

Pushing Techniques Used by Midwives When Providing Second Stage Labor Care

Kathryn Osborne
Marquette University

Recommended Citation

Osborne, Kathryn, "Pushing Techniques Used by Midwives When Providing Second Stage Labor Care" (2010). *Dissertations (2009 -)*. Paper 44.
http://epublications.marquette.edu/dissertations_mu/44

PUSHING TECHNIQUES USED BY MIDWIVES WHEN PROVIDING SECOND
STAGE LABOR CARE

by

Kathryn Osborne, BSN MSN CNM

A Dissertation Submitted to the Faculty of the Graduate School,

Marquette University,

In Partial Fulfillment of the Requirements for

the Degree of Doctor of Philosophy

Milwaukee, Wisconsin

May 2010

ABSTRACT
PUSHING TECHNIQUES USED BY MIDWIVES WHEN PROVIDING SECOND
STAGE LABOR CARE

Kathryn M. Osborne, BSN MSN CNM

Marquette University, 2010

A growing body of evidence suggests that spontaneous pushing during the second stage of labor results in better outcomes than directed pushing, which usually involves repeated use of the Valsalva maneuver. However, birth attendants in the United States (U.S.) continue to use directive methods when caring for women in the second stage of labor. This study used quantitative methods with the *Theory of Diffusion of Innovations* as a framework to identify and describe the practices used by certified nurse-midwives and certified midwives, practicing in the U.S., when caring for women in second stage labor. Data were gathered using a questionnaire mailed through the U.S. Postal Service. Implications for nursing practice, nursing education and nursing research are identified. The literature regarding what is known about pushing methods used during second stage labor is reviewed, as well as the philosophical underpinnings and theoretical framework of the present study. Findings revealed that midwives provide care during second stage labor that is primarily supportive of women's physiologic urge to bear down. When midwives use directive methods, they do so as an intervention to prevent potential problems. Further, midwives offer "supportive direction" in response to cues they receive from women in labor.

ACKNOWLEDGMENTS

Kathryn Osborne, BSN MSN CNM

I would like to extend special thanks to my dissertation committee members, Dr. Lisa Hanson, Dr. Leona VandeVusse, and Dr. Kate Harrod for the assistance they have provided me over the last several years. Their willingness to share their time and wisdom afforded me the opportunity to approach the conduct and reporting of this research with new ways of thinking about scholarly inquiry. I am especially grateful to Dr. Lisa Hanson, who served as my committee Chair, and who provided me with invaluable (and timely) feedback and mentorship throughout the course of my doctoral education. In addition to encouraging me to take on this study, Dr. Hanson provided just enough direction to keep me on the correct path (and find my way back when I strayed), encouragement when I wasn't sure I could go much further, and solace when I was learning from my mistakes. She has indeed been a midwife's midwife; assisting in the birth of a new member of the scientific community.

I would like to thank Dr. Kathleen Thompson for the guidance and assistance she provided as my statistical consultant. I also thank Dr. Susan Stone, the Dean of the Frontier School of Midwifery and Family Nursing for providing financial support and a work environment that allowed me the time I needed to take on this scholarly endeavor. I am grateful to have had the opportunity to learn about survey research from a leading expert in the field, Dr. Nora Schaeffer. And I thank the faculty of the College of Nursing at Marquette University for helping me to think in new and exciting ways about nursing theory, research, education and scholarly inquiry.

I would like to thank several organizations which provided funding for this research, including the Frontier Nursing Service Foundation, The Delta Gamma Chapter of Sigma Theta Tau International, and the Wisconsin Nurses Association.

I would also like to thank my classmates for the countless hours we spent together uncovering new knowledge. Working with them enriched my education in many ways and taught me that the process of inquiry really does occur best when conducted with individuals who view phenomena from multiple perspectives.

I am especially grateful for the midwives who participated in the focus groups, developmental interviews and the national survey. Without their willingness to share their knowledge, this research would not have been possible.

I am also grateful for the friends and family who cheered me on and offered words of encouragement when I needed them most. I thank my mother, Carolyn Splett for instilling in me very early in my life, a passion for keeping birth normal, and my father, Gilbert Splett who taught me the importance of life-long learning. I thank my children, Lindsay Lorang and Benjamin Osborne, for regularly reminding me that I was capable of doing this work, for providing the occasional diversion when I needed one, and for remaining patient with me when I needed to focus on school.

Finally, I would like to express my deepest gratitude to my husband, Patrick Osborne, who has remained steadfast by my side during the good times and the challenging times. By the time I reached the end of this journey he had heard more about second stage labor than many health care providers. I am thankful for his willingness to listen, and for all the help he offered to get the mailings out. But most of all, I am grateful for his constant faith in me and his belief in the midwifery model of care.

TABLE OF CONTENTS

LIST OF TABLES.....	vi
LIST OF FIGURES.....	vii
CHAPTER	
I. INTRODUCTION.....	1
Statement of the Problem.....	3
Purpose of the Study.....	4
Significance to Nursing.....	4
Significance to Nursing Education.....	6
Significance to Nursing Research.....	7
II. REVIEW OF THE LITERATURE.....	9
Philosophical Underpinnings.....	9
A Brief History of the Medicalization of Childbirth.....	10
Medicalization of Childbirth and the Shift of Power.....	13
Feminist Philosophy.....	15
Marginalization: A Critical Feminist Nursing Theory.....	16
Theoretical Framework.....	24
Outline of Literature to be Reviewed.....	30
Critical Review of the Literature	31
Pushing Techniques Used During the Second Stage of Labor.....	31
Physiologic Pushing: Spontaneous Bearing Down Efforts.....	35
The Valsalva Maneuver.....	38
Valsalva Pushing Compared to Open-Glottis Pushing.....	43

Coached Versus Uncoached Pushing.....	45
Recognizing the Phases of Second Stage Labor.....	50
Laboring Down with Epidural Anesthesia.....	53
Immediate Versus Delayed Pushing.....	54
Duration of the Second Stage of Labor:	
How long is too long?.....	62
The Impact of Pushing Technique on Length of Second Stage Labor.....	67
Maternal and Neonatal Outcomes Related to Length of Second Stage of Labor.....	72
Relationships Between Pushing Techniques and Fetal Status/Outcomes.....	77
Relationships Between Pushing Techniques and Maternal Outcomes.....	80
Perineal Integrity and GU Functioning.....	81
Fatigue.....	83
Women’s Response to the Physiologic Urges of Second Stage Labor.....	86
Current Practices.....	90
Care Practices Which Enhance Spontaneous Bearing-Down Efforts.....	91
Barriers to Evidence Based Practice.....	96
Midwifery Management of Second Stage Labor.....	100
Gaps in the Literature.....	103
Assumptions of the Study.....	109
Research Questions.....	109
III. RESEARCH DESIGN AND METHODS.....	111

Preliminary Studies.....	111
Research Design.....	113
Concepts Under Investigation.....	114
Sample Size.....	117
Instrument.....	118
Procedure.....	122
Data checking and cleaning.....	123
Data Analysis.....	124
Limitations/Potential Difficulties.....	126
Human Subjects Protection.....	129
IV. Providing Care to Women in the Second Stage Labor: A Focus Group With Nurse-Midwives as Informants.....	131
V. Pushing Techniques Used by Midwives When Providing Second Stage Labor Care.....	157
BIBLIOGRAPHY.....	187
APPENDICES.....	198
A. Glossary of terms.....	198
B. Cover Letter and Self Administered Questionnaire.....	202
C. Follow-up Postcard.....	214
D. Cover letter/consent Form for Second Round Mailing.....	215
E. Significant Findings of data analysis.....	216

LIST OF TABLES

1. Quantitative studies included in the review of literature.....	32
2. Qualitative studies included in the review of literature.....	34
3. Maternal and neonatal outcomes related to length of second stage labor.....	65
4. Effect of pushing techniques on length of second stage labor and maternal/fetal outcomes.....	68
5. Questionnaire items and the concepts they measure.....	116

LIST OF FIGURES

1. Rate of adoption of an innovation.....27
2. Physiologic response to the two phases of the Valsalva maneuver.....39

CHAPTER 1

Introduction

Historically, the second stage of labor has been defined anatomically as the interval between the time when a cervix reaches full dilatation (10 centimeters) and the birth of the baby (Friedman, 1954). The second stage of labor is often characterized by regular, frequent contractions during which the woman in labor feels vaginal pressure, rectal pressure, and an overwhelming urge to bear down. During the second stage, maternal bearing down efforts aid in fetal descent as the fetus completes the cardinal movements of labor, rotating and descending through the maternal pelvis (Liao, Buhimschi, & Norwitz, 2005). Management of the second stage of labor has typically included a ritualistic set of behaviors that begins with an announcement that the woman is fully dilated and therefore ready to push, and continues with instruction for the woman to hold her breath and push for prolonged periods of time with each contraction (Bergstrom, Roberts, Skillman, & Seidel, 1992; Hanson, 2006; Roberts & Woolley, 1996). Managing second stage in this manner has been widely used by maternity care providers for many decades in an attempt to hasten fetal descent and shorten the length of the second stage of labor despite a lack of evidence regarding its efficacy and safety (Barnett & Humenick, 1982; Beynon, 1957; Bloom et al., 2006; Roberts & Hanson, 2007). Many authors refer to this style of second stage management as “traditional management”. However, as will be demonstrated, this style of management wherein *authoritative pushing* has replaced *spontaneous pushing* during the second stage of labor (see Appendix A for Glossary of

terms) appears to have gained popularity during the mid 20th Century and has only been used for a relatively short period of time.

Criticism of directing women to use long, sustained pushes during second stage labor dates as far back as the middle of the 20th century, when Dr. Grantly Dick Read (1947) described the safety and efficacy of what he referred to as “physiological labor”; labor that is undisturbed by mechanical, physical, or psychological means. Read (1947) described the involuntary pushing that occurs near the onset of second stage and advised that the woman in second stage labor should be allowed to “follow the lead of her uterus” (p. 705). Ten years later, Constance Beynon (1957) leveled harsh criticism at her colleagues who “still seem to consider it their function to aid and abet and even coerce the mother into forcing the foetus as fast as she can through her birth canal” (p. 815). Beynon (1957) went on to describe her observations while allowing women to engage in what she termed “the spontaneous second stage”. Included in these observations was the fact that most women required less voluntary straining than was practiced at the time; that as the fetal head neared the pelvic floor the straining efforts became involuntary and irresistible; that the patient’s involuntary straining did not begin until well after the contraction had been established; and that the amount of straining and exertion by the woman varied significantly with each contraction. Almost twenty years passed before the first studies were conducted to evaluate the safety and efficacy of abandoning directive methods of managing the second stage of labor.

Over the past thirty years, much research has been conducted to more fully understand the second stage of labor. The body of evidence regarding the second stage of labor includes information about two distinct approaches to caring for women who are

pushing during second stage labor: directive approaches that include providing instructions to use long sustained Valsalva pushes, and supportive approaches that encourage spontaneous pushing in response to the involuntary physiologic urges women experience during the second stage of labor. An in-depth review of the literature demonstrates that directive approaches to pushing do not result in improved outcomes for mothers or babies (Bloom et al., 2006; East, Dunster, & Colditz, 1998; Hansen et al., 2002; Paine & Tinker, 1992; Roberts et al., 2004; Woolley & Roberts, 1995). In fact, both maternal and neonatal outcomes are improved when women are allowed to push in response to their own spontaneous urges (Albers et al., 2006; Bloom et al., 2006; Caldeyro-Barcia et al., 1981; Barnett & Humenick, 1982; Fitzpatrick et al., 2002; Hansen et al., 2002; Maresh et al., 1983; Roberts et al., 1987; Sampsel & Hines, 1999; Schaeffer et al., 2005; Thomson, 1993; Yeates & Roberts, 1984).

Statement of the Problem

Despite this growing body of evidence demonstrating optimal outcomes when women push in response to their own physiologic urges during second stage, directing women to push using the Valsalva maneuver during second stage labor continues to be a technique that is widely used among birth attendants in the U.S. (Declercq et al., 2006). As a result, women who give birth in the U.S. are receiving care that is not evidence based and does not result in optimal maternal, fetal and neonatal outcomes.

Certified Nurse-Midwives (CNMs) and Certified Midwives (CMs) have been identified as early adopters of innovative second stage care practices (Hanson, 1998a). CNMs are midwives who were first educated as nurses and who have completed advanced education in the art and science of midwifery, most of whom hold a master's

degree. CMs are midwives who were not nurses prior to entering midwifery, but who have been educated in the art and science of midwifery and have attained a master's degree. CNMs and CMs are maternity care providers who believe in the normalcy of birth, the importance of intervening only when indicated based on the health and wellbeing of the maternal-fetal dyad, and remaining flexible in order to meet the unique needs of the individual women for whom they care (American College of Nurse-Midwives, 2004a; Kennedy & Shannon, 2004; Sinuefield, 1985). Further, CMs and CNMs promote patient autonomy (American College of Nurse-Midwives, 2002, 2004a). However, little is known about how CNMs and CMs support maternal bearing-down efforts during the second stage of labor.

Purpose of the Study

The purpose of this study was to learn from CNMs and CMs about the pushing techniques they use when caring for women during the second stage of labor. In addition to identifying current practices of CNMs and CMs, the factors which facilitate evidence based practice (supporting spontaneous pushing during second stage) and barriers to evidence based practice were also described. Finally, the existence of factors that affect the use of evidence in bearing-down practices during the second stage of labor were explored.

Significance to Nursing

CNMs and CMs are providers of labor and birth care who work along side of nurses and in some instances, physicians. As advanced practice nurses, CNMs serve as role models for nurses providing care at the bedside. CMs, who were not nurses prior to

entering midwifery, are educated to meet the same core competencies as CNMs upon completion of an accredited midwifery education program. Following passage of the same national certifying exam taken by CNMs, most CMs work in settings identical to CNMs, along side nurses. Just over 10% of all vaginal births in the U.S. are attended by CNMs and CMs, primarily in the hospital setting (American College of Nurse-Midwives, 2008). CNMs and CMs view labor and birth as a normal physiologic process (American College of Nurse-Midwives, 2002, 2004a). Because CNMs and CMs are often viewed as role models, the care provided by CNMs and CMs can influence the care that nurses, and sometimes physicians, give to their other patients.

Understanding the pushing techniques used by CNMs and CMs provides important information about the way in which these birth attendants make decisions, based on evidence, during second stage labor. It also offers important information about the knowledge that is transmitted from these providers to their nursing and physician colleagues. Despite the fact that these midwives attend only a small percentage of births in the U.S., gaining an understanding about the way in which knowledge is disseminated among CNMs and CMs can be used to identify ways to enhance the adoption of evidence based practices to the larger population of maternity care providers, including nurses. Canam (2008) has conceptualized nursing as a knowledge driven enterprise and has identified the importance of recognizing the role of nurses (whose care is often unrecognized) on the health care team. Failing to articulate nursing practice and the knowledge that informs it, contributes to maintaining the status quo and the continued invisibility of nursing practice (Canam, 2008). This study makes visible the second stage care practices of CNMs and CMs, the majority of whom are advanced practice nurses.

Further, identifying the barriers to and facilitating factors for evidence based practice during the second stage of labor can help bridge the gap between research and practice. Doane & Varcoe (2008) argue that causes of the theory-practice gap in nursing are not necessarily epistemological, or knowledge based, but rather they are ontological in nature. Inquiry that fails to recognize who nurses are and how they function in every day practice is difficult, if not impossible, to implement. By identifying the barriers and facilitating factors nurses encounter with the use of physiologic management of the second stage of labor, this study recognizes the reality of implementing this evidence in every day practice. Once identified, nursing leaders can enact policies related to second stage labor care that remove the barriers to, and enhance facilitating factors for the use of evidence in practice.

Significance to Nursing Education

In 2003, the Institute of Medicine issued a report mandating that “all health professionals should be educated to deliver patient-centered care as members of an interdisciplinary team, emphasizing evidence-based practice, quality improvement approaches and informatics” (Institute of Medicine, 2003). What this means for nursing education is that program curricula, at all levels of nursing education, must be based on the best available scientific evidence. It is, therefore, crucial that undergraduate and graduate nursing education programs in maternal-child health include an evidence based understanding of best practices during the second stage of labor. Findings of this study can serve to inform nurse educators regarding the practice patterns of advanced practice nurses (CNMs) as well as best practices for second stage labor care, to be incorporated in both undergraduate and graduate nursing education programs.

The basic tenets of evidence based practice are consistent with the *Philosophy of the American College of Nurse-Midwives*. According to Melnyk & Fineout-Overholt (2005), evidence based practice is a “problem solving approach to clinical practice that integrates the conscientious use of best evidence in combination with a clinician’s expertise as well as patient preferences and values to make decisions about the type of care that is provided” (p. 6). Further, evidence based *nursing practice* is “the conscientious, explicit and judicious use of theory-derived, research-based information in making decisions about care delivery to individuals or groups of patients and in consideration of individual needs and preferences” (Whall, Sinclair, & Parahoo, 2006, p. 30). One of the goals of this study was to describe the second stage care practices of CNMs and CMs, who believe in the judicious use of technology and promote patient autonomy (American College of Nurse-Midwives, 2004a). Therefore, the findings of this study provide important information about the way advanced practice nurses make decisions about care practices which are based on scientific evidence and support individual patient autonomy. The findings relative to the way CNMs and CMs make practice decisions during second stage labor can inform educators about methods of teaching evidence based decision making to undergraduate and graduate nursing students as well as direct entry midwifery students (CMs).

Significance to Nursing Research

Since its inception, nursing practice has been based primarily on medical knowledge and knowledge borrowed from the social sciences. Not until the last half century did nurses begin to generate, and base their practice on, nursing knowledge (Newman, 1972/2004). Nursing research has been conducted to more clearly understand

many phenomena, including clinical therapeutics. More specifically, much nursing research has focused on therapeutic interventions that promote the health and wellbeing of patients and families (Gortner, 1983/2004a). Findings of this study contribute to the body of nursing knowledge regarding care practices used by CNMs and CMs based on the normalcy of pregnancy and birth, and used to promote the wellbeing of mothers and babies. It is further anticipated that the findings of this study will inform future research and the development of interventions which promote widespread adoption of evidence based practice during the second stage of labor.

CHAPTER 2

Review of the Literature

There is a vast body of evidence regarding the second stage of labor. Following a discussion of the philosophical underpinnings and the theoretical framework which informed this study, key studies that provide an understanding of what is known about second stage labor are critically reviewed here. Gaps in the literature and research questions to be answered with this study are also identified.

Philosophical Underpinnings

Since the time of the ancient Greeks, “philosophy” has been used to describe that which is known by human beings. Epistemology is the branch of philosophy that encompasses knowledge and individual ways of knowing (Silva, 1977/2004). In its earliest form, all knowing occurred from the perspective of empiricism; all knowledge came from sense experience, and that which was experienced by the knower was considered “the truth”. Since the time of Socrates, scientists have come to realize that true knowledge is subject to influence from multiple sources, and as a result many philosophical perspectives have emerged over time. Feminist philosophy is one perspective from which to view the acquisition of knowledge and the way in which knowledge is used (Gortner, 1993/2004b).

To the extent that feminist philosophy has as its focus the world of women in a male dominated society, and views the experiences of women as central to the generation of knowledge (Gortner, 1993/2004b), the basic tenets of feminist philosophy served to inform this study. These tenets include an awareness that the oppression of women is a

constant phenomenon inherent to all biological and social systems which are dominated by males, and that failure to impact change in these systems leads to undervaluing the individuality of women, as well as the contributions they make (Wittman-Price, 2004). Feminist philosophy recognizes that power and/or domination over women lead to oppression and serve to deny equality and perpetuate the silencing of women's voice. While focusing on the oppression of women, the aim of feminist philosophy is to advocate for societal change for both genders, as individuals and groups. Recognizing the oppressive nature of social systems is an important first step in bringing about equality for all groups. Once recognized, listening to and valuing the voices of women acknowledges the significance of personal knowing, and contributes to emancipation and autonomy (Wittman-Price).

An examination of the history of childbirth reveals that as physicians (most of whom were male) entered the birth room, women lost control of what had previously been considered a woman's affair (Leavitt, 1983). This loss of control placed physicians in positions of power. Women in the birth room, both those in labor and the midwives who served them, were silenced as the knowledge of physicians came to be viewed as superior to the knowing of women. Feminist philosophy offers a perspective from which to view the way power is used and identify the harmful effects of misplaced power.

A brief history of the medicalization of childbirth.

Germane to the discussion of feminist philosophy and its utility for examining birth practices, is the concept of medicalized childbirth and the way in which medicine has come to influence current practices in childbirth care. Some of the earliest accounts of women in labor and birth can be found in the art work of ancient people and the

records of anthropologists (Ashford, 1988). Through a chronologic analysis of art work, Ashford (1988) traced the changes that have occurred in childbirth practices over time. The earliest depictions of women in labor and birth, dated as far back as the ancient Aztecs, portray women as powerful, active participants in the process of labor and birth. Ashford (1988) describes a “classic birth pose” that can be seen in artistic depictions of birth well into the 19th century. Included in this pose are three important elements: birthing women have been portrayed in upright positions, actively involved in the process of giving birth, and surrounded by women “helpers” (Ashford, 1988).

It was not until the mid 1800s, when male physicians began to replace female midwives as birth attendants, that artistic images of women in labor and birth began to change; women were then portrayed in supine positions, passive (if even conscious), and alone. In the United States, this change occurred early in the 20th century as the place of birth moved from women’s homes to the hospital, and male physicians began replacing female midwives (Ashford, 1988). Only during the last 50 years, with the re-emergence of organized midwifery and a feminist examination of childbirth practices, has the portrayal of women in labor and birth returned to images that express the power of women in labor and birth (Ashford, 1988).

This story of the evolution of birth practices has been echoed by historians. Leavitt (1983) described changing birth practices in the United States, where until 1760, birth was strictly a woman’s affair; women were surrounded in labor and birth by midwives and their women friends who had previously given birth. Male physicians entered the birth room with forceps, drugs, and the promise of a safer childbirth experience. Women who could afford a physician eagerly invited them into their homes,

in hopes of a safer and less painful childbirth experience. By 1900 physicians were attending almost half of the births in the U.S., although still in women's homes where women remained largely in control of the childbearing experience; women determined who would be present for labor and birth and continued to make many of the decisions about how, where, and with whom they would give birth (Leavitt, 1983).

However, birth began moving to the hospital during the first two decades of the twentieth century, and by 1955, 95% of women in the U.S. gave birth in hospitals. This brought about a "medicalization" of childbirth, where birth was viewed as a pathological event which needed to be managed with physician intervention, and women relinquished control of the birth experience. Moving childbirth from home to hospital (considered the physician's domain) brought about a shift in the balance of power. Women were no longer the "main actor, but instead physicians acted upon women's bodies" (Leavitt, 1983, p. 302). The centuries old practice of social birth, where birthing women were "brought to bed" in their own homes by the women they had called together, had transitioned to so-called scientific birth, and women were "alone among strangers" (Leavitt, 1983, p. 302). Further, physicians and hospital staff were not able to achieve the safety they promised. The excessive and unsafe use of technology and anesthesia, as well as the spread of puerperal fever from unclean hands that had cared for sick patients, created new dangers that did not exist when childbearing women were attended by midwives, in their own homes (Leavitt, 1983)

Cahill (2001) argued that the medicalization of childbirth began as early as the 18th century when male physicians, armed with forceps and scientific knowledge obtained in formal institutions of higher learning (from which women were excluded),

began to replace midwives who relied on experiential learning and intuitive knowledge. As this care of women in labor and birth was transferred from the hands of midwives to physicians, pregnancy and birth began to be viewed as pathological and in need of active intervention. This ultimately threatened women's autonomy and led to a "reconceptualization of birth from a 'normal' and 'attended' life event to an 'abnormal' and 'managed' crisis that was pivotal to the success of medicine" (Cahill, 2001, p. 338). Cahill (2001) reminded readers that this medicalization has not led to maternity care practices which have resulted in improved outcomes, noting there is very little evidence regarding the efficacy of the wide spread, routine use of obstetrical interventions such as episiotomy, epidural anesthesia, induction and augmentation of labor, and continuous electronic fetal heart rate monitoring.

Medicalization of childbirth and the shift of power.

One of the consequences of the medicalization of childbirth, and movement of the place of birth from women's homes to the hospital, was a shift in power; the transfer of decision making from women in labor to the physicians who attended their births (Ashford, 1988; Cahill, 2001; Levitt, 1983). VandeVusse's (1999) work reconceptualized the essential forces that exert control and maintain power over the process of labor and birth. Nurses and physicians are taught about the essential forces of labor that have commonly been described as "the three Ps": the powers (contractions), passageway (pelvis) and passenger (fetus). The identification of two additional "Ps" (psyche and positioning) has been noted in the nursing literature and represented gradual movement away from the medical view of essential forces of labor, although it failed to recognize the perception of women who had actually experienced those forces (VandeVusse).

Through in depth interviews with women who had given birth, VandeVusse (1999) gave voice to the women, an important first step towards emancipation (Wittman-Price, 2004). Through women's voices the three Ps were reconceptualized to include 13 forces which the women reported as exerting control over labor and birth. While seven of these forces were identified as being internal forces that originated within the women themselves, six of the forces were identified as external, originating outside the control of women in labor. Among these, and central to the discussion of the shift in power that occurred with the medicalization of childbirth, were *professional providers*, *place of birth*, and *procedures*; three additional forces which profoundly affect the process of labor and birth (VandeVusse). The women in that study confirmed having experienced the same sense of powerlessness that has been identified by previous authors with regard to several of the essential forces of labor.

It is unclear exactly when the practice of directing women to use Valsalva pushing during the second stage of labor began. It has been suggested that instructions to push with prolonged Valsalva efforts were developed by childbirth advocates in the 1950s to overcome the disadvantage of the lithotomy position and to hasten delivery of the infant in order to prevent intervention with obstetrical forceps (Simkin & Anchetta, 2005). Given the history of the medicalization of childbirth, it is likely that intervening in the spontaneous process of labor and birth arose out of physicians' perceived need to manage and control a process they believed was inherently dangerous for both the mother and the baby. Feminist philosophy offers a perspective from which to view both the medicalization of childbirth and the need to reconceptualize childbirth to return control to women during labor and birth.

Feminist philosophy.

Feminist philosophers of science examine knowledge from a perspective that seeks to understand the way scientific knowledge is created and used to support practices that are, or may be, harmful or beneficial to women (McErlean, 2000). The history of the medicalization of childbirth described above, from the perspective of three feminist scholars, sheds light on the origins of contemporary labor and birth practices. As childbirth moved from women's homes to the hospital, and began to be seen as a pathologic process, decision-making about where, with whom, and how to give birth was transferred from women in labor to the physicians who cared for them. Viewed from a feminist perspective, the medicalization of childbirth has served to disempower women (both the midwives and the women they care for) without the benefit of improving childbirth outcomes (Cahill, 2001; Leavitt, 1983).

As control in the birth room shifted to the hands of physicians, an additional consequence was the devaluing of midwives and the knowledge midwives bring to labor and birth. The oppression of midwives in the U.S. reached its peak during the "midwife debates" in the 1920s and to some extent continues today (Rooks, 1997). CNMs and CMs are midwives who have experienced this oppression, and as such, are keenly aware of its consequences. As midwives regain their place in the birth room, guiding women towards healthy birth outcomes, they are well situated to recognize the harmful effects of oppression and to use care practices that enhance the autonomy of women in labor and birth. The study described in these chapters sought to examine the body of knowledge related to pushing during the second stage of labor, and to determine whether that knowledge is being used to improve outcomes for women and babies. Further, the study

described here sought to examine the pushing techniques used by CNMs and CMs and the extent to which these birth attendants use techniques that may improve outcomes for mothers and babies.

According to McErlean (2000), in addition to uncovering biased knowledge, feminist philosophy aims to influence social change. This study sought to learn from midwives about practices used during the second stage of labor which support a woman's ability to give birth spontaneously. It seems clear that through the process of medicalizing childbirth, the misuse of power over women, primarily by male physicians and hospital-based staff, has led to the use of care practices (such as directive pushing) that have not proven to be beneficial to women. Hearing from CNMs and CMs (the majority of whom are women) about the care practices they use while attending women in birth, provides an initial step towards understanding ways in which to return control in the birth room to the hands of women. It is anticipated that findings of this study will also be used in further research that aims to advance a change in practice; a change that returns the balance of power in the birth room to women who are capable of giving birth in response to the physiologic and instinctive urges they experience during the second stage of labor.

Marginalization: A critical feminist nursing theory.

Central to the discussion of the medicalization of childbirth practices are the women themselves; women who have, over time, relinquished some of the power and control over their own bodies to others in dominant positions in hopes of less painful and safer childbirth experiences (Leavitt, 1983). One of the consequences of this has been a *marginalization* of women in labor and birth, which leaves them vulnerable to poor health outcomes. Hall, Stevens, & Melies (1994) define marginalization as “the

peripheralization of individuals and groups from a dominant, central majority...a process through which persons are peripheralized on the basis of their identities, associations, experiences, and environments” (p. 25). Marginalization was described as a social process that produces both vulnerabilities (or risks) and strengths (or resilience). The properties of marginalization according to Hall et al. (1994) include 1) intermediacy, 2) differentiation, 3) power, 4) secrecy, 5) voice, 6) reflectiveness, and 7) liminality. These properties can be found in the experience of women in labor and birth and are described here.

1) *Intermediacy*, which is considered the essence of marginalization, is defined as “the tendency of human boundaries to act both as barriers and as connections” (Hall et al., 1994, p. 25). Further, 2) *differentiation* is defined as “the establishment and maintenance of distinct identities through boundary maintenance” (Hall et al., p. 26). Jordan’s (1994) examination of authoritative knowledge in childbirth sheds light on the way knowledge in the birth room, and the way it is communicated, serve to establish and maintain boundaries. These boundaries can leave birthing women on the periphery of the experience of labor and birth. Jordan (1994) described authoritative knowledge as a way of knowing that comes to be legitimized as superior to other ways of knowing and which is valued above all others. Authoritative knowledge is not related to its *correctness*, but rather to its *status* within social groups, which has been achieved in part through devaluing and dismissing other ways of knowing. It is through the devaluation of non-authoritative knowledge that hierarchical social structures are built and maintained (Jordan). Such is the case in American birth rooms, where women’s knowledge about their own bodies and the sensations they feel during labor have been dismissed, and

decisions about when and how to push during second stage are made based on the authoritative knowledge of physicians and other birth attendants.

Using previously recorded videotapes of women in the second stage of labor, Jordan (1994) identified the way in which obstetric technology and technical procedures shape the system of knowing in American birth rooms. Jordan (1994) posits that it is the *ownership* of the technology that defines who it is, in the birth room, that possesses authoritative knowledge. In American hospitals, the artifacts/technology of birth are owned by those who work within the institution; physicians and health care professionals who, as a result of possessing the authoritative knowledge, also control decision-making power (Jordan).

Identifying those who hold the decision making ability in American birth rooms leads to identification of another property of marginalization, 3) *power*. Hall et al. (1994) define power as “influence exerted by those at the center of a community over the periphery” (p. 27). Power held by those at the center is dependent upon the uncontested authority of those at the center, and keeps those on the periphery silent and invisible (Hall et al., 1994). As has been previously described, women relinquished much of their power in the childbearing experience in exchange for promises of a safe and less painful birth; a promise which has not been achieved (Leavitt, 1983). It is anticipated that the study described here will lead to further research that culminates in an intervention to return decision-making power about when and how they wish to spontaneously push, to women who are capable of giving birth without directions to push that include sustained breath holding as soon as the cervix is fully dilated.

The property of 4) *secrecy* is defined as the confinement of “information to establish interpersonal bonds, maintain trust, and avoid betrayal” (Hall et al., 1994, p. 28). Secrecy creates marginalized social groups, as information that increases access to resources is withheld from individuals on the margins (Hall et al., 1994). Not knowing the “secrets” that are held by those at the center limits the decision-making ability of those on the margins and requires that those on the margins maintain a degree of trust in their decision makers (Hall et al). Jordan (1993) identified that in American birth rooms, health care providers hold the knowledge about technology that is used during the childbearing process; knowledge that is not consistently shared with women in labor. For example, women in labor are often subjected to continuous electronic fetal monitoring and information about how the monitoring is interpreted is seldom shared with the women. This withholding of knowledge (or secrecy) maintains a hierarchical distribution of knowledge and allows the perpetuation of authoritative knowing (Jordan). Further, health care providers often look to the fetal monitor for information about the onset, duration, and strength of contractions as they make management decisions, rather than listening to feedback about contractions from the woman in labor. This kind of secrecy grants greater status regarding information about contractions to the fetal monitor, rather than the woman in labor, and enhances the authoritative knowing of those who hold the knowledge about this form of technology (Jordan).

5) *Voice* “as a property of marginalization is defined as the languages and forms of expression characterizing marginalized sub-cultures” (Hall et al., 1994, p. 31). The use of medical and scientific jargon is one way that health care professionals maintain a language that is different from their patients (Hall et al., 1994). In Jordan’s (1993)

examination of video tapes of a woman nearing the onset of second stage, the woman in labor seemed to be speaking a language that was much different from the language of the health professionals. The woman's language focused on the physiologic urges she was experiencing (the overwhelming need to bear down), while the nurse's language focused on the physician. As the nurse seemingly disregarded the voice of the woman in labor, her focus remained on the physician and the need to obtain permission before allowing the woman to begin pushing. Disregarding the woman's knowledge (and voice) about her readiness to begin pushing further validated the authoritative knowledge of the physician (Jordan, 1993). Jordan (1993) also identified a language disconnect between a nurse and the woman in labor for whom she was caring; a disconnect that granted authoritative knowledge about the contractions to the nurse. In that instance, the nurse relied on what she was seeing on the fetal monitor to tell the woman what was happening with her contractions, rather than listening to the cues the woman was giving her. The nurse's machine-based language provided entirely different knowledge about the contraction than what the woman was experiencing. For the nurse, the voice of the machine negated the voice of the woman (Jordan, 1993).

Hall et al., (1994) defined 6) *reflectiveness* as “the fragmenting and conflicting psychic effects on marginalized persons of discrimination, privatization, isolation, invisibility, and fragmentation and the interior work that is required to understand and compensate for these effects” (p. 30). Significant to the discussion of women nearing the second stage of labor and Jordan's (1993) observation of a woman whose voice is ignored, while the nurse awaits pronouncement from a physician that the woman is ready to push, exemplifies the notion of *invisibility*. The woman is essentially invisible; her

knowledge of the physiologic process she is experiencing is not authoritative and subsequently has no bearing on the decision to allow her to begin pushing.

Each of these properties culminate in 7) *liminality*, or the altered “perceptions of time, worldview, and self-image that characterize and result from marginalizing experiences” (Hall et al., 1994). Women who are marginalized during labor have lost their voice and have relinquished the power of decision-making to those who are perceived as holding authoritative knowledge; they are invisible in the decision-making process. As such, birth attendants have been able to exert authoritative knowledge over women in labor and birth. Viewed from this perspective, the directive approaches to pushing that are widely used in birth rooms in the U.S. can be conceptualized as authoritative pushing methods rather than traditional methods of pushing. Traditional methods of pushing likely included the spontaneous response of women to the physiologic urges and sensations they experienced in labor. Only since the middle of the 20th Century, with the medicalization of childbirth, have authoritative pushing, and the discounting of women’s knowledge about when and how to push, become the norm.

Indeed, childbearing women in the U.S. are a vulnerable population. Despite per capita health expenditures for the U.S. that exceed all other nations, maternal-child health outcomes in the U.S. are worse than most developed countries (Skala & Corry, 2008). In 2008, the U.S. ranked 27th (globally) in infant mortality (Save the Children, 2008). The degree to which this vulnerability has resulted from marginalization is yet unknown and deserves further inquiry. The study described here began the process of further inquiry by examining the care practices of CNMs and CMs, birth practitioners

whose philosophy adheres to a belief in the self determination of the women for whom they care (American College of Nurse-Midwives, 2004a).

In addition to identifying the marginalization of women in labor and birth, it is also important to recognize the marginalization of midwives that has occurred over time in the United States. As has been previously discussed, prior to the late 19th century, birth was a woman's affair and childbirth was attended primarily by women known as midwives. With the dawn of the 20th century, male physicians increasingly began to enter American birth rooms. In an attempt to eliminate midwifery practice and take control over childbirth, prominent physicians in the early 1900s launched what has come to be known as "the midwife debate" (Rooks, 1997). This campaign, which portrayed midwives as illiterate, dirty, and incompetent led to the near demise of midwifery in the U.S., while midwifery care flourished as the standard of care for pregnant women in other countries around the world. By 1960, 97% of births in the U.S. took place in the hospital under the care of a physician (Rooks).

The social movements of the 1960s and 1970s, as well as women's dissatisfaction with the medicalization of childbirth, led to a resurgence of midwifery in America (Rooks, 1997). Introduced during the 1920s by Mary Breckinridge and the Frontier Nursing Service, *nurse*-midwives were seen as an alternative to the lay midwife who had been maligned during the midwife debates, and an alternative to the physician who had managed to take control of the childbearing experience away from women (Rooks). The utilization of nurse-midwives in the U.S. has gradually increased, particularly during the last 40 years. However, despite documentation of the outstanding outcomes of nurse-midwifery care in the U.S. (Kennedy & Shannon, 2004) nurse-midwives (and certified

midwives) continue to care for a very small proportion of the population. Currently, CNMs/CMs attend roughly 10% of American births (American College of Nurse-Midwives, 2008). One explanation for the underutilization of CNMs and CMs is the marginalization of these birth care providers that has occurred over time (Cahill, 2001; Goodman, 2007).

Goodman (2007) described the strong economic and political power that is held by physicians in the U.S. Groups with this kind of power, who have also been granted authoritative knowledge, are able to escape accountability and assume positions of dominance (Goodman, 2007). Such is the case for physicians in American health care systems, who continue to play a dominant role in the provision of maternity care. Physician dominance in the American health care system is exemplified with something as simple as the name given to nurses who care for women in labor and birth. These nurses are commonly referred to as *obstetrical* nurses; nurses whose role it is to tend to the needs of the obstetrician rather than *maternity* nurses whose role it should be to attend to the needs of the mother.

One of the ways physicians maintain dominance in the health care system is through the exercise of political power. Powerful lobbying on behalf of the American Medical Association has contributed to passage of restrictive practice acts for CNMs and CMs in many states. For example, many states require CNMs and CMs to have a written collaborative agreement with a physician as a condition of licensure and practice. Consequently, CNMs and CMs are essentially required to obtain permission to practice from those at the center who, by refusing to grant permission to practice, successfully keep CNMs and CMs marginalized. This study aimed to hear from CNMs and CMs, birth

attendants who ascribe to a philosophy which supports women's autonomy and the right to self determination (American College of Nurse-Midwives, 2004a), about the pushing techniques they use when caring for women during the second stage of labor. Allowing CNMs and CMs to articulate their practice and the knowledge that informs it, by completing a detailed questionnaire, can contribute to altering the status quo including the practice constraints and marginalization experienced by CNMs and CMs (Canam, 2008).

It is important to note that while feminist philosophy has informed the overall aim of this study, the methods chosen for this study were not based on feminist philosophy or the methods of inquiry recommended for use with vulnerable populations. As feminist theorists, Hall et al. (1994) recommend using qualitative methods of inquiry that invite marginalized populations to talk at length about life experiences that block their access to resources and identify what they believe is needed to correct the situation. The study described here aimed to understand the care practices of CNMs and CMs during the second stage of labor, an important first step in the process of returning the power of decision-making to women in labor. In order to maximize the number of CNM and CM informants, quantitative methods were used for the current study. Future research using qualitative methods will build on the findings of this study. A description of the theoretical framework for this study helped conceptualize the way in which second stage practices, which are considered new and/or different, are disseminated to providers of labor and birth care.

Theoretical Framework

The process by which innovations are adopted and implemented by individuals or groups is a complex one and is influenced by multiple forces. Diffusion of innovations theory (Rogers, 2003) offers a theoretical framework for understanding this process and served as the framework for this study. According to Rogers (2003) “diffusion is the process by which an innovation is communicated through certain channels over time among the members of a social system” (p. 35). Viewed through this lens, diffusion becomes a form of communication that encompasses the spread of new ideas among members of a community. There are four key elements required for this diffusion of new ideas: *an innovation, communication channels, time*, and some sort of *social system*.

An *innovation* is a practice, idea, or object that is perceived by an individual or group as something new. An innovation is not necessarily something which is “new” in a chronological sense. Rather it is viewed by potential adopters of the innovation as “new” in a given context. The rate at which innovations are adopted is largely dependent upon five attributes of an innovation. These attributes include the innovation’s relative (a) advantage, (b) compatibility, (c) complexity, (d) trialability and (e) observability (Rogers, 2003).

Communication channels are the means through which information about the innovation is transferred. The most effective way to change attitudes about an innovation, and subsequently influence adoption and implementation, is through interpersonal communication. Rogers (2003) posited that rather than evaluating the merits of an innovation based on scientific research conducted by experts, most individuals base their opinion regarding an innovation on the subjective evaluation of their peers who have adopted the innovation. This belief sheds light on potential reasons

for gaps between research and practice that exist within health care systems in general, and more specifically within nursing practice. It may be that despite the volume of evidence with regard to specific practices, change in practice or the adoption of new ideas will not occur until nurses see their peers using the evidence, and that facilitating dialogue about new ideas will ultimately lead to the adoption of new (evidence based) care practices.

None of this transfer of knowledge regarding an innovation can occur without the existence of a *social system* which is engaged in joint problem solving to accomplish a common goal. The way in which social systems communicate information about innovations can either impede or facilitate adoption of the innovation. Within this system, *change agents* are those who attempt to influence others in the decision making process. Members of social systems look to these change agents, who are also their peers, as role models. The decision by members of a social system to imitate the behavior of these peers culminates in the overall diffusion of the innovation (Rogers,2003).

Time is a crucial element in the process of diffusion of innovations. The process of deciding to adopt an innovation occurs over time in a sequential manner. First, an individual receives knowledge of the innovation. They then form an opinion about the innovation and decide to adopt or reject the innovation. Following implementation, the individual confirms their decision to either adopt or reject the innovation. The relative speed with which an innovation is adopted among a social group is referred to as the *rate of adoption* (Rogers, 2003). The degree to which individuals adopt and implement any innovation, relative to other members in the group, is referred to as *innovativeness*. Rogers (2003) identifies five categories of innovativeness; adopter categories, used to

classify members of a social system on the basis of their innovativeness, which are germane to this study. Those categories are 1) innovators, 2) early adopters, 3) early majority, 4) late majority, and 5) laggards. When plotted over time (see figure 1) the rate of adoption among group members forms an S shaped curve (Rogers, 2003).

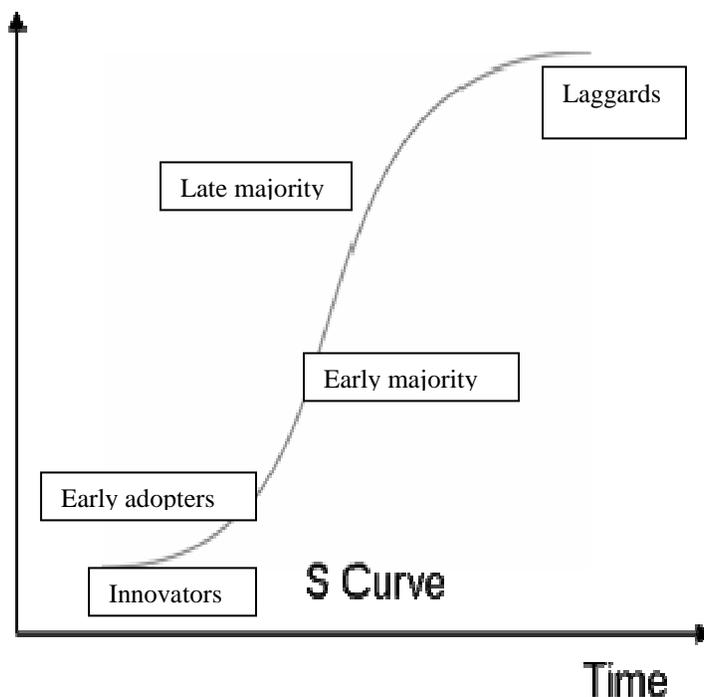


Figure 1. Rate of adoption of an innovation (Rogers, 2003)

Diffusion of innovation theory fits well as a framework for this study, which aimed to understand the extent to which CNMs and CMs have adopted pushing techniques for use during the second stage of labor which support women's spontaneous pushing, rather than directive methods of second stage management which use Valsalva pushing. Clearly, spontaneous pushing during second stage labor is not something "new"; it has been used by women giving birth since the beginning of time. However,

somewhere in the process of the medicalization of childbirth, health care providers began directing women to use Valsalva pushing during the second stage of labor. This method continues today. Consequently, although spontaneous pushing has been around for a very long time, viewed within the context of medicalized childbirth, spontaneous pushing is the *innovation* under consideration in this study. The *adopters* under consideration are CNMs and CMs. As the population under investigation in this study is CNMs and CMs who care for women in labor, the *methods of pushing* to be investigated will be those methods that are used by CNMs and CMs as they care for women in second stage labor, rather than the methods of pushing used by women themselves.

The American College of Nurse-Midwives (ACNM) provides a *social structure* with multiple channels of *communication* for dissemination of an *innovation over time*. The more than 4,000 members of ACNM interact on a regular basis. Each year, the College holds an annual meeting at which over 1,000 members convene in one location in the U.S. to discuss recent advances in women's health care, share recent research findings, and conduct the business of the College. In addition, the College is divided into six geographic regions; within each region there exist state chapters. These local chapters generally meet on a quarterly basis, allowing members to discuss and problem solve maternal-child health issues that may be state specific, and to network with other CNMs and CMs living and working in the same state. These state-wide and national meetings offer the opportunity for dissemination of new ideas and practices. Further, each region is represented by a member who is elected to serve on the Board of Directors and act as liaison to the national office. In addition, the *Journal of Midwifery and Women's Health* serves as the official publication of the ACNM. Through this journal, research related to

women's health, conducted by multiple provider types and from the perspective of multiple disciplines, is disseminated to readers. *Quickening* is a quarterly publication of the ACNM which serves as a news letter to inform members of issues related to health policy and practice.

CNMs and CMs with similar interests also convene regularly for the purpose of disseminating knowledge. For example, directors of midwifery education programs meet yearly to discuss issues related to midwifery education. Through meetings such as this, midwifery educators learn about best practices related to the education of future midwives. Similarly, CNMs and CMs meet regularly with members of their individual practice groups during staff meetings and educational inservices. This allows for the communication of information between all CNMs and CMs regardless of membership in the ACNM. Finally, in order to bring a global perspective to midwifery care, the International Confederation of Midwives (of which ACNM is a member organization) meets every three years to discuss advances in midwifery care and issues related to the delivery of maternal child health care world-wide. It is through these social networks that information about evidence based second stage management is diffused to potential adopters.

Diffusion of innovations has previously been used to identify factors which influence the use of alternative positions for women during the second stage of labor. Hanson (1998a) conducted a descriptive study of nurse-midwives in the United States using a national survey of ACNM members. Using Rogers' innovation diffusion theory as a framework for the research, Hanson (1998a) identified that nurse-midwives were "innovators" in their use of alternative positions during the second stage of labor.

Therefore, nurse-midwives and certified midwives were selected as the population of interest for this study rather than all nurses, physicians, or direct entry midwives (whose educational background is neither standardized nor formalized). Similar to Hanson's (1998a) study that examined the use of alternative positions by CNMs as an innovation, the research described here investigated the use of evidence based methods of supporting women's spontaneous bearing-down efforts by CNMs and CMs as an innovation in second stage care. Examining the care practices of these birth attendants, who have been previously identified as innovators and early adopters, can lead to diffusion of care practices which support women's spontaneous pushing. In addition to moving towards evidence based practice, this diffusion is an important first step towards shifting control in the birth room from physicians who have misused their power, to women who are capable of giving birth in response to the physiologic urges they experience during labor and birth.

Outline of Literature to be Reviewed

The process of identifying publications related to pushing techniques used during the second stage of labor began with an extensive online literature search using the Cumulative Index of Nursing and Allied Health Literature (CINAHL), MEDLINE, and Social Sciences in ProQuest. Search inclusion criteria required that the publication be written in English and published in a peer reviewed journal. No restriction based on date of publication was imposed in order to identify early works which may have contributed to this body of knowledge. This search strategy revealed several hundred publications, many of which appeared in more than one data base. A careful review of the abstract of each publication revealed 98 publications that were relevant to this study. Following a

thorough review of these publications, 56 were chosen for inclusion in this review of the literature; the remaining publications were primarily expert opinions and literature reviews that did not provide the findings of original research.

In addition to the search of online databases, the reference lists of each of the publications described above were reviewed in order to discover important ancestral documents. This search revealed additional documents, most of which were reports of scientific research. The literature search described above was repeated 10 months later as the principal investigator was initiating data analysis and revealed an additional five studies that had been published since the time of the initial search. A total of 51 studies were included in this review of the literature; two meta-analyses/systematic reviews, 16 randomized controlled trials (RCTs), six quasi-experimental studies, 22 non-experimental studies, and five qualitative studies. Table 1 presents the 46 quantitative studies and Table 2 presents the five qualitative studies.

Critical Review of the Literature

Pushing techniques used during the second stage of labor.

Early criticism of directed methods of pushing during the second stage of labor began to appear in the literature during the middle of the twentieth century. At that time, the common practice was for physicians to encourage women to begin pushing in the lithotomy position as soon as the cervix was completely dilated, and for her to do so in a manner that required her to take a deep breath and hold it for long, sustained periods of time (Beynon, 1957; Fitzhugh & Newton, 1956; Read, 1947).

Table 1. Quantitative studies included in review of literature

Study (Design)	Variables Under Consideration					
	Spontaneous vs. Directed Pushing	Closed vs. Open glottis	Delayed vs. Immed. Pushing	SSL Duration	Fetal - Neonatal Outcomes	Maternal Outcomes
Aderhold & Roberts, 1991 (Non-experimental)	X					
Albers et al., 1996 (Non-experimental)				X	X	X
Albers, 1999 (Non-experimental)				X	X	X
Albers et al., 2005 (RCT)	X					X
Albers et al., 2006 (RCT)		X				X
Aldrich et al., 1995 (Non-experimental)		X			X	
Barnett & Humenick, 1982 (Quasi-experiment)		X			X	
Bassell et al., 1980 (Non-experimental)		X				X
Beynon, 1957 (Non-experimental)	X					X
Bloom et al., 2006 (RCT)	X			X	X	X
Brancato et al., 2008 (Meta-analysis)			X	X		X
Buhimschi et al., 2002 (Non-experimental)		X		X		
Caldeyro-Barcia, 1979 (Non-experimental)		X			X	
Caldeyro-Barcia et al., 1981 (Non-experimental)	X				X	X
Cohen, (1984) (Non-experimental)				X	X	
Declercq et al., 2006 (Non-experimental)	X					X
Fitzpatrick et al., 2002 (RCT)			X	X	X	X
Fraser et al., 2000 (RCT)			X	X	X	X

Study (Design)	Variables Under Consideration					
	Spontaneous vs. Directed Pushing	Closed vs. Open glottis	Delayed vs. Immed. Pushing	SSL Duration	Fetal - Neonatal Outcomes	Maternal Outcomes
Friedman, 1954 (Non-experimental)				X		
Hansen et al., 2002 (RCT)			X	X	X	X
Kilpatrick & Laros, 1989 (Non-experimental)				X		
Lai et al., 2009 (Quasi-experiment)			X	X	X	X
LeRay et al., 2009 (RCT)			X	X	X	X
Maresh et al., 1983 (RCT)			X	X	X	X
Mayberry & Strange, 1997 (Non-experimental)	X					
Menticoglou et al., 1995 (Non-experimental)				X	X	X
Myles & Santolaya, 2003 (Non-experimental)				X	X	X
Paine & Tinker, 1992 (Quasi-experiment)		X		X	X	X
Perry & Porter, 1979 (Non-experimental)	X			X		
Petrou et al., 2000 (RCT)			X	X	X	X
Piquard et al., 1989 (Non-experimental)	X				X	
Roberts et al., 1987 (Non-experimental)	X			X		X
Roberts et al., 2004 (Meta-analysis)			X	X	X	X
Roberts et al., 2007 (Non-experimental)	X					
Rouse et al., 2009 (RCT)				X	X	X
Sampselle & Hines, 1999 (Non-experimental)	X					X

Study (Design)	Variables Under Consideration					
	Spontaneous vs. Directed Pushing	Closed vs. Open glottis	Delayed vs. Immed. Pushing	SSL Duration	Fetal - Neonatal Outcomes	Maternal Outcomes
Sampselle et al., 2005 (Non-experimental)	X					X
Schaffer et al., 2005 (RCT)	X					X
Simpson & James, 2005 (RCT)		X	X	X	X	X
Sprague et al., 2008 (Quasi- experimental)			X			X
Thomson, 1993 (RCT)	X			X	X	X
Thomson, 1995 (RCT [pilot])	X					X
Vause et al., 1998 (RCT)			X	X	X	X
Woolley & Roberts, 1995 (Quasi-experiment)		X			X	
Yeates & Roberts, 1984 (Quasi-experiment [pilot])	X			X	X	X
Yildirim & Beji, 2008 (RCT)	X			X	X	X

Table 2. Qualitative studies included in the review of literature

Study (Design)	Informants	Focus
Bergstrom et al., 1997 (videotape analysis)	Women in labor and their care providers	Communication during SSL between women and labor and care providers
Kennedy & Shannon, 2004 (Delphi-narrative analysis)	Midwives	Exemplary midwifery practice
McKay et al., 1990 (Videotape & narrative analysis)	Women whose labors had been videotaped at six months postpartum	Women's experience of second stage labor
Niesen and Quirk, 1997 (Narrative analysis)	Labor and birth care providers	Evaluation of SSL research utilization project
Sinquefield, 1985 (Narrative analysis)	Midwives	SSL management approaches

Among the concerns regarding this method of pushing were that strong, expulsive pushing very early in the second stage would lead to maternal exhaustion and that pushing in the lithotomy position resulted in unnecessary discomfort and an inefficient use of the abdominal muscles (Fitzhugh & Newton, 1956). Additionally, questions began to arise regarding the potential trauma to the perineum and supportive tissues of the genitourinary tract that occurred as a result of rapid and forceful descent of the fetal head (Beynon, 1957). Despite these early concerns, directive methods of pushing during the second stage of labor continued to be used for the next 50 years, and are widely used today.

Much of the research regarding pushing techniques has focused on describing maternal bearing down efforts, and the benefits of open versus closed glottis pushing. Researchers have also compared the maternal and fetal-neonatal outcomes of directed versus spontaneous pushing, and attempted to identify the most appropriate time to begin pushing during the second stage of labor. A concise summary of these studies was described in Tables 1 and 2. Findings of these studies are reported here in the review of literature.

Physiologic pushing: Spontaneous bearing-down efforts.

Beynon (1957) was among the first to examine spontaneous maternal bearing-down efforts through scientific inquiry. Her relatively simplistic clinical trial compared 100 healthy primigravidas who received no instruction to push, but rather “followed their own inclination” pushing when and for as long as they felt the urge, with 393 primigravidas cared for using directive methods. Despite the small sample size and the potential for measurement and sampling bias, this study provided evidence that among

the population studied, 83% of the women in the experimental group were able to give birth using spontaneous bearing-down efforts with no instruction to push and 81% did so with a total second stage length of less than two hours. In addition, the forceps rate, as well as the need for suturing among the experimental group, was almost half that of the women who pushed using directive methods (Beynon, 1957).

Very little was done to confirm the findings of Beynon until the conduct of a landmark study observing the efficacy and outcomes of births wherein women were simply instructed to push in response to spontaneous urges (Caldeyro-Barcia et al., 1981). In 1981, Caldeyro-Barcia et al. conducted a descriptive study with 12 uncomplicated primigravidas in spontaneous labor, to describe the relationship between spontaneous bearing down efforts and several maternal-fetal outcomes. All participants in the study assumed a sitting or semi-sitting position during second stage, and were instructed to push when they felt the urge; they were not instructed to use closed-glottis pushing. Findings of that study revealed that women made an average of 4.29 bearing down efforts per contraction throughout the duration of second stage labor, with an increase in average intrauterine pressure with each contraction from 88 mm Hg during the initial phase of second stage, to 119 mm Hg in the final phase. The average duration of the spontaneous bearing down efforts ranged from 0.93 seconds to 5.78 seconds, with the shortest efforts occurring as the contraction peaked. This was shorter than the duration of expulsive efforts the researchers had observed in women who were directed to push using the Valsalva maneuver. The researchers also observed an increased frequency in contractions and expulsive efforts exerted by the mother as labor progressed, leading to the identification of three distinct phases of second stage labor. During each contraction, the

interval between bearing-down efforts averaged 2 seconds, during which time the participants made several breathing movements. The researchers suggested that the breathing during these intervals minimized the fall in maternal pO_2 and rise in pCO_2 (Caldeyro-Barcia et al., 1981).

The fetal effects of spontaneous pushing identified by Caldeyro-Barcia et al. (1981) included frequent, transient “dips” in the fetal heart rate during maternal bearing down efforts. The researchers also discovered higher average umbilical vein pO_2 levels (33mm Hg), lower umbilical vein pCO_2 levels (35 mm Hg), and higher umbilical vein pH values (7.33) than were considered normal among women who pushed using directive methods. There was no difference in pO_2 or acid base balance of fetal blood between women who pushed 15-60 minutes and women who pushed 60-210 minutes, and all infants in the study were born with one minute Apgar scores of 8 or higher (Caldeyro-Barcia et al.). Limitations of that study include its small sample size and lack of randomization. However, the findings served as an early description of maternal and fetal outcomes when women pushed spontaneously.

To further understand the characteristics of reflexive maternal bearing-down efforts, 31 healthy primigravidas in spontaneous labor who had not been instructed or encouraged to push during second stage were observed by a team of researchers (Roberts, Goldstein, Gruener, Maggio, & Mendez-Bauer, 1987). In addition to researcher observation, data were also collected using intrauterine pressure catheters to identify the strength of uterine contractions and pressure exerted during bearing-down efforts. Findings of this study revealed that many women experienced the first bearing-down efforts prior to complete cervical dilatation, and that the fetal head was at +1 station or

lower when women first felt an urge to bear down. Twenty-five percent of spontaneous bearing-down efforts were accompanied by periods of breath holding (for no more than 4-6 seconds), while 75% were accompanied by release of air. Consistent with the findings of Caldeyro-Barcia et al. (1981), the number of bearing-down efforts per contraction increased as labor progressed (Roberts et al., 1987).

It is also important to recognize the effect of maternal posturing which enhances maternal bearing down efforts during the second stage of labor. Caldeyro-Barcia (1975) was among the first to suggest that non-supine positions should be used to enhance the physiologic processes of labor. More recently, the Cochrane review of randomized controlled trials regarding positions in the second stage of labor for women without epidural anesthesia (Gupta, Hofmeyr, & Smyth, 2004) demonstrated significant effects of maternal posture on both maternal and fetal outcomes. The review revealed that when compared with supine or lithotomy positions, the use of upright or lateral positions was associated with a significant reduction in duration of second stage labor, episiotomies, abnormal fetal heart rate patterns, and maternal report of severe pain at birth, and a small but significant reduction in assisted deliveries. The authors warned that findings of the review should be interpreted with caution because of the relatively poor methodological quality of the included studies. The authors concluded that women should be allowed to make informed decisions about positions for second stage labor and birth, and be encouraged to give birth in comfortable non-supine positions, most of which are upright (Gupta et al.).

The Valsalva maneuver.

The Valsalva maneuver, a forced expiratory effort against a closed glottis which is sustained for several seconds, was first described in the literature as a diagnostic measure by Leonard of Bertapaglia in 1497 (Junqueira, 2008). The maneuver, which did not have a name at the time of that publication, enabled physicians to visualize discharged cerebrospinal fluid in order to confirm the presence of a fractured skull. The maneuver was not named until it was described, in 1704, by Antonio Maria Valsalva as a way in which to expel foreign matter or exudates from the middle ear (Junqueira). In 1851 Edward Weber, a German physiologist, described the cardiovascular alterations associated with the maneuver (see Figure 2). Since that time, the Valsalva maneuver has been used both as a therapeutic measure in the fields of otolaryngology and urology, and a diagnostic procedure in the field of cardiology (Junqueira).

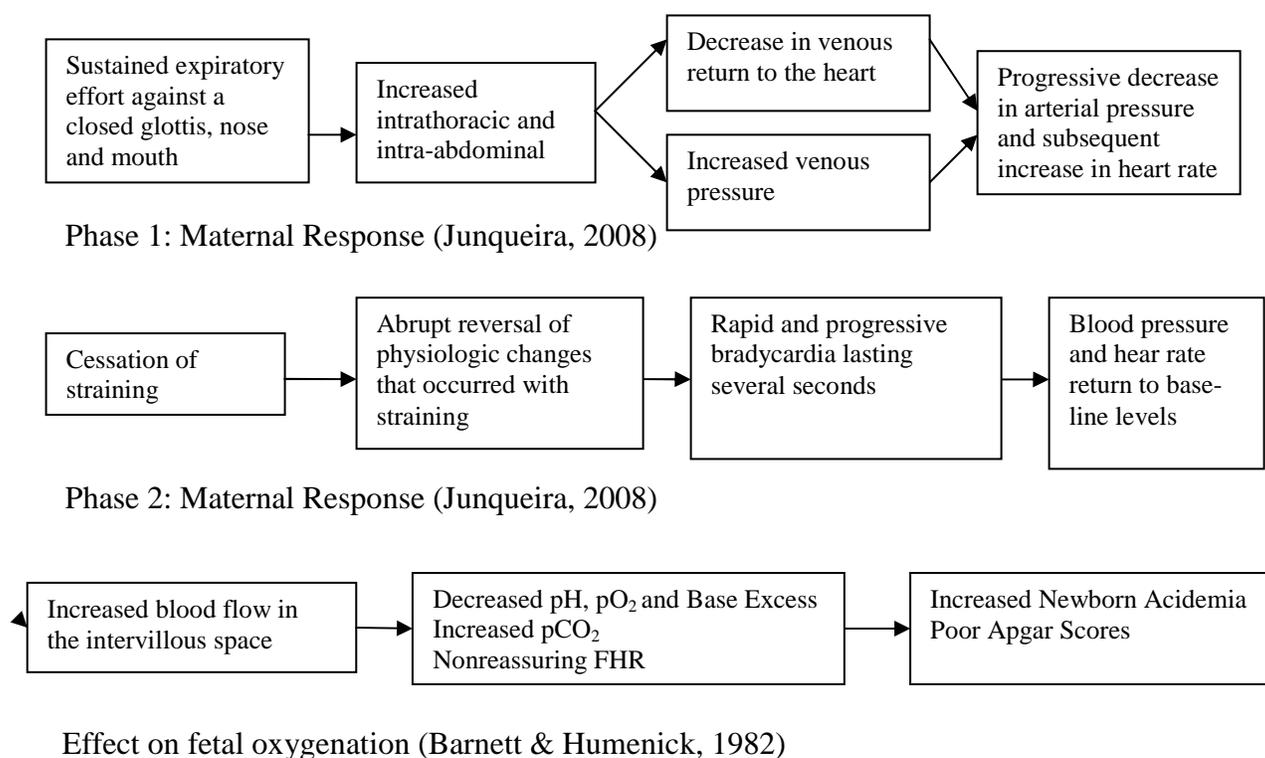


Figure 2. Physiologic response to the Valsalva maneuver

The Valsalva maneuver is also commonly employed as a major component of directive methods of pushing during the second stage of labor. It appears that this practice started in an effort to assist women to overcome the disadvantage of using the lithotomy position, prevent forceps delivery (Simkin & Ancheta, 2005), and shorten the length of second stage labor (Barnett & Humenick, 1982). When this technique is used, women are typically asked to take a deep breath and hold it while they push for sustained periods, often while someone in the room counts aloud to ten. As seen in Figure 2, the physiological response in the pregnant woman to Valsalva breath holding includes an increase in intrathoracic and intra-abdominal pressure, decrease in cardiac output with subsequent vasoconstriction, increased intrauterine pressure and a progressive decrease in maternal and uterine blood flow (Barnett & Humenick). Not surprisingly, some of the concerns regarding directive methods of pushing, which include repeated use of the Valsalva maneuver, revolve around the impact of these physiologic changes on the maternal-fetal dyad.

Caldeyro-Barcia (1975) was among the first to describe the physiologic effect of sustained use of the Valsalva maneuver that occurred with maternal bearing down efforts during the second stage of labor. Using fetal monitor tracings, Caldeyro-Barcia (1979) identified a relationship between maternal bearing down efforts with the Valsalva maneuver and changes in the fetal heart rate. The author also identified alterations in maternal blood pressure and umbilical arterial blood pH and pO₂ that occurred with sustained use of the Valsalva maneuver; as the duration of bearing-down efforts using the Valsalva maneuver increased there was a decrease in maternal arterial blood pressure, increased frequency of late decelerations, and increased incidence of neonatal acidosis.

The same late decelerations were not seen in fetal tracings when the mother used spontaneous bearing down efforts during which breath holding usually lasted for 5-6 seconds. Caldeyro-Barcia (1979) concluded that the late decelerations were an indication of fetal hypoxia resulting from decreased placental perfusion that occurred with the drop in arterial blood pressure, decreased oxygen content of maternal blood as a result of breath holding, and a subsequent decrease in oxygenation of the fetus. Caldeyro-Barcia (1979) suggested that maternity care providers were actually causing the fetal hypoxia and acidosis by instructing women to bear down for prolonged periods using the Valsalva maneuver. These early observations provide important information about the hemodynamic changes in the maternal-fetal dyads that were observed.

An early prospective, descriptive study conducted by Bassell, Humayun, & Marx (1980) to assess the effect of Valsalva pushing on maternal blood pressure may have contributed to provider concerns regarding the fetal dangers inherent to the second stage of labor. The study population included 12 unmedicated women in second stage labor; ten of the women were “healthy” and two were “moderately preeclamptic”. All blood pressures were recorded with the woman in the supine position and repeated following placement of a wedge under the right hip. The researchers identified a decrease in pulse pressure which occurred with Valsalva pushing both with and without displacement of the uterus. Displacement of the uterus had a mitigating effect on widening popliteal pulse pressure between contractions and when the mother did not perform the Valsalva maneuver with contractions, but no such effect was noted when the Valsalva maneuver was performed with contractions. The investigators suggested that maternal bearing-down may place the fetus at risk for acidosis and encouraged suppression of the urge to

push with regional block during second stage labor (Bassell et al., 1980). Despite being limited by small sample size, this study identified maternal cardiovascular changes in response to Valsalva pushing, particularly with women in supine positions. However, recommending regional anesthesia to suppress the urge to push for all women in second stage of labor, based on the findings of a single study with a sample size of 12 was premature. Further research using randomized controlled trials with larger sample sizes to determine the efficacy and safety of routine use of epidural anesthesia for the purpose of suppressing the maternal urge to push would be necessary before adopting such an invasive practice. However, studies conducted over the next 20 years identified that rather than completely suppressing a woman's bearing down efforts with epidural anesthesia, as was suggested by Bassell et al. (1980), the use of *spontaneous pushing* during second stage labor in *non-supine positions* reduces the morbidity related to maternal cardiovascular changes in second stage labor.

The physiologic implications of closed-glottis pushing on the mother should also not be underestimated. Cammarata, Brush, & Hyzy (1991) published a case report of a woman who experienced chylothorax during the postpartum period which offers evidence regarding the potential maternal effects of the physiologic changes that occur with repeated use of the Valsalva maneuver. Chylothorax refers to the accumulation of lymphatic fluid in the pleural space resulting from a tear or leak in the thoracic duct (Kozar, 2007). Tumors are the leading cause of chylothorax. However, in the case described by Cammarata, Brush and Hyzy (1991), the patient's chylothorax was a result of the obstructive expiratory effort of the Valsalva maneuver used during second stage labor, and subsequent high intrathoracic pressure which caused a rupture of the thoracic

duct. Treatment of the patient required a 27 day hospital stay, surgery for ligation of the thoracic duct, parenteral nutrition and antibiotic therapy. Although this was only the second reported case of chylothorax resulting from childbirth (Cammarata, Brush and Hyzy, 1991) it highlights the potential maternal damage that may result from repeated use of the Valsalva maneuver during the second stage of labor.

Valsalva pushing compared to open-glottis spontaneous pushing.

During the past several decades, researchers have begun comparing the outcomes of two distinct forms of pushing. Although the pushing techniques may be referred to by different terms, for the purpose of this study, *directed pushing* refers to maternal bearing down in response to the direction of birth attendants rather than the physiologic sensations the woman in labor is experiencing. This includes the use of Valsalva pushing wherein women are directed to push against a closed glottis. *Spontaneous pushing* refers to maternal bearing down in response to the physiologic urges and sensations experienced by the woman in labor. *Directive methods* of second stage management refer to pushing techniques used by birth attendants to direct a woman in labor regarding when and how to push, while *methods supportive of spontaneous pushing* refer to techniques used by birth attendants which support the spontaneous urges and sensations women experience during the second stage of labor.

Several early studies which compared open-glottis pushing to closed-glottis pushing, were done in order to demonstrate the safety of open-glottis pushing since closed-glottis pushing had become so widely accepted and used. Barnett & Humenick (1982) conducted a quasi-experimental study of 10 healthy women with normal labors. The subjects were randomly assigned to either a long Valsalva pushing group or a short,

open glottis pushing group. Outcomes were examined and revealed that open glottis pushing resulted in significantly higher umbilical vein pH ($P = .05$). The mean venous umbilical blood pH was 7.43 for the open-glottis pushing group and 7.37 for the Valsalva pushing group, at a .05 level of significance. Open glottis pushing also resulted in a non-significant trend toward longer second stage duration and higher umbilical artery pH (Barnett & Humenick, 1982). While the study had a small sample size, the findings add to the body of evidence suggesting a deleterious effect of long Valsalva pushing on the hemodynamic status of the maternal-fetal dyad.

Paine and Tinker (1992) conducted a quasi-experimental study using a convenience sample of 30 women who self selected assignment to one of two treatment groups, open or closed glottis pushing. The investigators compared the two types of maternal bearing-down techniques as they related to length of second stage labor and umbilical cord pH. Using an independent-samples t-test, the findings among 14 women who used closed glottis pushing and 16 women who pushed spontaneously, with open glottis, revealed no statistically significant difference between groups with regard to arterial umbilical cord pH ($t = -.64$; $P = .53$) or length of second stage duration ($t = .10$; $P = .92$). Spontaneous bearing-down efforts did not have a deleterious effect on either the mother or the fetus (Paine & Tinker, 1992). A larger sample would be required to demonstrate significance; power analysis suggested a sample size of 142 to achieve a power of .80 at a .05 level of significance. Randomization, and inclusion of maternal position as a confounding variable, would have improved the validity and reliability of findings relative to the effect of closed glottis pushing during second stage.

Woolley and Roberts (1995) conducted an investigation comparing the effect of sustained, strenuous Valsalva bearing-down efforts with the effect of short, open-glottis (“mini” pushes) bearing down efforts on the fetal heart rate (FHR) of the same fetus during the second stage of labor, with women serving as their own controls. In the study, 32 healthy nulliparous women were asked to alternate between sustained Valsalva pushing and brief, “mini” pushes every three contractions during the second stage of labor. Findings of that study revealed no statistically significant difference in the amplitude of FHR decelerations between pushing methods. In most cases, if the fetus experienced FHR decelerations, they were found equally with either pushing technique. The authors suggested that the use of subjects as their own controls may have negated any difference in the pushing techniques related to alterations in fetal heart tones. The researchers concluded that the fetal response to labor may be mediated by a responsivity that is inherent to the individual fetus rather than simply a response to the type of bearing-down efforts used during the second stage of labor. This study failed to support the hypothesis that sustained Valsalva pushing would have more frequent and deleterious effects on FHR patterns than “mini” pushes. It did demonstrate that mini pushes did not lead to deleterious outcomes for the fetus (Woolley & Roberts, 1995).

Coached versus uncoached pushing.

Directive methods of second stage labor management generally include a care provider whose role it is to “coach” or direct the woman with regard to when and how long to push; women are typically instructed to “take a deep breath, hold it to the count of 10, then take a quick breath and come right back to it”. Women who are directed in this manner are asked to ignore the spontaneous urges they may be experiencing and in stead,

push in response to the direction provided by the birth attendant. Providing this kind of direction results in the same kind of closed-glottis, Valsalva pushing which has been described above. In order to fully uncover the evidence regarding the effect of the Valsalva maneuver on maternal-fetal dyads, the following four studies that examined coached versus un-coached spontaneous pushing were also reviewed.

Yeates and Roberts (1984) conducted a quasi-experimental pilot study to contrast the effects of spontaneous bearing down during the second stage of labor with directive approaches which involved Valsalva pushing. The convenience sample consisted of two groups of healthy nulliparous patients; five patients in the control group who were taught to push using sustained breath holding and forceful bearing down efforts, and five in the experimental group who were taught to push in response to their involuntary urges. Findings of the study revealed that nine out of the ten women in the total sample experienced an urge to push before the cervix was fully dilated with a mean dilatation of 8.5 cm. at the onset of the urge to push. There was no difference, at the 0.05 level of significance, in mean duration of the second stage, Apgar scores, or maternal energy expenditure between groups. Participants in the experimental group did, however, experience greater perineal integrity than the control group. All five subjects in the control group had episiotomies that required suturing while three of the five participants in the experimental needed no suturing, one needed suturing of a labial laceration and one had an episiotomy that required repair. Limitations of the study include its small sample size, lack of randomization, and lack of blinding of the health care providers. The authors concluded that providers of maternity care should continue to question the wisdom of encouraging long sustained breath-holding with forceful pushing during second stage

labor, a technique with no documented benefit, and recommended further research of the common practice of encouraging women to bear down strenuously with contractions rather than in response to involuntary urges during the second stage of labor (Yeates & Roberts, 1984).

Thomson (1993) conducted a randomized controlled trial to compare spontaneous pushing with directed pushing. The sample population included 32 healthy primigravidas who were randomly assigned to one of two groups; 15 were allocated to the experimental group and encouraged to push spontaneously, and 17 were allocated to the control group and instructed to “take a deep breath, hold it and push for as long as possible” (Thomson, 1993, p. 172). In order to ensure the reliability of group allocation and treatment provided between groups, the researcher was present for all second stages so that she was able to observe the instructions that were provided to the participants. There was no significant difference between groups with regard to type of delivery, perineal trauma, maternal blood loss, rates of neonatal resuscitation, or maternal satisfaction with the second stage of labor. There was, however, a significant ($P= 0.002$) difference in the length of second stage between groups. The mean length of second stage was 121.4 minutes in the experimental group and 58 minutes in the control group. However, a significant positive correlation between length of the first stage of labor, the amount of narcotics used for pain relief, and length of the second stage of labor was identified, suggesting that duration of second stage labor cannot be attributed to pushing technique alone. Since the use of narcotics for pain relief was associated with a longer first stage of labor, and there was a positive correlation between length of first stage of labor and

length of second stage of labor, it is possible that narcotic use contributed significantly to the differences in length of second stage labor.

Thomson (1993) also found a significant ($P= 0.006$) negative correlation between the length of second stage and venous cord pH in the control group: longer second stage was associated with lower pH values. This relationship did not exist in the experimental group despite the longer second stages experienced by women in that group (Thomson, 1993). Limitations of the study included its small sample size, generalizability only to nulliparous patients and the fact that the author failed to report the position assumed by women during second stage labor and for delivery, which may have been a confounding variable for both maternal and neonatal outcomes. The author concluded that prolonged second stage was only problematic when women used directed pushing methods (Thomson, 1993).

Bloom et al. (2006) conducted a randomized controlled trial to compare obstetrical outcomes of coached versus uncoached pushing during second stage labor. The study population for that analysis consisted of 163 nulliparous women randomly assigned to the coached group and 157 nulliparous women randomly assigned to the uncoached group. There was no significant difference in route of delivery, episiotomy use or lacerations, infection rates, or oxytocin use between groups. The investigators did identify a significant difference ($P = 0.01$) in mean duration of second stage labor between the coached group (46 minutes) and the uncoached group (59 minutes). The only neonatal outcome of statistical significance ($P = 0.028$) was a nearly twofold rate of meconium stained fluid in the coached group. However, 89% of the cases of meconium stained fluid were diagnosed before expulsive efforts began and were not associated with

adverse neonatal outcomes. The investigators concluded that coached pushing offered no short-term benefits for mother or baby and withholding such coaching was not harmful (Bloom et al., 2006).

Schaffer et al. (2005) conducted a secondary analysis of data collected by Bloom et al. (2006) on 128 nulliparous women at term to determine the effect of refraining from coached pushing during second stage labor on the pelvic floor structures and function; 67 women were allocated to the coached group and 61 women were allocated to the uncoached group. The total sample population for this study represents only those women enrolled in the Bloom et al. (2006) study who presented for (and consented to) urogynecologic testing at three months post-partum. Ninety-four percent of the sample population was Hispanic, 4% were African American and 2% were Caucasian. All women pushed and gave birth on their backs or in a side-lying position. The researchers found no significant differences in prolonged second stage, episiotomy rates, anal sphincter lacerations, macrosomia, forceps deliveries or oxytocin use between groups. Findings of the study revealed decreased bladder capacity (472 mL vs 482 mL; $P = 0.051$) and decreased volume of first urge void (160 mL vs 202 mL; $P = 0.025$) in the subjects in the coached group. The researchers also identified a non-significant trend toward urodynamic stress incontinence ($P = 0.42$) and detrusor overactivity ($P = 0.17$) in the coached group. The authors concluded that coached pushing is a modifiable obstetric practice, with potentially negative effects on urogynecologic indices, which should be used only for specific indications such as prolonged second stage or nonreassuring fetal heart tones (Schaffer et al., 2005). Limitations of the study include generalizability which

is limited primarily to Hispanic primigravidas, and the short term follow-up which did not allow for resolution of post partum changes beyond 3 months following delivery.

Recognizing the phases of second stage labor.

Caldeyro-Barcia et al. (1981) were among the first to describe the phasic nature of the second stage of labor. Data collected during their examination of spontaneous maternal bearing-down efforts revealed three distinct phases of the second stage of labor. During the first phase, maternal bearing-down efforts were shorter in duration and less in amplitude than bearing-down efforts which occurred in the second phase; bearing-down efforts were also shorter and less intense in the second phase than they were in the third and final phase. While the number of bearing down efforts with each contraction and the uterine pressure at the base of each bearing down effort remained constant throughout the three phases, there were significant increases ($P < 0.001$) in the amplitude and duration of bearing down efforts as labor progressed. The researchers also noted an almost three-fold increase ($P < 0.001$), in pressure exerted by the expulsive contractions of the abdominal muscles as labor progressed (Caldeyro-Barcia et al., 1981).

Simkin (1984) described a triphasic second stage of labor which was based on an in depth review of the literature as well as the anecdotal observations of maternity care providers. Simkin described the first phase, or “latent phase”, as the period of time immediately following complete dilatation. During this phase there is a lull in contractions which allows the woman to rest, following the often difficult transition phase of the first stage of labor. As the fetal head descends, stretching the lower uterine segment around the body of the fetus, the frequency and intensity of contractions increases, and the woman experiences a stronger urge to push as she enters the second (or

“active”) phase of second stage labor. During the active phase, strong and regular uterine contractions combined with maternal bearing-down efforts culminate in rapid descent of the fetus. Finally, the fetus emerges during the “transition” phase of second stage. This phase is often characterized by extreme pain and a sensation of burning as the fetal head emerges through the vaginal introitus (Simkin, 1984).

Piquard et al. (1989) identified two distinct phases of the second stage of labor in their prospective observational study of 228 healthy women in the second stage of labor; 127 of the study subjects were primiparous and 101 were multiparous. The onset of second stage was defined as the time the cervix was found to be fully dilated on vaginal exam; vaginal exams were repeated every ten minutes from the time the participant was 8-9 centimeters dilated in an attempt to capture the exact moment of complete dilatation. The initiation of maternal bearing down efforts was left to maternal physiologic urges. The researchers defined the “first part” of second stage as the interval between the diagnosis of complete cervical dilatation and the point at which the woman began to spontaneously bear down, and the “final part” continued from the first bearing-down efforts until the moment of delivery. External tocography revealed an increase in magnitude and frequency of contractions as women transitioned from the first to final part of second stage labor. Based on changes in the pH, pCO₂, and lactate levels in the fetus (discussed later), the investigators concluded that there were two distinct phases of the second stage of labor.

Aderhold and Roberts (1991) used a descriptive case study design with the videotapes of four women to examine the phases of the second stage of labor. The videotapes of four nulliparous women were transcribed verbatim and analyzed in

conjunction with the fetal monitor tracings that were collected during second stage. Findings of that study revealed three distinct phases of the second stage. Phase I, “the lull”, marked the period of time from complete dilatation until the expression of an urge to bear down and/or the establishment of frequent, regular, rhythmic bearing down efforts. This phase was relatively short, lasting from six to 14 contractions. Phase II, “active bearing down”, occurred from the onset of regular, rhythmic bearing down efforts until “crowning”. This was the longest phase for all participants and ranged from 20 to 50 minutes. Phase III, “the perineal phase”, lasted five to seven contractions and marked the time from “crowning” until birth. Limitations of this study include its small sample size, and the recognition that the findings may be unique to the women who were observed. In addition, both the women and their caregivers may have altered their behavior in response to the presence of a video camera in the room. However, the study provides further information about the phasic nature of the second stage of labor that can be used to inform further research as well as the individualized care of women in the second stage of labor.

In 2003, Roberts proposed a reconceptualization of the second stage of labor. This reconceptualization viewed second stage labor onset in relationship to the onset of maternal bearing down urges and fetal station and position rather than from the arbitrary time at which the cervix reaches complete dilatation. Roberts described the way in which a woman’s bearing-down efforts are more effective and less fatiguing when the fetal present part has advanced past the ischial spines to at least a +1 station and has rotated to (or is in) the anterior position. Prior to that point, women may have little or no urge to push; Roberts (2003) referred to this early phase of the second stage as the “pelvic

phase”, the time during which the fetal head is negotiating the pelvis. As the fetal head descends, stretching the muscles of the pelvic floor, most women begin to feel a strong urge to bear down. Previously referred to as the press period, Roberts (2003) referred to this as the “perineal phase”. Roberts went on to describe the importance of allowing passive descent during the pelvic phase and delaying active pushing until the woman feels a strong urge to push in the perineal phase. This approach to management allows a more effective use of maternal energy during the second stage of labor (Roberts, 2003).

Recognizing the phases of second stage labor, and responding with management that allows for the best use of maternal energy, are crucial components of evidence based practice. Directive methods of pushing that involve instructing a woman to begin pushing as soon as the cervix is completely dilated, regardless of the bodily sensations she may be feeling, disregard what is known about the phasic nature of second stage labor. This is just one example of authoritative pushing, wherein the birth attendant is granted authoritative knowledge about the best time to begin pushing during the second stage of labor.

Laboring down with epidural anesthesia.

The phrase “laboring down” first began to appear in the literature over a decade ago to describe a method of caring for women using epidural anesthesia for pain management (McCartney, 1998). Women who experience well functioning epidural anesthesia typically feel little or no abdominal or pelvic sensation, and consequently do not experience an urge to bear down when the cervix is fully dilated. Lacking an effective urge to bear down, attempts to push early in the second stage often prove to be futile and serve only to exhaust the woman in labor. Recognizing that passive descent takes place

during the early phase of second stage labor, “laboring down” refers to a method of second stage management wherein the woman is allowed a period of rest at the onset of second stage; rather than actively pushing the fetus through the pelvis, the woman in labor is allowed to rest while passive descent occurs. Use of this method requires an observant birth attendant that encourages active pushing only after the woman in labor demonstrates readiness to push by means of expressing an urge to bear down. The method itself has been practiced for many years by early adopters of this innovation. Early adopters referred to this method with terms such as “physiologic second stage”, “delayed pushing”, “spontaneous pushing”, “passive descent”, “passive second stage”, “second stage pause”, or “rest and descend” (McCartney). The following studies examined the effectiveness of laboring down.

Immediate versus delayed pushing.

Maresh, Choong and Beard (1983) were the first to study the effects of delayed pushing in the second stage of labor with women undergoing epidural anesthesia. The researchers conducted a randomized controlled trial among 76 healthy nulliparous women who delivered vaginally with epidural anesthesia; 40 subjects were allocated to the early pushing group and 36 subjects were allocated to the late pushing group. Women in the early pushing group initiated bearing down efforts as soon as they began to feel an urge to push, with a mean delay of 27 minutes past complete dilatation. Women in the late pushing group began pushing when the head was visible at the introitus with a mean delay of 123 minutes. This difference in delay was statistically significant between groups ($P < 0.01$).

The investigators (Maresh et al., 1983) also identified that although women in the late pushing group who delivered spontaneously had a significantly longer ($P < 0.01$) mean duration of second stage labor (170 minutes) than women in the early pushing group (78 minutes), the mean active pushing time was almost identical between groups (49 minutes/early; 53 minutes/late). Women in the late pushing group required forceps delivery less often than women in the early pushing group, but the difference did not reach statistical significance ($P = 0.06$). The difference in episiotomy rates (90% in early pushers and 79% in late pushers) was also not statistically significant. Mean umbilical cord pH values and Apgar scores were similar between groups (Maresh et al.). This study was limited by a sample that included only primigravidas and the fact that posture of the woman in second stage labor and birth was not considered as a potential confounding variable. However, the findings of the study suggest that delayed pushing in women with epidural anesthesia in the second stage of labor had no deleterious effect on the fetus and was associated with a trend toward increased rates of spontaneous vaginal delivery. The researchers suggest redefining the management of second stage labor to include a period of rest following the diagnosis of complete dilatation when epidural anesthesia is used (Maresh et al.).

Vause, Congdon, & Thornton (1998) conducted a randomized controlled trial of 135 healthy nulliparous women with epidural anesthesia in labor to test the hypothesis that delayed pushing in nulliparous women with epidural blocks reduced operative vaginal deliveries; 67 subjects were allocated to the early pushing group and 68 to the delayed pushing group. Findings revealed a significant difference ($P < 0.002$) in the time between diagnosis of complete cervical dilatation and the initiation of maternal bearing

down. Women in the early pushing group began pushing within one hour of the diagnosis of full dilatation and women in the late pushing group delayed pushing for a maximum of three hours, pushing earlier if they experienced an overwhelming urge to push or if the vertex was visible at the introitus. Though not statistically significant, findings also revealed a trend that early pushing increased the odds of rotational forceps delivery (6/67 early; 3/43 delayed) but did not increase the overall instrumental delivery rate (29/67 early; 25/68 late). Women in the delayed pushing group experienced a significantly longer average ($P < 0.002$) second stage labor duration (214 minutes) than women in the early group (119 minutes), although there was no significant difference in duration of active pushing between groups. There was also no statistically significant difference in neonatal outcomes between groups (Vause et al., 1998). Although this study was limited because the researchers failed to identify the indications for assisted deliveries, and the sample included only nulliparous women, the results supported that a delay in pushing had no deleterious effect on the fetus.

Fraser et al. (2000) conducted a multicenter randomized controlled trial of delayed pushing in nulliparous women for the Pushing Early or Pushing Late with Epidural (PEOPLE) Study Group. The study population included 936 healthy nulliparous women with epidural anesthesia randomized to the delayed pushing group who were advised to wait at least two hours after complete dilatation before initiating bearing down efforts, and 926 healthy nulliparous women with epidural anesthesia randomized to the early pushing group who began pushing as soon as complete dilatation was confirmed. Median duration of second stage labor was 187 minutes in the delayed pushing group and 123 minutes in the early pushing group ($P = 0.0001$). However, median duration of

active pushing was 68 minutes in the delayed pushing group and 110 minutes in the early pushing group ($P = 0.0001$). Spontaneous vaginal delivery occurred more frequently in the delayed pushing group with a relative risk of 1.09 (95% confidence interval, 1.00-1.18), and “difficult deliveries” occurred less frequently in the delayed pushing group (relative risk, 0.79; 95% confidence interval, 0.66-0.95). For the purpose of this study, “difficult deliveries” were defined as those requiring cesarean delivery, operative delivery from a midpelvic position, and low pelvic procedures with a rotation of greater than 45 degrees. There was no significant difference in maternal morbidity between groups except for intrapartum fever which occurred more frequently in the delayed pushing group (relative risk, 1.88; 95% confidence interval). There were also no significant differences in neonatal outcomes between groups. Women rated their experience with second stage labor similarly except that more women in the early pushing group reported that they felt they had pushed for “a long time”. However there was no difference between groups in the degree of fatigue reported by the women (Fraser et al., 2000). While the study was limited by potential bias in determining time of complete dilatation (the exact time of complete dilatation may not have been identified for all participants), delayed pushing appeared to be effective in reducing difficult deliveries in nulliparous women.

A secondary analysis of the data collected for the PEOPLE study (Fraser et al., 2000) was conducted by Petrou, Coyle, & Fraser (2000) to determine the cost effectiveness of a policy of delayed pushing for nulliparous women with epidural anesthesia. That analysis confirmed that delayed pushing resulted in fewer “difficult” deliveries, although the mean cost of intrapartum care, incurred because of the additional

care required as a result of an extended second stage of labor, was significantly higher ($P < 0.0005$) in the delayed pushing group (\$625.86) than the early pushing group (\$557.64). There was no significant difference in average costs of postpartum or total hospital care between groups (Petrol, Coyle, & Fraser, 2000). Despite the limitations of this study, including difficulty in determining indirect costs, direct nonmedical costs, and intangible costs related to the two pushing methods, this study suggested that a policy of delayed pushing does not significantly increase overall health care costs.

Hansen, Clark and Foster (2002) conducted a randomized controlled trial of 252 women to compare perinatal outcomes among women with epidural anesthesia who were encouraged to push at complete dilatation with the outcomes of women with epidurals who were allowed a period of rest before pushing. One of the strengths of this study was that the study population was comprised of both primigravid and multigravid women, both of which were randomized to one of two treatment groups. Subjects in the immediate pushing group were coached to push using the Valsalva maneuver as soon as the cervix was fully dilated. Women in the delayed pushing group were allowed to rest until the vertex was visible at the introitus before they began pushing; the period of rest was limited to 120 minutes for primigravidas and 60 minutes for multigravidas. Mean length of time pushing was significantly less ($P < 0.001$) for multigravidas who were allowed a period of rest (13 minutes) than for multigravidas who pushed immediately (24 minutes). There was no significant difference between groups for Apgar scores, umbilical arterial cord pH, postpartum endometritis, episiotomies, lacerations, or instrumental deliveries. There were a total of three study subjects who were delivered by cesarean section, all of whom were primigravidas in the immediate pushing group.

Primigravidas in both groups had higher overall fatigue scores than multigravidas.

However, delayed pushing was significantly associated ($P = .017$) with less fatigue than immediate pushing for primiparous women. The authors conclude that despite a second stage duration of up to 4.9 hours, delayed pushing was not associated with demonstrable adverse outcomes and that in appropriate patients, prolonged second stage is safe and may be beneficial for the mother and fetus (Hanson, Clark and Foster, 2002).

In order to evaluate the impact of second stage management on maternal fecal incontinence and fetal outcomes, Fitzpatrick et al. (2002) conducted a randomized controlled trial of 178 women randomly assigned to one of two treatment groups; 90 women pushed immediately upon diagnosis of complete cervical dilatation and 88 women delayed pushing for one hour after diagnosis of complete cervical dilatation. The median duration of second stage labor was significantly longer ($P < 0.001$) for subjects in the delayed pushing group (120 minutes) versus subjects in the immediate pushing group (60 minutes), although there was no statistical difference between groups for duration of active pushing. There was no significant difference in fetal outcomes, episiotomy rates, perineal trauma or perineal pain between groups, nor was there a difference in anal function between groups. There was no significant difference in instrumental delivery between groups, although 6% of the women in the immediate pushing group were delivered by cesarean section compared 4% in the delayed pushing group (relative risk 1.67; 95% confidence interval, 0.30 – 7.19). The investigators concluded that while delayed pushing prolonged the second stage of labor, it did not result in significantly higher rates of maternal morbidity (Fitzpatrick et al., 2002). Although the labor

management between groups was not standardized, and the rest period was limited to one hour, delayed pushing did not result in an increase in anal sphincter injury or functioning.

Roberts, Torvaldsen, Cameron, & Olive (2004) conducted a systematic review and meta-analysis of randomized controlled trials that examined delayed pushing during second stage labor in women with epidural anesthesia. That analysis included nine randomized controlled trials with 2,953 participants. The researchers identified a non-significant reduction in instrumental deliveries with delayed pushing in six of the studies, and an overall reduction in instrumental deliveries that did not reach statistical significance. Delayed pushing also resulted in a non-significant reduction in cesarean section deliveries. However, the overall reduction in operative deliveries with delayed pushing was statistically significant (relative risk, 1.22; 95% confidence interval, 1.05 to 1.42). There was an overall increase in length of second stage labor but no significant difference in the duration of active pushing with the practice of delayed pushing with epidurals. The investigators found no significant difference in maternal morbidity or neonatal outcomes noted with delayed pushing (Roberts et al., 2004). Although this systematic review was limited by the small sample size of several of the studies that were included, inconsistent techniques used for pushing during second stage across studies, and a lack of consistently described anesthesia protocols across studies, it does provide important information about the lack of maternal morbidity and adverse neonatal outcomes when pushing is delayed for women with epidural anesthesia.

The effect on fetal wellbeing of two different pushing methods for women undergoing epidural anesthesia, immediate closed glottis Valsalva and delayed open-glottis, was evaluated using fetal O₂ saturation measurement in a randomized controlled

trial (Simpson & James, 2005). Forty five nulliparous women were randomized to one of two treatment groups; 22 women in the immediate pushing group who were instructed to push with closed glottis immediately when the cervix was fully dilated, and 23 women in the delayed group who were encouraged to push with open glottis for intervals no longer than 6-8 seconds when they felt the urge to push or two hours after complete cervical dilatation (whichever came first). Fewer subjects randomized to the delayed, open-glottis pushing group experienced fetal oxygen desaturation (2.7 versus 7.9, $P = 0.02$), variable FHR decelerations (15.6 versus 22.4, $P = 0.03$), and perineal lacerations (5 versus 13, $P = 0.01$). Women in the delayed pushing group also had shorter average durations of active pushing (59 versus 101 minutes, $P = 0.002$). There was no significant difference in cesarean section rates, operative delivery rates, rates of prolonged second stage of labor, or episiotomy rates between groups. Although the sample size was small, the findings support that open-glottis pushing in nulliparous women with epidural anesthesia is more favorable than closed-glottis pushing for the physiologic wellbeing of the fetus (Simpson & James, 2005).

Brancato, Clark, & Stone (2008) conducted a similar meta-analysis of passive descent versus immediate pushing in nulliparous women with epidural anesthesia during the second stage of labor to determine which method was beneficial to women. That analysis included seven randomized controlled trials and 2,827 women. Pooled data revealed that passive descent increases the odds of vaginal delivery (relative risk, 0.77; 95% confidence interval, 0.01 – 1.15; $P = 0.025$), decreases the risk of instrument delivery (relative risk, 0.77; 95% confidence interval, 0.77 – 0.85; $P < 0.0001$), and decreases mean duration of pushing time (mean difference, -0.19; 95% confidence

interval, -0.27 to - 0.12; $P < 0.0001$). The investigators found no significant difference in cesarean birth rates, lacerations, or episiotomies between pushing methods (Brancato et al.). The investigators concluded that passive descent resulted in significant positive effects and should be used to safely increase the rate of spontaneous vaginal births, decrease the number of instrumental deliveries and shorten pushing time in the second stage of labor (Brancato et al.).

Duration of the second stage of labor: How long is too long?

Over half a century ago, Emanuel Friedman (1954) published the findings of a non-experimental, observational study of 100 nulliparous women in active labor. Friedman combined his observations with simple mathematical formulas to arrive at a graphic depiction of the expected rate of cervical dilatation in the “normal” first stage of labor. Despite the multiple flaws in that study, including its small sample size and homogeneity of the study population, Friedman’s work set the precedent for diagnosing alterations in the normal progress of labor with what is known today, and widely used in clinical practice, as *The Friedman Curve*. Of note, Friedman was quite clear that determining “normal” progress in labor was limited to the first stage; second stage labor could not be analyzed in the same fashion because of the many variables which impact progress in the second stage. Friedman declared that management of the second stage should be “left as a clinical art” (Friedman, 1954, p. 1574).

Despite Friedman’s declaration, many practitioners began to define the normal duration of second stage as lasting no longer than two hours (Cohen, 1984). Cohen (1977) conducted a retrospective review of records of 4,403 nulliparous women in second stage labor in order to reevaluate the relationship between the length of second stage and

the incidence of perinatal morbidity and mortality, and puerperal morbidity. Findings of that study revealed no significant increase in perinatal mortality or neonatal death, regardless of delivery mode, related to the duration of second stage. There was no correlation between longer second stage and low five minute Apgar scores. The findings suggested a non-significant relationship between hemorrhage and longer second stage, although this finding was attributed to the high rate of mid-forceps deliveries among women with a long second stage. Similarly, the non-significant increased infection rate found in the study was attributed to the increased rate of cesarean section for women with a longer second stage. The investigator concluded that the length of second stage labor had no direct effect on maternal morbidity or perinatal outcome (Cohen, 1977).

Several studies have been conducted to identify the parameters relative to the length of active labor in healthy women. Kilpatrick & Laros (1989) conducted a review of records for 6,991 women to describe the lengths of normal first and second stages of labor. The records of multiparous and nulliparous women both with and without conduction anesthesia were evaluated; the onset of second stage was identified as the time the cervix was found to be fully dilated. Of the 6,991 women in the study sample, 432 were nulliparous patients with conduction anesthesia, 2,302 were nulliparous women without conduction anesthesia, 490 were multiparous women with conduction anesthesia, and 3,767 were multiparous women without conduction anesthesia. Epidurals placed during the first or second stage of labor accounted for 95% of the conduction anesthesia and saddle blocks placed during the second stage of labor accounted for the remaining five percent. The average length of second stage labor for nulliparous women without anesthesia was 54 minutes (limit: 132 minutes) and with anesthesia the mean length was

79 minutes (limit: 185 minutes) ($P < 0.0001$). Mean length of second stage labor for multiparous women without anesthesia was 19 minutes (limit: 61 minutes) and with anesthesia the average length was 45 minutes (limit: 131 minutes) ($P < 0.0001$).

Differences between nulliparous and multiparous length of second stage labor, both with and without anesthesia were also statistically significant ($P < 0.0001$). The authors concluded that rather than using the 2-hour rule to evaluate second stage progress, providers should recognize that both nulliparity and conduction anesthesia lengthen second stage labor, and individualize second stage evaluation according to parity and use of anesthesia (Kilpatrick & Laros, 1989).

Several studies have examined maternal and neonatal outcomes relative to length of second stage labor and are briefly summarized in Table 3 on the following page. Albers, Schiff, & Gorwoda (1996) conducted a review of records to describe the length of first and second stage of labor in a low-risk population of non-Hispanic white, Hispanic, and American Indian women and identify differences among these three ethnic groups. The study population consisted of 1,473 women; 573 were non-Hispanic white, 402 were Hispanic and 498 were American Indian. All patients in the study population were attended in birth by CNMs. Second stage was defined as the time from complete cervical dilatation to delivery. Although the midwifery practice had no prescribed intervals at which to perform vaginal exams, women were typically examined for complete dilatation when clinical signs indicated the onset of second stage. There was no statistically significant difference by ethnic group for parity, intrapartum care measures, or prolonged second stage of labor. In all ethnic groups combined, 4% experienced prolonged second stage, which was defined as longer than 2.5 hours for nulliparous women and 1 hour for

multiparous women. There was also no significant increase in maternal or neonatal complications following a prolonged second stage (Albers et al., 1996). Although the reliability and validity of the findings were largely dependent on potentially inconsistent cervical measurements and the record keeping of multiple providers, and despite limited generalizability, it is clear that there is a wide variation in duration of second stage and that second stage for some women in this study lasted longer than is widely accepted as normal. This study added to the body of evidence which identified that duration of second stage alone is not a contributing factor to adverse maternal or neonatal outcomes.

Table 3
Maternal and neonatal outcomes related to length of second stage labor

Study	Sample size	Independent Variable	Maternal Outcomes	Fetal/neonatal outcomes
Albers et al., 1996	1,473	Length of labor (Prolonged SSL > 2.5 hours)	No relationship between prolonged SSL and maternal morbidity/mortality	No relationship between prolonged SSL and neonatal morbidity/mortality
Albers, 1999	2,511	Length of SSL	No relationship between SSL duration and maternal morbidity/mortality	No relationship between SSL duration and neonatal morbidity/mortality
Cohen, 1984	1,977	Length of SSL	No relationship between SSL duration and maternal morbidity/mortality	No relationship between SSL duration and neonatal morbidity/mortality
Menticoglou et al., 1995	6,041	Prolonged SSL	Not studied	No deleterious effect
Myles & Santolaya, 2003	6,791	SSL \leq 2 hours vs. SSL > 2 hours	\uparrow morbidity with prolonged SSL especially after 4 hours	No difference between groups

Albers (1999) extended her previous work, measuring the duration of active labor in low-risk women, with a descriptive study of 2,511 healthy women who did not receive oxytocin or epidural anesthesia and who were attended by CNMs in nine hospitals across the United States. Data were collected on all healthy patients admitted to the CNM

practices during 1996 who experienced spontaneous vaginal birth without the use of oxytocin or epidural anesthesia. Findings revealed a mean length of second stage labor for nulliparous women of 54 minutes (upper limit: 146 minutes), and 18 minutes for multiparous women (upper limit: 64 minutes) ($P < 0.05$). Analysis of variance revealed a significant effect on length of second stage for maternal age; nulliparous women over 30 had longer second stages ($P < 0.05$). Narcotic analgesia use in multiparous women and continuous fetal monitoring in nulliparous women were both associated with a longer second stage of labor. There were no significant differences in maternal or neonatal outcomes related to length of second stage labor (Albers, 1996). Despite the fact that this study only examined women who were cared for by CNMs, whose overall management and continuous presence may have had an impact on length of active labor, the findings offer important information about the wide variation in length of second stage labor in healthy women. Prolonged duration of second stage was not associated with adverse maternal or neonatal outcomes.

In 2003, following the publication of several studies demonstrating the effect of epidural anesthesia on the duration of second stage labor, the American College of Obstetricians and Gynecologists (ACOG) recommended a change in the criteria for the diagnosis of prolonged second stage labor. Prior to that time, second stage was considered to be prolonged if it exceeded two hours in all nulliparous women and one hour in all multiparous women. The 2003 guidelines recommended amending the time limit to three hours for nulliparous women with epidural anesthesia and two hours for multiparous women with epidural anesthesia (American College of Obstetricians & Gynecologists, 2003)

The impact of pushing technique on length of second stage labor.

Several studies have been conducted specifically to examine the effect of pushing technique on the length of second stage labor. Findings of these studies are briefly summarized in Table 4 on the following page. Perry & Porter (1979) conducted an observational study of 40 women in second stage labor to examine the relationship between the use of “diaphragmatic, abdominal-vaginal” pushing and the length of second stage labor. The researchers observed ten multiparous and nulliparous women who had been taught “diaphragmatic abdominal-vaginal” pushing prenatally and who were directed to use the method during second stage, as well as the same number of multiparous and nulliparous women who had not been taught and did not use the method. The investigators identified a shorter mean duration of second stage in multiparous women who used the technique (13 minutes) than multiparous women who did not use the technique (18 minutes), and a shorter mean duration of second stage in nulliparous women who used the technique (45 minutes) than nulliparous women who did not use the technique (68 minutes). The researchers concluded that use of this method had a physiologic benefit of shortening second stage labor and recommended teaching the method to all women prenatally (Perry & Porter, 1979). Consistent with the findings of previous researchers, the investigators in this study identified that most women needed one or two contractions to “get their pushing organized” (Perry & Porter, 1979, p. 33). Limitations of this study include the small sample size, no description of the demographic characteristics of the participants, and the fact that all women pushed and gave birth in a semi-recumbent position with feet in stirrups, which may have had a significant impact on maternal bearing-down efforts and total duration of second stage.

Table 4
Effect of pushing techniques on length of second stage labor and maternal/fetal outcomes

Study	Sample size	Independent Variable	Length of SSL	Total time pushing	Maternal outcomes		Fetal/Neonatal outcomes
					Perineum	Fatigue	
Albers et al., 2006	1,176	Closed vs. open glottis pushing	NA	NA	↓ trauma w/ open	NA	NA
Barnett & Humenick, 1982	10	Closed vs. open glottis pushing	↑ with open glottis	NA	NA	NA	↑ with open glottis
Bloom et al., 2006	163	Coached vs. uncoached pushing	↑ with uncoached pushing. Rates of prolonged SSL were similar between groups	NA	No significant difference	NA	No significant difference
Fitzpatrick et al., 2002	178	Immediate vs. delayed pushing	↑ with delayed pushing	No significant difference	No significant difference	NA	No significant difference
Fraser et al., 2000	936	Immediate vs. delayed pushing	↑ with delayed pushing	↓ with delayed pushing	No significant difference	No significant difference	No significant difference
Hansen et al., 2002	252	Immediate vs. delayed pushing	↑ with delayed pushing	↓ with multips who delayed	No significant difference	↓ with delayed	No significant difference

NA = Not Applicable/not reported

Table 4. (continued)

Study	Sample size	Independent Variable	Length of SSL	Total time pushing	Maternal outcomes		Fetal/Neonatal outcomes
					Perineum	Fatigue	
Lai et al., 2009	72	Immediate vs. delayed pushing	↑ with immediate pushing	↑ with immediate pushing	No significant difference	↑ with immediate pushing	No significant difference
Maresh et al., 1983	76	Immediate vs. delayed pushing	↑ with delayed pushing	No significant difference	↓ trauma w/ delay	NA	No significant difference
Paine & Tinker, 1992	30	Closed vs. open glottis pushing	No significant difference	NA	NA	NA	No significant difference
Perry & Porter, 1979	40	“Diaphragmatic, abdominal-vaginal” pushing (directive)	Decreased	NA	NA	NA	NA
Roberts et al., 1987	31	Spontaneous pushing	10-95 minutes	10-170.5 minutes	NA	NA	One minute Apgars of 8 or 9 for all subjects
Sampselle & Hines, 1999	39	Directive pushing vs. spontaneous pushing	No significant difference	NA	↓ trauma w/ spontaneous	NA	NA
Schaffer et al., 2005	128	Coached vs. uncoached pushing	No significant difference in rate of prolonged SSL	NA	↑ UG trauma w/ coached	NA	NA

Table 4 (continued).
Effect of pushing techniques on length of second stage labor and maternal/fetal outcomes

Study	Sample size	Independent variable	Length of SSL	Total pushing time	Maternal Outcomes		Fetal/neonatal outcomes
					Perineum	Fatigue	
Simpson & James, 2005	45	Immediate vs. delayed pushing	No significant difference in rate of prolonged SSL	↓ with delayed pushing	No significant difference	NA	↑ with delayed pushing
Thomson, 1993	32	Directed vs. spontaneous pushing	↑ with spontaneous pushing	NA	No significant difference	NA	No significant difference
Vause et al., 1998	135	Immediate vs. delayed pushing	↑ with delayed pushing	No significant difference	No significant difference	NA	No significant difference
Yeates & Roberts, 1984	10	Coached vs. spontaneous pushing	No significant difference	NA	↓ trauma w/ spontaneous	No significant difference	No significant difference
Yildirim et al., 2008	100	Valsalva like vs. spontaneous pushing	↑ with Valsalva like pushing	↑ with Valsalva like pushing	No significant difference	Greater satisfaction with spont pushing	Improved 1 minute apgar with spont pushing

NA = Not Applicable/not reported

In contrast, Roberts et al. (1987) conducted a descriptive study to gain a deeper understanding of second stage labor in 31 nulliparous women who were not instructed to bear down with contractions but rather pushed in response to their own physiologic urges. The mean age of the participants was 20; twenty eight of the participants were African American and three were Hispanic. Data were collected using the observations recorded by members of the research team, audiotapes of maternal sounds and interaction with the birth attendants, and labor and delivery records (including fetal heart monitoring). The goal of this study was to describe the duration of second stage when women bear down spontaneously. The investigators identified that the mean dilatation at the time of the first bearing-down effort was 9 (+/- 1.25) centimeters. The mean duration of the second stage of labor, from ten centimeters to delivery, was 45 minutes with a range of 10-95 minutes (Roberts et al., 1987). Although the study sample included only young African American and Hispanic women, and despite potential bias related to variations in the recoding of observations by research team members, findings suggest that adequate labor progress occurs when women are encouraged to push in a way that compliments the involuntary bearing-down reflex rather than coached to used the Valsalva maneuver.

Buhimschi et al. (2002) conducted a descriptive study of 52 women with epidural anesthesia during the second stage of labor to examine the maternal, fetal, and labor characteristics that influenced maternal “pushing performance” during the second stage of labor. The researchers measured the intrauterine pressure of all participants with standardized intrauterine pressure catheters and myometrial thickness was measured with abdominal ultrasound. Study participants were taught to perform the Valsalva maneuver with maximal effort, and were instructed to perform three Valsalva maneuvers, each

lasting 10 seconds, with every contraction. The maximum amplitude, uterine tone, and duration of each bearing-effort during both involuntary bearing-down efforts and the Valsalva maneuver were recorded and analyzed.

The researchers identified that an increase in intrauterine pressure using the Valsalva maneuver was influenced by myometrial thickness, estimated fetal weight, and maternal body mass index. Based on those findings, the researchers generated an equation to determine a “Valsalva index” that could be used to measure “pushing performance” and determine a need for labor augmentation. Study participants were then separated into two groups; high and low pushing performance. The researchers identified that while use of the Valsalva maneuver increased the intrauterine pressure by 62%, there was no correlation between the Valsalva index and duration of second stage between groups for either primarous or multiparous women. The duration of second stage labor was similar for nulliparous (median, 58 minutes; 5th – 95th percentile, 28-164 minutes) and multiparous women (median, 44 minutes; 5th – 95th percentile, 12-140 minutes). These values remained constant regardless of the patient’s Valsalva index. The authors concluded that pushing performance is not the sole contributor to duration of second stage labor and suggest that women with a low Valsalva index could benefit from delaying pushing efforts until the head has descended deep into the pelvis (Buhimschi et al., 2002).

Maternal and neonatal outcomes related to length of second stage of labor.

Along with an increased use of epidural anesthesia for pain relief in labor came the emergence of new evidence regarding the maternal and fetal effects of prolonged second stage. Menticoglou, Manning, Harman, & Morrison (1995) conducted a

retrospective review of the records of 6,041 nulliparous women who gave birth over a five year period, in one hospital, to determine whether perinatal outcomes worsened as the second stage lengthened. Fifty five percent of the women whose records were included in the study had epidural anesthesia and 82% of the study population delivered spontaneously. Among the study population, 11% experienced a second stage lasting longer than three hours and 2.7% had a second stage that exceeded five hours. The onset of second stage was defined as the time of diagnosis of complete cervical dilatation, and there were no fixed protocols with regard to second stage management. The researchers found no significant relationship between second stage duration and low 5-minute Apgar scores, neonatal seizures, or admission to the neonatal intensive care unit (NICU) (Menticoglou et al., 1995). Although the measures of fetal wellbeing in this study were limited to 5-minute Apgar scores, the occurrence of neonatal seizures, and rates of admission to the NICU, the findings demonstrate that fetuses who enter second stage in good condition seldom experience asphyxia, even when the second stage is prolonged; second stage is not a time of particular risk of fetal asphyxia.

Myles and Santolaya (2003) conducted a descriptive study using a retrospective chart review of the records of 6,791 women who delivered at a single hospital during a three year period to determine the risk factors for prolonged second stage, and evaluate the impact of prolonged second stage on maternal and neonatal outcomes. Study participants were evenly distributed for parity and ethnicity, and all were cared for by either a resident physician, attending physician or certified nurse-midwife. For the purpose of analysis, study participants were separated into two group; Group 1

experienced a second stage labor duration of two hours or less and Group 2 experienced a second stage labor of greater than two hours (with an upper range of five hours).

The researchers found no significant difference in neonatal outcomes between groups. Group 2 experienced higher rates of perineal trauma, episiotomy, operative vaginal delivery, postpartum hemorrhage and chorioamnionitis than Group 1 ($P < 0.001$); the highest rates occurred in patients with a second stage longer than four hours (Myles and Santolaya, 2003). A limitation of this study was that the authors failed to describe the indications for assisted vaginal delivery. While there did appear to be an increased risk for maternal morbidity with prolonged second stage, it is likely that the morbidity was related to instrumental delivery. If the decision to intervene with instrumental delivery was based solely on length of second stage, rather than a fetal or maternal indication, it may be that length of second stage contributed less significantly to adverse maternal outcomes than the evidence suggests. This study further demonstrates that prolonged second stage was not associated with adverse neonatal outcomes, and in light of the increased risk for maternal morbidity associated with instrumental delivery, prolonged second stage of labor alone should not be an indication for operative vaginal delivery.

Rouse, Weiner, Bloom et al. (2009) conducted a secondary analysis of data to examine the relationship between length of second stage labor and various maternal and perinatal outcomes. The sample included 4,126 women from 14 institutions, who were enrolled in a multi-center randomized controlled clinical trial to test fetal pulse oximetry. All of the participants were nulliparous women in active labor who were carrying a singleton pregnancy at ≥ 36 weeks gestation and who had reached second stage labor.

Ninety five percent of the participants had epidural anesthesia. The duration of second stage was defined as the time from the first vaginal exam that revealed complete cervical dilatation until birth. Data were collected by research nurses who were present for the labor and birth. Maternal outcome measures included duration of first and second stage labor, mode of delivery, chorioamnionitis, third or fourth degree perineal laceration, endometritis, uterine atony and blood transfusion. The neonatal outcome measures included birthweight, five-minute apgar score, umbilical artery pH, intubation in delivery room, NICU admission, sepsis and brachial plexus injury (Rouse, Weiner, Bloom et al.).

Findings revealed a decrease in the incidence of spontaneous vaginal birth as the duration of second stage labor increased (85.2% with < 1 hour; 78.7% with 1 to < 2 hours; 59.1% with 2 - < 3 hours; 24.7% with 3 - < 4 hours), with the most significant decrease occurring after four hours of second stage labor (8.7% with 4 - \geq 5 hours). Although the authors examined the impact of prolonged second stage on many deleterious maternal outcomes, chorioamniotitis (OR = 1.60; 95% CI = 1.4 – 1.83), third or fourth degree perineal lacerations (OR = 1.44; 95% CI = 1.29 – 1.6) and uterine atony (OR = 1.31; 95% CI = 1.14 – 1.51) were the only adverse maternal outcomes significantly related to duration of second stage. After controlling for mode of delivery, the only neonatal outcome significantly related to length of second stage labor was NICU admission (OR = 1.13; 95% CI = .98 – 1.29). The authors recognized that factors other than length of second stage labor may have contributed to each of these adverse outcomes, especially in light of the fact that second stage labor management was not standardized (Rouse, Weiner, Bloom et al., 2009). The lack of standardized second stage labor management calls into question the reliability with which conclusions can be drawn

about the impact of length of second stage on maternal and neonatal outcomes. The use of closed glottis pushing versus open glottis, sustained breath holding, and various positions assumed by the women in labor may have accounted for differences in the outcomes. Further, the fact that 95% of the participants in this study had an epidural renders the findings generalizable only to women with epidural anesthesia. The authors concluded that extending the duration of second stage labor will allow some women to achieve a vaginal delivery, and that length of second stage labor should not be the sole determinant for terminating second stage. The authors recommend using the findings of this study to counsel women about the risks and benefits of prolonged second stage labor so that decisions about Cesarean birth can be made by individual women and their providers (Rouse, Weiner, Bloom et al., 2009).

LeRay, Audibert, Goffinet, & Fraser (2009) conducted a secondary analysis of the data collected during the Pushing Early Or Pushing Late with Epidural (PEOPLE) trial (Fraser et al., 2000) in order to determine the effects of the duration of expulsive efforts during second stage labor on various maternal and neonatal outcomes. The sample included 1,862 nulliparous women at ≥ 37 weeks gestation, with epidural anesthesia, in second stage labor with a singleton fetus. Women in the study sample were randomized to one of two groups: early pushing (began pushing as soon as the cervix was discovered to be complete) or late pushing (advised to wait to begin pushing for two hours after complete cervical dilatation unless they felt an urge to push or the fetal head was visible at the introitus). Pushing techniques that were used were not standardized. The primary outcome measure was defined as a spontaneous vaginal delivery of an infant with Apgar scores of ≥ 7 and a neonatal arterial pH (when available) of > 7.10 . Secondary outcome

measures included maternal intrapartum fever, third or fourth degree perineal lacerations, blood loss of > 500 ml with vaginal delivery and > 1000 ml with cesarean delivery, any neonatal trauma, and neonatal admission to the NICU. Of the participants, only 13.1% pushed actively for > 3 hours, 55.1% delivered spontaneously, 39.5% experienced an assisted vaginal birth, and 5.4% were delivered by cesarean section. After adjusting for mode of delivery, the only significant adverse outcomes affected by duration of pushing during second stage were postpartum hemorrhage and intrapartum fever. There were no adverse neonatal outcomes significantly associated with pushing duration alone (LeRay et al., 2009). One of the limitations of this study is that the data were collected over a decade ago. Since that time, obstetric practices have changed significantly, particularly the use of forceps assisted vaginal birth. In addition, the findings were not adjusted for length of first stage of labor which may have influenced the incidence of both postpartum hemorrhage and intrapartum fever. Nonetheless, these authors (in contrast to Rouse et al., 2009) used the findings to propose that active pushing, with or without a period of laboring down, should not be continued beyond two hours in women with epidural anesthesia (leRay et al., 2009). Limitations of this study include the inability to generalize the findings to women without an epidural, or to multigravid women with or without an epidural. Further, the lack of standardized management of the period of active pushing limits the ability to accurately determine a cause and effect relationship between length of active pushing and the outcomes that were measured.

Relationships between pushing techniques and fetal status/outcomes.

Several researchers have investigated the effect of maternal bearing-down efforts with fetal status or neonatal outcome as the primary dependent variable. Aldrich et al.

(1995) conducted a prospective study of 10 term fetuses to compare changes in the fetal cerebral concentrations of oxyhemoglobin, deoxyhemoglobin and cerebral blood volume, before and during maternal bearing-down efforts in the second stage of labor. All subjects in the study pushed in a semi-recumbent position using sustained Valsalva pushes. Findings of the study include a significant increase ($P < 0.01$) in mean cerebral deoxyhemoglobin concentration, significant ($P < 0.01$) decrease in mean cerebral oxygen saturation, and significant ($P < 0.05$) increase in mean cerebral blood volume.

The authors concluded that maternal pushing during second stage labor leads to a significant decrease in fetal cerebral oxygenation and an increase in cerebral blood volume, and while this change may not be significant for a healthy fetus, it may be significant for a fetus that enters second stage with impaired oxygenation (Aldrich et al., 1995). However, it must be noted that in addition to the small sample size, this study has several limitations. First, all subjects pushed in semi-recumbent positions using the Valsalva maneuver; no attempt was made to determine if other positions or methods of pushing resulted in similar changes in fetal status. Second, maternal posture and method of pushing were not controlled for as confounding variables. In light of the evidence regarding the hemodynamic changes that occur with the Valsalva maneuver, it is impossible to conclude that the fetal hemodynamic responses measured in this study were attributable to maternal bearing-down efforts alone; maternal posture likely played a significant role in the hemodynamic alterations that were observed. It may be that the findings of this study simply provide evidence to support discontinuing the practice of encouraging Valsalva pushing, rather than evidence that substantiates the fetal danger inherent to the second stage of labor.

Yildirim & Beji (2008) conducted a randomized trial to examine the effects of pushing techniques used during second stage labor on maternal and neonatal outcomes in a single hospital in Istanbul, Turkey. The convenience sample enrolled in this study included 100 low risk primiparous women in active labor with a singleton vertex pregnancy at 38-42 weeks gestation. Subjects were randomized to one of two treatment groups: a spontaneous pushing group and a Valsalva pushing group. During the first stage of labor women in the spontaneous pushing group were instructed to push during second stage in response to the sensations they felt during a contraction; during second stage they were supported by their care providers to push spontaneously. Women in the Valsalva pushing group were given instruction about the Valsalva maneuver during the first stage of labor and coached to push using the Valsalva maneuver during second stage. All of the women began pushing when the cervix was discovered to be completely dilated and none of the women had epidural anesthesia. Outcome measures included length of second stage labor (defined as the time the cervix was found to be fully dilated until delivery), length of the expulsion phase (defined as the time when the fetal head became visible at the introitus until delivery), episiotomy or perineal laceration, cervical laceration, neonatal Apgar scores at one and five minutes, and umbilical cord blood gasses (pO_2 , pCO_2 , and pH). In addition, all participants completed the *Postpartum Interview Form* (Cronbach's alpha = 0.836) to assess the women's satisfaction with the pushing method that was used (Yildirim & Beji, 2008).

Participants in the Valsalva pushing group experienced a significantly longer second stage ($t = 2.028$, $p = < .05$) and longer expulsive phase ($t = 3.935$, $p = < .001$) than women in the spontaneous pushing group (Yildirim & Beji, 2008). However, the authors

failed to describe the methods that were used to identify the exact time that marked the onset of second stage. This creates a potential source of bias; inaccuracies may have existed with regard to total length of second stage. There were no between groups differences in perineal lacerations or episiotomies, or postpartum hemorrhage ($\chi^2 = 1.027$, $p > .05$). Babies born to women in the spontaneous group had significantly higher one minute Apgar scores ($\chi^2 = 8.696$, $p < .01$). There was no difference between groups for 5 minute Apgar scores ($p = 0.001$) or cord pH levels ($p = 0.004$). Women in the spontaneous pushing group believed they pushed more effectively and reported significantly greater levels of satisfaction with the pushing technique than women in the Valsalva pushing group (Yildirim & Beji). Missing from the discussion in this study was information relative to the actual pushing techniques that were used by women in the two groups. It is unknown whether or not women in the groups actually pushed using the method they were instructed to use. However, the authors concluded that teaching women about spontaneous pushing during the first stage of labor, and supporting them to push spontaneously during second stage labor results in a shorter duration of second stage labor, improved neonatal outcomes and improved maternal satisfaction (Yildirim & Beji).

Relationships between pushing techniques and maternal outcomes.

Even in 1957, Constance Beynon argued that during second stage, slow distension of the perineal tissue is less traumatic and should result in fewer lacerations than rapid stretching, and that gentle pushing and slower descent of the fetal head should result in less trauma to the pelvic structures than forced straining and rapid descent. Her clinical observation of 100 women who were allowed to push spontaneously did, in fact, demonstrate that women who were allowed to push in response to their own spontaneous

urges experienced fewer perineal lacerations and episiotomies than women who were directed to bear down with long sustained pushes. Over 20 years later, Caldeyro-Barcia (1979) called for a reform in second stage management with the suggestion that allowing the perineum to stretch more slowly, while women push only in response to their physiologic urges, would lead to less perineal trauma and the need for fewer episiotomies. Several decades later, studies examining the effect of maternal bearing-down techniques on maternal morbidity began to appear in the literature.

Perineal integrity and GU functioning.

Several investigators have examined the effect of various pushing methods on maternal genitourinary functioning. Flynn et al. (1997) conducted a critical review of the literature examining the relationship between second stage management and perineal trauma which revealed that improved perineal outcomes appeared to be associated with less forceful pushing (Flynn et al., 1997). Fitzpatrick et al. (2002) identified that delayed pushing did not result in higher rates of altered continence or anal sphincter injury when compared with immediate pushing. Schaffer et al. (2005) identified that coached pushing in second stage labor had a significant negative effect on urodynamic outcomes. In addition to these previously discussed studies, the following studies have been conducted to examine the impact of pushing technique on perineal integrity and genitourinary functioning.

Sampselle & Hines (1999) conducted a secondary analysis of data, collected using a retrospective design, to describe the relationship between the type of pushing used during birth and perineal tissue injury, as well as the relationship between type of pushing and postpartal pain. Thirty-nine women who experience spontaneous vaginal birth

completed a questionnaire that asked about the type of pushing used during second stage and the amount of pain they experienced during the first week postpartum. Data regarding episiotomies and lacerations experienced by the participants were collected from labor and delivery records. Of the participants, 28% reported using spontaneous bearing-down efforts to give birth while the remaining 72% reported being directed in their pushing efforts.

Women who reported using spontaneous bearing-down efforts were significantly less likely ($P = 0.043$) to have had episiotomies, and second or third degree lacerations, and were more likely to have had an intact perineum, than women who reported being directed in their pushing efforts. These findings were consistent regardless of provider type, maternal age, infant birth weight, length of second stage, and use of epidural anesthesia. Women who pushed spontaneously also demonstrated a trend toward reporting lower levels of pain in the first week post partum than women who were directed to push. Further analysis of data revealed a correlation between reported levels of pain and the amount of perineal tissue disruption (Sampselle & Hines; 1999). Although this study was limited by its small sample size, lack of randomization, and reliance on self reported questionnaire response data, the findings of this study support previous studies which have identified a correlation between spontaneous pushing and improved perineal integrity.

Albers et al. (2006) conducted a secondary analysis of data from a randomized clinical trial of perineal management techniques to identify factors related to genital tract trauma in normal, spontaneous vaginal births. All study participants ($N = 1176$) were attended by certified nurse-midwives in the hospital setting and had normal spontaneous

vaginal births without an episiotomy. Participants in the original study were randomly assigned to one of three perineal management strategies during second stage: warm compresses to the perineum, perineal massage with lubricant, or hands kept off the perineum until crowning of the fetal head. Although pushing techniques were not a primary independent variable under consideration in the original study, data were collected for all participants regarding the use of Valsalva or non-Valsalva pushing.

Findings of the secondary analysis of data revealed that primigravidas with lacerations which required suturing were significantly more likely to have used Valsalva pushing than primigravidas without lacerations (37.4% vs. 23.6%; $P < 0.001$). Multigravidas with lacerations which required suturing were also significantly more likely to have used Valsalva pushing than multigravidas without lacerations (26.4% vs. 15.3%; $P < 0.01$). Logistic regression revealed that in primigravidas, Valsalva pushing in second stage labor was an independent predictor of perineal trauma (risk ratio 1.65; 95% confidence interval 1.05-2.59). Although the study sample included only women cared for by nurse-midwives in the hospital setting, it provides important evidence about the relationship between rushing the second stage with Valsalva pushing and increased rates of perineal trauma. Unlike predictors of perineal trauma that are beyond the control of the provider, such as a history of prior perineal trauma or infant birthweight (Albers et al., 2006), the authors suggest that use of Valsalva pushing during second stage can be modified or eliminated when caring for healthy women in the second stage of labor in order to improve outcomes.

Fatigue.

Second stage labor has been identified as the most strenuous and energy depleting portion of labor (Mayberry, Gennaro, Strange, Williams, & De, 1999). Despite this understanding, maternal fatigue has been less well explored than other maternal outcomes. Two previously described studies have examined the relationship between pushing techniques and maternal fatigue. In a multi-center randomized controlled trial of delayed pushing in women with epidural anesthesia, Fraser et al. (2002) assessed women's perception of control during labor and birth using the *Birth Experience Rating Scale*. Significantly more women ($P < 0.001$) in the early pushing group (40.4%) were in moderate or strong agreement with the statement that "I feel that I pushed for a long time" than women in the delayed group (31.4%). Similarly, the findings of a randomized controlled trial comparing the outcomes of active pushing versus passive descent revealed that primigravidas who were allowed a period of rest and passive descent reported significantly less fatigue ($P = 0.017$) than primigravidas who pushed immediately with the onset of second stage labor (Hansen & Foster, 2002).

More recently, Lai, Lin, Li & Shey (2009) used a quasi-experimental design to study the effects of delayed pushing during second stage labor on postpartum fatigue and various maternal and neonatal outcomes for women who gave birth at two hospitals in northern Taiwan. Unique to this study is the fact that none of the participants in the study received epidural anesthesia. The participants included a convenience sample of 72 nulliparous women at 38-42 weeks gestation in active labor who self selected assignment to one of two groups: the control group or an experimental group. Women in the control group were instructed by their physician to begin pushing when the cervix was completely dilated, the fetal head was in the occiput anterior position and the uterine

contractions were at least 30 mmHg. Rather than simply delaying pushing until women in the experimental group felt a strong urge to push, the following obstetrical conditions also had to be met: the fetal head was to be in the occiput anterior position at +1 station, uterine contractions needed to be at least 30 mmHg, and the cervix needed to be completely dilated. Regardless of group assignment, women were instructed to push using the same technique; they were instructed to push forcefully 3-4 times for more than 4-6 seconds per time with each contraction. All participants were instructed not to hold their breath with the push but to push with an open glottis. All participants were in the Fowler's position with knees drawn up and apart while pushing. Fatigue was measured at one and 24 hours postpartum using the *Fatigue Symptom Checklist* (Lai et al., 2009).

Findings revealed a significantly longer duration of second stage labor (time of complete cervical dilatation) and longer duration of active pushing for the control group ($p < .05$) and a higher rate of spontaneous vaginal delivery in the experimental group ($p < .05$). There were no significant differences in adverse neonatal or maternal outcomes between groups. There was a significant difference in reported postpartum fatigue at both one hour ($t = -3.825, p < .01$) and 24 hours ($t = -4.21, p < .01$) postpartum, with women in the experimental group reporting lower levels of fatigue (Lai et al., 2009). However, there was no discussion regarding potential bias which may exist relative to the reliability of the documentation of complete cervical dilatation and other obstetrical conditions. This source of bias would limit the researcher's ability to draw conclusions based on total length of second stage and/or time spent actively pushing during second stage. Further, all subjects pushed in the Fowler's position; a position which may impact length of second stage labor as well as the fatigue experienced by women who are required to push

while lying flat on their back. All participants were also instructed to use the same pushing technique once they had met the requirements to initiate bearing down. It is possible that this instruction to push using a prescribed technique, rather than spontaneously, also had an impact on perceived levels of fatigue. Nonetheless, this study does provide information about the differences in fatigue experienced by women who push immediately compared to women who wait to push until they feel an urge. Based on the findings, the authors suggest a change in current obstetric practice which recommends the initiation of bearing down efforts as soon as the cervix is fully dilated (Lai et al., 2009).

Women's response to the physiologic urges of second stage labor.

Central to this discussion about pushing techniques and the second stage of labor are the women themselves; women who experience both the physiologic urges of second stage labor, and care from providers that either supports their physiologic urges or provides direction to push in various ways. In addition to the previously described studies which identified the maternal fatigue that occurs during second stage (Fraser et al., 2000; Hansen & Foster, 2002), several studies have examined women's response to second stage labor, most of which has been qualitative in nature.

In a descriptive study conducted by Roberts et al. (1987), one of the goals was to characterize spontaneous maternal respiration, type of bearing-down efforts, vocalization and behavior of women in second stage labor. Data were collected through researcher documentation of the type of bearing-down efforts, respiratory rate between bearing-down efforts, length of breath holding with bearing-down efforts, and maternal position changes of 31 nulliparous women during second stage. An observation guide was used to

document maternal behaviors during bearing down efforts, though the training of observers to use the guide and inter-rater reliability of its use were not described. Data from internal monitoring were also recorded for additional analysis.

Spontaneous bearing-down efforts were characterized according to the type, duration, and number of respirations between bearing-down efforts by members of the research team. Seventy-five percent of the bearing-down efforts made by women in the study were accompanied by release of air, and when breath holding did occur, the duration of breath holding never exceeded six seconds. The number of bearing-down efforts per contraction increased from three to five efforts per contraction as second stage labor progressed. The same was true for the mean duration of bearing-down efforts which increased from four to six seconds as second stage progressed. Most of the contractions (60%) were accompanied by three or more breaths between bearing-down efforts and sustained breath holding rarely occurred (Roberts et al., 1987).

Despite the small sample size and potential for bias related to variations in researcher observations in this study, it does provide important information about the way women push during second stage when allowed to do so spontaneously. Of critical importance is the fact that spontaneous bearing-down efforts occur in a way that is significantly different from directive methods that incorporate Valsalva pushing where women are told to “take a deep breath, hold it to the count of ten, take a quick breath and then come right back to it...try to get at least three big pushes with each contraction”.

McKay, Barrows, & Roberts (1990) conducted a qualitative study of 20 women whose second stage had been videotaped. Within six months of giving birth, data were collected using open-ended interviews; women were asked to describe their labor in as

much detail as they recalled while the interviewer interjected with requests for clarification as necessary. Following the interview, participants viewed the videotape of their second stage of labor and were encouraged to discuss what was happening in the film, caregiver behaviors that were helpful or not, and the feelings and sensations they recalled while watching the tape. All interviews were tape recorded and transcribed verbatim. The transcripts were reviewed by all members of the research team and analyzed for themes using the constant comparative method.

The theme reported in this study was *women's experiences of pushing*. Thirteen of the women reported a clearly defined urge to push, while five reported no urge to push. Nine women reported feeling a sense of relief while pushing while seven described significant discomfort. Many of the women felt unprepared for the sensations and the amount of work required during second stage labor, and much of the time, instructions provided by caregivers did not occur in synchrony with the physiologic responses the women had to their contractions (McKay et al., 1990). Although this evidence regarding the experience of labor is unique to the women who were interviewed for this study, much can be learned from these informants. Clearly, the women in this study experienced the sensations of second stage in ways that were unique to the individual woman. Caregivers would be well served to pay close attention to the unique response to physiologic sensations experienced by women in second stage labor, and individualize their management rather than provide routine and arbitrary instructions regarding when and how to push.

In the descriptive study by Aderhold & Roberts (1991) videotape recordings of four women during the second stage of labor were analyzed in order to describe the

progression through three phases of the spontaneous second stage of labor. As has been previously discussed, women's behavior in second stage was categorized into three distinct phases (Aderhold & Roberts, 1991). The findings provide important information for providers about women's response to the physiologic sensations of the phases of the second stage labor. Rather than offering arbitrary instructions for women to begin using Valsalva pushing the moment the cervix is fully dilated and continue to do so until the birth is complete, it may be more beneficial for birth attendants to individualize second stage care in a way that supports the unique physiologic urges of each woman, remaining aware that the woman's response to those urges will change as labor progresses.

In a pilot study of a randomized controlled trial comparing spontaneous pushing with Valsalva pushing during the second stage of labor, Thomson (1995) observed the behavior of women who were allowed to push in response to their own physiologic urges and the behavior of women directed to push using the Valsalva maneuver. Fifteen women were randomly assigned to the spontaneous pushing group and 17 women were randomly assigned to the Valsalva pushing group; all women were cared for by midwives and the principal investigator observed and recorded the behavior of all 32 women during second stage labor. Among the women who pushed spontaneously there were several notable findings. None of the women began pushing as soon as the contraction started, nor did they continue pushing through the entire duration of the contraction. Most of the women used a combination of open and closed glottis pushing, but none of them spontaneously took a deep breath before they started to push. There was quite a bit of variation in the number of expulsive efforts made with each contraction. This was true both between and within each woman, with some women making as many as 10 expulsive efforts with each

contraction (Thomson, 1995). This study was limited by its small sample size which consisted only of women under the care of a midwife, and the fact that the primary investigator did not corroborate her findings with a second observer. However, the findings confirm the results of previous studies which have demonstrated that women who are allowed to push spontaneously do so in a manner that is much different than the way women push when subjected to authoritative methods of second stage management.

Current practices.

Despite a growing body of evidence that supports the use of physiologic management of the second stage of labor, most women in the U.S. continue to be directed to push during second stage labor using the Valsalva maneuver (Declercq, Sakala, Corry, & Applebaum, 2006). *Listening to Mothers II*, a national survey sponsored by Childbirth Connections, reported the childbearing experience of 1,573 women who gave birth in the U.S. during 2005. All subjects who participated in the survey delivered a live, singleton pregnancy in a hospital in the U.S. The purpose of the survey was to describe the childbearing experience of American women from the women's perspective, and to identify gaps that exist between evidence regarding optimal maternity care and the care that is actually delivered. Of significance to this review of the literature is the finding that, when asked when and how hard women pushed during the second stage of labor, 21% of mothers relied on their body's own sensations, 28% pushed when a nurse or provider told them to, and 47% indicated that they used both methods. When asked to describe her experience one respondent replied "My first delivery I had a nurse yelling at me that I had to push, and this time around....it was the same scenario. A nurse that had not been in my room the whole time I was there, was in there yelling at me, telling me

that I had to push” (Declercq et al., 2006, p. 34). Although this study is limited by potential sampling bias and reliability issues related to recall of the subjects who completed the survey, it provides important information about second stage labor as it is experienced by women in the U.S. There appears to be a significant gap between the evidence that has been presented in this review of the literature and actual practice in U.S. hospitals.

The reasons for this gap between research and practice are unclear. Nursing literature has been replete with expert opinions, editorials and literature reviews in an attempt to bring the evidence to nurses who commonly attend women during second stage labor (Cesario, 2005; Hanson, 2006; McKeon & O’Reilly, 1997; Peterson & Besuner, 2007; Rice Simpson, 2005; Roberts, 2003). Although much of the evidence in support of a spontaneous second stage of labor has been published in medical journals, the same outcry for change in practice has not been seen in the medical literature since the writings of Beynon (1957) and Caldeyro-Barcia, (1975 and 1979). Despite the fact that studies identifying the maternal and fetal benefits of spontaneous pushing have been published in medical journals, publications calling for change in practice have been absent in the medical literature and have appeared primarily in nursing journals. Evidence regarding care practices which enhance spontaneous bearing-down efforts and barriers to evidence based practice is presented here.

Care practices which enhance spontaneous bearing-down efforts.

Much of the literature aimed at changing clinical practice has focused on identifying care practices which enhance spontaneous bearing down efforts, more specifically, identifying those behaviors which are supportive and those which are

directive. Directive behaviors are those which have been previously described; behaviors wherein the care provider directs the woman in second stage labor regarding when to begin pushing, how long to sustain a push, and when to rest between contractions.

Supportive behaviors, on the other hand, are those which encourage a woman to listen and respond to the powerful bodily sensations that occur during the second stage of labor.

Using a descriptive analysis of the videotapes of three women as they transitioned from first to second stage labor, Bergstrom et al. (1997) examined the exchange of communication that occurs between the patient and provider during that transition. Conversational analysis of the videotape transcripts revealed a three step interactive process that occurred between the nurse who was providing care and the woman in labor. Upon expression of feeling an urge to push, the first response of the care provider was to request that she suppress her urge and wait to push until she had been certified as “ready”. This certification usually required a cervical exam by the physician who was not present, so women were expected to wait. Once complete dilatation had been confirmed, the woman was given permission, and actively encouraged to push in response to the involuntary urges she was experiencing. Variations in the point in time at which women began to feel the urge to push were also identified; some women began feeling the urge to push prior to complete cervical dilatation while other began to feel the urge long after the cervix was completely dilated (Bergstrom et al., 1997). Although the findings of this study are limited by its small sample size, it provides important information about care practice which support spontaneous pushing as women transition from first to second stage labor. Listening to women and supporting them to respond to the involuntary sensations they experience in second stage allows women to *give birth* in

a timeframe which is guided by a physiologic process rather than *be delivered* according to an arbitrary and ritualistic set of rules regarding how the second stage of labor “should” proceed.

In 1995, the Association of Women’s Health, Obstetric and neonatal Nurses (AWHONN) launched a research utilization project in an attempt to bring research to practicing labor and delivery nurses and examine the process issues related to the implementation of a research-based practice protocol for nursing management of second stage labor (Mayberry & Strange, 1997). The protocol, *Management of Women in the Second Stage of Labor*, was developed by experts in the field based on all available research. The protocol was implemented with careful consideration of the evidence regarding change theory in 40 hospital based labor and delivery units across the U.S. after two years of data collection and planning. The following were identified in the protocol as evidence based supportive, rather than directive, approaches to caring for women in the second stage of labor:

1. Review realistic expectations and sensations of second stage early in labor as well as at the onset of second stage.
2. Encourage spontaneous bearing down. If the fetal head has not descended low enough in the pelvis to stimulate Ferguson’s reflex, allow the mother to rest until she feels the urge to push.
3. Consider fetal station and position in addition to dilatation in determining a woman’s readiness for pushing.
4. Discourage prolonged maternal breath holding (greater than 6-8 seconds) during pushing (encourage four or more pushing efforts per contraction).

5. Support rather than direct the woman's involuntary pushing efforts. These efforts may include grunting, groaning, exhaling during the push and/or breath holding less than 6 seconds.
6. Validate normalcy of sensations and sounds the mother is voicing.

(Mayberry & Strange, 1997, pp. 702-703)

Although this protocol was not widely adopted by labor and delivery nurses nationwide, it has provided a framework on which to base the implementation of evidence at the practice level. Barriers to the implementation of the protocol will be discussed later.

Based on all available research, Roberts (2003) offered additional guidance for nurses looking to implement evidence into practice. Among supportive care practices Roberts recommended intermittent auscultation of fetal heart rate patterns according to ACOG guidelines rather than continuous fetal monitoring, encouraging women to push in response to the physiologic urges they experience, aiding in the maintenance of hydration, and offering encouragement and information that limits anxiety, including feedback with all vaginal exams (which should be kept to a minimum). Roberts (2003) also recommended supporting women to make active decisions about their care, supporting involuntary bearing-down efforts and using maternal positions that enhance fetal descent and reduce pain.

Sampselle et al. (2005) conducted a descriptive study using the videotapes of 20 primigravidas who gave birth vaginally to describe the association between provider communication and maternal pushing behavior in second stage labor. Provider communication phrases were categorized using a content analysis of the video tapes. The

communication phrases that were categorized as supportive of spontaneous pushing were as follows:

- Affirming how well the birthing woman's body is working. "You're doing good."
- Giving information about progress of baby through birth canal. "You're moving the baby down."
- Giving information about sensations the mother might be feeling. "You're probably feeling a lot of burning and stretching."
- Affirming her effort, when no instruction has been given about the bearing-down effort. Patient does bearing down on her own; provider says, "Good."
- Asking for feedback from the birthing woman about what she is feeling.
- Encouraging the birthing woman to work with or listen to her bodily urges.

(Sampselle et al., 2005, p. 698)

Communication phrases that were categorized as directive included:

- Instructing how or when to push.
- Using a vaginal examination to instruct about pushing, e.g., "Push right here."
- Reinforcing the birthing mother's compliance with immediately preceding instructions about pushing.
- Instructing how to breathe. (Sampselle et al., 2005, p. 698)

Findings of that study revealed that overall, provider communication which encouraged spontaneous pushing ranged from 11% to 95% over all 20 cases. There was a strong positive association between the use of communication phrases categorized as supportive and the percentage of maternal pushing behavior that was in deed spontaneous (Pearson's $r = 0.80$; $P \leq 0.001$), and the use of communication phrases categorized as

directed and the percentage of maternal pushing behavior that was directed (Pearson's $r = 0.89$; $P \leq 0.001$) (Sampsel et al., 2005). While the findings of this study are limited by the small sample size, they provide important information regarding the influence that provider communication has on maternal pushing techniques. Birth attendants need to remain mindful of the powerful influence their communication patterns have on women in the second stage of labor, and cognizant of the importance of communicating with patients in a way that is evidence based.

Barriers to evidence based practice.

To date, the best information available regarding barriers to the implementation of evidence based care practices during the second stage of labor comes from lessons learned with the *AWHONN Second Stage Labor Research Utilization Project*. Following implementation of the second stage labor protocol, site coordinators at all 40 of the participating sites were asked to complete a written summary of the experience using report forms that were developed specifically for the purpose of evaluating the process (Niesen & Quirk, 1997).

Program coordinators identified several barriers to the successful implementation of the second stage practice protocol. First, although participants at all 40 sites were provided with in-depth education regarding the purpose and scientific rationale of the protocol, participants tended to mistrust (and failed to implement the protocol) if the education was rushed or when there was a change in staff during or following the education process. Site coordinators also identified that nurses were willing to try new approaches, but it was common for nursing staff to return to the use of practices which had become "old habits" unless they were continuously reminded of the project. Nurses

also reported that patients who had previously delivered using the Valsalva maneuver were often unwilling to try a new approach. Both nurses and physicians expressed discomfort with the spontaneous noises that were made by women in second stage (Niesen & Quirk, 1997).

Finally, most of the site coordinators reported high levels of physician resistance; despite the fact that the nurses understood, believed in the importance of, and had implemented new ways of providing care during the second stage of labor, as soon as physicians entered the rooms, nurses and patients reverted back to directive methods of pushing in second stage (Niesen & Quirk, 1997; Petersen & Besuner, 1997). Clearly, implementation of any new practice protocol for use in second stage labor requires careful planning, and preparation that includes extensive education of all professionals involved in the provision of care. It is crucial that all care providers, particularly those that maintain a dominant role in controlling the birth environment, are aware of the evidence based nature of the protocol and the scientific rationale for changing practice patterns. Although steps were taken to familiarize physicians who appeared to be in a dominant position with regard to controlling the birth environment, with the evidence which supported a change in practice, nurses involved in the *Second Stage Labor Research Utilization Project* experienced high levels of physician resistance (Niesen & Quirk, 1997). Further research, conducted to identify ways in which primary providers of birth care implement research in practice, may help to inform the development of an intervention which successfully accomplishes wide spread adoption of changes in second stage labor care.

In a similar study, which took place in Ottawa, Canada, Sprague, Oppenheimer, McCabe, Graham and Davies (2008) conducted a quasi-experimental study to examine the degree of adoption of a clinical practice guideline (CPG) which called for a waiting period of up to two hours after complete cervical dilatation (for women with epidural anesthesia) before initiating bearing down efforts. The study was conducted at two separate hospitals. Prior to initiating the guideline, physicians, residents, midwives, unit leaders and nurses on both maternity units were provided with intensive education sessions about the protocol. Five to six “champions” of the CPG were recruited to work on each unit and the CPG was laminated and placed in each labor room. Monthly feedback was sought from all providers of labor care during the implementation phase. Pre and post-evaluation was conducted (using retrospective chart audit) to determine the degree to which the CPG had been adopted. Findings were different between hospitals; implementation of the CPG resulted in a significant increase in waiting (“laboring down”) at the first hospital (median waiting time pre-implementation = 22.5 minutes and post-implementation 56 minutes; $p = .04$) and no significant change in practice at the second site (Sprague et al., 2008).

The authors concluded that the process of knowledge translation is complex, and is influenced by social networks. The authors identified that “interprofessional collaboration and communication is associated with the diffusion of evidence-based practice” and suggested that differences in these may have accounted for the different outcome between sites (Sprague et al., 2008, p. 183). Consistent with the findings of previous research (Hanson, 1998b), the authors identified that providers’ perceived degree of autonomy impacts research utilization. While this study did examine the “real

world” experience of nurses’ using a practice guideline, the study is limited by its small sample size and lack of randomization. In addition, the response rate for the post-implementation evaluation of satisfaction was only 28%, which substantially limits the ability to draw meaningful conclusions relative to provider satisfaction with the CPG. Deeper understanding of provider satisfaction could have provided more information about reasons for adoption of (and failure to adopt) the CPG by providers.

Roberts, Gonzalez, & Sampsel (2007) conducted a descriptive and exploratory secondary analysis of 10 videotaped cases that were obtained from two previous studies of caregiver actions during the second stage of labor. Videotapes that were selected for inclusion in this analysis were those in which providers used both supportive and directive caregiver communication patterns. Using the categories of communication phrases identified by Sampsel et al. (2005) as either supportive or directed pushing, Roberts et al. (2007) analyzed the videotapes for occurrences during which the caregivers’ communication changed from supportive to directive and determined the implied or stated rationale for the change in coaching style. Of the communications noted in the videotapes, 63% involved direction to the woman regarding her bearing-down with contractions, 17% used a combination of support and praise (“supportive praise”), and 20% used a combination of support and direction (“supportive direction”).

These researchers identified seven different reasons that caregivers changed their communication patterns from supportive to directive. The percentages for each rationale were calculated as a percentage of the total number of caregiver communications and include: maternal fatigue (19%), maternal pain (11%), diminished urge to push, including

those with epidural anesthesia (10%), routine/no apparent indication for direction (9%), maternal fear or holding back (8%), request from the women's support person (6%), and fetal indications (1%) (Roberts, Gonzalez, & Sampsel, 2007). Although this study is limited by its sample size, the findings provide important information about the way in which supportive providers make decisions to become more directive in their care. In most instances, the decision to provide direction was based on the maternal response to second stage labor and the need, perceived by the birth attendant, to provide more direction. It may be that the birth attendants viewed the provision of more direction as a specific intervention, offered in response to a clear maternal or fetal indication. More research is needed to more clearly understand the reason care providers become more directive in the absence of any clinical indication.

Midwifery management of second stage labor.

The midwifery model of care is based on the premise that labor and birth are normal physiologic events in a woman's life. Tenets of midwifery care include watchful waiting and non-intervention in normal life processes, as well as the appropriate use of interventions and technology. Midwives trust the inherent ability of women to give birth, and participate in continual risk assessment, intervening in the process of labor and birth only when necessary, with practices based on evidence. Several studies have been conducted to identify the way in which midwives provide care during the second stage of labor.

Following the emergence of early evidence suggesting that directive methods of managing the second stage of labor should be reevaluated because of the potential deleterious effects of Valsalva pushing, Siquefield (1985) summarized the comments of

three experienced nurse-midwives who were asked to describe their management of second stage labor. The nurse-midwives all spoke of the importance of remaining sensitive to the unique needs with which each individual woman in labor presents, and remaining flexible enough to meet those unique needs as management decisions were made. While each midwife also described using practices which were directive at times, they also provided constant support and human presence to women in second stage labor (Sinquefield, 1985). While this publication offers only a limited summary of midwifery care in second stage, it provides important information about the flexible approach to care that is taken by midwives and their willingness to individualize patient care.

Kennedy & Shannon (2004) conducted a qualitative analysis of the interviews of 14 midwives who participated in a large national Delphi panel on exemplary midwifery practice. During the interview, each midwife was asked to provide at least one story that best reflected her practice as a midwife. The interviews were videotaped, transcribed verbatim, and analyzed for themes using narrative analysis. Although Kennedy's (2000) original Delphi study identified "support of normalcy" as the highest ranked process of midwifery care, the findings of this study go further to demonstrate the actual care practices used by midwives to support normal birth. Significant to this review of the literature are the findings that midwives believe in the normalcy of birth, tolerate wide variations in "normal", believe and trust in women's strength, and believe in the importance of physical presence. The midwives whose stories were analyzed made decisions about when to intervene based on vigilant assessment and a belief that intervention was seldom necessary (Kennedy & Shannon, 2004). Although this study was limited by its small sample size and potential bias related to the stories the midwives

chose to tell, the findings provide important information about a philosophy, based on the normalcy of birth and the limited need for intervention, that guides midwifery practice.

This philosophy is consistent with management of second stage labor that includes supporting the woman's spontaneous bearing-down efforts rather than directing women to push according to the provider's predetermined criteria.

Albers et al. (2005) conducted a large randomized controlled trial of 1211 women, from one nurse-midwifery practice, to evaluate the effectiveness of perineal management techniques which are commonly employed by nurse-midwives during second stage labor to reduce genital tract trauma. Women in the study were randomly assigned to one of three treatment groups: use of warm compresses to the perineum, perineal massage with lubricant, or no touching of the perineum until crowning of the fetal head. Data were also recorded regarding the style of pushing that was used for each participant (Valsalva pushing versus self-regulated pushing without prolonged breath holding). Using the common definition of "intact perineum" (no trauma, or minor and unsutured trauma), the findings revealed that 73% of the women in the study gave birth over an intact perineum. While the frequency distribution of perineal trauma was equal in all three groups, germane to this discussion regarding midwifery practices during second stage labor is the fact that of the 1211 women included in the study, 78.7% gave birth using non-Valsalva pushing (Albers et al., 2005). Although this study examined the practices used in just one midwifery practice, it is clear that a significant number of midwifery patients are cared for using the evidence based practice of pushing techniques that do not include Valsalva pushing. It appears that in this setting, since over 78% of the patients were cared for using supportive measures during second stage labor, nurse-midwives have been early adopters

of this innovation in second stage management. It was anticipated that surveying these practitioners about their adoption of evidenced based practice would provide information to help bridge the gap between research and practice.

Gaps in the Literature

This review of the literature has uncovered much about what is known regarding pushing techniques used during the second stage of labor. The early work of Beynon (1957), and Caldeyro-Barcia (1979; 1981) failed to bring about a change in second stage labor management, and directive methods which included instructing women to use Valsalva pushing continue to be used. Cohen's (1977) work did not result in changing the two-hour cut-off for determining the length of "normal" second stage labor (Liao et al., 2005). As a result, many of the practices used during second stage have focused on hastening delivery, with directions for the mother to push in a forced manner rather than in response to the physiologic cues she receives from bodily sensations (McKay & Roberts, 1985). Several studies have been conducted to identify the parameters relative to the length of active labor in healthy women. Investigators have identified a wide range in the normal duration of second stage labor among subjects (Albers, 1999; Albers, Schiff, & Gorwoda, 1996; Kilpatrick & Laros, 1989;) and no significant increase in maternal or neonatal complications following prolonged second stage (Albers, 1999; Albers, Schiff, & Gorwoda, 1996).

The evidence regarding the way in which *length of second stage labor* and *length of time pushing* in second stage are affected by *pushing techniques* is somewhat conflicting. Some investigators have identified no change in total length of second stage labor or length of time pushing, regardless of pushing technique (Paine and Tinker, 1992;

Roberts et al., 1987; Yeates and Roberts, 1984), while others have noted a significant increase in length of second stage with the use of uncoached versus coached pushing (Bloom et al., 2006). Maresh et al. (1983) identified a longer second stage of labor with delayed versus immediate pushing with epidurals but no difference in actual time spent pushing during second stage (Maresh et al., 1983), while Brancato et al. (2008) and Hansen et al. (2002) found a longer second stage of labor and shorter time pushing with passive descent versus immediate pushing.

Much of the management of second stage labor is based on the premise that a shorter second stage is better for both the mother and the fetus (Roberts, 2002). As has been identified with this review of the literature, this is not necessarily the case. Several studies identified no significant difference in *neonatal outcomes* based on *length of second stage or duration of pushing* in second stage (Bloom et al., 2006; Brancato et al., 2008; Caldeyro-Barcia et al., 1981; Cohen, 1977; Hansen et al., 2002; Janni et al., 2002; Menticoglou et al., 1995; Myles & Santolaya, 2003; Paine & Tinker, 1992; Roberts et al., 2004) or *maternal outcomes* (Bloom et al., 2006; Brancato et al., 2008; Hansen et al., 2002; Roberts et al., 2004). There is also evidence of improved outcomes (higher rates of spontaneous vaginal delivery) when the duration of labor is lengthened following a period of rest (Maresh et al., 1983).

Findings of studies related to the relationship between *pushing techniques* and *neonatal outcomes* have been fairly consistent. Several investigators found no significant difference in fetal status or neonatal outcome regardless of the pushing technique that was used (Bloom et al., 2006; East, Dunster, & Colditz, 1998; Paine & Tinker, 1992; Woolley & Roberts, 1995). Improved fetal status and neonatal outcomes were found

when women were allowed to bear-down in response to their own natural urges rather than in response to commands for repeated, sustained pushes using the Valsalva maneuver (Caldeyro-Barcia, 1979; Caldeyro-Barcia et al., 1981; Barnett & Humenick, 1982; Roberts et al., 1987; Thomson, 1993). Other researchers have identified improved fetal outcomes when women with epidural anesthesia were allowed a period of rest and delayed pushing in second stage rather than pushing immediately upon complete dilatation (Hansen et al., 2002; Maresh et al., 1983).

Several studies have demonstrated that allowing women to push spontaneously resulted in at least the same *maternal outcomes* with regard to perineal trauma and at best, less perineal damage. The earliest studies were done to demonstrate the safety and efficacy of changing practice from directive methods of second stage management, which encouraged Valsalva pushing, to management which included suggestions for women to push in response to their own spontaneous urges. Some investigators identified no increase in perineal trauma with a physiologic approach to second stage management (Brancato, 2008; Hansen et al., 2002; Roberts et al., 2004; Thomson, 1993). Others found a non-significant trend towards improved outcomes when women pushed spontaneously (Bloom et al., 2006; Fitzpatrick et al., 2002), while still others found less perineal trauma when women were allowed to push in response to their own physiologic urges (Albers et al., 2006; Sampsel & Hines, 1999; Schaffer et al., 2005; Yeates & Roberts, 1984).

With regard to women's experience of second stage labor, it is clear that although second stage has been identified as energy depleting, primigravidas who are allowed a period of rest before initiating bearing-down efforts during second stage experience less fatigue than those who begin pushing immediately after the cervix is found to be fully

dilated (Fraser et al., 2002; Hansen & Foster, 2002). Several investigators revealed that women experience the sensations of second stage in ways that are unique to individual women (Aderhold & Roberts, 1991; McKay, Barrows, & Roberts, 1990; Thomson, 1995) and that when allowed to push in response to their own urges, women's spontaneous bearing down efforts are much different than bearing-down efforts done in response to directed requests for sustained Valsalva pushing (Roberts et al., 1987; Thomson, 1995).

Despite a growing body of evidence in support of spontaneous pushing during the second stage of labor, and attempts to bring the evidence to nurses and physicians for implementation at the bedside, most of the women who give birth in the U.S. continue to be cared for with directive methods which include instructions to push using the Valsalva maneuver (Declercq et al., 2006). Researchers have tried to identify reasons for this gap between evidence and practice. The reasons cited for reverting to directive methods of second stage labor management include maternal responses to pushing in second stage such as fatigue or requests for more direction (Hanson, 2009; Niesen & Quirk, 1997; Roberts, Gonzalez, & Sampsel, 2007), nurses' comfort with the use of directive methods of pushing and discomfort with women's spontaneous noises during second stage, and physician resistance to physiologic management of second stage labor (Niesen & Quirk, 1997). Examining the care practices of CNMs and CMs whose philosophy adheres to a belief in the normalcy of labor and birth and the self determination of the women they care for (American College of Nurse-Midwives, 2004a) adds to the body of knowledge regarding pushing techniques used during the second stage of labor.

Several studies have identified care practices which enhance spontaneous bearing-down efforts. These practices include listening to women and supporting them to

respond to involuntary sensations they experience rather than providing direction during second stage (Bergstrom et al, 1997; Mayberry & Strange, 1997; Roberts, 2003; Sampsel et al., 2005), providing positive feedback and encouragement during second stage, and asking for feedback from the woman while validating the normalcy of the sensations she may be experiencing during second stage labor (Mayberry & Strange, 1997; Roberts, 2003; Sampsel et al., 2005).

Studies which have examined midwifery care during second stage labor have identified that midwives understand the unique ways in which women enter the second stage of labor and the importance of remaining flexible so that care practices can be tailored to meet every woman's individual needs (Kennedy & Shannon, 2004; Sinuefield, 1985). Midwives understand the importance of continuous presence and support (Kennedy & Shannon, 2004; Sinuefield, 1985), believe in the normalcy of birth, and make evidence based decisions with regard to when to intervene in the natural process of labor and birth (Kennedy & Shannon, 2004). Finally, a study that examined patients cared for by one midwifery practice in the U.S., identified that women under the care of midwives pushed using non-Valsalva methods over 78% of the time (Albers et al., 2005).

What is less well understood is the way in which CNMs and CMs, practicing throughout the entire United States, provide care to women in the second stage of labor. Based on the findings of a study conducted in one nurse-midwifery practices (Albers et al., 2005) and the findings of studies related to midwifery care during second stage labor (Hanson, 1998a), it is likely that the care practices of CNMs and CMs, nation wide, are supportive of women's spontaneous bearing down efforts. Further, it is likely that CNMs

and CMs are cognizant of the barriers and facilitating factors encountered in the use of care practices which support women's spontaneous bearing down efforts. However, documentation of the second stage care practices of CNMs and CMs nation-wide, as well as the barriers and facilitating factors encountered in the use of evidence based practice, is missing from the literature. This study was designed to fill this gap in the literature by seeking information directly from CNMs and CMs through the administration of a national survey.

Identifying the second stage care practices used by these providers of labor and birth care, who believe in the normalcy of birth and the judicious use of intervention, provides a greater understanding of the way in which evidence that supports spontaneous pushing during second stage labor is implemented in practice. Further, understanding the care practices that are used by innovators and early adopters during second stage labor may help translate evidence into practice; it is likely that these providers will be instrumental in the diffusion of this innovation to larger groups of labor and birth care providers. Although some of the barriers to evidence based second stage management have been identified in the literature, factors that support and/or facilitate the use of spontaneous pushing techniques during the second stage of labor are missing from the literature. It was anticipated that surveying CNMs and CMs, who are early adopters, would provide important information about these facilitating factors which can then be used to enhance the diffusion of care practices which support spontaneous pushing during second stage labor to all providers of labor and birth care including physicians and nurses. Further inquiry will be necessary to understand the meaning of those care practices to the vulnerable women served by CNMs and CMs and will most certainly be

the focus of future research as an initial step towards returning the power of decision-making to women in labor.

Assumptions of the Study

The conduct of this study moved forward with the following assumptions:

1. It is assumed that the vast majority of women are healthy and capable of giving birth without direction from others regarding when and how to push (Caldeyro-Barcia et al., 1981; Beynon, 1957; Roberts et al., 1987).
2. It is assumed that CNMs and CMs are providers of second stage labor care who make independent management decisions regarding the method of pushing to be used during second stage labor (American College of Nurse-Midwives, 2004b).
3. It is also assumed that CNMs and CMs believe in a woman's ability to give birth and the judicious use of intervention, and that decisions made regarding management of the second stage of labor include consideration of the woman's choices and limited use of interventions (American College of Nurse-Midwives, 2002, 2004a).
4. It is assumed that the American College of Nurse-Midwives provides a social system within which ideas are shared and innovations are diffused among CNMs and CMs (American College of Nurse-Midwives, n.d.).
5. It is assumed that CNMs and CMs will be interested in and willing to share their experience of caring for women in second stage labor by participating in survey research (Hanson, 1996).

Research Questions

1. What pushing techniques do CNMs and CMs use when caring for women during the second stage of labor?
2. To what extent do CNMs and CMs provide second stage labor care that is supportive of women's spontaneous bearing down efforts or directive with regard to when and how to push during second stage labor?
3. What are the barriers and/or facilitating factors that influence CNMs and CMs use of pushing techniques which are supported by scientific evidence?
4. What are the characteristics of adopters of physiologic management of the second stage of labor?

CHAPTER 3

Research Design and Methods

Preliminary Studies

Prior to the outset of this study, and following IRB approval from Marquette University, a pilot study using a focus group design was conducted to gather data for narrative analysis. The focus group participants included seven nurse-midwife informants and two co-investigators (the principal investigator and committee chair for this study). Participants in the focus group were purposively sampled from the membership list of the Wisconsin Chapter of the ACNM in order to have representation from CNMs practicing in all settings: home, hospital and birth center. Broadly stated questions regarding management of the second stage of labor were asked, giving the nurse-midwife participants opportunities to discuss the care practices they employ during second stage labor, the similarities and differences in their care practices, and the facilitating factors and barriers they may encounter when implementing care practices that are supportive of women's spontaneous urges during the second stage of labor. The focus group session was audio-taped, transcribed verbatim, and analyzed for themes.

Data analysis was done through independent review of the transcripts by the co-investigators. Emerging themes were inductively identified and corroborated between the co-investigators; agreement about the themes was reached by the investigators through extensive discussion. The following themes emerged from the data:

1. Recognition of second stage as physiologic
2. Midwifery care practices

3. Direction as an intervention
4. The fluid nature of supportive versus directive care practices
5. Barriers to supporting self regulated pushing

These themes were reviewed with five of the midwife informants in order to establish trustworthiness of the findings. Each of the informants confirmed that these were the themes that emerged during the focus group.

In addition to the focus group, four individual semi-structured developmental interviews were conducted by the principal investigator in order to more clearly understand the experiences of nurse-midwives caring for women during the second stage of labor. The purpose of conducting developmental research, as an initial step in the process of survey design, is to aid the researcher in identifying (and operationalizing) constructs which are central to a phenomenon of interest (N.C. Schaeffer, personal communication, February 6, 2008). Spradley's (1979) methods of domain and taxonomic analyses were then used to establish a taxonomy of care practices of nurse-midwives during the second stage of labor. The first step in this process involves the selection of a primary domain. The domain selected for this taxonomic analysis was *Care Practices of Nurse-Midwives During the Second Stage of Labor*. Using this method, the words used by informants were analyzed to identify the behaviors that the informants considered to be care practices they employ. In order to identify types of care practices, transcripts of the interviews were analyzed for semantic relationships using the following substitution frame:

1. Domain: Care Practices of Nurse-Midwives During SSL
2. Semantic Relationship: A specific behavior (is a kind of) care practice.

3. Underlying semantic relationship: X (is a kind of) Y
4. Substitution frame (example): determining the onset of second stage (is a kind of) care practice

Using this tool, eight subsets (categories of behaviors) of the domain were identified: (a) determining the onset of second stage, (b) initiating bearing-down efforts, (c) providing supportive care (such as the verbal affirmation of progress with each push), (d) providing direction when needed, (e) watchful waiting, (f) working with outside forces, (g) caring for women with epidurals, and (h) providing comfort measures (such as warm compresses and massage). Analytical review of the transcripts from each interview resulted in the identification of multiple behaviors in each category, exhibited by nurse-midwives during the second stage of labor. These categories and behaviors were reviewed and validated with each of the midwife informants. Data gathered from the individual interviews and focus group were used to inform the development of individual items for the questionnaire that was used in the current study.

Research Design

Quantitative methods using a descriptive, exploratory, correlational design were used to address the aims of this study. Survey research has been identified as a customary research methodology for the investigation of innovation diffusion (Rogers, 2003). A self-administered questionnaire was distributed to a random sample of active members of the American College of Nurse-Midwives (ACNM). Data provided from respondents who had attended a birth in the past six months were included in the final analysis. This approach allowed the researcher to quantitatively estimate characteristics of the population (Dillman, 1991). Specific to this study, survey research allowed for collection

and analysis of data to address the research questions from CMs and CNMs who work in a wide variety of settings in locations throughout the country. This research design revealed descriptive information about the care practices, as well as facilitating factors and barriers to the use of physiologic management of the second stage of labor.

Concepts Under Investigation

The primary concept under investigation in this study was the extent to which CNMs and CMs use evidence based care practices which support spontaneous pushing during the second stage of labor. Rogers (2003) describes *trialability* as “the degree to which an innovation may be experimented with on a limited basis” (p. 16). While it is possible that some CNMs and CMs exclusively use care practices which support spontaneous pushing and some use directive pushing techniques exclusively, it is more likely that CNMs and CMs use care practices throughout the second stage of labor that move along a continuum which ranges from fully supportive of spontaneous pushing to fully directive. Viewed in that context it was important to understand *the extent* to which spontaneous pushing methods are used during the second stage of labor, rather than simply whether or not they are used. Factors that facilitate the implementation of evidence-based spontaneous pushing methods during the second stage of labor, and barriers to the use of these methods are some of the underlying concepts that were investigated.

These concepts are consistent with the components of the theory of diffusion of innovations. Recalling that there are four necessary elements to the diffusion of innovations (the innovation, communication channels, time, and a social system), variables related to each of these components were also identified. Concepts related to the

innovation (spontaneous pushing during second stage labor) include the way in which adopters view its relative advantage, compatibility, complexity, trialability, and observability. Rogers (2003) refers to these as *attributes of an innovation* and recommends that measures of these attributes be included in any study of innovation diffusion. Questions regarding respondent's perception of the advantages, compatibility with practice, observability, and trialability of physiologic management of second stage labor were included in the questionnaire (see appendix B for complete version of the questionnaire). Complexity refers to the degree to which an innovation is perceived by adopters as difficult to understand (Rogers, 2003). Since the innovation under consideration in the current study is based on a basic understanding of physiology and requires no specialized understanding of technology, and since an understanding of human anatomy and physiology is necessary for the clinical practice of the respondents, items regarding complexity were not included in the questionnaire.

Relative to communication channels and social systems, the diffusion of an innovation is dependent in large part on the characteristics of the adopters, the channels through which information is sought, and the degree to which individual adopters communicate with, and are part of, larger social systems (Rogers, 2003). Questions regarding demographic characteristics of respondents, specifically educational background, years in clinical practice, age, gender, practice setting, location of practice, types of journals read by the respondent and membership in professional organizations were included in the questionnaire to evaluate these variables.

Most of the items in the questionnaire were developed to determine the degree of adoption, or the degree to which individual respondents have implemented spontaneous

pushing approaches during the second stage of labor. Answers to these questions provided information about the adopter categories of the respondents. These items examined and clarified the relative speed with which CMs and CNMs have adopted physiologic management of the second stage of labor. To further understand the notion of time, as it relates to diffusion of an innovation, a question regarding when and from whom respondents learned the practices they use during second stage labor was added to the questionnaire. A detailed listing of the questionnaire items used to measure each of the concepts under consideration can be seen in Table 5. Items 1, 12, and 19 were filter questions used to direct respondents away from questions they would be unable to answer because of lack of relevance of the item to the individual respondent's experience.

Table 5.
Questionnaire items and the concepts they measure

Concept	Questionnaire Item
Pushing techniques used by CNMs and CMs	8; 10; 13; 14; 15; 18; 20
Supportive of spontaneous bearing down efforts	8E; 10D, E, G, I; 13D,E, F; 14D, E, G, I,
Barriers to supporting spontaneous bearing down efforts	16; 17; 20
<u>Characteristics of adopters/antecedent conditions</u>	
Demographic data	2; 12; 22-33
Autonomy	21
Practice patterns	3; 4
Innovativeness (relative time of adoption)	7
<u>Attributes of the innovation</u>	
Advantage	8; 10; 13; 14; 20
Compatibility	5; 6; 9; 11
Trialability	8; 10; 13; 14; 20
Observability	5; 6; 9; 11

Sample Size

A simple random sample of members of the ACNM, selected using a computer generated random numbers table, was used for inclusion in the study sample. The ACNM is the professional organization of CNMs and CMs in the U.S., and therefore provides the most inclusive roster of CNMs and CMs in clinical practice available. The membership list of ACNM includes both active and inactive members. Since the purpose of this study was to describe practice patterns of CNMs and CMs during second stage labor, a list of only CNMs and CMs with active membership status was requested from ACNM. Of the CNMs and CMs who identify themselves as actively practicing, many do not practice in the intrapartum setting. According to the 2003 membership survey, 72% of respondents were attending births (Schuiling, Sipe, & Fullerton, 2005). This is similar to the findings of Hanson (1996) who identified that 18% of respondents to a survey of ACNM members, regarding positions used for pushing in second stage labor, did not practice in the intrapartum setting. It was therefore possible that roughly 25% of respondents do not attend births and would not be able to provide data that were useful for answering the questions regarding second stage labor under consideration in this study.

Since the primary purpose of this study was descriptive in nature, there were no predictor or outcome variables. Consequently, the concepts of power (as related to hypothesis testing) did not apply when calculating a sample size (Hulley, Cummings, Browner, Grady, & Newman, 2007). However, one of the study questions sought to identify the extent to which CNMs and CMs use evidence based physiologic management of the second stage of labor. Since it is likely that the use of evidence based physiologic management by CNMs and CMs occurs along a continuum, it was important to determine

a sample size that was large enough to capture the CNMs and CMs on both ends of the continuum. Therefore, a formula for calculating a sample size for a descriptive study of a continuous variable was used (Hulley et al., 2007). In a similar study that evaluated the degree to which nurse-midwives used scientific evidence regarding best positions for second stage labor, Hanson (1996) identified the mean percent use of non-lithotomy positions was 91.9% with a standard deviation of 21.4. Using those findings to determine a standard width of 0.28, it was determined that a study sample size of 339 respondents would be required to estimate mean percentage use of evidence in second stage labor management with a 99% confidence interval of +/- three percentage points (Hully et al., 2007).

Anticipating an overall response rate of 60% (Dillman, 1991), it was necessary to sample 565 members of ACNM in order to attain 339 completed questionnaires. However, recalling the estimated 25% of respondents who may not attend births and would subsequently not provide data that are useful in the final analysis, it was necessary to sample an additional 140 (25% of 565) active members in order to be assured responses from at least 339 CNMs who care for women in the second stage of labor. Questionnaires were mailed through the U.S. postal service to a simple random sample of 705 active members of the American College of Nurse-Midwives.

Instrument

Since this was the first time a national survey of CNMs and CMs has been conducted to describe the care practices used by CNMs and CMs to support maternal bearing-down efforts, it was necessary to design a new survey instrument for data collection. Questionnaire development began with the focus group and individual

developmental interviews described previously. The taxonomy of second stage management approaches identified during the developmental interviews and focus group, informed the development of an initial questionnaire with 20 items. That questionnaire was administered to four CNMs who served as content experts, and two researchers with expertise in survey design, using a cognitive interview process (Fowler, 1995).

Respondents were interviewed individually and asked to *think aloud* while reading and responding to each item. Each respondent was offered verbal probes in order to determine if the respondents were interpreting the questions and response categories correctly.

CNM content experts were asked to review each question and response set for accuracy and the survey researchers were asked to review each question for potential bias related to item and/or response category design. Following that initial round of cognitive interviews, several changes were made to the questionnaire.

One of the flaws discovered during the cognitive interviews was the omission of an important contextual cue; questions about care practices were asked without specifying if the care practices of interest were used with women who had, or did not have, an epidural in place for pain management. In order to improve response accuracy, all questions were rewritten to make the context in which care was delivered explicit.

Changes in the questionnaire were also made to enhance respondent recall, which was particularly important since the accuracy of survey research is largely dependent upon the memory and accurate recall of the respondents. Each item was rewritten to offer verbal cues to aid recall and an appropriate reference period was set to improve recall accuracy. Specifically, a six month reference period was established for all questions, which allowed respondents to more accurately recall the behaviors they had used during

the second stage of labor. Verbal cues to enhance accurate recollection were also added. For example, prior to stating a question, respondents are asked first to *think about* the care they provided to women in second stage labor during the established reference period. The risk of telescoping, or overestimating the number of times one engaged in a given practice, exists any time respondents are asked about practices. This is particularly true with regard to practices respondents would prefer to use more often than they are actually able, for example providing a certain type of care to a labor patient. Using a reference period that allowed respondents to more accurately recall the practices or behaviors that were actually used reduces the risk for telescoping (Schaeffer & Presser, 2003; Tourangeau, Rips, & Rasinski, 2000) so a reference period of six months was chosen for use throughout the questionnaire.

The questionnaire was also reformatted in a manner that would allow respondents to use minimal effort to move from question to question, thereby reducing respondent fatigue. For example, type fonts, bolding, and italics were used to enhance cognition and visual perception (Jenkins & Dillman, 1997). In order to improve accuracy regarding the degree to which respondents engage in specific behaviors, questions regarding “usual practice” were written such that the response categories were scaled from “never” to “almost always”, rather than simply asking for yes or no responses. Finally, each question was written with at least five response categories, with equidistant scale points devised to reduce response bias related to satisficing, which is defined as simply choosing the midpoint because it requires less thought (Krosnick & Fabrigar, 1997).

After making these changes, the second iteration of the questionnaire was administered to one CNM content expert (who is also a survey researcher) and one expert

survey researcher. Based on feedback received from those reviewers, individual items were revised to improve response accuracy and the instrument was significantly revised to reduce respondent fatigue. Items that were redundant were deleted from the instrument, and items that asked about similar practices were grouped together to reduce respondent fatigue. The third iteration of the questionnaire was individually administered to three CNM experts for content validity, using an interactive technique used to evaluate questionnaires referred to as the “intensive interview” (Royston, 1989). Much like the cognitive interviews used with the first iteration of the questionnaire, respondents were asked to *think aloud* while responding to each item. This process allowed the respondents to clarify that they understood the questions in the way they were intended to be asked. Final changes were made to the questionnaire for the purpose of clarifying some of the items, based on feedback from the principal investigator’s dissertation committee, prior to pilot testing the questionnaire.

Following IRB approval, the final questionnaire was pilot tested with 10 CNMs who were not involved in the process of questionnaire development. Reliability was assessed by measuring internal consistency (the degree to which the items are measuring the same construct) with Cronbach’s alpha (Pallant, 2005). Internal consistency of items related to the practices and beliefs of midwives relative to management of the second stage of labor was good, with a Cronbach’s alpha coefficient of .837. Internal consistency of items related to perceived barriers to the use of supportive approaches to second stage labor care was also good, with a Cronbach’s alpha coefficient of .777. The final questionnaire was printed in booklet format and mailed to respondents. A cover letter explaining the purpose of the study, researcher’s qualifications, an opportunity to decline

participation, and a request for signed consent was sent with each questionnaire (see Appendix B for complete version of cover letter and questionnaire).

Procedure

Following approval of the ACNM Division of Research, the mailing list of active members was acquired from the ACNM. A total of 705 active members of ACNM were randomly selected for inclusion in the study using a computer generated random numbers table. The first round of questionnaires was mailed, along with self-addressed and stamped return envelopes, to the 705 randomly selected members. Numeric codes that were matched to the participant's names were assigned to each questionnaire so that the principal investigator could identify which study participants had returned the questionnaire. A running record of responders was maintained throughout the data collection period. One week after the initial mailing, a postcard was sent to the 705 members of the sample population (see Appendix C). The purpose of the postcard was to thank those who had responded, and provide a gentle and friendly reminder to those who had not responded (Dillman, 2007).

Four weeks after the initial mailing, a second round of questionnaires was mailed with a reminder letter (see Appendix D) to non-responders. The first round of mailings yielded 446 responses (63%). In order to minimize non-response error by insuring that responses were received from an adequate number of respondents from the original sample (Dillman, 2007; Draugalis, Coons, & Plaza, 2008) a second round of questionnaires was mailed to the 259 non-responders four weeks after the initial mailing. Following the second mailing, a total of 512 responses were received, for an overall response rate of 73%. Of those who responded to the survey, 137 respondents (27%)

reported that they did not attend births, leaving a total of 375 respondents for inclusion in the final study sample. Data were coded and entered into the *Statistical Package for the Social Services (SPSS) 16.0* by the principal investigator.

Data checking and cleaning.

Following data entry, the data were checked and cleaned by the principal investigator. First, the principal investigator selected ten percent of the paper questionnaires and checked every item that had been entered on the SPSS spread sheet against the corresponding paper questionnaires for accuracy. Items that had been entered incorrectly were corrected by changing the value on the SPSS spread sheet. The principal investigator then selected a second set of questionnaires (an additional ten percent) and checked every item on the original paper copy against the data that had been entered on the SPSS spread sheet for accuracy; incorrectly entered items were corrected by changing the value on the SPSS spread sheet. This process was repeated two more times, at which point no errors in data entry were detected. In total, 40% of the questionnaires were checked against the SPSS spread sheet for accuracy using this process.

All categorical variables were checked for outliers and missing data. Descriptive statistics were obtained for each categorical variable and minimum and maximum values were evaluated for accuracy. For example, responses to questions about care practices used when caring for women in labor ranged from one to five; all items with response categories ranging from one to five were checked to see that the minimum value for each of those variables was one and the maximum value for each of those variables was five. If a minimum or maximum value fell outside of the expected range, the entire paper copy

of the questionnaires was checked against the data that had been entered for that questionnaire. Examining the data for accuracy relative to maximum and minimum values revealed no incorrectly entered data.

All variables were checked for missing data. When missing data were identified, the entire paper copy of the questionnaire with missing data was checked against the corresponding data from that questionnaire that had been entered on the SPSS spreadsheet for accuracy. This process was repeated for every case with missing data and revealed no errors in data entry.

Categorical variables were checked in a similar manner using descriptive statistics. For example, the autonomy variable was checked to see that none of the entries fell outside of the expected response from the participants. Most of the subjects rated their level of perceived autonomy as very high (8-10 on a Likert-type scale). When an item was identified as falling outside of the expected range (less than 8 for the autonomy variable) the entire paper copy of the questionnaire for that case was checked against the corresponding data that had been entered on the SPSS spreadsheet. This process revealed no errors in data entry.

Data Analysis

In order to identify the pushing techniques used by CNMs and CMs when caring for women in second stage labor (research question one), and to determine the normality of distribution of midwives who have adopted the innovation, data regarding practice patterns were analyzed with descriptive statistics (mean, median, mode, and standard deviation) using *SPSS for Windows (16.0)*. Identifying the practice patterns that were used most frequently also allowed the principal investigator to identify whether the

practices used by CNMs and CMs were supportive of women's spontaneous bearing down efforts or directive in nature (research question two).

Data regarding factors which influence midwives' decision to become more directive in their approach to second stage labor care (item 16 on the questionnaire) were analyzed using descriptive statistics (mean, median, mode, and standard deviation). This allowed the principal investigator to identify barriers and facilitating factors that may be encountered in the use of physiologic management of the second stage and answer research question three.

Descriptive statistics (mean, median, mode and standard deviation) were used to analyze all demographic data in order to describe the sample (potential adopters), using *SPSS for Windows(16.0)*. Demographic data that were collected included age, gender, educational background, years of experience, place of practice, geographic location by state, preceptor status, professional journals read, and professional organization memberships. Frequency distributions and correlation coefficients (Pearson's Product-Moment correlation) were also obtained using *SPSS for Windows (16.0)* in order to identify and describe relationships which existed between demographic data and practice data. This statistical analysis allowed the principal investigator to identify the characteristics of participants who use supportive approaches to second stage labor care, and answer research question four.

Two separate one-way between-groups ANOVAs were also conducted. The first used all the items relating to care practices as dependent variables, and practice setting (home, birth center, level1 hospital, level 2, hospital, and level 3 hospital) as the independent variable. The second ANOVA included all the items relating to care

practices as dependent variables and the geographic location in which the participants lived, grouped according to the geographic regions identified by the U.S. Census Bureau (U.S. Census Bureau, n.d.), as the independent variable. The purpose of running the ANOVAs was to identify any potential variance in second stage care practices between groups of providers (relative to practice setting or the geographic region in which the participant lived). This analysis provided further information about the characteristics of adopters of the innovation (research question four).

One final adopter characteristic was examined using independent samples t-tests which compared the items related to care practices with each of four types of preceptors: midwifery student preceptors, medical student preceptors, nursing student preceptors and preceptors who work with residents. The purpose of running the t-tests was to identify potential differences in care practices that may be related to whether the respondent did or did not precept each of the four types of students. Findings of the data analysis are reported in Chapter 5 and summarized in Appendix E.

Limitations/Potential Difficulties

Limitations of survey research have previously been identified and are primarily related to four sources of potential error: sampling error, noncoverage error, nonresponse error and measurement error (Dillman, 1991; Dillman, 2007). *Sampling error* occurs when an inadequate number of the members of the survey population are surveyed. *Noncoverage error* occurs when not all members of a survey population are allowed an equal opportunity of being randomly sampled to participate in the survey. *Nonresponse error* occurs when people who respond to a survey are different from the sampled individuals who did not respond, and is minimized by taking measures to insure an

adequate response rate. *Measurement error* is the result of poorly worded questions or questions that were worded in such a way that inaccurate responses are provided (Dillman, 2007). Steps to reduce measurement error were identified in the description of instrument development. Steps taken to reduce sampling, noncoverage and nonresponse errors are described below.

The risk of sampling error in this study was reduced by administering the questionnaire to a sample of adequate size (determined using the formula described previously) and by randomly selecting the sample population from the total population of active members of the ACNM. The risk of non-coverage error was difficult to avoid in this study. Since the sample population was drawn from the ACNM active membership list, and since not all nurse-midwives are members of the ACNM, there was no opportunity to include non-members in the study sample. This potential for non-coverage error will be addressed as a limitation in the discussion section of the written report.

Low response rates are one of the disadvantages of self-report survey research, and are the focus of much research and debate (Dillman, 1991; Waltz et al., 2005). Several measures were taken with this survey to reduce the risk of nonresponse error. First, the sample size was calculated based on an estimated response rate of 60% to insure the total number of responses were sufficient for the study. Second, follow-up postcards were sent to the entire sample population one week after the initial mailing of questionnaires, and a second round of questionnaires were sent to non-responders, with a reminder note and request to participate, four weeks after the initial mailing (Dillman, 2007). In addition, steps were taken following Dillman's (2007) *Tailored Design Method* during the construction and pre-testing of the questionnaire, to insure ease of

understanding and completion, and to reduce the risk of measurement error. A stamped return envelope was included with the questionnaire for ease of return. Finally, each member of the sample population received one dollar, included in the first mailing, as an incentive to complete and return the questionnaire. Research has demonstrated that including a small financial incentive of one to five dollars with a request to complete a questionnaire significantly improves response rates (Dillman, 2007).

Finally, *social desirability bias* has been identified as a limitation of survey research. Social desirability refers to the desire of respondents to answer survey questions in such a way that they appear to be “good people” in the eyes of the survey administrator. Social desirability bias is particularly problematic for questions that deal with socially desirable behavior or attitudes (Bradburn, Sudman & Wansink, 2004). It is likely that most CNMs and CMs are keenly aware of the evidence based nature of physiologic management of the second stage of labor, and it is possible that they had difficulty admitting that they do not use evidence in practice. The likelihood of this was increased for the present study because the principal investigator is a CNM member of the total population from which the sample for this study was selected and holds a leadership position within the ACNM. While the risk for social desirability bias is less concerning with self administered questionnaires than with interviewer administered questionnaires (Bradburn et al., Dillman, 2007) the risk for social desirability bias exists nonetheless for this study.

Several steps were taken to reduce the risk for social desirability bias in this study. First, care was taken with the development of each question to avoid judgmental language; questions were developed in a straightforward and nonjudgmental manner.

Second, rather than asking separate questions about practices that could be considered undesirable, questions about such practices were embedded in lists of questions about a range of practices. For example, rather than asking respondents to reply to a stand-alone question about how often they encourage long sustained pushes for an entire contraction, that question was embedded in a list of approaches to second stage management. Using this technique reduces the perceived importance of a potentially threatening question and reduces the risk for social desirability bias (Bradburn et al., 2004). The issue of social desirability was also explored with the pilot study (focus group) where participants were willing to share all approaches (supportive and directive) used during second stage management despite the fact that all participants were well acquainted with each other and with the focus group leaders. Finally, potential respondents to the survey were provided information in the cover letter about the way in which confidentiality would be maintained from the onset of data collection through the report of findings. Because complete avoidance of this source of bias is not possible, the potential for social desirability bias will be addressed as a limitation in the discussion section of the written report.

Human Subjects Protection

Prior to the initiation of this study, IRB approval was obtained from Marquette University, including approval of the final version of the cover letter and questionnaire, consent form, reminder postcard, and the cover letter which was used with the second mailing. In order to gain access to the mailing list from which to select study participants, this protocol was also submitted for review and approved by the Division of Research of the ACNM. All questionnaires were numerically coded so that only the PI was aware of

the names of respondents, in order to allow for follow-up of non-responders. A cover letter accompanied each questionnaire to inform potential participants of the qualifications of the principal investigator, purpose of the study, measures of confidentiality, and directions for completion and return of the questionnaire. All respondents were offered an opportunity to refuse to participate; those who chose to participate returned a signed consent form with their completed questionnaire.

Strict confidentiality was maintained throughout the study. During data collection and data entry, each questionnaire was identified numerically and all paper instruments were kept in a locked drawer located in the locked office of the principal investigator. Computerized files were password protected with access available only to the principal investigator. Results are reported as aggregate data only; no individual responder was identified. The lists of respondents and corresponding identification numbers are maintained in a locked drawer located in the locked principal investigator's office and destroyed three years after complete reporting of the results of this study. All questionnaires will be shredded three years after complete reporting of the results of this study.

CHAPTER 4

Providing Care to Women in the Second Stage of Labor:
A Focus Group of Nurse-Midwives as Informants**Abstract**

Aims: The purpose of this study was to describe the care practices used by Certified Nurse-Midwives (CNMs) when providing second stage labor care, and to identify the facilitating factors and barriers to providing evidence-based care to women during this labor phase. **Background:** Most women who give birth in the U.S. are given arbitrary instructions concerning when and how to bear down. Therefore, birthing women do not receive second stage labor care that is based on the scientific evidence that indicates that support of women's spontaneous efforts contributes to more optimal maternal, fetal and neonatal outcomes. **Methods:** Prior to the focus group, a brief questionnaire was used to screen CNMs to identify potential participants who use evidence based second stage labor care practices such as support of maternal spontaneous pushing. A focus group of 7 CNMs was conducted in 2008 using a series of questions, audio-tape recorded, transcribed and analyzed for themes. **Results/Findings:** Five major themes emerged from the analysis: 1) Recognition of second stage as physiologic (natural); 2) Midwifery care practices; 3) Direction as an intervention; 4) The fluid nature of supportive versus directive care practices; and 5) Barriers to supporting self-regulated pushing. **Conclusion:** The findings of this study suggested that second stage care tailored to the sensations and needs of individual women, versus routinized instructions, is possible in clinical practice. Barriers to translating evidence into practice appeared to come from

institutional policies as well as routine practices used by other members of the health care team.

Introduction

Historically defined as the anatomic interval between the time when a cervix reaches full dilatation (10 centimeters) and the birth of the baby (Friedman, 1954), the second stage of labor is often characterized by regular, frequent contractions during which the woman in labor feels an overwhelming urge to bear down. Maternal bearing down efforts during second stage aid in fetal descent as the fetus rotates and descends through the maternal pelvis (Liao, Buhimschi, & Norwitz, 2005). Management of the second stage of labor has typically included a ritualistic set of behaviors that starts with an announcement from a care provider that the woman is fully dilated and ready to push, and continues with instruction for the woman to hold her breath and bear down using the Valsalva maneuver (Bergstrom, Roberts, Skillman, & Seidel, 1992; Hanson, 2006; Roberts & Woolley, 1996). Managing second stage in this way has been widely used by maternity care providers for many decades, and remains in use today, despite a lack of evidence regarding its efficacy and safety (Barnett & Humenick, 1982; Beynon, 1957; Bloom et al., 2006; Roberts & Hanson, 2007).

Purpose

There is a significant body of evidence that demonstrates optimal outcomes with the use of physiologic management of the second stage of labor; management that supports women's efforts to push in response to their own physiologic urges. Yet directing women to push using the Valsalva maneuver during second stage labor

continues to be a method that is widely used among birth attendants in the U.S. (Declercq et al., 2006). As a result, women whose providers use this approach are not receiving care that is evidence based and which results in optimal maternal, fetal and neonatal outcomes.

Certified Nurse-Midwives (CNMs) are maternity care providers who believe in the normalcy of birth, the importance of intervening only when indicated based on the health and wellbeing of the maternal-fetal dyad, and promoting patient autonomy (American College of Nurse-Midwives, 2002, 2004a; Kennedy & Shannon, 2004; Sinquefield, 1985). However, little is known about the care practices CNMs use specifically to support maternal bearing-down efforts during the second stage of labor. The purpose of this study was to describe the care practices used by CNMs when providing second stage labor care, and to identify the facilitating factors and barriers CNMs face when using scientific evidence in practice during this final phase of labor.

Background and Significance

One of the earliest critics of the practice of directing women to use long, sustained pushes during second stage labor was Dr. Grantly Dick Read (1947) who described the safety and efficacy of what he referred to as “physiological labor”; labor that is undisturbed by mechanical, physical, or psychological means. Read (1947) described the involuntary pushing that occurs near the onset of second stage and recommended that a woman in second stage labor should be allowed to “follow the lead of her uterus” (p. 705). Ten years later, Constance Beynon (1957) documented the efficacy of spontaneous bearing down efforts to facilitate vaginal birth. In an observational study of 100 women, Beynon (1957) identified that when women were allowed to engage in what she termed

“the spontaneous second stage”, bearing down efforts became involuntary and irresistible as the fetal head neared the pelvic floor and most women required very little direction to push voluntarily.

Twenty years later, Caldeyro-Barcia (et al. 1981) conducted an observational study to describe the relationship between spontaneous bearing down efforts and several maternal-fetal outcomes. When the subjects were encouraged to push when they felt the urge, the bearing down efforts were significantly shorter in duration than the expulsive efforts observed previously in women who were directed to push using the Valsalva maneuver. Between spontaneous bearing down efforts, women made several breathing movements. The researchers suggested that it was the breathing during these intervals which minimized the fall in maternal pO_2 and rise in pCO_2 , resulting in a subsequent improvement in umbilical vein pO_2 , pCO_2 , and pH values (Caldeyro-Barcia et al., 1981).

Therefore, there are two distinct approaches to caring for women during second stage labor that have emerged from the literature. The directive approach includes specific instructions to use long sustained Valsalva pushes. The supportive approach includes encouragement for women to push in response to their own involuntary urges. When women push spontaneously, most bearing-down efforts are accompanied by a release of air and multiple breaths between bearing-down efforts; sustained breath holding rarely occurs (Roberts et al., 1987; Thomson, 1995). When pushing spontaneously the number of bearing-down efforts per contraction, as well as the mean duration of each bearing-down effort, increases as second stage progresses (Roberts et al., 1987). The number and duration of bearing-down efforts used during a contraction varies from woman to woman and for individual women may vary between each contraction

(Thomson, 1995). Women rarely begin pushing as soon as a contraction begins, nor do they spontaneously take a deep breath and hold it before the first bearing-down effort with each contraction (Thomson, 1995). Finally, not all women feel the same sensations with regard to an urge to push. While many women experience a strong urge to push, some women feel no urge at all. And although some women experience relief while pushing, others experience significant discomfort with every bearing-down effort (McKay, Barrows, & Roberts, 1990). Directions to bear down appear to have their origins in concerns about second stage labor duration.

Length of Second Stage Labor

Several studies have been conducted to identify the parameters relative to the *length* of active labor in healthy women. Second stage labor duration is defined by the upper limits of normal. The upper limits are currently considered one hour for multigravidas and two hours for primigravidas, with one additional hour added for women who have epidural anesthesia (ACOG, 2003). Investigators have identified a wide range in the normal duration of second stage labor among subjects; 54-185 minutes for nulliparous women and 17-131 minutes for multiparous women (Albers, 1999; Albers, Schiff, & Gorwoda, 1996; Kilpatrick & Laros, 1989) and no significant increase in maternal or neonatal complications following a prolonged second stage (Albers, 1999; Albers, Schiff, & Gorwoda, 1996). Nonetheless, the directive approach to second stage labor management appears to have been based on the premise that a shorter second stage is better for both the mother and the fetus (Roberts, 2003). Therefore the practices commonly used during second stage have focused on hastening delivery, which maternity care providers have believed could be accomplished by directing women to push in a

forced manner rather than in response to the physiologic cues they receive from bodily sensations (McKay & Roberts, 1985). These practices continue today despite the fact that several studies have identified no significant difference in *neonatal outcomes* (Bloom et al., 2006; Brancato et al., 2008; Caldeyro-Barcia et al., 1981; Cohen, 1977; Hansen et al., 2002; Janni et al., 2002; Menticoglou et al., 1995; Myles & Santolaya, 2003; Paine & Tinker, 1992; Roberts et al., 2004) or *maternal outcomes* (Bloom et al., 2006; Brancato et al., 2008; Hansen et al., 2002; Roberts et al., 2004) based on length of second stage or duration of pushing in second stage.

The Impact of Pushing Techniques on Maternal and Fetal Outcomes

In addition to research investigating the effect of second stage *duration* on maternal and fetal outcome, studies have also been conducted to determine the impact of directive pushing methods using the Valsalva maneuver, versus spontaneous pushing methods, on both the mother and baby. Improved fetal status and neonatal outcomes have been identified when women are allowed to bear-down in response to their own natural urges rather than in response to commands for repeated, sustained pushes using the Valsalva maneuver (Caldeyro-Barcia, 1979; Caldeyro-Barcia et al., 1981; Barnett & Humenick, 1982; Roberts et al., 1987; Thomson, 1993). Investigators have also identified that women experience less perineal trauma when allowed to push in response to their own physiologic urges (Albers et al., 2006; Beynon, 1957; Sampsel & Hines, 1999; Schaffer et al., 2005; Yeates & Roberts, 1984), and less fatigue when a period of rest and passive descent is allowed for women with epidurals, rather than pushing immediately upon complete dilatation (Fraser et al., 2002; Hansen et al., 2002). Finally, investigators in a large randomized trial of coached versus uncoached pushing during

second stage labor concluded that coached pushing offers no clinical advantage and the withholding of coaching during second stage labor is not harmful (Bloom et al., 2006).

What Do Midwives Do?

Very little is known about the pushing methods used by certified nurse-midwives (CNMs) during second stage labor. What is known about CNM care during second stage is that midwives understand the unique needs of women in labor, and the importance of remaining flexible and providing individualized care (Kennedy & Shannon, 2004; Sinuefield, 1985). Midwives understand the importance of continuous presence and support (Kennedy & Shannon, 2004; Sinuefield, 1985), believe in the normalcy of birth, and make evidence based decisions with regard to when to intervene in the natural process of labor and birth (Kennedy & Shannon, 2004). CNMs have also been identified as early adopters of the innovative use of positions and position changes during the second stage of labor (Hanson, 1998).

Albers et al. (2005) examined pushing methods used by CNMs, in a single nurse-midwifery practice, and discovered that women under the care of midwives pushed using non-Valsalva methods over 78% of the time (Albers et al., 2005). It is likely that the pushing methods used by CNMs, nation-wide, are supportive of spontaneous bearing-down efforts, and that CNMs are keenly aware of the barriers and facilitating factors encountered in the use of care practices which support spontaneous bearing-down. However, the voices of CNMs with regard to their experiences supporting spontaneous pushing during second stage are missing from the literature.

Philosophical Foundations

Feminist philosophy, which focuses on the world of women in a male dominated society and views the experiences of women as central to the generation of knowledge (Gortner, 1993/2004b) has served to inform this study. Included in the tenets of feminist philosophy is an awareness that the oppression of women is a constant phenomenon inherent to systems dominated by males, and that within these systems the contributions of women are undervalued (Wittman-Price, 2004). Feminist philosophy recognizes that this oppression, including the devaluation and silencing of women's voices, is perpetuated by those who maintain power and/or domination over women (Wittman-Price).

The aim of feminist philosophy is to advocate for change for both individuals and groups, realizing that through change comes emancipation, which can be achieved in part by listening to and valuing the voices of women (Wittman-Price, 2004). Viewed from a feminist perspective, placing decisions about when and how to push during second stage labor in the hands of birth attendants, the majority of whom in recent history have been male physicians, has served to disempower women (both the midwives and the women they care for) without the benefit of improving childbirth outcomes. This study sought to give voice to CNMs regarding the way they care for women in the second stage of labor.

Design and Methodology

A narrative method of qualitative research using a focus group design was used for this study. One of the goals of narrative methods in qualitative research is to gather narratives and re-present or re-story the narratives to readers, and in so doing give voice to those who are underrepresented (Duffy, 2007; Frid, Ohlen, & Bergbom, 2000). Focus groups allow for group narratives, which bring multiple voices to the narrative process,

enhancing a deeper understanding of the topic of discussion (Aranda & Street, 2001). As such, this study gave voice to CNMs and allowed them to share their experience of providing care to women during the second stage of labor.

Participants

Following approval of the Institutional Review Board of Marquette University, a sample of seven certified nurse-midwives in active clinical practice in a Midwestern state was purposively selected for inclusion in the focus group. All of the CNM participants completed a brief screening questionnaire (see Table 1) prior to the focus group session in order to identify participants who use evidence in practice. Responses to the questionnaire indicated that all of the potential participants engage in evidence based practice. CNMs who attend births in a variety of settings (hospital, birth center, and home) were intentionally selected in order to include the voices of midwives who practice in all settings and to hear any difference in experiences that might exist relative to place of practice. The focus group included two co-investigators, both of whom are also CNMs, who served as moderators in the process. All participants in the group were female. Participants in the focus group included one CNM who attends births in a birth center, one CNM who attends births in women's homes, and five CNMs who attend births in the hospital. Participation in the focus group was voluntary. Following an assurance that confidentiality would be maintained to the best of the investigators' ability, all participants provided written informed consent. Participants were provided with a meal following the focus group and reimbursed \$75.00 as a sign of gratitude for their willingness to share their time and knowledge.

Data Generation

Data were generated during a three hour focus group session with seven CNM informants and two CNM co-investigators. The entire session was audio recorded using two digital recording devices. Prior to the onset of the focus group, participants were reminded of the confidential nature of the session, the importance of honoring each participant's comments by speaking one at a time, and the fact that there were no wrong answers to the questions that would be asked. The topic of the discussion was introduced by asking each participant to introduce herself and describe how she recognizes the onset of the second stage of labor. Although a list of open ended questions to ask throughout the session had been developed, the investigators allowed the discussion to move in a natural manner within the framework of these questions, allowing the participants to spend time discussing issues they felt needed attention.

Broadly stated questions regarding management of the second stage of labor were asked and the participants often responded by discussing the similarities and differences in their care practices. The co-investigators served as moderators of the discussion, restating what was heard and asking for clarification from participants when responses were vague or unclear, and providing clarification for the participants when there was confusion about an interview question. Each of the topics included in the pre-determined questions (see Table 2) were addressed during the session.

Data Analysis

Audio-recordings of the focus group session were transcribed verbatim by one of the co-investigators. Data analysis was done through independent review of the transcripts by the co-investigators. Emerging themes were inductively identified and corroborated between the co-investigators; the words of the participants were carefully

examined and the themes developed directly from the data. Agreement about the themes was reached by the investigators through discussion which took place until consensus was reached. The themes were then reviewed with five of the midwife informants in order to establish trustworthiness of the findings. Each of the informants confirmed that the co-investigators had accurately identified the themes that emerged during the focus group. Final approval of the re-telling of the collective narrative was sought from participants prior to publication of this manuscript.

Findings

Each of the participants appeared to be eager to share their stories of second stage labor management. Five themes regarding nurse-midwives' experience with providing care during second stage labor emerged from the data.

Theme 1: Recognition of Second Stage as Physiologic

An overarching theme that occurred throughout the session was the recognition of the physiologic nature of second stage labor. Participants spoke very clearly about the physiologic cues they see and hear from women in second stage labor. They also spoke about the importance of using those cues to guide the woman and the midwife through the process.

I recognize second stage almost always by an overwhelming bearing down with every contraction and usually mom reporting that she can feel the baby moving....that she can feel some descent or some effectiveness with that bearing down that she has an irresistible urge to do.

...there's also a component of reassuring about normalcy that midwives really take seriously. So...there's not so much direction but there is just saying...what you're doing is working wonderfully...you know...and just...keeping the power with the mom....and...helping her kind of keep her in her body.

I'm getting 'em in a different position....on their sides or on their hands and knees or squatting...no matter what they're doing I give them reassurance too, just to kind of do what they feel like doing.

When it starts with that panic...and a woman doesn't know what to do...then sometimes I will just suggest...just see what it feels like...you know...give a push. And then with primips it's sort of that gradual move into letting the body take over and doing it.

Theme 2: Midwifery Care Practices

Throughout the session, the participants spoke often about the care practices they use. Many of these were practices that the midwives had learned, over time, were effective in supporting a woman's response to the sensations she was experiencing during second stage. While many of the practices were commonly used by all of the participants, there were also practices that individual midwives used, but which were new to other members of the group. Participants expressed a sense of excitement when hearing about a practice they had not yet used, anticipating how new practices would work in their own settings.

Going outside is often effective too because then you get the profound relaxation....right...in between contractions...and then that contraction comes and whammo...it's so strong...

...one size does not fit all....it is useless for a woman to attempt to give birth according to someone else's recipe...or comfort zone. There are times when a woman is resisting letting her body open and give up the baby...and so you try to creatively figure out situations and positions...places where we're feeling safe....then that [opening up] can happen.

...but she didn't have an urge to push and we just waited and then...she was in the tub...and we just waited until I could see more crowningand finally...she did have an urge...and then she pushed twice maybe...and the baby was born...and everything was fine.

I give words, and touch, and reinforcers all the time when I think that the baby is moving or that the woman is somehow in synch with the process.

We usually have stairs at home. So...um boy...that is useful...two stairs at a time with a contraction if possible...that makes them really feel it. It's exhausting...but it's that lunge position...every time you lift that leg up two stairs and then you're going downward at the same time you're alternating the hip bones...

Sometimes I just turn around [when the woman is] in the tub so they can't see us...the tub seems to be really protective to this woman...it's like there's that moat that you can't get across without asking permission...

I put 'em in the bathroom and I try to keep everybody else out except for their partner...including the nurse...I close the door... And I would put on nice lights and...then it's a safe spot...and women are ready to open up and give birth and feel more like pushing. So I try to create a safer place...and I just let them know when we need to listen to the baby...and it helps a lot.

I've used really warm compresses too...on their bottoms...that seems to help...they feel that warmth down there...and for some women...it's soothing and give's 'em kind of a place to push towards...I think that works.

Theme 3: Direction as an Intervention

The participants spoke specifically about the times during second stage labor when they believe they needed to provide more direction. The participants also clearly identified the simple act of providing direction as an intervention in the natural process that was occurring. At times the participants appeared to be uncomfortable admitting to being more directive, but they clearly articulated the reasons they believed that more direction was indicated.

I also get more directive at crowning...because I really try to get women to stop ...the giving it their all pushing when the head's near...so they don't blow the baby out...blow their bottoms out.

With primips that labor down for a few hours...you know...nothing's happening...the baby hasn't descended at all...it's been 2 or 3 hours...um....I begin to feel like...ok...we should do something...like... you know....like...get directive.

I think I've used it (vaginal pressure) once this year...a mom who didn't feel [the urge] to push...and wasn't able to cope even though we tried other things first but it was kind of a last resort thing.

I'm definitely supportive but there are those situations where I am really directive....and it's the heart tones. So it depends upon the situation...like with epidurals if there is absolutely no ability for the woman to feel...and she's labored down for a long time and I'm worried about the epidural fever...and the baby's looking tachycardic. There are many different times when unfortunately I have to be directive...but I'd like not to be ever.

Theme 4: The Fluid Nature of Supportive Versus Directive Care Practices

Over the course of the session it became clear that the midwife participants viewed their role, with regard to supporting maternal bearing-down efforts, as moving along a continuum from fully supportive to very directive. In addition to describing the circumstances under which they became more directive, they also recognized points in time when they were able to return to a more supportive role. The participants described a special kind of “supportive direction”. As has been found of midwifery care in previous studies, the midwife participants in this focus group individualized their management such that no single method of providing care was used for every woman, and in many instances multiple methods were used with the same woman depending upon the individual needs of that woman and fetus.

I sort of think it's an artificial distinction. I think good midwives are supportive until they can't be...and then they're a little more directive. I think we all have the ability to do both.

...you do kind of go in and out of sort of between being somewhat more directive ...you do move in and out...within both of those roles.

I also recently had a mom with a history of sexual abuse and we talked through that... but that is also a time where I will get supportively directive...I am right in her face...really connect.

I often say... “you know I'd just like you to try something else for a couple of contractions...if you don't like it you can go right back”.

...unless there's a need from the mother or from the situation...from the condition...I don't give directions at all. I am watching and learning and the less I interfere...the more I'm able to be in this...in this place...and the amazement that women find their dance through second stage in particular...I mean I vividly remember so many times where a mom...did something I never would have thought of telling her to do...I think I've learned most from my moms...you know...directly.

Theme 5: Barriers to Supporting Self Regulated Pushing

Finally, the participants had many stories to tell about times when they confronted barriers to providing supportive care to women during second stage labor. Some of the barriers were institutional, coming from other health care providers with whom they work, and some of the barriers came from women in labor who expected and asked for more direction. There were also times when the participants saw the condition of the mother or fetus as a barrier; times when because of a clinical indication they were expected to provide more direction, regardless of whether or not there was evidence to suggest that directive methods would be beneficial for mother or baby.

We are realistically constrained....when we're in the hospital....we're also constrained by the nurses....but I think we are expected in the hospital to follow the normal expectations of labor.

There are the fetal indications and then there's the maternal indications...if the mother is exhausted...or the energy has change in the room...you know that's really when I feel like I need to be directing and be the cheer leader and change my energy to assist her with that transition.

Because I do feel pressure from the OB...you know...oversight...that um...you know...if I've been pushing for 6 hours and I haven't consulted there's trouble.

...there's been a very few instances where I've been driven to have a baby born because I've got somebody else whose about to birth. But...but that's totally schedule based...that's not what I would like to do.

...heart tones that are ok for me but not ok for other people in the room or people outside of the room who keep coming to the door asking if I need help. Sometimes I will then get a little bit more directive and say you know I really think it's time

for your baby to be born...do you think you could push your baby out on this next push...

...some women ask to be coached and I think there's also some times where I...and I don't exactly know what it is...but I get a sense that they would do better if I did guide them...if I did coach them at least some of the time? You know... it's almost like they're not trusting themselves...they're not trusting that they do have that instinct or maybe they don't have that really intense...involuntary need to push...so I do...I will do some coaching or talking about pushing with them.

Discussion

Despite a growing body of evidence that supports spontaneous pushing during the second stage of labor, and attempts to bring the evidence to nurses for implementation at the bedside, most of the women who give birth in the U.S. continue to be cared for with directive methods that include instructions to push using the Valsalva maneuver (Declercq et al., 2006). Researchers trying to discover the reason for this gap between evidence and practice have identified several reasons that care providers revert to directive methods; these include maternal responses to pushing in second stage such as fatigue or requests for more direction (Hanson, 2009; Niesen & Quirk, 1997; Roberts, Gonzalez, & Sampsel, 2007), nurses' comfort with the use of directive methods of pushing, and physician resistance to physiologic management of second stage labor (Niesen & Quirk, 1997; Sprague et al., 2008). Examining the care practices of CNMs, whose philosophy adheres to a belief in the normalcy of labor and birth and the self-determination of the women they care for, adds to the body of knowledge regarding pushing methods used during the second stage of labor. Specifically, the focus group participants carefully described how they as CNMs apply the evidence to practice.

One of the aims of feminist philosophy is to influence social change (McErlean, 2000). This study sought to hear from midwives (the majority of whom are women)

about practices used during the second stage of labor which support a woman's ability to give birth spontaneously. Thematic analysis of the narratives of CNMs, who believe in the normalcy of birth and the evidence-based, judicious use of intervention, culminated in the identification of five themes which brought together the voices of CNMs to clarify the way in which evidence that supports spontaneous pushing during second stage labor is implemented in practice. Similar to the findings of previous investigators (Roberts et al., 2007), the participants in this study described specific instances, based largely on cues they receive from the mother and baby, which called for more direction. The midwives in this study viewed their intervention as "supportive direction".

In keeping with the aim of feminist philosophy, to recognize the silencing and oppression of women and to give voice to women as an initial step towards emancipation (Wittman-Price, 2004), this study made visible the experience of nurse-midwives when caring for women in second stage labor. Giving voice to each of the participants allowed for the recognition and valuing of individual ways of knowing and caring for women in labor. Further, identifying that midwives provide a kind of supportive direction rather than routine directions when caring for women in second stage labor, recognizes a unique approach to evidence based care that promotes the autonomy of the women they serve.

The participants in this study clearly identified the physiologic nature of second stage labor and the importance of using the physiologic cues they receive from women in labor to guide the experience of second stage. The participants described the care practices they use to support a woman's ability to give birth spontaneously. They also described the practices they use when they believe they needed to provide more direction, recognizing the act of providing direction as an intervention in the natural process that

was occurring. The participants in this focus group described the care provided during second stage labor as moving along a continuum, offering varying degrees of support or direction based on the individual needs of the women they were caring for, rather than routine and arbitrary instructions regarding when and how to push.

The CNM informants identified the barriers they face when using spontaneous pushing methods during the second stage of labor. Many of these barriers were related to institutional policies and the care practices of physicians, as well as the nurses whose role is often focused on carrying out the orders of physicians. As has been identified in previous studies (Sprague et al., 2008) it is likely that institution-wide adoption of evidence based second stage care practices will be necessary in order to insure that the provision of care for women during second stage labor is based on evidence.

One of the limitations of this study is that the data were generated with a small sample of CNMs whose experiences with second stage may have been unique. More research needs to be conducted to clearly understand the practices of nurse-midwives caring for women in the U.S. Findings of the study reported here have been used to inform the development of a questionnaire to be used in a national survey of CNMs. In addition, similar studies should be conducted with nurses who care for women in labor and birth. Understanding the care practices of nurses and nurse-midwives may then lead to the development of an intervention to bring about change in current practice; change that acknowledges a woman's ability to give birth spontaneously, in response to the powerful physiologic sensations she experiences rather than only in response to direction from care providers about when and how to push.

References

- Albers, L. (1999). The duration of labor in healthy women. *Journal of Perinatology*, *19*(2), 114-119.
- Albers, L., Schiff, M., & Gorwoda, J. (1996). The length of active labor in normal pregnancies. *Obstetrics and Gynecology*, *87*(3), 355-359.
- Albers, L., Sedler, K., Bedrick, E., Teaf, D., & Peralta, P. (2006). Factors related to genital tract trauma in normal spontaneous vaginal births. *Birth*, *33*(2), 94-100.
- American College of Nurse-Midwives. (2002). *Core Competencies for Basic Midwifery Practice*. Retrieved November 14, 2008, from http://www.acnm.org/siteFiles/descriptive/Core_Competencies_6_07_3.pdf
- American College of Nurse-Midwives. (2004). *Philosophy of the American College of Nurse-Midwives*. Retrieved November 13, 2008, from <http://www.acnm.org/philosophy.cfm>
- American College of Obstetrics and Gynecology. (2003). ACOG practice bulletin no. 49: Dystocia and augmentation of labor. *Obstetrics and Gynecology*, *102*(6), 1445-1454.
- Aranda, S., & Street, A. (2001). From individual to group: Use of narratives in participatory research process. *Journal of Advanced Nursing*, *33*(6), 791-797.
- Barnett, M., & Humenick, S. (1982). Infant outcome in relation to second stage labor pushing method. *Birth*, *9*(4), 221-228.
- Bergstrom, L., Roberts, J., Skillman, L., & Seidel, J. (1992). "You'll feel me touching you, sweetie": Vaginal examinations during the second stage of labor. *Birth*, *19*(1), 10-18.

- Beynon, C. (1957). The normal second stage of labour: A plea for reform in its conduct. *Journal of Obstetrics and Gynaecology*, 64(6), 815-820.
- Bloom, S., Casey, B., Schaffer, J., McIntire, D., & Leveno, K. (2006). A randomized trial of coached versus uncoached maternal pushing during the second stage of labor. *American Journal of Obstetrics and Gynecology*, 194, 10-13.
- Brancato, R., Church, S., & Stone, P. (2008). A meta-analysis of passive descent versus immediate pushing in nulliparous women with epidural analgesia in the second stage of labor. *JOGNN*, 37(1), 4-12.
- Caldeyro-Barcia, R. (1979). The influence of maternal bearing-down efforts during second stage on fetal well-being. *Birth and the Family Journal*, 6(1), 17-21.
- Caldeyro-Barcia, R., Giussi, G., Storch, E., Poseiro, J., Lafaurie, N., Kettenhuber, K., & Ballejo, G. (1981). The bearing-down efforts and their effects on fetal heart rate, oxygenation and acid base balance. *Journal of Perinatal Medicine*, 9, 63-67.
- Cohen, W. (1977). Influence of the duration of second stage labor on perinatal outcome and puerperal morbidity. *Obstetrics and Gynecology*, 49, 266-267.
- Declercq, E., Sakala, C., Corry, M., & Applebaum, S. (2006). *Listening to mothers II: Report of the second national US survey of women's childbearing experiences*. New York: Childbirth Connection.
- Duffy, M. (Ed.). (2007). *Narrative inquiry: The method*. Sudbury, MA: Jones and Bartlett.
- Fraser, W., Marcoux, S., Krauss, I., Douglas, J., Goulet, C., & Boulvain, M. (2000). Multicenter, randomized, controlled trial of delayed pushing for nulliparous

- women in the second stage of labor with continuous epidural analgesia. *American Journal of Obstetrics and Gynecology*, 182(5), 1165-1172.
- Frid, I., Ohlen, J., & Bergbom, I. (2000). On the use of narratives in nursing research. *Journal of Advanced Nursing*, 32(3), 695-703.
- Friedman, E. (1954). The graphic analysis of labor. *American Journal of Obstetrics and Gynecology*, 68, 1568-1575.
- Gortner, S. (2004). Nursing's syntax revisited: A critique of philosophies said to influence nursing theories. In P. G. Reed, N. C. Shearer, & L. H. Nicoll (Eds.), *Perspective on nursing theory* (pp. 403-414). Philadelphia: Lippincott Williams & Wilkins. (Original work published in 1993).
- Hansen, S., Clark, S., and Foster, J. (2002). Active pushing versus passive fetal descent in the second stage of labor: A randomized controlled trial. *Obstetrics and Gynecology*, 99(1), 29-34.
- Hanson, L. (1998). Second-stage positioning in nurse-midwifery practices. Part 1: Position use and preferences. *Journal of Nurse-Midwifery*, 43(5), 320-325.
- Hanson, L. (2006). Pushing for change. *Journal of Perinatal and Neonatal Nursing*, 20(4), 282-284.
- Hanson, L. (2009). Second stage labor care: Challenges in spontaneous bearing down. *Journal of Perinatal and Neonatal Nursing*, 23, 31-39.
- Janni, W., Schiessl, B., Peschers, U., Huber, S., Strobl, B., Hantschmann, P., Uhlmann, N., ... Kainer, F. (2002). The prognostic impact of a prolonged second stage of labor on maternal and fetal outcome. *Acta obstetrician et gynecologica Scandinavica*, 81, 214-221.

- Kennedy, H. P., & Shannon, M. (2004). Keeping birth normal: Research findings on midwifery care during childbirth. *JOGNN*, 33(5), 554-560.
- Kilpatrick, S., & Laros, R. (1989). Characteristics of normal labor. *Obstetrics and Gynecology*, 74(1), 85-87.
- Liao, J., Buhimschi, C., & Norwitz, E. (2005). Normal labor: Mechanism and duration. *Obstetrics and Gynecology Clinics of North America*, 32, 145-164.
- Maresh, M., Chong, K., & Beard, R. (1983). Delayed pushing with lumbar epidural analgesia in labour. *British Journal of Obstetrics and Gynaecology*, 90, 623-627.
- McKay, S., Barrows, T., & Roberts, J. (1990). Women's views of second-stage labor as assessed by interviews and videotapes. *Birth*, 17(4), 192-198.
- McKay, S., & Roberts, J. (1985). Second stage labor: What is normal? *JOGNN*, 14(2), 101-105.
- Menticoglou, S., Manning, F., Harman, C., & Morrison, I. (1995). Perinatal outcome in relation to second-stage duration. *American Journal of Obstetrics and Gynecology*, 173(3), 906-912.
- Myles, T., & Santolaya, J. (2003). Maternal and neonatal outcomes in patients with a prolonged second stage of labor. *Obstetrics and Gynecology*, 102(1), 52-58.
- Niesen, K., & Quirk, A. (1997). The process for initiating nursing practice changes in the intrapartum: Findings from a multisite research utilization project. *JOGNN*, 26(6), 709-717.
- Paine, L., & Tinker, D. (1992). The effect of maternal bearing-down efforts on arterial umbilical cord pH and length of the second stage of labor. *Journal of Nurse-Midwifery*, 37(1), 61-63.

- Read, G. D. (1947). An outline of the conduct of physiological labor. *American Journal of Obstetrics and Gynecology*, 54(4), 702-710.
- Roberts, C., Torvaldsen, S., Cameron, C., & Olive, E. (2004). Delayed versus early pushing in women with epidural analgesia: A systematic review and meta analysis. *British Journal of Obstetrics and Gynaecology*, 111, 1333-1340.
- Roberts, J. (2003). A new understanding of the second stage of labor: Implications for nursing care. *JOGGN*, 32(6), 794-801.
- Roberts, J., Goldstein, S., Gruener, J., Maggio, M., & Mendez-Bauer, C. (1987). A descriptive analysis of involuntary bearing-down efforts during the expulsive phase of labor. *JOGNN*, 16(1), 48-55.
- Roberts, J., Gonzalez, C., & Sampsel, C. (2007). Why do supportive birth attendants become directive of maternal bearing-down efforts in second-stage labor? *Journal of Midwifery and Women's Health*, 52(2), 134-141.
- Roberts, J., & Hanson, L. (2007). Best practices in second stage labor care: maternal bearing down and positioning. *Journal of Midwifery and Women's Health*, 52(3), 238-245.
- Roberts, J., & Woolley, D. (1996). A second look at the second stage of labor. *JOGNN*, 25(5), 415-423.
- Sampsel, C., & Hines, S. (1999). Spontaneous pushing during birth: Relationship to perineal outcomes. *Journal of Nurse-Midwifery*, 44(1), 36-39.
- Schaffer, J., Bloom, S., Casey, B., McIntire, D., Nihira, M., & Leveno, K. (2005). A randomized trial of the effects of coached vs uncoached maternal pushing during

the second stage of labor on postpartum pelvic floor structure and function.

American Journal of Obstetrics and Gynecology, 192, 1692-1696.

Sinquefield, G. (1985). Midwifery management of second stage of labor. *Journal of Nurse-Midwifery*, 30(2), 112-116.

Sprague, A., Oppenheimer, L., McCabe, L., Graham, I., & Davies, B. (2008). Knowledge to action: Implementing a guideline for second stage labor. *MCN*, 33(3), 179-186.

Thomson, A. (1993). Pushing techniques in the second stage of labour. *Journal of Advanced Nursing*, 18, 171-177.

Thomson, A. (1995). Maternal behaviour during spontaneous and directed pushing in the second stage of labour. *Journal of Advanced Nursing*, 22, 1027-1034.

Wittman-Price, R. (2004). Emancipation in decision-making in women's health care. *Journal of Advanced Nursing*, 47(4), 437-445.

Yeates, D., & Roberts, J. (1984). A comparison of two bearing-down techniques during the second stage of labor. *Journal of Nurse-Midwifery*, 29(1), 3-11.

Table 1

Screening questionnaire

For each of the items below, CNM participants were asked the degree to which they agreed or disagreed with the following statements. Response categories included strongly agree, agree, neutral, disagree, and strongly disagree.

1. I believe that I am responsible for directing care in the second stage of labor.
2. At least some women with epidurals under my care “labor down” during second stage.
3. I believe that it is acceptable to determine second stage labor onset as the time the woman perceives an irresistible urge to push.
4. If I had my choice, women would make noise when they push.
5. I believe that women need to begin pushing as soon as they are completely dilated.
6. I believe that a short second stage is better for the mother and baby than one that is long.
7. If I had my choice, all women would push in non-lithotomy positions (other than supine)
8. I think that once completely dilated women can safely wait to push, until they feel a strong urge as long as the fetal heart tones are reassuring.
9. If I had my choice, my patients would wait to begin pushing until they felt an urge to do so.
10. Before women push, I think a vaginal exam is necessary to document the onset of second stage.
11. I think that most women need to receive specific instruction in order to push effectively.
12. I believe that Valsalva bearing down efforts result in the most optimal maternal and fetal outcomes.
13. I think that women push most effectively when they are positioned in modified-lithotomy.
14. All women should hold their breath, count to ten, and avoid noise-making while pushing.
15. Regarding pushing instructions, I instruct multiparas and primiparas in the same manner.
16. Women with epidurals should use passive descent/“laboring down” for the second stage of labor to achieve optimal outcomes.
17. I think women need constant verbal direction during the second stage.
18. I think that the actual duration of the second stage of labor is not critical if the mother and baby are low risk and tolerating labor well.
19. I believe that women should avoid supine positions in labor.
20. Women with epidurals especially need coached instruction to push when completely dilated.
21. I think that if women were allowed to push in their own natural manner, they would push effectively.
22. I think that open-glottis (noise-making) pushing results in a significantly longer second stage of labor.
23. I have strong opinions about how women experiencing second stage labor should be cared for.
24. I am able to care for women during the second stage of labor in the manner that I believe is best for the mother and baby.
25. I become frustrated when the patient instructions I have been giving related to pushing are changed by the nurses.
26. Even though I don’t used directed pushing instructions, I believe verbal support and my physical presence are essential to optimal second stage labor care.

Table 2

Focus Group Questions

1. How do you recognize the onset of the second stage of labor?
 - What is your approach to vaginal exams?
2. What is your approach to the initiation of bearing down efforts?
 - When do you offer women directions to start pushing?
 - What factors do you consider before directing a woman to begin pushing?
 - What role does fetal station or fetal position play in you decision to provide direction?
 - What sources of information inform your approach?
3. How does your approach change based on the parity of the woman?
4. How do you see your role during this phase of labor?
 - As supportive? If so, how?
 - As directive of the woman's behaviors? If so, how?
5. How do you support a woman through the early portion of 2nd stage...
 - if you think she should not push actively or?
 - if she does not have an urge to push?
 - How long do you wait to offer directions?
6. What strategies, if any, do you use to help women push effectively?
 - How does the mother's labor progress influence your care?
 - How does the mother's condition influence your care?
 - How does the mother's comfort/pain/coping influence your care?
 - Give examples of the words you use during this care.
7. If you primarily offer women support and encouragement with their own involuntary bearing down efforts, when would you consider offering more directions?
 - How does your care differ if a woman has an epidural?
8. What factors in your clinical unit influence your approach?
(For examples, medical policies, positions, time frames that are acceptable, "laboring down?")
9. Do you direct/encourage women to assume certain positions?
 - Which positions and why?
 - Do you encourage different positions in the early phase (positions that facilitate descent and rotation) in contrast to later second stage (positions that facilitate effective pushing) ?
10. How does the duration of second stage influence your care?
 - Do you differentiate the duration from complete to 'active pushing' or from active/forceful pushing to the birth of the infant?
 - How do you document second stage duration? ("complete" or "initiation of pushing")
 - How long do you wait to provide direction to push?
11. How do you approach suspected fetal compromise during the second stage?
 - Do you direct pushing?
 - Recommend position changes?
 - Encourage a type of breathing?

CHAPTER 5

Pushing Techniques Used by Midwives When Providing Second Stage Labor Care

Abstract

Background: Most women who give birth in the U.S. bear down in response to direction from care providers about when and how to push, rather than in response to their own physiologic urges. This practice is not based on evidence, nor does it result in optimal outcomes. Midwives have been previously identified as innovators and early adopters of physiologic approaches to second stage labor care. **Objectives:** The primary objective of this study was to learn from CNMs/CMs about the practices they use when caring for women in second stage labor within an innovation-diffusion framework. The investigators also sought to identify barriers to evidence based second stage labor care. **Methods:** A national survey of 705 CNMs/CMs was conducted. Data were collected using questionnaires, developed and pilot tested for use in this study, mailed through the U.S. Postal Service. A 73% response rate was achieved. **Results:** Midwives provide second stage labor care that is primarily supportive of women's physiologic urge to bear down. Midwives offer "supportive direction" during second stage as an intervention to prevent potential problems. **Conclusion:** CNMs/CMs are innovators and early adopters of the use of supportive approaches to second stage labor care, who may be instrumental in the diffusion of this approach to larger groups of maternity care providers including physicians and nurses.

Introduction

There is a substantial body of evidence that has identified that second stage labor care practices affect outcomes for both the mother and neonate. Two distinct approaches to pushing have been described in the literature: directive and supportive. When using the directive approach, care providers offer specific directions for women to use sustained Valsalva pushes from the time of complete cervical dilatation until the birth of the baby. Alternatively, when using the supportive approach, care providers engage in behaviors that support the involuntary physiologic urges women experience during second stage labor. Research examining these approaches has identified that supporting a woman's spontaneous bearing-down efforts and allowing her to begin pushing when she feels the urge, rather than arbitrarily directing her to push immediately when the cervix is completely dilated, leads to optimal birth outcomes and maximizes a woman's ability to give birth spontaneously (Roberts, 2003; Roberts & Hanson, 2007). However, widespread adoption of supportive approaches to caring for women in second stage labor has not occurred and the majority of maternity care providers continue to be directive in their approach when caring for women in second stage labor (Declercq et al., 2006).

Background

Criticism of the practice of directing women to use long, sustained pushes during second stage labor began over half a century ago (Beynon, 1957) and continues today (Hanson, 2009; Roberts & Hanson, 2007; Yildirim & Beji, 2008). One of the early critics was Constance Beynon (1957) who challenged her colleagues who "still seem to consider it their function to aid and abet and even coerce the mother into forcing the foetus as fast

as she can through her birth canal” (p. 815). Beynon (1957) documented the efficacy of spontaneous bearing-down efforts to facilitate vaginal birth with an observational study of 100 women who were allowed to engage in what she referred to as “the spontaneous second stage”. Despite these early findings, studies comparing directive approaches to caring for women during second stage labor with supportive approaches did not appear in the literature until the publication of a landmark study in 1981 that demonstrated improved fetal oxygenation when women pushed spontaneously (Caldeyro-Barcia et al., 1981)

During the last 25 years, researchers have documented improved outcomes for both mothers and neonates when they are cared for with supportive methods during second stage labor. Several investigators have identified improved immediate perineal and long term urogynecologic outcomes in women who push spontaneously rather than in response to commands for long, sustained Valsalva pushes (Albers et al., 2006; Bloom et al., 2006; Fitzpatrick et al., 2002; Sampsel & Hines, 1999; Schaffer et al., 2005; Yeates & Roberts, 1984). With regard to women’s experience of second stage labor, investigators have identified that primigravidas who are allowed a period of rest before initiating bearing-down efforts during second stage experience less fatigue than those who begin pushing immediately after the cervix is found to be fully dilated (Fraser et al., 2000; Hansen, Clark, & Foster, 2002; Lai et al., 2009). Further, women who are allowed to push spontaneously report higher levels of satisfaction with their birth experience than women who are instructed to use Valsalva-like pushing during second stage labor (Yildirim & Beji, 2008). Improved fetal oxygenation (as measured with cord blood gas and fetal heart rate patterns) and neonatal Apgar scores have also been identified when

women were allowed to bear-down in response to the physiologic urges they experience during second stage labor, rather than in response to direction to push using the Valsalva maneuver (Barnett & Humenick, 1982; Caldeyro-Barcia et al., 1981; Roberts et al., 1987; Thomson, 1993; Yildirim & Beji, 2008).

Despite a growing body of evidence substantiating the safety and efficacy of supportive approaches to second stage labor management, most women who give birth in the U.S. continue to be cared for with directive methods which include instructions to push using the Valsalva maneuver (Declercq et al., 2006). Researchers have tried to identify reasons for this gap between evidence and practice. The rationale cited for resistance to adopting supportive approaches to second stage labor management include maternal responses to pushing in second stage, such as requests for more direction (Niesen & Quirk, 1997; Roberts, Gonzalez, & Sampsel, 2007); nurses' comfort with the use of directive methods of pushing and discomfort with women's spontaneous noises during second stage; and physician resistance to physiologic management of second stage labor (Niesen & Quirk, 1997).

Underlying the persistent use of directive approaches to second stage labor management appears to be the erroneous assumption that spontaneous bearing down results in a prolonged second stage labor (Roberts, 2003). However, researchers have identified no significant difference in maternal outcomes (Bloom et al., 2006; Brancato et al., 2008; Hansen et al., 2002; Roberts et al., 2004) or neonatal outcomes (Bloom et al., 2006; Brancato et al., 2008; Caldeyro-Barcia et al., 1981; Cohen, 1977; Hansen et al., 2002; Janni et al., 2002; Lai et al., 2009; Menticoglou et al., 1995; Myles & Santolaya, 2003; Paine & Tinker, 1992; Roberts et al., 2004) relative to the length of second stage or

duration of time spent pushing in second stage. Further, there is no strong evidence that spontaneous approaches to maternal bearing down lead to an increased incidence of prolonged second stage labor (Lai et al., 2009; Roberts et al., 1987; Schaffer et al., 2005; Yildirim & Beji, 2008)

Midwifery Management of Second Stage Labor

In addition to affirming the power and strength of women, *The Philosophy of the American College of Nurse-Midwives* (ACNM) clearly articulates that CNMs/CMs believe in every woman's right to self determination and active participation in health care decision making. Further, CNMs/CMs believe that the best health outcomes for mothers and babies are achieved with watchful waiting and non-intervention in the normal process of labor and birth, as well as the evidence-based individualization of patient care (ACNM, 2004). The use of supportive approaches to second stage labor care is consistent with these beliefs held by CNMs and CMs. In a study that examined patients cared for by one midwifery practice in the U.S., investigators identified that women who were cared for by midwives pushed using non-Valsalva methods over 78% of the time (Albers et al., 2005). This suggests that midwives may be early adopters of innovations.

What is less well understood is the way in which CNMs and CMs, practicing throughout the entire United States, provide care to women in the second stage of labor. Documentation of the second stage care practices of CNMs and CMs nation-wide, as well as the barriers and facilitating factors they encounter in the use of evidence based practice, is missing from the literature. This study was designed to fill this gap in the literature by seeking information directly from CNMs and CMs through the administration of a national survey. The purpose of this study was to learn from CNMs

and CMs about the pushing techniques they use when caring for women during the second stage of labor. In addition to identifying current practices of CNMs and CMs, this study sought to identify the factors that affect the use of evidenced based approaches to caring for women in the second stage of labor.

Theoretical Framework

Diffusion of innovations theory (Rogers, 2003) offers a theoretical framework for understanding the process by which innovations are adopted and implemented by individuals or groups, and served as the framework for this study. An *innovation* is a practice, idea, or object that is perceived by an individual or group as something new. An innovation is not necessarily something that is “new” in a chronological sense. Rather it is viewed by potential adopters of the innovation as “new” in a given context (Rogers, 2003). The innovation under consideration in this study was the use of supportive approaches to pushing during the second stage of labor.

The relative speed with which an innovation is adopted among a social group is referred to as the *rate of adoption*. The degree to which individuals adopt and implement any innovation, relative to other members in the group, is referred to as *innovativeness*. Rogers (2003) identifies five categories of innovativeness; adopter categories, used to classify members of a social system on the basis of their innovativeness, which are germane to this study. Those categories are (a) innovators, (b) early adopters, (c) early majority, (d) late majority, and (e) laggards (Rogers, 2003). Innovators and early adopters are instrumental in the diffusion of an innovation to larger social groups. The adopters under consideration in this study were CNMs and CMs.

Methods

Preliminary Studies and Instrument Development

Data were collected through a national mail survey of CNMs and CMs using a new survey instrument designed for this purpose. Instrument development began, following IRB approval from Marquette University, with the conduct of a focus group comprised of seven CNM participants and four individual semi-structured developmental interviews. The purpose of the focus group and interviews was to learn from the CNM participants about their experiences when caring for women in second stage labor. The practices described by the midwives were categorized according to themes and formed the basis of item development for the survey instrument. The initial items were pretested twice with two separate content experts, using a cognitive interview process (Fowler, 1995); changes were made to the items, based on feedback, in order to clarify the questions, enhance recall, and reduce respondent fatigue. A third iteration of the questionnaire was then individually administered to three CNM experts for content validity, using an interactive technique to evaluate questionnaires referred to as the “intensive interview” (Royston, 1989). Respondents were asked to *think aloud* while responding to each item. This process allowed the respondents to clarify that they understood the questions in the way they were intended to be asked. Final changes to the questionnaire were then made prior to pilot testing.

The final draft of the questionnaire included 22 demographic items, and 59 items which used Likert type scales to quantify the behaviors and beliefs of CNMs and CMs caring for women during second stage labor, and the potential barriers encountered to using spontaneous approaches. Following IRB approval from Marquette University, the final questionnaire was pilot tested with 10 CNMs who were not involved in the process

of questionnaire development. Items on the questionnaire were divided into two subsets based on the concept they were designed to measure, and assessed for reliability by measuring internal consistency with Cronbach's alpha. The first subset included items developed to identify the specific care practices and beliefs of midwives relative to management of the second stage of labor (Cronbach's alpha .837). The second subset included items intended to identify perceived barriers to the use of supportive approaches to second stage labor care (Cronbach's alpha .777). Findings indicated that these questions were measuring the content they were developed to measure. The final questionnaire was printed in booklet format and mailed to respondents along with a cover letter explaining the purpose of the study, researcher's qualifications, an opportunity to decline participation, and a request for signed consent.

Sample

Following IRB approval from Marquette University and permission to use the American College of Nurse-Midwives' (ACNM) mailing list from the Division of Research, participants for this study were randomly selected (using a computer generated random numbers table) from the list of active members. Using a formula for calculating a sample size for a descriptive study of a continuous variable (Hully et al., 2007), it was determined that a sample size of 705 CNM/CM members was necessary in order to be assured responses from at least 339 CNMs/CMs who care for women in the second stage of labor.

Procedure

Questionnaires were mailed, along with one dollar and self addressed stamped return envelopes, through the U.S. postal service to a simple random sample of 705 active

members of the American College of Nurse-Midwives. The *Tailored Design Method* (Dillman, 2007) was used to maximize the response rate. One week after the initial mailing, a postcard was sent to the 705 members of the sample population to thank those who had responded, and provide a gentle reminder to those who had not. A second round of questionnaires was mailed to non-responders three weeks after the reminder postcards were sent. Following the second mailing of questionnaires, a total of 512 responses were received, for an overall response rate of 73%. Of those who responded to the survey, 375 (73%) respondents had attended births in the previous six months and were included in the final study sample.

Data were coded and entered into the Statistical Package for the Social Services (SPSS) 16.0 by the principal investigator. Following data entry, the data were checked and cleaned by the principal investigator. The data were analyzed using descriptive statistics, frequency distributions, and various correlation coefficients.

Results

Central to understanding the care practices used by CNMs/CMs when caring for women in second stage labor is determining the degree to which these providers of labor and birth care are “with women” before and during this stage. Most CNMs/CMs reported spending a substantial amount of time with their patients as they are transitioning to second stage and during second stage labor (see Table 1). Respondents were also asked to identify the degree of autonomy they experience when caring for low risk women in labor. On a Likert scale of zero (no autonomy) to ten (complete autonomy), the midwife respondents rated themselves as very autonomous when caring for healthy women during

labor and birth ($M = 9.1$; $SD = 1.2$). Additional demographic characteristics of the 375 respondents in the study's completed sample are presented in Table 2.

Initiating Bearing-Down Efforts

When caring for women without epidural anesthesia, 83% of the respondents believed it was very important to listen for a woman to express an urge to push before initiating bearing-down efforts while only 27% of respondents believed it was very important to check a woman's cervix before initiating bearing-down efforts. Specific actions used by CNMs/CMs as their patients initiate bearing-down efforts can be seen in Tables 3 and 4. Most CNMs/CMs (82.4%) often or almost always support women without epidural anesthesia to initiate bearing-down efforts only when the woman feels an urge to do so, and 69.4% rarely or never direct a woman to use Valsalva pushing immediately upon complete cervical dilatation. When caring for women with epidural anesthesia, 85.2% of CNMs/CMs often or almost always use "laboring down" until the woman feels an urge to push. For the purpose of this study, "laboring down" was defined as allowing a woman with an epidural to sleep or rest through contractions, without pushing, until she had an urge to push.

Practices Used By CNMs/CMs

The relationship between care practices used when caring for women without an epidural and practices used when caring for women with an epidural was investigated using Pearson product-moment correlation coefficient. There was a strong correlation between most of the practices used for women with epidural anesthesia and the practices used for women without an epidural ($r = .591 - .815$; $p < .01$). Responses concerning the

frequency of use of the specific supportive and directive approaches used during second stage labor care are presented in Tables 5 and 6 respectively. The care practices used by CNM/CM respondents when caring for women during second stage labor are overall supportive of women's spontaneous pushing efforts. All respondents reported providing verbal affirmation when signs of progress were seen with a push, with 97% doing so often or almost always. When caring for women without an epidural, almost all of the respondents reported that they support a woman's spontaneous bearing-down efforts without providing direction.

The one directive practice that most respondents reported engaging in is providing more direction as the fetal head emerges and the final stretching of the perineum is taking place. Whether or not a woman has an epidural, most of the respondents reported that they encourage women to breathe or blow through these final contractions. All respondents were given an opportunity to provide open-ended qualitative comments regarding the direction they provide during second stage labor. Many of the respondents provided lengthy explanations for the direction they provide, clarifying that there is almost always some sort of clinical indication which prompts them to provide more direction when caring for women in second stage labor. Qualitative analysis of those data will be conducted for future publications.

Perceived Barriers to Supportive Approaches

One of the items on the questionnaire asked respondents to identify the degree of influence that fifteen different factors had on their decision to provide more direction during second stage labor. Each of these factors was identified during the focus group and developmental interviews as barriers to the use of supportive approaches when caring

for women during second stage. As can be seen in Table 7, the factor which had the greatest degree of influence on the participant's decision to provide more direction was a change in fetal heart tones (90.7%) that led the midwife to believe the birth needed to occur quickly. Most of the respondents also indicated that they were influenced to provide more direction when women in labor asked for more direction (73.8%) or appeared to be fatigued (74.6%), and when the respondents perceived that their patient was having difficulty coping with pain (69.3%). Very few of the respondents reported that pressure from their consulting physician and/or pressure from the nurses caring for their patients influenced their decision to provide more direction.

Characteristics of the Participants/Facilitating Factors

In order to identify the influence that practice patterns or demographic characteristics may have on the participants' adoption of supportive approaches to second stage care, various correlation coefficients were obtained for the items. The relationship between demographic characteristics and the care practices used by participants was investigated using Pearson product-moment correlation coefficient. There was a weak, but statistically significant positive correlation between several of the care practices consistent with supportive approaches to second stage labor care and hours spent reading per month ($r = .107-.173$; $\text{sig} = 0.01-0.05$), age ($r = .113-.176$; $\text{sig} = 0.01-0.05$), perceived autonomy ($r = .111-.216$; $\text{sig} = 0.01-0.05$), and years in practice ($r = .127-.155$; $\text{sig} = 0.01-0.05$). There was also a weak but statistically significant positive correlation between the hours participants reported being present with women during labor and many of the care practices that are consistent with supportive approaches to second stage labor care ($r = .112-.259$; $\text{sig} = 0.01-0.05$).

One-way between-groups analysis of variance (ANOVA) was conducted to explore the impact of practice setting (home, birth center, level 1 hospital, level 2 hospital, or level 3 hospital) and/or geographic location of practice (West, Midwest, Northeast, or South) on the use of supportive approaches. There was no significant effect for geographic location or place of practice on the use of supportive approaches to second stage labor care. Independent-samples t-tests were conducted to compare care practices between CNMs/CMs who precept and CNMs/CMs who do not precept each of four types of students: midwifery students, medical students, nursing students and residents. Findings revealed little or no difference between care practices used by midwives who precept learners and care practices used by midwives who do not serve as preceptors. There was no significant difference in the care practices used by CNMs/CMs who precept medical students and those who do not. There were only a few care practices that differed based on whether or not the midwife participants worked with nursing students, midwifery students and/or residents and the magnitude of the differences in the means for those few practices was very small ($\eta^2 = .01-.03$; $\text{sig} = .002-.048$).

Discussion

Although most women who give birth in the U.S. report having been directed about when and how to push during second stage labor (Declercq et al., 2006), the midwife respondents in this study reported using primarily supportive approaches in the second stage labor care they provide. Data from midwives, who attend just over 10% of the births in the U.S. (ACNM, 2009), provides important detail which may be used to facilitate the use of supportive approaches during second stage labor by all maternity care providers, including physicians and nurses. Consistent with the findings of previous

studies that identified a positive correlation between perceived autonomy and the adoption of evidence in practice (Hanson, 1998; Sprague et al., 2008), the participants in the current study reported high levels of perceived autonomy. The positive correlation between time spent with women in labor and the use of supportive approaches, suggests that observing women as they progress spontaneously through the process of labor and birth, enhances care providers' ability to trust a woman's innate ability to give birth without direction and adopt supportive approaches to second stage labor care. Moreover, understanding the factors that influence midwives to become more directive in the care they provide illuminates the use of direction as an intervention aimed at managing potential problems, rather than a routine and arbitrary approach to caring for women in second stage labor. For example, many of the respondents reported providing direction with the final contractions during second stage labor, as the head was emerging. It is likely that providing this type of direction is seen by midwives as a specific intervention, done to avoid perineal lacerations.

While it is clear that the midwife respondents to this survey provide care that is primarily supportive of the spontaneous sensations women experience during second stage, there were clearly times when the respondents identified that they provide more direction. These factors may be viewed by some as "barriers" to implementing evidence in practice. However, the midwives identified specific conditions, either maternal or fetal, which appeared to call for more direction. Unlike previous findings which have identified institutional and practice barriers to the use of supportive approaches to second stage labor management (Niesen & Quirk, 1997), this study clarifies that rather than providing more direction in response to institutional barriers such as pressure from physicians and

nurses, CNMs/CMs provide more direction primarily in response to cues they receive from the mother or fetus. This finding is consistent with previous research which aimed to identify why supportive birth attendants become directive in their approach to second stage labor care (Roberts et al., 2007).

The factors that most of the respondents in this study perceived as having quite a bit of influence to provide more direction, in order of frequency included: (a) a change in fetal heart tones that led the midwife to believe the birth needed to occur more quickly, (b) a woman's request for more direction, (c) a woman's perceived state of emotional or physical fatigue, (d) the level of fetal descent that had occurred since initiating bearing-down efforts, (e) the midwife's understanding of the woman's ability to cope with pain, and (f) the length of time a woman had been pushing. Roberts et al. (2007) categorized directive verbalizations used by care providers that were observed in the videotapes of 10 births. Directive verbalizations were then categorized based on the reasons for their use. Similar to the current study, the categories identified by Roberts et al. (2007) included cues the provider received from the woman or fetus, such as expressions of maternal pain or fear, diminished urge to push, and fetal distress. As was first described by Roberts et al. (2007), the midwife participants in the current study clearly articulated the use of direction as an intervention.

Roberts et al. (2007) also described two new phenomena which were identified: "supportive direction" and "supportive praise" (p. 138). Supportive direction involved suggestions and minimal direction given to women during second stage, and including women in decision-making about breathing techniques or pushing positions. Supportive praise was identified as affirmation of the woman's involuntary efforts that were offered

by the care provider (Roberts et al., 2007). Similar to those findings, all of the midwives in the present study reported providing verbal affirmation when signs of fetal head progression are seen during a push, and 94% of the respondents reported that they often, or almost always, offer words of encouragement with each push. The finding that the midwives in the current study viewed maternal requests for more direction as a leading contributor to their decision to provide more direction further exemplifies the use of supportive direction. It is likely that the midwives included in this study population view ignoring women's requests for more direction as a failure to listen to the needs expressed by the women for whom they care, and that providing direction upon request is supportive of women's spontaneous pushing efforts. Further, providing affirmation with every push may be seen by the respondents as a way in which to empower women with the knowledge that they are capable of giving birth spontaneously.

For the midwives included in this study sample there was a statistically significant positive correlation between the use of supportive approaches to second stage labor care and time spent reading per month, age, autonomy and years in practice. Further, most respondents (85%) identified that when caring for women in second stage labor they combine the strategies they learned in school with those they have learned in practice, and most report reading more than seven hours per month (mean = 7.86; mode = 10). It is perhaps this commitment to life-long learning that facilitates the use of evidence in practice. More significant was the way in which time spent with women during labor, both late first stage and second stage, positively influences the use of supportive methods. It appears that being "with woman" allows midwives to recognize and respond to the cues, both physical and emotional, they receive from the mother and fetus, and in so

doing support a woman's inherent ability to give birth spontaneously. Further research needs to be conducted to more clearly understand the way in which precepting students influences the use of supportive approaches to second stage labor care.

This study is limited by the same sources of potential error and bias that are common to all forms of survey research. Using the *Tailored Design Method* (Dillman, 2007), careful steps were taken during instrument development and study design planning to reduce the potential for measurement error, sampling error and non-response error. In order to minimize non-response error, a second round of questionnaires was mailed to non-responders, culminating in an overall response rate of 73%. Non-coverage error occurs when not all members of a population are allowed an equal opportunity to be randomly sampled for participation in a survey, and was difficult to avoid in this study. Since the sample population was drawn from the ACNM active membership list, and since not all CNMs and CMs are members of the ACNM, there was no opportunity to include non-members in the study sample. In order to obtain findings relative to second stage care practices that are generalizable to a wider group of midwives, it would be necessary to survey CNMs/CMs who are not members of ACNM as well as midwives who are not also nurses.

Social desirability refers to the desire of respondents to answer survey questions in such a way that they appear to be "good people" in the eyes of the survey administrator (Bradburn, Sudman & Wansink, 2004). While the risk for social desirability bias is less concerning with self administered questionnaires than with interviewer administered questionnaires (Bradburn et al., Dillman, 2007), the potential for social desirability bias existed for this study because the principal investigator is a CNM and holds a leadership

position in the organization from which the sample for this study was selected. Several steps were taken during instrument development to reduce the risk for social desirability bias and respondents were informed of the confidential nature of their responses.

Nonetheless, identifying the second stage care practices used by these autonomous providers of labor and birth care, who believe in the normalcy of birth and the judicious use of intervention, provides a greater understanding of the way in which evidence that supports spontaneous pushing during second stage labor is implemented in practice. Most CNMs/CMs use supportive approaches when providing care to women in second stage labor, intervening with direction when they receive maternal and/or fetal cues that intervention in the natural process of labor and birth is warranted. Further research is necessary to determine whether or not direction as an intervention results in improved outcomes for mothers and babies.

As users of supportive approaches to second stage labor care, regardless of place of practice or geographic location, CNMs/CMs can be considered innovators or early adopters of the innovation under consideration in this study. This is consistent with findings of previous research that identified CNMs as innovators in their use of nonlithotomy positions during second stage (Hanson, 1998). Understanding the care practices used by innovators and early adopters during second stage labor may help translate evidence into practice; it is innovators and early adopters who are likely to facilitate the diffusion of this innovation to larger groups of labor and birth care providers. Further efforts need to be taken to disseminate information regarding the safety and efficacy of supportive approaches to second stage labor care. It is likely that the adoption of innovative approaches to second stage labor care by all providers of labor

and birth care, including physicians and nurses, will require an intervention designed to promote the use of evidence based practice.

Since the inception of the first nurse-midwifery practice at the Frontier Nursing Service in 1925, nurse-midwives have conducted research documenting the outcomes of midwifery care. Much of that research has focused on establishing the safety and efficacy of care provided by nurse-midwives (Summers, 2007). The outcomes of midwifery care have been clearly documented as safe and effective. A systematic review of the literature on midwifery care from 1925-2003 identified that midwives predominantly provide care for women who are members of vulnerable populations, and they do so with excellent outcomes for both mothers and babies (Raisler & Kennedy, 2007). More recently, midwifery leaders have called for a change in the focus of research related to midwifery care; a change that shifts the focus from outcomes alone, to the processes used by midwives and the link between process and outcomes, demarcating the difference between maternity care delivered by midwives and care delivered by other providers (Ernst, 2000; Raisler & Kennedy, 2007; Summers, 2007). This study answers that call by providing insight regarding the processes used by midwives when caring for women in the second stage of labor. Further, this study offers information that challenges late adopters and laggards to adopt second stage care practices which are evidence based and which lead to optimal outcomes for mothers and babies. The time has come for supportive approaches to second stage labor care to be considered the standard of care, and directive approaches to be viewed as an intervention in the natural process of labor and birth.

References

- Albers, L., Sedler, K., Bedrick, E., Teaf, D., & Peralta, P. (2005). Midwifery care measures in the second stage of labor and reduction of genital tract trauma at birth: A randomized Trial. *Journal of Midwifery & Women's Health, 50*(5), 365-372.
- Albers, L., Sedler, K., Bedrick, E., Teaf, D., & Peralta, P. (2006). Factors related to genital tract trauma in normal spontaneous vaginal births. *Birth, 33*(2), 94-100.
- American College of Nurse-Midwives. (2004). *Philosophy of the American College of Nurse- Midwives*. Retrieved October 4, 2009, from <http://www.acnm.org/philosophy.cfm>
- American College of Nurse-Midwives. (2009). *Fact sheet: Essential facts about midwives*. Retrieved October 9, 2009, from www.midwife.org/Essential_Facts.pdf
- Barnett, M., & Humenick, S. (1982). Infant outcome in relation to second stage labor pushing method. *Birth, 9*(4), 221-228.
- Beynon, C. (1957). The normal second stage of labour: A plea for reform in its conduct. *Journal of Obstetrics and Gynaecology, 64*(6), 815-820.
- Bloom, S., Casey, B., Schaffer, J., McIntire, D., & Leveno, K. (2006). A randomized trial of coached versus uncoached maternal pushing during the second stage of labor. *American Journal of Obstetrics and Gynecology, 194*, 10-13.
- Bradburn, N., Sudman, S., & Wansink, B. (2004). *Asking Questions: The definitive guide to questionnaire design for market research, political polls, and social and health questionnaires*. San Francisco: Wiley.

- Brancato, R., Church, S., & Stone, P. (2008). A meta-analysis of passive descent versus immediate pushing in nulliparous women with epidural analgesia in the second stage of labor. *JOGNN*, 37(1), 4-12.
- Caldeyro-Barcia, R., Giussi, G., Storch, E., Poseiro, J., Lafaurie, N., Kettenhuber, K., & Ballejo, G. (1981). The bearing-down efforts and their effects on fetal heart rate, oxygenation and acid base balance. *Journal of Perinatal Medicine*, 9, 63-67.
- Cohen, W. (1977). Influence of the duration of second stage labor on perinatal outcome and puerperal morbidity. *Obstetrics and Gynecology*, 49, 266-267.
- Declercq, E., Sakala, C., Corry, M., & Applebaum, S. (2006). *Listening to mothers II: Report of the second national US survey of women's childbearing experiences*. New York: Childbirth Connection.
- Dillman, D.A. (2007). *Mail and internet surveys: The tailored design method*. Hoboken, NJ: Wiley.
- Ernst, K. (2000). Guest commentary. A model of exemplary midwifery practice: Results of a Delphi study. *Journal of Midwifery and Women's Health*, 45(1), 19.
- Fitzpatrick, M., Harkin, R., McQuillan, K., O'Brien, C., O'Connell, P., & O'Herlihy, C. (2002). A randomised clinical trial comparing the effects of delayed versus immediate pushing with epidural analgesia on mode of delivery and faecal continence. *British Journal of Obstetrics and Gynaecology*, 109, 1359-1365.
- Fowler, F. (1995). *Improving survey questions: Design and evaluation*. Thousand Oaks, CA: SAGE Publications.
- Fraser, W., Marcoux, S., Krauss, I., Douglas, J., Goulet, C., & Boulvain, M. (2000).

- Multicenter, randomized, controlled trial of delayed pushing for nulliparous women in the second stage of labor with continuous epidural analgesia. *American Journal of Obstetrics and Gynecology*, 182(5), 1165-1172.
- Hansen, S., Clark, S., and Foster, J. (2002). Active pushing versus passive fetal descent in the second stage of labor: A randomized controlled trial. *Obstetrics and Gynecology*, 99(1), 29-34.
- Hanson, L. (1998). Second-stage positioning in nurse-midwifery practices. Part 2: Factors affecting use. *Journal of Nurse-Midwifery*, 43(5), 326-330.
- Hanson, L. (2009). Second-stage labor care: Challenges in spontaneous bearing down. *Journal of Perinatal and Neonatal Nursing*, 23(1), 31-39.
- Hulley, S., Cummings, S., Browner, W., Grady, D., & Newman, T. (2007). *Designing clinical research (3rd ed.)*. Philadelphia: Lippincott Williams & Wilkins.
- Janni, W., Schiessl, B., Peschers, U., Huber, S., Strobl, B., Hantschmann, P., Uhlmann, N., Dimpfl, T., Rammel, G., & Kainer, F. (2002). The prognostic impact of a prolonged second stage of labor on maternal and fetal outcome. *Acta obstetrician et gynecologica Scandanavica*, 81, 214-221.
- Lai, M., Lin, K., Li, H., Shey, K., & Gau, M. (2009). Effects of delayed pushing during the second stage of labor on postpartum fatigue and birth outcomes in nulliparous women. *Journal of Nursing Research*, 17(1), 62-71.
- Menticoglou, S., Manning, F., Harman, C., & Morrison, I. (1995). Perinatal outcome in relation to second-stage duration. *American Journal of Obstetrics and Gynecology*, 173(3), 906-912.

- Myles, T., & Santolaya, J. (2003). Maternal and neonatal outcomes in patients with a prolonged second stage of labor. *Obstetrics and Gynecology*, *102*(1), 52-58.
- Niesen, K., & Quirk, A. (1997). The process for initiating nursing practice changes in the intrapartum: Findings from a multisite research utilization project. *JOGNN*, *26*(6), 709-717.
- Paine, L., & Tinker, D. (1992). The effect of maternal bearing-down efforts on arterial umbilical cord pH and length of the second stage of labor. *Journal of Nurse-Midwifery*, *37*(1), 61-63.
- Raisler, J. & Kennedy, H. (2005). Midwifery care of poor and vulnerable women, 1925 – 2003. *Journal of Midwifery and Women's Health*, *50*(2), 113-121.
- Roberts, C., Torvaldsen, S., Cameron, C., & Olive, E. (2004). Delayed versus early pushing in women with epidural analgesia: A systematic review and meta analysis. *British Journal of Obstetrics and Gynaecology*, *111*, 1333-1340.
- Roberts, J. (2003). A new understanding of the second stage of labor: Implications for nursing care. *JOGNN*, *32*(6), 794-801.
- Roberts, J., Goldstein, S., Gruener, J., Maggio, M., & Mendez-Bauer, C. (1987). A descriptive analysis of involuntary bearing-down efforts during the expulsive phase of labor. *JOGNN*, *16*(1), 48-55.
- Roberts, J., Gonzalez, C., & Sampsel, C. (2007). Why do supportive birth attendants become directive of maternal bearing-down efforts in second-stage labor? *Journal of Midwifery and Women's Health*, *52*(2), 134-141.

- Roberts, J., & Hanson, L. (2007). Best practices in second stage labor care: maternal bearingdown and positioning. *Journal of Midwifery and Women's Health*, 52(3), 238-245.
- Rogers, E. (2003). *Diffusion of innovations* (5th ed). New York: Free Press.
- Royston, P. (1989). Using intensive interviews to evaluate questions. Proceedings of the Fifth Conference on Health Survey Research Methods, Keystone, CO.
- Sampselle, C., & Hines, S. (1999). Spontaneous pushing during birth: Relationship to perineal outcomes. *Journal of Nurse-Midwifery*, 44(1), 36-39.
- Schaffer, J., Bloom, S., Casey, B., McIntire, D., Nihira, M., & Leveno, K. (2005). A randomized trial of the effects of coached vs uncoached maternal pushing during the second stage of labor on postpartum pelvic floor structure and function. *American Journal of Obstetrics and Gynecology*, 192, 1692-1696.
- Spradley, J.P. (1979). *The ethnographic interview*. New York: Holt, Rinehart & Winston.
- Sprague, A., Oppenheimer, L., McCabe, L., Graham, I., & Davies, B. (2008). Knowledge to action: Implementing a guideline for second stage labor. *MCN*, 33(3), 179-186.
- Summers, L. (2007). Enough is enough! *Journal of Midwifery and Women's Health*, 52(5), 427-428.
- Thomson, A. (1993). Pushing techniques in the second stage of labour. *Journal of Advanced Nursing*, 18, 171-177.
- Yeates, D., & Roberts, J. (1984). A comparison of two bearing-down techniques during the second stage of labor. *Journal of Nurse-Midwifery*, 29(1), 3-11.
- Yildirim, G., & Beji, N. (2008). Effects of pushing techniques in birth on mother and fetus: A randomized study. *Birth*, 30(1), 25-30.

Table 1. Time spent with women in labor

% of Time Present With Women	During Late First Stage/Transition		During Second Stage	
	N (%) (total = 373)		N (%) (total = 374)	
Less than 25%	52 (14)		7 (2)	
25%-50%	53 (14)		23 (6)	
51%-75%	87 (23)		51 (14)	
More than 75%	181 (48)		293 (78)	

Table 2. Characteristics of Participants

<i>Characteristic</i>	<i>N (%)</i> (371)	<i>Mean</i>	<i>Range</i>
Gender: Female	367 (99)		
Age		49.7	25-69
Years in CNM/CM practice		13.7	1-38
Certification Type			
CNM	369 (99.5)		
CM	2 (.5)		
Worked previously as L&D nurse	298 (80.3)		
Midwifery Education			
Basic Certificate	92 (24.7)		
ADN to MSN Bridge	11 (3.0)		
Direct Entry Program	9 (2.4)		
Graduate Program	229 (61.6)		
Post-masters Certificate	30 (8.1)		
DNP	1 (0.3)		
Highest academic degree			
Associate degree	25 (6.8)		
BSN	17(4.6)		
Bachelor's degree (not in nursing)	2 (0.5)		
MSN	252 (68.5)		
Master of Midwifery	35 (9.5)		
Other Master's degree	21 (5.7)		
Doctoral degree	16 (4.3)		
Work Settings			
Level 1 Hospital	84 (19.9)		
Level 2 Hospital	152 (36.0)		
Level 3 Hospital	145 (34.4)		
Home	21 (4.9)		
Birth Center	20 (4.7)		
Number of births attended in past 6 months			
Without an epidural		22.80	1-120
With an epidural		22.03	0-112
Serve as preceptors			
CNM/CM students	258 (70.9)		
Medical students	131 (36.0)		
Nursing students	181 (49.7)		
Residents	98 (26.9)		
Continuing Education			
Participate in CMP	219 (59.5)		
Participate in CCA	232 (63.0)		
Hours spent reading per month		7.6	0-40

Table 3. Actions taken by CNMs/CMs when initiating bearing down efforts in women **without** epidural anesthesia

<i>Frequency</i>	<i>Never or Rarely</i>	<i>Sometimes</i>	<i>Often or Almost Always</i>
Action	N (%)	N (%)	N (%)
• Supported a woman to begin pushing only when she felt the urge to push	9 (2.5)	56 (15.1)	305 (82.4)
• Directed a woman to “take a quick breath and come right back to it before this contraction ends” after the first push with a contraction	118 (32.1)	128 (34.8)	122 (33.1)
• Told a woman when to start pushing with each contraction	165 (44.5)	135 (36.4)	71 (19.2)
• Began directing a woman to use Valsalva pushing as soon as she was fully dilated	257 (69.4)	85 (23)	28 (7.6)
• Avoided documenting the time a woman was completely dilated	212 (57.8)	88 (24)	67 (18.2)

Table 4. Actions taken by CNMs/CMs when initiating bearing down efforts in women **with** epidural anesthesia

<i>Frequency</i>	<i>Never or Rarely</i>	<i>Sometimes</i>	<i>Often or Almost Always</i>
Action	N (%)	N (%)	N (%)
• Allowed a woman to “labor down” – sleep or rest without pushing until she felt the urge to push	1 (.3)	50 (14.5)	294 (85.2)
• Allowed a woman to sleep or rest until there were FHT changes suggesting she was near second stage	13 (3.8)	72 (20.9)	259 (75.3)
• Encouraged active bearing down only when you saw the fetal head	133 (38.7)	122 (35.5)	89 (25.9)
• Turned the epidural down or off to facilitate second stage progress	167 (48.7)	123 (35.9)	53 (15.4)
• Began directing a woman to use Valsalva pushing as soon as she was fully dilated	219 (63.7)	93 (27)	32 (9.3)
• Delayed documenting the time a woman was completely dilated	205 (57.5)	73 (21.2)	67 (19.4)

Table 5. **Supportive** approaches used when caring for women **without an epidural**

<i>Frequency</i>	<i>Never or Rarely</i>	<i>Sometimes</i>	<i>Often or Almost Always</i>	<i>r</i>
Care Practices	N (%)	N (%)	N (%)	
• Provide verbal affirmation when signs of fetal head progression are seen during a push	0 (0)	12 (3)	359 (97)	.648*
• Offer words of encouragement with each push	3 (1)	20 (5)	347 (94)	.648*
• Offer women the opportunity to touch the baby's emerging head	4 (1)	24 (7)	343 (92)	.787*
• Encourage position changes	3 (1)	27 (7)	334 (91)	.591*
• Support women's spontaneous bearing down efforts without providing direction	11 (3)	111 ^a (30)	248 (67)	.327*
• Encourage women to make spontaneous noises	73 (20)	118 ^a (31)	180 (48)	.793*

r: Pearson correlation between practices without epidural and practices with epidural

* Correlation is significant at the 0.01 level (2 tailed)

Table 6. **Directive** approaches used when caring for women **without an epidural**

<i>Frequency</i>	<i>Never or Rarely</i>	<i>Sometimes</i>	<i>Often or Almost Always</i>	<i>r</i>
Care Practices	N (%)	N (%)	N (%)	
• Encourage women to breathe/blow through contractions as the final stretching of the perineum takes place	28 (7.5)	57 (15.4)	286 (77.1)	.768*
• Help women identify where to push by inserting your fingers to apply downward pressure at the introitus	143 (38.6)	166 (44.9)	61 (16.5)	-.053
• Encourage long sustained pushes for the entire contraction	171 (46.3)	140 (37.8)	59 (16)	.627*
• Encourage frequent small pushing efforts to keep the fetal head from receding	197 (53.4)	115 (31.2)	57 (15.4)	.815*
• Remind women with each contraction that it is time to push	232 (62.7)	110 (29.7)	28 (7.5)	.303*
• Encourage women to push quietly	191 (79.1)	57 (15.5)	20 (5.4)	.715*

r: Pearson correlation between practices without epidural and practices with epidural

* Correlation is significant at the 0.01 level (2 tailed)

Table 7. Factors which influence the decision to provide more direction

<i>Degree of influence</i>	<i>None or Only a little</i>	<i>Some</i>	<i>Quite a bit</i>
Factor	N (%)	N (%)	N (%)
1. Change in FHTs indicating birth needed to occur quickly	3 (0.8)	32 (8.6)	339 (90.7)
2. The woman asked for more direction	34 (9.1)	66 (17.6)	274 (73.8)
3. Woman's condition (emotional or physical fatigue)	5 (1.3)	90 (24.1)	279 (74.6)
4. Level of descent that had occurred since initiating bearing down	4 (1.1)	97 (26)	272 (72.9)
5. Midwife's understanding of the woman's ability to cope with pain	16 (4.2)	99 (26.5)	259 (69.3)
6. Length of time a woman had been pushing	15 (4.1)	120 (32.3)	237 (63.7)
7. Position of the fetal head	43 (11.6)	156 (42)	172 (46.4)
8. Presence of thick meconium	66 (17.3)	144 (39)	159 (43.1)
9. Parity of the woman	72 (19.3)	137 (36.2)	164 (43.9)
10. Length of time a woman had been fully dilated	83 (22.1)	186 (49.7)	105 (28.1)
11. Length of time a woman had been in labor	127 (34.1)	17 (47.5)	69 (18.5)
12. Pressure from the consulting physician	246 (66)	81 (21.7)	46 (12.3)
13. Pressure from the nurses caring for the patient	266 (71.1)	81 (21.2)	27 (7.2)
14. Pressure from family members	310 (83.1)	56 (15)	7 (1.9)
15. Busy with other patients and needed to get done with the birth	313 (83.7)	52 (13.9)	9 (2.4)

BIBLIOGRAPHY

- Aderhold, K., & Roberts, J. (1991). Phases of second stage labor. *Journal of Nurse-Midwifery*, 36(5), 267-275.
- Albers, L. (1999). The duration of labor in healthy women. *Journal of Perinatology*, 19(2), 114-119.
- Albers, L., Schiff, M., & Gorwoda, J. (1996). The length of active labor in normal pregnancies. *Obstetrics and Gynecology*, 87(3), 355-359.
- Albers, L., Sedler, K., Bedrick, E., Teaf, D., & Peralta, P. (2005). Midwifery care measures in the second stage of labor and reduction of genital tract trauma at birth: A randomized Trial. *Journal of Midwifery & Women's Health*, 50(5), 365-372.
- Albers, L., Sedler, K., Bedrick, E., Teaf, D., & Peralta, P. (2006). Factors related to genital tract trauma in normal spontaneous vaginal births. *Birth*, 33(2), 94-100.
- Aldrich, C., d'Antona, D., Spencer, J., Wyatt, J., Peebles, D., Delpy, D., & Reynolds, E. (1995). The effect of maternal pushing on fetal cerebral oxygenation and blood volume during the second stage of labour. *British Journal of Obstetrics and Gynaecology*, 102, 448-453.
- American College of Nurse-Midwives. (2002). *Core Competencies for Basic Midwifery Practice*. Retrieved November 14, 2008, from http://www.acnm.org/siteFiles/descriptive/Core_Competencies_6_07_3.pdf
- American College of Nurse-Midwives. (2004a). *Philosophy of the American College of Nurse-Midwives*. Retrieved November 13, 2008, from <http://www.acnm.org/philosophy.cfm>
- American College of Nurse-Midwives. (2004b). *Independent midwifery practice*. Retrieved December 1, 2008, from http://www.acnm.org/siteFiles/position/Independent_Mid_Prac_05.pdf
- American College of Nurse-Midwives. (2008). *CNM – attended birth statistics*. Retrieved November 13, 2008, from http://www.acnm.org/siteFiles/news/CNM_Attended_Births.pdf
- American College of Nurse-Midwives. (2009). Fact sheet: Essential facts about midwives. Retrieved October 9, 2009, from www.midwife.org/Essential_Facts.pdf
- American College of Nurse-Midwives. (n.d.). *About us*. Retrieved December 1, 2008, from <http://www.acnm.org/about.cfm>

- American College of Obstetrics and Gynecology. (2003). ACOG practice bulletin no. 49: Dystocia and augmentation of labor. *Obstetrics and Gynecology*, 102(6), 1445-1454.
- Anastasi, A., & Urbina, S. (1997). *Psychological testing* (7th ed.). Upper Saddle River, NJ: Prentice Hall.
- Aranda, S., & Street, A. (2001). From individual to group: Use of narratives in participatory research process. *Journal of Advanced Nursing*, 33(6), 791-797.
- Ashford, J. (1988). *Mothers and midwives*. Mendocino, CA: Author.
- Barnett, M., & Humenick, S. (1982). Infant outcome in relation to second stage labor pushing method. *Birth*, 9(4), 221-228.
- Bassell, G., Humayun, S., & Marx, G. (1980). Maternal bearing down efforts – Another fetal risk? *Obstetrics and Gynecology*, 56(1), 39-41.
- Bergstrom, L., Roberts, J., Skillman, L., & Seidel, J. (1992). “You’ll feel me touching you, sweetie”: Vaginal examinations during the second stage of labor. *Birth*, 19(1), 10-18.
- Bergstrom, L., Seidel, J., Skillman-Hull, L., Roberts, J. (1997). “I gotta push. Please let me push!” Social interactions during the change from first to second stage of labor. *Birth*, 24(3), 173-180.
- Beynon, C. (1957). The normal second stage of labour: A plea for reform in its conduct. *Journal of Obstetrics and Gynaecology*, 64(6), 815-820.
- Bloom, S., Casey, B., Schaffer, J., McIntire, D., & Leveno, K. (2006). A randomized trial of coached versus uncoached maternal pushing during the second stage of labor. *American Journal of Obstetrics and Gynecology*, 194, 10-13.
- Bradburn, N., Sudman, S., & Wansink, B. (2004). *Asking Questions: The definitive guide to questionnaire design for market research, political polls, and social and health questionnaires*. San Francisco: Wiley.
- Brancato, R., Church, S., & Stone, P. (2008). A meta-analysis of passive descent versus immediate pushing in nulliparous women with epidural analgesia in the second stage of labor. *JOGNN*, 37(1), 4-12.
- Buhimschi, C., Buhimschi, I., Malinow, A., Kopelman, J., & Weiner, C. (2002). Pushing in labor: Performance and not endurance. *American Journal of Obstetrics and Gynecology*, 186(6), 1339-1345.

- Cahill, H. (2001). Male appropriation and medicalization of childbirth: An historical analysis. *Journal of Advanced Nursing*, 33(3), 334-342.
- Caldeyro-Barcia, R. (1975). Some consequences of obstetrical interference. *Birth and the Family Journal*, 2(2), 34-38.
- Caldeyro-Barcia, R. (1979). The influence of maternal bearing-down efforts during second stage on fetal well-being. *Birth and the Family Journal*, 6(1), 17-21.
- Caldeyro-Barcia, R., Giussi, G., Storch, E., Poseiro, J., Lafaurie, N., Kettenhuber, K., & Ballejo, G. (1981). The bearing-down efforts and their effects on fetal heart rate, oxygenation and acid base balance. *Journal of Perinatal Medicine*, 9, 63-67.
- Cammarata, S., Brush, R., & Hyzy, R. (1991). Chylothorax after childbirth. *Chest*, 99(6), 1539-1540.
- Canam, C. (2008). The link between discourses and nurses' silence: Implications for knowledge-based discourse for nursing practice. *Advances in Nursing Science*, 31(4), 296-307.
- Cesario, S. (2005). Research into practice: Evaluating Friedman's labor curve & assessing the "normal" length of labor. *AWHONN Lifelines*, 8(6), 506-10.
- Cohen, W. (1977). Influence of the duration of second stage labor on perinatal outcome and puerperal morbidity. *Obstetrics and Gynecology*, 49, 266-267.
- Cohen, W. (1984). Steering patients through the second stage of labor. *Contemporary OB/GYN*, 22(1), 122-139.
- Declercq, E., Sakala, C., Corry, M., & Applebaum, S. (2006). *Listening to mothers II: Report of the second national US survey of women's childbearing experiences*. New York: Childbirth Connection.
- Dillman, D.A. (1991). The design and administration of mail surveys. *Annual Review of Sociology*, 17, 225-249.
- Dillman, D.A. (2007). *Mail and internet surveys: The tailored design method*. Hoboken, NJ: Wiley.
- Doane, G. H., & Varcoe, C. (2008). Knowledge translation in everyday nursing: From evidence-based to inquiry-based practice. *Advances in Nursing Science*, 31(4), 283-295.
- Draugalis, J., Coons, S., & Plaza, C. (2008). Best practices for survey research reports: A synopsis for authors and reviewers. *American Journal of Pharmaceutical Education*, 72(1), 1-6.

- Duffy, M. (Ed.). (2007). *Narrative inquiry: The method*. Sudbury, MA: Jones and Bartlett.
- East, C., Dunster, K., & Colditz, P. (1998). Fetal oxygen saturation during maternal bearing down efforts in the second stage of labor. *American Journal of Perinatology*, *15*(2), 121-124.
- Ernst, K. (2000). Guest commentary. A model of exemplary midwifery practice: Results of a Delphi study. *Journal of Midwifery and Women's Health*, *45*(1), 19.
- Fitzhugh, M., & Newton, M. (1956). Muscle action during childbirth. *The Physical Therapy Review*, *36*(12), 805-809.
- Fitzpatrick, M., Harkin, R., McQuillan, K., O'Brien, C., O'Connell, P., & O'Herlihy, C. (2002). A randomised clinical trial comparing the effects of delayed versus immediate pushing with epidural analgesia on mode of delivery and faecal continence. *British Journal of Obstetrics and Gynaecology*, *109*, 1359-1365.
- Flynn, P., Franiek, J., Janssen, P., Hannah, W., & Klein, M. (1997). How can second stage management prevent perineal trauma? *Canadian Family Physician*, *43*, 73-84.
- Fowler, F. (1995). *Improving survey questions: Design and evaluation*. Thousand Oaks, CA: SAGE Publications.
- Fraser, W., Marcoux, S., Krauss, I., Douglas, J., Goulet, C., & Boulvain, M. (2000). Multicenter, randomized, controlled trial of delayed pushing for nulliparous women in the second stage of labor with continuous epidural analgesia. *American Journal of Obstetrics and Gynecology*, *182*(5), 1165-1172.
- Frid, I., Ohlen, J., & Bergbom, I. (2000). On the use of narratives in nursing research. *Journal of Advanced Nursing*, *32*(3), 695-703.
- Friedman, E. (1954). The graphic analysis of labor. *American Journal of Obstetrics and Gynecology*, *68*, 1568-1575.
- Goodman, S. (2007). Piercing the veil: The marginalization of midwives in the United States. *Social Science & Medicine*, *65*, 610-621.
- Gortner, S. (2004a). The history of philosophy of nursing science and research. In P. G. Reed, N. C. Shearer, & L. H. Nicoll (Eds.), *Perspective on nursing theory* (pp.105-111). Philadelphia: Lippincott Williams & Wilkins. (Original work published in 1983).
- Gortner, S. (2004b). Nursing's syntax revisited: A critique of philosophies said to influence nursing theories. In P. G. Reed, N. C. Shearer, & L. H. Nicoll (Eds.),

- Perspective on nursing theory* (pp. 403-414). Philadelphia: Lippincott Williams & Wilkins. (Original work published in 1993).
- Gupta, J., Hofmeyr, G., Smyth, R. (2004). Position in the second stage of labour for women without epidural anaesthesia. *Cochrane Database of Systematic Reviews* Issue 1, Art. No.: CD002006. DOI: 10.1002/14651858.CD002006.pub2.
- Hall, J., Stevens, P., & Meleis, A. (1994). Marginalization: A guiding concept for valuing diversity in nursing knowledge development. *Advanced Nursing Science*, 16(4), 23-41.
- Hansen, S., Clark, S., and Foster, J. (2002). Active pushing versus passive fetal descent in the second stage of labor: A randomized controlled trial. *Obstetrics and Gynecology*, 99(1), 29-34.
- Hanson, L. (1996). *Factors affecting the use of maternal positions for the second stage of labor: A survey of certified nurse-midwives*. Unpublished doctoral dissertation.
- Hanson, L. (1998a). Second-stage positioning in nurse-midwifery practices. Part 1: Position use and preferences. *Journal of Nurse-Midwifery*, 43(5), 320-325.
- Hanson, L. (1998b). Second-stage positioning in nurse-midwifery practices. Part 2: Factors affecting use. *Journal of Nurse-Midwifery*, 43(5), 326-330.
- Hanson, L. (2006). Pushing for change. *Journal of Perinatal and Neonatal Nursing*, 20(4), 282-284.
- Hanson, L. (2009). Second-stage labor care: Challenges in spontaneous bearing down. *Journal of Perinatal and Neonatal Nursing*, 23(1), 31-39.
- Hulley, S., Cummings, S., Browner, W., Grady, D., & Newman, T. (2007). *Designing clinical research* (3rd ed.). Philadelphia: Lippincott Williams & Wilkins.
- Inhorn, M. (2006). Defining women's health: A dozen messages from more than 150 ethnographies. *Medical Anthropology Quarterly*, 20(3), 345-369.
- Institute of Medicine. (2003). *Health professions education: A bridge to quality*. Washington, DC: National Academies Press.
- Janni, W., Schiessl, B., Peschers, U., Huber, S., Strobl, B., Hantschmann, P.,... Kainer, F. (2002). The prognostic impact of a prolonged second stage of labor on maternal and fetal outcome. *Acta obstetrician et gynecologica Scandanavica*, 81, 214-221.
- Jenkins, C. & Dillman, D. (1997). Towards a theory of self-administered questionnaire design. In L. Lyberg et al. (Eds.), *Survey measurement and process quality* (pp. 165-196). New York: Wiley.

- Jordan, B. (1993). *Birth in four cultures: A crosscultural investigation of childbirth in Yucatan, Holland, Sweden, and the United States (4th ed.)*. Prospect Heights, IL: Waveland Press.
- Junqueira, L. (2008). Teaching cardiac autonomic function dynamics employing the Valsalva (Valsalva-Wever) maneuver. *Advances in Physiology Education*, 32, 100-106.
- Kennedy, H. P. (2000). A model of exemplary midwifery practice: Results of a Delphi study. *Journal of Midwifery and Women's Health*, 45, 4-19.
- Kennedy, H. P., & Shannon, M. (2004). Keeping birth normal: Research findings on midwifery care during childbirth. *JOGNN*, 33(5), 554-560.
- Kilpatrick, S., & Laros, R. (1989). Characteristics of normal labor. *Obstetrics and Gynecology*, 74(1), 85-87.
- Kozar, R. (2007). Chylothorax. Retrieved October 12, 2008, from <http://www.emedicine.com/med/topic381.htm>
- Krosnick, J., & Fabrigar, L. (1997). Designing rating scales for effective measurement in surveys. In L. Lyberg et al. (Eds.), *Survey Measurement and Process Quality* (pp. 141-164). New York: Wiley.
- Lai, M., Lin, K., Li, H., Shey, K., & Gau, M. (2009). Effects of delayed pushing during the second stage of labor on postpartum fatigue and birth outcomes in nulliparous women. *Journal of Nursing Research*, 17(1), 62-71.
- Leavitt, J. (1983). "Science" enters the birthing room: Obstetrics in America since the eighteenth century. *The Journal of American History*, 70(2), 281-304.
- LeRay, C., Audibert, F., Goffinet, F., & Fraser, W. (2009). When to stop pushing: Effects of duration of second –stage expulsion efforts on maternal and neonatal outcomes in nulliparous women with epidural analgesia. *American Journal of Obstetrics and Gynecology*, 201(4), 361 e1 – e7.
- Liao, J., Buhimschi, C., & Norwitz, E. (2005). Normal labor: Mechanism and duration. *Obstetrics and Gynecology Clinics of North America*, 32, 145-164.
- Manyonda, I., Shaw, D., & Drife, J. (1990). The effect of delayed pushing in the second stage of labor with continuous lumbar epidural analgesia. *Acta obstetrica et gynecologica Scandanavica*, 69, 291-295.
- Maresh, M., Chong, K., & Beard, R. (1983). Delayed pushing with lumbar epidural analgesia in labour. *British Journal of Obstetrics and Gynaecology*, 90, 623-627.

- Mayberry, L., Gennaro, S., Strange, L., Williams, M., & De, A. (1999). Maternal fatigue: Implications of second stage labor nursing care. *JOGNN*, 28(2), 175-181.
- Mayberry, L., & Strange, L. (1997). Strategies for designing a research utilization project with labor and delivery nurses. *JOGNN*, 26(6), 701-708.
- McCartney, P. (1998). Caring for women with epidurals using the “laboring down” technique. *The American Journal of Maternal Child Nursing*, 23(5), 274.
- McErlean, J. (2000). *Philosophies of science: From foundations to contemporary issues*. Belmont, CA: Wadsworth.
- McKay, S., Barrows, T., & Roberts, J. (1990). Women’s views of second-stage labor as assessed by interviews and videotapes. *Birth*, 17(4), 192-198.
- McKay, S., & Roberts, J. (1985). Second stage labor: What is normal? *JOGNN*, 14(2), 101-105.
- McKeon, V., & O’Reilly, M. (1997). Nursing management of second stage labor. *The Online Journal of Knowledge Synthesis for Nursing*, 4, Document 4.
- Melnik, B., & Fineout-Overholt, E. (2005). *Evidence-based practice in nursing & healthcare: A guide to best practice*. Philadelphia: Lippincott Williams & Wilkins.
- Menticoglou, S., Manning, F., Harman, C., & Morrison, I. (1995). Perinatal outcome in relation to second-stage duration. *American Journal of Obstetrics and Gynecology*, 173(3), 906-912.
- Myles, T., & Santolaya, J. (2003). Maternal and neonatal outcomes in patients with a prolonged second stage of labor. *Obstetrics and Gynecology*, 102(1), 52-58.
- Newman, M. (2004). Nursing’s theoretical evolution. In P. G. Reed, N. C. Shearer, & L. H. Nicoll (Eds.), *Perspective on nursing theory* (pp. 113-119). Philadelphia: Lippincott Williams & Wilkins. (Original work published in 1972).
- Newton, R., & Rudestam, K. (1999). *Your statistical consultant*. Thousand Oaks, CA: SAGE Publications.
- Niesen, K., & Quirk, A. (1997). The process for initiating nursing practice changes in the intrapartum: Findings from a multisite research utilization project. *JOGNN*, 26(6), 709-717.
- Paine, L., & Tinker, D. (1992). The effect of maternal bearing-down efforts on arterial umbilical cord pH and length of the second stage of labor. *Journal of Nurse-Midwifery*, 37(1), 61-63.

- Pallent, J. (2005). *SPSS survival manual (2nd Ed.)*. New York, NY: McGraw-Hill Education.
- Perry, L., & Porter, C. (1979). Pushing technique and the duration of the second stage of labor. *The West Virginia Medical Journal*, 75(2), 32-34.
- Petersen, L., & Besuner, P. (1997). Pushing techniques during labor: Issues and controversies. *JOGNN*, 26(6), 719-726.
- Petrou, S., Coyle, D., & Fraser, W. (2000). Cost-effectiveness of a delayed pushing policy for patients with epidural anesthesia. *American Journal of Obstetrics and Gynecology*, 182(5), 1158-1164.
- Piquard, F., Schaefer, A., Hsiung, R., Dellenback, P., & Haberey, P. (1989). Are there two biological parts in the second stage of labor? *Acta obstetricia et gynecologica Scandinavica*, 68, 713-718.
- Raisler, J. & Kennedy, H. (2005). Midwifery care of poor and vulnerable women, 1925 – 2003. *Journal of Midwifery and Women's Health*, 50(2), 113-121.
- Read, G. D. (1947). An outline of the conduct of physiological labor. *American Journal of Obstetrics and Gynecology*, 54(4), 702-710.
- Roberts, C., Torvaldsen, S., Cameron, C., & Olive, E. (2004). Delayed versus early pushing in women with epidural analgesia: A systematic review and meta analysis. *British Journal of Obstetrics and Gynaecology*, 111, 1333-1340.
- Roberts, J. (2003). A new understanding of the second stage of labor: Implications for nursing care. *JOGNN*, 32(6), 794-801.
- Roberts, J., Goldstein, S., Gruener, J., Maggio, M., & Mendez-Bauer, C. (1987). A descriptive analysis of involuntary bearing-down efforts during the expulsive phase of labor. *JOGNN*, 16(1), 48-55.
- Roberts, J., Gonzalez, C., & Sampsel, C. (2007). Why do supportive birth attendants become directive of maternal bearing-down efforts in second-stage labor? *Journal of Midwifery and Women's Health*, 52(2), 134-141.
- Roberts, J., & Hanson, L. (2007). Best practices in second stage labor care: maternal bearing down and positioning. *Journal of Midwifery and Women's Health*, 52(3), 238-245.
- Roberts, J., & Woolley, D. (1996). A second look at the second stage of labor. *JOGNN*, 25(5), 415-423.
- Rogers, E. (2003). *Diffusion of innovations (5th ed.)*. New York: Free Press.

- Rooks, J. (1997). *Midwifery & childbirth in America*. Philadelphia: Temple University Press.
- Rouse, D.J., Weiner, S.J., Bloom, S.L., Varner, M.W., Spong, C.Y., Ramin, S.M.,... Anderson, G.D. (2009). Second-stage labor duration in nulliparous women: Relationship to maternal and perinatal outcomes. *American Journal of Obstetrics and Gynecology*, 210(4), 357, e1-e7.
- Royston, P. (1989). Using intensive interviews to evaluate questions. Proceedings of the Fifth Conference on Health Survey Research Methods, Keystone, CO.
- Sampsel, C., & Hines, S. (1999). Spontaneous pushing during birth: Relationship to perineal outcomes. *Journal of Nurse-Midwifery*, 44(1), 36-39.
- Sampsel, C., Miller, J., Luecha, Y., Fischer, K., & Rosten, L. (2005). Provider support of spontaneous pushing during the second stage of labor. *JOGNN*, 34(6), 695-702.
- Save the Children. (2008). *Mother's Day report card: The best and worst countries to be a mother*. Retrieved December 2, 2008, from <http://www.savethechildren.org/newsroom/2008/best-worst-countriesmother.html>
- Schaffer, J., Bloom, S., Casey, B., McIntire, D., Nihira, M., & Leveno, K. (2005). A randomized trial of the effects of coached vs uncoached maternal pushing during the second stage of labor on postpartum pelvic floor structure and function. *American Journal of Obstetrics and Gynecology*, 192, 1692-1696.
- Schaeffer, N.C., & Presser, S. (2003). The science of asking questions. *Annual Reviews of Sociology*, 29, 65-88.
- Schuling, K., Sipe, T., & Fullerton, J. (2005). Findings from the analysis of the American College of Nurse-Midwives' membership survey. *Journal of Midwifery and Women's Health*, 50(1), 8-15.
- Silva, M. (2004). Philosophy, science, theory: Interrelationships and implications for nursing research. In P. G. Reed, N.C. Shearer, & L. H. Nicoll (Eds.), *Perspective on nursing theory* (pp. 3-9). Philadelphia: Lippincott Williams & Wilkins. (Original work published in 1977).
- Simkin, P. (1984). Active and physiologic management of second stage: A review and hypothesis. In S. Kitzinger (Ed.), *Episiotomy and the second stage of labor* (pp. 7-21). USA: Pennypress.
- Simkin, P., & Anchetta, R. (2005). *The labor progress handbook*. Oxford, UK: Blackwell.

- Simpson, K. R. (2005). The context & clinical evidence for common nursing practices during labor. *Maternal Child Nursing, 30*(6), 356-363.
- Simpson, K. R., & James, D. (2005). Effects of immediate versus delayed pushing during second-stage labor on fetal well-being. *Nursing Research, 54*(3), 149-157.
- Sinquefield, G. (1985). Midwifery management of second stage of labor. *Journal of Nurse-Midwifery, 30*(2), 112-116.
- Skala, C. & Corry, M. (2008). *Evidence-base maternity care: What it is and what it can achieve*. Retrieved November 14, 2008 from [http://www.childbirthconnection.org/pdf.asp?PDFDownload=evidence-based maternity-care](http://www.childbirthconnection.org/pdf.asp?PDFDownload=evidence-based%20maternity-care)
- Spradley, J.P. (1979). *The ethnographic interview*. New York: Holt, Rinehart & Winston.
- Sprague, A., Oppenheimer, L., McCabe, L., Graham, I., & Davies, B. (2008). Knowledge to Action: Implementing a guideline for second stage labor. *MCN, 33*(3), 179-186.
- Summers, L. (2007). Enough is enough! *Journal of Midwifery and Women's Health, 52*(5), 427-428.
- Thomson, A. (1993). Pushing techniques in the second stage of labour. *Journal of Advanced Nursing, 18*, 171-177.
- Thomson, A. (1995). Maternal behaviour during spontaneous and directed pushing in the second stage of labour. *Journal of Advanced Nursing, 22*, 1027-1034.
- Tourangeau, R., Ripps, L., & Rasinski, K. (2000). *The psychology of survey response*. Cambridge: University Press.
- US Census Bureau. (n.d.). Census regions and divisions of the United States [demographic map]. Retrieved from http://www.census.gov/geo/www/us_regdiv.pdf
- VandeVusse, L. (1999). The essential forces of labor revisited: 13 Ps reported in women's stories. *The American Journal of Maternal/Child Nursing, 24*(4), 176-184.
- Vause, S., Congdon, H., & Thornton, J. (1998). Immediate and delayed pushing in the second stage of labour for nulliparous women with epidural analgesia: A randomised controlled trial. *British Journal of Obstetrics and Gynaecology, 105*, 186-188.
- Waltz, C., Strickland, O., & Lenz, E. (2005). *Measurement in nursing and health research*. New York, NY: Springer.

- Whall, A., Sinclair, M., & Parahoo, K. (2006). A philosophic analysis of evidence-based nursing: Recurrent themes, metanarratives, and exemplar cases. *Nursing Outlook*, 54(1), 30-35.
- Wittman-Price, R. (2004). Emancipation in decision-making in women's health care. *Journal of Advanced Nursing*, 47(4), 437-445.
- Wood, C., Ng, K., Hounslow, D., & Benning, H. (1973). The influences of different birth times upon fetal condition in normal deliveries. *The Journal of Obstetrics and Gynaecology of the British Commonwealth*, 80(4), 289-294.
- Woolley, D. & Roberts, J. (1995). Second stage pushing: A comparison of Valsalva-style with "mini" pushing. *Journal of Perinatal Education*, 4(4), 37-43.
- Yeates, D., & Roberts, J. (1984). A comparison of two bearing-down techniques during the second stage of labor. *Journal of Nurse-Midwifery*, 29(1), 3-11.
- Yildirim, G., & Beji, N. (2008). Effects of pushing techniques in birth on mother and fetus: A randomized study. *Birth*, 35(1), 25-30.

Appendix A

Glossary of terms

Active pushing: The act of bearing down during labor. The period of time during which a woman is actively pushing is not synonymous with second stage labor. There are periods of time during second stage when a woman may be resting or sleeping; the period of active pushing refers to times during which the woman is actually bearing down.

Adopters: Individuals who implement, or put into practice, a new idea or innovation.

Based on the speed with which these individuals implement a new practice, adopters are classified in four categories:

Innovators: The earliest adopters of an innovation. These adopters are usually highly interactive with their peers, intelligent enough to apply complex knowledge to practice, and able to cope with high levels of uncertainty as they apply new ideas to practice (Rogers, 2003).

Early adopters: The second group of adopters. These adopters are often viewed as leaders in a social system and serve as role models for other potential adopters (Rogers, 2003).

Early majority: Individuals who adopt a new idea just prior to the average member of a social system. These adopters are highly interactive with their peers, although they do not usually hold leadership positions. This category represents one of the largest categories of adopters and provides an important link between the earliest adopters and those who are hesitant to adopt new ideas because of their interconnectedness between groups (Rogers, 2003).

Late majority: Individuals who adopt a new idea just after the average member of a social system. Similar in size to the early majority, these adopters approach innovations with caution and skepticism, and are motivated to adopt an innovation primarily by peer pressure (Rogers, 2003).

Laggards: The last members of a social system to adopt an innovation. Many of these individuals are isolated from the social system and are suspicious of innovations and those who promote them (Rogers, 2003).

Attributes of an Innovation: The five characteristics of an innovation which effect the rate at which an innovation is adopted (Rogers, 2003).

Relative Advantage: The degree to which an innovation is perceived by potential adopters as better than the idea or practice which it will replace (Rogers, 2003).

Compatibility: The degree to which an innovation is perceived as being consistent with the values, norms and prior experience of potential adopters (Rogers, 2003).

Complexity: The degree to which potential adopters view an innovation as being difficult to use; usually refers to complex theories or technically complex innovations (Rogers, 2003).

Observability: The degree to which others are able to see improvements which result from use of an innovation (Rogers, 2003).

Trialability: The degree to which innovations can be implemented in incremental steps, allowing potential adopters to gradually test the effectiveness or usefulness of the innovation (Rogers, 2003).

Authoritative Knowledge: A way of knowing that comes to be legitimized as superior to other ways of knowing, valued above all others, and based on the status of the knower rather than the correctness of the knowledge (Jordan, 1994).

Authoritative Pushing: For the purpose of this study, authoritative pushing refers to maternal bearing down in response to a birth attendant's authoritative knowledge regarding when and how to push, rather than spontaneous pushing done by women in response to the physiologic sensations they experience during labor.

Bearing down efforts: Any action taken by women, during second stage of labor, to push the baby out.

Birth Attendant: For the purpose of this study, birth attendant refers to the health professionals in attendance of a woman during labor and birth; CNMs, CMs, physicians, and nurses.

Diffusion: "The process in which an innovation is communicated through certain channels over time among the members of a social system" (Rogers, 2003. p. 5).

Directed Pushing: For the purpose of this study, directed pushing is the same as authoritative pushing. Directed pushing refers to maternal bearing down in response to the direction of birth attendants rather than the physiologic sensations the woman in labor is experiencing.

Innovation: A practice, idea, or object that is perceived by an individual or group as something new. Innovations are not necessarily new in a chronological sense; they are perceived by potential adopters as new in a given context (Rogers, 2003).

Marginalization: The process through which individuals are kept in the periphery by a dominant, central majority (Hall et al., 1994).

Medicalization: “The biomedical tendency to pathologize otherwise normal bodily processes and states. Such pathologization leads to incumbent medical management” (Inhorn, 2006, p. 354).

Physiologic Management of Second Stage: For the purpose of this study, physiologic management of second stage refers to care practices, used by birth attendants, which support the normal physiologic processes occurring during labor. This includes, but is not limited to, support of spontaneous maternal bearing down.

Pushing Techniques: Practices used by birth attendants to support or encourage maternal bearing down efforts.

Directive methods: Techniques wherein the birth attendant directs the woman in labor regarding when and how to push.

Methods supportive of spontaneous pushing: Techniques wherein the birth attendant supports the spontaneous urge to push and sensations the woman in labor is experiencing during the second stage.

Second Stage of Labor: The anatomic interval between the time the cervix reaches full dilatation (10 centimeters) and the birth of the baby (Friedman, 1954).

Spontaneous Pushing: For the purpose of this study, spontaneous pushing refers to maternal bearing down in response to the physiologic urges and sensations experienced by the woman in labor.

Valsalva maneuver: A forced expiratory effort against a closed glottis which alters intrathoracic pressure and results in systemic cardiovascular changes.

Appendix B

Cover Letter and Self Administered Questionnaire

Kathryn Osborne MSN CNM
 Doctoral Student – Marquette University
 305 Coach House Drive
 Madison, WI 53714 (608)241-5094

5-1-2009

Dear Colleague,

I am writing to ask for your help in a national research survey of midwives that I am conducting for my doctoral dissertation. This survey is being conducted to collect information about the way in which midwives provide care during the **second stage of labor**. Your name was randomly selected from the active membership list of the American College of Nurse-Midwives. Solicitation of CNM/CM participants for this study has been approved by the ACNM. As an expert in the care of healthy women in labor and birth, you have important knowledge that will contribute to a greater understanding about the care practices used during the second stage of labor. Results from this survey will help maternity care providers better understand a part of the process used by midwives as they care for women during labor and birth. You will be one of approximately 350 participants in this research study.

The answers you provide here will be held completely confidential. The questionnaire you fill out has been assigned a numeric code for the purpose of follow-up and only I will be aware of the numeric code associated with the name of each respondent. Your name will not be entered into a data base and will never be shared with anyone not involved in the study. Only the unique numeric code will appear on the questionnaire. The link between your name and this code will be kept in my locked files and accessed by only me. Your name will be used only in the event that follow-up is necessary. Once the study is completed, the document linking your name to the survey will be shredded. The information from this survey will only be reported as summaries in which no individual's answers can be identified. Your name will never be used, nor will any other identifying information be collected, used or shared when study findings are presented. All data will be kept in a locked drawer located in my locked office and all computer files will be password protected. All questionnaires will be shredded three years after the written submission of the findings. While I have taken these steps to insure strict confidentiality, I cannot guarantee confidentiality with 100% certainty. The only risk to participating in this study is a risk for breached confidentiality. I am asking you to complete this short questionnaire about the practices you use when caring for women in the second stage of labor. The questionnaire will take about 15-20 minutes to complete. **Participation in this survey is voluntary. You may choose to participate or not and you may withdraw your participation at any time. If you choose to withdraw, your data will be destroyed. Please return this signed consent form with your completed questionnaire.**

VOLUNTARY CONSENT: I understand all of the above and that, throughout my participation in this research study, I am encouraged to ask any additional questions I may have about the research. I may call Kathryn Osborne at 608-241-5094 or e-mail her at kathryn.osborne@marquette.edu with any questions that I may have. Any questions I have about my rights as a research subject will be answered by the Marquette University Office of Research Compliance at 414-288-7570.

By signing this form, I agree to participate in the research study described above. A copy of this consent form has been provided for my own records.

Participant's Signature

Date

I have enclosed a small token of my appreciation (\$1) as a way of saying thanks for your help, which you may keep regardless of your participation. Please complete this questionnaire and return it in the self-addressed stamped envelope that is enclosed. I would greatly appreciate your response within the next 2-3 weeks. If you prefer not to respond, please let me know by returning the blank questionnaire in the enclosed stamped envelope.

Sincerely,
 Kathryn Osborne MSN CNM PhD(c)

Care Practices of CNMs and CMs During the Second Stage of Labor

START HERE:

1. **Have you attended a normal, spontaneous vaginal birth in the last 6 months?**

Yes (Go to question 2)
 No If no, it is not necessary to complete the rest of the questionnaire. Please return the questionnaire in the envelope provided. Thank you very much for your time.

2. **During the last 6 months, approximately how many normal spontaneous vaginal births have you attended:**

Without an epidural _____
 With an epidural _____

3. **What percentage of the time are you present with your patients during late first stage of labor as your patients are transitioning to second stage?**

(Fill in one circle)



Less than 25% of the time.....
 25% - 50% of the time.....
 51% - 75% of the time.....
 More than 75% of the time.....

4. **What percentage of the time are you present with your patients during the second stage of labor, whether or not they are pushing?**

(Fill in one circle)



Less than 25% of the time.....
 25% - 50% of the time.....
 51% - 75% of the time.....
 More than 75% of the time.....

5. **Thinking about the women you cared for during the last six months who experienced a normal, spontaneous vaginal birth *without an epidural*, how important did you believe it was to check a woman's cervix before supporting her bearing down efforts? (Fill in one circle)**



Not at all important.....○
 Slightly important.....○
 Somewhat important.....○
 Moderately important.....○
 Very important.....○
 Extremely important.....○

6. **Think still about the women you cared for during the last six months who experienced a normal, spontaneous vaginal birth *without an epidural*. How important did you believe it was to listen for a woman to describe an urge to push before initiating bearing down efforts? (Fill in one circle)**



Not at all important.....○
 Slightly important.....○
 Somewhat important.....○
 Moderately important.....○
 Very important.....○
 Extremely important.....○

7. **Think now about the strategies you use when you are caring for a woman in the second stage of labor. Which of the following most closely describes the strategies you use? (Fill in one circle)**



I use the strategies I learned as a labor and delivery nurse.....○
 I use the strategies I learned in midwifery school.....○
 I use strategies I have learned since starting midwifery practice....○
 I combine the strategies I have learned in school and in practice...○

8. Think now about the practices you used during the last six months when caring for a woman in the second stage of labor *without an epidural*. How often – if at all - did you take each of the following actions to *initiate bearing down efforts*? (Check most appropriate box for each action)

	NEVER ↓	RARELY ↓	SOME-TIMES ↓	OFTEN ↓	ALMOST ALWAYS ↓
A). Began directing a woman to push with long, sustained pushes immediately when you discovered she was fully dilated					
B). Helped a woman use a contraction to its fullest by telling a woman <i>when</i> to start pushing with each contraction					
C). After the first sustained push with a contraction, directed a woman to “take a quick breath and come right back to it before this contraction ends”.					
D). Avoided documenting the time a woman was complete					
E). Supported a woman to begin pushing <i>only</i> when she felt the urge to push					

9. Do you believe women *without epidurals* need specific direction/coaching about when and how to push? (Fill in one circle)

- ↓
- No – not usually.....○
 - Yes - sometimes.....○
 - Yes – they often do.....○
 - Yes – they usually do.....○

10. During the last six months, how often – if at all – did you use each of the following practices with women without an epidural as the second stage progressed?

(Check the most appropriate box for each practice)

	NEVER ↓	RARELY ↓	SOME- TIMES ↓	OFTEN ↓	ALMOST ALWAYS ↓
A) Encouraged long sustained pushes for the entire contraction					
B) Reminded a woman with each contraction that it was time to push					
C) Encouraged a woman to push quietly					
D) Supported a woman's spontaneous bearing down efforts without providing direction					
E) Encouraged a woman to make spontaneous noises					
F) Helped a woman identify where to push by inserting your fingers to apply downward pressure at the introitus					
G) Offered words of encouragement with each push					
H) Encouraged frequent small pushing efforts to keep the fetal head from receding					
I) Provided verbal affirmation when you saw signs of fetal head progression during a push					
J) Encouraged position changes					
K) Encouraged a woman to breathe or blow through the contractions as the final stretching of the perineum was taking place					
L) Offered a woman the opportunity to touch the baby's emerging head					

11. Do you believe women with an epidural need specific direction/coaching about when and how to push? (Fill in one circle)

- ↓
- No – not usually.....○
 Yes - sometimes.....○
 Yes – they often do.....○
 Yes – they usually do.....○

12. During the last six months have you provided care to a healthy woman who experienced a normal, spontaneous vaginal birth with an epidural?

- Yes ○ (Go to question 13)
 No ○ (Go to question 16)

13. Think now about the practices you used during the last six months, when you were caring for a woman with an epidural. How often – if at all - did you take each of the following actions when you thought she was entering the second stage to initiate bearing down efforts?

(Check most appropriate box for each action)

	NEVER ↓	RARELY ↓	SOME-TIMES ↓	OFTEN ↓	ALMOST ALWAYS ↓
A) Began directing a woman to push with long, sustained pushes immediately when you discovered she was fully dilated					
B) Turned the epidural down or off to facilitate second stage progress					
C) Delayed documenting the time a woman was complete					
D) Allowed a woman to sleep or rest until you saw heart tone changes that suggested she was nearing second stage					
E) Encouraged active bearing down only when you saw the fetal head					
F) Allowed a woman to “labor down”, that is, to sleep or rest through contractions without pushing until she had an urge to push					

14. During the last six months, how often – if at all – did you use each of the following practices with women *with an epidural* as the second stage *progressed*? (Check the most appropriate box for each practice)

	NEVER ↓	RARELY ↓	SOME-TIMES ↓	OFTEN ↓	ALMOST ALWAYS ↓
A) Encouraged long sustained pushes for the entire contraction					
B) Reminded a woman with each contraction that it was time to push					
C) Encouraged a woman to push quietly					
D) Supported a woman's spontaneous bearing down efforts without providing direction					
E) Encouraged a woman to make spontaneous noises					
F) Helped a woman identify where to push by inserting your fingers to apply downward pressure at the introitus					
G) Offered words of encouragement with each push					
H) Encouraged frequent small pushing efforts to keep the fetal head from receding					
I) Provided verbal affirmation when you saw signs of fetal head progression during a push					
J) Encouraged position changes					
K) Encouraged a woman to breathe or blow through the contractions as the final stretching of the perineum was taking place					
L) Offered a woman the opportunity to touch the baby's emerging head					

15. Are there any other approaches you use when caring for a woman with an epidural during second stage? (List here)
-

16. During the last six months, when you were caring for a woman *with or without an epidural*, how much influence, if any, did each of the following have on decisions you made about providing direction?

(Check most appropriate box for each)

	NO INFLUENCE AT ALL ↓	ONLY A LITTLE INFLUENCE ↓	SOME INFLUENCE ↓	QUITE A BIT OF INFLUENCE ↓	A GREAT DEAL OF INFLUENCE ↓
A) The length of time a woman had been in labor					
B) The length of time a woman had been fully dilated					
C) The length of time a woman had been pushing					
D) The level of descent that had occurred since initiating bearing down efforts					
E) The woman's condition, that is, how tired she was, physically or emotionally					
F) Your understanding of how much pain the woman was in, or her ability to cope with the pain					
G) A change in fetal heart tones that led you to believe that the birth needed to occur more quickly					
H) The presence of thick meconium					
I) Parity of the woman					
J) Position of the fetal head					
K) Pressure from your consulting physician					
L) Pressure from the nurse caring for your patient					
M) Pressure from family members					
N) You were busy with other patients and needed to get done quickly with the birth					
O) The woman asked you to provide more direction					

17. Can you think of anything else that may have influenced your decision to provide direction to a woman with or without an epidural during second stage? _____

18. If you use different approaches when caring for women in the second stage of labor based on parity, please describe them here:

19. During the last six months, has there been a time when you identified non-reassuring fetal heart tones while caring for a healthy woman with or without an epidural during the second stage of labor?

Yes (Go to question 20)

No (Go to question 21)

20. During the last six months, *when you identified non-reassuring fetal heart tones*, how often – if at all - did you take each of the following actions? (please check most appropriate box for each practice)

	NEVER ↓	RARELY ↓	SOME TIMES ↓	OFTEN ↓	ALMOST ALWAYS ↓
A) Encouraged sustained bearing down efforts of 10 seconds or greater					
B) Encouraged position changes					
C) Helped her identify where to push by using your fingers to apply downward pressure at the introitus					
D) Limited each sustained bearing down effort to 6 seconds or less					
E) Encouraged the woman not to push with every contraction, for example to push with every other contraction					

21. On a scale of zero (no autonomy) to ten (complete autonomy), what degree of autonomy do you experience when dealing with low risk women in labor?
(check one box)

Zero	1	2	3	4	5	6	7	8	9	10

22. What is your gender?

Female
Male

23. In what year were you born? _____

24. For how many years have you worked as a CM or CNM in full scope practice? _____

25. Did you work as a labor and delivery nurse before becoming a nurse-midwife?

Yes
No
NA (I am a CM)

26. From what type of midwifery education program did you graduate?

Basic Certificate program
ADN to MSN Bridge Program
Graduate Program
Post-masters Certificate Program
Doctorate of Nursing Practice
Other _____

27. What is the highest academic degree you have earned?

Associate degree
Bachelor of Science in Nursing
Bachelor's degree (not in nursing)
Master of Science in Nursing
Master of Midwifery
Other Master's degree (Specify which type) _____
Doctoral Degree Which Type _____

28. In which of the following settings do you attend births? (Check all that apply)

Level I Hospital.....
 Level II Hospital.....
 Level III Hospital.....
 Home.....
 Birth Center.....

29. What percentage of births do you attend in each setting? (Combined total should equal 100%)

Level I Hospital _____
 Level II Hospital _____
 Level III Hospital _____
 Home _____
 Birth Center _____
 [TOTAL] _____ 100%

30. Please estimate to the best of your ability (in percentages), the mode of delivery experienced by women cared for in your midwifery practice:

Normal spontaneous vaginal delivery _____ %
 Instrumental vaginal delivery _____ %
 Cesarean section _____ %
 Total _____ %

31. In what state do you practice? _____

32. Do you precept any of the following learners?

Nurse-midwifery students..... Yes No
 Medical students..... Yes No
 Nursing students..... Yes No
 Residents..... Yes No

33. Do you participate in Continued Competency Assessment (CCA)?

Yes..... No.....

34. Do you participate in the Certificate Maintenance Program (CMP)?

Yes..... No.....

35. Approximately how many continuing education units do you accrue each year? _____

**36. During the last 2 months which professional journals have you read?
(Check all that apply)**

- None.....
- American Journal of Obstetrics and Gynecology (the “grey journal”)...
- Birth.....
- Journal of Nursing Scholarship.....
- JOGNN.....
- Journal of Midwifery & Women’s Health.....
- Journal of Reproductive Medicine.....
- MCN.....
- Midwifery Today.....
- Nursing Research.....
- Obstetrics and Gynecology (the “green journal”).....
- Practicing Midwife.....
- Any others? _____

**37. Approximately how many hours per month do you spend reading or
studying material related to clinical practice? _____**

35. To which professional organizations do you belong? (Check all that apply)

- None.....
- American Association of Birth Centers.....
- American College of Nurse-Midwives.....
- American Nurses Association.....
- American Public Health Association.....
- Association of Women’s Health Obstetric & Neonatal Nurses.....
- International Childbirth Education Association.....
- Midwives Alliance of North America.....
- National Association of Nurse Practitioners in Women’s Health....
- State Nurse’s Association.....
- Sigma Theta Tau.....
- Others (Please list) _____

You have now reached the end of the survey. Thank you very much for participating in this survey. Your response to these questions will help maternity care providers understand the way CNMs and CMs care for women during the second stage of labor. Please feel free to contact Kathryn Osborne at kathryn.osborne@marquette.edu if you have any questions or concerns regarding this survey or the research she is conducting.

**PLEASE PLACE COMPLETED SURVEY IN STAMPED, SELF ADDRESSED
ENVELOPE AND RETURN TO KATHRYN OSBORNE.**

Appendix C

Follow-up Postcard

June 29, 2009

Last week a questionnaire seeking information about the care practices you use when caring for women during the second stage of labor was mailed to you. Your name was randomly selected from the list of active members of the ACNM.

If you have already completed and returned the questionnaire to me, please accept my sincere thanks. I am especially grateful for your help because it is only by asking people like you to share your experiences that I can understand the practices used by CNMs and CMs when caring for women during the second stage of labor.

If you have not completed the questionnaire, please do so today.

If you did not receive a questionnaire, or if it was misplaced, please call me collect at 608-241-5094 and I will get another one in the mail to you today.

Sincerely,

Kathryn Osborne MSN CNM
Doctoral Student – Marquette University

Appendix D

Cover Letter/Consent Form for Second Round Mailing

Kathryn Osborne MSN CNM
305 Coach House Drive
Madison, WI 53714

May 30, 2009

Dear Colleague,

About three weeks ago I sent a research questionnaire to you that asked about the practices you use when caring for women during the second stage of labor. To the best of my knowledge that questionnaire hasn't been returned. I am writing again because of the importance that your questionnaire has for helping to get accurate results. Although I sent questionnaires to many members of ACNM, it's only by hearing from nearly everyone in the sample that I can be sure that the results are truly representative.

This survey is being conducted to collect information about the way in which midwives provide care during the **second stage of labor**. Your name was randomly selected from the active membership list of the American College of Nurse-Midwives. Solicitation of CNM/CM participants for this study has been approved by the ACNM. As an expert in the care of healthy women in labor and birth, you have important knowledge that will contribute to a greater understanding about the care practices used during the second stage of labor. Results from this survey will help maternity care providers better understand a part of the process used by midwives as they care for women during labor and birth. You will be one of approximately 350 participants in this research study.

The answers you provide here will be held completely confidential. The questionnaire you fill out has been assigned a numeric code for the purpose of follow-up and only I will be aware of the numeric code associated with the name of each respondent. Your name will not be entered into a data base and will never be shared with anyone not involved in the study. Only the unique numeric code will appear on the questionnaire. The link between your name and this code will be kept in my locked files and accessed by only me. Once the study is completed, the document linking your name to the survey will be shredded. The information from this survey will only be reported as summaries in which no individual's answers can be identified. Your name will never be used, nor will any other identifying information be collected, used or shared when study findings are presented. All data will be kept in a locked drawer located in my locked office and all computer files will be password protected. All questionnaires will be shredded three years after the written submission of the findings. While I have taken these steps to insure strict confidentiality, I cannot guarantee confidentiality with 100% certainty. The only risk to participating in this study is a risk for breached confidentiality. I am asking you to complete this short questionnaire about the practices you use when caring for women in the second stage of labor. The questionnaire will take about 15-20 minutes to complete. **Participation in this survey is voluntary. You may choose to participate or not and you may withdraw your participation at any time. If you choose to withdraw, your data will be destroyed. Please return this signed consent form with your completed questionnaire.**

VOLUNTARY CONSENT: *I understand all of the above and that, throughout my participation in this research study, I am encouraged to ask any additional questions I may have about the research. I may call Kathryn Osborne at 608-241-5094 or e-mail her at kathryn.osborne@marquette.edu with any questions that I may have. Any questions I have about my rights as a research subject will be answered by the Marquette University Office of Research Compliance at 414-288-7570.*

By signing this form, I agree to participate in the research study described above. I can keep the copy of this consent form that was sent previously for my own records.

Participant's Signature

Date

Please complete this questionnaire and return it in the self-addressed stamped envelope that is enclosed. I would greatly appreciate your response within the next 2-3 weeks. If you prefer not to respond, please let me know by returning the blank questionnaire in the enclosed stamped envelope. You may keep the \$1 that was previously sent regardless of your participation.

Sincerely,

Kathryn Osborne MSN CNM PhD(c)

Appendix E
Significant Findings of Data Analysis

Table A1. Characteristics of Participants

<i>Characteristic</i>	<i>N (%)</i> <i>(371)</i>	<i>Mean</i>	<i>Range</i>
Gender			
Female	367 (99)		
Age		49.7	25-69
Years in CNM/CM practice		13.7	1-38
Certification Type			
CNM	369 (99.5)		
CM	2 (.5)		
Worked previously as L&D nurse			
Yes	298 (80.3)		
Midwifery Education			
Basic Certificate	92 (24.7)		
ADN to MSN Bridge	11 (3.0)		
Graduate Program	229 (61.6)		
Post-masters Certificate	30 (8.1)		
Direct Entry Program	9 (2.4)		
DNP	1 (0.3)		
Highest academic degree			
Associate degree	25 (6.8)		
BSN	17(4.6)		
Bachelor's degree (not in nursing)	2 (0.5)		
MSN	252 (68.5)		
Master of Midwifery	35 (9.5)		
Other Master's degree	21 (5.7)		
Doctoral degree	16 (4.3)		
Work Settings			
Level 1 Hospital	84 (19.9)		
Level 2 Hospital	152 (36.0)		
Level 3 Hospital	145 (34.4)		
Home	21 (4.9)		
Birth Center	20 (4.7)		
Number of births attended in past 6 months			
Without an epidural		22.80	1-120
With an epidural		22.03	0-112
Serve as preceptors			
CNM/CM students	258 (70.9)		
Medical students	131 (36.0)		
Nursing students	181 (49.7)		
Residents	98 (26.9)		
Continuing Education			
Participate in CMP	219 (59.5)		
Participate in CCA	232 (63.0)		
Hours spent reading per month		7.6	0-40

Table A2. Actions taken by CNMs/CMs when initiating bearing down efforts in women **without** epidural anesthesia

<i>Frequency</i>	<i>1</i>	<i>2</i>	<i>3</i>	<i>4</i>	<i>5</i>	Mean (SD)	Mode
	<i>(never)</i>	<i>(rarely)</i>	<i>(sometimes)</i>	<i>(often)</i>	<i>(almost always)</i>		
Action	N (%)	N (%)	N (%)	N (%)	N (%)		
• Supported a woman to begin pushing only when she felt the urge to push	1 (0.3)	8 (2.2)	56 (15.1)	150 (40.5)	155 (41.9)	4.2 (.8)	5
• Directed a woman to “take a quick breath and come right back to it before this contraction ends” after the first push with a contraction	35 (9.5)	83 (22.6)	128 (34.8)	102 (27.7)	20 (5.4)	2.97 (1.1)	3
• Told a woman when to start pushing with each contraction	53 (14.3)	112 (30.2)	135 (36.4)	60 (16.2)	11 (3)	2.6 (1)	3
• Began directing a woman to use Valsalva pushing as soon as she was fully dilated	114 (30.8)	143 (38.6)	85 (23)	24 (6.5)	4 (1.1)	2 (.94)	2
• Avoided documenting the time a woman was completely dilated	123 (33.5)	89 (24.3)	88 (24)	50 (13.6)	17 (4.6)	2.32 (1.2)	1

Table A3. Actions taken by CNMs/CMs when initiating bearing down efforts in women **with** epidural anesthesia

<i>Frequency</i>	<i>1</i>	<i>2</i>	<i>3</i>	<i>4</i>	<i>5</i>	Mean (SD)	Mode
	<i>(never)</i>	<i>(rarely)</i>	<i>(sometimes)</i>	<i>(often)</i>	<i>(almost always)</i>		
Action	N (%)	N (%)	N (%)	N (%)	N (%)		
• Allowed a woman to “labor down” – sleep or rest without pushing until she felt the urge to push	0 (0)	1 (.3)	50 (14.5)	143 (41.4)	151 (43.8)	4.29 (.72)	5
• Allowed a woman to sleep or rest until there were FHT changes suggesting she was near second stage	8 (2.3)	5 (1.5)	72 (20.9)	184 (53.5)	75 (21.8)	3.91 (.83)	4
• Encouraged active bearing down only when you saw the fetal head	37 (10.8)	96 (27.9)	122 (35.5)	74 (21.5)	15 (4.4)	2.81 (1.0)	3
• Turned the epidural down or off to facilitate second stage progress	52 (15.2)	115 (33.5)	123 (35.9)	44 (12.8)	9 (2.6)	2.5 (.98)	3
• Began directing a woman to use Valsalva pushing as soon as she was fully dilated	65 (18.9)	154 (44.8)	93 (27)	27 (7.8)	5 (1.5)	2.3 (.9)	2
• Delayed documenting the time a woman was completely dilated	125 (36.2)	80 (21.3)	73 (21.2)	52 (15.1)	15 (4.3)	2.3 (1.2)	1

Table A4. CNM's/CM's use of **supportive** approaches during second stage labor

<i>Frequency</i>	<i>1</i> <i>(never)</i>	<i>2</i> <i>(rarely)</i>	<i>3</i> <i>(sometimes)</i>	<i>4</i> <i>(often)</i>	<i>5</i> <i>(almost always)</i>	Mode	r
Care Practices	N (%)	N (%)	N (%)	N (%)	N (%)		
• Provide verbal affirmation when signs of fetal head progression are seen during a push	0 (0) 0 (0)	0 (0) 0 (0)	12 ^a (3) 9 ^b (2.6)	107 ^a (29) 82 ^b (23.6)	252 ^a (68) 257 ^b (73.9)	5 ^a 5 ^b	.648*
• Offer words of encouragement with each push	0 (0) 0 (0)	3 ^a (1) 0 (0)	20 ^a (5) 9 ^b (2.6)	103 ^a (28) 99 ^b (28.5)	244 ^a (66) 239 ^b (68.9)	5 ^a 5 ^b	.648*
• Offer women the opportunity to touch the baby's emerging head	0 (0) 0 (0)	4 ^a (1) 5 ^b (1.4)	24 ^a (7) 26 ^b (7.5)	108 ^a (29) 101 ^b (29)	235 ^a (63) 216 ^b (62.1)	5 ^a 5 ^b	.787*
• Encourage position changes	0 (0) 1 ^b (.3)	3 ^a (1) 14 ^b (4.1)	27 ^a (7) 48 ^b (13.9)	136 ^a (37) 117 ^b (33.9)	198 ^a (54) 165 ^b (47.8)	5 ^a 5 ^b	.591*
• Support women's spontaneous bearing down efforts without providing direction	4 ^a (1) 9 ^b (2.6)	7 ^a (2) 60 ^b (17.3)	111 ^a (30) 157 ^b (45.4)	164 ^a (44.3) 94 ^b (27.2)	84 ^a (22.7) 26 ^b (7.5)	4 ^a 3 ^b	.327*
• Encourage women to make spontaneous noises	24 ^a (7) 27 ^b (7.8)	49 ^a (13) 55 ^b (15.8)	118 ^a (31) 119 ^b (34.2)	119 ^a (32) 106 ^b (30.5)	61 ^a (16) 41 ^b (11.8)	4 ^a 3 ^b	.793*

^a When caring for women without epidural anesthesia^b When caring for women with epidural anesthesia

r: Pearson correlation between practices without epidural and practices with epidural

* Correlation is significant at the 0.01 level (2 tailed)

Table A5. CNM's/CM's use of **directive** approaches during second stage labor

<i>Frequency</i>	<i>1</i> <i>(never)</i>	<i>2</i> <i>(rarely)</i>	<i>3</i> <i>(sometimes)</i>	<i>4</i> <i>(often)</i>	<i>5</i> <i>(almost always)</i>	Mode	r
Care Practices	N (%)	N (%)	N (%)	N (%)	N (%)		
• Encourage women to breathe/blow through contractions as the final stretching of the perineum takes place	5 ^a (1.3) 8 ^b (2.3)	23 ^a (6.2) 21 ^b (6)	57 ^a (15.4) 42 ^b (12.1)	127 ^a (34.2) 117 ^b (33.6)	159 ^a (42.9) 160 ^b (46)	5 ^a 5 ^b	.768*
• Help women identify where to push by inserting your fingers to apply downward pressure at the introitus	32 ^a (8.6) 40 ^b (11.5)	111 ^a (30) 150 ^b (43.1)	166 ^a (44.9) 131 ^b (37.6)	57 ^a (15.4) 20 ^b (5.7)	4 ^a (1.1) 6 ^b (1.7)	3 ^a 2 ^b	-.053
• Encourage long sustained pushes for the entire contraction	55 ^a (14.9) 30 ^b (8.7)	116 ^a (31.4) 46 ^b (13.3)	140 ^a (37.8) 136 ^b (39.3)	52 ^a (14.1) 112 ^b (32.4)	7 ^a (1.9) 22 ^b (6.4)	3 ^a 3 ^b	.627*
• Encourage frequent small pushing efforts to keep the fetal head from receding	79 ^a (21.4) 66 ^b (19)	118 ^a (32) 94 ^b (27)	115 ^a (31.2) 114 ^b (32.8)	44 ^a (11.9) 51 ^b (14.7)	13 ^a (3.5) 23 ^b (6.6)	2 ^a 3 ^b	.815*
• Remind women with each contraction that it is time to push	62 ^a (16.8) 6 ^b (1.7)	170 ^a (45.9) 27 ^b (7.8)	110 ^a (29.7) 128 ^b (36.9)	26 ^a (7.0) 154 ^b (44.4)	2 ^a (.5) 32 ^b (9.2)	2 ^a 4 ^b	.303*
• Encourage women to push quietly	180 ^a (48.9) 146 ^b (42)	11 ^a (30.2) 122 ^b (35.1)	57 ^a (15.5) 63 ^b (18.1)	16 ^a (4.3) 14 ^b (4)	4 ^a (1.1) ^a 3 ^b (.9)	1 ^a 1 ^b	.715*

^a When caring for women without epidural anesthesia^b When caring for women with epidural anesthesia

r: Pearson correlation between practices without epidural and practices with epidural

* Correlation is significant at the 0.01 level (2 tailed)

Table A6. Factors which influence the decision to provide more direction

<i>Degree of influence</i>	<i>1</i>	<i>2</i>	<i>3</i>	<i>4</i>	<i>5</i>	Mean (SD)	Mode
	<i>(none)</i>	<i>(only a little)</i>	<i>(some)</i>	<i>(quite a bit)</i>	<i>(a great deal)</i>		
Factor	N (%)	N (%)	N (%)	N (%)	N (%)		
1. Change in FHTs indicating birth needed to occur quickly	1 (0.3)	2 (0.5)	32 (8.6)	114 (30.5)	225 (60.2)	4.5 (.7)	5
2. The woman asked for more direction	18 (4.8)	16 (4.3)	66 (17.6)	139 (37.7)	135 (36.1)	3.95 (1.07)	4
3. Woman's condition (emotional or physical fatigue)	0 (0)	5 (1.3)	90 (24.1)	196 (52.4)	83 (22.2)	3.95 (.72)	4
4. Level of descent that had occurred since initiating bearing down	1 (0.3)	3 (0.8)	97 (26)	204 (54.7)	68 (18.2)	3.9 (.7)	4
5. Midwife's understanding of the woman's ability to cope with pain	5 (1.3)	11 (2.9)	99 (26.5)	182 (48.7)	77 (20.6)	3.84 (.83)	4
6. Length of time a woman had been pushing	4 (1.1)	11 (3.0)	120 (32.3)	179 (48.1)	58 (15.6)	3.74 (.79)	4
7. Position of the fetal head	6 (1.6)	37 (10)	156 (42)	132 (35.6)	40 (10.8)	3.44 (.87)	3
8. Presence of thick meconium	19 (5.1)	47 (12.2)	144 (39)	83 (22.5)	76 (20.6)	3.41 (1.1)	3
9. Parity of the woman	21 (5.6)	51 (13.7)	137 (36.2)	109 (29.2)	55 (14.7)	3.34 (1.1)	3
10. Length of time a woman had been fully dilated	20 (5.3)	63 (16.8)	186 (49.7)	89 (23.8)	16 (4.3)	3.05 (.89)	3
11. Length of time a woman had been in labor	48 (12.9)	79 (21.2)	17 (47.5)	55 (14.7)	14 (3.8)	2.75 (.98)	3
12. Pressure from the consulting physician	123 (33)	123 (33)	81 (21.7)	27 (7.2)	19 (5.1)	2.18 (1.1)	2
13. Pressure from the nurses caring for the patient	123 (33)	143 (38.1)	81 (21.2)	19 (5.1)	8 (2.1)	2.05 (.97)	2
14. Pressure from family members	157 (42.1)	153 (41)	56 (15)	4 (1.1)	3 (0.8)	1.77 (.8)	1
15. Busy with other patients and needed to get done with the birth	189 (50.5)	124 (33.2)	52 (13.9)	7 (1.9)	2 (0.5)	1.69 (.82)	1