adoption is the relative speed with which an innovation is adopted by members of a social system, and is generally measured by the number of individuals who adopt an innovation within a specified time period. Studying the process of innovation-diffusion in many countries, Rogers (1995) replicated Tarde's findings and noted that the rate of adoption followed an S-shaped diffusion curve with a very slow beginning, followed by a period of very rapid diffusion, followed by a long late-adopter or laggard period. However, Rogers also found that the slope of the curve varied depending on the speed of the diffusion of the innovation, with rapid diffusion creating a steep slope and slower diffusion creating a more gradual slope.

The sequential process by which individuals or organizations adapt to an innovation is referred to as the innovation-decision process and parallels the five stages of change described in the Transtheoretical model of behaviour change, or the readiness to change model outlined by Prochaska and DiClemente (1983). As described by Rogers (1995), the first stage of change is awareness and knowledge of the innovation. The next stage, persuasion, is a time when positive or negative attitudes are formed regarding the innovation. In the subsequent decision stage, the individual or organization actively moves towards either adopting or rejecting the innovation. During the fourth stage, implementation, the individual puts the innovation to use, and in the last stage, confirmation, the individual seeks confirmation and reinforcement of the decision to use the innovation, or reverses the decision based on conflicting messages.

### *Social Systems*

The fourth component of the diffusion of innovations model is the social system, which is a group of people engaged in joint problem solving to accomplish a common goal. Rogers (1995) found that ideas that allow individual-optional decisions regarding

adoption are generally adopted more rapidly than ideas that are adopted by an organization. He suggested that the rate of adoption is slowed when a greater number of people are involved in making the decision to adopt an innovation, and therefore one method to accelerate adoption is to limit the number of decision makers.

The relevance of identifying adopter categories and the innovation decision process lies in the ability to explicate adoption of an innovation as a process. This is significant in terms of research utilization as it highlights the importance of targeting change strategies appropriately according to individual readiness. Roger's (1995) innovation and diffusion model provides a supportive framework for research utilization in nursing practice. The importance of the model lies in its suggestion that the process of individual change based on innovative research findings requires more than simple knowledge acquisition. The individual characteristics of the practitioner - beliefs, values, and cultural associations - all require consideration when evaluating the uptake and use of clinical practice guidelines.

### Summary

Evidence-based practice is a relatively new approach to health care that has developed over the past 15 years. Evidence-based practice implies practice based on the best available evidence that facilitates individual clinical decision making in specific patient circumstances. The innovation-diffusion framework, as outlined by Rogers (1995), may be used as a foundation for conceptualizing research utilization. Barriers and facilitators to both evidence-based practice and research utilization continue to be described in the literature and it is in the identification and consideration of these barriers that guidelines may potentially facilitate research utilization and promote evidence-based practice. However, many questions remain regarding the impact of guidelines, despite

their widespread use. To date it is not known whether guidelines have been useful in establishing evidence-based practice in perinatal care in B.C. to optimize maternal, fetal, and newborn health. There is limited information regarding the effectiveness of multidisciplinary guidelines, and whether guidelines designed for multidisciplinary use do in fact meet the needs of various groups of care providers. There is also limited literature on the impact and utilization of guidelines within the nursing profession. The existing literature suggests that barriers to implementation still exist in the medical profession, and there appears to be very little literature linking guidelines to improved patient outcomes. It is clear that further investigation into the impact of guidelines on patient outcomes should be pursued.

## CHAPTER THREE: METHODS

In this chapter, an overview of the study methods is presented. This includes the study setting, study design, sampling criteria, survey development, data collection procedures, ethical considerations, data cleaning methods, and data analysis for both the practitioner survey and the guideline outcome indicators.

### Study Setting

The setting for this study was the province of British Columbia (B.C.), specifically those facilities in B.C. that provide planned maternity services. Hospitals with planned maternity services have from 10 to greater than 5,000 births per year. According to the B.C. Perinatal Database Registry, the number of hospitals that provide planned maternity services decreased from 70 in fiscal 2000/2001, to 58 in fiscal 2003/2004 (Table 2). This decrease reflects the complex issue of perinatal regionalization, the closing of maternity care units in small hospitals, and the subsequent reduction in the planned maternity services accessible to women living in rural communities. The setting also included the approximately 60 community health agencies in B.C. that provide perinatal community services.

Table 2

*Number of Hospitals Providing Planned Maternity Services, April 1, 2000, to March 31, 2004*

Fiscal Year	Number of Hospitals
April 1, 2000 to March 31, 2001	70
April 1, 2001 to March 31, 2002	66
April 1, 2002 to March 31, 2003	62
April 1, 2003 to March 31, 2004	58

## Study Design

This study was divided into two parts in order to complete both program process evaluation and outcome evaluation.

### *Part 1: Process Evaluation*

For Part 1 of the study, a cross-sectional design was used to survey multidisciplinary perinatal health care providers in B.C., including hospital nurses, community health nurses, facility managers, physicians, and midwives working in community health and hospital facilities throughout B.C. A survey may be used to “describe, compare, or explain knowledge, attitudes, and behaviour” (Fink, 1995, p.1) and this design was chosen in order to obtain practitioner knowledge and information about attitudes to the BCRCP perinatal guidelines.

It should be noted that this study did *not* include an evaluation of the scientific rigor of individual clinical practice guidelines. This investigator was aware that the AGREE Instrument criteria were not used by the BCRCP during guideline development. Instead, practitioners were asked to express their thoughts regarding incorporation of the AGREE Instrument criteria (AGREE Collaboration, 2001) into future guidelines. A section of the survey instrument that addressed changes to the BCRCP Guideline Program was therefore based on criteria in the AGREE Instrument.

### *Part 2: Outcome Evaluation*

Part 2 of the study consisted of a retrospective cohort study design using population data from the BCRCP Perinatal Database Registry for fiscal years 2000/2001, 2001/2002, and 2002/2003. The prevalence rates and trends for specific maternal and fetal/newborn outcome indicators were examined over this 3-year period to determine whether outcomes were as expected, and whether specific guidelines were being adhered



to within B.C. As defined by Beaglehole, Bonita, & Kjellstrom (1993, p. 15-16), prevalence rate is defined as

The number of cases in a defined population at a specified point in time... Data on prevalence and incidence become much more useful if converted into rates... The prevalence rate (P) for a disease is calculated as follows:

$$P = \frac{\text{Number of people with the disease or condition at a specified time}}{\text{Number of people in the population at risk at the specified time}}$$

The prevalence rate is often expressed as cases per 1000 or per 100 population.

The five guidelines studied were Vaginal Birth after Caesarean, Postterm Pregnancy, Induction of Labour, Fetal Health Surveillance in Labour, and Management of the Singleton Breech at Term.

### Sampling

#### *Part 1, Process Evaluation*

Subjects for Part 1 of the study were health care professionals who provide perinatal care in B.C. in both community and hospital settings. The population was divided into five strata or subgroups composed of hospital nurses, community health nurses, facility managers, midwives, and physicians. The samples of community health nurses, hospital nurses, and physicians were equally divided between each of the five Health Authorities (HA): Interior HA, Fraser HA, Northern HA, Vancouver Island HA, and Vancouver Coastal HA.

The College of Registered Nurses of B.C. (formally the Registered Nurses Association of B.C. or RNABC) undertook random sampling, stratified for perinatal community health nurses (N=375) and hospital nurses (N=375). The nurses were

randomly selected by the RNABC through RNABC computerized practice lists, and 75 community health nurses and 75 hospital nurses were selected from each of the aforementioned Health Authorities to ensure complete provincial representation. The RNABC selected the sample based on those hospital nurses who were coded to work in maternal-child care, and the RNABC applied the mailing labels. The RNABC maintained confidentiality of the study sample. Total sampling procedures were used for the midwives (N=90) and surveys were distributed via the Midwives Association of B.C. (MABC), i.e., to all practicing midwives registered with the MABC. Total sampling procedures were also used for facility (community health agency and hospital) managers (N=88). Random sampling was not possible for the physician subgroup as the B.C. Medical Association (BCMA) and the B.C. College of Physicians and Surgeons lacked both the capability to identify physicians with obstetrical practices and the means to distribute a survey. Convenience sampling, or sampling from the accessible and available population of physicians, was therefore used for this subgroup (N=375).

#### *Part 2, Outcome Evaluation: Data source*

For the outcome evaluation, data were obtained from the BCRCPP Perinatal Database Registry for births in B.C. between April 1, 2000, and March 31, 2003. The BCRCPP Perinatal Database Registry is a comprehensive, province-wide retrospective perinatal database designed for the purpose of evaluating perinatal outcomes and ultimately improving maternal, fetal, and newborn care. The registry collects, summarizes, interprets, and reports on perinatal outcomes at community, regional, and provincial levels.

Data in the BCRCPP Perinatal Database Registry are obtained from two sources (Sheryll Dale, Manager, BCRCPP Perinatal Database Registry, personal communication,

April 2003). Seventy percent of the data are abstracted directly from the provincial perinatal forms and health records, and the other 30% are downloaded from hospital Canadian Institute of Health Information (CIHI) abstracting systems. Data are collected only when both BCRCP and CIHI data are complete; three methods are used for collection. Sixty six percent of perinatal facilities in B.C. have the BCRCP database installed at their site and data are collected directly from each facility. Eighteen percent of perinatal facilities in B.C. submit data on their perinatal forms and these data are input at the BCRCP. At sixteen percent of perinatal facilities in B.C., BCRCP database analysts collect data on laptop computers during site visits. The first pilot site for data collection was established in 1994 and complete data on all rural sites (defined as facilities with less than 500 births per year) have been available since the 1997-1998 fiscal year. As of April 1<sup>st</sup>, 2000, complete provincial data have been available from all facilities, and as of March 2003, data have been collected on a total of 190,000 births.

The database has four dimensions: perinatal events, care processes and outcomes, diagnostic and procedural codes, and demographic data. The maternal data encompass both hospital and home births during the antepartum ( $\leq 20$  weeks gestational age), intrapartum, and postpartum (end of the delivery episode) periods. The newborn data encompass birth information, course in the hospital from birth to discharge (including transfers), and all re-admissions up to 28 days of age. Standardized data elements and definitions are used, and the maternal and newborn list of fields in the perinatal provincial database is readily available. The fields identified as "diagnosis" are coded according to the World Health Organization International Classification of Diseases (ICD-9) (World Health Organization, 1977). All patient data entered into the provincial perinatal database are confidentially protected. The reporting of perinatal data has

occurred in the form of hospital reports consisting of standard outcome variables, ad-hoc reports on specific outcome variables as requested, and the perinatal reporting tool.

The 1999/2000 data on 37,864 births within B.C. became available on an interactive CD-ROM called the B.C. Perinatal Reporting Tool, Version 1. The data on the Reporting Tool are a subset of summarized data extracted from the provincial perinatal database. This tool is designed to allow clinicians, administrators, or data analysts to access standardized perinatal information at an institutional or provincial level. The Reporting Tool supports facility and regional analysis, comparisons with other facilities within B.C., and exploration of clinical data, to facilitate effective program and resource management. The Reporting Tool has been distributed to all facilities in B.C. providing perinatal care. The B.C. Perinatal Reporting Tool: Version 2 became available in the summer of 2003 and includes two years (1999-2001) of facility-based and population-based data. It has both an increased number of demographic variables and increased functionality. Version 2 also has the capacity to export data sets into Excel.

In summary, the BCRCP Perinatal Database Registry collects specific maternal and newborn data elements on every birth in B.C. Data from the Registry were used to complete the outcome evaluation component of the BCRCP Clinical Practice Guideline program.

For this study, data included mothers delivering a singleton live-birth infant in B.C. (Table 3) for all guidelines except for the Vaginal Birth after Caesarean Section and Breech at Term guidelines. Live birth was defined as

The complete expulsion or extraction from its mother, irrespective of the duration of pregnancy, or a product of conception in which, after the expulsion or extraction, there is any of the following: breathing, beating of the heart, pulsation

of the umbilical cord or unmistakable movement of voluntary muscle, whether or not the umbilical cord has been cut or the placenta attached. (B.C. Vital Statistics, 2005, p.137)

Late terminations (after 20 weeks) and multiple births were excluded.

For the guideline entitled Vaginal Birth after Caesarean Section and Term Singleton Breech, the data included stillbirths greater than 20 weeks or 500 grams (excluding terminations after 20 weeks), as well as live births (Table 4). This was because perinatal mortality is an important outcome indicator for VBAC and breech, and the stillbirths must be included to determine perinatal mortality.

Mother and infant data were matched using the maternal identification number. Outcome indicators were chosen based on the research question and were individually defined according to ICD-9 coding practices.

Table 3

*Singleton Live Births in B.C. for Fiscal Years April 1, 2000, to March 31, 2003*

Fiscal year	Number of births
April 1, 2000 – March 31, 2001	38,844
April 1, 2001 – March 31, 2002	38,590
April 1, 2002 – March 31, 2003	<u>38,411</u>
Total	115,845

Table 4

*Singleton Live Births and Stillbirths in B.C. for Fiscal Years April 1, 2000, to March 31, 2003*

Fiscal year	Number of births
April 1, 2000 – March 31, 2001	39,045
April 1, 2001 – March 31, 2002	38,773
April 1, 2002 – March 31, 2003	<u>38,582</u>
Total	116,400

#### Part 1, Process Evaluation: Survey Instrument

To the investigator's knowledge, there was no pre-existing survey instrument designed to measure guideline uptake within the context of policies, procedures, and quality assurance programs. In order to address the research questions, a survey was developed by the investigator for hospital nurses, community health nurses, managers, midwives, and physicians providing perinatal care in B.C. The survey had theoretical foundations in innovation and diffusion theory, research utilization theory, and in the AGREE instrument's principles underlying guideline development. Questions were predominantly fixed choice and used interval level scales (Likert scale) as appropriate to represent relative amounts of individual survey items. Other questions were left open-ended to allow opportunity for narrative comments.

The survey instrument (Appendix G) was divided into six sections to address the following areas: (1) demographic data; (2) awareness and use of guidelines; (3) attitudes towards guidelines; (4) factors that facilitate or deter the use of guidelines at the individual and organizational levels; (5) incorporation of guidelines into facility policies, procedures, and quality assurance programs; and (6) possible changes to the BCRCP

Guideline Program that might maximize guideline utilization. Table 5 outlines each of the theoretical content domains in the survey and identifies the question items associated with them.

Table 5

*Content Domains of the Survey*

Content area	Item number
Demographic Information	1-5
Awareness/Use of guidelines	6, 7,10,11
Attitudes	
The Innovation:	
Relative advantages	13 a-g
Compatibility with values and norms	13 h,i,m,t
Complexity of the guidelines and perceived difficulty using them	13 j,k,l,
Degree to which guidelines are considered experimental	13 n,o,
Observability	13 q,r,s,
Communication	8,9,
Adopter type	15
Barriers and Facilitators	12 a-g
Facility policies/procedures/quality assurance	13 p, 18-23
Suggested changes to guideline program to maximize utilization	14 a-p, 16 a-g, 17, 24, 25

*Content Validity*

The survey was tested for content validity prior to distribution using a content validity rating scale. According to Lynn (1988), "content validity" is the determination of the content representativeness or content relevance of the elements/items of an instrument and consists of two stages. The first stage is the determination of the content domains, survey items, and the instrument formation. For this study, this first stage was completed using the theoretical foundations of innovation and diffusion theory, research utilization theory, the AGREE instrument for guideline content/evaluation, and the application of

measurement principles for item development (Fink, 1995). The second stage of content validity is the quantification of the entire constructs of the survey instrument, and this was accomplished by determining the Content Validity Index (CVI). A content validity rating scale was used to rate each survey item in the 6 content areas on a 4-point scale, as follows: (a) not relevant, (b) unable to assess relevance without item revision or item is in need of such revision that it would no longer be relevant, (c) relevant but needs revision, or (d) very relevant and succinct. The rating scale also included a narrative page for suggested revisions for individual items and invited feedback on any content area thought to be missing from the survey tool. For the purpose of this study, the 12 members composing the BCRCP Interdisciplinary Support and Education Committee (ISEC) received a copy of the proposed survey instrument, a copy of the content validity rating scale, a narrative page, and an instruction page with directions for completing and returning the rating form and narration (Appendix H). This committee had interdisciplinary representation from perinatal community health nurses, hospital nurses, managers, midwives, and physicians, all of whom were familiar with the BCRCP Guideline Program, and were therefore deemed experts able to determine the content validity of the survey instrument.

Eight of the 12 members of ISEC completed and returned the rating forms and narrative pages. All members rated the majority of items as 4; the remaining items scored 3 and were accompanied by narrative suggestions for improvement. No items scored 1 or 2. The narrative suggestions for improvement were mainly editorial and there were no suggestions for inclusion of any other content area. The actual CVI is the proportion of items receiving a rating of either 3 or 4 (Walz & Bausell, 1981). Walz and Bausell developed a table to determine “the proportion of experts whose endorsement is required



to establish content validity beyond the 0.05 level of significance” (Lynn, 1988, p.134). This table was used to determine that content validity existed beyond the 0.05 level of significance (100% of the 8 experts endorsed the items) and only minor editorial modifications were made to the measuring instrument.

### *Internal Consistency and Factor Analysis*

Internal validity and factor analyses of the survey were not completed since the survey instrument was developed to obtain information on multiple content domains related to guideline attitudes, awareness, and use. The survey instrument was not designed as a scale to measure a specific construct, in which case internal consistency and factor analysis would have been considered appropriate. For a descriptive survey instrument with multiple content areas, one would not expect high internal consistency or inter-correlations between variables. Test-retest was attempted but proved problematic for two reasons. First, the response rates were poor for the second survey: Only 8 of 70 test-retest surveys were returned fully or partially completed. Second, among those who returned completed surveys, numerous respondents indicated that they did not know how to answer the guideline awareness questions on the retest surveys as they had only become aware of some guidelines when completing the first survey. It would therefore be erroneous to conclude that the source of temporal instability for those variables was due to measurement error. For these reasons, test-retesting is not reported.

### *Data Collection Procedures*

#### *Data Collection, Part 1: Process Evaluation*

The surveys were distributed in December 2004 and January 2005. The hospital nurses and community health nurses received the surveys directly from the RNABC via mail, and the midwives received the surveys directly from the MABC via mail. The

managers received the survey by email to facilitate response rates, as it was known to the researcher that the managers preferred email communication. The distribution to the managers was facilitated by use of the Public Health Administrators and Acute Care Managers email lists that were available to the researcher. The email distribution to the managers also provided the opportunity to let the hospital managers know that surveys would be arriving in the mail for distribution to the physicians in their facility. The managers at hospitals in all Health Authorities were sent an appropriate number of surveys and were asked to distribute them to the mailboxes of those physicians practising obstetrics. This method of survey distribution for physicians has been used by the BCRCP in the past, and perinatal managers have previously cooperated with the request. The program support staff of the BCRCP participated in the survey labelling and distribution for the physician and manager group.

The envelope sent contained a cover letter (Appendix J), the survey instrument, and a stamped, self-addressed return envelope. Two weeks after the initial distribution of the survey, a reminder letter was circulated to all practitioners except the physician group. Considering that the managers had already been asked to participate in the survey *and* distribute the physician surveys via mailboxes, a further request to distribute a reminder letter was deemed excessive, given the managers' already heavy workloads.

#### *Data Collection: Part 2, Outcome Evaluation*

The researcher reviewed each guideline to identify appropriate maternal and fetal/newborn outcome indicators. Once the indicators were selected, an obstetrician and neonatologist then reviewed them to verify their applicability. The researcher then submitted a standard written application form to the BCRCP Research Review Committee to request the data indicators required to conduct this research. The BCRCP

Research Review Committee reviewed the application in the absence of the researcher (who is a member of this committee), and the application for data was approved. The maternal and infant data were then supplied to the researcher in Excel format and transposed into SPSS. Mother and infant data were matched according to the maternal identification number, which was present in each database.

### Ethical Considerations

Ethical approval for this study was obtained from two organizations. The University of British Columbia Behavioural Research Ethics Board granted ethical approval for this study and consequently the researcher was obliged to abide by the Tri-council Policy and Ethical Conduct for Research Involving Human Subjects. The BCRCP Research Review Committee also granted approval for this research study and consequently the researcher was obliged to abide by the provisions of the agreement entitled Access to Health Data for Research or Statistical Purposes. In terms of the database, the ethical considerations of patient confidentiality were addressed, as all data supplied to the researcher were aggregate data, but with personal identifiers removed.

A cover letter was included with each survey distributed. This letter stated the purpose of the research, explained confidentiality, requested the practitioners' voluntary participation, and outlined arrangements for returning the completed survey (Appendix K). Consent for participation in the study was assumed when the participant returned the completed questionnaire to the BCRCP. Each participant was given the option to fax a form back to the BCRCP with their email contact information so that they could receive any future updates of the guidelines by automatic email. This form was kept separate from the completed survey and protected the respondents' confidentiality. Although no personal identifying information was solicited on the questionnaire, many respondents

chose to fax the completed survey to the BCRCP together with the form providing their contact information. The sealed envelopes provided to the participants facilitated the protection of confidentiality. Only group data were reported.

For the outcome evaluation, all maternal-newborn data supplied to the researcher were anonymous and there was no way to identify either the individual case or the care provider involved. The maternal-newborn data were used only for the purpose of this study. Both parts of this study have met the ethical considerations for research.

### Data Screening

#### *Part 1, Process Evaluation: Data Screening*

A total of 313 surveys were completed and returned. Whenever the investigator received a survey, it was reviewed for completeness and clarity and then categorized according to professional designation. All 313 returned surveys were accepted as being complete with clear responses for data entry. Once the deadline for return of the surveys had passed, the surveys were given to a data input specialist for entry into SPSS. The data input specialist was instructed to code missing data as "99" and non-applicable data as "88," and to enter narrative data verbatim. The data input specialist was asked to contact the investigator regarding any uncertainty or lack of clarity in the survey responses. Once data input was complete and the SPSS file had been provided to the investigator, the investigator screened the data file prior to initiating statistical analysis.

First, the coding and input for each item in the survey were checked against the variables in the data file to ensure completeness. The cases were then checked to ensure that they were complete and had no entry duplications. Each variable was then tested using frequency distributions to determine that all value entries were appropriate and that

they had a full range of data values. No values with a range outside that specified for the specific variable were entered in the data field.

Second, a histogram was generated for each variable to determine whether or not there was a normal distribution of responses. A majority of items for attitudes, facilitators and barriers, and suggested changes to the guideline program demonstrated distribution skewed left as the majority of responses were in the upper bounds of the item scores (agree and strongly agree).

#### *Non Applicable Data*

Data for survey items 8 to 14 were entered as non-applicable (NA) for those respondents who indicated that they were not aware of either the BCRCP Guideline manual *or* the guidelines on the BCRCP website. There were a total of 25 respondents whose responses were coded as NA for those items and these were not included in statistical calculations. Two coding errors were corrected. One respondent had checked “not aware” for both the BCRCP manual and website, but had completed the survey and provided extensive narrative. The respondent was quite obviously aware of the guidelines, so this was recoded as “aware” of the guidelines for question 6. Another respondent indicated that she was not “aware” of guidelines on the BCRCP website (question 7), and in question 8 indicated that she became aware of guidelines on the website. She had indicated in her narrative that she was aware of guidelines on the website but did not have electronic access at work. This respondent’s entry for question 7 was therefore recoded from “no” to “yes.”

#### *Missing Data*

For the demographic data, variables with missing values were checked by reviewing individual surveys. Surveys with other missing demographic information were

reviewed to see if they had been completed without systematic deletions. All surveys were complete, although one respondent appeared to answer systematically on two questions (13 and 14), both of which included several items. This survey was complete with some narrative comments and so the results were included in the analysis. Variables that had missing values were entered as “missing” and were not included in statistical calculations. Missing values occurred randomly, and ranged from 5% to 9% for any individual survey item. For questions regarding facility policies and procedures and guidelines, the rate of missing responses was higher, likely because the respondent did not know the answer. These questions were analyzed using only data from the managers, who would be expected to know the answers, and who had fewer missing values. Case values coded as missing were excluded from analysis.

#### *Part 2, Outcome Evaluation: Data Screening*

For the outcome evaluation, two data files (maternal and infant) were provided to the investigator in SPSS format. The files were merged in SPSS using the mother identification number to match mother and baby cases. The file was checked initially to ensure that all variables that had been requested were included in the data file. All variables were checked for their defining characteristics and to determine whether each was a continuous or categorical variable. Each variable was tested using univariate descriptive statistics to determine that values were within the expected range, and that means and standard deviations for continuous variables were plausible. Outlier values were reviewed and deleted from the data set if they were deemed implausible, e.g., obvious data input error had occurred when gestational age was valued at 68 weeks and the length of labour was coded as -22 hours. Two variables were deleted from the data set. One variable (fetal compromise) had only one year of complete data and upon

validation with the BCRCP Perinatal Database Registry, the researcher found that the coding had been changed in 2001. The other variable, umbilical artery pH, was deemed to have too many missing values because it was not being performed routinely and because smaller facilities in B.C. often lacked the capability to perform cord gas analysis. Categorical variables were labelled and, where appropriate, some variables were recoded into different categories. One continuous variable (Apgar score) was recoded to a categorical variable.

## Data Analysis

### *Part 1, Process Evaluation*

Descriptive statistics were computed for survey responses and frequency distribution was reported by practice type. Case values that were coded as “not applicable,” “missing,” or “don’t know” were excluded from mean calculations. Total scores and subgroup scores by professional designation were computed for each variable. Descriptive statistics of each variable included the mean, standard deviation (SD), mode, and range of scores. Ordinal responses were collapsed to dichotomous variables for Chi square analysis to combine the responses “disagree” and “strongly disagree,” and “agree” and “strongly agree,” thereby avoiding cells with small numbers for analysis. The Chi square test was used to explore univariate relationships between variables. The Mann-Whitney test was used to compare differences in rank scoring between groups. The odds ratio was used as the measure of effect size. The skewed distribution of scores required use of non-parametric tests. Statistical tests were considered significant at  $p \leq 0.05$ . First, groups were compared by practitioner designation to illustrate frequency of responses (community health nurses, hospital nurses, managers, midwives, and physicians) and divided into dichotomous variables (nurses and primary practitioners) to compare

differences in attitude. Outcomes were also analyzed by facility size of < 500 births/year and > 500 births/year.

To determine predictors of guideline use, responses relating to the frequency of guideline use were recoded to a dichotomous variable as follows: (a) guideline users (those who used the guidelines always or often,  $n = 153$ ), and (b) non-users (those who used the guidelines occasionally or never,  $n = 127$ ). The “occasional” users were coded as “non-users” because their frequency of use was sporadic (q3-12 months). A sequential logistic regression analysis was performed to determine which factors were most predictive of guideline use. Sequential regression allows the researcher to determine the order of variable entry based on theoretical considerations. Independent variables were tested in the model one at a time and were retained if the p-value for the beta-estimate was .05 or less as derived from the Wald statistic (Tabachnick, 1996). The one with the lowest p-value was retained and then the remaining variables tested one at a time and the process repeated. The four variables tested were guidelines being readily available, the respondents’ self-perception of their comfort level regarding the uptake of new information, having time to read guidelines, and a high level of co-operation from physicians to practice according to guideline recommendations. The amount of variability in the outcome explained by the model was calculated using Nagelkerke’s measure. Nagelkerke’s measure adjusts Cox and Snell (based on log-likelihoods and taking sample size into account) so that values between 0 and 1 can be achieved (Tabachnick). The odds ratio and 95% CI were estimated based on beta parameters derived from the model.

Narrative responses for each variable were reviewed and recurrent themes were identified and assigned a colour code. Each response was then colour-coded according to the identified theme and the responses were summed.



## *Part 2, Outcome Evaluation*

For those questions addressing rates of maternal and fetal/newborn outcomes over the 3-year period between April 1, 2000, and March 31, 2003, simple frequency distributions were reported. The population rates were reported by year and not tested for statistical significance over the 3 years as the researcher did not intend to infer to a longer period of time, and the short time period of 3 years makes interpretation of statistical test for trend (linear-by-linear association) rather limited. Also, the sample size used in this study was 115,845, so that any difference that is clinically important will also be statistically significant because of the large sample. It was decided, therefore, to assess whether observed differences were clinically important. Univariate analyses using the Chi square statistic, relative risk, and 95% confidence intervals were used to compare outcomes of cohorts defined by exposures of interest for each guideline.

### Summary

In this chapter, an overview of the study methods was presented. The study consisted of two parts: (a) a practitioner survey to identify knowledge of, attitudes towards, and use of, BCRCP perinatal guidelines among physicians, midwives, managers, hospital nurses, and community health nurses in B.C. involved in perinatal care, and (b) analysis of specific BCRCP Perinatal Database outcome indicators related to five specific maternal-newborn guidelines. The analysis of the practitioner survey was completed based on 313 respondents, and analysis of the outcome indicators was completed based on 115,845 women having singleton live births in B.C. between April 1, 2000, and March 31, 2003. All analysis was completed following thorough data screening and in accordance with the ethical considerations required by the University of British Columbia Behavioural Research Ethics Board and the BCRCP Research Review

Committee.

## CHAPTER FOUR: FINDINGS

In this chapter the research findings are presented. Each research question is reiterated prior to the presentation of findings relevant to that specific question. The survey findings include the response rates, demographic data, and the quantitative and qualitative findings relating to each research question. Following presentation of the survey findings, the population outcome findings are presented for each of the following five guidelines: (1) VBAC, (2) Postterm pregnancy, (3) Induction of labour, (4) Fetal health surveillance in labour, and (5) Singleton term breech.

### Part 1, Process Evaluation: Findings

#### *Response Rates*

A total of 1,303 surveys were distributed to hospital and community health nurses, managers, physicians, and midwives in B.C. Of these, 97 responses from hospital and community nurses indicated that they did *not* work in perinatal care and therefore did not complete the survey. These were removed from the sample. Three hundred and thirteen of the remaining 1,206 surveys were completed and returned for an overall response rate of 26% (Table 6). The highest response rate was from the nurse manager group (59%), and the lowest was from the physician group (19%). Four surveys were completed by “others,” including a student midwife, a lactation consultant, a research nurse, and a licensed practical nurse. These were included in the sample.

Table 6

*Response Rates by Professional Designation*

Professional designation	Number of surveys distributed	Number of surveys returned	Response rate
Total surveys	1,303		
Non-perinatal RNs		97	
Corrected total	1,206		
Perinatal RNs: Hospital and community	653	160	25%
Nurse Managers	88	52	59%
Registered Midwives	90	24	27%
Physicians	375	72	19%
Other		4	
Unknown		1	
Total	1,206	313	26%

*Demographic Data*

By professional designation, the largest group of respondents of the 313 practitioners were hospital nurses (33%), followed by physicians (23%), community health nurses (18%), managers (17%), and midwives (8%). By health authority, the greatest representation was from Interior HA (27%), followed by Fraser HA (20%), Northern HA (19%), Vancouver Island HA (17%), Vancouver Coastal HA (16%), and Provincial HA (1%). Respondents worked in facilities with number of births/year ranging from 0 - >5,000, with the majority working in facilities with 1,000-1,499 births per year. Forty three percent of respondents worked in facilities with <500 births/year, and 57% worked in facilities with >500 births/year. Respondents had worked in maternal-child care in B.C. from 0-35 years, with the mean number of years being  $13.88 \pm 8.9$ . The number of years in their current facility ranged from 0-35 years, with the mean number of

years being  $10.23 \pm 7.9$ . For the midwives and physicians, the number of deliveries attended in the past year ranged from 0 - >200, with the mean number of deliveries at  $60 \pm 75$  (Table 7).

Table 7

*Demographic Data of 313 Respondents*

Demographic data	Frequency	Percent
Professional designation		
Hospital RNs	102	(33%)
MDs	72	(23%)
Community Health Nurses	58	(18%)
Managers	52	(17%)
RMs	24	( 8%)
Other	4	( 1%)
Health authority		
Interior HA	83	(27%)
Fraser HA	59	(20%)
Northern HA	56	(19%)
Vancouver Island HA	53	(17%)
Vancouver Coastal HA	48	(16%)
Provincial HA	4	( 1%)
Number of Births/Year in Facility or Public Health Service Area		
0-9	3	( 1%)
10-49	24	( 9%)
50-249	46	(18%)
250-499	39	(15%)
500-999	29	(11%)
1,000-1,499	54	(21%)
1,500-2,499	37	(14%)
2,500-4,999	25	( 9%)
>5,000	6	( 2%)
Respondents in facilities with < 500 or >500 births/year		
< 500 births/year	112	(43%)
> 500 births/year	151	(57%)

*(table continues)*

Table 7 (continued)

Demographic data	Frequency	Percent
Years working in maternal-child care in B.C.		
0-5	79	(26%)
5.5-10	38	(13%)
10.5-15	58	(19%)
15.5-20	53	(18%)
20.5-35	73	(24%)
Years working in current facility		
0-5	119	(39%)
5.5-10	51	(17%)
10.5-15	55	(18%)
15.5-20	41	(14%)
20.5-35	36	(12%)
Number of deliveries done in 2004 for RMs and MDs		
0-50	56	(64%)
60-100	19	(22%)
111-200	11	(12%)
>200	2	( 2%)

*Research Question 1.1: Attitudes towards and Level of Awareness of Guidelines*

1.1. What are the attitudes towards and level(s) of awareness of guidelines among hospital and community health nurses, managers, physicians, and midwives?

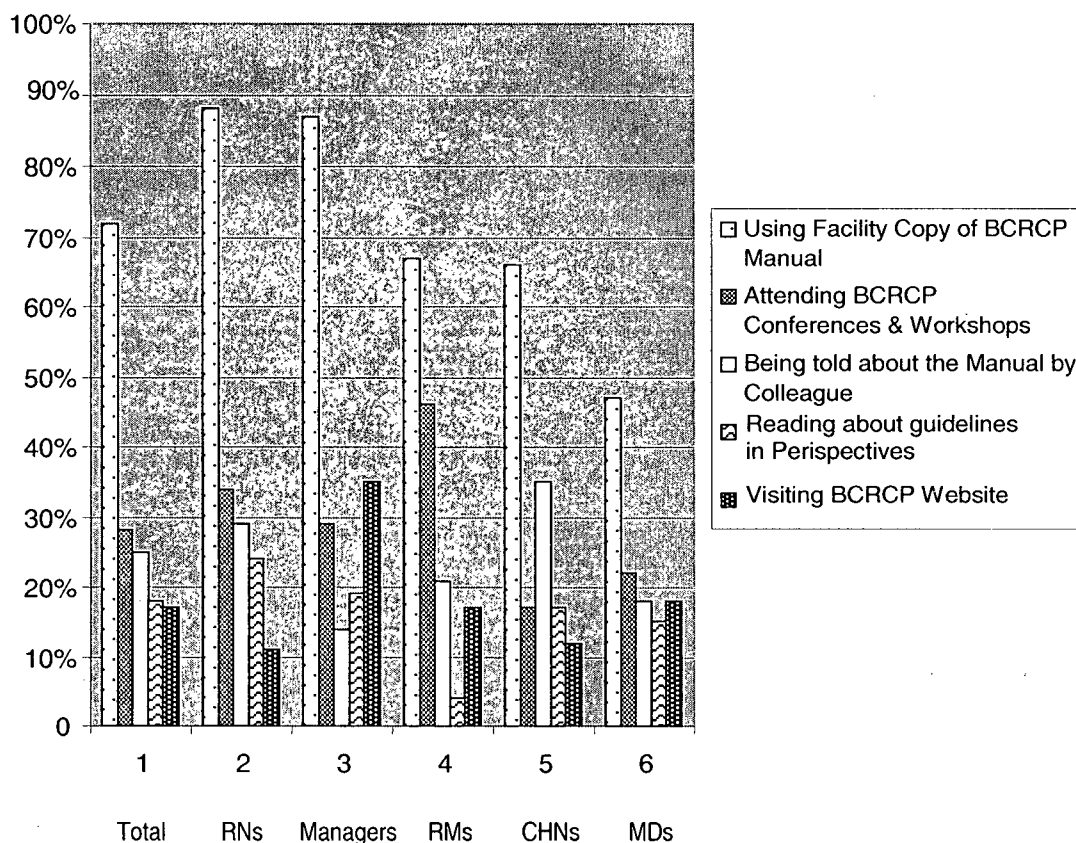
The level of awareness of the BCRCP guidelines was high, with 287 (92%) of the respondents indicating that they were aware of the BCRCP Guideline manual. By professional designation, all (100%) of the hospital nurses were aware of the manual, 98% of the managers, 91% of the community health nurses, 87% of the midwives, and 78% of the physicians. When the nursing group (hospital nurses, community health nurses, and managers) was compared to the primary practitioner group (midwives and physicians), the nurses were significantly more aware of the guidelines manual (RR = 1.2, 95% CI = 1.1-1.3). One hundred and eighty seven respondents (60%) were aware

that the guidelines were available on the Web. By professional designation, 84% of the managers were aware of this electronic version, 71% of the midwives, 61% of the hospital nurses, 56% of the community health nurses, and 43% of the physicians.

Awareness of the manual was associated with only one demographic variable. Practitioners who had worked 5 years or less in B.C. were less aware of the manual than those who had worked in the province for more than 5 years ( $\chi^2 = 9.34$ ,  $p = .002$ ). Other demographic factors, including years working in their current facility, Health Authority in which they practice, and number of deliveries that primary practitioners attend each year, were not significantly related to awareness of guidelines.

The most frequent method by which practitioners became aware of the manual was using the facility's hard copy (72%), and attending BCRCP conferences and workshops (28%) (Figure 1). Of the nursing group (managers, community health nurses, and hospital nurses), 82% indicated that they became aware of the manual by using the facility hard copy, whereas only 52% of the primary practitioner group (midwives and physicians) indicated that they became aware of the manual in this way. Respondents indicated other methods by which they had become aware of the guidelines, including professional education and continuing education (8 respondents), facility's orientation manuals (6 respondents), and facility committees and policy/procedure manuals (5 respondents). The most frequently cited way of becoming aware of new or revised guidelines was use of the facility's copy (44%), followed by reading about guidelines in the BCRCP Perspectives newsletter (18%). Less than 40% of practitioners became aware of new or revised guidelines by visiting the BCRCP website.

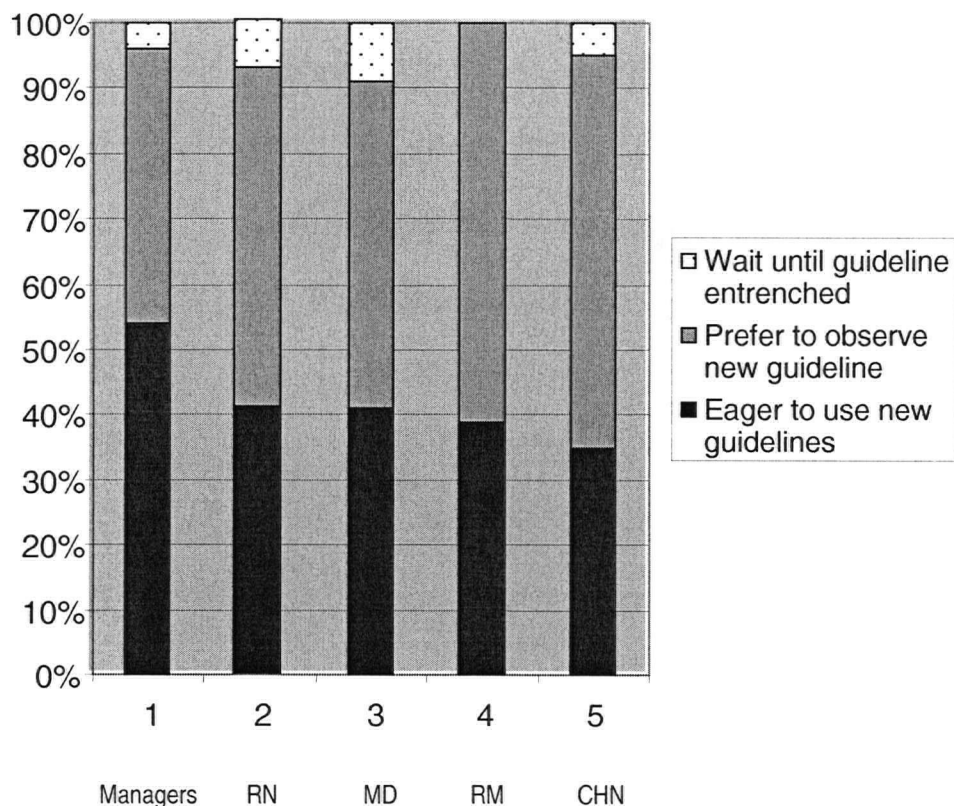
Figure 1. Major ways practitioners became aware of the BCRCP guidelines manual



In terms of how respondents viewed themselves in relation to the uptake of new information, 42% indicated they were “eager to use new or revised guidelines,” 53% indicated they “prefer to observe a new or revised guideline and discuss it with [my] colleagues before implementing changes in [my] clinical practice,” and 5% indicated they “wait until a new or revised guideline is well entrenched in policies and the guideline is considered common clinical practice before I change my practice.” The responses to this item varied according to professional designation. Fifty four percent of the managers were “eager to use new or revised guidelines,” whereas 41% of hospital nurses and physicians, 39% of midwives, and 35% of community health nurses were “eager to use new or revised guidelines” (Figure 2).



Figure 2. Self-perception of uptake of new information, by professional designation



Twenty survey items addressed attitudes towards current BCRCP guidelines.

Scores for individual items ranged from 1 (strongly disagree) to 4 (strongly agree), with the majority of items being skewed with means  $\geq 3.0$  based on the entire group of practitioners. Respondents could also score 5 (don't know) and these responses were not included in the calculation of the means. The 20 items addressing attitudes towards current BCRCP guidelines were not applicable to 25 (8%) of the respondents, who were unaware of both the guideline manual and the website and were therefore asked to ignore these items. "Don't know" response rates ranged from 1% to 23% for the individual items, and the incidence of missing data ranged from 6% to 9%.

Practitioners expressed very positive attitudes towards the guidelines. They stated that guidelines provided interdisciplinary guidance, practice knowledge and judgments for specific clinical situations, and guidance in controversial areas of practice, led to best

practice outcomes, decreased medical-legal risk, decreased opportunity for variance in clinical practice, were written in user-friendly language with practice recommendations readily apparent in the guideline, were based on current research evidence or consensus opinion when evidence was not available, were readily available for use, and allowed enough flexibility for independent clinical decision making (Table 8).

Table 8

*Attitudes towards Current BCRCP Guidelines*

Item	n	Mode	Mean (SD)
Provide practice knowledge for specific situations	263 (84%)	4	3.6 $\pm$ .54
Provide interdisciplinary guidance	251 (80%)	4	3.5 $\pm$ .55
Lead to best practice outcomes	248 (79%)	4	3.5 $\pm$ .57
Decrease medical-legal risk	232 (74%)	4	3.5 $\pm$ .60
Provide practice judgments for specific situations	253 (81%)	4	3.4 $\pm$ .62
Provide guidance in controversial areas of practice	249 (80%)	3	3.4 $\pm$ .61
Decrease opportunity for variance in practice	247 (79%)	3	3.3 $\pm$ .70
Are written in user-friendly language	260 (83%)	3	3.3 $\pm$ .57
Are readily available to me	261 (83%)	4	3.3 $\pm$ .78
Practice recommendations are readily apparent	250 (80%)	3	3.3 $\pm$ .62
Generally, guidelines are based on current evidence	234 (75%)	3	3.3 $\pm$ .57
Staff nurses use guidelines in their practice	246 (79%)	3	3.3 $\pm$ .61
I discuss the content of guidelines with colleagues	265 (85%)	3	3.3 $\pm$ .64
When research evidence is not available, guidelines are based on professional consensus	196 (63%)	3	3.2 $\pm$ .52
I facilitate incorporating guidelines into policy	246 (79%)	3	3.2 $\pm$ .67
Allow enough flexibility for independent decisions	245 (78%)	3	3.2 $\pm$ .62
The medical/midwifery staff use guidelines	190 (61%)	3	3.0 $\pm$ .64
The recommendations presented sometimes do not reflect my beliefs	242 (77%)	2	2.3 $\pm$ .71
Are too prescriptive	223 (71%)	2	2.1 $\pm$ .59
I don't use guidelines because I don't like them	262 (84%)	1	1.4 $\pm$ .56

Scale: 1. Strongly disagree 2. Disagree 3. Agree 4. Strongly agree 5. Don't know

In order to determine if there were significant attitudinal differences towards the guidelines between the hospital nurses and primary practitioners as suggested in the literature, the respondents were divided into two groups: the nurses (hospital nurses,

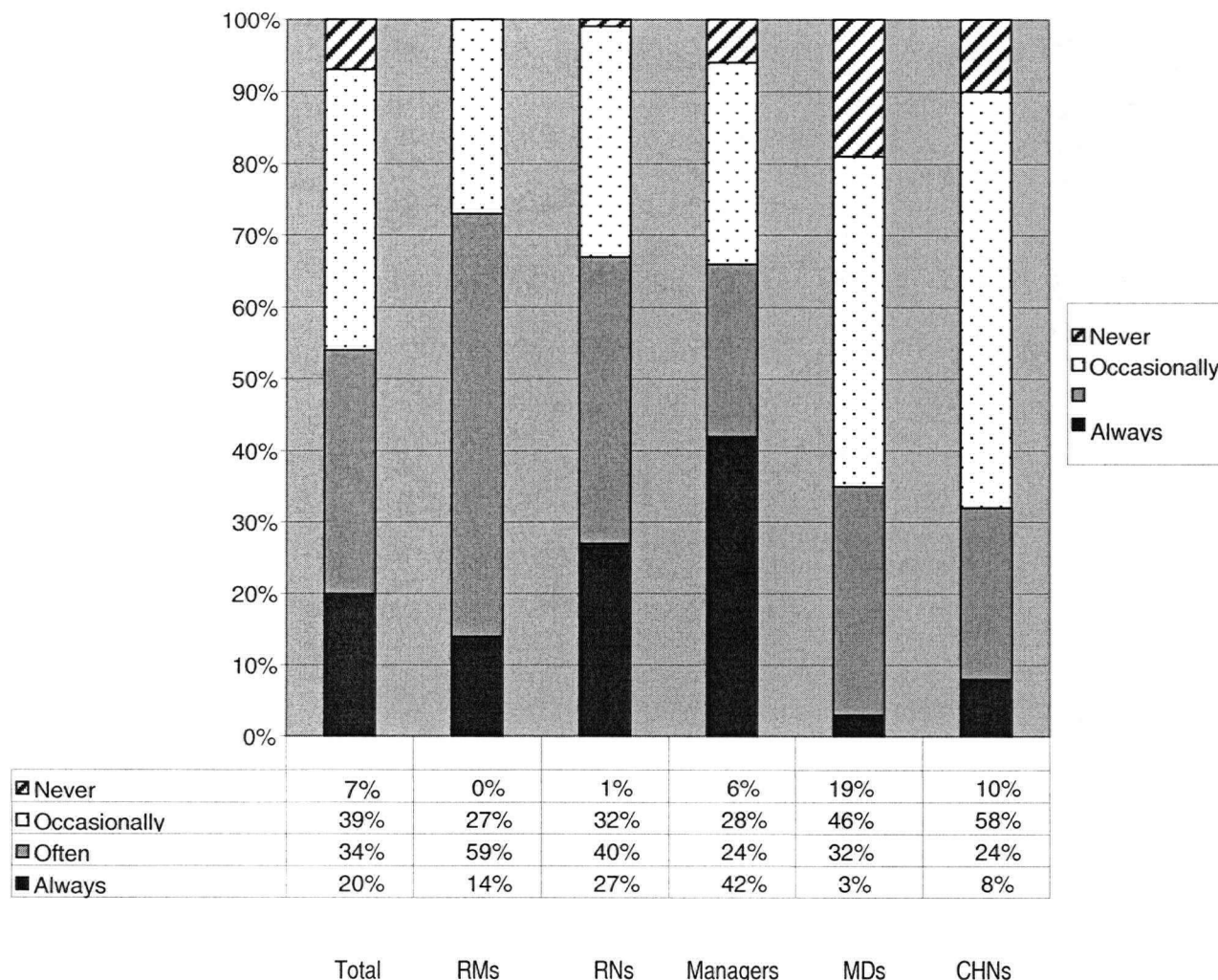
community health nurses, and managers) and the primary practitioners (midwives and physicians). The groups were compared using the Mann-Whitney test. Nurses believed more strongly that they facilitate incorporating guidelines into facility policies ( $z = -2.1$ ,  $p = <.001$ ), that guidelines lead to best practice outcomes ( $z = -4.8$ ,  $p = <.001$ ), that guidelines allow enough flexibility for independent clinical decision making ( $z = -3.5$ ,  $p = <.001$ ), and that guidelines are written in user-friendly language ( $z = -1.9$ ,  $p = <.001$ ). Primary practitioners stated more strongly that guideline recommendations sometimes fail to reflect their beliefs ( $z = -2.2$ ,  $p = <.001$ ).

#### *Research Question 1.2: Practitioner Use of BCRCP Guidelines*

1.2. To what degree do hospital and community nurses, managers, physicians, and midwives use guidelines in general, and selected guidelines in particular, in their clinical practice?

One survey item addressed the frequency with which practitioners used the guidelines. Twenty percent (57/280) of total respondents indicated that they always used the guidelines (monthly), 34% (96/280) indicated that they used the guidelines often (every 1-3 months), 39% (108/280) used them occasionally (every 3-12 months), and 7% (19/280) indicated that they had never used them. The professional groups using the guidelines most frequently (always/often) were the midwives (73%), the hospital nurses (67%), and the managers (66%). However, the managers used them most frequently on a monthly basis (Figure 3).

Figure 3. Frequency of guideline use by perinatal practitioners



In order to determine individual guideline use, each guideline in the BCRCP Perinatal Guideline manual was listed in the survey and respondents were asked to indicate whether they had used each individual guideline within the past 3 years, were aware of the guideline, or were not aware of the guideline (Table 9). The number of respondents for any individual guideline ranged from 263 (84%) to 274 (88%) of the total 313. This question was coded “not applicable” for the 25 (8%) of the 313 survey respondents who were not aware of either the guideline manual or the website. In addition, there were missing data ranging from 4% to 8% for any individual survey item.

Over all, the obstetrical guidelines demonstrated very high use and awareness, as did the newborn and provincial perinatal forms guidelines. The reproductive mental health and substance use guideline demonstrated fair use and awareness (68%-79%), and the perinatal mortality review guidelines had relatively low use and awareness (52%-59%).

Table 9

*Use and Awareness of Individual Guidelines by All Practitioners*

Guideline number and title		% Used within past 3 years	% Aware but not used	% Not aware
Obstetrical Guidelines				
12	Group B Streptococcus	75%	17%	8%
11	Hypertension in Pregnancy	64%	28%	8%
1	Induction of Labour	61%	28%	11%
6	Fetal Health Surveillance in Labour	61%	28%	11%
10A	Gestational Diabetes	61%	31%	8%
8	Vaginal Birth after Previous Caesarean	59%	31%	10%
2A	Preterm Labour	58%	31%	11%
4	Pain Management in Labour	53%	35%	12%
7	Postterm Pregnancy	52%	34%	14%
10B	Diabetes Mellitus, Type 1 & 2	49%	41%	10%
16	Planned Maternity Discharge: Term	46%	38%	16%
3	Herpes in the Perinatal Period	45%	42%	13%
14	Assist Vaginal Birth: Forceps/Vacuum	42%	41%	17%
18	Hepatitis C in the Perinatal Period	39%	43%	18%
5	Management of Twin Pregnancies	37%	48%	15%
17	Antenatal Screening & Diagnostic Tests	36%	46%	18%
9	Folic Acid & Prevention of Neural.	33%	48%	19%
15	HIV in the Perinatal Period	32%	52%	16%
2B	Management of Extreme Prematurity	28%	48%	24%
13	Intimate Partner Violence in Perinatal Period	25%	52%	23%

*(table continues)*

Table 9 (continued)

Guideline number and title		% Used within past 3 years	% Aware but not used	% Not aware
Newborn Guidelines				
4	Jaundice in Healthy Term Newborn	66%	26%	8%
10	Care of the Umbilical Cord	56%	31%	13%
7	Neonatal Resuscitation	54%	35%	11%
5	Neonatal Hypoglycemia	51%	38%	11%
12	Vitamin K <sub>1</sub> Prophylaxis	50%	39%	11%
9	Newborn Screening	47%	42%	11%
11	Eye Care & Prevention of Ophthalmia Neo.	45%	43%	12%
2	Neonatal Thermoregulation	42%	41%	17%
1	Newborn Care Resources	40%	41%	19%
3	Stabilization: Asphyxiated Infant	36%	45%	19%
6	Surfactant Replacement Therapy in Neonates	18%	58%	24%
13	Sudden Infant Death Syndrome	33%	48%	19%
8	Newborn Hospital Security	27%	48%	25%
Perinatal Mortality Guidelines				
5	Investigation & Assessment of Stillbirth	18%	41%	41%
4	Clinical Examination of the Placenta	17%	42%	41%
3	Classification of Perinatal Deaths	16%	40%	44%
1	The PMR Process	12%	45%	43%
2	Hospital PMR: TOR	10%	42%	48%
Substance Use Guidelines				
1	Principles of Perinatal Care	33%	46%	21%
3	General Clinical Management	29%	49%	22%
4B	Perinatal Opioid Use: Newborn	29%	47%	24%
4A	Perinatal Opioid Use: Mother	28%	47%	25%
2	Discharge Planning Guide.	27%	49%	24%
5B	Perinatal Cocaine Use: Newborn	26%	51%	23%
2	Discharge Planning/Community Follow-up	29%	46%	25%
4	Major Depression	28%	43%	29%
5A	Perinatal Cocaine Use: Mother	26%	51%	23%
Reproductive Mental Health Guidelines				
1	Reproductive Mental Illness: Principles	28%	45%	27%
3	Identification and Assessment RMH Illness	26%	42%	32%
5	Anxiety Disorders	26%	44%	30%
6	Psychotic Disorders	21%	47%	32%

(table continues)

Table 9 (continued)

Guideline number and title		% Used within past 3 years	% Aware but not used	% Not aware
General Guidelines				
3	Nutrition: Part I: Breastfeeding Term	58%	27%	15%
	Part II: Breastfeeding the Healthy Preterm	51%	34%	15%
1	Mat/Newborn Transport Flowsheet	31%	42%	27%
2	Maternal/Fetal Transport	31%	41%	28%
4	Interdisciplinary Perinatal Committees	17%	46%	37%
Statements				
	Reducing the Risk of Sudden Infant Death	37%	38%	25%
	SOGC Statement on Vaginal Breech	37%	33%	30%
	SOGC Joint Position Paper: Rural Maternity Care	29%	33%	38%
Perinatal Forms Guidelines				
5	Newborn Record (1583A)	81%	15%	4%
6	Labour/Birth Summary Record (1588)	77%	18%	5%
3	Antenatal Record Part 1 & 2 (1582)	75%	20%	5%
1	Provincial Perinatal Forms	74%	18%	8%
4	Labour Admission Partogram (1583)	70%	22%	8%
7	Maternal Assess. Record (1590)	69%	23%	8%
9	Maternal PP Care Path (Vaginal Delivery)	66%	25%	9%
10	Newborn Care Path (1593 & 1594)	65%	26%	9%
8	Community Liaison Record (15910)	62%	26%	12%
12	Maternal Caesarean Care Path (1595)	55%	31%	14%
13	Maternal Assessment Checklist (1956)	55%	29%	16%
2	Generic Charting Guideline	55%	27%	18%
11	Abbreviations used in 1998 Forms	44%	30%	26%
14	Community NB Assessment Check (1597)	39%	40%	21%
15	Expanded NB Resuscitation Record	34%	41%	25%

The use of individual guidelines within the past 3 years varied between professional groups (Table 10). The three guidelines with the highest use among physicians were Group B Streptococcus (77%), Induction of Labour (65%), and Preterm Labour (64%). The guidelines with the highest use among midwives were Group B Streptococcus (100%), Vaginal Birth after Previous Caesarean Section (91%), Induction

of Labour (82%), Postterm Pregnancy (82%), Gestational Diabetes (82%), and Hypertension in Pregnancy (82%). The three guidelines with the highest use among hospital nurses were Group B Streptococcus (87%), Fetal Health Surveillance in Labour (81%), and Hypertension in Pregnancy (81%). The three guidelines with the highest use among community health nurses were Breastfeeding the Term Infant (76%), Jaundice in the Healthy Term Newborn (75%), and Breastfeeding the Healthy Preterm Infant (74%). The majority of the obstetrical guidelines (which generally have an acute care focus) were used by < 30% of community health nurses over the 3-year period.

Those practitioners who indicated that they were not aware of individual guidelines were in the minority, and varied according to professional designation and practice area. The percentage of community health nurses not aware of acute care guidelines ranged from 17% to 40%, whereas the percentage of hospital nurses not aware of these guidelines ranged from 5% to 12%. However, for guidelines applicable to community health nurses, such as care of the umbilical cord, breastfeeding, and neonatal jaundice, the percentage of community health nurses not aware was much lower at 8%. Over all, the physician group demonstrated a considerable lack of awareness, ranging from 11% to 31% for individual guidelines. For example, the guideline titled "Assisted Vaginal Birth: The Use of Forceps and Vacuum Extraction" had a 23% response rate for "not aware" from the physician group.



Table 10

*Percentage of Practitioners who have Used Individual Guidelines within the Past 3 Years, by Practitioner Designation*

Guideline number and title		RN	CHN	Manager	RM	MD
<b>Obstetrical Guidelines</b>						
1	Induction of Labour	77%	19%	55%	82%	65%
2A	Preterm Labour	76%	19%	48%	68%	64%
2B	Management of Extreme Prematurity	42%	8%	29%	27%	18%
3	Herpes in the Perinatal Period	47%	28%	43%	77%	46%
4	Pain Management in Labour	69%	20%	59%	59%	44%
5	Management of Twin Pregnancies	48%	13%	35%	64%	28%
6	Fetal Health Surveillance in Labour	81%	11%	57%	96%	54%
7	Postterm Pregnancy	63%	19%	40%	82%	50%
8	Vaginal Birth after Previous C/S	69%	23%	59%	91%	57%
9	Folic Acid & Prevention of Neural..	17%	45%	31%	50%	47%
10A	Gestational Diabetes	75%	32%	51%	82%	61%
10B	Diabetes Mellitus, Type 1 & 2	64%	28%	44%	41%	47%
11	Hypertension in Pregnancy	81%	30%	63%	82%	59%
12	Group B Streptococcus	87%	40%	71%	100%	77%
13	Intimate Partner Violence in Perinatal Period	22%	36%	38%	23%	10%
14	Assist Vaginal Birth: Forceps/Vacuum	56%	18%	43%	18%	46%
15	HIV in the Perinatal Period	37%	30%	43%	32%	16%
16	Planned Maternity Discharge: Term	49%	54%	55%	41%	24%
17	Antenatal Screening & Diagnostic Tests	32%	20%	38%	73%	41%
18	Hepatitis C in the Perinatal Period	37%	46%	48%	36%	29%
<b>Newborn Guidelines</b>						
1	Newborn Care Resources	48%	43%	45%	36%	16%
2	Neonatal Thermoregulation	62%	22%	43%	50%	16%
3	Stabilization: Asphyxiated Infant	46%	2%	41%	64%	28%
4	Jaundice in Healthy Term Newborn	67%	75%	82%	77%	35%
5	Neonatal Hypoglycemia	66%	33%	55%	64%	31%
6	Surfactant Replacement Therapy in Neonates	25%	4%	61%	18%	6%
7	Neonatal Resuscitation	76%	7%	55%	73%	44%
8	Newborn Hospital Security	44%	7%	41%	9%	6%
9	Newborn Screening	53%	41%	59%	59%	24%
10	Care of the Umbilical Cord	65%	67%	67%	50%	18%
11	Eye Care & Prevention of Ophthalmia Neo.	55%	28%	57%	50%	25%

*(table continues)*

Table 10 (continued)

Guideline number and title		RN	CHN	Manager	RM	MD
12	Vitamin K <sub>1</sub> Prophylaxis	63%	30%	61%	64%	29%
13	Sudden Infant Death Syndrome	32%	54%	41%	38%	4%
Perinatal Mortality Guidelines						
1	The PMR Process	20%	4%	18%	27%	18%
2	Hospital PMR: TOR	19%	4%	27%	32%	16%
3	Classification of Perinatal Deaths	19%	4%	31%	5%	12%
4	Clinical Examination of the Placenta	10%	2%	14%	5%	16%
5	Investigation & Assessment of Stillbirth	13%	4%	18%	5%	14%
Substance Use Guidelines						
1	Principles of Perinatal Care	31%	39%	53%	27%	14%
2	Discharge Planning Guide	23%	35%	45%	23%	10%
3	General Clinical Management	27%	33%	45%	23%	14%
4A	Perinatal Opioid Use: Mother	25%	31%	45%	23%	18%
4B	Perinatal Opioid Use: Newborn	23%	31%	53%	23%	16%
5A	Perinatal Cocaine Use: Mother	25%	29%	40%	18%	14%
5B	Perinatal Cocaine Use: Newborn	22%	35%	47%	18%	10%
Reproductive Mental Health Guidelines						
1	Reproductive Mental Illness: Principles	22%	40%	35%	27%	20%
2	Discharge Planning/Community Follow-up	28%	43%	35%	27%	14%
3	Identification and Assessment RMH Illness	17%	36%	38%	32%	22%
4	Major Depression	23%	38%	29%	31%	28%
5	Anxiety Disorders	19%	31%	27%	36%	29%
General Guidelines						
1	Mat/Newborn Transport Flowsheet	43%	11%	43%	37%	16%
2	Maternal/Fetal Transport	43%	5%	40%	41%	20%
3	Nutrition: Part I: BreastfeedingTerm	63%	76%	77%	55%	14%
	Part II: Breastfeeding the Healthy Preterm	53%	74%	69%	50%	8%
4	Interdisciplinary Perinatal Committees	15%	16%	31%	5%	10%
Statements						
	Reducing the Risk of Sudden Infant Death	41%	37%	44%	48%	18%
	SOGC Statement on Vaginal Breech	24%	9%	38%	81%	71%
	SOGC Joint Position Paper: Rural Maternity Care	22%	13%	39%	52%	37%

(table continues)

Table 10 (continued)

Guideline number and title		RN	CHN	Manager	RM	MD
Perinatal Forms Guidelines						
1	Provincial Perinatal Forms	77%	60%	71%	91%	79%
2	Generic Charting Guideline	64%	53%	63%	59%	32%
3	Antenatal Record Part 1 & 2 (1582)	80%	52%	67%	100%	87%
4	Labour Admission Partogram (1583)	85%	33%	65%	96%	74%
5	Newborn Record (1583A)	87%	67%	77%	100%	79%
6	Labour/Birth Summary Record (1588)	84%	56%	73%	100%	79%
7	Maternal Assess. Record (1590)	87%	60%	70%	68%	48%
8	Community Liaison Record (15910)	71%	84%	69%	64%	17%
9	Maternal PP Care Path (Vaginal Delivery)	81%	69%	71%	77%	31%
10	Newborn Care Path (1593 & 1594)	78%	71%	75%	73%	26%
11	Abbreviations used in 1998 Forms	47%	58%	57%	50%	8%
12	Maternal Caesarean Care Path (1595)	75%	48%	56%	50%	23%
13	Maternal Assessment Checklist (1956)	65%	69%	58%	52%	20%
14	Community NB Assessment Check (1597)	33%	72%	50%	41%	4%
15	Expanded NB Resuscitation Record	47%	11%	48%	46%	14%

*Research Question 1.3: Alignment of Facility Policies/Procedures/Quality*

*Assurance Programs with BCRCP Perinatal Guidelines*

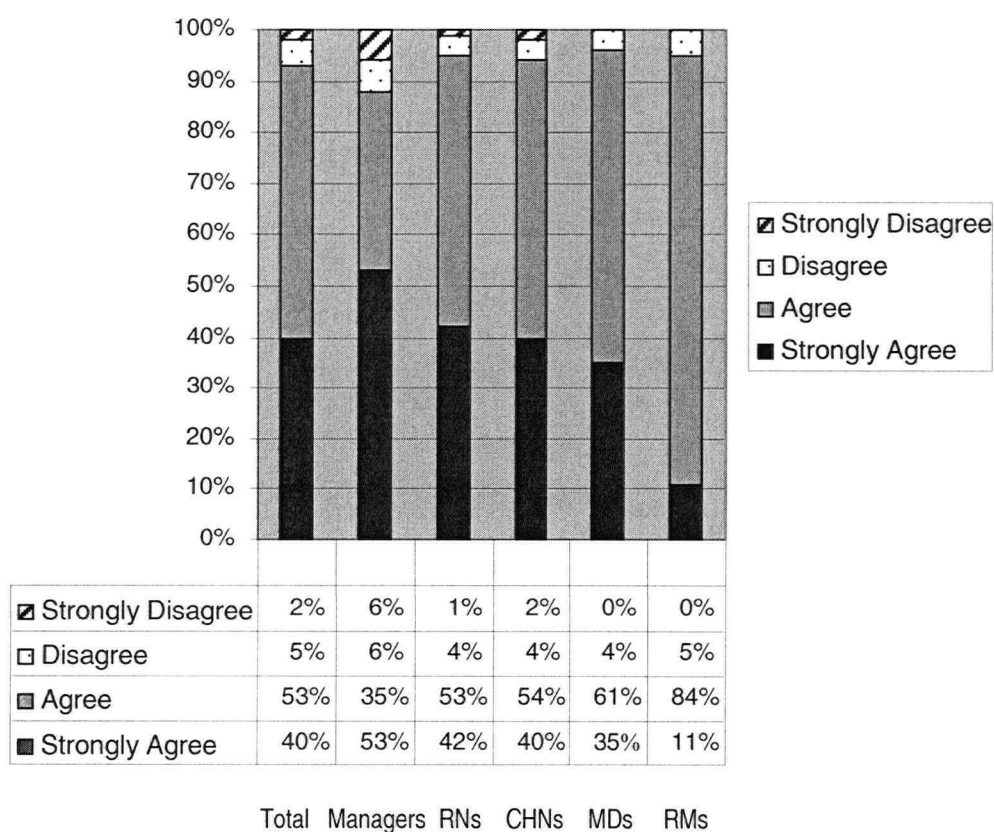
1.3. To what degree have community and hospital perinatal care facilities aligned their policies, procedures, and quality assurance programs with guidelines?

To determine the degree to which facility policies and procedures and quality assurance programs were aligned with the BCRCP Perinatal Guidelines, one item addressed the number of guideline manuals available in individual facilities. It was expected that small facilities would have one manual available, and facilities with designated antepartum, intrapartum, postpartum, and newborn units would have a manual available for each unit. This item is reported only for the manager group, because they alone would be expected to hold this information. This was evidenced by the rate of “don’t know” responses. The rate of “don’t know” responses was 11% for the managers,

whereas it was 35% for the practitioners. The managers indicated a range of 0-7 manuals per facility, with an average of 1 manual for facilities with < 250 births/year, and 3 manuals for facilities with > 250 births/year.

Another item addressed the following statement: “My facility’s perinatal policies generally reflect the content of the BCRCP guidelines.” A total of 265 (85%) respondents answered this question. Data were missing from those who did not answer the item (4%) and another 11% of respondents indicated that they did not know. For the 265 respondents, 40% of practitioners indicated that they “strongly agreed” and 53% indicated that they “agreed” with the statement. Only 7% indicated that they disagreed or strongly disagreed (Figure 4).

Figure 4. Facility perinatal policies generally reflect BCRCP guideline content



The majority of managers (60%) indicated that the most common method used to update their facility manuals was the BCRCP hard copy mail-out, and the second most common method was downloading manuals from the BCRCP website (17%). When asked if their facility had a process in place for adopting clinical practice guidelines into facility policies and procedures, 67% of managers indicated yes, 21% indicated no, and 12% did not know. For the 67% who answered in the affirmative, the most common method of incorporating guidelines into policies included review of guidelines by the perinatal committee, review of guidelines by the policy and procedure committee, and adoption of guidelines at the manager's discretion. Other processes frequently indicated in the narrative responses included review at staff meetings and review by other departmental committees. Thirty five percent of managers indicated that their facility had incorporated guidelines into quality management strategies.

*Research Questions 1.4 & 1.5: Factors that Facilitate or Inhibit Use of  
Guidelines at the Individual and/or Organizational Level*

1.4. What factors facilitate use of guidelines at individual and organizational levels?

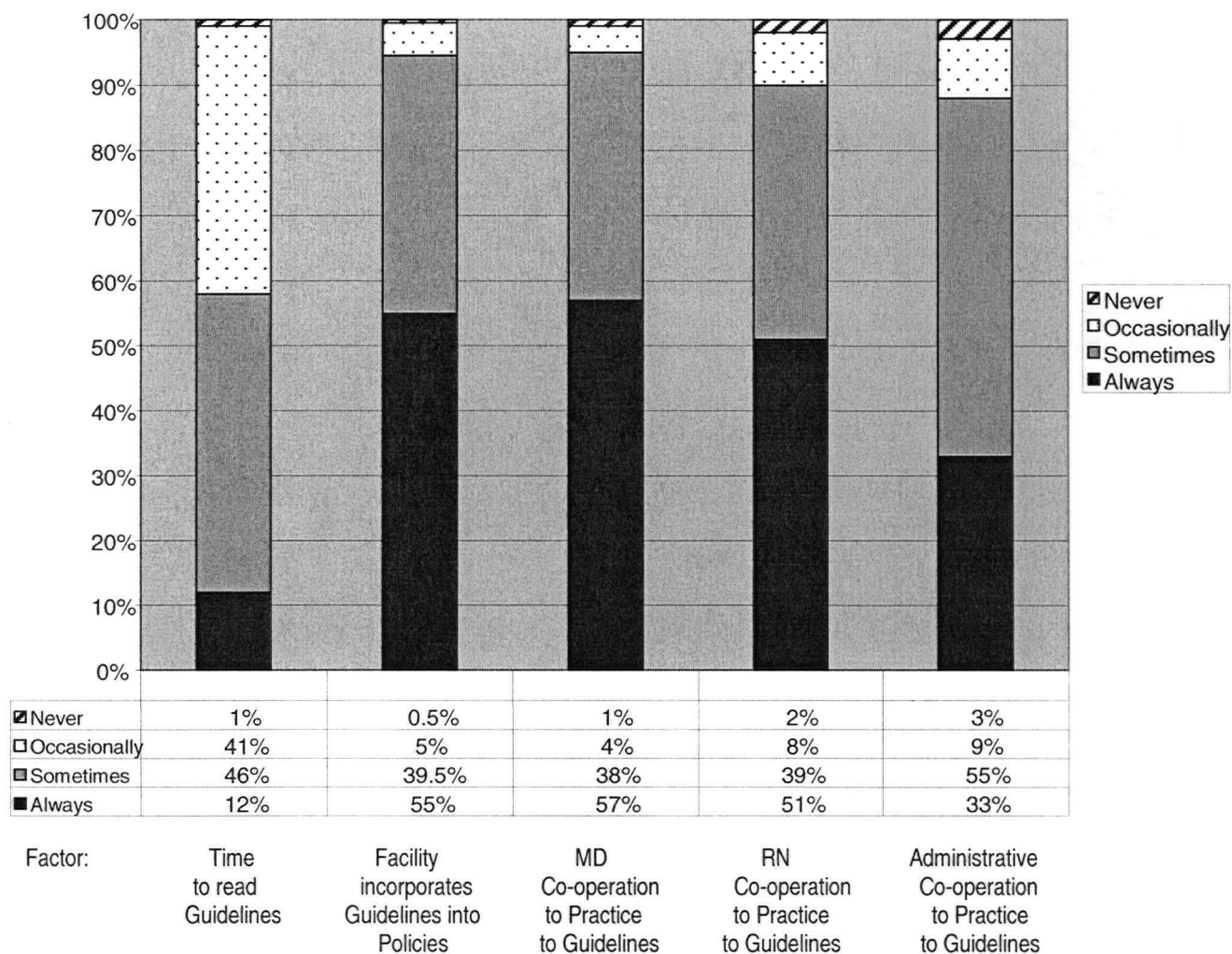
1.5. What barriers deter use of guidelines at individual and organizational levels?

In order to determine the factors that facilitate or inhibit the use of guidelines at the individual and/or organizational level, five organizational factors identified in the literature were listed in the survey. These included having or lacking time to read guidelines, facility incorporation of guidelines into policies, and a high level of co-operation between physicians, hospital nurses, and the administration to practice according to guideline recommendations (Figure 5). Data were missing from the 25

respondents (8%) for whom this question was not applicable. Individual items had missing values ranging between 4% and 9% of total survey respondents.

Findings indicate that 12% of respondents “always” had time to read guidelines and 46% of respondents “sometimes” had time to read guidelines. Forty one percent had time to read guidelines “occasionally,” and 1% never had time. A majority of respondents (55%) indicated that their facility “always” incorporated guidelines into facility policies, and almost 40% indicated that this occurred “sometimes.” Fifty seven percent of respondents indicated that there is “always” a high level of co-operation among physicians to practice according to guideline recommendations, and 38% indicated that this occurred “sometimes.” A lower proportion (51%) of respondents indicated that there is “always” a high level of co-operation among hospital nurses to practice according to guideline recommendations, and 39% indicated that this “sometimes” occurred. Proportionally fewer (33%) respondents indicated that there is “always” a high level of co-operation from facility administration to practice according to guideline recommendations, and a majority (55%) indicated that this “sometimes” occurred.

Figure 5. Factors facilitating guideline use: Frequency of occurrence



In addition to the five factors listed in the survey item, respondents were asked to provide narratives about factors that they felt facilitated guideline use, and about factors that they felt inhibited guideline use. The narratives for both questions were reviewed and themes were determined by the repetition of responses. The responses were then coded according to theme and the frequency of responses for each theme was summed (Table 11).

Table 11

*Factors that Facilitate and Inhibit Guideline Use: Narrative Responses*

Factor	n
Factors that encourage and facilitate the use of BCRCP guidelines	
Guidelines provide a consistent standard of care in B.C.	31
Binder is readily accessible on ward	30
Guidelines are a reference for unusual clinical situations	13
Support by facility management and clinicians to use guidelines	13
Being reminded by colleagues, clinicians, management	12
Guideline binder is user-friendly and easy to follow	10
Guidelines are evidence-based and current	6
Being self-motivated to provide a high standard of care	6
Having time to read the guidelines	5
Web availability of the guidelines	4
Factors that inhibit and discourage the use of BCRCP guidelines	
Time limitations and the business of the unit/facility	54
Lack of co-operation among MDs, RMs, and RNs to follow guideline recommendations	17
Binder not user-friendly, ungainly for urgent clinical situations	15
Difficult to access binder and binder not being available	14
Lack of resources, funding, and staff to practice according to guideline recommendations	12
Not being aware of updated guidelines	6
Information confusion from multiple sources of guidelines	4

*Research Question 1.6: Predictors of Guideline Use*

## 1.6. What factors predict guideline use?

One survey item addressed the frequency with which practitioners used the guidelines. Twenty percent (57/280) of total respondents indicated that they always used the guidelines (monthly), 34% (96/280) indicated that they used the guidelines often (every 1-3 months), 39% (108/280) used them occasionally (every 3-12 months), and 7% (19/280) indicated that they had never used them.



There was a statistically significant association between guideline users and four variables: (a) guidelines being readily available ( $\chi^2 = 22.37$ ,  $p = <.001$ ); (b) the respondents' self-perception of their comfort level regarding the uptake of new information ( $\chi^2 = 17.67$ ,  $p = <.001$ ); (c) having time to read guidelines ( $\chi^2 = 11.94$ ,  $p = <.001$ ); and (d) a high level of co-operation from physicians in their facility to practice according to guideline recommendations ( $\chi^2 = 5.69$ ,  $p = .017$ ).

The final model contained three variables. The predictor variables for guideline use were guidelines being *readily* available (OR = 7.8; 95%CI = 2.9-21.1), an eagerness for the uptake of new information (OR = 3.2; 95% CI = 1.7-5.7), and time to read guidelines (OR = 1.9; 95% CI = 1.1-3.5) (Table 12).

Table 12

*Final Model for Predictors of Guideline Use*

Variable	Beta	SE	Adjusted OR for guideline use	95% CI
Guidelines readily available	2.06	.50	7.8	2.9 – 21.1
Eager uptake of guidelines	1.16	.29	3.2	1.8 – 5.7
Time to read guidelines	.684	.28	1.9	1.1 – 3.5

*Research Question 1.7: Hospital Size and Influence on Attitudes, Awareness,  
Alignment of Policies and Procedures, and Facilitators/Barriers*

1.7. To what degree does hospital size influence attitudes to, awareness and use of, alignment of policies and procedures and quality assurance programs with, and facilitators and barriers for guidelines?

To address this question, a dichotomous variable was created based on the size of the facility where the respondent practiced, either < 500 births per year or > 500

births/year. Survey variables were reviewed and categorized according to the concepts to be measured (attitudes, awareness, etc.) and appropriate variables were then recoded for bivariate analysis. Two variables demonstrated a statistically significant relationship with facility size. Facilities with < 500 births/year showed a 2.4 greater probability of not adopting guidelines into their policies and procedures (RR = 2.4; 95% CI = 1.25-4.73). Also, facilities with < 500 births/year were 2.7 times more likely not to have guidelines readily available (RR = 2.7; 95% CI = 1.07-4.47).

*Research Question 1.8: Changes to the BCRCP Guideline*

*Program for the Future*

1.8. What changes should be made to the BCRCP Perinatal Clinical Practice Guideline program to increase use of guidelines?

To determine possible future changes to the BCRCP Guideline Program that might increase practitioner use of guidelines, respondents were asked to rate items based on variables extracted from the AGREE instrument. Respondents who scored “5” (don’t know) were not included in calculation of the means. The question was not applicable to 25 (8%) respondents who were unaware of both the guideline manual and the BCRCP website. “Don’t know” response rates ranged from 2% to 9% of total survey respondents for any individual item, and the incidence of missing values ranged from 5% to 7% of total survey respondents for any individual item.

Respondents scores ranged from 1 (strongly disagree) to 4 (strongly agree), with the majority of items scoring means  $\geq 3.0$ . There was agreement that guidelines should be interdisciplinary and that separate guidelines should not exist for separate professional groups. There was agreement that guidelines should include a quick reference page, informed consent information, clear outcome indicators, graphic decision trees, that key

recommendations should be high-lighted and easily identifiable, and that practice

recommendations should be linked to the evidence (Table 13).

Table 13

*Recommended Changes to the BCRCP Guideline Program to Increase Practitioner Use*

Item	n	Mode	Mean (SD)
A summary, quick reference page should be included	261 (83%)	4	3.6 $\pm$ .60
Informed consent information (risks & benefits and their probability) for specific clinical situations should be included	261 (83%)	4	3.5 $\pm$ .62
Key recommendations should be easily identifiable	267 (85%)	4	3.5 $\pm$ .55
Patient information leaflets should be included	260 (83%)	4	3.4 $\pm$ .69
Graphic decision trees should be included as appropriate	254 (81%)	4	3.4 $\pm$ .66
Guidelines should present clear outcome indicators for quality assurance purposes	248 (79%)	3	3.4 $\pm$ .55
There should be explicit links between recommendations and supporting evidence	260 (83%)	3	3.3 $\pm$ .60
The method of formulating recommendations should be described	248 (79%)	3	3.1 $\pm$ .64
The criteria for selecting evidence should be described	250 (80%)	3	3.1 $\pm$ .64
The guidelines should be piloted with target users	241 (77%)	3	3.1 $\pm$ .60
The patients to whom the guideline applies should be described	257 (82%)	3	3.1 $\pm$ .55
The objective of the individual guideline should be specified	250 (80%)	3	3.1 $\pm$ .52
The clinical question addressed should be described	253 (81%)	3	3.1 $\pm$ .52
The professional groups the guideline targets should be specified	250 (80%)	3	3.0 $\pm$ .61
The authors of the guideline should be identified	240 (77%)	3	3.0 $\pm$ .61
Separate guidelines should exist for RNs, RMs, & MDs	255 (82%)	2	2.0 $\pm$ .93

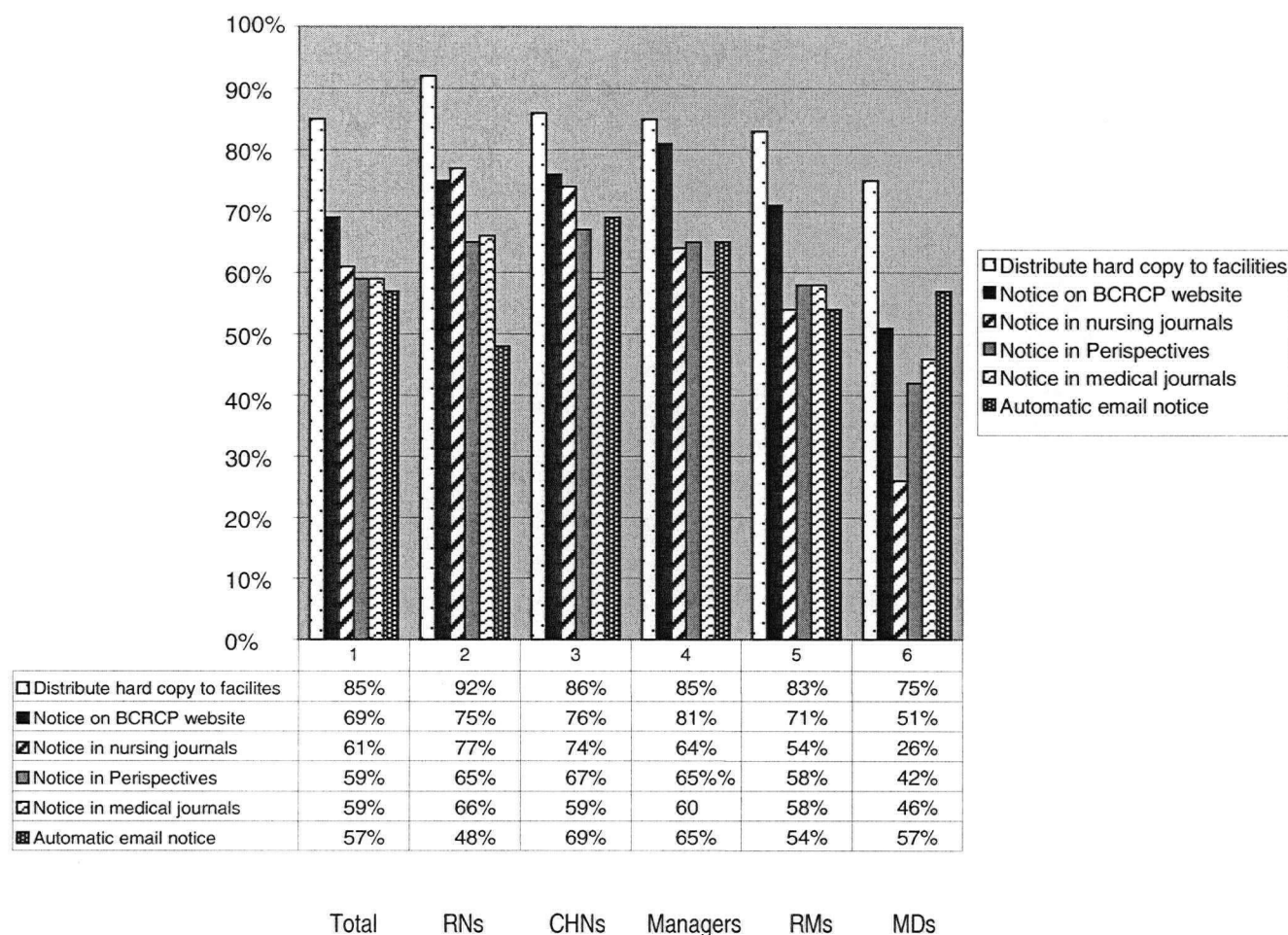
Scale: 1. Strongly disagree 2. Disagree 3. Agree 4. Strongly agree 5. Don't know

Because different professional groups may have differing expectations of and perceive different needs for future guidelines, the professional groups were recoded to two groups for comparative analysis: nurses (hospital nurses, community health nurses, and managers), and primary practitioners (midwives and physicians). The Mann-Whitney

test was used to determine if there were significant differences in responses between the professional designations for each of the stated variables. The nursing group believed more strongly that (a) patient information leaflets should be provided ( $z = -2.564$ ,  $p = .01$ ), and (b) guidelines should present clear outcome indicators for quality assurance purposes ( $z = -2.474$ ,  $p = .013$ ).

This research question also addressed suggested strategies that the BCRCP might use to increase awareness of newly published guidelines. Respondents were asked to tick all methods they thought should be used. Eighty five percent of respondents indicated that distributing the guidelines to health care facilities throughout B.C. was vital, and 69% of respondents indicated the importance of notices on the BCRCP website. Notices in nursing and medical journals, in the Perspectives newsletter, and via automatic electronic email received responses between 57% and 61% (Figure 6).

Figure 6. Ways in which the BCRCP may increase awareness of guidelines in future



Respondents were asked to provide narrative comments about other methods that the BCRCP might utilize to increase guideline use. Their suggestions included individual distribution of guidelines to primary care providers (midwives and physicians) by hard copy or email (5 respondents), links with perinatal clinical instructors and managers throughout B.C. (4 respondents), distribution of information at conferences, workshops, and continuing education sessions (4 respondents), and distribution of information to medical, midwifery, and nursing schools throughout B.C. (3 respondents).

One item asked respondents to provide narratives about ways in which the BCRCP Guideline Program might be improved, over and above issues addressed in the

survey. Using content analysis, responses were reviewed and the principal investigator identified recurring themes. Narrative comments were then coded according to theme, and the number of responses was summed. Suggestions included improving guideline presentation and ease of use, increasing awareness among the physician group, facilitating implementation through workshops, and facilitating cooperation among the physician group to use guidelines (Table 14).

Table 14

*Ways to Improve the BCRCP Guideline Program: Narrative*

Theme	n
Improve guideline presentation. Include graphics, indexing, tabs, easier formatting, and quick references.	14
Focus on increasing the awareness and availability to the medical practitioners.	11
Facilitate guideline implementation through workshops and provision of facility and practitioner support.	9
Facilitate co-operation among medical practitioners to use guidelines	7
Provide updates, consistency of information, and evaluate guidelines.	5
Increase availability of guidelines through improved distribution, email, web, and computer access to guidelines on the unit.	5
Endorse BCRCP guidelines as province-wide standards of practice.	3
No suggestions – BCRCP is already doing a great job with the guidelines	10

In another question, survey respondents were asked to identify the particular strengths of the BCRCP Guideline Program. Using content analysis, responses were reviewed and recurring themes were identified. Narrative comments were then coded according to theme, and the number of responses was summed. The strengths identified included the guidelines' provision of a consistent standard across the province, the provision of evidence-based information, the binder being user friendly, and the program

having strong credibility among health professionals in B.C. (Table 15).

Table 15

*Identified Strengths of the BCRCP Guideline Program: Narrative*

Theme	n
The BCRCP perinatal guidelines provide a consistent standard of care and consistent information throughout B.C.	83
Guidelines provide current, evidence-based information.	43
The guideline binder is user-friendly.	14
The BCRCP Guideline Program is an excellent program with strong credibility throughout B.C.	10
Guidelines provide a resource to support best care outcomes in perinatal care.	8
Guidelines provide information to small facilities without educational resources.	4
BCRCP guidelines address issues not covered in the SOGC guidelines.	1

Other general comments supported the focus of the guideline program. For example, one respondent wrote

Guidelines provide consistency of information to all care providers. [They provide] top-down sharing of expertise, i.e., from the centres of excellence, outreach format, rather than all facilities having to seek and source information. I think it should be a model for other specialties.

Another comment suggested focusing only on implementation of guidelines:

Avoid reinventing the wheel. Guidelines are already published by professional associations. Don't redo work. If you want to do something useful, implement and facilitate implementation of guidelines.

One respondent articulated the challenge of interdisciplinary guideline development and implementation at the provincial level:

The issue of practice and each area of practice working together under the

guidance of research and evidence-based practice towards the best standard of care for the patient/client, is... the biggest issue to overcome and address. As it stands now, I constantly hear of parents complaining that they are very tired and confused by the various things they have heard within the hospital and after. It leaves the providers frustrated as well.

*Part 1, Process Evaluation: Summary of Findings*

All practitioner groups demonstrated a high level of awareness of BCRCP guidelines, mostly achieved through their facility manual, and demonstrated positive attitudes towards guidelines. The guidelines were used monthly or every 1 to 3 months for the majority of practitioners; the midwives group used guidelines most frequently of all. Use of individual guidelines varied according to guideline topic and practitioner designation. The majority of respondents indicated that their facility policies generally reflect the content of BCRCP guidelines. Significant predictors of guideline use included ready availability of guidelines, eagerness for uptake of new guidelines characteristic of adopters, and availability of time to read guidelines. Hospital facilities with fewer than 500 births/year were significantly less likely to adopt guidelines into their facility policies, and were less likely to have guidelines readily available. Respondents indicated that all the recommended criteria outlined in the AGREE instrument should be incorporated into future guideline development. Other suggestions for future improvements to the guideline program included enhancing and/or simplifying guideline format and presentation, increasing awareness of guidelines among medical practitioners, and facilitating guideline implementation strategies. These study findings provide a foundation for the direction(s) in which the BCRCP Perinatal Guideline program might evolve in the future.



## Part 2, Outcome Evaluation Findings

In this section, the analysis of perinatal outcome indicators is presented for five BCRCP guidelines: (1) Vaginal Birth after Previous Caesarean Birth, (2) Postterm Pregnancy (3) Induction of Labour, (4) Fetal Health Surveillance in Labour, and (5) Delivery of Singleton Term Breech. The indicators were derived from the BCRCP Perinatal Database Registry. For the guidelines Postterm Pregnancy, Induction of Labour, Fetal Health Surveillance, and Singleton Term Breech, the outcome indicators included total singleton live births occurring in B.C. between April 1, 2000, and March 31, 2003, and totaled 115,845 mothers and infants. For the guideline Vaginal Birth after Previous Caesarean Birth, the data included stillbirths in order to calculate perinatal mortality – an important outcome indicator for this specific guideline. Each guideline analysis is prefaced with the research questions specific to that particular guideline.

### *Vaginal Birth after Previous Caesarean Birth*

This evaluation examined five questions relevant to maternal and fetal/newborn outcomes expected if practitioners had followed the Vaginal Birth after Previous Caesarean Birth guideline. The period for evaluation was April 1, 2000, to March 31, 2003, and included all singleton live birth deliveries and stillbirth deliveries greater than 20 weeks' gestation or 500 grams.

### *Rate of Attempted and Successful VBAC*

#### 2.1. Was there an increase in the rate of attempted and successful VBAC?

To determine the rate of attempted VBAC, the number of women “eligible” for VBAC must be known. The definitions for “eligible,” “attempted,” and “successful” VBAC follow those provided to this investigator by the BCRCP Perinatal Database Registry (Appendix I). Women coded as “eligible” in the dataset were those with a

previous caesarean section, singleton pregnancy, and cephalic presentation. Attempted VBAC was defined as “vaginal birth after caesarean section, was attempted” and successful VBAC was defined as, “vaginal birth after caesarean section, was attempted and was successful (vaginal delivery).”

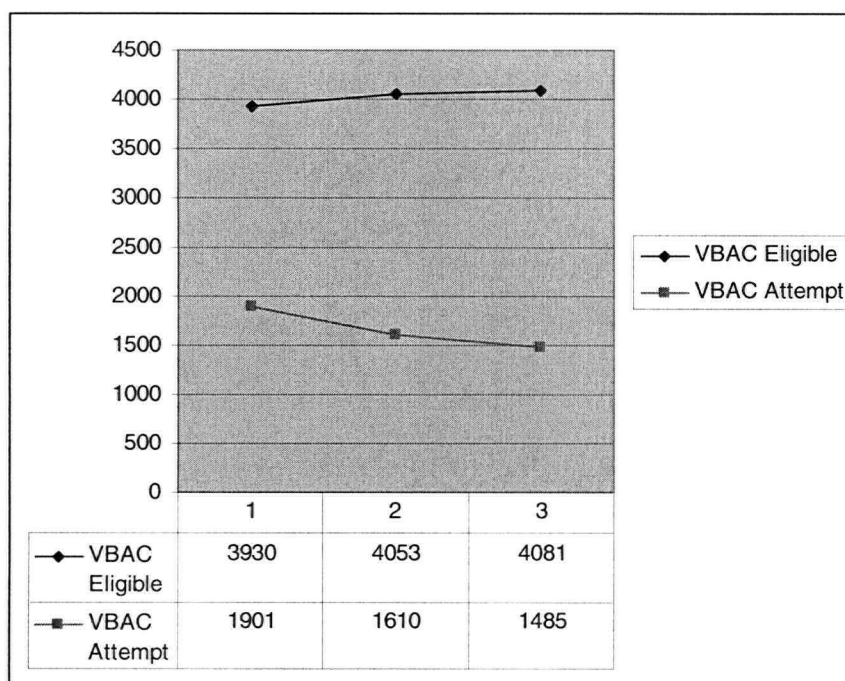
The number of women eligible for VBAC increased from April 1, 2000, to March 31, 2003. The proportion of eligible women who actually attempted VBAC decreased over the 3-year period from 48.4% in 2000/2001 to 36.4% in 2002/2003 (Table 16).

Table 16

*Rate of Attempted VBAC in Women Eligible, by Fiscal Year*

Fiscal year	Eligible VBAC	Attempted VBAC	Rate
April 1, 2000 – March 31, 2001	3,930	1,901	48.4%
April 1, 2001 – March 31, 2002	4,053	1,610	39.7%
April 1, 2002 – March 31, 2003	<u>4,081</u>	<u>1,485</u>	<u>36.4%</u>
Total	12,064	4,996	41.4%

Figure 7. Number of women VBAC eligible and VBAC attempted by fiscal year



The rate of *successful* VBAC for the 3-year period of April 1, 2000, to March 31, 2003, was 67.4% (3,368 successful of the 4,996 attempted VBAC). The annual rate of successful VBAC from April 1, 2000, to March 31, 2003, decreased slightly from 68.4% in 2000/2001 to 67.3% in 2002/2003 (Table 17).

Table 17

*Rate of Successful VBAC by Fiscal Year*

Fiscal year	Attempted VBAC	Successful VBAC	Rate
April 1, 2000 – March 31, 2001	1,901	1,302	68.4%
April 1, 2001 – March 31, 2002	1,610	1,066	66.2 %
April 1, 2002 – March 31, 2003	<u>1,485</u>	<u>1,000</u>	<u>67.3%</u>
Total	4,996	3,368	67.4%

*Rates of Oxytocin Induction and Augmentation*

2.2. What was the rate of oxytocin induction and augmentation in women attempting VBAC?

It is important to begin by determining the rate of induction by all methods for those women having attempted VBAC. From April 1, 2000, to March 31, 2003, the rate of induction with attempted VBAC decreased from 22.4% to 16% (Table 18).

Table 18

*Rate of Induction by All Methods with Attempted VBAC by Fiscal Year*

Fiscal year	Inductions of attempted VBAC	Total attempted VBACs	Rate of induction
April 1, 2000 – March 31, 2001	426	1,901	22.4%
April 1, 2001 – March 31, 2002	350	1,610	21.7%
April 1, 2002 – March 31, 2003	<u>239</u>	<u>1,485</u>	<u>16.0%</u>
Total	1,015	4,996	20.3%

From April 1, 2000, to March 31, 2003, the rate of oxytocin *induction* decreased from 11.3% to 8.7%, and the rate of oxytocin *augmentation* with VBAC decreased from 17.2% to 12.9%, and (Table 19).

Table 19

*Rate of Oxytocin Induction & Augmentation with VBAC by Fiscal Year*

Fiscal year	Inductions & augmentation	Total attempted VBACs	Rate
<b>Oxytocin Inductions</b>			
April 1, 2000 – March 31, 2001	214	1,901	11.3%
April 1, 2001 – March 31, 2002	171	1,610	10.6 %
April 1, 2002 – March 31, 2003	<u>129</u>	<u>1,485</u>	<u>8.7%</u>
Total	514	4,996	10.3%
<b>Oxytocin Augmentations</b>			
April 1, 2000 – March 31, 2001	327	1,901	17.2%
April 1, 2001 – March 31, 2002	207	1,610	12.9%
April 1, 2002 – March 31, 2003	<u>191</u>	<u>1,485</u>	<u>12.9%</u>
Total	725	4,996	14.9%

*Rates of Prostaglandin Augmentation and Induction*

2.3. Did the rate of prostaglandin induction and augmentation decrease in women attempting VBAC, consistent with guideline cautions and research published in 2001 (Lyndon-Rochelle, Holt, Easterling, & Martin, 2001)?

From April 1, 2000, to March 31, 2003, the rate of prostaglandin induction decreased from 11.4% to 4.9%, and the rate of prostaglandin augmentation decreased from 0.6% to 0.1% (Table 20).

Table 20

*Rate of Prostaglandin Induction & Augmentation with VBAC by Fiscal Year*

Fiscal year	Inductions & augmentation	Total attempted VBACs	Rate
Prostaglandin Inductions			
April 1, 2000 – March 31, 2001	216	1,901	11.4%
April 1, 2001 – March 31, 2002	153	1,610	9.5%
April 1, 2002 – March 31, 2003	<u>73</u>	<u>1,485</u>	<u>4.9%</u>
Total	432	4,996	8.7%
Prostaglandin Augmentations			
April 1, 2000 – March 31, 2001	12	1,901	0.6%
April 1, 2001 – March 31, 2002	4	1,610	0.2%
April 1, 2002 – March 31, 2003	<u>1</u>	<u>1,485</u>	<u>0.1%</u>
Total	17	4,996	0.3%

*Rates of Uterine Rupture*

2.4. Was the rate of uterine rupture in women attempting VBAC within the 0.1% – 0.5% range reported in the guideline, and how did it compare with women eligible for but not attempting VBAC?

The definition of uterine rupture is “the complete separation of the myometrium with or without extrusion of the fetal parts into the maternal peritoneal cavity requir[ing] emergency caesarean section or postpartum laparotomy” (SOGC, 2005, p.167). It is important to note, however, that the coding in the BCRC database follows the ICD-9 Diagnostic Code 665.1, which includes rupture or trauma to the uterus by instruments *and* includes uterine dehiscence. Using this definition, the incidence of uterine rupture for women attempting VBAC for the 3-year period of April 1, 2000, to March 31, 2003, was 1.4% (69/4,996 women attempting VBAC). The incidence of uterine rupture for women eligible, but *not* attempting VBAC over the same period was 0.6% (44/7,068 women eligible but not attempting VBAC). Bivariate analysis revealed that there was a 2.2

greater probability of uterine rupture in women eligible for and actually attempting VBAC, compared to those women eligible for but *not* attempting VBAC (RR= 2.2; 95% CI = 1.5-3.2).

2.5. What was the risk of uterine rupture in women attempting VBAC and having induction or augmentation, compared to those having spontaneous labour?

There was no statistical difference in the rate of uterine rupture for women attempting VBAC and having *induction* compared to those women attempting VBAC and having *spontaneous* labour (RR= 1.2; 95% CI = 0.68-2.0). Likewise, there was no statistical difference in the rate of uterine rupture for women attempting VBAC and having *augmentation*, compared to women attempting VBAC and having spontaneous labour (RR= 1.1; 95% CI = 0.68-1.7).

#### *Fetal/Newborn Outcomes*

2.6. Were fetal/newborn outcomes (1-minute Apgars 0-3 and 4-6, 5-minute Apgars 0-3 and 4-6, and intermittent positive pressure ventilation [IPPV] by mask) for women attempting VBAC comparable to outcomes for women eligible for but not attempting VBAC?

The fetal/newborn outcomes examined included the 1-minute Apgars grouped as 0-3 and 4-6, 5-minute Apgars 0-3 and 4-6, intermittent positive pressure ventilation (IPPV) by mask, and neonatal and perinatal death for the entire 3 years in the data set. The results indicate significant differences in all morbidity and mortality indicators. For IPPV by mask, infants of attempted VBAC had a 2.6 increased probability of requiring IPPV by mask, compared to those infants whose mothers were eligible for but did not attempt VBAC (RR 2.6; 95 % CI 2.3-3.1). For the 1-minute Apgar 0-3, infants of attempted VBAC had a 3.8 increased probability of having a 1-minute Apgar 0-3

compared to those infants whose mothers were eligible for but did not attempt VBAC (RR 3.8; 95 % CI 2.9-5.0). For the 1-minute Apgar 4-6, infants of attempted VBAC had a 2.5 increased probability of having a 1-minute Apgar 4-6 compared to those infants whose mothers were eligible for but did not attempt VBAC (RR 2.5; 95 % CI 2.1-2.8). For the 5-minute Apgar 0-3, infants of attempted VBAC had an 8.2 increased probability of having a 5-minute Apgar 0-3 compared to those infants whose mothers were eligible for but did not attempt VBAC (RR 8.2; 95 % CI 4.3-15.6). For the 5-minute Apgar 4-6, infants of attempted VBAC had a 2.0 increased probability of having a 5-minute Apgar 4-6 compared to those infants whose mothers were eligible for but did not attempt VBAC (RR 2.0; 95 % CI 1.4-3.0). For perinatal death, infants of attempted VBAC had a 4.9 increased probability of having a perinatal death compared to those infants whose mothers were eligible for but did not attempt VBAC (RR 4.9; 95 % CI 2.9-8.5). For stillbirth, infants of attempted VBAC had a 6.9 increased probability of having a stillbirth compared to those infants whose mothers were eligible for but did not attempt VBAC (RR 6.9; 95 % CI 3.4-14.1). For neonatal death, infants of attempted VBAC had a 3.4 increased probability of having a neonatal death compared to those infants whose mothers were eligible for but did not attempt VBAC (RR 3.4; 95 % CI 1.5-7.7) (Table 21).



Table 21

*Risk of Fetal/Newborn Morbidity & Mortality for VBAC Eligible Women Attempting VBAC vs. Not Attempting VBAC (Live Births and Stillbirths)*

	Eligible, Attempted (n = 4,996)	Eligible, Not attempted (n = 7,068)	RR	95%CI
IPPV by Mask	7.8% (390)	2.9% (207)	2.6	2.3-3.1
1 min Apgar 0-3	3.7% (183) <sup>1</sup>	1.0% (68) <sup>2</sup>	3.8	2.9-5.0
1 min Apgar 4-6	9.8% (490) <sup>3</sup>	4.0% (282) <sup>4</sup>	2.5	2.1-2.8
5 min Apgar 0-3	1.3% (64) <sup>5</sup>	0.2% (11) <sup>6</sup>	8.2	4.3-15.6
5 min Apgar 4-6	1.2% (62) <sup>7</sup>	0.6% (43) <sup>8</sup>	2.0	1.4-3.0
Perinatal Death	1.2% (60)	0.2% (17)	4.9	2.9-8.5
Stillbirth	0.9% (44)	0.1% (9)	6.9	3.4-14.1
Neonatal Death	0.4% (19)	0.1% (8)	3.4	1.5-7.7

1. denominator totals 4,981 due to missing data

2. denominator totals 7,053 due to missing data

3. denominator totals 4,981 due to missing data

4. denominator totals 7,053 due to missing data

5. denominator totals 4,984 due to missing data

6. denominator totals 7,049 due to missing data

7. denominator totals 4,984 due to missing data

8. denominator totals 7,049 due to missing data

In order to evaluate whether the poorer newborn outcomes in the attempted VBAC group may have been attributable to antenatal intrauterine death and subsequent VBAC delivery rather than caesarean section, the analysis was repeated for *live births only*, excluding stillbirths.

For IPPV by mask, infants of attempted VBAC had a 2.7 increased probability of requiring IPPV by mask, compared to those infants whose mothers were eligible for but did not attempt VBAC (RR 2.7; 95 % CI 2.3-3.2). For the 1-minute Apgar 0-3, infants of attempted VBAC had a 3.4 increased probability of having a 1-minute Apgar 0-3, compared to those infants whose mothers were eligible for but did not attempt VBAC (RR 3.4; 95 % CI 2.5-4.5). For the 1-minute Apgar 4-6, infants of attempted VBAC had a 2.5 increased probability of having a 1-minute Apgar 4-6, compared to those infants

whose mothers were eligible for but did not attempt VBAC (RR 2.5; 95 % CI 2.1-2.8).

For the 5-minute Apgar 0-3, infants of attempted VBAC had a 14.2 increased probability of having a 5-minute Apgar 0-3, compared to those infants whose mothers were eligible for but did not attempt VBAC (RR 14.2; 95 % CI 3.3-60.9). For the 5-minute Apgar 4-6, infants of attempted VBAC had a 2.0 increased probability of having a 5-minute Apgar 4-6 compared to those infants whose mothers were eligible for but did not attempt VBAC (RR 2.0; 95 % CI 1.4-3.0) (Table 22).

Table 22

*Risk of Fetal/Newborn Morbidity & Mortality for VBAC Eligible Women Attempting VBAC vs. Not Attempting VBAC, (Live Births)*

	Eligible, Attempted (n = 4,952)	Eligible, Not attempted (n = 7,059)	RR	95%CI
IPPV by Mask	7.9% (390)	2.9% (207)	2.7	2.3-3.2
1 min Apgar 0-3	2.8% (139) <sup>1</sup>	0.8% (59) <sup>2</sup>	3.4	2.5-4.5
1 min Apgar 4-6	9.9% (490) <sup>3</sup>	4.0% (282) <sup>4</sup>	2.5	2.1-2.8
5 min Apgar 0-3	0.4% (20) <sup>5</sup>	0.03% (2) <sup>6</sup>	14.2	3.3-60.9
5 min Apgar 4-6	1.3% (62) <sup>7</sup>	0.6% (43) <sup>8</sup>	2.0	1.4-3.0

1. denominator totals 4,937 due to missing data

2. denominator totals 7,044 due to missing data

3. denominator totals 4,937 due to missing data

4. denominator totals 7,044 due to missing data

5. denominator totals 4,940 due to missing data

6. denominator totals 7,040 due to missing data

7. denominator totals 4,940 due to missing data

8. denominator totals 7,040 due to missing data

### Postterm Pregnancy

This evaluation examined three questions relevant to the maternal and fetal/newborn outcomes that would be expected if practitioners had followed the Postterm Pregnancy guideline. The period for evaluation was from April 1, 2000, to

March 31, 2003 and included all live birth singleton deliveries. For the purpose of this analysis, the postterm group includes all pregnancies  $\geq 41$  completed weeks.

### *Rate of Postterm Pregnancy*

#### 3.1. Has the rate of postterm pregnancy decreased?

For the 3-year period of April 1, 2000, to March 31, 2003, the rate of pregnancy greater or equal to 41 weeks' gestational age decreased from 16.1% to 14.4% of all pregnancies (Table 23).

Table 23

#### *Gestational Age at Delivery for Live Singleton Births by Fiscal Year*

	2000-2001 (n = 38,739)	2001-2002 (n = 38,539)	2002-2003 (n = 38,356)
< 37 weeks	6.9% ( 2,694)	6.7% ( 2,583)	7.4% ( 2,824)
37-40 weeks	76.7% (29,781)	77.9% (30,016)	78.2% (30,004)
$\geq 41$ weeks	16.1% (6,264)	15.4% (5,940)	14.4% (5,528)

### *Rate of Induction for Postterm Pregnancy*

#### 3.2. What was the rate of induction for postterm pregnancy?

The rate of induction for postterm pregnancy  $\geq 41$  weeks increased from 45.4% in 2000/2001 to 50.1% in 2001/2002, and then decreased to 47.6% in 2002/2003 (Table 24).

Table 24

#### *Rate of Induction for Gestational Age at Delivery $\geq 41$ weeks*

	2000 – 2001 (n = 6,121)	2001– 2002 (n = 5,763)	2002 – 2003 (n = 5,390)
Spontaneous labour	54.6% (3,342)	49.9% (2,878)	52.4% (2,823)
Induction	45.4% (2,779)	50.1% (2,885)	47.6% (2,567)

*Fetal/Newborn Outcomes*

3.3. Were the fetal/newborn outcomes (1-minute Apgars 0-3 and 4-6, 5-minute Apgar 0-3 and 4-6, IPPV by mask, meconium, meconium aspiration, shoulder dystocia and fetal trauma) for infants born at 41 weeks comparable to those for infants born at 40 weeks?

For all fetal/newborn outcomes examined, the majority of outcomes were significantly worse for infants born at 41 weeks compared to infants born at 40 weeks. Infants born at 41 weeks had an increased probability of having a 1-minute Apgar 0-3 (RR, 1.3; 95% CI, 1.1-1.5), a 1-minute Apgar 4-6 (RR, 1.2; 95% CI, 1.1-1.3), a 5-minute Apgar 4-6 (RR, 1.3; 95% CI, 1.1-1.6), IPPV by mask (RR, 1.2; 95% CI, 1.1-1.3), thick meconium (RR, 1.3; 95% CI, 1.2-1.4), birth trauma (RR, 1.2; 95% CI, 1.0-1.4), and neonatal seizures (RR, 1.9; 95% CI, 1.1-3.1). There were no significant differences in 5-minute Apgar 0-1 (RR, 1.6; 95 % CI, 0.8-30), meconium aspiration (RR, 1.3; 95% CI, 0.99-1.6) or shoulder dystocia (RR, 1.1; 95% CI, 0.98-1.2) (Table 25).

Table 25

*Fetal/Newborn Outcomes for Women Delivering at 41 weeks vs. 40 weeks*

	41 weeks (n = 15,617)	40 weeks (n = 29,491)	RR	95% CI
1-minute Apgar 0 – 3	2.9% (455) <sup>1</sup>	2.3% (668) <sup>2</sup>	1.3	1.1- 1.4
1-minute Apgar 4 – 6	11.8% (1,835) <sup>3</sup>	10.1% (2,963) <sup>4</sup>	1.17	1.11-1.23
5-minute Apgar 0 – 3	0.1% (18) <sup>5</sup>	0.1% (21) <sup>6</sup>	1.6	0.8- 3.0
5-minute Apgar 4 – 6	1.2% (192) <sup>7</sup>	0.9% (270) <sup>8</sup>	1.3	1.1-1.6
IPPV by Mask	8.5% (1,320)	7.1% (2,099)	1.2	1.1-1.3
Thick meconium	7.5% (1,172)	5.8% (1,696)	1.3	1.2-1.4
Birth trauma	2.2% (342)	1.9% (547)	1.2	1.0-1.3
Neonatal seizures	0.2% (30)	0.1% (30)	1.9	1.1-3.1
Meconium aspiration	0.6 % (99)	0.5% (147)	1.3	0.99-1.6
Shoulder dystocia	3.0% (472)	2.7% (809)	1.1	0.98-1.2

1. denominator totals 15,593 due to missing data

2. denominator totals 29,425 due to missing data

3. denominator totals 15,593 due to missing data

4. denominator totals 29,425 due to missing data

5. denominator totals 15,583 due to missing data

6. denominator totals 29,424 due to missing data

7. denominator totals 15,583 due to missing data

8. denominator totals 29,414 due to missing data

### Induction of Labour

This evaluation examined three questions relevant to the maternal and fetal/newborn outcomes that would be expected if practitioners had followed the Induction of Labour guideline. The period for evaluation was from April 1, 2000, to March 31, 2003 and the data included all live birth singleton deliveries coded as either “spontaneous labour” or “induced labour”. There were 12,267 cases coded as “none/unknown labour”. This group would include women with elective caesarean delivery who had no labour as well as women where the labour type was unknown. This group is excluded from the analysis.

### *Rate of Induction*

#### 4.1. Was there an increase in the rate for induction of labour?

The rate of induction for the 3-year period of April 1, 2000, to March 31, 2003, was 24.4% (25,245/103,578 deliveries). The rate of induction increased from 23.3% for 2000/2001 to 25.4% in 2001/2002, and was slightly lower in 2002/2003 to 24.4%. Over all, the rates have trended upward (Table 26).

Table 26

#### *Rate of Induction by Fiscal Year*

Fiscal year	Total inductions	Total deliveries	Rate
April 1, 2000 – March 31, 2001	8,227	35,247	23.3%
April 1, 2001 – March 31, 2002	8,712	34,330	25.4%
April 1, 2002 – March 31, 2003	<u>8,306</u>	<u>34,001</u>	<u>24.4%</u>
Total	25,245	103,578	24.4%

### *Rates of Complications*

4.2. What were the rates of caesarean delivery and tetanic contractions in women with induced labour, and how did they compare with those for women with spontaneous labour?

The rate of caesarean delivery must be considered within the context of parity, as rates vary significantly between nulliparous and multiparous women. For nulliparous women with induced labour from 2000-2003, 63.3% delivered vaginally, and 36.7 % delivered by caesarean. For nulliparous women with spontaneous labour during the same time period, 79.3% delivered vaginally, and 20.7% delivered by caesarean. There was a 1.77 greater probability of having a caesarean delivery if a nulliparous woman had an induced labour versus spontaneous labour (RR, 1.77; 95% CI, 1.72-1.83) (Table 27).

Table 27

*Risk of Caesarean Section for Nulliparous Women: Induced vs. Spontaneous Labour, 2000-2003*

	Induced Labour (n = 13,625)	Spontaneous Labour (n = 35,430)	RR	95% CI
Caesarean section	36.7% (5,004)	20.7% (7,339)	1.77	1.72 - 1.83
Vaginal delivery	63.3% (8,621)	79.3% (28,091)	0.79	0.78 - 0.81

For multiparous women with induced labour from 2000-2003, 90% delivered vaginally, and 10% delivered by caesarean. For multiparous women with spontaneous labour during the same time period, 90.1% delivered vaginally, and 9.9% delivered by caesarean. These differences were not significant (RR, 1.0; 95% CI, 0.95-1.1) (Table 28).

Table 28

*Risk of Caesarean Section for Multiparous Women: Induced vs. Spontaneous Labour, 2000-2003*

	Induced Labour (n= 11,620)	Spontaneous Labour (n=42,903)	RR	95% CI
Caesarean section	10% (1,167)	9.9% (4,234)	1.0	0.95-1.1
Vaginal delivery	90% (10,453)	90.1% (38,669)	0.998	0.991-1.005

The rate of tetanic contractions was higher in the induced group for both nulliparous and multiparous women. Nulliparous women with induced labour had a 1.7 increased probability of having tetanic contractions (RR, 1.7; 95% CI, 1.4-2.1), compared to those nulliparous women with spontaneous labour. For multiparous women with induced labour, the probability of having tetanic contractions was 2.9 times greater (RR,

2.9; 95% CI, 2.2-3.9) than for multiparous women with spontaneous labour (Table 29).

For those women (nulliparous and multiparous) who were induced and developed tetanic contractions, 41.2% (98/238) delivered by caesarean section.

Table 29

*Risk of Tetanic Contractions: Induced vs. Spontaneous Labour, 2000-2003*

	Induced Labour	Spontaneous Labour	RR	95% CI
Primiparous	1.1% (155/13,625)	0.7% (235/35,430)	1.7	1.4-2.1
Multiparous	0.7% (83/11,620)	0.2% (104/42,903)	2.9	2.2-3.9

*Fetal/Newborn Outcomes*

4.3. Were fetal/newborn outcomes (1-minute Apgar 0-3 and 4-6, 5-minute Apgar 0-3 and 4-6, IPPV by mask, and shoulder dystocia) of women with induced labour comparable to those for women with spontaneous labour?

Fetal/newborn outcomes for induced labour were significantly different from outcomes for spontaneous labour. There was a 1.4 greater probability of having a 1-minute Apgar score 0-3 when labour was induced (RR, 1.4; 95%CI, 1.3-1.5). There was a 1.2 greater probability of having a 1-minute Apgar score 4-6 (RR, 1.28; 95%CI, 1.23-1.34), and a 1.3 greater probability of having a 5-minute Apgar score 4-6 when labour was induced (RR, 1.3; 95%CI, 1.2-1.5). Babies born by induction had a 1.4 greater probability of having IPPV compared to those born following spontaneous labour (RR, 1.4; 95%CI, 1.33-1.48). Babies born by induction had a 1.2 greater probability of experiencing birth trauma (RR, 1.2; 95% CI, 1.1-1.3). Shoulder dystocia was also significantly higher in the induction group (RR, 1.2; 95% CI, 1.1-1.3) (Table 30).



Table 30

*Fetal/Newborn Outcomes for Women with Induced vs. Spontaneous Labour, 2000-2003*

	Induced labour (n = 25,245)	Spontaneous labour (n = 78,333)	RR	95%CI
1-minute Apgar 0 – 3	3.2% (805) <sup>1</sup>	2.3% (1,803) <sup>2</sup>	1.4	1.3-1.5
1-minute Apgar 4 – 6	12.2% (3,085) <sup>3</sup>	9.8% (7,637) <sup>4</sup>	1.28	1.23-1.34
5-minute Apgar 0 – 3	0.3% (66) <sup>5</sup>	0.2% (167) <sup>6</sup>	1.2	0.9-1.8
5-minute Apgar 4 – 6	1.4% (356) <sup>7</sup>	1.1% (829) <sup>8</sup>	1.3	1.2-1.5
IPPV by Mask	9.4% (2,384)	6.9% (5,405)	1.40	1.34-1.48
Birth trauma	2.1% (519)	1.7% (1,356)	1.2	1.1-1.3
Shoulder dystocia	2.6% (648)	2.1% (1,660)	1.2	1.1-1.3

1. denominator totals 25,206 due to missing data

2. denominator totals 78,107 due to missing data

3. denominator totals 25,206 due to missing data

4. denominator totals 78,107 due to missing data

5. denominator totals 25,200 due to missing data

6. denominator totals 78,071 due to missing data

7. denominator totals 25,200 due to missing data

8. denominator totals 78,071 due to missing data

### Fetal Health Surveillance in Labour

This evaluation examined two questions relevant to the maternal and fetal/newborn outcomes that would be expected if practitioners had followed the Fetal Health Surveillance in Labour guideline. The period for evaluation was from April 1, 2000, to March 31, 2003 and included live, singleton deliveries.

Data collected in the BCRCP Perinatal Database for electronic fetal monitoring (EFM) were completed using electronic fetal monitoring as the data indicator, therefore, “no” monitoring meant that no monitoring was performed at all (as in the case of precipitate labour), or that intermittent auscultation (IA) was performed.

### Rate of Electronic Fetal Monitoring

5.1. Was there a decrease in the rate of use of electronic fetal monitoring in B.C.?

The overall rate of EFM use over the 3 years from April 1, 2000, to March 31,

2003, was 75.2% (87,434 of 115,845 live births). Over this 3-year period, provincial rates of EFM decreased from 79% in 2000/2001, to 75.3 % in 2001/2002, and to 72.1% in 2002/2003 (Table 31). Mothers delivering in facilities with <500 births/year had 1.5 times increased probability of avoiding EFM (10,634/16,243 or 65.5%), compared to facilities with >500 births/year where EFM rates were 76,800/99,602 or 77.1% (RR = 1.5; 95%CI = 1.47-1.55). This is to be expected, since mothers with risk factors for adverse perinatal outcome would commonly be screened and transferred to a larger centre prior to the onset of labour, and some smaller facilities would not have an electronic fetal monitor available.

Table 31

*Rate of Electronic Fetal Monitoring and Intermittent Auscultation by Fiscal Year*

Fiscal year	EFM	IA (or no EFM)	Total Deliveries
2000 – 2001	79% (30,680)	21% (8,164)	38,844
2001 – 2002	75% (29,064)	25% (9,526)	38,590
2002 – 2003	<u>72% (27,690)</u>	<u>28% (10,721)</u>	<u>38,411</u>
	75% (87,434)	24% (28,411)	115,845

*Fetal/Newborn Outcomes*

5.2. Have fetal/newborn outcomes (1-minute Apgars 0-3, 4-6, and 7-10; 5-minute Apgars 0-3, and newborn seizures) remained unchanged?

Given the evidence that there is no difference in fetal/newborn outcomes for healthy women (without risk factors for adverse perinatal events) receiving EFM vs. IA during labour, and assuming that the rate of IA increased in B.C. from 2000 to 2003 (it is highly unlikely that “no EFM” means “no monitoring at all”), one would expect to see similar outcomes between the EFM and no EFM groups, and no change in newborn

outcomes for the worse, during this 3-year period.

Over the 3 fiscal years, the rate of 1-minute Apgars scoring 0-3 decreased from 2.5% in 2000/2001, to 2.4% in 2001/2002, to 2.3% in 2002/2003. The rate of 1-minute Apgars scoring 4-6 decreased from 10.8% in 2000/2001, to 9.7% in 2001/2002, to 9.2% in 2002/2003. The rate of 1-minute Apgars scoring 7-10 increased from 86.5% in 2000/2001, to 87.6% in 2001/2002, to 88.3% in 2002/2003 (Table 32).

Table 32

*Rate of 1-Minute Apgar Scores for Live Singleton Births by Fiscal Year*

Fiscal year	0-3	4-6	7-10	n*
2000 – 2001	2.5% (962)	10.8% (4,178)	86.5% (33,603)	38,743
2001 – 2002	2.4% (941)	9.7% (3,755)	87.6% (33,791)	38,487
2002 – 2003	2.3% (894)	9.2% (3,526)	88.3% (33,912)	38,332

\* Includes live singleton births with recorded 1-minute Apgar score

While newborn Apgars provide one measure of newborn outcome, the criteria reflective of intrapartum asphyxia include a 5-minute Apgar of 0-3, newborn seizures, and a U/A pH <7.0. The rates for the 5-minute Apgar 0-3 and newborn seizures were stable over the 3-year period (Table 33). The U/A pH <7.0 was not analyzed as the numbers were too small for valid analysis.

Table 33

*Rate of Intrapartum Asphyxia for Live Singleton Births by Fiscal Year*

Indicator	2000/2001 (n = 38,844)	2001/2002 (n = 38,590)	2002/2003 (n = 38,411)
5 min. Apgar 0-3	0.20% (80)	0.20% (86)	0.20% (86)
Newborn seizures	0.17% (66)	0.15% (60)	0.15% (56)

## Singleton Term Breech

This evaluation examined three questions relevant to the maternal and fetal/newborn outcomes that would be expected if practitioners had followed the Singleton Term Breech guideline. The period for evaluation was from April 1, 2000, to March 31, 2003, and included singleton live births and stillbirths >37 weeks gestation with a breech presentation at delivery.

### *Rate of Caesarean Delivery*

6.1. What was the rate of singleton term (> 37 weeks) breech delivery by caesarean section?

For the 3-year period from 2000 to 2003, there were 3,691 breech births, of which 3,505 (95%) were delivered by caesarean and 186 (5%) were delivered vaginally. For those who delivered vaginally, 67 (36%) were nulliparous and 119 (64%) were multiparous women.

### *Fetal/Newborn Outcomes*

6.2. Did singleton term breech infants delivered by caesarean demonstrate better newborn outcomes (1-minute Apgar 0-3 and 4-6, 5-minute Apgar 0-3 and 4-6, IPPV by mask, birth trauma, perinatal death, stillbirth, and neonatal death) than those delivered vaginally?

As would be expected according to guideline recommendations, 95% of breech presentations were delivered by caesarean. For all the fetal/newborn indicators examined except 5-minute Apgar 0-3, neonatal morbidity outcomes were worse for those women who delivered vaginally. Perinatal death was also worse in the vaginal delivery group; however, the absolute number was very small. There was no significant statistical difference in stillbirth or neonatal death (Table 34).

Table 34

*Fetal/Newborn Outcomes for Singleton Term Breech*

	Vaginal (n = 186)	Caesarean (n = 3505)	RR	95%CI
1-minute Apgar 0 – 3	9.7% (18)	2.1% (74)	4.6	2.8-7.5
1-minute Apgar 4 – 6	25.3% (47)	9.2% (323)	2.7	2.1-3.6
5-minute Apgar 0 – 3	1.6% (3)	0.1% (2)	28.2	4.7-167.8
5-minute Apgar 4 – 6	3.2% (6)	0.4% (15)	7.5	2.9-19.2
IPPV by Mask	12.4% (41)	8.2% (289)	2.7	2.0-3.6
Birth Trauma	3.8% (7)	0.7% (23)	5.7	2.5-13.2
Perinatal death	1.6% (3)	1.0% (4)	14.1	3.1-62.6
Stillbirth	0.5% (1)	0% (0)	1.0	
Neonatal death	0% (0)	0.1% (3)	1.0	

## Part 2, Outcome Evaluation: Findings Summary

In this section, the analysis findings for five BCRCP guidelines utilized for outcome evaluation of the guideline program were presented. Questions for each of the guidelines were formulated based on guideline indicators and expected outcomes for specific clinical situations.

The VBAC guideline analysis showed an increase in the number of women eligible for VBAC, a decrease in attempted VBAC from 2000 to 2003, and rates of uterine rupture higher than those suggested in the guideline. Rates of oxytocin and prostaglandin augmentation and induction also decreased over the 3-year period. There were significant differences in all fetal/newborn morbidity and mortality indicators for babies born of those mothers eligible for and attempting VBAC, compared to those not attempting VBAC.

For the Postterm Pregnancy guideline, analysis indicated that the rate of postterm pregnancy  $\geq 41$  weeks decreased from 2000 to 2003. This was associated with an

increase in the rate of induction for postterm pregnancy. All fetal/newborn morbidity indicators were significantly worse for infants delivering at 41 weeks compared to 40 weeks' gestational age.

For the Induction of Labour guideline, the analysis indicated that the rates of oxytocin induction have trended upward from 2000 to 2003, consistent with historical increases in the induction rate across Canada since 1991. For nulliparous women there was a 1.77 greater probability of having a caesarean section (RR, 1.77; 95% CI, 1.72-1.83) if labour was induced. There was no difference for multiparous women. The risk of tetanic contractions was also significantly higher when labour was induced. All fetal/newborn morbidity indicators were significantly worse with induced labour.

For the Fetal Health Surveillance in Labour guideline, the analysis indicated that the use of electronic fetal monitoring decreased from 2000 to 2003, but it is not known whether the use of intermittent auscultation increased as "no electronic monitoring" was used for coding purposes. Nevertheless, newborn outcomes measured by the 1-minute Apgar improved from 2000 to 2003. There was no difference over time in indicators measuring intrapartum asphyxia.

Analysis of the Singleton Term Breech guideline indicated that 95% of singleton term breech infants were delivered by caesarean section from 2000 to 2003. The infants delivered by vaginal delivery had significantly worse morbidity outcomes than those delivered by caesarean, but no significant difference in stillbirth or neonatal mortality.

## CHAPTER FIVE: DISCUSSION OF FINDINGS

The following discussion of the study findings is in two parts. In the first part, the findings of the survey results are presented in the context of the existing literature and current issues in clinical practice related to guideline use. In the second part, the findings of the outcome evaluation for individual guidelines are presented in the context of the guideline itself and current issues related to clinical practice. For each of the guidelines analyzed, the user response rates identified in the survey are presented.

### Part 1, Process Evaluation: Discussion of Findings

#### *Response Rate*

Three hundred and thirteen of 1,206 surveys were completed and returned for an overall response rate of 26%. Thirty three percent of the respondents were hospital nurses, 23% were physicians, 18% were community health nurses, 17% were managers, and 8% were midwives. The overall response rate for the survey was low (26%), and was lowest among the physician group (19%). It is possible that some physicians who should have received a survey did not because of the distribution method, and this may have contributed to the low response rate.

It is likely that those practitioners who responded by returning a completed survey did so because they already had established positive attitudes towards guidelines (characteristic of early adopters) and therefore saw some utility in participating in the survey. This may have created a systematic bias in the results, evidenced by the fact that the majority of survey items for attitudes reflected predominantly positive attitudes. While these findings are valuable, it must be emphasized that this study is based on the responses of those who volunteered to respond rather than a representative sample of practitioners from each of the professional designations.

### *Level of Awareness and Attitudes towards BCRCP Perinatal Guidelines*

This study is the first to systematically evaluate the level of awareness and attitudes of health care practitioners towards BCRCP clinical practice guidelines. The level of awareness of the BCRCP Guideline manual was high among the 313 respondents, with 287 (92%) aware of the manual, and 187 (60%) aware of guidelines on the BCRCP website. While 92% of survey respondents were aware of the manual, 95% of respondents indicated that they were “eager to use new guidelines” or “discussed” guidelines prior to implementing them into their practice, reflecting behaviour characteristic of leaders and early adopters (Rogers, 1995). Only 5% indicated that they would “wait until the guideline was well entrenched,” reflecting behaviour characteristic of the late majority or laggards. According to Rogers, approximately 50% of the population are leaders, such as the innovators, early adopters, and the early majority, and the other 50% are the late majority and laggards. If the survey respondents were truly representative of the total population, it would be expected that approximately 50% would perceive themselves as early adopters and leaders, and approximately 50% would classify themselves as the late majority or laggards. Because those practitioners already considered “leaders” in the perinatal field are more likely to have chosen to complete and return a survey, there may be systematic bias in the survey results. These early adopters were not only aware of the guidelines, but also already had positive attitudes established towards them. The late majority or laggards may not have completed the survey for a number of reasons. It is possible they were not aware of the guidelines, or did not deem them important enough to spend time completing the questionnaire, e.g., they may have reached the persuasion stage of the innovation-decision process without formulating positive attitudes towards guidelines and/or the change process. The preponderance of



“early adopters” in the survey responses (95%) may explain why a majority of survey items for attitudes towards guidelines demonstrated a skewed distribution, reflecting predominantly positive attitudes.

While 92% of practitioners were aware of the manual, there was a 1.2 greater probability of hospital nurses, community health nurses, and managers being aware of the hard-copy manual, compared to the primary practitioners (midwives and doctors) (RR = 1.2, 95% CI = 1.1 -1.3). These findings are not consistent with those in the literature. Two studies, both conducted in Australia, examined the awareness and use of guidelines between interdisciplinary groups (Brand et al., 2005; Scott, Buckmaster, & Harvey, 2003). Brand et al. surveyed nurses and physicians at the Melbourne Health Service and received 183 responses. They found that nurses were twice as likely as medical staff to be aware of general clinical practice guidelines, but in this sample this finding was not statistically significant (OR = 2.09, 95% CI 0.88-4.01). Scott et al. received 216 responses in a survey of medical and nursing staff at 19 public hospitals in Queensland and found no interdisciplinary differences in guideline awareness and use.

In the current study, 82% of the nursing group indicated that they became aware of the guidelines through use of the facility copy of the manual, whereas only 52% of primary practitioners indicated this. These findings are consistent with those of Scott et al. (2003), who noted that nurses became aware of the facility copy through ward orientation and were more likely to use facility copy guidelines than physicians, who tended to use national or international guidelines. Brand et al. (2005) also found that nurses expressed the need for a hard copy of guidelines because they often lacked access to computer terminals. Clearly these findings have implications for the development of future implementation strategies that are effective for both professional groups.

Question 13 on the survey instrument asked respondents to indicate their degree of agreement or disagreement with 20 items regarding attitudes towards current guidelines. The majority of these items had a distribution skewed left (strongly agree), as the majority of responses were in the upper bounds of the item scores. Again, this may be because those practitioners who chose to complete and return the surveys did so because they already had established positive attitudes towards guidelines, and this may have created some systematic bias in the study results. The majority of respondent practitioners agreed that BCRCP guidelines provide practice knowledge for particular situations, provide interdisciplinary guidance, provide judgments for specific clinical situations, provide guidance in controversial areas of practice, decrease opportunity for variance, are readily available, are based on current evidence, and are based on expert opinion when evidence is not available. It is apparent from these results that the BCRCP Guideline Program objectives of (a) providing a measure of knowledge, skills, attitudes, and judgments required to practice safely in given situations, and (b) providing guidance to the appropriate interdisciplinary care providers, have been met within the context of this study sample.

In three items related to professional autonomy, statistically significant differences were identified between the nurse group and the primary practitioner group. The nurses believed more strongly that guidelines lead to best practice outcomes and allow enough flexibility for independent decision making, while the primary practitioners stated that recommendations sometimes fail to reflect their beliefs. These findings may reflect a certain sensitivity within the medical community about guidelines leading to a possible reduction in clinical freedom and practitioner autonomy, as reported by Berg (1997) and Harrison and Ahmad (2000). Despite these differences between practitioner

groups, all practitioners disagreed with the statement that guidelines were too prescriptive, and strongly disagreed with the statement that they “do not use guidelines because they don’t like them.”

Respondent practitioners indicated agreement with the idea that guidelines decrease medical-legal risk. While medical malpractice attorneys may debate this supposition, there is some evidence to suggest that guidelines have lowered malpractice suits in the U.S. When anesthesiologists in Massachusetts, Colorado, and Utah agreed to follow guidelines for intraoperative monitoring, malpractice claims for hypoxic injuries decreased substantially (Crane, 1994; Eichhorn 1989). There is no apparent evidence that guidelines have lowered medical malpractice claims in Canada, but practitioners may nevertheless feel some medical-legal protection when they are practicing according to accepted guideline standards. B.C. courts have used BCRCPP guidelines as the accepted standard of care in medical malpractice proceedings where facility policies and procedures were found to be outdated.

#### *Practitioner Use of BCRCPP Guidelines*

According to the survey, overall practitioner use of the guidelines was high, with 54% of respondents considering themselves as “users” of guidelines in that they referred to guidelines every one to three months, and 46% of respondents considering themselves as “non-users” of guidelines in that they referred to guidelines either occasionally (every 3-12 months), or never.

Practitioner use of BCRCPP guidelines varied among the professional groups. The managers demonstrated the most frequent use (42% used guidelines monthly), followed by the hospital nurses (27% used guidelines monthly), and the midwives (14% used guidelines monthly). Only 8% of community health nurses used guidelines monthly. This

may reflect the acute focus of many guidelines and their lack of relevance for this particular group of nurses. Only 3% of doctors used guidelines monthly. The lower usage among the physicians may reflect their lower level of awareness.

The BCRCP Perinatal Guideline manual index was included in the survey and respondents were asked to indicate for each individual guideline whether they had used it within the past 3 years, were aware of the guideline but had never used it, or were not aware of it at all. Each guideline group (e.g., obstetric, newborn, etc.) was then rank-ordered according to frequency of use over the past 3 years. This item provided the investigator with knowledge of the most frequently used guidelines, as well as groups of guidelines. The guidelines with the highest usage ( $\geq 60\%$  used them within the past 3 years) were those where clinical management is controversial, such as Induction of Labour, Group B Streptococcus, Hypertension in Pregnancy, and Newborn Jaundice. Those guidelines with lower usage ( $< 50\%$  used them within the past 3 years) may not be applicable for interdisciplinary use, e.g., Pain Management in Labour or Management of Extreme Prematurity. Practitioners may also be using resources other than BCRCP guidelines to access information. For example, Health Canada guidelines on folic acid supplement for women of childbearing age are easily available. Some groups of guidelines had low usage, such as the Perinatal Mortality guidelines, where overall use was less than 20% for the past 3 years. This group of guidelines may not be an appropriate topic for general guidelines and may be better disseminated and implemented through other avenues, such as direct communication with Perinatal Review Committees across B.C.

Use of the BCRCP Perinatal Guideline manual over the past 3 years was also analyzed according to professional designation. It was deemed important to determine

which guidelines were used most frequently by each professional group in order to determine gaps in usage where use would be expected, and to plan effective implementation strategies for the future. Some guidelines, e.g., Hypertension in Pregnancy and Group B Streptococcus, showed high usage (> 50%) across all professional groups, while others showed higher use in specific professional domains, e.g., Breastfeeding the Term Infant and Jaundice in the Healthy Term Newborn showed the highest use among the community health nurses. These findings suggest that the program goal that guidelines “be applicable to the appropriate practice setting, e.g., hospital, office, or community” has been met to some extent. It is important to note however, that specific user “targets” do not appear to exist within the BCRCPP Guideline Program. Determining the “ideal” user rate for specific guidelines was therefore difficult.

This information on individual guideline use will assist in determining ideal user rates in the future, and in directing future guideline implementation strategies targeted towards specific professional groups. The information will also help to clarify which guidelines might be eliminated because of low usage among all professionals and in consideration of accessibility to other resources. This information is specifically relevant to the future planning of program guidelines and may assist other provincial reproductive care programs in Canada in determining priorities for guideline development in the face of limited resources.

*Alignment of Facility Policies/Procedures/Quality Assurance Programs  
with BCRCPP Perinatal Guidelines*

It is apparent that the majority of facilities where respondents work have aligned their organizational policies and procedures with BCRCPP guidelines. Ninety three percent of respondents indicated that the policies in the facility where they work

generally reflect the content of the BCRCP guidelines, and 67% of the managers indicated that the facility where they work has a process in place for the adoption of practice guidelines into facility policies and procedures. Thirty five percent of the managers indicated that guidelines had been utilized in quality management strategies in the facility where they work. These results suggest that the BCRCP Guideline Program objective of “facilitating policy development by facilities/stakeholders” has been met to some degree.

These findings are consistent with those of Scott et al. (2003), who examined guideline use in 19 public hospitals in Queensland, Australia. Two thirds (67%) of their 216 respondents indicated that guidelines were used in their clinical area and 80% indicated that guidelines were used to develop clinical protocols; 63% indicated that guidelines were used to develop policies; and 56% indicated that guidelines were used to develop clinical pathways. In Scott et al.’s study statistical comparison was not available to determine whether a significant relationship existed between facility incorporation of guidelines into policies and guideline use.

Research findings have repeatedly identified administrative support as an important factor influencing research utilization (Champion & Leach, 1989; Hatcher & Tranmer, 1997; Mulhall, 1995; Parahoo, 2000; Pettengill, Gillies, & Clark 1994; Webb & Mackenzie, 1993). In the study conducted by Brand et al. (2005), the investigators concluded that the Melbourne Health Service required improved incorporation of general guideline development and maintenance into formal quality frameworks, as nursing staff identified lack of integration as a barrier to guideline use. Borkowski and Allen (2003) also found that administrative support was required for effective guideline use. After surveying 169 physicians about their attitudes towards guidelines, Borkowski and Allen

recommended that healthcare administrators encourage physician participation in the guideline decision-making process and provide feedback to physicians on patient outcomes to demonstrate that the standard of care had improved. This recommendation describes the quality assurance process and emphasizes the need for guidelines to be formally incorporated into facility processes to achieve physician buy-in and maximum effectiveness.

*Factors that Facilitate or Inhibit Use of Guidelines  
at the Individual or Facility Level*

Three predictors of guideline use were identified in this study, including guidelines being readily available, self-perception of practitioners regarding their uptake of new information, and time to read guidelines. First, the results indicate that the odds of guidelines being used increase by 7.8. These findings parallel those of Scott et al. (2003), in which 87% of the 216 survey respondents identified the inability to find or access existing guidelines when they needed them as one of the greatest impediments to guideline use. Brand et al. (2005) also reported that 37% of survey respondents identified difficulty locating a guideline, or poor indexing, as barriers to guideline use. These findings, in combination with the findings that facility nurses tend to rely heavily on facility hard copies of the guidelines manual, make it incumbent on the BCRCF to ensure that an adequate number of manuals have been distributed to all perinatal facilities around B.C. and to check that each facility has an effective process in place for updating their manuals. This is particularly relevant for those facilities with < 500 births/year, given the survey finding that they were 2.7 times more likely not to have guidelines readily available compared to those facilities with > 500 births/year.

Another predictor of guideline use found in this study was practitioners' self-

perception(s) regarding their uptake of new information. Those who perceived themselves as eager to use new or revised guidelines (innovators and early adopters) had a 3.2-fold greater chance of using guidelines than those who perceived themselves as preferring to observe a new or revised guideline and discuss it with their colleagues before implementing it into clinical practice. This observation is significant, as it emphasises the importance of identifying provincial opinion leaders and establishing a network with them to facilitate guideline implementation.

A third factor identified as a predictor variable to guideline use was the time available to read guidelines. Lacking the time to read guidelines is well identified in the literature as a factor inhibiting guideline use. In a study conducted in Glasgow, O'Donnell (2004) compiled data from 289 surveys exploring attitudes across interdisciplinary groups towards use of evidence in clinical practice. While all professional groups (nursing, medicine, and pharmacists) supported evidence-based practice, they also identified lack of time as the greatest barrier to implementing evidence-based practice (72% of respondents). Conversely, they identified having protected time to keep abreast of the evidence as the greatest facilitator for guideline use. Other researchers have also cited lack of time as a barrier to effective guideline implementation (Parahoo, 2000; Pettengill et al., 1994; Scott et al., 2003; Webb & Mackenzie, 1993).

In addition to the three predictor variables facilitating guideline use listed above, various other barriers and facilitating factors were identified in the narrative report, the majority of which were organizational in nature. These included time limitations around reading guidelines due to the business of the unit or facility, lack of cooperation among practitioners to follow guideline recommendations, the guideline binder not being readily



available for use or being ungainly for urgent clinical situations, and a lack of resources to follow guideline recommendations. Organizational support is recognized in the literature as an important element in achieving successful guideline dissemination and implementation (Bradley et al., 2001). Given these findings, and given its role as a provincial organization, it would seem that the BCRCP has an ideal opportunity to assist individual facilities in promoting an environment and infrastructure that support and enhance guideline utilization. The BCRCP could assist individual facilities in identifying both the barriers and facilitators that they may have in place, and then to develop strategies that minimize the barriers to and maximize the facilitating factors for guideline use.

*Hospital Size and Influence on Attitudes, Awareness, Alignment of  
Facility Policies and Procedures, and Facilitators and Barriers*

It is important to consider the potential impact of hospital size on guideline use, as there is evidence that rural facilities providing obstetrical care have unique needs (Kornelsen & Grzybowski, 2005; SOGC, 1998). The BCRCP's philosophy has always been that expectations for a standard of care should not vary between facilities of different sizes. For example, a woman having an induction of labour in a facility with < 500 births/year should theoretically receive the same quality of care as she would if delivering in a facility with > 500 births/year. Given actual differences in facility resources, however, she should also be informed in advance of potential limitations in her locale, such as lack of operating room facilities, so that she can make an informed choice about delivering locally or in a larger community. BCRCP guidelines were developed to be applicable to all practitioners and all facilities, within reason.

Two variables demonstrated significant relationships between guideline use and

facility size. Facilities with < 500 births/year showed a 2.4 greater probability of not adopting guidelines into their policies and procedures (RR = 2.4; 95% CI = 1.25-4.73), compared to facilities with > 500 births/year. Also, facilities with < 500 births/year were 2.7 times more likely not to have guidelines readily available compared to facilities with > 500 births/year (RR = 2.7; 95% CI = 1.07-4.47), even though hard copies of the guidelines are sent to all facilities in B.C. with planned maternal-child care services. These findings suggest that the problem of accessibility to guidelines as a barrier to guideline use is more prevalent in facilities with < 500 births/year. Despite these findings, however, there was no statistically significant difference between users and non-users of guidelines based on facility size (OR = 1.3; 95% CI = .77 – 2.2).

Scott et al. (2003) examined guideline use in Queensland, Australia, based on the type of hospital. They categorized the study facilities as general hospitals, tertiary hospitals, or district hospitals. They found that guideline use was greatest in general hospitals (75%; 80/107), less in tertiary hospitals (60%; 49/82), and least in district hospitals (56%; 15/27). Scott et al. did not control for hospital size when analyzing facilitators and barriers to guideline use, and consequently it is not known what factors were associated with less use in the district hospitals. However, their recommendations suggested that standards of care might need to be codified in general hospitals where there is a lack of specialist consultants. They also suggested that some facilities might require guidelines for more common conditions, unnecessary in larger facilities, in order to promote familiarity with current best practice.

The findings indicating that facilities with < 500 births/year have a significantly greater chance of not adopting guidelines into their policies and procedures, and a significantly greater chance of not having guidelines readily accessible, are cause for

concern. It is incumbent upon the BCRCP to ensure that all facilities in the province have equal access to BCRCP resources. Although those facilities with < 500 births/year account for only 14% (5,399 of 39,886 births, 2002/2003) of the total births in the province, it is clearly just as important that resources be readily available to care providers in those facilities as it is for care providers in facilities with >500 births/year.

### *Suggested Changes to the BCRCP Guideline Program for the Future*

This section provides a basic summary of the findings regarding suggested future changes for the BCRCP guideline Program. The items addressing the suggested changes to the guideline format were adopted from the AGREE instrument, which is an internationally respected and valid tool for evaluating the rigor of evidence-based clinical practice guidelines. Clearly, practitioners desire guidelines that are easy to use. An ideal format would include easily identifiable key recommendations linked to graded evidence, a summary quick reference page, and use of clinical decision trees or algorithms. This formatting is supported by Scott et al. (2003), who suggested that more effort should be put into making guidelines more user-friendly by including key recommendation summaries, incorporating graded evidence into recommendations, and using quick reference visual formats such as algorithms.

The current study found the almost unanimous opinion that guidelines should remain multidisciplinary. The challenge for the future will be to maintain an interdisciplinary focus while simultaneously meeting the individual needs of various professional groups. Effective strategies to attain this goal will need to be explored.

### Part 2, Outcome Evaluation: Discussion of Findings

The BCRCP Guideline Program's ultimate goals are acceptable maternal and newborn morbidity and mortality as compared to benchmark data, if available. However,

the comparison of provincial maternal and newborn morbidity and mortality with benchmark data was somewhat problematic, since very few benchmark figures appear to exist. Benchmark indicators were not obtainable from the Society of Obstetricians and Gynaecologists of Canada; indeed, to date few benchmarks have actually been identified. For instance, the acceptable rate of induction of labour for primigravidas, acceptable caesarean delivery rates, and acceptable rates of small-for-gestational-age infants are not currently known. Consequently the ability to compare actual outcomes with desired outcomes was severely limited.

#### Vaginal Birth after Previous Caesarean Discussion

The VBAC guideline was reviewed and research questions were developed based on maternal and fetal/newborn outcomes expected if the guideline had been followed. Five areas for evaluation were identified, based on evidence and recommendations stated in the guideline, and considering data indicators available to the researcher.

#### *Rates of Eligible, Attempted and Successful VBAC*

The number of women eligible for VBAC increased steadily over the 3-year evaluation period, while the number of total births in B.C. decreased over the same period. The increasing number of women eligible for VBAC reflects the increasing trend in caesarean delivery rates, which have gone from 23.9% of all births in 2000-2001, to 27.3% of all births in 2002-2003.

The Vaginal Birth after Previous Caesarean Birth guideline states that the success rate for labour and vaginal delivery (successful VBAC) following previous caesarean section will vary from 50% to 80% (i.e., the percentage of women with a previous caesarean birth who attempt labour *and* deliver vaginally). Numerous reports attesting to the safety of labour and VBAC have been published over the past 30 years (Bilodeau,

1993; Cowan, Kinch, Ellis, & Anderson, 1994; Miller, Diaz, & Paul, 1994; Videla, Satin, Barth, & Hankins, 1995). The SOGC states "Hospital perinatal committees should review these guidelines and promote VBAC" (SOGC, 1997, p. 1). Accordingly, one would expect the rate of attempted VBAC to increase over the 3-year period from April 1, 2000, to March 31, 2003, were attempts made to promote VBAC.

While the trend in the rate of attempted VBAC as a percentage of those women eligible for VBAC would be expected to increase if the guideline were being followed, rates actually decreased over the 3-year period. This trend may reflect changes in clinical practice regarding VBAC. The guideline clearly specifies that sufficient back-up operating facilities must be in place for VBAC to be safely attempted, and the current lack of availability of human resources, such as 24-hour coverage for anesthesia, a surgeon to perform an emergency caesarean section, and operating theatre nursing staff, may have decreased the ability of facilities in B.C. to offer VBAC. Furthermore, in 2000-2002, evidence was published outlining the risks of perinatal mortality and morbidity with uterine rupture (Bujold & Gauthier, 2002; Mozurkewich & Hutton, 2000). It is possible that physicians prefer not to risk offering VBAC because of medical-legal concerns, or it may be that women are choosing elective repeat caesarean section based on information and current evidence outlining VBAC risks.

#### *Rates of Oxytocin Induction and Augmentation*

The Vaginal Birth after Previous Caesarean Birth guideline states that although augmentation and induction of labour with oxytocin is not contraindicated with one previous caesarean, it must be carefully considered and monitored. The guideline further states that augmentation with oxytocin should be undertaken only when an immediate response to emergency events requiring caesarean section can be mounted, and that

oxytocin induction should only occur within a hospital setting. In view of these precautionary notes, one would expect that the rate of oxytocin augmentation and induction would remain relatively constant as long as emergency back-up services remained available.

The use of oxytocin augmentation and induction with VBAC decreased over the 3-year period. The lower rates of oxytocin use may reflect the limited availability of resources needed for safe oxytocin use. Also, women may be opting not to receive oxytocin and physicians may prefer not to offer it as an alternative, given the controversy in the literature regarding the risk of uterine rupture when oxytocin is used. Practice tends to err on the side of caution, as reflected in the decreased use of oxytocin induction and augmentation over the 3-year period.

#### *Rates of Prostaglandin Augmentation and Induction*

The Vaginal Birth after Previous Caesarean Birth guideline states that the safety of prostaglandin gel use with previous low-segment sections has not been clearly established and that further research is required. Where prostaglandin is to be used, women must first be informed of the limitations of knowledge in this area, and back-up emergency resources must be available.

Following publication of the guideline, key research evidence was published in 2001 in the *New England Journal of Medicine* (Lyndon-Rochelle, Holt, Easterling, & Martin, 2001) indicating the increased risk of uterine rupture with the use of prostaglandin gel induction (RR, 15.6; 95% CI, 8.1-30.0). Given the wide circulation of this information, one would expect to see a resulting decrease in the use of prostaglandin augmentation/induction.

From April 1, 2000, to March 31, 2003, the rate of prostaglandin augmentation and induction decreased from 0.6% to 0.1%, and the rate of prostaglandin induction decreased from 11.5% to 5.0%. The decreased use of prostaglandin gel use reflects a change in clinical practice based on the research published in the *New England Journal of Medicine*, cited above. Although the VBAC guideline already contained a cautionary note regarding prostaglandin use, it was not until definitive evidence was published that clinical practice was affected and the use of prostaglandin gel with VBAC actually subsided.

#### *Rates of Uterine Rupture*

The Vaginal Birth after Previous Caesarean Birth guideline states that the reported rate of scar dehiscence, an opening of a scar without maternal or fetal consequences, is 0.5%, and the rate of maternal uterine rupture with hemorrhage and fetal compromise or death is 0.1%. One would expect the rate of uterine rupture for women undergoing VBAC in B.C. between April 1, 2000, and March 31, 2003, to be comparable with the rates quoted in the guideline.

In fact, the incidence of uterine rupture with VBAC for the 3-year period (1.4%) is considerably higher than that stated in the guideline (0.5% dehiscence without fetal consequences to 0.1% for uterine rupture with fetal compromise or death). The variance in rates may be due to differences in definition that affect coding practices. Uterine rupture is coded as such in the BCRC database if the physician indicates on the chart that a rupture occurred. The rupture may only have been a dehiscence, so caution must be exercised when comparing provincial rates to expected norms stated in the literature. It is also possible that the rates of uterine rupture quoted in the guideline are inaccurate. In the new SOGC guideline on VBAC published in February 2005 (SOGC, 2005), the rates of

uterine rupture for a previous transverse lower uterine segment incision is 0.2%-1.5%. Regardless of the differences in definitions and coding practices, the rate of uterine rupture was 2.2 times higher for women eligible for and attempting VBAC than for women eligible and not attempting VBAC, although the absolute risk remains very low. There was no statistical difference in the risk of rupture for women attempting VBAC having induced labour compared to those attempting VBAC and having spontaneous labour. These findings suggest that inductions with VBAC are undertaken with some caution in B.C.

#### *Fetal/Newborn Outcomes*

In terms of fetal/newborn outcomes, the Vaginal Birth after Previous Caesarean Birth guideline states that overall fetal outcomes compare favorably with those associated with uncomplicated pregnancy. However no guidance is proffered for expected fetal outcomes for attempted VBAC vs. no attempted VBAC in eligible women. All newborn morbidity and mortality indicators demonstrated significantly worse outcomes for newborns of women attempting VBAC, compared to newborns of women eligible for and not attempting VBAC. However, these findings must be interpreted with caution considering that 3% of VBAC eligible births were missing data on 1 and 5-minute Apgar scores. Considering that rarity of these outcomes, the missing cases could feasibly reduce the relative risk of a particular indicator to a non-significant level, depending into which category they fell. Despite the limitations implied by missing data, these findings are cause for clinical concern. The direction of differences in rates of perinatal morbidity and mortality indicators were in favor of elective caesarean delivery for all women eligible for VBAC, and these findings were repeated when the data were restricted to only those women who had live births. Despite the small absolute number of cases that have poor



outcomes, the findings should be further investigated and attempts should be made to retrieve the missing data to allow for accurate analysis and interpretation.

*Practitioner Response Rates for the VBAC Guideline*

Fifty nine percent of all respondent practitioners indicated that they had used the VBAC guideline within the past 3 years, 31% indicated that they were aware of it but had never used it, and 10% indicated that they were not aware of it. By professional designation, the highest-use group was the midwives (91% had used the guideline within the past 3 years), followed by the hospital nurses (69%), the managers (59%), the physicians (57%), and the community health nurses (23%). While it is not surprising that the community health nurses rarely utilized this particular guideline, it is alarming that physician and manager use was so low. While it is not possible to correlate clinical outcomes with practitioner use of the guideline in this study, the examination of outcome data following a province-wide active implementation of the VBAC guideline and its connections to evidence of greater use in the clinical area would surely be justified.

Part 2, Outcome Evaluation: Postterm Pregnancy Discussion

*Rate of Postterm Pregnancy and Rate of Induction for Postterm Pregnancy*

Study findings indicated that the rate of postterm pregnancy decreased from 16.1% to 14.4% of all live births during the period 2000-2003, while the rate of induction for postterm pregnancy increased over the same period, from 45.4% in 2000/2001 to 47.6% in 2002/2003. This is likely due to the reluctance to let pregnancies progress much past 41 3/7 completed weeks. In practice, many inductions are performed at term (37-40 weeks) for the indication of "postterm." For the 3-year period of this study, 19.4% of inductions (2,985/15,380) were performed between 37-40 weeks for the indication of "postterm," and it is apparent that the number of deliveries in this gestational age group

increased from 2000 to 2003. Both of these factors likely contributed to the decreasing rate of pregnancies  $\geq 41$  weeks over the 3-year period.

#### *Fetal/Newborn Outcomes*

While the guideline indicates that gestational age beyond 42 weeks is associated with a higher risk of perinatal mortality and morbidity, it is apparent that perinatal morbidity is higher at 41 weeks (consistent with current literature), compared to 40 weeks. Infants born at 41 weeks had an increased probability of having a 1-minute Apgar 0-3, a 1-minute Apgar 4-6, IPPV by mask, thick meconium, birth trauma, and neonatal seizures. However, these findings should be interpreted with caution, given the possible effects of missing data. In some categories cases were missing, and depending into which category they fell, these could feasibly reduce the relative risk of a particular indicator to a non-significant level. Despite this limitation and findings of statistical significance, the clinical importance may be only marginal, considering that very large numbers of women would need to be induced at 40 weeks to avoid the increased perinatal morbidity apparent at 41 weeks. Induction poses its own set of potential morbidity complications, such as increased risk of caesarean section and sequelae.

#### *Practitioner Response Rates for the Postterm Labour Guideline*

Fifty two percent of all practitioners indicated that they had used the Postterm Labour guideline within the past 3 years, 34% indicated that they were aware of it but had never used it, and 14% indicated that they were not aware of it. The highest-use group was the midwives, followed by the hospital nurses, the physicians, the managers, and the community health nurses. While the low use of the guideline overall is somewhat troubling, it is understandable given that the BCRCP guideline had become outdated and was superseded by the SOGC guideline. It is of critical importance that the guideline

program is kept up to date, both from a resource perspective and from a medical-legal perspective.

## Part 2, Outcome Evaluation: Induction of Labour Discussion

The outcomes examined for the Induction of Labour guideline were derived from the risks listed in the guideline, including increased risk of caesarean delivery and hyperstimulation of the uterus. Since no fetal/newborn risks were listed in the guideline, one may assume that fetal/newborn outcomes for induced labour should be comparable to those for spontaneous labour.

### *Rate of Induction of Labour*

The rate of induction in B.C. was 23.3% of total births in 2000/2001, 25.4% in 2001/2002, and 24.4% in 2002/2003. The increase in the rate of induction in B.C. is consistent with Canadian Institute of Health Information (CIHI) data indicating that the rate for induction in Canada has increased steadily from 1991 (12.9%) to 2000 (27.2%) (Health Canada, 2003). This increase is cause for concern, given the rate of complications associated with induction, particularly caesarean section for nulliparous women. Reasons for this increase may include more inductions being performed to prevent postterm pregnancy and fear of medical litigation. To determine the exact reasons, a detailed analysis of the primary indication of induction would need to be conducted.

### *Rates of Complications*

There was a 1.8 greater probability of a nulliparous woman having a caesarean delivery if she had an induced labour. This statistic is disturbing not only because of the increased maternal morbidity associated with caesarean delivery, but also because of the increased risk of entering a future pregnancy with a scarred uterus. The reasons for the high caesarean rate need to be investigated further, as do the methods employed for

induction and the use of cervical ripening agents prior to induction. The indications for induction should also be investigated considering that the categories of “other” and “maternal condition” have increased steadily over the past 3 years. More explicit categories may be required for coding purposes to determine why more inductions are being performed.

The increase in tetanic contractions suggests either sensitivity to, or aggressive use of, induction agents. This too is cause for concern, considering the risk of intrapartum asphyxia and the rate of caesarean delivery (41.2%) for mothers with tetanic contractions. The appropriate use of induction agents needs to be emphasized so that this complication can be avoided in clinical practice.

#### *Fetal/Newborn Outcomes*

Significant differences in adverse newborn outcomes between induced labour and spontaneous labour are apparent. Once again, however, the findings should be interpreted with caution considering the possible effects of missing data. In some categories cases were missing, and, depending into which category they fell, they could feasibly reduce the relative risk of a particular indicator to a non-significant level. Nevertheless, the findings warrant comment. First, there are no fetal/newborn risks indicated in the guideline, suggesting that there should not be any differences in outcome(s).

Consequently practitioners relying on the guideline to inform their patients of relative risks are not providing an opportunity for informed maternal consent. Second, babies born of induction are by definition at higher risk, given that there must be some indication (either fetal or maternal) to induce labour, and this automatically places them in a higher-risk category. For example, it would be expected that babies induced postterm would have a higher incidence of birth trauma and shoulder dystocia because they are

generally larger infants. It is difficult to determine from these data if there are inherent differences in the population, or if inductions are being conducted in such a way that they are compromising the well being of newborns, as reflected in the fetal/newborn outcome data. This aspect of outcome evaluation clearly warrants deeper scrutiny.

*Practitioner Response Rates for the Induction of Labour Guideline*

Sixty one percent of all respondent practitioners indicated that they had used the Induction of Labour guideline within the past 3 years, 28% indicated that they were aware of it but had never used it, and 11% indicated that they were not aware of it. By professional designation, the highest-use group was the midwives, followed by the hospital nurses, the physicians, the managers, and the community health nurses. Consistent with the findings on use of the VBAC guideline, the low use of the Induction guideline among physicians and managers is cause for concern. Managers have the opportunity to influence clinical practice and support guideline implementation among nursing staff. If manager use of guidelines is low, the opportunity to provide administrative support for guideline implementation is lost. Given the high rate of complications associated with induction (such as the high caesarean delivery rate in nulliparous women) and low guideline use among physicians and managers, one wonders whether population outcomes might be improved in conjunction with an active, province-wide program targeting guideline implementation.

Part 2, Outcome Evaluation: Fetal Health Surveillance in Labour Discussion

*Rate of Electronic Fetal Monitoring*

The decreasing use of EFM is very encouraging, assuming that the increase in the “no EFM” group is due to an increase in the use of intermittent auscultation rather than the absence of any monitoring at all. Logic suggests that the rate of IA has increased and

the rate of EFM decreased, so this would indicate increased compliance with the Fetal Health Surveillance guideline during the 3-year period. This may reflect an effective, province-wide educational campaign from 1998 to the present, focusing on decreasing the unnecessary use of EFM.

Data collection methods used by the BCRCP to record the method of intrapartum fetal surveillance have been revised since 2002, so that EFM, intermittent auscultation, or no monitoring, are recorded in the perinatal database. This change in data collection methods will allow a more accurate analysis of whether or not more intermittent auscultation is being used in place of EFM.

#### *Fetal/Newborn Outcomes*

While it is heartening to see improvements in newborn outcomes as measured by the 1-minute Apgar, this can be attributed to multiple factors, including improved neonatal resuscitation resulting from the very active Neonatal Resuscitation Program (NRP) in B.C. The NRP is an educational program for neonatal resuscitation that the majority of practitioners working in the intrapartum clinical area have completed.

From the findings presented, it is apparent that the use of EFM in B.C. is decreasing. On the whole, there is no significant change in those indicators measuring intrapartum asphyxia, and, judging from the trend in 1-minute Apgar scores over the 3-year period, overall newborn well being at birth appears to be improving.

#### *Practitioner Response Rates for the Fetal Health Surveillance in Labour Guideline*

Sixty one percent of all respondent practitioners indicated that they had used the Fetal Health Surveillance in Labour guideline within the past 3 years, 28% indicated that they were aware of it but had never used it, and 11% indicated that they were not aware of it. The highest-use group was the midwives (96% had used the guideline within the

past 3 years), followed by the hospital nurses (81%), the managers (57%), the physicians (54%), and the community health nurses (11%). It is worth noting that of all BCRCP guidelines, this one has undergone the largest implementation process in terms of educational workshop opportunities and the education of regional fetal health surveillance instructors. Many midwifery educators have participated in this process and the high use by midwives reflects uptake of this guideline. The lower rates of EFM use provincially from 2000 to 2003 may be attributable to the active interdisciplinary implementation program. It is worrying that only 54% of physicians surveyed indicated that they have used this guideline in the past 3 years, and this reflects the decreased level of BCRCP guideline-use generally, within the physician group.

#### Part 2, Outcome Evaluation: Discussion of Singleton Term Breech Findings

##### *Rate of Caesarean Delivery*

As expected according to guideline recommendations, 95% of women with breech presentations delivered by caesarean section from fiscal 2000 to 2003. Among the 5% of women with singleton breech presentations who delivered vaginally, the majority were multiparous women. They were likely so far along in labour that there was no opportunity to mobilize a caesarean prior to delivery. Alternatively, some women may have requested a vaginal breech delivery and met the clinical criteria to have one.

##### *Fetal/Newborn Outcomes*

The increased probability of poorer newborn morbidity outcomes for those women with singleton term breech infants who delivered vaginally is consistent with the findings in the literature upon which the guideline is based (SOGC, 2001). It would seem prudent that women be informed of the increased risks of vaginal delivery during the third trimester of pregnancy, so that they may make a truly informed choice for caesarean

delivery. For the purpose of this study it is of interest to note that provincial data on newborn morbidity outcomes replicate those in the literature. The information on mortality statistics is of limited value. There was a significant difference in perinatal mortality in breeches with vaginal delivery vs. caesarean section, but one would expect that a woman with a known stillbirth would attempt a vaginal delivery rather than undergo the morbidity risks associated with caesarean delivery. However, without further, case-specific information, this observation is of negligible clinical significance.

#### *Practitioner Response Rates for the Singleton Term Breech Guideline*

Thirty seven percent of all respondent practitioners indicated that they had used the Singleton Term Breech guideline within the past 3 years, 33% indicated that they were aware of it but had never used it, and 30% indicated that they were not aware of it. The highest-use group was the midwives (81% had used the guideline within the past 3 years), followed by the physicians (71%), the managers (38%), and the community health nurses (9%). It is encouraging to note that the physician group was both aware of and used this guideline. However, the abrupt changes in clinical practice that accompanied publication of breech research in 2001 might explain why the majority of perinatal practitioners were aware of the guideline recommendations.

#### Summary: Outcome Evaluation Findings

##### *Vaginal Birth after Caesarean Section*

The VBAC guideline showed both a decrease in attempted VBAC between 2000 and 2003, and rates of uterine rupture higher than those suggested in the guideline. It is not known whether these rates are higher because of actual ruptures, or because of differences in definitions and coding practices. Rates of oxytocin augmentation and induction have also decreased, likely due to medical-legal concerns and current



controversy in the literature regarding the risk of uterine rupture. Induction with prostaglandin has decreased, reflecting the impact of research published in 2001 regarding the increased risk of uterine rupture when prostaglandin is used with VBAC. There were significant differences in all fetal/newborn morbidity indicators for babies born following attempted VBAC vs. no attempted VBAC. The perinatal morbidity and mortality indicators all trended in a negative direction, and that negative trend was still apparent for the morbidity indicators when the data were analyzed for only live births. However, further investigation may be warranted to determine the cause of these deaths.

#### *Postterm Pregnancy*

Analysis of the Postterm Pregnancy guideline indicated that the rate of postterm pregnancy  $\geq 41$  weeks decreased from 2000 to 2003, likely due to reluctance to allow pregnancies to continue past 41 3/7. This was associated with an increase in the rate of induction for postterm pregnancy. All fetal/newborn morbidity indicators were significantly worse for infants delivering at 41 weeks compared to 40 weeks' gestational age. However, the clinical implications of this are relatively insignificant, considering the huge numbers of inductions that would be required at 40 weeks (and the associated maternal morbidity) to affect newborn morbidity at 41 weeks.

#### *Induction of Labour*

Analysis of the Induction of Labour guideline indicated that the rates of oxytocin induction have trended significantly upward from 2000 to 2003, consistent with historical increases in the induction rate across Canada since 1991. For nulliparous women, there was a 1.8 greater probability of having a caesarean section (RR, 1.8; 95% CI, 1.7-1.8) if labour was induced. There was no difference for multiparous women. The risk of tetanic contractions was also significantly higher when labour was induced. All fetal/newborn

morbidity indicators were significantly higher with induced labour, but it is not clear whether this is due to a higher-risk population or to the induction procedures themselves.

### *Fetal Health Surveillance in Labour*

Analysis of the Fetal Health Surveillance in Labour guideline indicated that the use of electronic fetal monitoring decreased from 2000 to 2003, but it is not known whether the use of intermittent auscultation increased as “no electronic monitoring” was used for coding purposes when EFM was not indicated. Regardless, newborn outcomes measured by the 1-minute Apgar improved from 2000 to 2003, although this may be due to factors such as province-wide improvements in neonatal resuscitation. There was no difference in indicators measuring intrapartum asphyxia, and one may conclude that less electronic fetal monitoring is being performed with no apparent adverse fetal/newborn outcome(s).

### *Singleton Term Breech*

Analysis of the singleton term breech guideline indicated that 95% of these infants were delivered by caesarean section from 2000 to 2003. The infants delivered vaginally had significantly worse outcomes than those delivered by caesarean.

### Summary: Discussion of Findings

This research project consisted of a descriptive study to evaluate the BCRCP Clinical Practice Guideline program. The project consisted of two parts: Part 1, Process Evaluation, and Part 2, Outcome Evaluation.

This is the first study evaluating the BCRCP Perinatal Guideline program from a multidisciplinary perspective that includes hospital nurses, nurse managers, community health nurses, registered midwives, and physicians. The study findings showed a high level of awareness of the guidelines manual, high use of the guidelines, and

predominantly positive attitudes towards BCRCP guidelines. The findings also support the need to utilize components of the AGREE Instrument during future guideline development. The study findings revealed facilitators to guideline use, including the ready availability of guidelines, practitioner perspective(s) on their tolerance/readiness for uptake of new information, and time available to read guidelines. Special attention needs to be paid to those facilities with <500 births/year, given that the findings indicate that guidelines tend to be less available there, and that these facilities have significantly less uptake of guidelines into their policies and procedures.

Although the study examined outcome indicators for specific guidelines, it is not possible to make statements regarding causal relationships between population outcomes and guideline effectiveness. Examining population outcomes for specific guidelines has provided a prototype according to which the BCRCP might conduct ongoing quality assurance in perinatal health in B.C. However, before this can occur, specific guideline objectives and specific population health outcomes need to be defined for each guideline in order to ensure that a meaningful baseline measure exists for evaluation purposes.

Perhaps a method that could truly measure guideline effectiveness would be a randomized trial, in which some facilities received a guideline, and some did not. However, this methodology would be fraught with problematic ethical considerations, given that guidelines contain the best evidence currently available and provincial guideline programs have an inherent responsibility to disseminate that evidence and facilitate knowledge transfer to all facilities province-wide. Another method to evaluate effectiveness could be measures of perinatal morbidity and mortality outcomes pre and post guideline implementation.

## CHAPTER SIX: IMPLICATIONS OF FINDINGS AND RECOMMENDATIONS

This chapter includes (a) a review of the limitations of the study; (b) study conclusions; and (c) the implications of the findings and recommendations for guideline programs, nursing practice, administration, education, and research.

### Study Limitations

This study needs to be interpreted and considered within the context of numerous limitations. First, the survey instrument used for data collection was new and only underwent content validity testing. Conducting statistical analysis for reliability on a large sample to adequately test the stability of the survey instrument over time might have been preferable.

Second, the method of selecting study participants for the survey varied between the professional groups. While it was possible to obtain a random sample for the community health nurses and hospital nurses, convenience sampling was used for the physicians and it is not known how many surveys were actually distributed into the physician mailboxes.

Third, the overall response rate for the survey was low (26%), and was lowest among the physician group (19%). It is possible that some physicians who should have received a survey did not, contributing to the low response rate. It is likely that for all disciplines, those who responded by returning a completed survey did so because they already had established positive attitudes towards guidelines (characteristic of “early adopters”) and therefore saw utility in participating in the survey. This may have created a systematic bias in the results, as evidenced by the majority of survey items for attitudes having a skewed distribution, reflecting predominantly positive attitudes. While these findings are valuable to the BCRCP Clinical Practice Guideline program, it would be

prudent to obtain more information about attitudes towards guidelines from the entire population of physicians in B.C.

Fourth, the lack of clearly defined outcome objectives for each individual guideline was a major limitation in terms of outcome evaluation. The BCRCP Guideline Program's ultimate goals are acceptable maternal and newborn morbidity and mortality as compared to benchmark data, if available. This was problematic, however, since very few benchmark figures appear to exist. Benchmark indicators were not obtainable from the Society of Obstetricians and Gynaecologists of Canada; indeed, to date, few benchmarks have actually been identified. Consequently it was difficult if not impossible to identify guideline outcome objectives. For example, the acceptable caesarean delivery rate for primigravida women having induction of labour and acceptable rates of electronic fetal monitoring are not currently known. It was therefore not possible to compare actual outcomes to desired outcomes except in a few limited circumstances (e.g., rates of uterine rupture with VBAC).

Fifth, caution was warranted in the interpretation of newborn outcomes considering the limitations due to missing data. Three of the evaluated guidelines had missing data for the 1-minute Apgar 0-3 and 4-6, and the 5-minute Apgar 0-3 and 4-6. In some categories, over 30 cases were missing and depending into which category they fell, they might have feasibly reduced the relative risk of a particular indicator to a non-significant level.

The difficulties inherent in determining the extent to which maternal and newborn outcomes could be causally related to guideline use constitute a sixth limitation for this study. Given the study design, it is impossible and inappropriate to make inferences about the specific effects of guidelines on these study outcomes.

## Conclusions

The study findings provide several conclusions. Based on the survey, the following conclusions are made. First, there is a high level of awareness and use of perinatal guidelines among perinatal health care providers who participated in the study, and positive attitudes towards the guidelines from all disciplines. These findings are congruent with anecdotal information available to the researcher and support the overall value of the provincial perinatal guideline program with some degree of certainty.

Second, despite the disparity of use between professional groups, there is a desire for interdisciplinary guidelines. Future guidelines should incorporate changes to increase user-friendliness. Three factors that predict guideline use include ready availability of guidelines, practitioner motivation for uptake of new information, and time to read the guidelines in the work setting. These predictors of guideline use were also substantiated in the literature and one may conclude that organizational strategies that improve guideline availability and time to read guidelines would likely impact guideline use in facilities around B.C and elsewhere.

The following conclusions may be drawn from the outcome evaluation part of this study. However, the absence of specific outcome objectives and benchmarks for each clinical practice guideline was a major limitation to useful evaluation.

First, it is clear that a viable and effective guideline program must define outcome objectives and benchmarks during guideline development and prior to guideline implementation and evaluation.

Second, it is clear that specific guideline outcome indicators must match outcome indicators as defined in the program database, so that measurement of guideline objectives is consistent with database indicators. Clarity and consistency would then

eliminate any confusion in data interpretation.

Third, the study of rare but serious morbidity and mortality outcomes requires an effort to ensure that recorded data is complete.

Fourth, it is clear that guidelines must undergo an active implementation process following distribution. For the Fetal Health Surveillance in Labour guideline evaluation, data indicated that the use of electronic fetal monitoring had decreased from 2000/2001 to 2001/2003. This was the only guideline evaluated that had undergone an active guideline implementation and education process, and it is probable that the findings reflect the positive impact on clinical practice of this process.

These conclusions all support the need for further evaluation of clinical practice guidelines. In order for the effectiveness of clinical practice guidelines to be more accurately measured, guideline objectives need to be specified and guideline outcome indicators defined consistent with database definitions. Population outcomes need to be evaluated *prior* to guideline dissemination, and ample resources made available for an active and effective implementation strategy that spans all professional groups. Following guideline implementation, outcome indicators need to be evaluated and compared to initial findings over a period of several years to measure any differences in population outcomes. Even with this methodology, however, limited conclusions may be drawn regarding the effectiveness of guidelines as other variables may impact outcomes.

This study has demonstrated some of the difficulties and challenges inherent in evaluating a clinical practice guideline program, and the study conclusions must reflect these limitations. Nevertheless, despite the limitations, new and valuable information has clearly been obtained from this study and recommendations for future improvements to clinical practice guideline programs are made based on these findings.

## Recommendations

Based on the findings and limitations of the present study, the following recommendations are suggested for perinatal clinical practice guideline programs, as well as for nursing practice, administration, education, and research.

### Provincial Clinical Practice Guideline Programs

The recommendations for clinical practice guideline programs include suggestions for guideline development, guideline dissemination and implementation, and guideline evaluation.

#### *Guideline Development*

The findings from this study, in concert with anecdotal data, support the continued development of multidisciplinary guidelines for perinatal care providers in B.C. Guidelines that currently have only “low usage” require review to monitor their continuing relevance, and to determine whether their discontinuation might be warranted. Alternatively, guidelines that had low use among all practitioners may require focused implementation targeting those practitioners to whom the guideline best applies. An example is the Perinatal Mortality group of guidelines that may be better utilized by those practitioners participating in Mortality review in their facilities.

It is clear that practitioners desire scientific rigor in individual guidelines. Perinatal guidelines should incorporate components of the AGREE instrument to ensure simplicity for the guideline format, as well as rigor within the scientific process of presenting evidence-based recommendations. These components include the following: (a) the objective of the individual guideline is specified; (b) the clinical question addressed is described; (c) the patients to whom the guideline applies are described; (d) a summary quick reference page is included; (e) key recommendations are easily



identifiable; (f) informed consent information (risks and benefits and their probability) for specific clinical situations is included; (g) clear outcome indicators for quality assurance purposes are identified; (h) graphic decision trees are included, as appropriate; (i) the authors of the guideline are identified; and (j) the professional groups targeted by the guideline are specified (AGREE Collaboration, 2001). During the guideline development or revision process, attention needs to be paid to ensuring that each guideline is flexible enough to support autonomous clinical decision making and clinical judgment.

The criteria in the AGREE instrument addressing informed consent information (risks and benefits and their probability) for specific clinical situations requires exploration from a bioethical and legal perspective. As outcomes for specific maternal and fetal/newborn morbidity and mortality indicators were not always consistent with theoretical outcomes expected as per the guideline, a decision would need to be made regarding *which* data to use when defining risks and benefits and their probability. For instance, should the risk of ruptured uterus with attempted VBAC be based on rates quoted in the literature, the provincial rates in B.C., or the rates in the facility where the woman is planning to deliver? Is it possible that all rates should be included in order to provide information for truly informed consent? The dialogue around these issues should be initiated and subsequent determinations made by both provincial perinatal guideline programs and professional organizations.

The following criteria from the AGREE instrument need to be considered within the context of available resources. While the respondents indicated support for these criteria, the practical implications, in terms of the human and financial resources required to incorporate them into a guideline program, need to be considered. These include (a)

making explicit links between recommendations and supporting evidence, (b) describing the criteria for selecting evidence, (c) describing the method of formulating recommendations, (d) piloting guidelines with target users, and (e) including patient information leaflets.

Findings from this study indicate some disparity in guideline use between the professional groups, and suggest that the following need to be considered: written protocols defining the areas where guidelines are needed, criteria for screening proposed guidelines, criteria for priority setting, criteria for evaluating guidelines according to the accepted international "Gold Standard" (AGREE instrument), criteria for selecting evidence, structured abstracts, guideline format, and patient information resources. Financial and human resources available to guideline programs will need to be evaluated to determine if they are sufficient to operationalize the stated recommendations.

The multidisciplinary aspect of guideline development also warrants attention, especially among physicians. Strategies to increase physician awareness and use need to be developed, which might include publication in local medical journals, electronic guideline mail-outs, distribution of guidelines via CD-ROM, video-conferencing on guideline topics at times convenient for physicians, etc. The provincial perinatal guideline program could, in the future, collaborate with the Policy and Guidelines Committee within the Ministry of Health and other established guideline programs to improve guideline implementation among physicians.

### *Guideline Dissemination*

The findings from this study emphasize the role of both guideline programs and individual facilities in promoting an environment and infrastructure that support and enhance guideline utilization. Within perinatal guideline programs, guideline distribution

lists should be reviewed to ensure that all appropriate organizations receive a hard copy of the guidelines manual. A survey should also be sent to every facility to determine whether the number of guideline copies provided is adequate for each facility and the number of hard copy guideline manuals sent to facilities should be revised based on the survey results. This is particularly important for those facilities with <500 births/year, as the availability of guidelines was significantly lower there than for those facilities with >500 births/year, creating an inequity in access to resources and an increase in barriers to guideline use. It is incumbent upon guideline programs to ensure that all facilities in the province have equal access to their resources. Although those facilities with < 500 births/year account for only 14% (5,399 of 39,886 births 2002/2003) of the total births in the province, the provision of adequate resources to care providers in those facilities is as paramount as it is in facilities with >500 births/year.

Dissemination of guidelines to primary practitioners should be ensured. Ideally, each primary practitioner in the province should receive a CD-ROM of the guideline manual once the revision process has been completed. The CD-ROM could be accompanied by a letter from the program inviting the primary practitioners to utilize its website and to update their electronic copy of the guidelines manual, and/or inviting primary practitioners to submit their email addresses so that they may obtain automatic notice of guideline updates as they occur. Although a budget would have to be allocated for this project, it could be extremely beneficial in terms of raising physician awareness and use of the guideline manual. The provision of ongoing support is also important in creating positive attitudes among primary practitioners towards the guideline program.

Dissemination of guidelines via the various professional organizations should also be pursued. It is known to this research investigator that the College of Midwives of

British Columbia provides each midwife with the BCRCP guideline resource upon registration (College of Midwives of British Columbia, personal communication, 2003). Other professional regulatory organizations might be asked if they offer the same service, and, if not, this process might be facilitated. The disparity in distribution between the various professional groups may explain why 71% of the midwife respondents were aware of the guidelines and 73% used them always/often, whereas only 43% of the respondents among the physicians were aware of the guidelines and only 35% used them always/often.

Those providing guideline programs should work with the clinical managers in perinatal facilities to create an infrastructure that ensures ongoing support for the nurse managers, and to establish formalized communication channels with key leaders in the province. This study underlines the importance of identifying provincial opinion leaders and establishing a network with them to facilitate guideline implementation. Nurse managers should receive personal notification whenever guidelines are distributed, and nurse consultants could initiate communication specific to guideline issues. The finding that facility nurses tend to rely heavily on hard copies of the guidelines manual makes it particularly important that those providing guideline programs ensure that an adequate number of manuals are distributed to all perinatal facilities around B.C., and ensure that there are effective processes in place for updating all manuals.

#### *Guideline Implementation and Evaluation*

Those providing guideline programs have access to the excellent resource published by the Registered Nurses Association of Ontario (RNAO) on guideline implementation (RNAO, 2002). Those providers should consider following the six steps for success as outlined by the RNAO: (1) A systematic process is used to identify a well-

developed, evidence-based guideline; (2) appropriate stakeholders are identified and engaged; (3) an assessment of environmental readiness for guideline implementation is conducted; (4) evidence-based implementation strategies that address the issues raised through the environmental readiness scan are developed; (5) an evaluation of the implementation is planned and conducted; and (6) the resource implications for carrying out these activities are adequately addressed (p. 6).

Implementation of guidelines warrants evaluation using program evaluation principles (RNAO, 2002). In order to conduct outcome evaluation, guideline programs need to ensure that they are integrated with their database programs. This would help to determine guideline implementation priorities based on maternal and newborn perinatal morbidity and mortality indicators, and ensure consistency between database outcome indicator definitions and guideline objectives. Guideline objectives and maternal and newborn perinatal outcome indicators should be evaluated annually, and strategies developed to facilitate guideline implementation in those facilities, Health Regions, or Health Authorities where outcome variances occur. Once variances have been identified, educational support should be offered to facilitate changes in clinical practice to improve population outcomes. Outcome evaluation should then be repeated to determine whether guideline implementation was successful in affecting outcome indicators. Identified guideline outcomes should also be evaluated prior to distribution and implementation of new guidelines, so that baseline measures may be determined and guideline impact may be measured. Also, data collection methods (indicators and definitions) for intrapartum fetal surveillance, indeed all perinatal guidelines, should be reviewed to ensure the collection of clinically pertinent data.

Nurse consultants should also work with nurse managers to encourage and facilitate incorporation of guidelines into facility policies and procedures. The managers should understand the factors that act as facilitators for guideline use, including making sure that the guideline binder is readily available to practitioners, reminding staff to use guidelines, ensuring that facility policies are consistent with guideline recommendations, and facilitating time for staff to read guidelines. Alternative means of establishing easy guideline access should also be explored, such as ready computer access and/or access on small, mobile portable computer systems, such as PALM.

#### Nursing and Interdisciplinary Education

Educational mandates could be orchestrated more efficiently by determining educational needs based on guideline outcome indicators. For instance, in the case of labour induction, the database could provide provincial, regional, and facility data on primary indications for induction and outcome indicators. Following analysis, an interdisciplinary decision could be made to determine the need for practitioner education at the provincial, regional, or facility level(s). If needed, multidisciplinary education would then focus on guideline implementation. Of course, the availability of resources would need to be determined before this more "pro-active" approach to continuing education, and to evaluating patient outcomes following educational programs, could be adopted. Nevertheless, the findings from this study would seem to justify this approach when one considers that the only guideline (Fetal Health Surveillance in Labour) to undergo active educational implementation was also the guideline that demonstrated improved population outcomes, as would be expected were the guideline being followed.

The lack of a strategic implementation plan for the VBAC guideline may be the reason why only 59% of all practitioners indicated that they had used the VBAC

guideline within the past 3 years, 31% indicated that they were aware of it but had never used it, and 10% indicated that they were not aware of it at all. While it is not possible to correlate clinical outcomes with practitioner use of the guideline within this study, the examination of outcome data and levels of guideline use in the clinical area following the creation of an active provincial guideline implementation strategy for the VBAC seems warranted.

It is also important that basic nursing, midwifery, and medical education programs initiate students into the usefulness of clinical practice guidelines, evidence-based practice, and research utilization. Professors and clinical teachers could use the guidelines when teaching students in the classroom, or, more particularly, in clinical settings. Guidelines should also be frequently referred to during hospital orientations. Guideline manuals should be made available to university and college libraries, and communication networks should be developed with educational institutions. Liaison with organizations whose mandate is to integrate education, research, and practice in health care should also be considered. Administrators of guideline programs should explore ways to develop and support the use of research in basic nursing education and consider making more workshops on evidence-based practice and research processes available.

#### Nursing, Quality Assurance, and Policy Development

It is imperative that those administering guideline programs explore methods to work effectively with perinatal database programs to determine effective and clinically applicable maternal and fetal/newborn outcome indicators. For quality assurance purposes, guideline objectives and expected benchmark outcomes should be identified and measured on an annual basis. Measurement of outcomes relative to benchmark targets should take place at the provincial, regional, and facility level, with feedback

provided to the appropriate organizations. The authority of provincial perinatal programs needs to be determined in regards to facilitating changes in clinical practice in those areas where variances in guideline outcomes are found. A mandate of this type may require support from provincial ministerial authority and may also challenge the role of guidelines per se. If benchmark outcomes were established as part of each guideline, then the question arises whether following guideline recommendations should be “optional” for clinical practitioners, or mandatory. Provincial perinatal programs should address this issue, even though it is fraught with considerable medical-legal and resource implications.

#### Nursing and Interdisciplinary Research

Future studies using qualitative methods might be useful for obtaining more information about the strengths and limitations of interdisciplinary guidelines and the barriers to cooperation for guideline use. The use of focus group interviews with practitioners should be considered, as these might initiate an important dialogue on this complex issue. Future research should also focus on overcoming the complex methodological issues apparent in determining the impact of guidelines on population outcomes.

Future research related to the guideline programs should focus on evaluating specific guidelines and their impact on maternal and newborn health indicators. Once each guideline has defined specific objectives and outcomes, these should be evaluated annually or bi-annually to determine whether guideline strategies are being effectively implemented.

Future studies should also examine the economics of guideline use and their cost-benefit(s). Other investigators, including health economists, could explore the impact of a



particular guideline in terms of the cost-benefit savings in health care dollars that might follow guideline development, distribution, and education/implementation.

Future studies could also address the disparity in guideline awareness and use between professional groups, especially between primary practitioners. Research could investigate the differences between groups and explore strategies that might assist physicians in increasing both guideline awareness and use. Research could also be conducted to explore in greater depth the study findings that primary practitioners stated more strongly than nurses that guideline recommendations sometimes failed to reflect their beliefs. It would be of value to determine whether incongruence between practitioner beliefs and guideline recommendations constitutes a barrier to guideline use, and, if so, to determine effective strategies that might reconcile these differences.

Funders of guideline programs may also consider allocating resources towards more sophisticated guideline evaluation(s), such as time-series studies, to determine the impact of specific guidelines on population outcomes. A guideline evaluation plan would need to be compiled during guideline development to determine outcome indicators and to collect population outcomes at strategic time intervals. The resources required for this type of sophisticated analysis would also need to be planned for.

It seems possible that use of guidelines may resolve some of the particular research utilization challenges faced by nurses. For example, a guideline could eliminate the barrier described by nurses who felt they lacked the authority to change practice, if guidelines were adopted within a facility quality assurance program or as a policy. Furthermore, given that research findings are synthesized and presented in user-friendly and clinically understandable terms, and limited statistical analyses are presented within guidelines, it appears likely that guidelines could help nurses to achieve at least the first

step in the innovation-diffusion model – that of being knowledgeable about the innovation. Using guidelines to facilitate implementation of evidence-based practice may inspire the reading of more sophisticated research literature, benefiting those nurses who have limited knowledge in clinical research. Guidelines are also more likely to facilitate changes in nursing practice. Nursing management has both a medical-legal and professional obligation to support current best practice recommendations, and this may be accomplished through the use of guidelines. By maintaining an organizational infrastructure where guidelines are readily accessible, current best practices can easily be implemented. It is possible that guidelines may provide a solution for the challenges inherent in facilitating the transfer of knowledge from the research environment into the clinical practice setting.

### Summary

This research project consisted of a descriptive study to evaluate the BCRCP Clinical Practice Guideline program. The project consisted of two parts: Part 1, Process Evaluation, and Part 2, Outcome Evaluation.

Part 1, Process Evaluation, consisted of a descriptive survey to determine the awareness and use of, and attitudes towards, BCRCP perinatal guidelines by hospital and community health nurses, physicians, midwives, and managers. Analysis of the 313 survey respondents indicated that all practitioner groups had a high level of awareness of BCRCP guidelines, mostly through their facility manual, and demonstrated positive attitudes towards guidelines. The guidelines were used monthly or every one to three months by the majority of practitioners, and midwives used them most frequently of all the professional groups. Use of individual guidelines varied according to guideline topic and practitioner designation. The majority of respondents indicated that their facility

policies generally reflect the content of BCRCP guidelines. Significant predictors of guideline use included ready availability of guidelines, the eagerness for uptake of new guidelines characteristic of adopters, and availability of time to read guidelines. Hospital facilities with fewer than 500 births/year were significantly less likely to adopt guidelines into their facility policies, and less likely to have guidelines readily available.

Respondents indicated that all recommended changes to the guideline program as outlined in the AGREE instrument should be incorporated into future guideline development. Other recommendations for future changes to the guideline program included improving guideline format and presentation, increasing awareness among medical practitioners, and facilitating guideline implementation strategies.

The second part of this research project, Outcome Evaluation, consisted of a retrospective cohort study using maternal and fetal/newborn indicators derived from the BCRCP Perinatal Database Registry. The data used for this study included all singleton live births in B.C. between April 1, 2000, and March 31, 2003, and totaled 115,845 mothers and 115,845 infants. For two guidelines, data used for this study included all singleton live births *and* stillbirths in B.C. between April 1, 2000, and March 31, 2003 and totaled 116,400 mothers and 116,400 infants. The analysis of perinatal outcome indicators was presented for five BCRCP guidelines: (1) Vaginal Birth after Previous Caesarean Birth, (2) Postterm Pregnancy, (3) Induction of Labour, (4) Fetal Health Surveillance in Labour, and (5) Singleton Term Breech.

Evaluation of outcome indicators for the VBAC guideline showed a decrease in attempted VBAC in B.C. from 2000-2003, and rates of uterine rupture in B.C. for women attempting VBAC higher than those suggested in the guideline, and higher than those for women eligible for but not attempting VBAC. It is not known whether these rates are

higher because of actual ruptures, or because of differences in definitions and coding practices. Rates of oxytocin augmentation and induction with attempted VBAC decreased during the three-year study period, likely due to medical-legal concerns and recent controversy in the literature regarding the risk of uterine rupture. Induction with prostaglandin has decreased, likely reflecting the impact of research published in 2001 regarding the increased risk of uterine rupture when prostaglandin is used with VBAC. However, there was no significant risk of uterine rupture in those women attempting VBAC and having induction of labour. All newborn morbidity and mortality indicators demonstrated significantly worse outcomes for newborns of women attempting VBAC than for women eligible for but not attempting VBAC. However, these findings should be interpreted with caution, considering the possible effects of missing data. In some categories, up to 15 cases were missing, and depending into which category they fell, these might feasibly reduce the relative risk of a particular indicator to a non-significant level. Nevertheless, in spite of the limitations implied by missing data, these findings are cause for clinical concern. Perinatal morbidity and mortality indicators all trended in a negative direction, and that negative trend was still apparent for the morbidity indicators when the data were analyzed for only live births (i.e., when stillbirths were removed from the dataset). Despite the small absolute number of cases with poor outcomes, the findings should be further investigated and attempts should be made to retrieve the missing data to allow for accurate analysis and interpretation.

Evaluation of outcome indicators for the Postterm Pregnancy guideline indicated that the rate of postterm pregnancy  $\geq 41$  weeks decreased from 2000-2003, likely due to reluctance to allow pregnancies to continue past 41 3/7. This was associated with an increase in the rate of induction for postterm pregnancy. All fetal/newborn morbidity

indicators were significantly worse for infants delivering at 41 weeks compared to 40 weeks' gestational age. However, the clinical implications of this are relatively insignificant, considering the huge numbers of inductions that would be required at 40 weeks (and the associated maternal morbidity) to affect newborn morbidity at 41 weeks. Caution is warranted in the interpretation of newborn outcomes due to the possible effects of missing data.

Evaluation of outcome indicators for the Induction of Labour guideline indicated that the rates of oxytocin induction have trended upward from 2000-2003, consistent with historical increases in the induction rate across Canada since 1991. For nulliparous women, there was a 1.8 greater probability of having a caesarean section (RR, 1.77; 95% CI, 1.72-1.83) if labour was induced. There was no difference for multiparous women. The risk of tetanic contractions was also significantly higher when labour was induced (primiparous, RR, 1.7, 95% CI, 1.4-2.1; multiparous, RR, 2.9, 95% CI, 2.2-3.9). Except for a 5-minute Apgar of 0-3, all fetal/newborn morbidity indicators were significantly higher with induced labour versus spontaneous labour, but it is not known if this is due to a higher-risk population or to the induction procedures themselves. Again, caution is warranted in the data interpretation due to the possible effects of missing data.

Evaluation of outcome indicators for the Fetal Health Surveillance in Labour guideline indicated that the use of electronic fetal monitoring decreased from 2000-2003, but it is not known whether the use of intermittent auscultation increased as "no electronic monitoring" was used for coding purposes. Regardless, newborn outcomes measured by the 1-minute Apgar improved from 2000-2003, although this may be due to factors such as improved neonatal resuscitation in the province. There was no difference in indicators measuring intrapartum asphyxia, so one may conclude that less electronic

fetal monitoring is being performed with no apparent adverse fetal/newborn outcome.

Evaluation of outcome indicators for the Singleton Term Breech guideline indicated that 95% of these infants were delivered by caesarean section between 2000 and 2003. The infants delivered by vaginal delivery had significantly worse morbidity outcomes than those delivered by caesarean.

While this research study examined outcome indicators for specific guidelines, it is not possible to make statements regarding causal relationships between population outcomes and guideline effectiveness. The research findings from this study have practical implications for nursing and interdisciplinary research, practice, education, and quality assurance. This study contributes knowledge in the area of guideline awareness and use specific to interdisciplinary perinatal care providers, and to the challenges inherent in clinical practice guideline evaluation.

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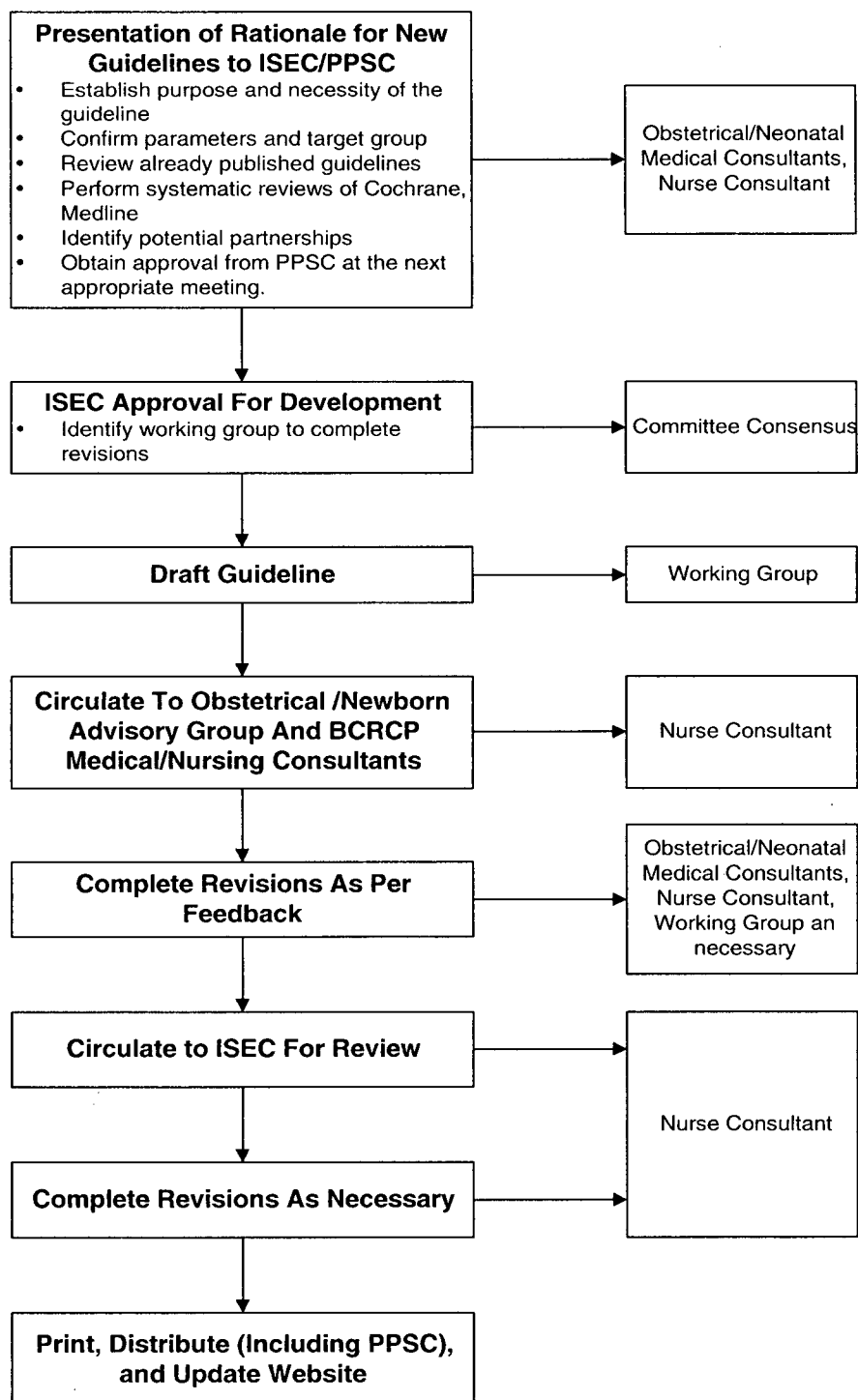
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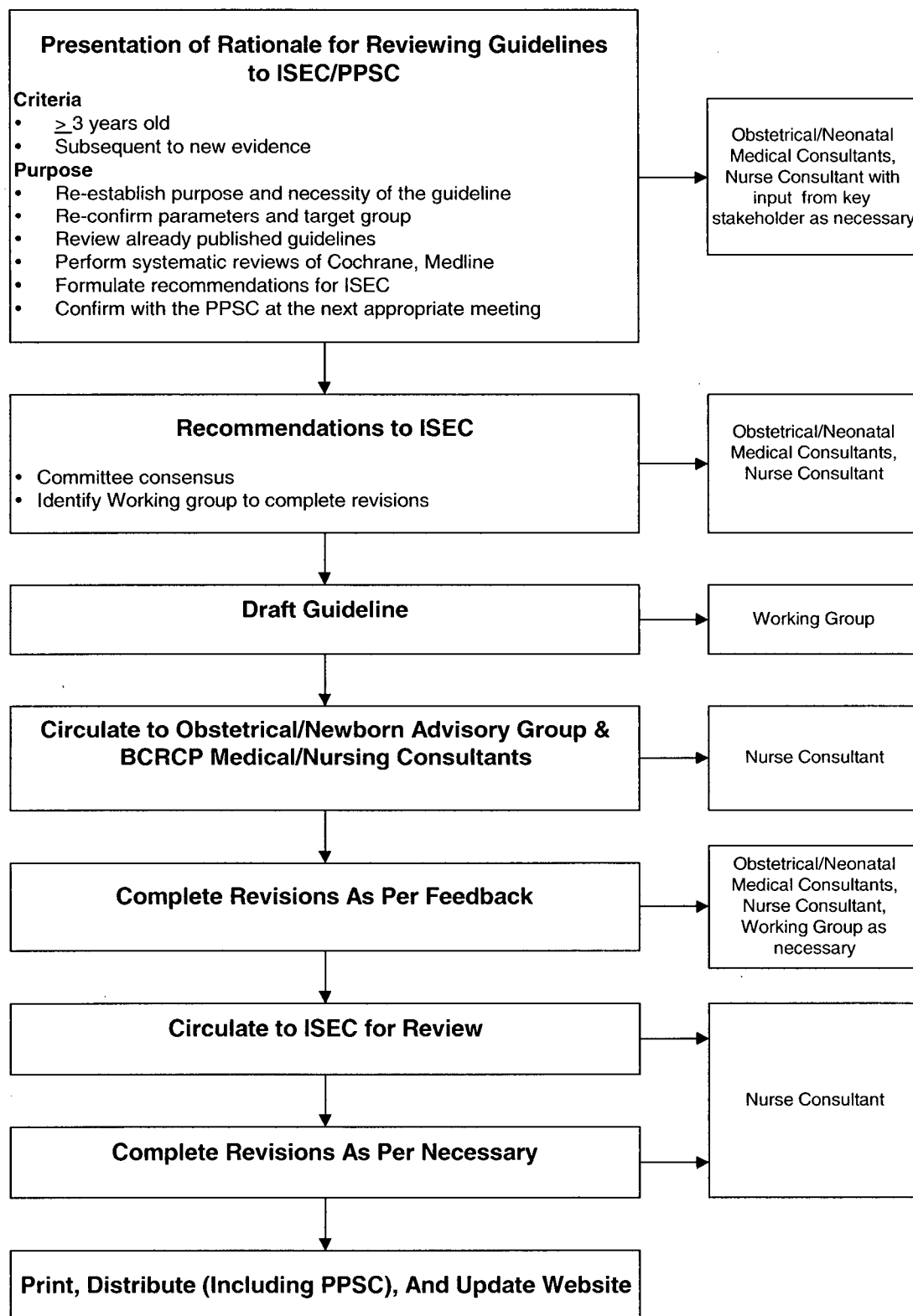
## APPENDIX A

## BCRCP Protocol for Guideline Development

## New Guidelines



## REVISING A GUIDELINE



## APPENDIX B

## Vaginal Birth after Previous Caesarean Birth Guideline

May, 2000

INTRODUCTION

**This guideline has incorporated verbatim the SOGC Clinical Practice Guideline Policy Statement No. 68, December 1997, except for Appendix A, which includes the signs that may occur with a complete or partial uterine rupture, or impending rupture.**

This document has been prepared by the Maternal/Fetal Medicine Committee of the Society of Obstetricians and Gynaecologists of Canada, and was approved by Council. It supersedes the Policy Statement published in the Journal SOGC in December 1993.

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The policy "once a Caesarean, always a Caesarean" is no longer tenable. While rates from around the world vary from below ten percent to over 30 percent of total births, in Canada approximately 20 percent of women giving birth do so by Caesarean section. In response to general concern about increases in Caesarean birth rates across Canada, a national consensus conference on aspects of Caesarean birth was held in 1985. A Canadian Consensus Statement on Caesarean Birth with guidelines for the appropriate use of Caesarean section was developed. While this statement was endorsed by the Society of Obstetricians and Gynaecologists of Canada and the Association of Professors of Obstetrics and Gynaecology, and was widely distributed to physicians, hospitals, childbirth educators, and other interested parties, the effect was limited until implementation strategies were designed in 1991.<sup>4,5</sup> The vaginal birth after Caesarean section (VBAC) rates increased from three percent to 33 percent in the following years – the plateau and subsequent decrease in Caesarean section rates in Canada have been entirely due to the increase in VBAC rates.<sup>6,7</sup>

BACKGROUND

The success rate for labour and vaginal delivery following previous Caesarean section will vary from 50 to 80 percent, and will depend upon the knowledge and attitudes of both health care users and providers. Many women undergoing Caesarean section for dystocia in a first labour will subsequently deliver vaginally in safety and without

difficulty. The slightly lower level of success of VBAC, following a primary Caesarean section for dystocia as compared with breech, may be more a reflection on the attitude of the woman and her caregivers than of uterine function. Numerous reports documenting the safety of labour and vaginal birth after Caesarean section have appeared in the literature over the past 30 years. These reports testify to the safety of the procedure with an incidence of "scar dehiscence," an opening of the scar without maternal or fetal consequence, of 0.5 percent. Maternal uterine rupture with haemorrhage and fetal compromise, or even death, occurs with an incidence of 0.1 percent.<sup>8-11</sup> The need for hysterectomy is rare. Overall fetal outcome compares favourably to that associated with uncomplicated pregnancy. For women achieving a successful VBAC, maternal morbidity is low, with fewer post-partum complications and a shorter hospital stay as compared with women undergoing Caesarean section. Accordingly, successful VBAC is associated with a significant reduction in health care costs as compared with elective repeat Caesarean section.

The effectiveness and safety of labour after previous Caesarean section are such that some authors suggest that it should be mandatory in the absence of contraindications.<sup>12-14</sup>

Each hospital that provides obstetric care and is capable of performing an emergency Caesarean section is already equipped to be able to offer vaginal birth after Caesarean section. Hospital perinatal committees should review these guidelines and promote VBAC. Full participation of the patient in the decision is of supreme importance.<sup>15,16</sup>

## RECOMMENDATIONS

### **A. FOR WOMEN WITH ONE PREVIOUS TRANSVERSE LOW SEGMENT CAESAREAN SECTION**

#### **1. A Trial of Labour**

A trial of labour should be recommended when developing a plan of care. Respect for the woman's autonomy, her participation and the participation of her partner in decision making is of paramount importance. The trial of labour and VBAC should take place in a hospital/health centre. Physicians should follow the SOGC Policy Statement, "Attendance at Labour and Delivery Guidelines for Physicians" published in the Journal SOGC, September 1996. A process of informed consent with appropriate documentation must be part of the birth plan for any woman with a previous Caesarean section scar.<sup>17</sup>

#### **2. Designation of Appropriate Hospital Facilities**

Every hospital engaged in obstetrical care and capable of providing an emergency Caesarean section should be able to offer care for a woman undergoing labour after previous low segment Caesarean section. Staff at each facility should develop guidelines for management in such a situation. Women undergoing labour after a previous Caesarean section must be made aware of the hospital resources and the availability of an obstetrical surgeon, anaesthetic services, and operating room personnel who may be required in an emergency.

### 3. Requirements of Antenatal and Intrapartum Notification/Consultation of Obstetrician/Surgeon

Antepartum consultation with an obstetrician is not mandatory. However, the primary care provider must determine the appropriateness of labour by reviewing the woman's previous Caesarean section operative report. Documentation of the location and type of uterine incision is mandatory. The advisability of antenatal specialist consultation may be influenced by local factors.

### 4. Contra-indications to VBAC

Contra-indications to labour following previous Caesarean section include:

- a) previous classical, inverted T incision or unknown incision scar,<sup>18,19</sup>
- b) previous hysterotomy;
- c) previous myomectomy involving entry of the uterine cavity or extensive myometrial dissection;
- d) previous uterine rupture;
- e) presence of placenta praevia, transverse lie or any other contra-indications to labour.

### 5. Augmentation of Labour – Use of Oxytocin

Augmentation with oxytocin is not contra-indicated, and the literature supports its use in carefully selected women with one previous low transverse incision.<sup>8,9,13,20</sup>

As in all situations where augmentation is used, careful attention to monitoring the progress of labour is important. Caution should be taken in augmenting labour in a woman with a previous low segment section who arrests in the active phase of labour (late first stage or second stage). Augmentation should only be undertaken when an immediate response to emergency events requiring Caesarean section can be mounted.

### 6. Induction of Labour

#### a) Oxytocin

Induction of labour increases the risk above that of spontaneous labour in a woman with a previous Caesarean section scar. However, induction with oxytocin is not contra-indicated.<sup>21,22</sup> A literature review of over 3,000 women who have received oxytocin with a previous low segment section suggests that, although the rates of scar dehiscence and uterine rupture are slightly increased compared with women in a similar situation entering spontaneous labour, the incidence is still small (1.8% dehiscence, <0.5% for rupture). Oxytocin should be used after careful consideration of all other obstetrical factors. As with spontaneous labour, the availability of anaesthesia, operating room personnel, and obstetrical surgeons should be discussed with the woman prior to induction, and such a labour should take place in a hospital setting. Physicians should be guided by the SOGC Policy Statement entitled "Induction of Labour," published in the Journal SOGC in February 1997.<sup>23</sup>

#### b) Use of Prostaglandins

The safety of prostaglandin gel use in women with previous low segment sections has not been established and further research is needed. Prostaglandin



preparations may be associated with very strong uterine contractions, and there are little data available on their use in women with uterine scars. At this time, if prostaglandin gel is to be used in the presence of a low segment Caesarean section scar, the woman must understand the limitation of knowledge in this area, and the immediate availability of physicians and resources to respond to an emergency must be provided.<sup>21,22,24</sup>

**c) Foley Catheter**

Insertion of a Foley catheter into the cervical canal, extra-amniotically, and inflating it, is an alternative method of cervical ripening. It is less expensive than prostaglandin gel, and can be deflated and removed immediately if undesirable side effects occur. It may be effective in ripening the cervix. However, there is no evidence to support or refute its ability to decrease the incidence of Caesarean section or instrumental delivery associated with induction.<sup>23</sup>

**7. Fetal Monitoring**

One of the most consistent early signs of scar dehiscence and /or rupture is an abnormal fetal heart rate pattern. Thus, in cases of induction and /or augmentation, continuous electronic fetal heart rate monitoring is advised. Intermittent fetal heart monitoring is to be reserved for cases in which neither induction nor augmentation with oxytocin is performed.

**8. Twin Pregnancy or Breech Presentations**

Twins – labour and vaginal delivery with twin pregnancy is not contra-indicated. Although there is limited information concerning labour following previous low segment Caesarean section and twin gestation, what data are available show no significant difference in maternal or fetal morbidity compared with singleton pregnancy.<sup>25,26</sup>

Breech – previous transverse low segment incision is not of itself a contra-indication to labour with breech presentation. As in all cases of breech presentation, careful obstetrical assessment is required prior to a decision to embark upon labour.<sup>13,27</sup>

Published information does not suggest that a diagnosis of suspected macrosomia (estimated fetal weight greater than 4,000 grams) is a contra-indication to labour after previous low segment Caesarean section.<sup>[28]</sup>

**B. FOR WOMEN WITH MORE THAN ONE PREVIOUS TRANSVERSE LOW SEGMENT CAESAREAN SECTION**

Labour and vaginal delivery in women with more than one previous transverse low segment incision is an acceptable option, although there are less data available. Each situation should be carefully assessed. The incidence of scar dehiscence (less than 4%) is higher than that associated with one previous section.<sup>8,10,19,29</sup>

## CONCLUSION

Every hospital equipped for obstetrical care should be able to offer women vaginal delivery after previous Caesarean section. These clinical guidelines will help each hospital to evaluate and complete their own protocols for vaginal birth after Caesarean section. Full participation of the patient in these decisions is vital.

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### **VBAC GUIDELINE: APPENDIX A**

#### SIGNS THAT MAY OCCUR WITH A COMPLETE OR PARTIAL UTERINE RUPTURE

- Sudden non-reassuring fetal heart pattern
- Unusual abdominal/uterine pain
- Cessation of contractions or incoordinate uterine activity
- Unexplained vaginal bleeding
- A sudden onset of maternal tachycardia and hypotension
- Excessive fetal movement
- Fetal parts palpated through the abdominal wall
- Presenting part higher than found previously

#### SIGNS THAT MAY OCCUR WITH IMPENDING UTERINE RUPTURE

- Inadequate labour progress (cervical dilation, fetal descent) despite good contractions
- Incoordinate uterine activity
- Restlessness and anxiety
- Lower abdominal pain between contractions

## APPENDIX C

### Postterm Pregnancy Guideline

July, 1993

#### INTRODUCTION

The management of postterm pregnancy is still controversial and future clinical trials may indicate alternative guidelines.

#### DEFINITION

- Beyond 42 weeks gestation (294 days from LMP)

#### RELEVANCE

- Occurs in 5 – 15% of all pregnancies and is associated with a higher risk of perinatal mortality and morbidity
- Placental insufficiency can lead to fetal hypoxia
- Macrosomia can lead to difficulties at delivery and meconium can be aspirated into the fetal/newborn lungs

#### GESTATIONAL AGE

Gestational age must be assessed carefully to avoid delivery of a premature infant. Because actual dates of conception are rarely known, the LMP is used as the reference point. This, however, can make the accuracy of gestational age determination unreliable for reasons which include:

- irregular menses
- a cycle length other than 28 days
- recent cessation of the birth control pill
- inconsistent ovulation times

Perhaps all pregnant patients, and certainly those who do not have regular periods, should have an ultrasound examination for gestational age assessment, prior to 20 weeks; preferably between 16 – 18 weeks. If there is more than a one week discrepancy between the LMP and the ultrasound findings, use the ultrasound to determine the EDC.

#### MANAGEMENT

### 1. Antepartum Surveillance

- Consider doing NST's twice per week on all pregnant women from 41 weeks gestation
- Maternal kick counts (see Appendix 1 BC Women's Hospital)
- Normal NST ( $\geq 8$  kubli score) should be reviewed and initialed by physician within 24 hours
- Equivocal/suspicious NST for immediate physician assessment and follow-up
- NST is a part of patient's permanent medical record (serial testing improves sensitivity)

### 2. At 41 Weeks

Consider induction if:

- Evidence of inadequate fetal growth:
  - inadequate fundal height
  - from ultrasound
  - maternal weight loss or inadequate weight gain
- Abnormal NST (non-stress EFM test)
- Maternal disease affecting fetal wellbeing

### 3. At 42 Weeks

- If mother healthy; good fetal growth; adequate amniotic fluid:
  - if cervix ripe:
    - induce labour
    - ARM if head engaged and/or oxytocin
  - if cervix not ripe:
    - ripen cervix with prostaglandin or Foley catheter (see guideline re: induction)
    - then use oxytocin
- If mother is adverse to induction do:
  - daily fetal activity counts
  - NST or biophysical profile 2X per week
  - do an ultrasound to assess fetal size and amount of amniotic fluid

## COMPLICATING CONDITIONS

### Fetal Distress

- **More common in postterm labours**
- **Use EFM**

### Macrosomia

- **If the fetus is large, dystocia and difficult vaginal deliveries may occur**

### Meconium

- **Meconium aspiration can be a serious complication**
- **If meconium is detected prior to birth, ensure skilled newborn resuscitation personnel available at delivery**
- **To avoid and/or minimize meconium aspiration in utero, expedite delivery with early evidence of fetal distress**

\*\*\*\*\*

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## APPENDIX D

## Induction of Labour Guideline

April, 1999

## DEFINITION

The initiation of labour prior to the spontaneous onset of labour, for the purpose of accomplishing delivery of the fetal/placental unit.

## RISKS

Labour induction is an active intervention with potential risks for the mother and fetus. Therefore, elective induction in the absence of maternal or fetal indications should not be undertaken. The risks and benefits of induction in the given situation should be reviewed with the pregnant woman and her partner (SOGC, October 1996):

- Increased risk of Caesarean delivery.
- Fetal compromise/abnormal fetal heart rate tracing.
- Hyperstimulation of the uterus.
- Uterine rupture.
- Cord prolapse with ARM.
- Inadvertent delivery of preterm infant (unlikely with confirmed ultrasound dating).
- Maternal water intoxication (rare).
- Medical-Legal: oxytocin is commonly considered by the courts as a cofactor associated with fetal and/or neonatal compromise.

## COMMON INDICATIONS FOR INDUCTION OF LABOUR

- Postterm, > 41 completed weeks (287 days) (SOGC, March 1997).
- Prelabour rupture of membranes at term.
- Evidence of fetal compromise.
- Maternal disease e.g., diabetes, hypertension.
- Logistics e.g., geographic, past rapid labour at gestational age > 37 weeks.
- Fetal demise.

## CONTRAINDICATIONS

### I ABSOLUTE (SOGC, December 1997)

- Previous classical, inverted T, or unknown uterine incision.
- Previous hysterotomy or myomectomy of the uterine corpus involving entry of the uterine cavity or extensive myometrial dissection.
- Previous uterine rupture.
- Presence of placenta previa, transverse lie or any other contra-indications to labour.
- Active genital herpes.

### II RELATIVE

- Grand multiparity (>5).
- Malpresentations.
- Over-distention of the uterus e.g., polyhydramnios or multiple pregnancy.
- Invasive carcinoma of the cervix.
- Caution recommended with combination large fetus (EFW >4,000 g.) and previous Caesarean.

## INDUCTION PREREQUISITES

- Determine appropriate indication.
- Determine Bishop Score (ripeness) of the cervix.
- Assess potential for cephalo-pelvic disproportion by abdominal & pelvic examination.
- Assess fetal health. Electronic fetal surveillance and uterine monitoring for at least 20 minutes prior to any ripening/induction agents.
- Other fetal assessments may be indicated e.g., biophysical profile.

## MANAGEMENT OF INDUCTION OF LABOUR

### I GENERAL

- A. For induction of labour the following must be available:
  - Electronic fetal monitor.
  - Infant resuscitation equipment.
  - Personnel skilled in infant resuscitation (NRP).
  - A qualified registered nurse, familiar with the processes of induction and the agents used, able to detect both maternal and fetal complications, able to initiate and interpret electronic fetal surveillance and uterine monitoring, and able to intervene appropriately.
- B. It should be recognized that induction of labour in the nullipara is associated with twice the chance of Caesarean delivery compared with spontaneous labour (SOGC, 1996). Although there is no evidence-based information indicating that



operating room facilities be a requisite for induction of labour, it is incumbent on rural facilities without Caesarean delivery capability to determine their local practice and procedures regarding induction of labour and indications for patient transfer. The decision to induce labour should not be taken without due regard for the indication for induction, antenatal risk factors, intrapartum risk factors, method of induction, and geographic and climatic conditions (SOGC, No. 72, April 1998).

- C. There should be discussion and disclosure of risk factors (including anticipated obstetrical risk, advantages and limitations of local maternity care services, and transport risk) with the patient prior to the induction, and informed consent should be obtained.
- D. Prostaglandins and oxytocin must not be used concurrently.
- E. Before induction starts, the indication for, and method of induction must be clearly documented on the patient's chart.
- F. The SOGC recommends that before inducing labour, the responsible physician complete an appropriate assessment of the mother and fetus, including abdominal and pelvic examinations (to determine fetal lie and presentation, estimated fetal weight and cervical status).
- G. During the induction, the responsible physician must be immediately available by telephone/pager and available to come promptly to the labour and delivery area.
- H. Oral intake should be determined by the assessment of risk for uterine hyperstimulation and/or fetal compromise.
- I. Each facility, in conjunction with its perinatal committee, should implement appropriate induction policies, protocols, and audit processes.

## II CERVICAL ASSESSMENT

Reports on labour induction have shown that the state of the cervix is the most important predictor of success (SOGC, October 1996). Determine the "ripeness" or "favourability" of the cervix *prior to induction*. Using the Modified Bishop Score (Table 1), the SOGC and American College of Obstetricians and Gynaecologists suggest that a score of  $\geq 6$  is considered favourable and is likely to result in successful labour induction (SOGC, October 1996).

**Table 1: Modified Bishop Score**

Criteria	Points Assigned		
	0	1	2
<b>Dilation</b>	0	1-2 cm.	3-4 cm.
<b>Effacement</b>	0-30 %	40-50 %	60-70 %
<b>Cervical Length</b>	>3 cm.	1 – 3 cm.	<1 cm.
<b>Consistency</b>	Firm	Medium	Soft
<b>Position</b>	Posterior	Mid	Anterior
<b>Station</b>	-3	-2	-1 to $\geq 0$

### III PREPARATION OF THE UNFAVOURABLE CERVIX FOR INDUCTION

If the cervix is unfavourable or there is a Bishop Score < 6, (i.e., closed, posterior, thick, firm), then consider preparation of the cervix with the following ripening agents:

#### A. Prostaglandins

**Intracervical PGE<sub>2</sub> gel (Prepidil ®)**

**Intravaginal PGE<sub>2</sub> gel (Prostin ®)**

##### 1) Risks

- Uterine hyperstimulation.
- If hyperstimulation leads to fetal compromise (abnormal fetal heart rate pattern):
  - a) attempt to remove any remaining PGE<sub>2</sub> gel, and
  - b) administer a tocolytic agent e.g., Nitroglycerin IV 300 mcg. or sublingual 400 mcg.; Ritodrine 6 mg. in 10 ml. normal saline, give IV bolus over two to three minutes or until hyperstimulation subsides (SOGC, October 1996; Straszak-Suri & Nimrod, 1992).

##### 2) Pre-induction Criteria for Intracervical/Intravaginal Prostaglandins

- Induction prerequisites should be met (see p. 2).
- No administration of PGE<sub>2</sub> gel within the previous six hours.
- The safety of using prostaglandins with previous Caesarean delivery has not been established (SOGC, Dec.1997).

##### 3) Cautions

- Previous uterine surgery.
- Over-distention of the uterus (polyhydramnios or multiple pregnancy).
- Fetal malpresentation.
- History of asthma, glaucoma or epilepsy.
- Grandmultipara.
- Clinical evidence of fetal compromise.
- Unexplained vaginal bleeding.

- Rupture of membranes - Vaginal prostaglandin can be used with ROM (Hannah et al., 1996). Caution is recommended with intracervical prostaglandins.
- 4a) Dosage and Insertion for **Intracervical PGE2 gel (Prepidil ®)**
- The recommended dosage is 0.5 mg.
  - Each prefilled syringe contains 0.5 mg dinoprostone (CPS, 1997 p.1266).
  - The gel is inserted under direct vision using a vaginal speculum. Care should be taken that the gel is placed in the cervical canal and not in the lower uterine segment (see package insert).
  - **Caution: Do not use Intravaginal PGE2 gel (Prostin ®) intracervically.**
- 4b) Dosage and Insertion for **Intravaginal PGE2 gel (Prostin ®)**
- The manufacturers' recommended initial dose is 1.0 mg. into the posterior fornix.
  - A dose of 1.0 to 2.0 mg. may be repeated at least 6 hours later if labour is not established.
  - Prefilled syringes contain 1 or 2 mg of dinoprostone (CPS, 1997 p.1310).
- In some obstetrical units registered nurses insert vaginal prostaglandin into the patients for induction. This may be done as a Transfer of Function and requires written hospital policies and procedures.
- 5) Following PGE2 Gel Insertion
- Patient maintains bedrest for 1 hour.
  - Electronic fetal heart surveillance and uterine monitoring for 1 hour.
  - It is recommended that PGE2 gel insertion should be done no more frequently than every 6 hours for a maximum of 3 insertions, then reassess if not in labour.
  - Oxytocin may be administered 6 hours following the last insertion of PGE2 gel (BC Women's Hospital and Health Centre, 1996).
- 6) Outpatient Use of Prostaglandins
- There is little data on the outpatient use of prostaglandins. However, current practice in Canada is to allow selected mothers to go home after 1 hour of assessment/observation immediately following insertion of the gel.

## B. Foley Catheter

The cervix may be ripened by inserting a #16 Foley catheter (with a 30 cc balloon) through the cervical canal and above the internal os the evening prior to induction. The proposed advantages are that it is considerably less expensive than PGE2 gel, and it can be deflated and removed immediately should any undesirable side effect occur (SOGC, October 1996).

### 1) Potential Risks

- Infection.
- Bleeding (Low-lying Placenta).
- Rupture of membranes.

2) Procedure

- Visualize cervix with a speculum.
- Cleanse cervix.
- Advance Foley catheter 2-3 cm. beyond the internal os.
- Inflate balloon with sterile water. Some practitioners tape the catheter to the inner thigh under tension as this may increase the effectiveness.

**C. Cervidil ® Vaginal Insert**

1) Advantages

- String present for quick removal if there is uterine hyperstimulation.
- Oxytocin may be used after 30 minutes of Cervidil removal.

2) Risks

- Uterine hyperstimulation.
- If hyperstimulation leads to fetal compromise:
  - a) remove Cervidil from vagina.
  - b) administer a tocolytic agent e.g., Nitroglycerin IV 300 mcg. or sublingual 400 mcg.; Ritodrine 6 mg. in 10 ml. normal saline, give IV bolus over two to three minutes or until hyperstimulation subsides (SOGC, 1996; Straszak-Suri & Nimrod, 1992).

3) Pre-induction Criteria for Cervidil

- Induction prerequisites should be met (see p. 2).

4) Cautions (see p. 4)

- Previous uterine surgery – there is insufficient evidence to determine if this agent can be used safely in women with uterine scars.

5) Dosage and Insertion

- Inserted digitally and placed transversely in the posterior fornix of the vagina.
- Cervidil contains 10 mg prostaglandin E<sub>2</sub> which is slowly released at approximately 0.3 mg/hour.

6) Following Cervidil Insertion

- The appropriate form of fetal surveillance to be used in the presence of a Cervidil insert is not clear at this time. Accumulated experience suggests that the incidence of hypertonus is no greater than that associated with intracervical or intravaginal prostaglandin gel. Hypertonus is most likely to occur if the device is left in place after

regular contractions have become established. Current practice in many centres follows monitoring guidelines similar to those used after application of intracervical or intravaginal gel. An ACOG committee opinion (ACOG, 1998) recommends continuous electronic fetal surveillance for as long as the device is in place.

- Cervidil should be removed:
  - a) if labour is established.
  - b) 12 hours following insertion; some may leave it in for 24 hours (Wing, 1997).
  - c) if uterine hyperstimulation occurs.

#### **IV LABOUR INDUCTION WITH FAVOURABLE CERVIX (BISHOP $\geq 6$ )**

##### **A. Stripping/Sweeping of the Membranes**

Stripping the membranes is controversial, but Boulvains' review (1997) indicates that it can result in the onset of labour and may decrease the frequency of post-term pregnancy.

##### **B. Amniotomy / Artificial Rupture of Membranes (ARM)**

###### **1) Risks**

- **Cord prolapse if the presenting part is not well applied to the cervix.**
- Infection.
- Patient is committed to delivery.
- With polyhydramnios, increased risk of both cord prolapse and possible abruption.

###### **2) Criteria**

- Cervix is favourable, or Bishop Score  $\geq 6$  (dilated  $\geq 2.0$  cm and  $< 1.0$  cm long).
- Presenting part is well applied to the cervix.

##### **C. Intravaginal PGE2 gel (Prostin ®)**

Intravaginal PGE2 gel may be used as a ripening agent or induction agent (see p. 4).

##### **D. Intravenous Oxytocin**

###### **1) Indications (see p. 1)**

- VBAC – oxytocin should be used cautiously.
- Prelabour rupture of membranes at term – Hannah et al. (1996) in a multi-centre trial, concluded "...induction of labor with intravenous oxytocin, induction of labor with vaginal prostaglandin E2 gel, and expectant management are all reasonable options... Induction of labor

with intravenous oxytocin results in a lower risk of maternal infection..." (p. 1010).

## 2) Dosage and Concentration

- The goal of oxytocin administration is to effect uterine activity that is sufficient to produce cervical change and fetal descent while avoiding uterine hyperstimulation (ACOG, 1995). Dawood (1995) reported that approximately 90% of women achieve adequate uterine activity with incremental doses of oxytocin, and rarely more than 6 mU/minute is required. Dose increments with time intervals of no less than 30 minutes apart are recommended as this is the time required to reach steady-state plasma levels (SOGC, Oct.1996).
- A common preparation is to mix 10 IU of oxytocin with 1000 ml balanced solution to give an infusion rate of 6 mls/hour = 1mU/minute (IVAC).

*Note: 1 International Unit equals 1,000 milliunits (mU)*

- Start oxytocin infusion at 0.5 - 1.0 mU/minute and increase by 1.0 - 2.0 mU/minute every 30-60 minutes (ACOG, 1995; Dawood, 1995) until ideal contraction pattern is achieved (i.e., 3-4 contractions in 10 minutes, duration <90 seconds, 30 seconds relaxation between contractions) **OR**
- Until a maximum dose of 20 mU/minute is attained. If higher doses are required, then the use of oxytocin should be reassessed, and a physician's order is needed. With an intrauterine death higher doses may be needed.

## 3) Prior to Initiating Oxytocin Infusion

- Ensure availability of 1:1 nursing care.
- Initiate an IV of balanced solution (mainline) using an 18-gauge intracatheter at a site that allows mobility of the patient's arm.
- Connect the oxytocin solution to a constant infusion pump and using a secondary site, connect to the main infusion.
- Ensure availability of a conversion table giving the equivalent of oxytocin in mU/minute and mls/hour. The conversion table should preferably be attached to the infusion pump.
- Obtain a 20 minute electronic fetal heart strip to obtain baseline data prior to initiating the oxytocin infusion.

## 4) During Oxytocin Infusion

- Assessment and documentation of maternal pulse and blood pressure, uterine contractions and fetal heart data should occur with every oxytocin increase.
- Once an ideal contraction pattern is achieved:
  - a) titrate the oxytocin dose to maintain the contraction pattern.
  - b) assess maternal vital signs as frequently as maternal condition dictates.

- Continuous electronic fetal surveillance and uterine monitoring throughout the induction is recommended. *However*, when the oxytocin dose and maternal/fetal conditions are stable, and there is NO evidence of fetal compromise, intermittent electronic monitoring may be commenced to allow for periods of ambulation, bath, or position change.
- If uterine hyperstimulation (5 or more contractions in 10 minutes, or lasting greater than 90 seconds) occurs *with fetal heart decelerations/abnormalities*:
  - a) **DISCONTINUE OXYTOCIN INFUSION**
  - b) reposition to left or right side.
  - c) give O<sub>2</sub> per mask @ 10 L.
  - d) increase mainline IV (balanced solution) if not contraindicated by maternal condition.
  - e) notify responsible physician.
  - f) prepare for possible Caesarean delivery if fetal heart does not return to normal.
- If intrauterine resuscitation is successful, oxytocin may be restarted at ½ the last dose.
- Should uterine hyperstimulation occur without fetal compromise, then decrease the oxytocin infusion rate.
- The administration of oxytocin with the birth of the infant remains an option. Following delivery, oxytocin 10 IU intramuscularly and/or infusion of 20 IU in 1,000mls R/L or N/S @ 100-125 mls/hour should be continued for at least one hour to prevent uterine atony. "The use of oxytocin infusions of greater than 20 U/L are no more effective and are more likely to result in problems with water retention or hypotension" (ALARM Course Syllabus, SOGC, 1999).

### **MISOPROSTOL (Cytotec ®)**

Research has shown that Misoprostol could be a safe, cheap, and effective mode of inducing labour compared to oxytocin and other prostaglandins. However the optimal dose, route of administration and dose interval have yet to be determined by further research and pilot projects. Misoprostol is currently not approved by the Health Protection Branch of Canada for the indication of cervical ripening or induction of labour at term with a viable fetus. The SOGC recommends its use only within a structured research project (SOGC, April 1998). The BCRCP supports this SOGC recommendation.

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## APPENDIX E

## Fetal Health Surveillance Guideline

July, 1997

**PREAMBLE**

We have become reliant on electronic fetal monitoring (EFM) over the years, **but** randomized clinical trials indicate that EFM changes indicating fetal distress have a poor predictive value i.e., there is a high false positive rate which leads to increased operative deliveries (with or without fetal blood sampling).

The Society of Obstetricians and Gynaecologists (SOGC) states that Intermittent Auscultation (IA) is the preferred method of fetal surveillance in low-risk women provided there is an appropriately trained professional in attendance. (SOGC Guideline #41, 1995). SOGC acknowledges "that a redefinition of priorities in birthing suites may require increased staffing" and "that implementation will take time and will increase the demand on resources" (SOGC Policy Statement #41, 1995).

SOGC has indicated that "guidelines can be modified" (Journal SOGC, December 1995) and, in referring to fetal scalp samples and cord blood gases, have stated that "rural hospitals will have to evaluate the feasibility of this recommendation" (SOGC Clinical Practice Guideline #41, 1995). Therefore, in consideration of the current literature and the reality of the situation in B.C. hospitals, BC Reproductive Care Program (BCRCP) provides this guideline to assist hospitals.

It is critical to remember that Fetal Heart Surveillance is only one aspect of the clinical picture. Decisions about management should always be made in light of the **total clinical picture**.

**INTERMITTENT AUSCULTATION (IA)****1. Basic Requirements**

- the woman is assessed to be Low Risk\* at the onset of labour

\*Pregnant women identified as low risk can develop fetal compromise from complications that may not be predictable until they occur, for example, cord compression, fetal/maternal haemorrhage, or sudden abruptio placentae.

Fortunately, cord compression is often transient or can be treated (moving patient to her side, giving oxygen, etc.) and a fetomaternal haemorrhage or a sudden intrapartum abruptio are uncommon. Thus in low risk patients, IA in the active phases of labour is appropriate.

- the professional caregiver is skilled in the procedure

- a hospital policy/procedure exists addressing the:
  - qualifications of the “professional caregiver”
  - technique
  - frequency of IA assessment and documentation standards
  - directions for clinical management when non-reassuring findings are present

## 2. Frequency of IA Assessment

### As per SOGC Clinical Practice Guideline #44, 1995

1:1 care with fetal heart auscultated:

- First Stage
  - Latent Phase - every 30 minutes
  - Active Phase\* - every 15 minutes
- Second Stage - every 5 minutes

\* Active phase is defined by regular contractions and cervix dilated 3-4cm. and 80-90% effaced in nullipara; and cervix 4-5cm. dilated and 70-80% effaced in multipara.

**When 1:1 care is not available**, fetal heart auscultation must be performed:

- First Stage
  - Latent Phase - every 30 minutes
 

Note: In early labour, IA monitoring should always be the preferred method for low risk pregnancy. However, until staff becomes available, in difficult circumstances (e.g., decrease in staff) or emergencies, continuous monitoring may be indicated. (Journal SOGC, Dec. 1995, pg.1241-3)
  - Active Phase - every 15-30 minutes
- Second Stage - every 5 minutes

**1:1 care is required in active second stage**

## 3. IA Assessments are also required:

- before:
  - Amniotomy
  - Administration of Medication/Analgesia
  - Transfer or discharge of patient
- after:
  - Admission of patient
  - Amniotomy or SRM
  - Vaginal exam
  - Abnormal uterine activity e.g., too frequent, too strong or prolonged contractions

## 4. Technique

- Perform Leopold's Manoeuvres
- Place doppler/fetoscope over fetal back or thorax
- Palpate maternal pulse to differentiate maternal and fetal heart
- Palpate uterine contraction during fetal heart rate (FHR) auscultation
- Count FHR before, during and after contraction for at least 60 seconds

**Note:** Because of maternal pushing during 2<sup>nd</sup> stage of labour, auscultation during contractions may not be feasible

#### **Reassuring Findings**

- Baseline FHR 120-160 beats per minute (BPM)
- Accelerations

#### **Non-Reassuring Findings**

- Inability to clearly auscultate FHR
- Baseline bradycardia or tachycardia
- No accelerations heard, especially with fetal movement
- Deceleration of FHR

### **ELECTRONIC FETAL MONITORING (EFM)**

Hospitals vary in their use of paper speed between 2 and 3 cm./minute. To ensure consistency in EFM interpretation, reporting and education, the BCRCP recommends a speed of 2 cm./min.

**Normal EFM tracings have a high predictive value**, i.e., the fetus is not compromised during the time of monitoring when the EFM shows normal rate, normal variability, appropriate accelerations, and no significant decelerations.

#### **1. Indications**

- inaudible or non-reassuring finding on intermittent auscultation
- meconium stained amniotic fluid
- inadequate progress
- dystocia
- prior to and following intracervical/intravaginal prostaglandin
- prior to and during oxytocin administration
- with epidural anaesthesia
- any patient assessed to be at risk for perinatal morbidity or mortality which may include:
  - Intrauterine Growth Restriction (IUGR)
  - Oligohydramnios
  - Hypertension in Pregnancy
  - Post-term Pregnancy (41 weeks)
  - Antepartum / Intrapartum Haemorrhage
  - Medical complications (e.g., Diabetes)
  - Preterm Rupture of the Membranes (PROM)

- Preterm Labour

**2. Electronic Fetal Monitoring and Auscultation may not be warranted if:**

- Lethal fetal anomalies (e.g., anencephaly)
- Extreme prematurity (< 23 weeks)

**3. Admission Baseline EFM Strip**

Current evidence is inconclusive regarding the benefits of a baseline fetal heart strip. Individual hospitals may wish to develop their own policy and procedure regarding this practice.

**4. Internal or Direct Monitoring**

**Indications**

- External tracing inadequate for accurate interpretation

**Contraindications**

- Placenta praevia
- Face presentation
- Unknown presentation
- HIV seropositive
- Active genital herpes

**5. Responsibilities Associated with Electronic Fetal Monitoring**

- The attending staff should understand the benefits and limitations of EFM
- The reasons, the benefits and limitations for use of EFM should be explained to the woman.
- The EFM tracings are part of the patient record and relevant events and interventions should be noted on the tracing.
- The EFM tracing should be assessed when indicated, and at least every 15 minutes by the attending professional.
- **Registered Nurses performing EFM are responsible for :**
  - **obtaining an interpretable EFM tracing with both ultrasound and tocotransducer channels**
  - **interpretation of the EFM and appropriate communication to the physician ,**
  - **documentation of EFM data on the patient's chart, and**
  - **appropriate emergency nursing interventions which include:**
    - Change maternal position
    - Give oxygen per mask @ 8-10 Litres
    - Initiate or increase IV fluids ( Solution should be a plasma expander such as Ringers Lactate)

**and may include:**

- Discontinue oxytocin; Remove prostaglandin if possible
- Vaginal examination **Note: Vaginal Exam should be done promptly if cord prolapse suspected.**
- When there are concerns regarding intermittent auscultation or electronic fetal monitoring, each hospital should have a policy to refer to regarding the chain of communication and consultation process between caregivers.

#### **6. Management if Non-reassuring EFM Tracings**

- Initiate appropriate emergency nursing interventions (see above)
- Consider fetal scalp stimulation during vaginal exam and observe presence/absence of fetal heart acceleration.
- Consider faxing tracing to regional referral centre or to BC Women's (604-875-2742) for consultation, as required.
- If scalp sampling is thought to be necessary, then consultation with an appropriate secondary or tertiary centre should be considered.
- Consider delivery if severe fetal compromise.

#### *FETAL SCALP SAMPLING*

Consider Fetal Scalp Sampling if physician/nurse is skilled and if equipment is available (See Appendix 1 for Value Chart).

Hospitals providing fetal scalp sampling should have a hospital policy and procedure describing the technique and responsibilities of both the physician performing the collection of the sample and the nurse assisting.

Intrapartum fetal scalp sampling:

- may not be technically easy
- may have to be repeated several times
- may have workload and cost implications

#### **Indications**

- non-reassuring FHR characteristics/patterns assessed by EFM
- unexplained absent variability without decelerations
- sinusoidal pattern
- fetal cardiac arrhythmias
- mixed deceleration pattern which complicate interpretation
- contradictory patterns(e.g., absent variability with accelerations, or late decelerations with average variability).

#### **Not Indicated When:**

- FHR characteristics clearly indicate fetal well-being
- significant fetal decompensation is evident
- non-reassuring FHR pattern may be best managed by interventions aimed at relieving causal factor(s).

#### **Contraindications**

- mother known carrier of haemophilia and fetus either affected or of unknown status
- mother is HIV seropositive
- active maternal genital infection (e.g., herpes).

### CORD BLOOD COLLECTION FOR ACID-BASE ASSESSMENT

**(Cord Blood Gases/CBGs)** (see Appendix 1 for Values Chart)

- The SOGC suggests that cord blood samples be obtained at all births (SOGC Clinical Practice Guideline #45, 1996)
- Some facilities may prefer to use the acceptable alternative of obtaining a clamped segment of cord (approximate length of 20cm.) and delay analysis until baby's condition is assessed.

**Note:** 1. Blood in a double-clamped segment of cord is stable for up to an hour at room

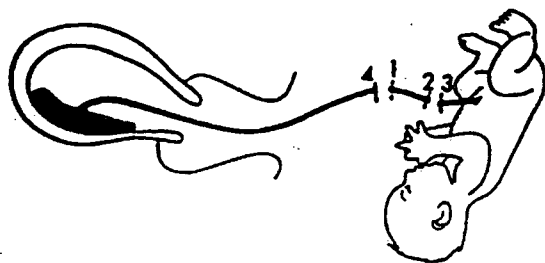
temperature (Duerbeck, 1992)

2. A cord blood sample in a syringe flushed with heparin is stable for 30-60 minutes at room temperature (Strickland, 1984, ACOG, 1991&1995)

3. There is some evidence that placing the cord segment or the blood filled syringe on ice will increase the time before testing is necessary (Chauhan, 1994), however, how long this extends the reliability of the test results is unknown.

4. The minimum amount of blood required is 0.3 ml.

**Doubly Clamped Section of Umbilical Cord for pH and Blood Gases**



### Indications for CBG's include:

- EFM pattern shows fetal compromise
- any pathological maternal/fetal condition predisposing, or creating a risk of hypoxic acidemia
- suspected or proven IUGR
- caesarean section for fetal indications
- antepartum and/or intrapartum haemorrhage
- Rh isoimmunization disease

- preterm delivery < 36 weeks
- cord prolapse
- low Apgar scores, i.e., 5-minute Apgar less than 7
- a newborn behaving other than healthy at birth

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Policy Statements:
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  - #38, July 1995 "Attendance at Labour and Delivery Guidelines for Physicians"
  - #41, October 1995 "Fetal Health Surveillance in Labour"
  - #44, December 1995 "Fetal Health Surveillance in Labour"
  - #45, January 1996 "Fetal Health Surveillance in Labour"
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## FETAL HEALTH SURVEILLANCE GUIDELINE

## APPENDIX 1: ACID / BASE VALUES

Acid-base tests (pH, Base excess, pCO<sub>2</sub>, HCO<sub>3</sub>, pO<sub>2</sub>, O<sub>2</sub> sat.) can be done to clarify if acidosis is metabolic or respiratory. However, pO<sub>2</sub> is not reliable on cord blood (Journal SOGC 1996; 18:p.1278).

Normal Umbilical Cord Blood PH and Blood Gas Values in Term Newborns (Mean +/- One Standard Deviation)

Value	Yeomans* (n = 146)	Ramin* (n = 1,292)	Riley† (n = 3,522)
Arterial blood			
pH	7.28 (0.05)	7.28 (0.07)	7.27 (0.069)
Pco <sub>2</sub> (mm Hg)	49.2 (8.4)	49.9 (14.2)	50.3 (11.1)
HCO <sub>3</sub> -(meq/L)	22.3 (2.5)	23.1 (2.8)	22.0 (3.6)
Base excess (meq/L)	∇	-3.6 (2.8)	-2.7 (2.8)
Venous blood			
pH	7.35 (0.05)	-	7.34 (0.063)
Pco <sub>2</sub> (mm Hg)	38.2 (5.6)	-	40.7 (7.9)
HCO <sub>3</sub> -(meq/l)	20.4 (4.1)	-	21.4 (2.5)
Base excess (meq/L)	-	-	-2.4 (2)

\* Data are from infants of selected patients with uncomplicated vaginal deliveries.

† Data are from infants of unselected patients with vaginal deliveries

∇ Data were not obtained

Ramin SM, Gilstrap LC III, Leveno KJ, Burns J. Little B8. Umbilical artery acid-base status in the preterm infant. Obstet Gynaecol 1989;74:256-258

Riley PJ, Johnson JWC. Collecting and analyzing cord blood gases. Clin Obstet Gynaecol 1993;36:13-23

Yeomans ER, Hauth JC, Gillstrap LC III, Stickland DM. Umbilical cord pH, Pco<sub>2</sub> and bicarbonate following uncomplicated term vaginal deliveries. Am J Obstet Gynaecol 1985;151: 798-800



### Criteria of Concern for Intervention and Brain Damage

Minimal tests required are pH and base deficit. PH alone is a less satisfactory measure of acidosis than when combined with base deficit values due to the variations of respiratory acidosis, which may be present at the time of blood sampling. SOGC has provided the following values for fetal scalp blood during labour and umbilical artery blood at delivery.

At this time, there is insufficient evidence to categorically state from what pH value brain damage results. The SOGC has indicated that "possible" brain damage can occur at the pH value of 7.00 and is therefore an appropriate value to use as a guideline. However, clinical management decisions should not rely on pH values alone but should be interpreted in light of the total clinical picture. For example, a scalp pH of 7.16 coupled with a non-reassuring FHR pattern may suggest intervention.

Criteria of Concern for:	Labour Base Deficit mmol/L	Delivery Base Deficit mmol/L
Intervention	10	$\geq 12$
Possible Brain Damage	16	$\geq 16$

Criteria of Concern for:	Labour pH	Delivery U.A. pH
Intervention	$< 7.15$	$< 7.15$
Possible Brain Damage	$< 7.00$	$< 7.00$

**SOGC (1996)**, Clinical Practice Guidelines #45, January.

**Note:** Blood gases can be reported as Base Excess in negative values or Base Deficit in positive values. The actual values are unchanged.

## APPENDIX F

## Singleton Term Breech Guideline

## SOGC STATEMENT ON VAGINAL BREECH, 2000

The Canadian Consensus on Breech Management at Term was presented as a Policy Statement (#31) by the SOGC in November 1994.

The workshop, which compiled these Consensus statements, used the best level of evidence that was then available, together with current expert opinion to aid practitioners in the safe management of the term vaginal breech delivery.

These guidelines have since been incorporated into a Canadian led International Randomized Controlled Trial designed to address the issues of whether the fetuses at term presenting as a frank or complete breech are best born vaginally, or by planned elective Low Segment Section (LSCS).

The results of this study have been published in The Lancet, Volume 556, October 21, 2000 and members are encouraged to read this landmark study in its entirety.

As a result of the findings of this study the Executive and Council of the SOGC feel it necessary to advise its members, and the public, that the best method of delivering a term frank or complete breech singleton is by planned LSCS. This policy results in a significantly lower, although not absent, risk of infant mortality and /or morbidity than planned vaginal birth.

From this study, composite data from the participating countries demonstrated the overall risk of perinatal death for the term/complete frank breech fetus with planned caesarean birth was reduced by 75% (RR 0.28, CI 0.07-0.8). From the same study, in developed countries such as Canada, the chance of a term breech infant dying associated with a policy of planned vaginal births is 1/170 (3/511) while no deaths (0/614) were reported in the planned caesarean section group. The chance of serious short-term neonatal morbidity was reported as one in 20 in the planned vaginal group versus one in 250 in the planned caesarean section group. A policy of planned LSCS will reduce these risks without a significant increase in immediate maternal complications.

Practitioners are encouraged to ensure that these data are conveyed to women who are contemplating a breech vaginal birth and to obtain an informed and documented consent.

The risks of LSCS should also be discussed and documented. When scheduling a LSCS it is important to ensure that accurate dating and presentation of the fetus are confirmed just prior to undertaking the delivery.

This study should in no way be extrapolated to the vaginal breech delivery of the second twin. This topic is addressed in the SOGC Consensus Statement on the Management of Twin Pregnancies published in July and August 2000.

This study also does not address the issue of pre-term breech deliveries, breech with anomalies, or breeches presenting in the late stages of labour. This study has not addressed the long-term infant morbidity and mortality but a two-year follow-up study is underway.

The long-term implications of delivery by LSCS on subsequent reproductive performance such as the risk of placenta accreta and uterine rupture, was not addressed in this study.

A complete update of the SOGC Policy statement of the management of the term breech is in progress.

## APPENDIX G

## Survey Instrument

## Demographic Information:

Health Authority in which you are located: FHA \_\_\_ IHA \_\_\_ NHA \_\_\_ VCHA \_\_\_ VIHA \_\_\_ PHSA \_\_\_  
 (Fraser) (Interior) (Northern) (Vancouver) (Vancouver) (Provincial)  
 Coastal) Island)

1. Indicate your position with a ✓ for one of the following:

	General Duty RN	or	Manager/Clinician	or	Midwife (RM) ___
Labour & delivery (L&D)	___		___		Obstetrician (OB) ___
Antepartum/postpartum	___		___		General Practitioner (GP) ___
Combined L&D/maternity	___		___		Other _____
Special care nursery	___		___		
Rural: Maternity and other areas	___		___		
Community public health	___		___		

2. Number of births/year in the facility where you work **or** \_\_\_\_\_  
 Number of postpartum women/year in your Public health unit area \_\_\_\_\_

3. Number of years in maternal-child care in BC \_\_\_\_\_

4. Number of years in maternal-child care in your current facility \_\_\_\_\_

5. For **MDs and RMs**, approximate number of deliveries you did in 2004 \_\_\_\_\_

## Clinical Practice Guidelines Information:

6. Are you aware of the BCRCP Guidelines for Perinatal Care manual? \_\_\_ Yes \_\_\_ No

7. Are you aware of the guidelines on the BCRCP website? \_\_\_ Yes \_\_\_ No

**If you answered no to questions 6 and 7, then go to questions 15-17 on pages 5-6.**

8. Choose the 2 major ways that you became aware of the guidelines.

- \_\_\_ Using facility copy of the BCRCP Guidelines manual
- \_\_\_ Reading about guidelines in the Perspectives Newsletter
- \_\_\_ Visiting the BCRCP website
- \_\_\_ Attending BCRCP workshop(s) or conference(s)
- \_\_\_ Being told about the manual by a colleague
- \_\_\_ Other \_\_\_\_\_

9. What is the most frequent way you become aware of *new or revised* guidelines? (Check one only).

- \_\_\_ Using facility copy of the BCRCP Guidelines manual
- \_\_\_ Reading about guidelines in the Perspectives Newsletter
- \_\_\_ Visiting the BCRCP website
- \_\_\_ Attending BCRCP workshop(s) or conference(s)
- \_\_\_ Being told about the manual by a colleague
- \_\_\_ Other \_\_\_\_\_
- \_\_\_ I don't keep abreast of new or revised guidelines

10. How often do you refer to the guidelines? (Check one only)

Never \_\_\_\_ Occasionally (every 3-12 mos) \_\_\_\_ Often (every 1-3 mos) \_\_\_\_ Always (monthly) \_\_\_\_

11. The BCRCP Clinical Guidelines Manual index is listed below. How aware are you and have you used the guidelines? Please provide one answer per guideline related to your use of the guideline, using the following scale:

1. Used within past 3 years

2. Aware, not used

3. Not aware

## OBSTETRICS

1	Induction of Labour	1	2	3
2A	Preterm Labour	1	2	3
2B	Management of the Mother/Fetus and Newborn Near the Threshold of Neonatal Viability (22-25 Completed Weeks)	1	2	3
3	Herpes in the Perinatal Period	1	2	3
4	Pain Management During Labour	1	2	3
5	Management of Twin Pregnancies	1	2	3
6	Fetal Health Surveillance in Labour	1	2	3
7	Postterm Pregnancy	1	2	3
8	Vaginal Birth after Previous Caesarean Birth	1	2	3
9	Folic Acid & The Prevention of Neural Tube Defects	1	2	3
10A	Gestational Diabetes	1	2	3
10B	Diabetes Mellitus and Pregnancy Type 1 & 2	1	2	3
11	Hypertension in Pregnancy	1	2	3
12	Group B Streptococcus in the Perinatal Period	1	2	3
13	Intimate Partner Violence during the Perinatal Period	1	2	3
14	Assisted Vaginal Birth: The Use of Forceps & Vacuum Extraction	1	2	3
15	HIV in the Perinatal Period	1	2	3
16	Planned Maternity Discharge Following Term Birth	1	2	3
17	Antenatal Screening and Diagnostic Tests for Singleton Pregnancies	1	2	3
18	Hepatitis C in the Perinatal Period	1	2	3

## NEWBORN

1	Newborn Care Resources	1	2	3
2	Neonatal Thermoregulation	1	2	3
3	Stabilization of the Asphyxiated Infant	1	2	3
4	Jaundice in the Healthy Term Newborn	1	2	3
5	Neonatal Hypoglycemia	1	2	3
6	Surfactant Replacement Therapy in Neonates	1	2	3
7	Neonatal Resuscitation	1	2	3
8	Newborn Hospital Security	1	2	3
9	Newborn Screening	1	2	3
10	Care of the Umbilical Cord	1	2	3
11	Eye Care and Prevention of Ophthalmia Neonatorum	1	2	3
12	Vitamin K <sub>1</sub> Prophylaxis	1	2	3
13	Sudden Infant Death Syndrome	1	2	3

**PERINATAL MORTALITY**

1	The Perinatal Mortality Review Process .....	1	2	3
2	Hospital Perinatal Mortality Review Committee: Terms of Reference .....	1	2	3
3	Classification of Perinatal Deaths .....	1	2	3
4	Clinical Examination of the Placenta .....	1	2	3
5	Investigation and Assessment of Stillbirth .....	1	2	3

**SUBSTANCE USE**

1	Principles of Perinatal Care for Substance Using Women .....	1	2	3
2	Discharge Planning Guide for Substance Using Women & Newborns .....	1	2	3
3	General Clinical Management of Pregnant Substance Using Women .....	1	2	3
4A	Perinatal Opioid Use, Care of the Mother .....	1	2	3
4B	Perinatal Opioid Use, Care of the Newborn .....	1	2	3
5A	Perinatal Cocaine Use, Care of the Mother .....	1	2	3
5B	Perinatal Cocaine Use, Care of the Newborn .....	1	2	3

**REPRODUCTIVE MENTAL HEALTH**

1	Reproductive Mental Illness in the Perinatal Period: Principles .....	1	2	3
2	Discharge Planning and Community Follow-up Guide .....	1	2	3
3	Identification and Assessment of Reproductive Mental Health Illness during the Preconception & Perinatal Periods .....	1	2	3
4	Major Depression .....	1	2	3
5	Anxiety Disorders .....	1	2	3
6	Psychotic Disorders .....	1	2	3

**GENERAL**

1	Maternal Newborn Transport Flowsheet .....	1	2	3
2	Maternal/Fetal Transport .....	1	2	3
3	Nutrition: Part I: Breastfeeding the Healthy Term Infant .....	1	2	3
	Part II: Breastfeeding the Healthy Preterm Infant .....	1	2	3
4	Interdisciplinary Perinatal Committees .....	1	2	3

**STATEMENTS**

	SOGC Joint Position Paper on Rural Maternity Care .....	1	2	3
	Reducing the Risk of Sudden Infant Death Syndrome in Canada .....	1	2	3
	SOGC Statement on Vaginal Breech .....	1	2	3

**PERINATAL FORMS**

1	Provincial Perinatal Forms .....	1	2	3
2	Generic Charting Guideline for Perinatal Care Providers .....	1	2	3
3	Antenatal Record Part 1 & 2 (HLTH 1582) .....	1	2	3
4	Labour Admission and Partogram (HLTH 1583) .....	1	2	3
5	Newborn Record (HLTH 1583A) .....	1	2	3
6	Labour and Birth Summary Record (HLTH 1588) .....	1	2	3
7	Maternal Assessment Record (HLTH 1590) .....	1	2	3
8	Community Liaison Record (HLTH 15910) .....	1	2	3

9	Maternal Postpartum Care Path (Vaginal Delivery) (HLTH 1592) .....	1	2	3
10	Newborn Care Path (HLTH 1593 & 1594) .....	1	2	3
11	Abbreviations used in the 1998 Provincial Perinatal Forms .....	1	2	3
12	Maternal Caesarean Section Care Path (HLTH 1595) .....	1	2	3
13	Maternal Assessment Checklist (HLTH 1956) .....	1	2	3
14	Community Newborn Assessment Checklist (HLTH 1597) .....	1	2	3
15	Expanded Newborn Resuscitation Record (HLTH 1583B) .....	1	2	3

12. The following questions refer to factors that may facilitate/encourage or inhibit/discourage your use of guidelines.

	1. Never	2. Occasionally	3. Sometimes	4. Always
a. Do you have time to read guidelines? .....	1	2	3	4
b. Does your facility incorporate guidelines into their policies? .....	1	2	3	4
c. Is there a high level of co-operation from MDs in your facility to practice according to guideline recommendations? .....	1	2	3	4
d. Is there a high level of co-operation from RNs in your facility to practice according to guideline recommendations? .....	1	2	3	4
e. Is there a high level of co-operation from your administration to practice according to guideline recommendations? .....	1	2	3	4

f. What other factors encourage/facilitate your use of guidelines?

g. What other factors act to inhibit/discourage your use of guidelines?

13. Indicate your degree of agreement with the following statements regarding current guidelines.

They:

1. Strongly Disagree

2. Disagree

3. Agree

4. Strongly agree

5. Don't know

a. Provide interdisciplinary guidance to care providers	1	2	3	4	5
b. Provide practice knowledge for specific clinical situations	1	2	3	4	5
c. Provide practice judgments for specific clinical situations	1	2	3	4	5
d. Provide guidance in controversial areas of practice	1	2	3	4	5
e. Lead to best patient outcomes	1	2	3	4	5
f. Decrease medical-legal risk	1	2	3	4	5
g. Decrease opportunity for variance in clinical practice	1	2	3	4	5
h. Allow enough flexibility for independent clinical decision making	1	2	3	4	5
i. Are too prescriptive	1	2	3	4	5
j. Are written in user-friendly language	1	2	3	4	5
k. Are readily available to me	1	2	3	4	5
l. Practice recommendations are readily apparent in the guideline	1	2	3	4	5
m. The recommendations presented sometimes do not reflect my beliefs	1	2	3	4	5
n. Generally, guidelines are based on current research evidence	1	2	3	4	5
o. When research evidence is not available, guidelines are based on professional consensus opinion	1	2	3	4	5
p. I facilitate incorporating guidelines into facility policy	1	2	3	4	5
q. The staff nurses use guidelines in their clinical practice	1	2	3	4	5
r. The medical/midwifery staff use guidelines in their clinical practice	1	2	3	4	5
s. I discuss the content of guidelines with my colleagues	1	2	3	4	5
t. I don't use guidelines because I don't like them	1	2	3	4	5

14. Specific guideline components are outlined below. Indicate your level of agreement with the following statements regarding the development of future guidelines by the BCRCP.

1. Strongly Disagree

2. Disagree

3. Agree

4. Strongly agree

5. Don't know

a. Separate guidelines should exist for RNs, RMs and MDs (discipline specific)	1	2	3	4	5
b. The objectives for individual guidelines should be specified	1	2	3	4	5
c. The clinical question addressed should be described	1	2	3	4	5
d. The patients to whom the guideline applies should be described	1	2	3	4	5
e. The authors of the guideline should be identified	1	2	3	4	5
f. The professional group(s) the guideline targets should be specified	1	2	3	4	5
g. The guidelines should be piloted among target users	1	2	3	4	5
h. The criteria for selecting evidence should be described	1	2	3	4	5
i. The method of formulating recommendations should be described	1	2	3	4	5
j. There should be explicit links between recommendations and supporting evidence	1	2	3	4	5
k. Key recommendations should be easily identifiable	1	2	3	4	5
l. Graphic decision trees should be included when appropriate	1	2	3	4	5
m. A summary, quick reference page should be included	1	2	3	4	5
n. Patient information leaflets should be included	1	2	3	4	5
o. Guidelines should present clear outcome indicators for quality assurance purposes	1	2	3	4	5
p. Informed consent information (risks and benefits and their probability), for specific clinical situations e.g., VBAC, Induction, should be included	1	2	3	4	5



15. In terms of the uptake of new information, I would consider myself (check one):

- ☐ Eager to use new or revised guidelines.  
☐ Prefer to observe a new or revised guideline and discuss it with my colleagues before implementing changes to my clinical practice  
☐ Wait until a new or revised guideline is well entrenched in policies and the guideline is considered common clinical practice before I change my own practice.

16. These questions relate to general attitudes towards guidelines. They also include opinions on whether the BCRCP should continue with the guidelines program in its current format. Indicate whether you agree or disagree.

1. Strongly Disagree  
 2. Disagree  
 3. Agree  
 4. Strongly agree  
 5. Don't know

a. Guidelines should be used by MDs to guide clinical practice .....	1	2	3	4	5
b. Guidelines should be used by RNs to guide clinical practice .....	1	2	3	4	5
c. Guidelines should be used by RMs to guide clinical practice .....	1	2	3	4	5
d. Health care facilities should adapt guidelines into policies .....	1	2	3	4	5
e. BCRCP should continue to develop, revise, and distribute guidelines .....	1	2	3	4	5
f. BCRCP should have a program to actively implement guidelines .....	1	2	3	4	5
g. BCRCP should continue to distribute guidelines for other professional organizations, e.g., SOGC and CPS .....	1	2	3	4	5

17. The following strategies should be used by BCRCP to increase awareness of newly published guidelines: (tick all that you think should apply)

- ☐ Provide notice in medical journals                      ☐ Provide notice on the BCRCP website  
☐ Provide notice in nursing journals                      ☐ Distribute to health care facilities throughout B.C.  
☐ Provide automatic electronic email notice                      ☐ Other (Comment):  
☐ Provide notice in Perspectives Newsletter

18. How many BCRCP Guideline Manuals do you have in your facility? \_\_\_\_\_ Don't know \_\_\_\_\_

19. Indicate whether you agree or disagree with the following statement:

"My facility perinatal policies generally reflect the content of the BCRCP clinical practice guidelines."

Strongly Disagree	Disagree	Agree	Strongly Agree	Don't Know
1	2	3	4	5

20. How are the manuals in your facility updated? Check one only.

- ☐ BCRCP hard-copy mail outs
- ☐ Downloading new / revised guidelines from the BCRCP website
- ☐ The manuals are not updated
- ☐ Don't know

21. Does your facility have a process by which to adapt clinical practice guidelines into facility policies and procedures?

☐ Yes                      ☐ No                      ☐ Don't know

22. If you answered yes to 21, please indicate the processes that are used at your facility to adapt guidelines into facility policies and procedures.

- ☐ Review of the guidelines by the perinatal committee
- ☐ Review of the guidelines by the policy and procedure committee
- ☐ At the discretion of the manager
- ☐ Other (please specify)

23. Has your facility incorporated guidelines into quality management strategies?

☐ Yes                      ☐ No                      ☐ Don't know

If yes, please explain:

24. Over and above the issues raised in the survey, how do you think the BCRCP guideline program could be improved?

25. What are the strengths of the BCRCP guideline program?

Other Comments:

*Thank you, your participation is greatly appreciated!*

## APPENDIX H

### Content Validity Rating Scale and Form

#### Evaluation of Clinical Practice Guidelines

##### Measuring Content Validity

##### BCRCP Interdisciplinary Support and Education Committee (ISEC)

February 25, 2004

The following two surveys have been designed to evaluate the BCRCP Clinical Practice Guidelines program. One survey is for managers of facilities that offer planned maternity care services and the other is for perinatal practitioners – MD's, RN's, and PHN's. As a perinatal expert, you are asked to participate in the evaluation of content validity of these survey tools.

The purpose of the survey is to determine the extent that perinatal care providers in BC are aware of, and use BCRCP guidelines in their practices. For the survey designed for facility managers, it is also desirable to determine the extent that guidelines are incorporated into facility policies, procedures, and quality assurance programs. The questions are predominantly based on innovation – diffusion theory. Innovation – diffusion theory as described by Rogers (1983) outlines the process by which individuals adapt to innovations, and is dependant on effective communication of information among a group of individuals over a period of time. The components of the innovation itself may also affect the rate at which the innovation is adopted. These components include the perceived relative advantages of the innovation, the compatibility of the innovation with existing values and norms within one's social system, the perceived complexity of the innovation, the degree to which the innovation is considered experimental, and the degree to which the benefits of the innovation are observable to others.

The other theoretical components considered in this survey include research utilization theory and the factors that act as either barriers or facilitators in the uptake of new information. Lastly, the AGREE Instrument (2002) (which is designed to evaluate guideline rigor) is used as a guide to determine what components of the BCRCP guideline program may need to be revised to improve its effectiveness and credibility.

The theoretical domains of the questionnaires may be summarized as follows:

- Demographic Information
- Relative Advantages of guidelines
- Compatibility with existing values/attitudes
- Complexity / perceived difficulty in using guidelines

- Degree guidelines are considered experimental
- The social influences on adapting guidelines
- Communication – effective channels of communication to disseminate CPGs
- Awareness of guidelines
- Uptake and use of guidelines
- AGREE Evaluation Tool components

There are two packages of attachments. Each package includes the following:

1. Survey tools
2. Instructions and Rating forms

Could you kindly complete the rating forms and FAX to: . Responses are requested by March 15<sup>h</sup>, 2004. Thank you kindly for your participation.

Diane Sawchuck PhD(c)  
Clinical Guidelines Coordinator,  
BCRCP

### Instructions and Rating Form: Manager Survey

Name:

Please rate each of the 24 questions of the Clinical Practice Guidelines Evaluation Questionnaire: Manager Survey as to its relevance to the evaluation of BCRCP Clinical Practice Guidelines using the following scale:

1	2	3	4
Not relevant	Unable to assess relevance without item revision – OR item is in need of such revision that it would no longer be relevant	Relevant but needs revision	Very relevant and succinct

Please indicate your numerical response corresponding with the Clinical Practice Guidelines Evaluation Questionnaire: Manager Survey numbers below:

Item number	Rating (1-4)	Item number	Rating (1-4)	Item number	Rating (1-4)
1		12 g		13 j	
2		12 h		13 k	
3		12 i		13 l	
4		12 j		13 m	
5		12 k		13 n	
6		12 l		13 o	
7		12 m		13 p	
8		12 n		14	
9		12 o		15 a	
10		12 p		15 b	
11 a		12 q		15 c	
11 b		12 r		15 d	
11 c		12 s		15 e	
11 d		12 t		15 f	
11 e		13 a		16	
11 f		13 b		17	
11 g		13 c		18	
12 a		13 d		19	
12 b		13 e		20	
12 c		13 f		21	
12 d		13 g		22	
12 e		13 h		23	
12 f		13 i		24	

For each item you rated as a “2” or “3,” please indicate your recommended revisions on page 4.

### Instructions and Rating Form: Practitioner Survey

Name:

Please rate each of the 24 questions of the Clinical Practice Guidelines Evaluation Questionnaire: Practitioner Survey as to its relevance to the evaluation of BCRCP Clinical Practice Guidelines using the following scale:

1	2	3	4
Not relevant	Unable to assess relevance without item revision – OR item is in need of such revision that it would no longer be relevant	Relevant but needs revision	Very relevant and succinct

Please indicate your numerical response corresponding with the Clinical Practice Guidelines Evaluation Questionnaire: Practitioner Survey numbers below:

Item number	Rating (1-4)	Item number	Rating (1-4)	Item number	Rating (1-4)
1		13 f		14 i	
2		13 g		14 j	
3		13 h		14 k	
4		13 i		14 l	
5		13 j		14 m	
6		13 k		14 n	
7		13 l		14 o	
8		13 m		14 p	
9		13 n		15	
10		13 o		16 a	
11		13 p		16 b	
12 a		13 q		16 c	
12 b		13 r		16 d	
12 c		13 s		16 d	
12 d		13 t		16 e	
12 e		14 a		16 f	
12 f		14 b		17	
12 g		14 c		18	
13 a		14 d		19	
13 b		14 e		20	
13 c		14 f		21	
13 d		14 g			
13 e		14 h			

For each item you rated as a “2” or “3,” please indicate your recommended revisions on page 4.

Name:

1. Recommended revisions: Manager Survey.

Item number	Suggested Revision
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2. Recommended revisions: Practitioner Survey.

Item number	Suggested Revision
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3. Please comment on the overall format and presentation of the surveys

4. Please include any questions not on the surveys that you think should be on the surveys.

## APPENDIX I

STUDY OF B.C. PERINATAL DATABASE GUIDELINES AND OUTCOMES –  
INDUCTION GUIDELINE

## RESEARCH REQUEST #2004005

## DATA PARAMETERS

**PLEASE NOTE: ALL DATA IS FOR THE MOTHER DELIVERY EPISODE OF CARE OR THE NEWBORN EPISODE OF CARE, UNLESS OTHERWISE STATED.**

## MATERNAL DATA

<b>DATA SET:</b>	Mothers delivering a baby > 20 weeks or attaining a weight of at least 500 grams in British Columbia. Late terminations have been excluded.
<b>DATE RANGE:</b>	Facilities with <500 births in a fiscal year – April 1, 1998 to March 31, 2003. Facilities with 500+ births in a fiscal year – April 1, 2000 to March 31, 2003.
<b>MOTHER ID:</b>	Mother study identification number (this number is on the Baby Data Table to identify the mother-baby link).
<b>DISCHARGE DATE:</b>	Date that mother was discharged from the delivery institution.
<b>DISCHARGE MONTH:</b>	Month that mother was discharged from the delivery institution.
<b>FISCAL YEAR:</b>	98/99 – April 1, 1998 to March 31, 1999.
<b>&lt;500 BIRTHS/YEAR:</b>	Mother delivered at an institution that had <500 births in that fiscal year (Y).
<b>PARITY:</b>	The number of previous pregnancies delivered at equal to or greater than 20 completed weeks gestation.
<b>NULLIP(AROUS):</b>	Mother who has no previous pregnancies delivered at equal to or greater than 20 completed weeks gestation.
<b>MULTIP(AROUS):</b>	Mother who has had one or more previous pregnancies delivered at equal to or greater than 20 completed weeks gestation. (Parity >=1)
<b>LABOUR TYPE:</b>	Spontaneous, Induced, None or Unknown. Spontaneous – Mother went into labour spontaneously and did not require instrumental or medicinal assistance to initiate labour. Induced – Mother received instrumental or medicinal assistance to promote labour, generally prior to the onset of first stage of labour.
<b>LABOUR AUGMENTED:</b>	Labour was assisted instrumentally or medicinally (generally) following the onset of the first stage of labour.



<b>LABOUR AUG- ARM:</b>	Labour was augmented with an Artificial Rupture of Membranes (ARM).
<b>LABOUR AUG- OXYTOCIN:</b>	Labour was augmented with Oxytocin.
<b>LABOUR AUG- PROSTAGLANDIN:</b>	Labour was augmented with Prostaglandin.
<b>LABOUR AUG- OTHER:</b>	Labour was augmented by a method other than noted above (eg foley catheter, misoprostal).
<b>LABOUR INDUCT- ARM:</b>	Labour was induced with an Artificial Rupture of Membranes (ARM).
<b>LABOUR INDUCT- OXYTOCIN:</b>	Labour was induced with Oxytocin.
<b>LABOUR INDUCT- PROSTAGLANDIN:</b>	Labour was induced with Prostaglandin.
<b>LABOUR INDUCT- OTHER:</b>	Labour was induced by a method other than noted above (eg foley catheter, misoprostal).
<b>LABOUR INDUCT- UNKNOWN:</b>	Labour was induced by an unknown method (no documentation on chart).
<b>INDUCTION- PRIMARY INDICATION:</b>	<p>The diagnosis which best describes the principal or primary reason for induction:</p> <ul style="list-style-type: none"> <li>0 – Not Applicable</li> <li>1 – Post Term</li> <li>2 – Prelabour Rupture of Membranes</li> <li>3 – Fetal Compromise</li> <li>4 – Maternal Condition</li> <li>5 – Logistics</li> <li>6 – Fetal Demise</li> <li>7 – Other</li> <li>8 – Unknown</li> </ul>
<b>FIRST STAGE – LENGTH – MINUTES:</b>	The length of mother's first stage of labour in minutes for the first baby.
<b>FIRST STAGE – LENGTH – HOURS:</b>	The length of mother's first stage of labour in hours for the first baby.
<b>SECOND STAGE – LENGTH – MINUTES:</b>	The length of mother's second stage of labour in minutess for the first baby.
<b>SECOND STAGE – LENGTH – HOURS:</b>	The length of mother's second stage of labour in hours for the first baby.

**DELIVERY METHOD:** Assigned by highest level of intervention hierarchy

Vag – Spontaneous Vaginal Delivery

Breech-Vag – Vaginal Delivery of Breech Presentation

C/S – C/section

Assist-Vacuum Only – Vacuum Assisted Vaginal Delivery

Assist-Forceps Only – Forceps Assisted Vaginal Delivery

Assist-ForcepsAndVacuum – Forceps and Vacuum Assisted Vaginal Delivery

Assist-Other – Other Instrument Assisted Vaginal Delivery (Includes forceps rotation of fetal head, forceps application to aftercoming head, other specified instrumental delivery)

**C/S-PRIMARY**

The diagnosis that best describes the principal or primary reason for C/Section delivery:

**INDICATION:**

- 1 – Breech
- 2 – Dystocia/CPD
- 3 – Fetal Comprromise
- 4 – Repeat C/Section
- 5 – Abruptio Placenta
- 6 – Placenta Previa
- 7 – Other
- 8 – Not Applicable
- 9 – Unknown
- 10 – Malposition/Malpresentation
- 11 – Active Herpes

**UTERINE RUPTURE:** Identified by ICD-9 Diagnostic codes 665.0 or 665.1 (Y).

**UTERINE RUPTURE** Identified by ICD-9 Diagnostic code (Y):

**- BEFORE LABOUR:** 665.0 – Rupture of uterus before onset of labour

**UTERINE RUPTURE** Identified by ICD-9 Diagnostic code (Y):

**- DURING LABOUR:** 665.1 – Rupture of uterus during and after labour

**CORD PROLAPSE:** Identified by ICD-9 Diagnostic code (Y):

663.0 – Prolapse of cord

**TETANIC**

**CONTRACTIONS:**

Identified by ICD-9 Diagnostic code (Y):

661.4 – Hypertonic, incoordinate or prolonged uterine contractions

Includes:

Cervical spasm

Incoordinate uterine action

Contraction ring (dystocia)

Retraction ring

(pathological)

Dyscoordinate labour

(Bandl's)

Hour-glass contraction of uterus

Tetanic contractions

Hypertonic uterine dysfunction

Uterine dystocia NOS

Uterine spasm

**FETAL**

**COMPROMISE:**

Identified by ICD-9 Diagnostic code (Y):

656.8 – Other specified fetal and placental problems

Lithopedian

Abnormal acid-base balance

Intrauterine acidosis

Meconium in liquor

(includes fetal distress – persistent late decelerations, prolonged decelerations, low/flat baseline, decreased FH to below 80

bpm (if occurs immediately prior to delivery Do Not Code), meconium in liquor as reason for intervention.)

**SHOULDER  
DYSTOCIA:**

Identified by ICD-9 Diagnostic code (Y):  
660.4 – Shoulder Dystocia  
Impacted shoulders

**PREVIOUS  
C/SECTION:**

Previous pregnancy(ies) resulted in a C/Section delivery.

**VBAC ELIGIBLE:**

Determined by previous C/Section, current pregnancy is a singleton with a cephalic presentation.  
(Cephalic is determined by two fields in the PDR. These are “baby presentation in labour” and “baby presentation at delivery”. Cephalic is “yes” when:  
Labour Presentation = cephalic; OR  
Labour Presentation = Unknown or Not Applicable  
AND  
Delivery Presentation – cephalic; OR  
Delivery Presentation = Transverse, Other, Unknown or Not Applicable AND Labour Presentation is cephalic;  
AND/OR “VBAC Attempted” field is “yes”.

**VBAC ATTEMPTED:** Vaginal birth after caesarean section was attempted.

**VBAC SUCCESSFUL:** Vaginal birth after caesarean section was attempted and was successful (vaginal delivery).

**ELECTRONIC FETAL  
MONITORING:** Electronic fetal monitoring (external and/or internal) was done during the first and/or second stage of labour.

**GESTATIONAL AGE  
FIRST BABY:** Final gestational age in completed weeks of first baby of this delivery episode.

## NEWBORN DATA

<b>DATA SET:</b>	Newborns linked to mothers delivering a baby > 20 weeks or attaining a weight of at least 500 grams in British Columbia. Late terminations have been excluded.
<b>DATE RANGE:</b>	Facilities with <500 births in a fiscal year – April 1, 1998 to March 31, 2003. Facilities with 500+ births in a fiscal year – April 1, 2000 to March 31, 2003.
<b>BABY ID:</b>	Baby study identification number.
<b>MOTHER ID:</b>	Mother study identification number (this number identifies the mother-baby link).
<b>DISCHARGE DATE:</b>	Date that baby was discharged from the delivery institution.
<b>DISCHARGE MONTH:</b>	Month that baby was discharged from the delivery institution.
<b>FISCAL YEAR:</b>	98/99 – April 1, 1998 to March 31, 1999.
<b>&lt;500 BIRTHS/YEAR:</b>	Mother delivered at an institution that had <500 births in that fiscal year (Y). DATA SET: Newborns linked to mothers as identified above in Maternal Data.
<b>SCREEN SOURCE:</b>	Indicate this is a newborn (NB) episode of care.
<b>BABY SEQUENCE:</b>	The birth sequence of the baby (eg 1 – singleton or first twin, first triplet; 2 – second twin, second triplet, etc.)
<b>MULTIPLE BIRTH COUNT:</b>	A birth is singleton (1), twin (2), triplet (3), etc.
<b>BIRTH WEIGHT:</b>	Weight of baby at admission (birth) in grams. (Where the field contains 0, 1 or is blank indicates that the actual weight is unknown.)
<b>GESTATIONAL AGE:</b>	Gestational age at time of delivery, recorded in completed weeks.
<b>GESTATIONAL AGE GROUPING:</b>	Gestational age at time of delivery, recorded in completed weeks grouped as follows: <37, 37-40, 41, 42, >42, Unknown
<b>STILLBIRTH:</b>	The complete expulsion or extraction from its mother after at least 20 weeks pregnancy or after attaining a weight of at least 500 grams, of a product of conception in which, after the expulsion or extraction, there is no breathing, beating of heart, pulsation of the umbilical cord or unmistakable movement of voluntary muscle. P – Prior to onset of labour A – During labour (after onset of first stage of labour) U – Unknown if prior to or during labour N – Not applicable
<b>1 MINUTE APGAR:</b>	Total Apgar score at 1 minute of age.
<b>5 MINUTE APGAR:</b>	Total Apgar score at 5 minutes of age.

<b>10 MINUTE APGAR:</b>	Total Apgar score at 10 minutes of age.
<b>DISCHARGE TO:</b>	Indicates where baby was discharge/transferred to following the newborn episode of care. <div style="display: flex; justify-content: space-between;"> <div> H – Home  A – Adoption  F – Foster Home </div> <div> O – Other Hospital  D – Death/SB  U – Unknown </div> </div>
<b>THICK MECONIUM:</b>	Thick meconium is present at delivery.
<b>MECONIUM ASPIRATION:</b>	Identified by ICD-9 diagnostic code: 770 - Other respiratory conditions of fetus and newborn 770.1 – Massive aspiration syndrome Meconium aspiration syndrome Pneumonitis : fetal aspiration meconium
<b>REPIRATORY DISTRESS SYNDROME :</b>	Identified by ICD-9 diagnostic code: 769 Respiratory distress syndrome Hyaline membrane (disease)(pulmonary) Idiopathic respiratory distress syndrome of newborn (IRDS or RDS) (Excludes: transient tachypnea of newborn (770.6))
<b>FETAL DISTRESS BEFORE LABOUR:</b>	Identified by ICD-9 diagnostic code: 768 Intrauterine hypoxia and birth asphyxia 786.2 – Fetal distress before onset of labour, in liveborn infant Liveborn infant showing evidence of intrauterine hypoxia before onset of labour.
<b>FETAL DISTRESS DURING LABOUR:</b>	Identified by ICD-9 diagnostic code: 768 Intrauterine hypoxia and birth asphyxia 768.3 – Fetal distress first noted during labour, in liveborn infant Liveborn infant showing evidence of intrauterine hypoxia during labour or delivery.
<b>FETAL DISTRESS UNSPECIFIED:</b>	Identified by ICD-9 diagnostic code: 768 Intrauterine hypoxia and birth asphyxia 768.4 – Fetal distress, unspecified, in liveborn infant Liveborn infant showing evidence of intrauterine hypoxia before delivery, but not stated whether before or after onset of labour.
<b>SEVERE BIRTH ASPHYXIA:</b>	Identified by ICD-9 diagnostic code: 768 Intrauterine hypoxia and birth asphyxia 768.5 – Severe birth asphyxia Pulse less than 100/minute at birth and falling or steady, respiration absent or gasping, colour poor, tone absent. 1 Minute Apgar score 0 – 3. “White asphyxia”
<b>MILD/MODERATE</b>	Identified by ICD-9 diagnostic code:

<b>BIRTH ASPHYXIA:</b>	<p>768 Intrauterine hypoxia and birth asphyxia</p> <p>768.6 – Mild or moderate birth asphyxia</p> <p>Normal respiration not established within one minute, but heart rate 100 or above, some muscle tone present, some response to stimulation.</p> <p>1 Minute Apgar score 4 – 7.</p> <p>“Blue asphyxia”.</p>
<b>UNSPECIFIED BIRTH ASPHYXIA:</b>	<p>Identified by ICD-9 diagnostic code:</p> <p>768 Intrauterine hypoxia and birth asphyxia</p> <p>768.9 – Unspecified birth asphyxia in liveborn infant</p> <p>Anoxia, Asphyxia, Hypoxia – NOS, in liveborn infant.</p>
<b>VENTILATOR DAYS:</b>	Total number of days baby was on ventilation for the newborn episode of care.
<b>SEIZURES:</b>	<p>Identified by ICD-9 diagnostic code:</p> <p>779 Other and ill-defined conditions originating in the perinatal period</p> <p>779.0 – Convulsions in newborn</p> <p>Fits, seizures in newborn.</p>
<b>LOS MINUTES:</b>	Newborn episode of care total length of stay in minutes.
<b>LOS HOURS:</b>	Newborn episode of care total length of stay in hours.
<b>LOS DAYS:</b>	Newborn episode of care total length of stay in days.
<b>NICU LEVEL 3:</b>	Total number of days newborn stayed in NICU Level 3.
<b>CORD ARTERIAL GASES pH:</b>	The recorded pH value of the cord arterial gases.
<b>CORD ARTERIAL GASES BASE EXCESS/DEFICIT:</b>	The recorded base excess/deficit of the cord arterial gases.
<b>BIRTH TRAUMA (INJURIES):</b>	<p>Identified by ICD-9 diagnostic codes:</p> <p>767.0 – Subdural and cerebral hemorrhage</p> <p>767.1 – Injuries to scalp</p> <p>767.2 – Fracture of clavicle</p> <p>767.3 – Other injuries to skeleton</p> <p>767.4 – Injury to spine and spinal cord</p> <p>767.5 – Facial nerve injury</p> <p>767.6 – Injury to brachial plexus</p> <p>767.7 – Other cranial and peripheral nerve injuries</p> <p>767.8 – Other</p> <p>767.9 – Unspecified</p>
<b>IPPV WITH MASK:</b>	Intermittent Positive Pressure Ventilation by mask.
<b>IPPV WITH ETT:</b>	Intermittent Positive Pressure Ventilation by Endotracheal Tube.
<b>PERINATAL DEATH:</b>	Includes stillbirths and live births up to and including 7 days of life. Death data has been used from BC Vital Statistics that was matched to our data for 1999/2000, 2000/2001 and 2001/2002 data.

- NEONATAL DEATH:** Includes live births up to and including 28 days of life. Death data has been used from BC Vital Statistics that was matched to our data for 1999/2000, 2000/2001 and 2001/2002 data.
- TRANSPORT:** The newborn is transferred to another acute facility following the newborn episode of care.
- BABY PRESENTATION AT DELIVERY** Presenting part of the baby at delivery. Codes in field indicate:
- 1 – Breech, NOS - Breech not otherwise specified. Baby is breech but specific type is not identified
  - 2 – Frank Breech - Breech presentation where the thighs may be flexed and the legs extended over the anterior surface of the body.
  - 3 – Footling Breech – One or both feet are lowermost.
  - 4 – Complete Breech – Breech presentation where the thighs may be flexed on the abdomen and the legs upon the thighs. If frank breech is recorded, do not code complete breech.
  - 5 – Incomplete Breech – One or both feet, or both knees are lowermost. If footling breech is recorded, do not code incomplete breech.
  - 6 – Vertex – The head is presenting (cephalic).
  - 7 – Transverse – The long axis of the fetus lies at right angle to that of the mother.
  - 8 – Other – The presentation is known, but is not one of those specified above.
  - 9 – Unknown – The presentation is not known.
  - 10 – Not Applicable
- BABY POSITION AT DELIVERY:** The position of the baby's head at delivery.
- 1 – Anterior – Fetal head in ROA, LOA or direct OA position.
  - 2 – Posterior – Fetal head in ROP, LOP or direct OP position.
  - 3 – Transverse – Fetal head in ROT or LOT position.
  - 4 – Other – Other position, or any other presentation other than vertex (indicating the top of the head) eg. Face, brow, breech, transverse lie.
  - 5 – Unknown – Unknown or unspecified position.
  - 6 – Not Applicable

Report Prepared For: Diane Sawchuck, Perinatal Nurse Consultant, BCRCP  
 Date Report Prepared: March 10, 2005  
 Date Report Revised: January 30, 2006  
 Request #: R2004005 – All Guidelines  
 Report Prepared By: Cathe Johnson, Analyst  
 BC Perinatal Database Registry  
 Data Source: BC Perinatal Database Registry  
 BC Reproductive Care Program  
 BC Vital Statistics, BC Ministry of Health

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## APPENDIX J

## Survey Cover Letter

**THE UNIVERSITY OF BRITISH COLUMBIA**

and

**British Columbia Reproductive Care Program (BCRCP)****EVALUATION OF BCRCP CLINICAL PRACTICE GUIDELINES  
FOR PERINATAL CARE**

January 4, 2005

As a provider of perinatal care within British Columbia, you have been sent a short survey to contribute to improved perinatal care in the province. Diane Sawchuck is a doctoral candidate at the University of British Columbia in the School of Nursing and is conducting a survey to evaluate the BCRCP Perinatal Clinical Practice Guidelines as part of her degree. The guidelines have been available in BC since 1990 and were originally designed for use for both physicians and nurses. To date, there has been no formal evaluation of the guidelines and hence their usefulness and effectiveness remain unknown. The purpose of this survey is to obtain information from interdisciplinary perinatal care-givers about BCRCP Clinical Practice Guidelines.

This survey consists of 25 questions and has been distributed to a sample of registered nurses working in acute maternal-care facilities in BC, community health nurses providing maternal-care services, registered midwives, and physicians with active obstetrical practices. The sample of hospital and community health nurses was randomly selected by the RNABC. RNABC then mailed the survey package so nurse identities remain anonymous to the researcher. Managers of all acute care facilities and community health units have also been asked to complete a survey. The managers were requested to place a survey in the mailbox of physicians who are involved in perinatal care. The researcher was not involved in that delivery process.

Your participation is entirely voluntary and you may refuse to participate without jeopardy. The survey will take approximately 20 minutes to complete. You are asked to complete all questions (unless directed otherwise in the survey) and then mail your completed survey back in the self-addressed and self-stamped envelope provided. Your responses are both anonymous and confidential. The results will be used to assist in the strategic direction of the BCRCP perinatal guidelines' program over the next few years. Data will be compiled and may be used for publication, but there will be no personal identifiers. If the questionnaire is completed and returned, it is assumed that consent has been given.

**Please complete and mail the survey by January 31<sup>st</sup>, 2005**



Thank you for taking the time to complete this survey. If you have any questions or desire further information with respect to this study, you may contact Diane Sawchuck at the BCRCP or her supervisor, Dr. Ann Hilton, Professor in the School of Nursing at UBC, (604) 822-7498. If you have any concerns about your treatment or rights as a research subject, you may contact the Research Subject Information Line in the UBC Office of Research Services at (604) 822-8598.

In acknowledgement for completing the attached survey, we would like to offer to you the opportunity to receive new or revised BCRCP Perinatal Guidelines by email at the time of their distribution. If you would like to receive new or updated guidelines by email, please complete the information below and fax it back to the BCRCP (604) 875-3747. Please note that this information request is totally separate from your completed survey and the process protects your anonymity. **Please print clearly.**

Name: \_\_\_\_\_ Email: \_\_\_\_\_

\_\_\_ MD    \_\_\_ RN    \_\_\_ PHN

Ms. Diane Sawchuck, RN, PhD(c)  
Clinical Practice Guidelines Coordinator