

FEMM

FERTILITY EDUCATION & MEDICAL MANAGEMENT

The Case for FEMM

White Paper

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Executive Summary

FEMM is a knowledge-based health program for women. FEMM teaches women to understand and monitor hormonal and other indicators of their health. Since these indicators bear directly on hormone-related processes in the body, responding to them allows women to better manage their health. This includes identifying and solving common health problems, such as irregular bleeding, pain, and depression; understanding their bodies to observe normal or abnormal activity; and achieving fertility-related outcomes, such as avoiding or achieving pregnancy. In the case of health problems, FEMM-trained medical professionals can provide more accurate testing, diagnosis, and treatment by working with biological indicators provided by the woman's own observations. With this support, women can maintain the highest standards of personal and reproductive health from puberty through menopause.

Introduction to FEMM

The need for hormonal health education

Without knowledge about the hormonal interplay of her cycle, a woman's ability to make empowered, informed health decisions is hindered. Unfortunately, evidence shows that most women do not understand how their bodies work. They also lack health literacy, or awareness of the behaviors that affect their general and reproductive health over the course of their lives, such as exercise, sleep, weight, and nutrition. Women often experience shame and stigma surrounding menstruation, which also leads to poorer health outcomes.

This startling reality evidences the need for the education that FEMM provides. A woman equipped with the knowledge to understand her body is empowered to make the health care and family planning decisions that are best for her.

FEMM content: Understanding hormonal biomarkers

FEMM details the hormonal activities that occur throughout a woman's cycle, so that she can observe and understand the signs of her hormonal fluctuations. There are three general phases of the cycle: pre-ovulatory, which begins at menstruation and is marked by low hormonal activity; ovulatory, a time of significant and rapid hormonal change, which is also the time of fertility; and post-ovulatory, when rising progesterone is the dominant hormonal activity. The cycle ends when progesterone drops, leading to the shedding of the uterine lining (menstruation), and the start of a new cycle. The appropriate activity and interplay of these hormones throughout this process is crucial to a woman's health and well-being.

FEMM health applications

Application #1: The importance of monitoring her cycle

Monitoring her cycle allows a woman to understand, maintain, and improve her health. She can learn to identify both regular and irregular activity and hormonal patterns. In fact, often the first sign of an underlying health problem a woman experiences is an abnormality in ovulation followed by irregular cycles. Cycle irregularities are associated with several poor health outcomes, such as coronary heart disease, Type 2 diabetes, and decreased fertility, so it is critical to identify and address irregularities promptly. Monitoring cycle irregularities can also be a diagnostic tool in determining underlying health problems. FEMM enables a woman to recognize irregularities and present evidence to health care professionals, who then are able to use that evidence to diagnose and treat the underlying problem.

Application #2: Achieving and avoiding pregnancy

Because a woman can get pregnant only in the few days leading up to and the day of ovulation, and because her biomarkers are usually identifiable during this phase of her cycle, she is able to use her FEMM knowledge either to achieve or to avoid pregnancy.

The importance of FEMM

Informed choice: Making informed health and family planning decisions

Informed choice is a central component of health care and family planning. Informed choice means making a health decision after learning about and considering all the options and information available. Women are often unable to make informed choices about their health and family planning decisions because they lack information about how certain methods work and what effects they might have on their health. FEMM informs women about the mechanism of action of each method, and the way that this relates to the long-term health outcomes she desires.

Addressing the campaign to reduce unmet need: The need for a new approach

Family planning has significant political and funding implications, and with so much at stake, it is necessary that the focus be on what women and men really need and want. The concept of “unmet need for family planning” dominates the health discourse in the international arena. It is claimed that globally 222 million women have unmet need for family planning. Current programs are unable to meet this need since many women with unmet need are unwilling or unable to use contraception because of health concerns or personal, cultural, or religious beliefs. Since FEMM focuses on informed choice and the education of women, it is uniquely

situated to provide new solutions in this area, which lead to women's empowerment and increased health outcomes.

The case for FEMM is clear. To make informed, empowered decisions about their health, women need to understand how their bodies work. The knowledge gained through FEMM can allow women to identify underlying health concerns and to achieve or avoid pregnancy. Funding and policy priorities must recognize the value that FEMM contributes to women's health.

For more information about FEMM, read the White Paper and visit FEMM's website, www.femmhealth.org, and FEMM on Facebook, www.facebook.com/FEMMhealth.

I. Introduction

FEMM (Fertility Education and Medical Management) is a knowledge-based women's health program. FEMM teaches women to understand and monitor hormonal and other indicators of their health. Since these indicators relate directly to hormone-related processes in the body, responding to them allows women to better manage their health. This is done by identifying and solving common health problems, such as irregular bleeding, pain, and depression; understanding their bodies to observe normal and abnormal hormonal activity; and achieving fertility-related outcomes, such as avoiding or achieving pregnancy. In the case of problems, FEMM-trained medical professionals can provide more accurate testing, diagnosis, and treatment by working with biological indicators provided by the woman's own observations. With this support, women maintain the highest standards of personal and reproductive health from puberty through menopause. FEMM education also enables women to exercise informed choice.

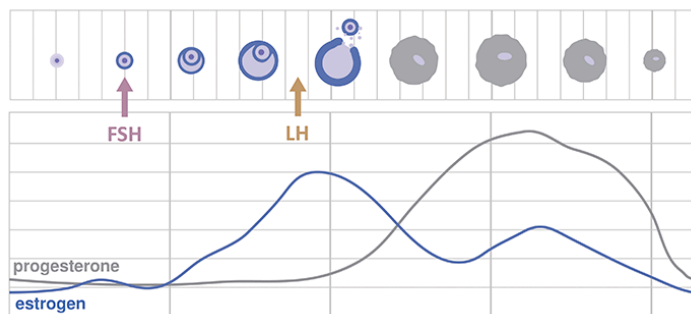
The following paper presents the case for FEMM: what it teaches, what it enables, and why it is needed. First, it presents an overview of the ovulation cycle and the role hormones play in the cycle. Second, it explores the importance of monitoring the hormonal biomarkers, by observing ovulation and menstruation in particular. This allows women to understand and observe the underlying health conditions that monitoring can help diagnose. It continues with a second application of FEMM, helping to achieve or avoid pregnancy by identifying when ovulation occurs. It then compares FEMM to artificial methods of contraception and their mechanisms of action, effectiveness rates, and side effects, concluding that FEMM is just as effective but is more attractive because it does not risk unpleasant side effects and it empowers women to monitor their health. An investigation of contraceptive discontinuation follows, proposing that high rates of discontinuation mean that women want a method that is both effective and free of side effects, two conditions FEMM satisfies. In a section on informed choice, the paper reviews international law and policy on informed choice, which requires that women have the necessary information to make their own health decisions, and then evaluates the many ways in which women are not informed: inability to identify when they are fertile, fertility illiteracy, lack of knowledge about and feelings of shame toward menstruation, and lack of comprehensive information about family planning methods. An analysis shows that FEMM can answer these shortcomings while meeting international law standards on informed choice. Finally, the paper discusses the concept of "unmet need for contraception," a political and advocacy construct that identifies 222 million women around the world as in need of contraception while ignoring that many women do not need or even want contraception. Instead, the paper concludes that FEMM is able to meet the needs of these and all women, and thus funding and policies should be refocused toward FEMM.

II. FEMM content: Hormones and the ovulation/menstrual cycle

To educate about ovulation, FEMM takes a parallel approach. First it offers women a top-down understanding of their body’s physiological activities, particularly the intricate interplay of hormones during the ovulation cycle. Then it helps women identify the biomarkers—the observable changes in the body—that follow from that interplay.

The reproductive system depends on the production and secretion of specific signal chemicals called hormones.¹ They travel through the blood stream and act as messengers, carrying information from one organ to another.² Reproduction-related hormones—FSH (follicle-stimulating hormone) and LH (luteinizing hormone)—originate in the brain.³ These hormones stimulate the maturation of a follicle and release of an egg.⁴ The production of estrogen and progesterone precedes and follows the follicle’s development.⁵

Identifying Ovulation Hormonal Biomarkers



Each healthy ovulation cycle operates in a cyclical rhythm. Once a woman’s reproductive system fully matures, during adolescence,⁶ an ovulation cycle occurs approximately every 24–38 days.⁷ At the beginning of each cycle, hormones recruit several growing follicles (small sacs in the ovary).⁸ Of these, one follicle matures by means of this hormonal activity, induces an estrogen-provoked LH surge, ovulates, and becomes a functional corpus luteum.⁹ If fertilized by the presence of

¹ See Jacqueline Wu & Joanne M. McAndrews, *Introduction to the Endocrine System, Part I: Basic Concepts and Anatomy*, 27 AM. MED. WRITERS ASS’N J. 152, 152 (2012).

² See *id.* at 155.

³ See CHARLES R.B. BECKMANN ET AL., *OBSTETRICS AND GYNECOLOGY* 303 (6th ed. 2012).

⁴ See Shannon M. Hawkins & Martin M. Matzuk, *The Menstrual Cycle: Basic Biology*, 1135 ANNALS N.Y. ACAD. SCI. 10, 10-11 (2008).

⁵ See BECKMANN ET AL., *supra* note 3, at 305–06.

⁶ See Ervin E. Jones, *The Female Reproductive System*, in *MEDICAL PHYSIOLOGY* 1146, 1146–49 (Walter F. Boron & Emile L. Boulpaep, eds., 2nd ed. 2011).

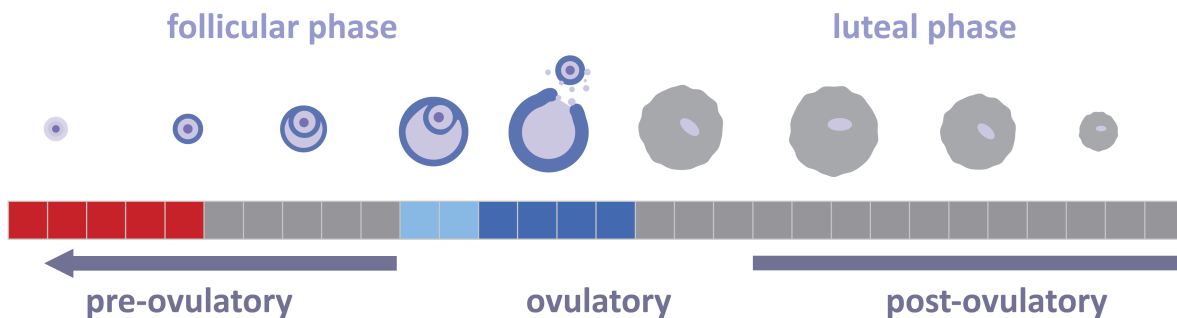
⁷ See Ian S. Fraser et al., *Can we achieve international agreement on terminologies and definitions used to describe abnormalities of menstrual bleeding?*, 22 HUM. REPROD. 635, 650 (2007).

⁸ See B. Lunenfeld & V. Insler, *Follicular development and its control*, 7 GYNECOLOGICAL ENDOCRINOLOGY 285, 286–87 (1993).

⁹ See *id.* at 289.

sperm, the egg travels the 4-inch length of the fallopian tube to the uterus,¹⁰ where it implants approximately 6–12 days after ovulation.¹¹ If fertilization does not occur, the egg survives for 12–24 hours, then dissolves.¹² The uterine lining then sheds in menstruation, after approximately 11–17 days, leading to the start of a new cycle.¹³

Phases of the Cycle



The cycle operates in three distinct phases: pre-ovulatory, ovulatory, and post-ovulatory. The pre-ovulatory phase begins with menstruation. Hormonal activity is low, but sufficient progesterone, left over from the previous luteal phase,¹⁴ stimulates the cervix to produce dense mucus that seals the cervix,¹⁵ and causes a sensation of dryness.¹⁶ When FSH levels begin to rise, a new group of follicles is recruited and stimulated.¹⁷ The timing of the FSH stimulation is variable.¹⁸ Its timing, and additional factors, including stress,¹⁹ aging,²⁰ illness,²¹ and diet,²²

¹⁰ See THOMAS W. SADLER, LANGMAN'S MEDICAL EMBRYOLOGY 32 (12th ed. 2012).

¹¹ See Allen J. Wilcox et al., *Time of implantation of the conceptus and loss of pregnancy*, 340 NEW ENG. J. MED. 1796, 1797 (1999).

¹² SADLER, *supra* note 10, at 23.

¹³ James B. Brown, *Types of ovarian activity in women and their significance: the continuum (a reinterpretation of early findings)*, 17 HUM. REPROD. UPDATE 141, 156 (2011).

¹⁴ See Erik Odeblad, *The Discovery of Different Types of Cervical Mucus and the Billings Ovulation Method*, 21 BULL. OVULATION METHOD RES. & REFERENCE CTR. AUSTL., Sept. 1994, at 6 (reprinted, on file with authors) [hereinafter Odeblad, *Discovery*].

¹⁵ See Erik Odeblad, *Investigations on the physiological basis for fertility awareness*, 29 BULL. OVULATION METHOD RES. & REFERENCE CTR. AUSTL., Mar. 2002, at 2 (reprinted, on file with authors) [hereinafter Odeblad, *Investigations*].

¹⁶ See Odeblad, *Discovery*, *supra* note 14, at 7.

¹⁷ See F. Miro, *The onset of the initial rise in follicle-stimulating hormone during the human menstrual cycle*, 20 HUM. REPROD. 96, 96 (2005).

¹⁸ See *id.*

¹⁹ See Brown, *supra* note 13, at 155.

²⁰ See Misao Fukuda et al., *Characteristics of human ovulation in natural cycles correlated with age and achievement of pregnancy*, 16 HUM. REPROD. 2501, 2505 (2001).

²¹ See, e.g., Johnny Awwad et al., *Fever in women may interfere with follicular development during controlled ovarian stimulation*, 28 INT'L J. HYPERTHERMIA 742, 744 (2012); Andrew S. Rowland et al., *Influence of Medical Conditions and Lifestyle Factors on the Menstrual Cycle*, 13 EPIDEMIOLOGY 668, 671 (2002).

affect the launch of FSH and consequently the pre-ovulatory phase length.

The stimulated follicles produce estrogen.²³ When sufficient estrogen rise is present, a woman experiences a change from dryness to moist, sticky mucus.²⁴ This ends the pre-ovulatory phase and begins the ovulatory phase: the time of fertility.

During the ovulatory phase, clearer mucus marks the onset of fertility.²⁵ The last day of mucus with fertile characteristics is termed peak day.²⁶ Peak day coincides closely with the peak of fertility and the day of ovulation in the woman's menstrual cycle.²⁷ Ovulation occurs within 3 days on either side of peak day in 98 percent of cycles.²⁸ There is no way to predict the day of ovulation in advance. Sperm may live in the crypts for a number of days,²⁹ and thus fertilization can occur up to a few days following intercourse. The "fertile window" is considered to be a 6-day time frame when pregnancy can occur: about 5 days prior to, and on the day of, ovulation.³⁰

The post-ovulatory phase begins on the fourth day after the peak and lasts until the cycle ends with the onset of menstruation. Rising progesterone halts the production of fertile cervical mucus.³¹ Mucus becomes thicker and forms a barrier in the cervix against sperm and bacteria.³² This phase length normally does not change significantly from cycle to cycle.³³ It is a time of infertility without possibility of fertilization, due to the impermeability of the mucus,³⁴ and the

²² See, e.g., Andréa P. Pinheiro et al., *Patterns of Menstrual Disturbance in Eating Disorders*, 40 INT'L J. EATING DISORDERS 424, 431 (2007); Dilprit Bagga et al., *Effects of a Very Low Fat, High Fiber Diet on Serum Hormones and Menstrual Function*, 76 CANCER 2491, 2494 (1995).

²³ Lunenfeld & Insler, *supra* note 8, at 289.

²⁴ See Odeblad, *Investigations*, *supra* note 15, at 3.

²⁵ See E.L. Billings et al., *Symptoms and hormonal changes accompanying ovulation*, 1 LANCET 282, 284 (1972).

²⁶ *Id.* at 282.

²⁷ Richard Fehring, *Accuracy of the Peak Day of Cervical Mucus as a Biological Marker of Fertility*, 66 CONTRACEPTION 231, 231 (2002).

²⁸ This is a mean length calculated per results of two studies. In the first, "PD fell +/- 4 days of the estimated day of ovulation 98% of the time." See *id.* at 234. In the second, "[in] 95.4% of [. . .] cycles, the ETO occurred from 2 days before the Peak to 2 days after the peak." See Thomas W. Hilgers et al., *Natural Family Planning, 1: The Peak Symptom and Estimated Time of Ovulation*, 52 OBSTETRICS & GYNECOLOGY 575, 578 (1978).

²⁹ Erik Odeblad, *Cervical mucus and their functions*, 26 J. IR. C. PHYSICIANS & SURGEONS 27, 30 (1997).

³⁰ See Allen J. Wilcox et al., *Timing of Sexual Intercourse in Relation to Ovulation: Effects on the Probability of Conception, Survival of the Pregnancy, and Sex of the Baby*, 333 NEW ENG. J. MED. 1517, 1520 (1995) [hereinafter Wilcox et al., *Timing of Sexual Intercourse*].

³¹ See A.R. Martinez et al., *Prediction and Detection of the Fertile Period: The Markers*, 40 INT'L J. FERTILITY 139, 143 (1995).

³² See Odeblad, *Discovery*, *supra* note 14, at 14.

³³ TONI WESCHLER, *TAKING CHARGE OF YOUR FERTILITY* 316 (2006).

³⁴ See Wilcox et al., *Timing of Sexual Intercourse*, *supra* note 30, at 1520; Odeblad, *Discovery*, *supra* note 14, at 7.

limited lifespan of the egg or oocyte of 12 to 24 hours after ovulation.³⁵ If fertilization has occurred, implantation follows in this phase of the cycle.³⁶ Progesterone causes the endometrial glands to actively secrete nutrient-rich fluids to nourish the developing fetus.³⁷ If implantation does not follow, the uterine lining sheds and a new cycle begins.³⁸

FEMM teaches a woman to observe very specifically the external signs that indicate these internal activities of her hormones and reproductive organs. Tracking biomarkers is a reliable means of managing health and fertility as well as identifying abnormal patterns that point to health conditions needing treatment.³⁹ A woman’s biomarkers indicate the vital signs of her entire health. Since ovulation is a sign of both health and fertility, understanding these changing hormonal fluctuations through biomarker observation allows a woman to understand and manage her long-term health.

The biomarkers capture the observations of blood, dryness, and cervical mucus. Blood is observed in the pre-ovulatory phase of the cycle during menstruation. The inner lining of the uterus, which built up throughout the previous cycle, sheds.⁴⁰ A sensation of dryness follows⁴¹;

Cervical Mucus
Subtle signs of health

hormone	progesterone	estrogen rising	estrogen high
observation	cloudy thick scant		clear thin, stretchy abundant
sensation	dry	moist	fluid / slippery

it represents low hormone levels⁴² and the dominance of progesterone remaining from the previous cycle.⁴³

The development of cervical mucus follows. Since mucus reflects hormonal activity, it is the most important biomarker in assessing and understanding a woman’s reproductive health.⁴⁴ The type of mucus secreted is dependent on the type and level of the hormonal

³⁵ See José María Murcia-Lora & María Luisa Esparza-Encina, *The Fertile Window and Biomarkers: A Review and Analysis of Normal Ovulation Cycles*, 15 PERSONA Y BIOÉTICA 133, 136 (2011).

³⁶ See Hawkins & Matzuk, *supra* note 4, at 11.

³⁷ See Michael J. Large & Francesco J. DeMayo, *The regulation of embryo implantation and endometrial decidualization by progesterone receptor signaling*, 358 MOLECULAR & CELLULAR ENDOCRINOLOGY 155, 156–57 (2011).

³⁸ See Hawkins & Matzuk, *supra* note 4, at 14.

³⁹ See *infra* Parts III, IV.

⁴⁰ See Hawkins & Matzuk, *supra* note 4, at 14.

⁴¹ See Odeblad, *Discovery*, *supra* note 14, at 12.

⁴² See Miro, *supra* note 17, at 96.

⁴³ See Odeblad, *Discovery*, *supra* note 14, at 6.

⁴⁴ Pilar Vigil et al., *Usefulness of Monitoring Fertility from Menarche*, 19 J. PEDIATRIC & ADOLESCENT GYNECOLOGY 173 (2006) [hereinafter Vigil et al., *Usefulness of Monitoring Fertility*].

stimulus. Mucus types are G (progesterone), EL (low estrogen), and ES (high estrogen).⁴⁵ Variability in observation occurs due to cell regeneration (differing secreting properties)⁴⁶ and fever and stress.⁴⁷

Rising estrogen levels stimulate the follicles.⁴⁸ A woman will then observe EL mucus (estrogen “locked-in”).⁴⁹ Malformed and slow-moving sperm are trapped in EL mucus, filtered out from normal and healthy sperm.⁵⁰ It marks the beginning of fertility, and can be sensed and observed as moist and sticky.⁵¹ When estrogen is at its highest levels—a condition of high fertility—ES mucus (estrogen “sperm-transmission”) is secreted.⁵² Healthy sperm can go through ES mucus and either reach the fertilization site in as soon as 3 to 10 minutes.⁵³ ES mucus is clear,⁵⁴ and is experienced as a slippery or lubricative sensation.⁵⁵

Finally, under the influence of progesterone, which is highest after ovulation, crypts in the cervix produce G mucus.⁵⁶ G mucus has crypts in the lower cervix,⁵⁷ and it narrows the cervical canal.⁵⁸ It is thick,⁵⁹ and generally experienced as a dry sensation⁶⁰ or as thick mucus.⁶¹ It forms a barrier in the cervix between the vagina and the uterine corpus.⁶² This barrier keeps sperm and other microorganisms out of the reproductive tract.⁶³ On the fourth day after peak day, G mucus seals the cervical canal.⁶⁴

This coordination between an overarching understanding of hormonal activity and its specific

⁴⁵ See Odeblad, *Discovery*, *supra* note 14, at 5. Odeblad notes the mucus types as G, S, L, and P, and a previously identified E mucus type. *Id.* Relevant for women’s biomarkers are the G mucus and E mucus types. The latter Odeblad notes as composed of two different types of mucus, S and L (therefore, ES and EL mucus types). *See id.*

⁴⁶ See Odeblad, *Investigations*, *supra* note 15, at 4.

⁴⁷ *See id.* at 5.

⁴⁸ See Lunenfeld & Insler, *supra* note 8, at 286.

⁴⁹ See Odeblad, *Investigations*, *supra* note 15, at 3.

⁵⁰ See Odeblad, *Discovery*, *supra* note 14, at 5; C. Barros et al., *Selection of Morphologically Abnormal Sperm by Human Cervical Mucus*, 12 ARCHIVES ANDROLOGY 95, 105 (1984).

⁵¹ Odeblad, *Discovery*, *supra* note 14, at 5

⁵² See Odeblad, *Investigations*, *supra* note 15, at 3.

⁵³ See Odeblad, *Discovery*, *supra* note 14, at 5.

⁵⁴ See Billings et al., *supra* note 25, at 282.

⁵⁵ See Odeblad, *Discovery*, *supra* note 14, at 7.

⁵⁶ *Id.* at 6.

⁵⁷ *Id.* at 11.

⁵⁸ See Odeblad, *Investigations*, *supra* note 15, at 2.

⁵⁹ *Id.* at 7.

⁶⁰ See Odeblad, *Discovery*, *supra* note 14, at 7.

⁶¹ See Billings et al., *supra* note 25, at 282.

⁶² Odeblad, *Investigations*, *supra* note 15, at 2.

⁶³ See E. Chantler & Max Elstein, *Structure and Function of Cervical Mucus*, 4 SEMINARS IN REPROD. MED. 333, 340 (1986).

⁶⁴ See Odeblad, *Discovery*, *supra* note 14, at 14.

biological indicators allows FEMM to introduce women holistically to the workings of their reproductive systems. Understanding the qualities of a harmonic, healthy cycle enables women to apply their observations to specific circumstances of health and fertility. In addition to educating, FEMM serves, therefore, as a guide to health care.

III. FEMM health application #1: The importance of monitoring the hormonal biomarkers

Monitoring her ovulation cycle allows a woman to understand, maintain, and improve her health. The main event in the cycle is ovulation, followed by menstruation, and thus observations surrounding each of these will provide information about the woman's health.

At the most basic level, monitoring the cycle can allow for a woman to be prepared for the onset of her next period. Many women cannot accurately predict the onset⁶⁵ or do not know how long their cycles are⁶⁶ and thus may be caught off-guard when the next period comes. In addition to monitoring the duration of the menstrual cycle, women should monitor the duration and flow of menstruation, cervical mucus quality, and duration of the luteal phase, and should be able to identify changes across menstrual cycles.

In monitoring ovulation, a woman can identify an irregularity if there are three or more cycles in a year with altered ovulation, such as anovulation (absence of ovulation), short luteal phases, or varied cycle lengths.⁶⁷ This irregularity can indicate an underlying health problem. In fact, often the first sign of an underlying health problem a woman experiences is an abnormality in ovulation followed by irregular cycles.⁶⁸

Often the first sign of an underlying health problem a woman experiences is an abnormality in ovulation followed by irregular cycles.

Identifying menstrual cycle irregularities is important because they are associated with several poor health outcomes. Women with a history of irregular cycles have an increased risk of coronary heart disease (CHD) and Type 2 diabetes compared with women whose regular cycle

⁶⁵ WHO Task Force on Psychosocial Research in Family Planning, Special Programme of Research, Development and Research Training in Human Reproduction, *Women's Bleeding Patterns: Ability to Recall and Predict Menstrual Events*, 12 STUD. FAM. PLAN. 17, 24 (1981).

⁶⁶ Anne Marie Zaura Jukic, *Accuracy of Reporting of Menstrual Cycle Length*, 167 AM. J. EPIDEMIOLOGY 25, 31 (2008); Chanley M. Small et al., *Validity of Self-Reported Menstrual Cycle Length*, 17 ANNALS EPIDEMIOLOGY 163, 167 (2007). This can pose challenges to women who are trying to conceive. *Id.* ("Without an accurate self-report, it is difficult for women trying to become pregnant to time intercourse appropriately near the midcycle fertile window.")

⁶⁷ Pilar Vigil et al., *The Importance of Fertility Awareness in the Assessment of a Woman's Health*, 79 LINACRE Q. 426, 437 (2012) [hereinafter Vigil et al., *Importance of Fertility Awareness*].

⁶⁸ See Nahrain H. Alzubaidi et al., *Meeting the Needs of Young Women With Secondary Amenorrhea and Spontaneous Premature Ovarian Failure*, 99 OBSTETRICS & GYNECOLOGY 720, 721 (2002).

lengths are 27 to 29 days, a risk not due to metabolic risk factors or hormones.⁶⁹ There is a correlation between a history of irregular menstruation and increased risk of developing pregnancy-related hypertensive disorders (PRHDs).⁷⁰ Dysmenorrhea (pain during menstruation) is also correlated to increased risk of developing PRHDs.⁷¹ Women who have varying cycle lengths have decreased fecundity, and women who have cycle lengths shorter or longer than 28–31 days have decreased fecundity.⁷² Menstrual cycle patterns may predict whether a pregnancy will survive.⁷³

The importance of monitoring begins in puberty and adolescence. Special attention must be given to precocious or delayed puberty, as they are linked to endocrine abnormalities.⁷⁴ The

The importance of monitoring begins in puberty and adolescence.

Committee on Adolescent Health Care of the American College of Obstetricians and Gynecologists and the Committee on Adolescence of the American Academy of

Pediatrics have issued a committee opinion on menstruation's role as a vital sign for adolescents and girls.⁷⁵ The opinion recognizes the menstrual cycle can signal other medical problems and suggests that charting of menses may be appropriate.⁷⁶ Identifying menstrual abnormalities in adolescence can allow for early diagnosis and treatment of underlying health problems.⁷⁷ The conditions that alter ovulation during adolescence will only worsen if a correct diagnosis is not done.⁷⁸

Monitoring menstrual cycle irregularities can be a diagnostic tool in determining underlying health problems.⁷⁹ They may be due to ovulatory dysfunctions, in particular endocrinal disorders⁸⁰; gynecological problems; or iatrogenic causes, such as contraceptive use and

⁶⁹ Gerrie-Cor M. Gast et al., *Menstrual cycle characteristics and risk of coronary heart disease and type 2 diabetes*, 94 FERTILITY & STERILITY 2379, 2381 (2010).

⁷⁰ Arrigo Fruscalzo et al., *Menstrual abnormalities and predisposition to pregnancy-related hypertensive disorders: a retrospective study*, 26 GYNECOLOGICAL ENDOCRINOLOGY 445, 448 (2010).

⁷¹ *Id.*

⁷² Henrik A. Kolstad et al., *Menstrual cycle pattern and fertility: a prospective follow-up study of pregnancy and early embryonal loss in 295 couples who were planning their first pregnancy*, 71 FERTILITY & STERILITY 494–95 (1999).

⁷³ *Id.* at 494.

⁷⁴ See Richard Stanhope, *Disorders of Puberty*, 37 MED. 494 (2009).

⁷⁵ See American Academy of Pediatrics Committee on Adolescence & American College of Obstetricians and Gynecologists Committee on Adolescent Health Care, *Menstruation in Girls and Adolescents: Using the Menstrual Cycle as a Vital Sign*, 118 PEDIATRICS 2245 (2006) [hereinafter *Using the Menstrual Cycle as a Vital Sign*].

⁷⁶ *Id.* at 2248.

⁷⁷ Vaishali B. Popat et al., *The Menstrual Cycle: A Biological Marker of General Health in Adolescents*, 1135 ANNALS N.Y. ACAD. SCI. 43, 43 (2008).

⁷⁸ See *id.* at 44.

⁷⁹ See Mary Lee Barron, *Proactive Management of Menstrual Cycle Abnormalities in Young Women*, 18 J. PERINATAL & NEONATAL NURSING 81, 81 (2004).

⁸⁰ 43 percent of women with irregular cycles present an ovulatory dysfunction. Vigil et al., *Usefulness of Monitoring Fertility*, *supra* note 44, at 175.

abortion. Various dysfunctions are detailed below with descriptions of possible accompanying menstrual irregularities. This gives a picture of how monitoring the menstrual cycle can play an important role in the diagnosis of an underlying health problem. The list is not comprehensive but emphasizes the most common underlying problems.

A. Monitoring ovulation

1. Ovulatory dysfunctions

a. Endocrine dysfunctions

There are several types of endocrine dysfunctions that can affect the ovulatory cycle and fertility, including hypothalamic, pituitary (hypophyseal), thyroid, adrenal, and ovarian disturbances.⁸¹ None of the endocrine dysfunctions has a specific pattern of ovarian activity, and thus diagnosis must follow consideration of each possibility, with a hormone assessment allowing a definitive diagnosis.⁸²

There are several types of endocrine dysfunctions that can affect the ovulatory cycle and fertility, including hypothalamic, pituitary (hypophyseal), thyroid, adrenal, and ovarian disturbances.

i. Hypothalamic disorders

Hypothalamic disorders may result in hypoestrogenic cycles, cycles that are dry due to the lack of estrogen and are marked by anovulation and amenorrhea (absence of menstruation).⁸³ Hypothalamic amenorrhea is caused by a change in the normal pattern of secretion by the GnRH pulse generator,⁸⁴ which affects the production of the other hormones. This change arises in several circumstances: functional hypothalamic amenorrhea, evidenced by the absence of menstruation for more than six months not due to anatomical abnormalities, results from excessive exercise, nutritional deficits/weight loss, or stress; physiological hypothalamic amenorrhea occurs postpartum and with breastfeeding; pharmacologic anovulation results from opiates; and amenorrhea may result from psychiatric disorders, such as anorexia.⁸⁵ Hypothalamic amenorrhea can also result from organic defects of the hypothalamic pituitary

⁸¹ See generally Vigil et al., *Importance of Fertility Awareness*, supra note 67; David Unuane et al., *Endocrine disorders & female infertility*, 25 BEST PRAC. & RES. CLINICAL ENDOCRINOLOGY & METABOLISM 861 (2011). See also Vigil et al., *Usefulness of Monitoring Fertility*, supra note 44, at 175.

⁸² Vigil et al., *Importance of Fertility Awareness*, supra note 67, at 437. See also P. Vigil et al., *Diagnosis of menstrual disorders in adolescence*, in REPRODUCTIVE MEDICINE 149, 154 (G. Frajese et al. eds., 1993) (“[P]atients consulting for menstrual irregularity should have a basic endocrinological evaluation done.”).

⁸³ Vigil et al., *Importance of Fertility Awareness*, supra note 67, at 438.

⁸⁴ See Unuane et al., supra note 81, at 862.

⁸⁵ *Id.*

axis.⁸⁶ Improvement in functional hypothalamic amenorrhea can result from weight gain, reducing exercise, and psychological counseling.⁸⁷

ii. Pituitary adenomas (tumors)

Prolactinomas, the most common pituitary tumor, can cause hyperprolactinemia, which is the result of increased prolactin secretion in the blood.⁸⁸ Symptoms of hyperprolactinemia include menstrual irregularities, galactorrhea (spontaneous milk flow from breast), infertile cycles, decreased libido, and dyspareunia (painful sexual intercourse).⁸⁹ Women with hyperprolactinemia who continue to have cycles often have short luteal phases, which is associated with infertility.⁹⁰ Treatment goals are normalizing prolactin levels; reducing, if present, the tumor; and restoring menstrual cycles and fertility.⁹¹ Other pituitary disorders that present with menstrual abnormalities are acromegaly and Cushing's disease.⁹²

iii. Thyroid disorders

Thyroid hormones influence the menstrual cycle directly by impacting the ovaries and indirectly by impacting sex hormone-binding globulin (SHBG), prolactin, and gonadotropin-releasing hormone (GnRH) secretion and coagulation.⁹³ Earlier detection and treatment of thyroid dysfunction can lead to fewer menstrual irregularities, and not all women with thyroid dysfunction have irregular cycles.⁹⁴ Hyperthyroidism can cause a number of menstrual abnormalities. In a study of 214 hyperthyroid women, 46 (21.5 percent) had irregular cycles, presenting with hypomenorrhea (short or scant menstruation), hypermenorrhea (heavy or prolonged menstruation), polymenorrhea (cycles 21 days or fewer), or oligomenorrhea (infrequent menstruation).⁹⁵ None had amenorrhea.⁹⁶ Hypothyroidism also can cause various abnormalities. In a study of 171 hypothyroid women, 40 (23.4 percent) had irregular cycles, presenting with oligomenorrhea, hypomenorrhea, amenorrhea, or hypermenorrhea/menorrhagia.⁹⁷ Severe hypothyroidism is associated with ovulatory dysfunction as well, given that the thyroid hormones interact with the reproductive system.⁹⁸

⁸⁶ *Id.*

⁸⁷ *Id.*

⁸⁸ *Id.* at 863.

⁸⁹ *Id.*

⁹⁰ *Id.*

⁹¹ *Id.*

⁹² *See id.* at 864–65.

⁹³ Kris Poppe et al., 66 *CLINICAL ENDOCRINOLOGY* 309, 309 (2007).

⁹⁴ *See* Unuane et al., *supra* note 81, at 865–66.

⁹⁵ *See* G.E. Krassas et al., *Menstrual disturbances in thyrotoxicosis*, 40 *CLINICAL ENDOCRINOLOGY* 641, 642 (1994).

⁹⁶ *Id.*

⁹⁷ *See* G.E. Krassas et al., *Disturbances of menstruation in hypothyroidism*, 50 *CLINICAL ENDOCRINOLOGY* 655, 657 (1999).

⁹⁸ Poppe et al., *supra* note 93, at 311.

Treatment of the underlying dysfunction can correct menstrual irregularities and improve fertility.⁹⁹

iv. Adrenal disorders

Congenital adrenal hyperplasia (CAH) is “a family of autosomal recessive disorders caused by mutations that encode for enzymes involved in one of the various steps of adrenal steroid synthesis.”¹⁰⁰ In some of these disorders, the synthesis of cortisol is impaired due to these defects, which causes the anterior pituitary to secrete excess adrenocorticotrophic hormone (ACTH), which in turn causes adrenal overstimulation.¹⁰¹ The adrenal glands synthesize sex steroids,¹⁰² and excess production of adrenal sex steroids, especially androgens, leads to gonadal dysfunction, precocious puberty, delay of menarche, menstrual disorders, anovulation, and infertility.¹⁰³ Women with CAH have a low childbearing rate because of ovulatory failure, psychological factors, and reduced sexual activity if genital abnormalities are present, depending on the severity of the androgenic disorder.¹⁰⁴ Treatment is aimed at regulating the abnormal hormonal levels.¹⁰⁵ Another adrenal disorder, Addison’s disease, or premature adrenal insufficiency, is “characterized by deficiency of cortisol, aldosterone, and adrenal androgen hormonal precursors,”¹⁰⁶ and in some women is associated with premature ovarian failure.¹⁰⁷ Hyperandrogenism (androgen excess) occurs with both adrenal abnormalities, particularly nonclassic 21-hydroxylase deficiency (NCAH), the third most common adrenal excess disorder, and polycystic ovary syndrome (PCOS), an ovarian disorder and the most common adrenal excess disorder,¹⁰⁸ so a differential diagnosis must be done.

⁹⁹ *Id.* at 309.

¹⁰⁰ Maria I. New, *An Update of Congenital Adrenal Hyperplasia*, 1038 ANNALS N.Y. ACAD. SCI. 14, 14 (2004).

¹⁰¹ *Id.*

¹⁰² *Id.* at 15.

¹⁰³ *See id.* at 25–27.

¹⁰⁴ H.F.L. Meyer-Bahlburg, *What Causes Low Rates of Child-Bearing in Congenital Adrenal Hyperplasia?*, 84 J.

CLINICAL ENDOCRINOLOGY & METABOLISM 1844, 1844–46 (1999).

¹⁰⁵ New, *supra* note 100, at 33.

¹⁰⁶ Martina M. Erichsen et al., *Sexuality and Fertility in Women with Addison’s Disease*, 95 J. CLINICAL ENDOCRINOLOGY & METABOLISM 4354, 4354 (2010).

¹⁰⁷ Martina M. Erichsen et al., *Clinical, Immunological, and Genetic Features of Autoimmune Primary Adrenal Insufficiency: Observations from a Norwegian Registry*, 94 J. CLINICAL ENDOCRINOLOGY & METABOLISM 4882, 4885 (2009).

¹⁰⁸ *See* Enrico Carmina, *Ovarian and Adrenal Hyperandrogenism*, 1092 ANNALS N.Y. ACAD. SCI. 130, 131, 134 (2006).

v. Ovarian disorders

01. PCOS

Polycystic ovary syndrome (PCOS) is the cause of 75 percent of cases of anovulatory infertility¹⁰⁹ and the most common endocrine disorder in reproductive-aged women.¹¹⁰ It is an ovarian dysfunction with key features of chronic anovulation or oligoovulation (infrequent or

Polycystic ovarian syndrome (PCOS) is the cause of 75 percent of cases of anovulatory infertility and the most common endocrine disorder in reproductive-aged women.

irregular ovulation), hyperandrogenism, and polycystic ovaries, although not all are present in each case due to its heterogeneity.¹¹¹ PCOS can entail subfertility or infertility that “may be explained by the effects of obesity, metabolic, inflammatory and endocrine abnormalities on ovulatory

function, oocyte quality and endometrial receptivity.”¹¹² Insulin resistance, varying levels of which are present in women with PCOS,¹¹³ also impairs ovulation and fertility.¹¹⁴ Excess insulin in women with PCOS can cause ovarian theca cells to produce excessive androgens, which in turn may cause premature follicular atresia and even an ovulation.¹¹⁵

PCOS is also often accompanied by hirsutism, acne, and alopecia; obesity; increased risk of psychological and behavioral disorders; increased risk of Type 2 diabetes; increased risk of cardiovascular disease due to metabolic dysfunction; and increased risk of the development of endometrial, ovarian, and/or breast cancer.¹¹⁶ PCOS can also be marked by continuous fertile mucus throughout the cycle or mucus patches that do not result in sufficient fertile mucus, and thus monitoring cervical mucus can help identify PCOS, even in adolescence.¹¹⁷ One-third of

¹⁰⁹ Saad A.K. Amer, *Polycystic ovarian syndrome: diagnosis and management of related infertility*, 19 *OBSTETRICS, GYNAECOLOGY & REPROD. MED.* 263, 263 (2009).

¹¹⁰ The Amsterdam ESHRE/ASRM-Sponsored 3rd PCOS Consensus Workshop Group, *Consensus on women’s health aspects of polycystic ovary syndrome (PCOS)*, 27 *HUM. REPROD.* 14, 14 (2011).

¹¹¹ *Id.*

¹¹² *Id.* at 17.

¹¹³ Pilar Vigil et al., *Evidence of subpopulations with different levels of insulin resistance in women with polycystic ovary syndrome*, 22 *HUM. REPROD.* 2974 (2007).

¹¹⁴ See J.M. Pauli et al., *Current perspectives of insulin resistance and polycystic ovary syndrome*, 28 *DIABETIC MED.* 1445, 1445 (2011).

¹¹⁵ Evanthia Diamanti-Kandarakis, *Insulin resistance in PCOS*, 30 *ENDOCRINE* 13, 15 (2006). See also J.M. Young & A.S. McNeilly, *Theca: the forgotten cell of the ovarian follicle*, 140 *REPROD.* 489, 493 (2010).

¹¹⁶ The Amsterdam ESHRE/ASRM-Sponsored 3rd PCOS Consensus Workshop Group, *supra* note 110, at 15–21. See also Caren G. Solomon et al., *Menstrual Cycle Irregularity and Risk for Future Cardiovascular Disease*, 87 *J. CLINICAL ENDOCRINOLOGY & METABOLISM* 2013, 2015–22 (2002).

¹¹⁷ Vigil et al., *Usefulness of Monitoring Fertility*, *supra* note 44, at 176. See also Pilar Vigil et al., *Scanning electron and light microscopy study of the cervical mucus in women with polycystic ovary syndrome*, 58 *J. ELECTRON MICROSCOPY* 21, 21 (2009).

pregnancies of women with PCOS result in miscarriage, possibly due to “elevated LH levels, deficient progesterone secretion, abnormal embryos from atretic oocytes, and an abnormal endometrium.”¹¹⁸ Insulin resistance also plays a role in miscarriages.¹¹⁹ PCOS management can restore normal ovarian function and correct the endocrine abnormality, including weight loss through diet and exercise in overweight and obese patients and medical treatment.¹²⁰

02. Premature ovarian failure

Premature ovarian failure (POF) is when “normal ovarian function discontinues in women younger than 40 years old, affect[ing] 1 in 100 women by age 40 and 1 in 250 by age 35.”¹²¹ POF is marked by the absence of periods or irregular periods and the absence of cervical mucus due to the lack of estrogen.¹²² The cause is usually unknown but exposure to cigarette smoking is positively related to POF.¹²³ Premature ovarian failure can result in premature menopause, which due to early deficiency of estrogen increases the risk of stroke and cardiovascular disease, independent of cardiovascular risk factors,¹²⁴ and leads to decreased bone mineral density and increased risk of osteoporosis.¹²⁵ Estrogen replacement therapy, which is indicated for these women, mitigates some of these complications.¹²⁶

2. Gynecological disorders

Gynecological disorders, including anatomical abnormalities, neoplasia, and inflammatory diseases, can also account for menstrual disorders and mucus pattern changes.¹²⁷

¹¹⁸ Enrico Carmina & Rogerio A. Lobo, *Polycystic Ovary Syndrome (PCOS): Arguably the Most Common Endocrinopathy Is Associated with Significant Morbidity in Women*, 84 J. CLINICAL ENDOCRINOLOGY & METABOLISM 1897, 1898 (1999).

¹¹⁹ See Yunhui Wang et al., *Relationship between Recurrent Miscarriage and Insulin Resistance*, 72 GYNECOLOGIC & OBSTETRIC INVESTIGATION 245, 248 (2011).

¹²⁰ See Amer, *supra* note 109, at 266; Vigil et al., *Usefulness of Monitoring Fertility*, *supra* note 44, at 176.

¹²¹ Unuane et al., *supra* note 81, at 869.

¹²² *Id.*

¹²³ Soung Hoon Chang et al., *Premenopausal factors influencing premature ovarian failure and early menopause*, 58 MATURITAS 19, 24 (2007).

¹²⁴ Melissa Wellons et al., *Early menopause predicts future coronary heart disease and stroke: the Multi-Ethnic Study of Atherosclerosis*, 19 MENOPAUSE 1081, 1085 (2012). See also Walter A. Rocca et al., *Premature menopause or early menopause and risk of ischemic stroke*, 19 MENOPAUSE 272, 275 (2012); D.F. Archer, *Premature menopause increases cardiovascular risk*, 12 CLIMACTERIC 26, 28 (2009).

¹²⁵ O. Svejme et al., *Early menopause and risk of osteoporosis, fracture and mortality: a 34-year prospective observational study in 390 women*, 119 BJOG 810, 812 (2012); C.M. Francucci et al., *Effect of natural early menopause on bone mineral density*, 58 MATURITAS 323, 326 (2009); D.J. Hadjidakis et al., *Bone density patterns after normal and premature menopause*, 44 MATURITAS 279, 283–85 (2003).

¹²⁶ Lynn T. Shuster et al., *Premature menopause or early menopause: Long-term health consequences*, 65 MATURITAS 161, 165 (2010).

¹²⁷ Vigil et al., *Usefulness of Monitoring Fertility*, *supra* note 44, at 177.

a. Inflammatory processes

Inflammatory processes are the second most common cause of fertility disorders.¹²⁸ These are usually secondary to genital tract infections caused by sexually transmitted infections (STIs).¹²⁹ Infections can occur almost anywhere in a woman's reproductive system.¹³⁰ Common STIs include chlamydia, mycoplasma genitalium, trichomonas vaginalis, herpes simplex virus (HSV), human papilloma virus (HPV), syphilis, gonorrhea, candidiasis, bacterial vaginosis, human immunodeficiency virus (HIV), and Hepatitis B and C.¹³¹ STI pathogens can degrade the mucins in cervical mucus, causing a change in the mucus properties.¹³² Mucus patterns vary depending on the type of infectious agent.¹³³ Because of this change in mucus, often a woman can recognize a genital infection early through familiarity with her normal mucus pattern.¹³⁴ A woman can identify an ovulatory pattern alongside the discharge.¹³⁵ This early recognition can mean early treatment and prevention of infertility.¹³⁶

A woman can identify an ovulatory pattern alongside discharge due to STIs. This early recognition can mean early treatment and prevention of infertility.

Gonorrhea and chlamydia in particular can cause pelvic inflammatory disease (PID) in women, a number of inflammatory disorders of the upper genital tract.¹³⁷ PID has many possible symptoms, including abnormal bleeding, dyspareunia, and vaginal discharge.¹³⁸ Tubal scarring in women with PID can lead to infertility and ectopic pregnancy, and chronic pelvic pain is also possible.¹³⁹ Blocked fallopian tubes are one of the most common causes of infertility, which can be caused by PID.¹⁴⁰ Chlamydia is also correlated to first-trimester pregnancy loss.¹⁴¹

¹²⁸ *Id.*

¹²⁹ *Id.*

¹³⁰ Donatella Pellati et al., *Genital tract infections and infertility*, 140 EURO. J. OBSTETRICS & GYNECOLOGY & REPROD. BIOLOGY 3, 4 (2008).

¹³¹ See generally Phillip Hay & Austin Ugwumadu, *Detecting and treating common sexually transmitted diseases*, 23 BEST PRAC. & RES. CLINICAL OBSTETRICS & GYNAECOLOGY 647 (2009).

¹³² Vigil et al., *Importance of Fertility Awareness*, *supra* note 67, at 440.

¹³³ *Id.*

¹³⁴ *Id.*

¹³⁵ Vigil et al., *Usefulness of Monitoring Fertility*, *supra* note 44, at 177.

¹³⁶ *Id.*

¹³⁷ KIMBERLY A. WORKOWSKI & STUART BERMAN, CTRS. FOR DISEASE CONTROL & PREVENTION (CDC), SEXUALLY TRANSMITTED DISEASES TREATMENT GUIDELINES, 2010 63 (2010) [herein after CDC, STD TREATMENT GUIDELINES].

¹³⁸ *Id.* at 63–64.

¹³⁹ *Id.* at 49.

¹⁴⁰ Mayo Clinic, *Infertility: Causes*, <http://www.mayoclinic.com/health/infertility/DS00310/DSECTION=causes> (last visited Sept. 30, 2013).

¹⁴¹ Pilar Vigil et al., *First-trimester pregnancy loss and active Chlamydia trachomatis infection: correlation and ultrastructural evidence*, 34 ANDROLOGIA 373, 376 (2002).

3. Iatrogenic causes

A number of other sources of infertility are iatrogenic (caused by medical testing or treatments). These include the use of hormonal contraceptives and abortion.

a. Hormonal contraceptives

The ovarian cycle can be altered by the use of hormonal contraceptives,¹⁴² resulting in a delay of return to fertility.¹⁴³ Compared to those of women who have not recently used OCs, the cycles of women who have discontinued OCs on average are longer and more variable in length.¹⁴⁴ This is likely because the hypothalamus-pituitary-ovarian axis is normalizing after it has been suppressed during OC use, and results in longer follicular phases.¹⁴⁵ The quality of cervical mucus, which as a conduit for sperm is important for achieving pregnancy, is diminished for at least the first six menstrual cycles after discontinuation.¹⁴⁶ Decreased menstrual flow can also follow OC use for at least the first six cycles, likely due to the thinning of the endometrium during OC use, and this can negatively affect implantation.¹⁴⁷ Amenorrhea can also occur after stopping use of hormonal contraceptives, in particular Depo-Provera, and women who have amenorrhea prior to using hormonal contraceptive may still have it after stopping use.¹⁴⁸

b. Induced abortion

Induced abortion poses risks to fertility and reproductive health. Often the abortifacient drug

¹⁴² Vigil et al., *Importance of Fertility Awareness*, *supra* note 67, at 441.

¹⁴³ See, e.g., LEON SPEROFF & PHILIP D. DARNEY, *A CLINICAL GUIDE FOR CONTRACEPTION* 228–29 (5th ed. 2010) (stating that it may take nine months for fertility to return after an injection of Depo-Provera); Ellen M. Mikkelsen et al., *Pre-gravid oral contraceptive use and time to pregnancy: a Danish prospective cohort study*, 28 *HUM. REPROD.* 1398, 1401 (2013) (finding a short-term delay in the return of fertility after oral contraceptive use); Claudia L. Nassaralla et al., *Characteristics of the Menstrual Cycle After Discontinuation of Oral Contraceptives*, 20 *J. WOMEN'S HEALTH* 169, 175 (2011) (same); Kurt T. Barnhart & Courtney A. Schreiber, *Return to fertility following discontinuation of oral contraceptives*, 91 *FERTILITY & STERILITY* 659, 660 (2009) (reviewing studies that show there is a transient delay in return of fertility after oral contraceptive use); Helen Doll et al., *Return of fertility in nulliparous women after discontinuation of the intrauterine device: comparison with women discontinuing other methods of contraception*, 108 *BRIT. J. OBSTETRICS & GYNAECOLOGY* 304, 307 (2001) (“At 12 months after stopping contraception (i.e. conception would have had to occur within approximately the first three months), return of fertility was lowest among the women who had been taking oral contraceptives (32% of whom had given birth) and highest among those who had been using a barrier method (54% of whom had given birth). The fertility of women who had been using an intrauterine device was midway between these two groups, 39% having given birth.”).

¹⁴⁴ Nassaralla et al., *supra* note 143, at 172.

¹⁴⁵ *Id.* at 173.

¹⁴⁶ *Id.* at 175.

¹⁴⁷ *Id.*

¹⁴⁸ Melissa F. Wellons & Robert W. Rebar, *Amenorrhea*, in *CLINICAL REPRODUCTIVE MEDICINE AND SURGERY: A PRACTICAL GUIDE* 105, 109 (T. Falcone & W.W. Hurd eds., 2013).

combinations in medical abortions inhibit progesterone production or implantation,¹⁴⁹ disrupting the hormonal cycle. Mifepristone-induced medical abortions lead to an increased risk of vaginal bleeding in subsequent pregnancy.¹⁵⁰ Surgical abortion can cause damage to the womb or cervix, including excessive bleeding¹⁵¹ and infection of the uterus and fallopian tubes,¹⁵² and results in increased risk of low birth weight,¹⁵³ premature delivery,¹⁵⁴ and prolonged third-stage labor¹⁵⁵ in subsequent pregnancies.

B. Monitoring menstruation

Monitoring the cycle also includes monitoring events occurring around menstruation, particularly dysmenorrhea and menorrhagia.

1. Endometriosis

Endometriosis is a gynecological disorder where endometrial tissue is present outside of the uterus, primarily on the pelvic peritoneum, the ovaries, or the rectovaginal septum.¹⁵⁶ It is estrogen-dependent and occurs primarily in reproductive-aged women; up to 10 percent of women and 25 to 40 percent of women with infertility have it.¹⁵⁷ It can present with chronic pelvic pain, dysmenorrhea, menorrhagia, and dyspareunia, or have no symptoms, and diagnosis takes an average of over 11 years in women with symptoms.¹⁵⁸ Treatment includes nonsteroidal anti-inflammatory drugs (NSAIDs), hormone therapy, GnRH agonists, and possibly surgery after laparoscopic identification.¹⁵⁹

2. Premenstrual disorders

Premenstrual syndrome (PMS) and its most severe form, premenstrual dysphoric disorder

¹⁴⁹ See, e.g., P.A. le Roux et al., *Inhibition of progesterone secretion with trilostane for mid-trimester termination of pregnancy: randomized controlled trials*, 17 HUM. REPROD. 1483, 1484 (2002).

¹⁵⁰ Hong Liang et al., *Mifepristone-induced abortion and vaginal bleeding in subsequent pregnancy*, 84 CONTRACEPTION 609, 612 (2011).

¹⁵¹ See, e.g., Daniel Grossman et al., *Complications after Second Trimester Surgical and Medical Abortion*, 16 REPROD. HEALTH MATTERS 173, 177 (2008).

¹⁵² See, e.g., *id.* at 178.

¹⁵³ See, e.g., Weijin Zhou et al., *Induced abortion and low birthweight in the following pregnancy*, 29 INT'L J. EPIDEMIOLOGY 100, 102 (2000).

¹⁵⁴ See, e.g., Laurence Henriët & Monique Kaminski, *Impact of induced abortions on subsequent pregnancy outcome: the 1995 French national perinatal survey*, 108 BRIT. J. OBSTETRICS & GYNAECOLOGY 1036, 1038 (2001).

¹⁵⁵ See, e.g., W. Zhou et al., *Induced abortion and duration of third stage labour in a subsequent pregnancy*, 19 J. OBSTETRICS & GYNAECOLOGY 349, 353 (1999).

¹⁵⁶ Sarina Schragger et al., *Evaluation and Treatment of Endometriosis*, 87 AM. FAM. PHYSICIAN 107, 107 (2013).

¹⁵⁷ *Id.* at 108.

¹⁵⁸ *Id.* at 109.

¹⁵⁹ *Id.* at 109–12; Linda C. Giudice & Lee C. Kao, *Endometriosis*, 364 LANCET 1789, 1789 (2004).

(PMDD), are premenstrual disorders (PMDs) caused by changing hormonal levels after ovulation.¹⁶⁰ The causes of PMS are unclear but appear to be related to progesterone production, neurotransmitter GABA_A receptor compositional alterations (gamma amino butyric

Prospective charting of symptoms and symptom severity during two menstrual cycles determines whether a PMD or another underlying health problem is present. Monitoring of the menstrual cycle is thus key to managing PMDs.

acid being a regulator in the brain of stress and anxiety), and abnormal serotonin neurotransmission.¹⁶¹ Although most women have one or more premenstrual symptoms, such as depressed mood, anxiety, sudden sadness, anger, irritability, difficulty in concentrating, lethargy, change in appetite, breast tenderness, bloating, or weight gain, for a diagnosis of a PMD, symptoms must be

severe enough to be life-disrupting, occur during the luteal phase, resolve with menstruation, and occur in at least four of the six previous cycles.¹⁶² Prospective charting of symptoms and symptom severity during two menstrual cycles determines whether a PMD or another underlying health problem is present.¹⁶³ Monitoring of the menstrual cycle is thus key to managing PMDs. Management can include hormone therapy, selective serotonin re-uptake inhibitors, and lifestyle changes, although treatment is uncertain given the unclear etiology.¹⁶⁴

IV. FEMM health application #2: Achieving and avoiding pregnancy

With regards to care, irregular changes in biomarkers help women and their doctors discover and deal with health problems. In addition to general health care, however, women can proactively respond to the underlying hormonal processes—especially their period of highest fertility—to achieve or avoid pregnancy. Since the biomarkers are distinct during the ovulatory phase, FEMM encourages women to track the changes by daily charting individual biomarkers, cervical mucus especially, then respond as necessary.

When women are uninformed about this possibility of managing their fertility, they turn to an array of artificial contraceptive methods. They choose a method based on advice from health

¹⁶⁰ Andrea J. Rapkin & Alin L. Akopians, *Pathophysiology of premenstrual syndrome and premenstrual dysphoric disorder*, 18 *MENOPAUSE INT'L* 52, 52 (2012).

¹⁶¹ *See id.* at 53–55.

¹⁶² *See* Serena Salamat et al., *Premenstrual Syndrome*, 18 *OBSTETRICS, GYNAECOLOGY & REPROD. MED.* 29, 29 (2007). *See also* Rapkin & Akopians, *supra* note 160, at 52.

¹⁶³ Andrea J. Rapkin & Judith A. Mikacich, *Premenstrual Dysphoric Disorder and Severe Premenstrual Syndrome in Adolescents*, 15 *PEDIATRIC DRUGS* 191, 191 (2013).

¹⁶⁴ *See* Salamat et al., *supra* note 162, at 30–32; Wendy S. Biggs & Robin H. Demuth, *Premenstrual Syndrome and Premenstrual Dysphoric Disorder*, 84 *AM. FAM. PHYSICIAN* 918, 922–23 (2011).

care providers, family, partners and/or friends.¹⁶⁵ Studies show that effectiveness is usually mentioned as the single most important reason for choosing a contraceptive.¹⁶⁶ If, in fact, effectiveness is the main concern, communicating the effectiveness of contraceptives is key to a woman's informed choice in the context of her reproductive health.

A. FEMM method and effectiveness

Certain conditions must be met to use any method of family planning effectively. The following are necessary prerequisites for greatest effectiveness with FEMM: First, a couple must understand both the nature of the internal hormonal cycles and their biomarkers, in order to make the practical component of this method coherent. FEMM concentrates on changes in

To avoid pregnancy, FEMM instructs couples to abstain from intercourse during the fertile window, which is from the first observation of fertile cervical mucus to three full days after the last day of peak fertile mucus.

cervical mucus, considered an entirely reliable biomarker. A study conducted by the World Health Organization (WHO) in both developed and developing countries found that 94 percent of the participating fertile women, regardless of cultural, socioeconomic, or educational backgrounds, were capable of identifying

and distinguishing fertile and infertile cervical secretions,¹⁶⁷ indicating that correct observation of cervical mucus is very achievable. Second, a woman must consistently (daily) observe the relevant biomarkers and chart them to identify her fertile period. Finally, a couple must follow these observed changes with appropriate sexual behavior. To achieve pregnancy, FEMM instructs couples to have intercourse during the fertile window, particularly on the day before and the day of ovulation. To avoid pregnancy, FEMM instructs couples to abstain from intercourse during the fertile window, which is from the first observation of fertile cervical mucus to three full days after the last day of peak fertile mucus. If a couple engages in intercourse during the fertile window but uses a barrier method to avoid pregnancy, they must note the risk of pregnancy given that the barrier may fail or be used improperly.

To achieve pregnancy, FEMM instructs couples to have intercourse during the fertile window, particularly on the day before and the day of ovulation.

To identify the fertile window, FEMM recommends careful observance of changes in cervical

¹⁶⁵ See, e.g., David Cibula, *Women's contraceptive practices and sexual behaviour in Europe*, 13 EURO. J. CONTRACEPTION & REPROD. HEALTH CARE, 362, 370 (2008).

¹⁶⁶ See Markus J. Steiner et al., *Understanding Risk: A Randomized Controlled Trial of Communicating Contraceptive Effectiveness*, 102 OBSTETRICS & GYNECOLOGY 709, 713 (2003).

¹⁶⁷ See William Gibbons et al., *A prospective multicenter trial of the ovulation method of natural family planning. I. The teaching phase*, 36 FERTILITY & STERILITY 152, 157 (1981).

mucus with a confirmation by LH strip readings as a simple and clear double-check option for women to manage their fertility. The LH strip is a simple urine test whose strip changes color when LH rises. Since the LH surge takes place 16–48 hours prior to ovulation,¹⁶⁸ it is an important and reliable marker for women to pinpoint ovulation and to corroborate this observation with the experience they have of their body. The LH surge is identified when the strip changes color after being dipped into urine.¹⁶⁹ The LH surge confirms the pre-ovulatory hormonal rise as identified by the observation of fertile cervical mucus, and allows women to pinpoint the day of ovulation. Since FEMM can teach women to understand their time of ovulation, it is also a precise tool to help women and couples to achieve their desired family planning outcomes.

A number of studies and organizations will lump FEMM-type methods with more historical methods, such as calendar/“rhythm,”¹⁷⁰ and their updated counterpart methods, which rely on population sample probabilities for all women.¹⁷¹ These, however, differ fundamentally from FEMM; FEMM’s concentration on biomarkers and explicit changes from periods of fertility to infertility is specific to each woman and accounts for irregular cycles, with much less room for error. Further, FEMM teaches women the link between their underlying physiology and the hormonal biomarkers they observe, so that the rules of use for family planning and other health applications are clear and make sense. Therefore, studies that “us[e] data from couples who believe they are using an NFP method, but who in reality are just basing their practices on inaccurate or insufficient information received from a variety of sources” should be ignored when considering the effectiveness of FEMM.¹⁷² The knowledge acquired with FEMM helps doctors diagnose underlying causes of abnormalities in the reproductive cycle. Many studies

¹⁶⁸ See Joseph B. Stanford et al., *Timing Intercourse to Achieve Pregnancy: Current Evidence*, 100 OBSTETRICS & GYNECOLOGY 1333, 1337 (2002).

¹⁶⁹ Kelly L. Scolaro et al., *Devices for home evaluation of women’s health concerns*, 65 AM. J. HEALTH-SYSTEM PHARMACY, 299 302 (2008).

¹⁷⁰ V. Lamprecht & J. Trussell, *Natural family planning effectiveness: evaluating published reports*, 13 ADVANCES IN CONTRACEPTION 155, 158 (1997). For examples of such general categorization, see Steiner et al., *supra* note 166, at 710; Am. Sexual Health Ass’n, Birth Control Method Comparison Chart, <http://www.ashasexualhealth.org/uploads/pdfs/ContraceptiveOptions.pdf>; CDC, Effectiveness of Contraceptive Methods, http://www.cdc.gov/reproductivehealth/UnintendedPregnancy/PDF/effectiveness_of_contraceptive_methods.pdf.

¹⁷¹ Another method that may be lumped in with FEMM is the Standard Days method, which proposes a fixed formula: women who typically have menstrual cycles of 26 to 32 days consider themselves fertile during Days 8 through 19 (12 days) and avoid unprotected intercourse on those days. Marcos Arévalo et al., *Efficacy of a new method of family planning: the Standard Days Method*, 65 CONTRACEPTION 333, 333 (2002) [hereinafter Arévalo et al., *Standard Days Method Efficacy*]. The first-year pregnancy rate was 4.8 percent with correct use of the method (pregnancies occurring in cycles in which participants reported no intercourse on Days 8–19). *Id.* at 336. With intercourse while using another method (i.e., barrier or withdrawal) during fertile days, the first-year pregnancy rate was slightly higher at 5.7 percent. *Id.* A 1-year pregnancy rate of 12 percent was calculated when accounting for all cycles and pregnancies. *Id.*

¹⁷² M. Arévalo, *Expanding the availability and improving delivery of natural family planning services and fertility awareness education: providers’ perspectives*, 13 ADVANCES IN CONTRACEPTION 275, 277 (1997) [hereinafter Arévalo, *Expanding NFP*].

regarding the effectiveness of natural models for family planning will exclude women with irregular cycles, as they do not reflect a model's effectiveness in responding to a healthy hormonal life.¹⁷³ Despite this exclusion, researchers have noted that an irregularity in cycle length with correct method use has no significant effect on the chance of pregnancy.¹⁷⁴

These conditions and distinctions are necessary to understand the FEMM approach. Examining periods of twelve months or thirteen ovulation cycles, and omitting irregular cycles, the major studies reflect extremely high effectiveness for methods in this type of family planning. In presenting results, researchers distinguish effectiveness corresponding to couples' "perfect use" versus couples' "typical use." *Perfect use* refers to the effectiveness of a method when directions are followed exactly each time.¹⁷⁵ *Typical use* refers to real-life effectiveness, in which compliance with a method and method guidelines are imperfect.¹⁷⁶

Comparing various fertility awareness-type methods is a challenge given that rules for abstinence during the fertile period are different, methods are taught differently, and study participant characteristics vary.¹⁷⁷ However, the following studies are instructive for FEMM's effectiveness because they evaluate methods that used cervical mucus observation similar to that taught by FEMM.¹⁷⁸ Further, the Marquette studies evaluated using LH readings as a double-check, as FEMM recommends.

Researchers at Marquette University compared two methods retrospectively, although participants were taught the methods prospectively.¹⁷⁹ One, which they called EFHM (electronic hormonal fertility monitor method), employed an electronic monitor to test the LH surge in addition to observing changes in cervical mucus, and the other, CMM (cervical mucus method), only observed changes to cervical mucus.¹⁸⁰ The fertile window for the EFHM was from the presence of cervical mucus or a high reading on the monitor to either the last day of peak mucus or the last peak monitor reading plus three full days, whichever happened last.¹⁸¹ For CMM, the fertile window was the presence of cervical mucus until the last day of peak

¹⁷³ See, e.g., P. Frank-Herrmann et al., *The effectiveness of a fertility awareness based method to avoid pregnancy in relation to a couple's sexual behaviour during the fertile time: a prospective longitudinal study*, 22 HUM. REPROD. 1310, 1312 (2007); Arévalo et al., *Standard Days Method Efficacy*, *supra* note 171, at 334.

¹⁷⁴ See Arévalo et al., *Standard Days Method Efficacy*, *supra* note 171, at 334.

¹⁷⁵ See James Trussell, *Contraceptive failure in the United States*, 83 CONTRACEPTION 397, 397 (2011).

¹⁷⁶ See *id.*

¹⁷⁷ See generally Lamprecht & Trussell, *supra* note 170. See also Frank-Herrmann et al., *supra* note 173, at 1310–11.

¹⁷⁸ "[C]omparison of studies with similar methods of NFP and similar participants can give the practitioner, the scientist, and the user information on relative efficacy." Richard J. Fehring et al., *Efficacy of Cervical Mucus Observations Plus Electronic Hormonal Fertility Monitoring as a Method of Natural Family Planning*, 36 J. OBSTETRIC, GYNECOLOGIC, & NEONATAL NURSING 152, 158 (2007) [hereinafter Fehring et al., *Efficacy*].

¹⁷⁹ See Richard J. Fehring et al., *Cohort Comparison of Two Fertility Awareness Methods of Family Planning*, 54 J. REPROD. MED. 165, 166 (2009) [hereinafter Fehring et al., *Cohort Comparison*].

¹⁸⁰ See *id.*

¹⁸¹ *Id.* at 167.

mucus plus three full days.¹⁸² The perfect-use unintended pregnancy rate for the EHFMM group was 2.0 percent while the perfect-use unintended pregnancy rate for the CMM group was 2.8 percent.¹⁸³ The total pregnancy rate for the EHFMM group was 12.3 percent and for the CMM group 22.8 percent.¹⁸⁴ This particular study did not consider irregularity in cycles, among other factors, in its analysis.¹⁸⁵ In a prospective 12-month trial of the EFHM method, the unintended pregnancy rate over 12 months for perfect use was 2.1 percent and for imperfect use was 14.2 percent.¹⁸⁶

A prospective longitudinal study in Germany evaluated a symptothermal method, which involved recording cervical mucus and basal body temperature changes and applying a calculation rule.¹⁸⁷ The calculation rule combined both components: the beginning of the fertile phase was the earlier of either the first day of mucus secretion or the sixth day of the cycle, but “after a woman has completed 12 cycles of use this guideline is replaced by a calculation that takes the earliest temperature rise in the last 12 cycles and subtracts seven days to identify the first fertile day.”¹⁸⁸ The last day of the fertile day was the later of either the evening of the third day after peak day or “[t]he evening of third higher temperature reading, all three higher than the previous six readings, the last one 0.2°C higher than the previous six.”¹⁸⁹ Researchers calculated an unintended pregnancy rate of 1.79 percent, but all unintended pregnancies due to method and user failure were included in this calculation.¹⁹⁰ The pregnancy rate after perfect use was only 0.43 percent.¹⁹¹ The German researchers note that a contraceptive requires a method failure rate of less than 1 percent to be on par with hormonal contraception.¹⁹² Their method-effectiveness rate of 0.4 percent is on par with the effectiveness of modern contraceptives.¹⁹³ The rate of unintended pregnancies in cycles with unprotected intercourse during the fertile period was 7.47 percent over 13 cycles,¹⁹⁴ a low rate due to “conscious intelligent risk taking,” or intercourse on the margins of the fertile period.¹⁹⁵ Discontinuation due to dissatisfaction or difficulties with the method was 9.2 per 100 women after 13 cycles of use.¹⁹⁶ Similarly, a European multicenter prospective study of a double-check symptothermal

¹⁸² *Id.*

¹⁸³ *Id.*

¹⁸⁴ *Id.*

¹⁸⁵ *See id.* at 168.

¹⁸⁶ *See* Fehring et al., *Efficacy*, *supra* note 178, at 156.

¹⁸⁷ *See* Frank-Herrmann et al., *supra* note 173, at 1311.

¹⁸⁸ *Id.* at 1311–12.

¹⁸⁹ *Id.* at 1312.

¹⁹⁰ *See id.* at 1314. Pregnancy rates for those abstaining from intercourse during the fertile period and for those using a barrier method (however frequently) during the fertile method were nearly the same. *Id.*

¹⁹¹ *See id.*

¹⁹² *See id.* at 1316.

¹⁹³ *See id.*

¹⁹⁴ *Id.* at 1314.

¹⁹⁵ *Id.* at 1317.

¹⁹⁶ *Id.* at 1314.

and cervical mucus method found an overall unintended pregnancy rate of 2.6 percent in the first 12 cycles and a dropout rate due to dissatisfaction or difficulties of 3.9 percent after 12 cycles.¹⁹⁷

In a prospective five-center WHO trial of women using an ovulation method to avoid pregnancy, which instructed them to abstain from sexual intercourse during menstruation, on alternate dry days before the fertile period, and during the fertile period, which occurred from the beginning of cervical mucus presence to the evening of the fourth day after the peak day, the method failure rate was only 2.8 percent.¹⁹⁸ Pregnancies were considered to result from method failure when intercourse occurred “on or before the last dry day of the pre-peak period, [and/or] on or after the 4th day following peak,” and “the subject had correctly identified the peak day.”¹⁹⁹ Conscious departure from the rules, when the “couple knowingly made a decision to have intercourse despite indications of fertility” caused a 15.4 percent failure rate.²⁰⁰ The method-failure rate of 2.8 percent indicates that the cervical mucus method itself is very effective. The highest failure rate, the rate due to conscious departure from the rules, indicates that some couples’ desire to avoid pregnancy is not strong relative to other countries or that the couples need additional support to be able to avoid intercourse on fertile days if they do wish to avoid pregnancy. Of the five centers, three were in developing countries (India, the Philippines, and El Salvador), and the success of the method there indicates its wide applicability.²⁰¹ The women were admitted to the trial only if they were fertile, had menstrual cycles lasting between 23 and 35 days, and were judged by their teachers and a principal investigator as having learned the method.²⁰²

When women with regular, healthy cycles accurately observe the physiological changes in their bodies and respond appropriately, they have near-perfect pregnancy avoidance rates on par with the most “successful” contraceptives, such as IUDs, with the possibility of perfect pregnancy avoidance with longer periods of abstinence. The greatest risk of unintended pregnancy is intercourse during

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¹⁹⁷ See The European Natural Family Planning Study Groups, *European multicenter study of natural family planning (1989-1995): efficacy and drop-out*, 15 *ADVANCES IN CONTRACEPTION* 69, 73 (1999).

¹⁹⁸ See William Gibbons et al., *A prospective multicenter trial of the ovulation method of natural family planning. II. The effectiveness phase*, 36 *FERTILITY & STERILITY* 591, 592, 596 tbl.4 (1981).

¹⁹⁹ *Id.* at 592.

²⁰⁰ *Id.* at 592, 596 tbl.4. Failure due to inadequate teaching was 0.4 percent and to inaccurate application of instructions 3.5 percent. *Id.* at 586 tbl.4.

²⁰¹ See *id.* at 597.

²⁰² *Id.* at 592.

a woman's fertile periods, whether or not the couple employs a secondary method of prevention, as indicated by the higher typical-use failure rates in the Marquette studies and the "conscious departures from the rules" in the WHO trial. Understanding why couples consciously choose to ignore the rules will help to decrease unintended pregnancies, so FEMM counsels couples and provides them with the support they need to make the decisions they determine are best for themselves and their families. An evaluation of predictors of correct use of methods that, like FEMM, require abstinence during a fertile window found that the housing quality index was a factor in having intercourse on fertile days.²⁰³ Women who scored lower on the housing quality index, a proxy for poverty, were likelier to have intercourse during the fertile window, suggesting that pressing immediate needs may distract from considering future consequences of intercourse.²⁰⁴ This suggests that couples in different situations, such as uneducated workers in developing countries as opposed to educated professionals in developed countries, need tailored support from FEMM. Typical-use failure rates reported in studies are also confounded in part by variations among motivations of couples,²⁰⁵ such as how strongly they wanted to avoid pregnancy; a couple that is hoping to delay and space pregnancies instead of avoiding pregnancies altogether may be more willing to test the margins of the fertile period or ignore the rules because a pregnancy is ultimately desired.²⁰⁶ Further, couples may choose to have intercourse on fertile days because they do not want to abstain for the entire perceived fertile window²⁰⁷; using a double-check like LH readings can help a couple narrow the fertile period down at the margins, allowing for intercourse on more days during the cycle and leading to a lower likelihood of intercourse on actually fertile days. Finally, cooperation of the male partner is critical to avoid unintended pregnancies,²⁰⁸ which is why FEMM emphasizes partner collaboration and teaches men FEMM as well.

An analysis of other methods' effectiveness rates follows, but first it is necessary to distinguish them from FEMM, which differs in essence. FEMM requires no oral intake or surgical intervention, and thus in no way disrupts the hormonal processes; is entirely "relevant," in that the knowledge-based approach helps reflect real-life processes and pinpoint health problems; is flexible, in that it allows for a switch from achieving to avoiding pregnancy, and vice versa, especially in comparison to irreversible/permanent methods like sterilization; requires and facilitates the cooperation of and coordination between both partners; and does not generate any side effects.

²⁰³ See Irit Sinai et al., *Fertility Awareness-Based Methods Of Family Planning: Predictors of Correct Use*, 32 INT'L FAM. PLAN. PERSP. 94, 98 (2006).

²⁰⁴ *Id.*

²⁰⁵ See, e.g., Frank-Herrmann et al., *supra* note 173, at 1311.

²⁰⁶ See, e.g., Fehring et al., *Efficacy*, *supra* note 178, at 158–59; John R. Weeks, *An evaluation of the use-effectiveness of fertility awareness methods of family planning*, 14 J. BIOSOC. SCI. 25, 30 (1982).

²⁰⁷ Fehring et al., *Efficacy*, *supra* note 178, at 158.

²⁰⁸ See Sinai et al., *supra* note 203, at 98; Fehring et al., *Cohort Comparison*, *supra* note 179, at 168.

B. Mechanisms of action, effectiveness rates, and side effects of artificial contraceptive methods

Understanding the mechanisms of action of artificial contraceptive methods is critical for informed choice. Women must be aware of how these methods work to prevent pregnancy in order to make truly informed decisions.

Artificial contraceptive methods include short-term contraceptives, such as the pill, the patch, the ring, and injectables; barrier methods during intercourse, such as the condom; long-acting reversible contraceptives (LARCs), such as implants and intrauterine devices (IUDs); more permanent methods, such as female and male sterilization; and emergency contraception.

Although not representative of women around the world,²⁰⁹ a look at contraceptive use in the U.S. is helpful. In 2006–08, 99.1 percent of women aged 15–44 years who had ever had sexual intercourse had ever used a contraceptive method,²¹⁰ 93 percent had ever had a partner use the male condom, 82.3 percent had used the pill, 22.2 percent had used Depo-Provera, a three-month injectable, 10 percent had used the patch, 9.7 percent had used emergency contraception, 9.7 percent had used the ring, and 1.4 percent had used the implant.²¹¹ 19.9 percent relied on female sterilization and 13.4 percent on male sterilization.²¹² 4.6 percent had used “natural family planning,”²¹³ and 19.4 percent had used the “calendar rhythm” method.²¹⁴ Although included as a form of *contraception*, “natural family planning” is more accurately a form of *family planning*, as it can be used to achieve or avoid pregnancy as well as to maintain health.

Because these options vary widely, such as the many manifestations of the hormonal pill, a comprehensive analysis of their effectiveness is impossible here. The following is a general overview of these methods, their effectiveness, and their potential side effects.

1. Short-term hormonal methods

Short-term or temporary hormonal contraceptives, including the pill, the patch, and the ring, are commonly used methods due to their easy access and use. Like FEMM, they also require

²⁰⁹ For example, IUD use is much higher outside the United States. See, e.g., Cunton Wang, *Trends in contraceptive use and determinants of choice in China: 1980–2010*, 85 *CONTRACEPTION* 570, 574–75 (2012); Adam Sonfield, *Popularity Disparity: Attitudes About The IUD in Europe and the United States*, *GUTTMACHER POL’Y REV.*, Fall 2007 at 19.

²¹⁰ This includes natural family planning, which many would not consider to be a contraceptive.

²¹¹ W.D. MOSTER & J. JONES, NAT’L CTR. FOR HEALTH STATISTICS, *USE OF CONTRACEPTION IN THE UNITED STATES: 1982–2008* 18 tbl.1 (2010).

²¹² *Id.*

²¹³ It is unclear what is included in this term.

²¹⁴ *Id.*

certain user conditions for greatest effectiveness, such as taking the pill on a daily basis, sometimes even at the exact same time every day. Failure to meet these conditions risks pregnancy, and is also the reason for lower effectiveness.²¹⁵

Hormonal contraceptives are either combined estrogen-progestin or progestin-only.²¹⁶ Combined estrogen-progestin contraceptives work by releasing hormones to inhibit ovulation and can increase cervical mucus viscosity.²¹⁷ Progestin-only contraceptives that release levonorgestrel thicken the cervical mucus and do not always prevent ovulation.²¹⁸ Desogestrel pills, Depo-Provera, and etonogestrel-releasing implants, types of progestin-only contraceptives, also work by inhibiting ovulation.²¹⁹ Combined contraceptives include the combined oral contraceptive (often referred to as the “pill”²²⁰), monthly injectables, transdermal patches, and vaginal rings.²²¹ Progestin-only contraceptives include the oral contraceptive (often referred to as the “mini-pill”), the depot medroxyprogesterone acetate injectable (DMPA or brand-name Depo-Provera), implants, and the levonorgestrel intrauterine system (LNG-IUS).²²² The progestin-only pill must be taken at the same time every day.²²³

The first-year typical-use and perfect-use failure rates for combined pill and progestin-only pill, the Evra patch, and the NuvaRing (vaginal ring) are each 9 percent and 0.3 percent, respectively.²²⁴

These short-term hormonal methods can result in a wide range of side effects and disruptions to the natural hormonal process that can mask underlying health problems and risk health problems, including infertility. The vaginal ring, for example, inhibits ovulation, an effect that remains for weeks thereafter.²²⁵ This inhibition is completely contrary to the natural functions of a woman’s hormonal processes. Additional side effects among ring users include headaches, vaginitis, and nausea.²²⁶ The pill can cause such side effects as breakthrough bleeding,

²¹⁵ See Rachel K. Jones et al., *Contraceptive Use Among U.S. Women Having Abortions in 2000–2001*, 34 PERSP. ON SEXUAL & REPROD. HEALTH 294, 297 (2002).

²¹⁶ Jean-Jacques Amy & Vrijesh Tripathi, *Contraception for women: an evidence based overview*, 339 BMJ 563, 564 (2009).

²¹⁷ *Id.*

²¹⁸ *Id.*

²¹⁹ *Id.*

²²⁰ Both types are referred to as the pill here.

²²¹ *Id.* at 565 tbl.1.

²²² *Id.* at 565 tbl.2.

²²³ *Id.*

²²⁴ Trussell, *supra* note 175, at 398 tbl.1.

²²⁵ See Devorah R. Wieder & Lynn Pattimakiel, *Examining the efficacy, safety, and patient acceptability of the combined contraceptive vaginal ring (NuvaRing®)*, 2 INT’L J. WOMEN’S HEALTH 401, 403 (2010).

²²⁶ See *id.* at 405.

headache, nausea, weight gain, mood changes, headaches, and breast tenderness,²²⁷ in addition to vomiting and diarrhea.²²⁸ The synthetic progestins and estrogens used in hormonal contraception can cause side effects because they are not identical to natural progesterone and estrogen.²²⁹ The hormones can have negative effects on carbohydrate metabolism and lipid and lipoprotein metabolism and cause hypertension and deep vein thrombosis.²³⁰

Current and recent use of combined oral contraceptives increases the risk of cervical cancer.²³¹ Several hypotheses have been proposed for the link between hormonal contraception, HPV, and cervical cancer.²³² One is that combined oral contraceptive use accelerates the maturation of the cervix, and the accompanying cell proliferation increases vulnerability to HPV, DNA damage, and subsequent neoplasia (abnormal tissue growth).²³³

Current and recent use of combined oral contraceptives increases the risk of cervical cancer.

Also, the estrogenic component of contraceptives can increase viral replication by acting at a genomic level.²³⁴ Use of hormonal contraception, particularly injectables, also heightens the risk of contracting and transmitting HIV-1.²³⁵

2. Long-acting reversible contraceptives (LARCs)

LARCs include IUDs and implants, and because they are longer-acting and require less user compliance, injectables are included here as well. The mechanisms of action of most of the

²²⁷ Michael J. Rosenberg & Michael S. Waugh, *Oral contraceptive discontinuation: A prospective evaluation of frequency and reasons*, 179 AM. J. OBSTETRICS & GYNECOLOGY 577, 579 (1998).

²²⁸ Jürgen Dinger et al., *Effectiveness of Oral Contraceptive Pills in a Large U.S. Cohort Comparing Progestogen and Regimen*, 117 OBSTETRICS & GYNECOLOGY 33, 36 (2011).

²²⁹ See Regine Sitruk-Ware & Anita Nath, *Metabolic effects of contraceptive steroids*, 12 REV. ENDOCRINE & METABOLIC DISORDERS 63, 64–65 (2011); Nathalie V. Goletiani et al., *Progesterone: Review of Safety for Clinical Studies*, 15 EXPERIMENTAL & CLINICAL PSYCHOPHARMACOLOGY 427, 429 (2007).

²³⁰ Diana E. Ramos et al., *Metabolic and Endocrinologic Effects of Steroidal Contraception*, GLOBAL LIBRARY WOMEN'S MED. (2009), http://www.glowm.com/section_view/heading/Metabolic%20and%20Endocrinologic%20Effects%20of%20Steroidal%20Contraception/item/388#23161.

²³¹ International Collaboration of Epidemiological Studies of Cervical Cancer, *Cervical cancer and hormonal contraceptives: collaborative reanalysis of individual data for 16 573 women with cervical cancer and 35 509 women without cervical cancer from 24 epidemiological studies*, 370 LANCET 1609, 1616 (2007).

²³² Morgan A. Marks et al., *Hormonal contraception and HPV: a tale of differing and overlapping mechanisms*, 2 OPEN ACCESS J. CONTRACEPTION 161, 161 (2011).

²³³ See Loris Y. Hwang et al., *Factors That Influence the Rate of Epithelial Maturation in the Cervix in Healthy Young Women*, 44 J. ADOLESCENT HEALTH 103, 108 (2009).

²³⁴ M. Moodley et al., *The role of steroid contraceptive hormones in the pathogenesis of invasive cervical cancer: A review*, 13 INT'L J. GYNECOLOGICAL CANCER 103 (2003).

²³⁵ Renee Heffron et al., *Use of hormonal contraceptives and risk of HIV-1 transmission: a prospective cohort study*, 12 LANCET INFECTIOUS DISEASES 19, 24 (2012). See also Jared M. Baeten et al., *The Influence of Hormonal Contraceptive Use on HIV-1 Transmission and Disease Progression*, 45 CID 360 (2007).

hormonal contraceptives are discussed above.²³⁶

IUDs are inserted in the uterus²³⁷ and create a low-grade inflammatory response that acts as a contraceptive.²³⁸ They may also prevent implantation of the fertilized egg.²³⁹ There are two kinds of IUDs, copper-bearing and levonorgestrel-releasing (LNG-IUS).²⁴⁰ The copper IUD is nonhormonal and works by immobilizing sperm in the uterus and preventing fertilization, and can be used for 10 years.²⁴¹ One brand name is ParaGard.²⁴² The LNG-IUS causes thinning and atrophy of the endometrium and can be used for 5 years.²⁴³ One brand name is Mirena.²⁴⁴ The LNG-IUS has a first-year typical-use and perfect-use failure rate of 0.2 percent.²⁴⁵ The copper IUD has a first-year typical use failure rate of 0.8 percent and perfect-use failure rate of 0.6 percent.²⁴⁶

Subdermal implants are inserted under the skin of the upper arm.²⁴⁷ Implanon, an etonorgestrel-releasing subdermal implant (ENG implant), and Jadelle, a levonorgestrel-releasing implant, are two brands.²⁴⁸ The first-year typical-use and perfect-use failure rates of Implanon are 0.05 percent.²⁴⁹

Injectables are either oily suspension of an estrogen and progestin by monthly deep intramuscular (IM) injection or oily suspension of a progestin by deep IM injection approximately every three months (DMPA or Depo-Provera).²⁵⁰ The first-year typical-use and perfect-use failure rates for Depo-Provera are 6 percent and 0.2 percent.²⁵¹

A major side effect of hormonal contraceptives, in particular implants and injectables, is decreased bone mineral density (BMD). Adolescents are particularly affected because during childhood and adolescence bones grow and bone mass and bone density increase, due to

²³⁶ See *supra* Part IV.B.1.

²³⁷ See Amy Stoddard et al., *Efficacy and Safety of Long-Acting Reversible Contraception*, 8 DRUGS 969, 976 (2011).

²³⁸ The ESHRE Capri Workshop Group, *Intrauterine devices and intrauterine systems*, 14 HUM. REPROD. UPDATE 197, 199 (2008).

²³⁹ *Id.* at 200.

²⁴⁰ Amy & Tripathi, *supra* note 216, at 566.

²⁴¹ *Id.*

²⁴² See Trussell, *supra* note 175, at 401.

²⁴³ Amy & Tripathi, *supra* note 216, at 566.

²⁴⁴ See Trussell, *supra* note 175, at 401.

²⁴⁵ *Id.* at 398 tbl.1.

²⁴⁶ *Id.*

²⁴⁷ Stoddard et al., *supra* note 237, at 974.

²⁴⁸ See Luis Bahamondes et al., *A prospective study of the forearm bone density of users of etonorgestrel- and levonorgestrel-releasing contraceptive implants*, 21 HUM. REPROD. 466, 467 (2006).

²⁴⁹ Trussell, *supra* note 175, at 398 tbl.1.

²⁵⁰ Amy & Tripathi, *supra* note 216, at 565 tbl.1, tbl.2.

²⁵¹ *Id.*

genetic, hormonal, and environmental factors.²⁵² 90 percent of peak bone mass is acquired by age 18.²⁵³ Estrogen is critical to bone accrual, and progestin-only contraceptives cause hypoestrogenism,²⁵⁴ particularly the injectable DMPA, which suppresses ovarian estrogen production.²⁵⁵ Therefore, BMD loss occurred in the hip and spine in one study after just one DMPA injection in first-time DMPA users and continued with each subsequent injection over 24 months.²⁵⁶ Another study found that women aged 19–43 years using the Implanon or Jadelle implant have significantly lower BMD at the midshaft of the ulna (elbow bone) after 18 months of use.²⁵⁷ A follow-up at 36 months found a significant reduction in BMD at the distal radius.²⁵⁸ While bone mineral recovery after using DMPA may occur, full recovery can take a year, with recovery at the hip taking up to 240 weeks.²⁵⁹ Even oral contraceptive use can cause BMD loss or lower BMD gains in young women.²⁶⁰

Another possible side effect of the Implanon is unscheduled bleeding patterns, which range from amenorrhea and infrequent bleeding to irregular, frequent, and prolonged bleeding.²⁶¹

Some possible side effects of IUDs are similar, with increased bleeding and cramping during menstruation with the copper IUD.²⁶² Further, almost all women experience painful insertions and insertion difficulty is common.²⁶³ Spontaneous expulsion can occur, particularly in the first year of use.²⁶⁴ A possible complication is uterine perforation, which, if it occurs, generally occurs at the time of insertion.²⁶⁵ Finally, in addition to the total disruption of the natural

²⁵² See Maria Luisa Bianchi, *Osteoporosis in children and adolescents*, 41 BONE 486, 487 (2007).

²⁵³ *Id.*

²⁵⁴ See Bahamondes et al., *supra* note 248, at 467.

²⁵⁵ See Sarah A.B. Pitts et al., *Bone Mineral Density, Fracture, and Vitamin D in Adolescents and Young Women Using Depot Medroxyprogesterone Acetate*, 25 J. PEDIATRIC & ADOLESCENT GYNECOLOGY 23, 23 (2012).

²⁵⁶ See M. Kathleen Clark et al., *Bone mineral density changes over two years in first-time users of depot medroxyprogesterone acetate*, 82 FERTILITY & STERILITY 1580, 1584 (2004).

²⁵⁷ See Bahamondes et al., *supra* note 248, at 468.

²⁵⁸ See Cecilia Monteiro-Dantas et al., *A three-year longitudinal evaluation of the forearm bone density of users of etonogestrel- and levonorgestrel-releasing contraceptive implants*, 4 REPROD. HEALTH 11, 13 (2007). This is a continuation of the Bahamondes et al. study. *Id.* at 12.

²⁵⁹ See Zeev Harel et al., *Recovery of bone mineral density in adolescents following the use of depot medroxyprogesterone acetate contraceptive injections*, 81 CONTRACEPTION 281, 288 (2010).

²⁶⁰ See Delia Scholes et al., *Oral Contraceptive Use and Bone Density Change in Adolescent and Young Adult Women: A Prospective Study of Age, Hormone Dose, and Discontinuation*, 96 J. CLINICAL ENDOCRINOLOGY & METABOLISM E1380, E1385 (2011); Hawley Almstedt Shoepe & Christine M. Snow, *Oral contraceptive use in young women is associated with lower bone mineral density than that of controls*, 16 OSTEOPOROSIS INT'L 1538, 1541 (2005).

²⁶¹ See Philip Darney et al., *Safety and efficacy of a single-rod etonogestrel implant (Implanon): results from 11 international clinical trials*, 91 FERTILITY & STERILITY 1646, 1650 (2009).

²⁶² See Stoddard et al., *supra* note 237, at 976, 977–79.

²⁶³ See Ana Raquel Gouvea Santos et al., *Pain at insertion of the levonorgestrel-releasing intrauterine system in nulligravida and parous women with and without cesarean section*, 88 CONTRACEPTION 164, 166–67 (2013).

²⁶⁴ *Id.*

²⁶⁵ See *id.* See also Janina Kaislasuo et al., *Uterine perforation caused by intrauterine devices: clinical course*

menstrual cycle, amenorrhea during LARC use can be problematic for women due to their inability to determine if lack of menses is due to the LARC or to pregnancy.²⁶⁶

3. Barrier methods

Barrier methods include the male and female condom, the diaphragm, and the cervical cap.²⁶⁷ They are usually chosen because of the convenience of using them only “when needed.”²⁶⁸ They are only successful if used correctly and consistently, so first-year typical-use failure rates are 18 percent for the male condom and 21 percent with the female condom.²⁶⁹ Perfect-use failure rates are 2 percent for the male condom and 5 percent for the female condom.²⁷⁰ Side effects include allergic reactions.²⁷¹

4. Sterilization

Female sterilization is done by blocking the fallopian tubes in one of several ways: surgically cutting, removing part of the tube, blocking with clips or rings, or electrically coagulating.²⁷² This can entail an abdominal, laparoscopic, vaginal, or transcervical approach.²⁷³ Male sterilization is done through vasectomy, which blocks each vas deferens, preventing the flow of sperm into semen.²⁷⁴

Female and male sterilization have similar effectiveness rates to LARC rates. First-year typical-use and perfect-use failure rates for female sterilization are 0.5 percent and for male sterilization are 0.15 percent and 0.1 percent, respectively.²⁷⁵ Failure rate post-sterilization increases with time, since pregnancies can occur several years following the procedure.²⁷⁶

Since sterilization is generally irreversible, a possible consequence is regret.²⁷⁷ In one study, women less than 30 years old were four to six times more likely to experience regret than women aged over 30 years; a 5-year follow-up found that 4.3 percent of women aged 20–24

and treatment, 28 HUM. REPROD. 1546 (2013).

²⁶⁶ See Santos et al., *supra* note 263, at 976.

²⁶⁷ Amy & Tripathi, *supra* note 216, at 566.

²⁶⁸ See *id.*

²⁶⁹ Trussell, *supra* note 175, at 398 tbl.1.

²⁷⁰ *Id.*

²⁷¹ Amy & Tripathi, *supra* note 216, at 566.

²⁷² Sabitha Jayaraman & Melanie Mann, *Male and female sterilization*, 22 OBSTETRICS, GYNAECOLOGY & REPROD. MED. 85, 85 (2012).

²⁷³ *Id.*

²⁷⁴ See *id.* at 88.

²⁷⁵ Trussell, *supra* note 175, at 398 tbl.1.

²⁷⁶ See Jayaraman & Mann, *supra* note 272, at 86.

²⁷⁷ See Roslyn Kane et al., *Long-acting, reversible and permanent methods of contraception: insight into women’s choice of method*, 17 QUALITY PRIMARY CARE 107 (2009).

years and 2.4 percent of women aged 30–34 years felt regret.²⁷⁸ Pregnancy following sterilization is 30 to 80 percent likely to be ectopic.²⁷⁹ Ectopic pregnancies carry their own set of complications.²⁸⁰ Furthermore, women report a number of problems, including Post-Tubal Ligation Syndrome (PTLS), which can cause a woman to be likelier to have a hysterectomy (removal of uterus) after tubal occlusion; descriptions may include simple pain and dysmenorrhea, menstrual dysfunction, dyspareunia, and heightened premenstrual syndrome.²⁸¹

Male sterilization is not effective immediately. It can take more than three months, or 12 to 20 ejaculations, for the ejaculate to be sperm-free.²⁸² Furthermore, men experience an array of side effects, among them sperm granuloma (lumps of sperm).²⁸³ They are seen in 15 to 40 percent of men having vasectomy reversal.²⁸⁴ Another side effect is orchalgia (chronic testicular pain), the incidence of which is 12 to 52 percent.²⁸⁵

5. Emergency contraception

Emergency contraception is designed for use after unprotected intercourse or intercourse with failed contraception.²⁸⁶ Emergency contraceptives take the form of pills (ECPs) containing synthetic hormones or copper IUDs.²⁸⁷ ECPs are combined, progestin-only, or antiprogestin (mifepristone or ulipristal acetate (UPA)).²⁸⁸ They can be used immediately or up to 120 hours post-coitus.²⁸⁹ Combined ECPs work by inhibiting or delaying ovulation and progestin-only ECPs

“To make an informed choice, women must know that ECPs [...] prevent pregnancy primarily by delaying or inhibiting ovulation and inhibiting fertilization, but may at times inhibit implantation of a fertilized egg in the endometrium.” –James Trussell

²⁷⁸ See Jayaraman & Mann, *supra* note 272, at 87.

²⁷⁹ *Id.* at 86.

²⁸⁰ See Anne McQueen, *Ectopic pregnancy: risk factors, diagnostic procedures and treatment*, 25 NURSING STANDARD 49, 50 (2011).

²⁸¹ See Jayaraman & Mann, *supra* note 272, at 86.

²⁸² *Id.* at 89.

²⁸³ See *id.*

²⁸⁴ *Id.*

²⁸⁵ See *id.*

²⁸⁶ See Kristina Gemzell-Danielsson et al., *Emergency contraception — mechanisms of action*, 87 CONTRACEPTION 300, 300 (2013).

²⁸⁷ *Id.* at 301.

²⁸⁸ JAMES TRUSSELL & ELIZABETH G. RAYMOND, EMERGENCY CONTRACEPTION: A LAST CHANCE TO PREVENT UNINTENDED PREGNANCY 1 (2013), <http://ec.princeton.edu/questions/ec-review.pdf>.

²⁸⁹ *Id.*

impair ovulation and luteal function.²⁹⁰ UPA ECPs can delay ovulation.²⁹¹ Twelve studies of levonorgestrel ECPs showed effectiveness rates of 52 to 100 percent.²⁹² UPA ECPs have effectiveness rates of 62 to 85 percent.²⁹³ James Trussell of the Office of Population Research at Princeton University has stated that “[t]o make an informed choice, women must know that ECPs [. . .] prevent pregnancy primarily by delaying or inhibiting ovulation and inhibiting fertilization, but may at times inhibit implantation of a fertilized egg in the endometrium.”²⁹⁴

A copper IUD can also be inserted up to 5 days after ovulation because implantation occurs 6-12 days after ovulation.²⁹⁵ Postcoital copper IUD insertion has a pregnancy rate of 0.1 percent.²⁹⁶ This high effectiveness suggests that it can work post-fertilization.²⁹⁷

Side effects of ECPs are nausea, vomiting, abdominal pain, breast tenderness, headache, dizziness, and fatigue, and they last for up to a few days.²⁹⁸ ECPs also have an impact on current cycle length and menstrual bleeding in the next cycle.²⁹⁹

6. Sexually transmitted infections

No form of contraception, including barrier methods, can fully protect a woman from

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contracting or spreading a sexually transmitted infection. For example, HPV, which lives on the skin, can infect an area not covered by a condom.³⁰⁰

7. Coital frequency

Using FEMM does not necessarily result in decreased sexual intercourse. Data from the Demographic and Health Surveys in developing countries show a mean coital frequency of 5.5 acts per month for sexually active married women, with a mean of 5.1 to 5.5 acts per month for

²⁹⁰ *Id.* at 5–6. See also Marta Durand et al., *On the mechanisms of action of short-term levonorgestrel administration in emergency contraception*, 64 *CONTRACEPTION* 227, 230 (2001).

²⁹¹ TRUSSELL & RAYMOND, *supra* note 288, at 6.

²⁹² *Id.* at 4.

²⁹³ *Id.*

²⁹⁴ *Id.* at 7. See also *infra* note 499 and accompanying text.

²⁹⁵ TRUSSELL & RAYMOND, *supra* note 288, at 2.

²⁹⁶ *Id.* at 4.

²⁹⁷ *Id.* at 7.

²⁹⁸ *Id.* at 8.

²⁹⁹ *Id.*

³⁰⁰ See CDC, Genital HPV Infection – Fact Sheet, <http://www.cdc.gov/std/hpv/stdfact-hpv.htm> (last visited Sept. 30, 2013).

coitus-dependent methods, and with significant variation among countries.³⁰¹ Another study of married and cohabiting couples in the U.S. found a mean frequency as reported by respondents of 7.0 acts per woman and 6.6 acts per man per month, with significant variation by age.³⁰² Coital frequency is affected by several factors, including age of each partner, marital duration, marital quality, number of children, and socioeconomic status.³⁰³

A study of users of either of two fertility awareness methods found that the mean coital frequency was similar to that of users of other methods, with intercourse timed to coincide with non-fertile days.³⁰⁴ The mean coital frequency was 5.7 acts per month,³⁰⁵ with intercourse during fertile days very low.³⁰⁶ The methods helped couples identify their fertile periods, and researchers requested that couples abstain during these periods.³⁰⁷ Although the methods in the study are not the same as FEMM, the results suggest that users of methods that require abstinence during the fertile period readjust intercourse to non-fertile periods.

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8. Sexual desire and satisfaction

Reviews of studies on the impact of hormonal contraceptives on sexual desire show varied results, indicating it is difficult to predict how each woman will react.³⁰⁸ Studies show that some women using hormonal contraceptives experience sexual dysfunction, such as decreased sexual desire, decreased arousability, and decreased intercourse.³⁰⁹ Users of the FEMM method do

³⁰¹ John Stover et al., *Empirically Based Conversion Factors for Calculating Couple-Years of Protection*, 24 EVALUATION REV. 3, 38 tbl.A6 (2000).

³⁰² See K.V. Rao & Alfred Demaris, *Coital frequency among married and cohabiting couples in the United States*, 27 J. BIOSOCIAL SCI. 135, 142 tbl.1 (1995). The mean number of self-reported coital acts per month for 16–24-year-old males was 13.3 and for females 12.3, for 40–44-year-old males it was 7.0 and for females 6.9, and for 60+-year-old males it was 2.3 and for females 2.2. *Id.*

³⁰³ *Id.* at 135. See also Alexandra Brewis & Mary Meyer, *Marital coitus across the life course*, 37 J. BIOSOCIAL SCI. 499 (2005).

³⁰⁴ See Irit Sinai & Marcos Arévalo, *It's all in the timing: coital frequency and fertility awareness-based methods of family planning*, 38 J. BIOSOCIAL SCI. 763, 773 (2006).

³⁰⁵ *Id.* at 771 tbl.1.

³⁰⁶ *Id.* at 768.

³⁰⁷ *Id.* at 765.

³⁰⁸ See Lara Burrows et al., *The Effects of Hormonal Contraceptives on Female Sexuality: A Review*, 9 J. SEXUAL MED. 2213 (2012); Jonathan Schaffir, *Hormonal Contraception and Sexual Desire: A Critical Review*, 32 J. SEX & MARITAL THERAPY 305 (2006).

³⁰⁹ See Paul Enzlin et al., *Sexual Functioning in Women Using Levonorgestrel-Releasing Intrauterine Systems as Compared to Copper Intrauterine Devices*, 9 J. SEXUAL MED. 1065 (2012); Cesare Battaglia et al., *Sexual Behavior and Oral Contraception: A Pilot Study*, 9 J. SEXUAL MED. 550 (2012); Aline Gubrium, *"I've Lost My Mojo, Baby": A*

not have to be concerned about whether or not they will experience decreased sexual dysfunction since FEMM has no side effects.

Further, oral contraceptive usage affects women's attraction to men's facial features³¹⁰ and both women's and men's mate choice preferences, both of which change throughout a woman's menstrual cycle.³¹¹ Women are attracted to more masculine features when they are ovulating, and men find women the most attractive during ovulation, as compared to other points in her cycle, but the pill eliminates ovulation.³¹² Women who were using oral contraceptives when they chose the partner who fathered their first child are later less satisfied with sexual aspects of their relationship, including lower partner attraction, although they are more satisfied with non-sexual aspects of their relationship, such as partner's paternal provision.³¹³ Over time, however, a woman's sexual dissatisfaction may increase and outweigh non-sexual satisfaction: "Evidence for this includes the finding that, among women using OC during partner choice, sexual dissatisfaction (compliant sex and sexual rejection) intensifies in relatively long relationships, while there was no change in non-users."³¹⁴ Women using hormonal contraceptives also use mate retention tactics towards their partners, such as jealousy and manipulation, more frequently, which is associated with the dosage of synthetic estradiol in the contraceptive.³¹⁵ All of these occurrences highlight the impact hormones have on the brain, which may impair relationships.

A descriptive study of users of fertility awareness found that many described their experiences as positive, with 74 percent of the comments coding as positive.³¹⁶ Themes in the responses included enhanced relationships, improved knowledge, enriched spirituality, and method successes.³¹⁷ Couples found they had improved communication, a sense of shared responsibility for fertility, increased respect for their partner, a better understanding of their bodies, success in spacing pregnancies, increased self-control, and health maintenance.³¹⁸ These positive

Narrative Perspective on the Effect of Depo-Provera on Libido, 8 *SEXUALITY RES. & SOC. POL'Y* 321 (2011); Christian W. Wallwiener et al., *Prevalence of Sexual Dysfunction and Impact of Contraception in Female German Medical Students*, 7 *J. SEXUAL MED.* 2139 (2010).

³¹⁰ See, e.g., Anthony C. Little et al., *Oral contraceptive use in women changes preferences for male facial masculinity and is associated with partner facial masculinity*, 38 *PSYCHONEUROENDOCRINOLOGY* 1777, 1782 (2013).

³¹¹ Alexandra Alvergne & Virpi Lummaa, *Does the contraceptive pill alter mate choice in humans?*, 25 *TRENDS ECOLOGY & EVOLUTION* 171 (2009).

³¹² *Id.* at 174–75.

³¹³ S. Craig Roberts et al., *Relationship satisfaction and outcome in women who meet their partner while using oral contraception*, 279 *PROC. ROYAL SOC'Y B* 1430, 1434 (2011).

³¹⁴ *Id.* at 1435.

³¹⁵ Lisa L.M. Welling et al., *Hormonal contraceptive use and mate retention behavior in women and their male partners*, 61 *Hormones & Behavior* 114, 118 (2012).

³¹⁶ See Leona VandeVusse et al., *Couples' Views of the Effects of Natural Family Planning on Marital Dynamics*, 35 *J. NURSING SCHOLARSHIP* 171, 127 (2003). There was no indication of which methods the couples were using.

³¹⁷ *Id.* at 172–74.

³¹⁸ *Id.*

experiences indicate that when periodic abstinence is chosen in order to prevent a pregnancy, the couple has a positive attitude toward it and may not consider it a burden. In fact, many users of periodic abstinence refer to a “honeymoon effect” after a time of abstinence.³¹⁹

Many users of periodic abstinence refer to a “honeymoon effect” after a time of abstinence.

Negative comments of fertility awareness users involved strained sexual interactions and fear of pregnancy.³²⁰ These reveal that to avoid such experiences, FEMM must educate women thoroughly in use of the method and make

available continuous support and follow-up for both women and couples.

Some criticisms of methods like FEMM center on the emphasis on abstinence during the fertile period as a means of avoiding pregnancy. However, abstaining is not only required when women are using the FEMM method. When starting or switching to a new contraceptive, abstaining from sex or using a “backup” method is often required for a certain time.³²¹ Further, treatment of STIs often requires abstinence until therapy is completed and no symptoms appear.³²² Abstinence also is medical advice in case of illness.³²³

9. Analysis: The need for FEMM

The evidence shows that effectiveness rates of artificial contraceptives are fairly high and increase the less user error is a factor, such as with LARCs. However, these methods also have the potential of more debilitating side effects. Meanwhile, the most commonly used contraceptive in the United States, the pill, requires daily use, a strict condition for user effectiveness. This mirrors the condition for FEMM, which requires daily monitoring of the cycle. Thus the same conditions that enable women to use the pill effectively enable them to use FEMM well. The methods have similar effectiveness rates. Yet FEMM is attractive in that it has no side effects and allows monitoring of underlying health conditions, which the pill does not. FEMM can elevate every woman out of the position of being relegated to trying several methods until she finds one that does not cause her to experience side effects, which can take years. No matter how low a risk of side

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³¹⁹ See, e.g., iusenfp.com, FAQ, <http://iusenfp.com/home/faq/> (last visited Sept. 30, 2013); Marital Dynamics of Using NFP, http://nfp.marquette.edu/marital_dynamics.php (last visited Sept. 30, 2013).

³²⁰ VandeVusse et al., *supra* note 316, at 174–75.

³²¹ See Ruth Lesnewski et al., *Preventing Gaps When Switching Contraceptives*, 83 AM. FAM PHYSICIAN 567, 567 (2011).

³²² See CDC, STD TREATMENT GUIDELINES, *supra* note 137, at 44, 46, 52, 60, 67, 69, 89.

³²³ See Planned Parenthood, *Abstinence, What Are the Benefits of Abstinence?*, <http://www.plannedparenthood.org/health-topics/birth-control/abstinence-4215.htm> (last visited Sept. 30, 2013).

effects may be for an artificial contraceptive, a woman cannot know how her body will respond until she tries it; with FEMM, she has prior assurance of no risk of side effects. FEMM stands apart from artificial contraceptives as an effective, natural, and education-based method.

C. Causes of contraceptive discontinuation

Having examined the types of artificial contraceptives and their respective mechanisms of action, effectiveness rates, and side effects, it is now important to examine why women discontinue use of these methods in order to understand how best to address their concerns and meet their needs. There are a number of reasons a woman may discontinue use of a particular method, whether she switches to a different method or simply discontinues without switching: failure (accidental pregnancy), method-related reasons, desire for pregnancy, or no further need due to marital dissolution (separation or divorce) or health-related sexual abstinence.³²⁴ Method-related reasons for discontinuation include side effects and health concerns, desire for a more effective method, cost or access issues, and husband's objections.³²⁵ Understanding contraceptive discontinuation is critical because it is linked to unintended pregnancy when it occurs for reasons other than desire for pregnancy, and because in countries where contraceptives use is prevalent, most unintended pregnancies result from contraceptive discontinuation or failure.³²⁶

1. Developing countries

A 2012 WHO compendium of 60 DHS surveys from developing countries looks at discontinuation rates for several methods of contraception,³²⁷ divided into two categories, modern and traditional. According to the surveys, modern methods are IUDs, the pill, injectables, and condoms, and traditional methods are periodic abstinence and withdrawal.³²⁸ Overall, in 19 countries with the most recent (2002–2009) DHS surveys, within the first 12 months of use 50 percent of condom users discontinued, 40 percent each of pill, injectable, periodic abstinence, and withdrawal users discontinued, and 13 percent of IUD users

³²⁴ WHO, CAUSES AND CONSEQUENCES OF CONTRACEPTIVE DISCONTINUATION: EVIDENCE FROM 60 DEMOGRAPHIC AND HEALTH SURVEYS 8 (2012), http://apps.who.int/iris/bitstream/10665/75429/1/9789241504058_eng.pdf, [hereinafter WHO, CAUSES AND CONSEQUENCES].

³²⁵ *Id.* at 13.

³²⁶ See Siân Curtis et al., *Contraceptive Discontinuation and Unintended Pregnancy: An Imperfect Relationship*, 37 INT'L PERSP. ON SEXUAL & REPROD. HEALTH 58, 58 (2011). See also Ann K. Blanc et al., *Monitoring Contraceptive Continuation: Links to Fertility Outcomes and Quality of Care*, 33 STUD. FAM. PLAN. 127, 132 (2002) ("Overall, between 28 and 64 percent of the TFR is associated with either a contraceptive failure or a contraceptive discontinuation for reasons other than a desire to become pregnant, and is more than half in Brazil, Colombia, Jordan, and Peru.").

³²⁷ The survey calls all methods used to avoid pregnancy "contraception," although many people would not consider contraception to include methods that do not involve artificial means of preventing pregnancy, such as FEMM.

³²⁸ See WHO, CAUSES AND CONSEQUENCES, *supra* note 324, at 14 tbl.3.

discontinued.³²⁹ Because these overall percentages include discontinuation due to desire for pregnancy, which does not reflect women’s satisfaction with each method, it is more revealing to examine method-related reasons for discontinuation and discontinuation due to failure.

a. Method-related discontinuation

Method-related discontinuation indicates dissatisfaction with a particular method.³³⁰ Periodic abstinence users’ likelihood of method-related discontinuation is 12.7 percent, 19.7 percent, and 23.9 percent by the end of the first, second, and third years, respectively; for withdrawal users it is 11.7 percent, 17.7 percent, and 22.3 percent; for IUD users it is 8.8 percent, 13.8 percent, and 20.2 percent; for injectable users it is 34.8 percent, 50.6 percent, and 58.0 percent; for pill users it is 25.4 percent, 37.9 percent, and 45.7 percent; and for condom users it is 23.1 percent, 28.8 percent, and 33.6 percent.³³¹

For all methods but periodic abstinence and withdrawal, “side-effects/health concerns dominate and other forms of method-related dissatisfaction are rarely stated as a reason to stop use.”³³² For each of the first three years of use, respectively, the discontinuation rate due

For all methods but periodic abstinence and withdrawal, “side-effects/health concerns dominate and other forms of method-related dissatisfaction are rarely stated as a reason to stop use.”

to side effects for each method is the following: for the pill, it is 20.1 percent, 30.3 percent, and 37.4 percent; for the IUD it is 7.7 percent, 13.0 percent, and 19.3 percent; for the injectable it is 26.9 percent, 39.8 percent, and 50.6 percent; for the condom it is 2.6 percent, 4.7 percent, and 5.0 percent, for periodic abstinence it is 1.0 percent, 1.2 percent, and 1.2 percent, and for withdrawal

it is 1.1 percent, 1.1 percent, and 1.2 percent.³³³ Meanwhile, method-related reasons for discontinuation of periodic abstinence and withdrawal are “low effectiveness and husband’s dislike.”³³⁴

³²⁹ *Id.* at 5.

³³⁰ *Id.* at 8.

³³¹ *Id.* at 12 tbl.2.

³³² *Id.* at 15.

³³³ *Id.* at 12 tbl.2.

³³⁴ *Id.* at 15.

Table 2: Cause-specific discontinuation probabilities at months 12, 24 and 36 per 100 episodes, by method: median values for 19 countries

Method	Month	All reasons	Reported failure	Method-related	(Side-effects or health concerns)	Desire for pregnancy	No further need
All methods	12	37.7	7.2	19.9	10.4	6.1	7.8
	24	54.6	13.9	28.4	16.8	16.7	12.5
	36	64.3	18.9	34.5	21.7	22.9	15.3
Pill	12	43.5	5.6	25.4	20.1	10.4	8.5
	24	65.0	11.7	37.9	30.3	20.8	12.1
	36	76.3	15.6	45.7	37.4	30.5	14.9
IUD	12	13.1	1.1	8.8	7.7	1.3	0.8
	24	26.3	2.2	13.8	13.0	4.0	1.7
	36	36.7	3.8	20.2	19.3	7.2	2.9
Injectable	12	40.6	1.5	34.8	26.9	6.6	5.7
	24	62.8	2.9	50.6	39.8	15.4	10.0
	36	77.1	4.3	58.0	50.6	24.5	13.9
Condom	12	50.4	7.6	23.1	2.6	11.1	12.7
	24	64.5	16.3	28.8	4.7	19.2	17.8
	36	73.9	22.2	33.6	5.0	26.1	23.8
Periodic abstinence	12	40.3	17.4	12.7	1.0	7.3	6.6
	24	61.2	28.7	19.7	1.2	17.5	10.4
	36	70.9	36.3	23.9	1.2	22.9	14.1
Withdrawal	12	40.0	15.3	11.7	1.1	7.8	9.2
	24	61.5	31.3	17.7	1.1	21.6	15.2
	36	73.8	40.8	22.3	1.2	30.0	18.9

Table 2, WHO, Causes and consequences of contraceptive discontinuation: evidence from 60 Demographic and Health Surveys³³⁵

b. Method failure³³⁶

Based on the WHO compendium, the rate of method failure, that is, unintended pregnancy while using a method, is less than five percent in the first three years of use for IUD users and injectable users.³³⁷ For pill users, it is 5.6 percent and 15.6 percent by the end of the first and third years, respectively.³³⁸ For condom users, it is 7.6 percent and 22.2 percent.³³⁹ For periodic abstinence users, it is 17.4 percent and 36.3 percent,³⁴⁰ with considerable differences among countries.³⁴¹ For withdrawal users, it is 15.3 percent and 40.8 percent.³⁴²

³³⁵ *Id.* at 12 tbl.2.

³³⁶ For effectiveness rates of artificial contraceptive methods, see *supra* Part IV.B.

³³⁷ WHO, CAUSES AND CONSEQUENCES, *supra* note 324, at 12 tbl.2.

³³⁸ *Id.*

³³⁹ *Id.*

³⁴⁰ *Id.*

³⁴¹ *Id.* at 13.

³⁴² *Id.* at 12 tbl.2.

c. Other studies

A USAID evaluation relying on the same data for 18 countries found modern contraceptive discontinuation rates in 13 of the countries of 33 to 44 percent in the first year.³⁴³ The most often cited reason for discontinuation was “other,” and the most common among “other” reasons was side effects.³⁴⁴ In fact, in 12 of 18 countries more than 20 percent of women stopped using contraception because of side effects.³⁴⁵ In Egypt and Peru, that number reached 38 percent of women.³⁴⁶ Health concerns were also a cause of discontinuation for 10 to 20 percent of women in 7 of the 18 countries.³⁴⁷

Another USAID evaluation of the then-two most recent Demographic and Health Surveys in Armenia, Bangladesh, Colombia, the Dominican Republic, Egypt, Indonesia, Kenya, and Zimbabwe found contraceptive discontinuation within the first year of use at rates of 18 to 63 percent, with side effects causing discontinuation ranging from 2 percent in Armenia to 37 percent in Egypt.³⁴⁸

2. Developed countries

Discontinuation rates are also high in developed countries. In a study using United States data from 2006 to 2010, 30.4 percent of users of the pill, 9.3 percent of condom users, 45.8 percent of Depo-Provera (injectable) users, and 47.5 percent of contraceptive patch users discontinued use due to method dissatisfaction.³⁴⁹ Method dissatisfaction was generally not related to costs or insurance coverage.³⁵⁰ Instead, 62.9 percent of the users who discontinued use of the pill due to dissatisfaction did so because of side effects and 11.8 percent because they were worried about potential side effects.³⁵¹ For users of Depo-Provera, these numbers were 74 percent and 5.9 percent, respectively, and for users of the patch 44.6 percent and 8.5 percent, respectively.³⁵² 30.5 percent of the women who discontinued use of Depo-Provera because of dissatisfaction with the method were dissatisfied because they did not like the accompanying

³⁴³ See DANIEL VADNAIS ET AL., *WOMEN'S LIVES AND EXPERIENCES: CHANGES IN THE PAST TEN YEARS* 41 (2006), <http://www.measuredhs.com/pubs/pdf/OD40/OD40.pdf>.

³⁴⁴ *Id.*

³⁴⁵ *Id.*

³⁴⁶ *Id.*

³⁴⁷ *Id.*

³⁴⁸ See SARAH E.K. BRADLEY ET AL., *LEVELS, TRENDS, AND REASONS FOR CONTRACEPTIVE DISCONTINUATION* xiii (2009), <http://www.measuredhs.com/pubs/pdf/AS20/AS20.pdf>.

³⁴⁹ Kimberly Daniels et al., *Contraceptive Methods Women Have Ever Used: United States, 1982–2010*, 62 NAT'L HEALTH STAT. REP. 14 (2013), <http://www.cdc.gov/nchs/data/nhsr/nhsr062.pdf>.

³⁵⁰ See *id.*

³⁵¹ *Id.*

³⁵² *Id.*

changes to their menstrual cycles.³⁵³ In another U.S. study on adolescents girls and women aged 15–24 who were attending public family planning clinics and who did not desire pregnancy within at least a year, the 12-month continuation rate for patch initiators was 10.9 per 100 person-years, for Depo-Provera initiators it was 12.1 per 100 person-years, for ring initiators it was 29.4 per 100 person-years, and for pill users it was 32.7 per 100 person-years.³⁵⁴ The most common reason for discontinuation was side effects.³⁵⁵ Data on young women and LARCs show that for women aged 14–19 years using implants, the 12-month discontinuation rate was 19.4 percent, as compared to approximately 13.2 percent for women aged 20–25 years and 13.6 percent for women 26 years and older.³⁵⁶ For the copper IUD, rates were 24.4 percent, 17.5 percent, and 14.1 percent, respectively.³⁵⁷ For the implant, rates were 17.8 percent, 19.9 percent, and 15.6 percent, respectively.³⁵⁸

A study across five European countries (France, Germany, Italy, Spain, and the United Kingdom) found that 24 percent of the women who discontinued use of oral contraceptives did so because of side effects and 16 percent did so because of health risks.³⁵⁹ 25 percent of the women never used oral contraception because of the potential of side effects, with a similar percentage of women refusing to use oral contraception because of perceived health risks.³⁶⁰ In France, after 12 months 21.5 percent of women discontinued pill use, 10.7 percent discontinued IUD use, and 38.3 percent discontinued condom use.³⁶¹ Those numbers increased to 32.7 percent, 17.6 percent, and 53.8 percent at 24 months.³⁶²

3. Analysis: The need for FEMM

To improve contraceptive continuation, the WHO compendium recommends improvements in service quality, highlighting counseling as a means to alert women about side effects and

³⁵³ *Id.* For another study on American women's contraceptive discontinuation rates, see Jourdan E. Stuart et al., *Factors Associated With 12-Month Discontinuation Among Contraceptive Pill, Patch, and Ring Users*, 121 *OBSTETRICS & GYNECOLOGY* 330 (2013).

³⁵⁴ See Tina R. Raine et al., *One-Year Contraceptive Continuation and Pregnancy in Adolescent Girls and Women Initiating Hormonal Contraceptives*, 117 *OBSTETRICS & GYNECOLOGY* 363, 367 (2011).

³⁵⁵ *Id.*

³⁵⁶ Jessica R. Rosenstock et al., *Continuation of Reversible Contraception in Teenagers and Young Women*, 120 *OBSTETRICS & GYNECOLOGY* 1298, 1302 (2012).

³⁵⁷ *Id.*

³⁵⁸ *Id.*

³⁵⁹ See S.O. Skouby, *Contraceptive use and behavior in the 21st century: a comprehensive study across five European countries*, 15 *EURO. J. CONTRACEPTION & REPROD. HEALTH CARE* S42, S47 (2010).

³⁶⁰ *Id.*

³⁶¹ C. Moreau et al., *Frequency of discontinuation of contraceptive use: results from a French population-based cohort*, 24 *HUM. REPROD.* 1387, 1390. The study also measured the discontinuation rates for women using fertility awareness. However, the study did not indicate what fertility awareness entails and whether or not the woman had received any training in fertility awareness. In fact, the authors acknowledged that for the estimates for natural and barrier methods "have mediocre validity and cannot be verified." *Id.* at 1391.

³⁶² *Id.* at 1390.

reassure them about health concerns.³⁶³ Guidelines stress that providers tell patients side effects are normal and will not harm them, which will then help patients cope.³⁶⁴ However, many women will discontinue use of a method regardless of service quality improvements.³⁶⁵

The need then is strong for a method that both has high user satisfaction—and, in particular, does not have side effects or prompt health concerns—and is effective, two key indicators of continuation. Women should not have to settle for “coping” with a method’s side effects for years while they attempt to avoid pregnancy. Reassurance from health care providers does not eliminate the side effects. FEMM addresses the reasons women discontinue contraceptive use, as the FEMM method is highly effective, has no side effects, and presents no health concerns. For women who want to achieve pregnancy, it does not require waiting for months for fertility to return after discontinuation, unlike other methods.³⁶⁶ Women can switch from attempting to avoid pregnancy to attempting to achieve pregnancy in the next cycle. To make an informed choice, women must be informed during family planning counseling about how long the return to fertility for each method is given that the timing of pregnancy is important for professional, economic, and social reasons.³⁶⁷ Further, a woman who stops contraceptive use because she does not like it is not prepared if she wants to avoid pregnancy. Yet a woman that has been educated through FEMM to understand ovulation and to recognize her own signs of fertility is prepared to avoid unintended pregnancies.

The need then is strong for a method that both has high user satisfaction—and, in particular, does not have side effects or prompt health concerns—and is effective, two key indicators of continuation.

There is cause for concern at a time when many family planning organizations are promoting the use of LARCs, particularly in developing countries³⁶⁸ and for adolescent and young

³⁶³ See WHO, CAUSES AND CONSEQUENCES, *supra* note 324, at 23.

³⁶⁴ See, e.g., JOHNS HOPKINS BLOOMBERG SCH. OF PUB. HEALTH, FOCUS ON IMPROVING HORMONAL METHOD CONTINUATION 7 (2007). See also USAID, JOHNS HOPKINS BLOOMBERG SCH. OF PUB. HEALTH, & WHO, FAMILY PLANNING: A GLOBAL HANDBOOK FOR PROVIDERS, 2011 UPDATE (2011), http://whqlibdoc.who.int/publications/2011/9780978856373_eng.pdf (instructing family planning providers to reassure patients that side effects are normal).

³⁶⁵ See WHO, CAUSES AND CONSEQUENCES, *supra* note 324, at 23. See also Curtis et al., *supra* note 326, at 63; Dawn S. Chin-Quee et al., *Counseling tools alone do not improve method continuation: further evidence from the decision-making tool for family planning clients and providers in Nicaragua*, 76 *CONTRACEPTION* 377, 381 (2007); *Frontiers in Reproductive Health, Population Council, Philippines and Senegal Quality of Care: Services Improve Quality of Care but Fail to Increase FP Continuation*, OR SUMMARY 30 (2002).

³⁶⁶ See *supra* note 143.

³⁶⁷ See Tarun Jain & Ilana B. Ressler, *Reversible contraception: Does it affect future fertility?*, *CONTEMPORARY OB/GYN*, Sept. 1, 2010, <http://contemporaryobgyn.modernmedicine.com/contemporary-obgyn/news/modernmedicine/modern-medicine-now/reversible-contraception-does-it-affect-f#sthash.FNJmALjv.dpuf>.

³⁶⁸ See, e.g., Bellagio Consensus, *Recommendations for Action to Increase Access to Highly Effective, Long-acting, Reversible Contraception*, July 2012, http://www.popcouncil.org/pdfs/MediaCenter/2012_Bellagio

women,³⁶⁹ because they do not require regular maintenance. The relatively low rates of LARC discontinuation do not necessarily indicate higher user satisfaction with LARCs. LARC discontinuation is active, meaning that the user must take active steps to remove the IUD or implant, such as scheduling an appointment and visiting a clinic to have it removed.³⁷⁰ Some suggest that LARCs are a more attractive option because it is easier to continue using them.³⁷¹ However, the converse is true as well: discontinuing use of LARCs is more difficult because removal must be done by a health care professional,³⁷² as opposed to simply stopping using condoms, stopping taking the pill, or stopping going to get injections at the local clinic. Providers have been reluctant to remove implants for minor side effects because of the costliness of the procedure³⁷³ or because they perceive the patient's reasons for desiring

Recommendations.pdf; Paul D. Blumenthal et al., *Revitalizing long-acting reversible contraceptives in settings with high unmet need: a multicountry experience matching demand creation and service delivery*, 87 *CONTRACEPTION* 170 (2013) (focusing on increasing demand for IUDs in 13 developing countries and resulting in the insertion of 575,601 IUDs in those countries in 2009–10).

³⁶⁹ See, e.g., ADVOCATES FOR YOUTH, PROVIDING LARCS TO YOUNG WOMEN: EFFECTIVENESS, ACCEPTABILITY, AND EFFORTS TO INCREASE USE (2012), <http://www.advocatesforyouth.org/storage/advfy/documents/providinglarcestoyoungwomen.pdf>; Am. College of Obstetricians and Gynecologists, Committee Opinion, *Adolescents and Long-Acting Reversible Contraception: Implants and Intrauterine Devices*, No. 539, October 2012, <http://www.acog.org/Resources%20and%20Publications/Committee%20Opinions/Committee%20on%20Adolescent%20Health%20Care/Adolescents%20and%20Long-Acting%20Reversible%20Contraception.aspx>. See also Alexandra, Guest post: The freedom not to use birth control, *Feministing*, <http://feministing.com/2013/07/03/guest-post-the-freedom-not-to-choose-birth-control/> (July 3, 2013) (“I was 15 years old when I had my daughter. A week after having her I went to my post birth appointment and was told by the doctor that she had already scheduled an insertion appointment for a five year hormonal Mirena IUD all [sic] I had to do was say yes and this ‘super convenient, hassle free, and no pill’ form of birth control would be mine. [. . .] It would be years before I realized I was essentially pushed into an IUD because of my age, lack of knowledge on birth control, and her lack of discussing any other options for me expect [sic] the only thing on the market closest to temporary sterilization.”).

³⁷⁰ This also applies to implants, the use of which was not evaluated in the DHS surveys. See Janine Barden-O’Fallon & Ilene Speizer, *What Differentiates Method Stoppers from Switchers? Contraceptive Discontinuation and Switching Among Honduran Women*, 37 *INT’L PERSP. ON SEXUAL & REPROD. HEALTH* 16, 16 (2011).

³⁷¹ See, e.g., Curtis et al., *supra* note 326, at 63.

³⁷² See Megan L. Kavanaugh et al., *Long-acting Reversible Contraception for Adolescents and Young Adults: Patient and Provider Perspectives*, 26 *J. PEDIATRIC & ADOLESCENT GYNECOLOGY* 86, 90 (2013); Planned Parenthood, IUD, <http://www.plannedparenthood.org/health-topics/birth-control/iud-4245.htm> (last visited Sept. 30, 2013). A health care professional must remove an implant as well. See Planned Parenthood, Birth Control Implant (Implanon and Nexplanon), <http://www.plannedparenthood.org/health-topics/birth-control/birth-control-implant-implanon-4243.htm> (last visited Sept. 30, 2013). See also Baris, Mülayim et al., *A lost intrauterine device. Guess where we found it and how it happened?*, 11 *EURO. J. CONTRACEPTION & REPROD. HEALTH CARE* 47, 47 (2006) (“This case illustrates that unless it can be recovered by simple traction on the threads, a trained medical professional should be called upon for removal of the IUD.”).

³⁷³ Ushma Upadhyay, *Informed Choice in Family Planning: Helping People Decide*, *POPULATION REP.* NO. 50 1, 25 (2001), <http://www.k4health.org/sites/default/files/j50.pdf>. See also L. Anne Jeffreys & Andrew L. Clark, *A successful approach to long-acting contraceptive implants in primary care*, 85 *CONTRACEPTION* 381, 383 (2012) (“[T]he Implanon® is not cheap. An approach that maximizes the retention of implants is thus important.”).

removal as not warranting removal.³⁷⁴ One doctor urges providers, “Keep your eye on the prize,” despite “failed insertions and higher rates of expulsion/removal.”³⁷⁵ Time and aseptic conditions are also necessary for removal, and providers are not always prepared to remove the IUD or implant when the woman comes in for removal.³⁷⁶ There are also misperceptions about a required minimum time for the LARC to stay in before removal.³⁷⁷ All these are reasons why discontinuation rates for LARCs are lower than for other methods. For many women, the challenge of needing to take active steps to discontinue use of an IUD or an implant means they must bear side effects for longer than they wish, especially women who live in rural areas with little access to health clinics or providers who are trained in IUD removal and implant removal and women for whom removal is too costly.³⁷⁸

V. The need for hormonal health education

Empowering a woman to take care of her hormonal health is multifaceted. It entails educating her to observe events throughout her cycle and to note any irregularities that require health care consultation. Without knowledge about the hormonal interplay of her cycle, a woman’s

Without knowledge about the hormonal interplay of her cycle, a woman’s ability to make empowered, informed sexual and reproductive decisions is hindered, as it renders her own health and fertility confusing.

ability to make empowered, informed sexual and reproductive decisions is hindered, as it renders her own health and fertility confusing. Every woman should understand how her body works in order to equip her to make the choice that is best for her. Hormonal health knowledge also includes fertility literacy, or awareness of the

behaviors that affect her reproductive health over the course of her lifetime. Understanding of menstruation also is key, as it protects a woman from the stigma and shame that surround menstruation in many cultures. Unfortunately, as discussed in this section, women around the world are lacking in knowledge that enables them to take care of their hormonal health, evidencing a need for the education FEMM provides.

³⁷⁴ See, e.g., Margot Zimmerman et al., *Assessing the Acceptability of NORPLANT Implants in Four Countries: Findings from Focus Group Research*, 21 *STUD. FAM. PLAN.* 92, 96–99 (1990).

³⁷⁵ *More women moving to LARC methods — Will your facility follow the trend?*, 34 *CONTRACEPTIVE TECH. UPDATE* 37, 40 (2013).

³⁷⁶ See Zimmerman et al., *supra* note 374, at 97–100.

³⁷⁷ See *id.* at 99.

³⁷⁸ According to one source, in the U.S. the purchase price of an IUD is \$300–806, the examination and insertion fee is \$150–300, and the cost of visit and removal is \$170–300. See Donna Shoupe & Timothy Campbell, *Cost and Availability of Contraceptive Methods*, in *CONTRACEPTION* 13, 16 (Donna Shoupe ed., 2011).

A. Knowledge of fertile period

At the most basic level, every woman should understand how ovulation works, what the signs of ovulation are, and that ovulation is a sign of health. A woman's accurate perception of when she ovulates is critical for recognizing whether she has any abnormalities that indicate a potential underlying health problem warranting medical consultation,³⁷⁹ and for understanding when she can and cannot become pregnant.³⁸⁰ Although identification of ovulation is a tool that helps both women trying to avoid pregnancy and women trying to achieve pregnancy, data indicate that most women cannot accurately identify when they ovulate and when they are fertile. Further, lack of knowledge about the relationship between fertility and age hinders a woman's ability to make informed decisions about her plans for a family.

1. Developing countries

An examination of 192 DHS surveys from almost 80 developing countries shows that a large majority of respondents cannot identify when a woman's fertile period is, even users of periodic abstinence, who necessarily rely on identifying ovulation.³⁸¹ In most countries, fewer than 20 percent of all respondents can identify the fertile period. For example, in Tanzania's 2010 DHS, only 20 percent of women and 14 percent of men, and only 33 percent of users of periodic abstinence, accurately identified a woman's fertile period as being "halfway between two menstrual periods."³⁸² This number decreased from the 2004–05 DHS, when 26 percent of women accurately identified a woman's fertile period.³⁸³ Even in the two countries with the highest correct identification of the fertile period, Jordan³⁸⁴ and Ukraine,³⁸⁵ nearly 40 percent of the female respondents could not identify the fertile period, although 77.7 percent and 81.1 percent, respectively, of users of periodic abstinence in these countries could identify the fertile period.

³⁷⁹ See *supra* Part III.

³⁸⁰ See Patricia J. Kelly et al., *Clinician Perceptions of Providing Natural Family Planning Methods in Title X Funded Clinics*, 57 J. MIDWIFERY & WOMEN'S HEALTH 35, 35 (2012).

³⁸¹ Data from STATcompiler, <http://statcompiler.com>.

³⁸² NAT'L BUREAU OF STATISTICS & ICF MACRO, TANZANIA DEMOGRAPHIC AND HEALTH SURVEY 2010 73–74 (2011). Halfway between cycles is the approximate point at which most women with regular cycles ovulate. It is not the same for all women, and is not necessarily on the same day of every cycle for each woman. See American Pregnancy Ass'n, *Understanding Ovulation*, <http://americanpregnancy.org/gettingpregnant/understandingovulation.html> (last visited Sept. 30, 2013). For estimates of the range of normal variability of the menstrual cycle, see Laurence A. Cole et al., *The normal variabilities of the menstrual cycle*, 91 REPROD. ENDOCRINOLOGY 522 (2009).

³⁸³ NAT'L BUREAU OF STATISTICS & ICF MACRO, *supra* note 382, at 73.

³⁸⁴ See DEP'T OF STATISTICS & MACRO INT'L INC., JORDAN POPULATION AND FAMILY HEALTH SURVEY 2007 50–51 (2008).

³⁸⁵ UKRAINIAN CTR. FOR SOC. REFORMS, STATE STATISTICAL COMM., MINISTRY OF HEALTH, & MACRO INT'L, UKRAINE DEMOGRAPHIC AND HEALTH SURVEY 2007 49–50 (2008).

2. Developed countries

The inability to identify the fertile period is also prevalent in the United States and other developed countries. Data from the National Survey of Reproductive and Contraceptive Knowledge reveal that few young adults in the U.S. can identify a woman's fertile period accurately. Only 34 percent of respondents—42 percent of women and 27 percent of men—had this knowledge.³⁸⁶ Only 23 percent and 27 percent, respectively, of black and Hispanic young adults could identify a woman's fertile period accurately, as compared to 38 percent of whites.³⁸⁷ 25 percent of young adults with a high school education or less could identify a woman's fertile period accurately, as compared to 40 percent of those with some college education and 47 percent with a college degree or higher.³⁸⁸ Women's knowledge of fertility increased with age while men's did not improve.³⁸⁹ Prior sexual activity, prior participation in a sex education program, prior receipt of sexual health services at a doctor's office or clinic, and prior pregnancy each had no bearing on the accuracy of young adults' fertility knowledge.³⁹⁰ Those men and women who had used "traditional" methods of birth control—defined in the study as withdrawal and natural family planning—had more accurate knowledge of a woman's fertile period, but still at low numbers: 29 percent of the 53 percent of young adult men who had used withdrawal could identify a woman's fertile period, as compared to 23 percent of the men who had not used withdrawal, and 58 percent of the 8 percent of young adult women who had used natural family planning methods could identify a woman's fertile period, as compared to 41 percent of the women who had not used natural family planning methods.³⁹¹ Despite these numbers, "90% believe (and 66% *strongly* believe) they have all the knowledge they need to avoid an unplanned pregnancy."³⁹²

In another study, less than 40 percent of women with a low-income background were able to identify the fertile period.³⁹³ Only 20.8 percent of the women had been told about fertility awareness methods by a health care provider at some point.³⁹⁴ Yet another study evaluated the accuracy of the ovulation predictions of women by testing their urine and found that only 28 percent of respondents correctly identified ovulation, and 48.9 percent of "highly motivated"

³⁸⁶ AMANDA BERGER ET AL., CHILD TRENDS RESEARCH BRIEF, WHAT YOUNG ADULTS KNOW—AND DON'T KNOW—ABOUT WOMEN'S FERTILITY PATTERNS: IMPLICATIONS FOR REDUCING UNINTENDED PREGNANCIES 2 (2012), http://www.childtrends.org/Files/Child_Trends-2012_09_21_RB_FertilityPatterns.pdf.

³⁸⁷ *Id.* at 2.

³⁸⁸ *Id.* at 2–3.

³⁸⁹ *Id.* at 3.

³⁹⁰ *Id.* at 3–4.

³⁹¹ *Id.* at 4–5.

³⁹² KELLEEN KAYE ET AL., NAT'L CAMPAIGN TO PREVENT TEEN AND UNPLANNED PREGNANCY, THE FOG ZONE: HOW MISPERCEPTIONS, MAGICAL THINKING, AND AMBIVALENCE PUT YOUNG ADULTS AT RISK FOR UNPLANNED PREGNANCY 10 (2009).

³⁹³ See Jacki Witt et al., *Knowledge and Experiences of Low-Income Patients With Natural Family Planning*, 9 J. NURSE PRACTITIONERS 99, 102 (2013).

³⁹⁴ *Id.* at 103.

participants could identify ovulation.³⁹⁵ The researchers estimated “that only 14% of women in a general population know when they ovulate.”³⁹⁶ In a telephone survey conducted in Australia of men and women who hoped to have a child now or in the future, only 32 percent of respondents correctly identified the week during which a woman is most likely to get pregnant.³⁹⁷

Interviews of Latina and black women in the United States using fertility awareness methods found that most women abstained from sexual intercourse when they perceived they were fertile, but that only half accurately perceived when they were fertile.³⁹⁸ Many had not received accurate information from health care providers or family members.³⁹⁹

Even women who are actively trying to become pregnant do not know when they ovulate. A study evaluating the accuracy of the ovulation predictions of women in the UK trying to achieve pregnancy found that only 12.7 percent accurately predicted it, only 54.9 percent of estimated ovulation days were within the respondents’ respective fertile windows, and only 26.5 percent were on days of peak fertility.⁴⁰⁰ In a 1997 study in Auckland, New Zealand, only 26 percent of the 80 women struggling with infertility in the study had adequate fertility awareness, and 46 percent did not understand the symptoms of fertility or their meaning, despite the fact that all had been trying to conceive for at least two years.⁴⁰¹ However, 80 percent of women who had received natural family planning instruction previously had adequate fertility awareness knowledge.⁴⁰² Likewise, a 2012 study of 204 women who visited fertility clinics in Melbourne, Australia, over 83 percent of whom had attempted to get pregnant for at least one year, found that only 12.7 percent could accurately identify the fertile window, even though 86.8 percent had consulted the Internet, books, general practitioners, and other sources to improve their fertility awareness

Even women who are actively trying to become pregnant do not know when they ovulate.

³⁹⁵ See Lynette Leidy Sievert & Catherine A. Dubois, *Validating Signals of Ovulation: Do Women Who Think They Know, Really Know?*, 17 AM. J. HUM. BIOLOGY 310, 316 (2005).

³⁹⁶ *Id.*

³⁹⁷ See Karin Hammarberg et al., *Knowledge about factors that influence fertility among Australians of reproductive age: a population-based survey*, 99 FERTILITY & STERILITY 502, 505 (2013).

³⁹⁸ See Lina Guzman et al., *The use of fertility awareness methods (FAM) among young adult Latina and black women: what do they know and how well do they use it? Use of FAM among Latina and black women in the United States*, 88 CONTRACEPTION 232, 236 (2013).

³⁹⁹ *Id.* at 235.

⁴⁰⁰ Michael Zinaman et al., *Accuracy of perception of ovulation day in women trying to conceive*, J. OBSTETRICS & GYNECOLOGY 749, 751 (2012).

⁴⁰¹ See D. Blake et al., *Fertility awareness in women attending a fertility clinic*, 37 AUSTL. & N.Z. J. OBSTETRICS & GYNECOLOGY 350, 351–52 (1997).

⁴⁰² *Id.* at 352.

knowledge⁴⁰³ and 68.2 percent thought they had timed intercourse mainly within the fertile window.⁴⁰⁴ 94.5 percent felt that a woman who has trouble conceiving should receive fertility awareness education when she reports it to her doctor.⁴⁰⁵

B. Health and fertility literacy

Fertility literacy “is important for improving reproductive health, pregnancy outcomes, and chronic disease prevention.”⁴⁰⁶ It is broader than being able to identify ovulation and the fertile period. A number of modifiable factors have a significant negative impact on fertility, and thus it is important for women to be aware of them. Many lifestyle factors affect fertility,⁴⁰⁷ including cigarette smoking,⁴⁰⁸ caffeine consumption,⁴⁰⁹ exercise,⁴¹⁰ body mass index (being underweight or overweight),⁴¹¹ stress,⁴¹² and rotating shift work.⁴¹³ Age also has a significant impact on fertility and risk of pregnancy and delivery complications for both mother and baby.⁴¹⁴

Many lifestyle factors affect fertility, including cigarette smoking, caffeine consumption, exercise, body mass index (being underweight or overweight), stress, and rotating shift work. Age also has a significant impact on fertility and risk of pregnancy and delivery complications for both mother and baby.

⁴⁰³ See Kerry D. Hampton et al., *Fertility-awareness knowledge, attitudes, and practices of women seeking fertility assistance*, 69 J. ADVANCED NURSING 1076, 1081 (2013).

⁴⁰⁴ See *id.* at 1080.

⁴⁰⁵ *Id.*

⁴⁰⁶ Mary Lee Barron, *Fertility Literacy for Women in Primary Care Settings*, 9 J. NURSE PRACTITIONERS 161, 161 (2013).

⁴⁰⁷ See *id.* at 162–64; Yan Liu et al., *Factors Affecting Menstrual Cycle Characteristics*, 160 AM. J. EPIDEMIOLOGY 131, 139 (2004); Rowland et al., *supra* note 21, at 672–74.

⁴⁰⁸ G.C. Windham et al., *Cigarette Smoking and Effects on Menstrual Function*, 93 OBSTETRICS & GYNECOLOGY 59, 63 (1999).

⁴⁰⁹ Laura Fenster et al., *Caffeine Consumption and Menstrual Function*, 149 AM. J. EPIDEMIOLOGY 550, 554 (1999). See also Jorge E. Chavarro et al., *Caffeinated and Alcoholic Beverage Intake in Relation to Ovulatory Disorder Infertility*, 20 EPIDEMIOLOGY 374, 379 (2009) (finding that soft drink consumption is related to ovulatory infertility, but not due to caffeine or fructose).

⁴¹⁰ David L. Olive, *Exercise and fertility: an update*, 22 CURRENT OPINION OBSTETRICS & GYNECOLOGY 259, 259 (2010); Mary Jane de Souza et al., *Luteal Phase Deficiency in Recreational Runners: Evidence for a Hypometabolic State*, 88 J. CLINICAL ENDOCRINOLOGY & METABOLISM 337, 342–43 (2003); Barbara Sternfeld et al., *Physical Activity and Menstrual Cycle Characteristics in Two Prospective Cohorts*, 156 AM. J. EPIDEMIOLOGY 402, 407 (2002).

⁴¹¹ Janet W. Rich-Edwards et al., *Physical Activity, Body Mass Index, and Ovulatory Disorder Infertility*, 13 EPIDEMIOLOGY 184, 188 (2002).

⁴¹² Laura Fenster et al., *Psychological Stress in the Workplace and Menstrual Function*, 149 AM. J. EPIDEMIOLOGY 127, 131 (1999).

⁴¹³ Christina C. Lawson et al., *Rotating Shift Work and Menstrual Cycle Characteristics*, 22 EPIDEMIOLOGY 305, 309 (2011).

⁴¹⁴ See, e.g., O. Djahanbakhch et al., *Reproductive ageing in women*, 211 J. PATHOLOGY 219 (2007); ESHRE Capri Workshop Group, *Fertility and ageing*, 11 HUM. REPROD. UPDATE 261 (2005); Egbert R. te Velde & Peter T. Pearson, *The variability of female reproductive ageing*, 8 HUM. REPROD. UPDATE 141 (2002).

The largest international study on fertility decision-making found that the 10,045 respondents from 79 countries scored an average 56.9 percent on a 13-item fertility questionnaire that included questions on the effects on fertility of age, smoking, weight, and STIs.⁴¹⁵ Women, university-educated people, and people from very high Human Development Index countries fared better, and results suggest that education plays a greater role in fertility knowledge than fertility and parenting experiences.⁴¹⁶ The Australian study on women and men of reproductive age found that more than 40 percent did not know the fertility risks associated with smoking and obesity in women.⁴¹⁷ In a study on Welsh university students' knowledge of lifestyle risk factors for infertility (age, weight, smoking, alcohol consumption, stress, and STIs), the study authors surmised that participants' relatively high scores were due to their using "their knowledge about negative lifestyle factors in other health conditions to make an assumption about their effect on fertility," and did not have "genuine knowledge" about fertility.⁴¹⁸ In another study, 58 percent of female adolescents from communities with high prevalence of STIs thought they had little or no control over future fertility problems,⁴¹⁹ even though many risk factors are modifiable.

Age-related misconceptions about fertility are very common, even among highly educated individuals, and are becoming more prominent as postponing childbearing grows, especially in the West. A survey of American women aged 25–35 years who had not yet had children revealed that most thought they would have a relatively easy time conceiving, and most overestimated the likelihood of getting pregnant over a month of unprotected intercourse and underestimated how long it takes to get pregnant.⁴²⁰ Most of the women visited an Ob/Gyn regularly and preferred the Ob/Gyn as a source of information about fertility, but 52 percent had never discussed pregnancy plans with their Ob/Gyns and 78 percent had never discussed age as an infertility risk factor; most discussed contraception during their visits.⁴²¹ A study of Canadian women found similar results about incorrect fertility knowledge.⁴²² In a survey of American undergraduates, 32 percent of women and 36 percent of men overestimated the age

⁴¹⁵ See Laura Bunting et al., *Fertility knowledge and beliefs about fertility treatment: findings from the International Fertility Decision-making Study*, 28 HUM. REPROD. 385, 385, 397 (2013).

⁴¹⁶ *Id.* at 391.

⁴¹⁷ See Hammarberg et al., *supra* note 397, at 506.

⁴¹⁸ Laura Bunting & Jacky Boivin, *Knowledge about infertility risk factors, fertility myths and illusory benefits of healthy habits in young people*, 23 HUM. REPROD. 1858, 1859, 1862 (2008).

⁴¹⁹ Maria Trent et al., *Gender-based differences in fertility beliefs and knowledge among adolescents from high sexually transmitted disease-prevalence communities*, 38 J. ADOLESCENT HEALTH 282, 285 (2006). For a study on Swedish high schoolers, see Maria Ekelin et al., *Swedish high school students' knowledge and attitudes regarding fertility and family building*, 9 REPROD. HEALTH 6 (2012).

⁴²⁰ See EMD SERONO, IN THE KNOW: FERTILITY IQ 2011 SURVEY: FERTILITY KNOWLEDGE AMONG US WOMEN AGED 25–35 13–14 (2011).

⁴²¹ *Id.* at 23–24.

⁴²² See Judith C. Daniluk et al., *Childless women's knowledge of fertility and assisted human reproduction: identifying the gaps*, 97 FERTILITY & STERILITY 420, 424 (2012).

at which women's fertility is highest, 83 percent of women and 91 percent of men overestimated the age at which women's fertility declines slightly, and 67 percent of women and 81 percent of men overestimated the age at which women's fertility declines markedly, even though the average participant self-ranked as being slightly more than "somewhat educated" on fertility issues.⁴²³ A Finnish study of university students likewise found that more than half of the men and one-third of the women thought that a woman's fertility declines markedly after the age of 45, and more than half of men and 43 percent of women overestimated a woman's chance of becoming pregnant between the ages of 34 and 40.⁴²⁴ Studies of Canadian students,⁴²⁵ Italian students,⁴²⁶ Swedish students,⁴²⁷ and Israeli students⁴²⁸ show the same levels of lack of information. Even female health care professionals believe they can safely postpone childbearing due to overestimation of fertility at advanced ages.⁴²⁹

C. Knowledge of and feelings toward menstruation

A woman's awareness about her cycle should not just be limited to ovulation. Menstruation is another important event that indicates the healthy functioning of the body.⁴³⁰ However, for many girls and women around the world, knowledge about menstruation is low and stigma surrounds it, even though it is universal to all women.⁴³¹

Mothers are generally the most important source of information about menstruation for girls,

⁴²³ See Brennan D. Peterson et al., *Fertility awareness and parenting attitudes among American male and female undergraduate university students*, 27 *HUM. REPROD.* 1375, 1378–79 (2012).

⁴²⁴ See Aira Virtala et al., *Childbearing, the desire to have children, and awareness about the impact of age on female fertility among Finnish university students*, 16 *EUR. J. CONTRACEPTION & REPROD. HEALTH CARE* 108, 110 (2011).

⁴²⁵ See K.L. Bretherick et al., *Fertility and aging: do reproductive-aged Canadian women know what they need to know?*, 93 *FERTILITY & STERILITY* 2162 (2010).

⁴²⁶ See Valentina Rovei et al., *Family planning, fertility awareness and knowledge about Italian legislation on assisted reproduction among Italian academic students*, 20 *REPROD. BIOMED. ONLINE* 873, 878 (2010).

⁴²⁷ See C. Lampic et al., *Fertility awareness, intentions concerning childbearing, and attitudes towards parenthood among female and male academics*, 21 *HUM. REPROD.* 558, 561 (2006); T. Tydén et al., *Female university students' attitudes to future motherhood and their understanding about fertility*, 11 *EUR. J. CONTRACEPTION & REPROD. HEALTH CARE* 181 (2006); Agneta Svoog Svanberg et al., *Attitudes toward parenthood and awareness of fertility among postgraduate students in Sweden*, 3 *GENDER MED.* 187 (2006).

⁴²⁸ See Yael Hashiloni-Dolev et al., *The fertility myth: Israeli students' knowledge regarding age-related fertility decline and late pregnancies in an era of assisted reproduction technology*, 26 *HUM. REPROD.* 3045, 3051 (2011).

⁴²⁹ See Luise Lermark Mortensen et al., *Attitudes towards motherhood and fertility awareness among 20 – 40-year-old female healthcare professionals*, 17 *EURO. J. CONTRACEPTION & REPROD. HEALTH CARE* 468, 479 (2012).

⁴³⁰ See, e.g., Vigil et al., *Usefulness of Monitoring Fertility*, *supra* note 44; *Using the Menstrual Cycle as a Vital Sign*, *supra* note 75.

⁴³¹ See, e.g., Anant Kumar & Kamiya Srivastava, *Cultural and Social Practices Regarding Menstruation among Adolescent Girls*, 26 *SOC. WORK PUB. HEALTH* 594 (2011) (discussing cultural and social practices in Ranchi, India); Shannon A. MacMahon et al., *'The girl with her period is the one to hang her head': Reflections on menstrual management among schoolgirls in rural Kenya*, 11 *BMC INT'L HEALTH & HUM. RTS.* 1 (2011); Tazeen Saeed Ali & Syeda Naghma Rizvi, *Menstrual knowledge and practices of female adolescents in urban Karachi, Pakistan*, 33 *J. ADOLESCENCE* 531 (2010).

but they often do not provide sufficient information to educate their daughters or are embarrassed, indicating to their daughters that it is an embarrassing event.⁴³² Another important source of information is formal educational materials, but these often focus on hygiene—including trying to hide menstruation—and not on physiology and puberty.⁴³³ Adolescent girls largely do not understand what happens when menstruation occurs and cannot identify reproductive anatomy.⁴³⁴

The stigma surrounding menstruation is evident.⁴³⁵ Young girls who are not able to explain what occurs during menstruation nonetheless have internalized negative beliefs about changes related to menstruation.⁴³⁶ People rate a woman's competence lower and like her less if they are aware that she is menstruating,⁴³⁷ and menstruation affects a woman's self-presentation if she knows that others are aware she is menstruating.⁴³⁸ Further exacerbation is provided by menstrual product advertising, which does not provide girls and women with much information about the actual menstrual cycle and its functioning.⁴³⁹ Instead, advertising communicates that periods are burdensome, with themes of silence and shame, embarrassment, avoidance of "getting caught" being on one's period, and dirtiness, all of which result in heightening girls' and women's insecurities surrounding menstruation.⁴⁴⁰ For example, a girl receives the message that she should be embarrassed if someone finds out she is currently on her period, and to avoid this she must find ways to conceal menstruation with various products.⁴⁴¹ She cannot objectively evaluate the products she will use to affect her cycle if her experience is one of shame. This shame also leads women to take more sexual risks.⁴⁴²

The idea that menstruation is bad has led to the promotion of birth control methods that allow

⁴³² Carol C. Beausang & Anita G. Razor, *Young Western Women's Experiences of Menarche and Menstruation*, 21 HEALTH CARE FOR WOMEN INT'L 517, 524–25 (2000).

⁴³³ See Dacia Charlesworth, *Paradoxical constructions of self: educating young women about menstruation*, 24 WOMEN & LANGUAGE 13, 14–19 (2001).

⁴³⁴ See Elissa Koff & Jill Rierdan, *Early adolescent girls' understanding of menstruation*, 22 WOMEN & HEALTH 1, 7–12 (1995).

⁴³⁵ See, e.g., Ingrid Johnston-Robledo & Joan C. Chrisler, *The Menstrual Mark: Menstruation as Social Stigma*, 68 SEX ROLES 9 (2013); Robin M. Kowalski & Tracy Chapple, *The Social Stigma of Menstruation: Fact or Fiction?*, 24 PSYCHOL. WOMEN Q. 74 (2000).

⁴³⁶ Koff & Rierdan, *supra* note 434, at 16.

⁴³⁷ Tomi-Ann Roberts et al., *"Feminine protection": The effects of menstruation on attitudes towards women*, 26 PSYCHOL. WOMEN Q. 131, 135 (2002).

⁴³⁸ See Kowalski & Chapple, *supra* note 435, at 77.

⁴³⁹ M.R. Simes & D.H. Berg, *Surreptitious Learning: Menarche and Menstrual Product Advertisements*, 22 HEALTH CARE FOR WOMEN INT'L 455, 466 (2001).

⁴⁴⁰ *Id.* at 457–67.

⁴⁴¹ *Id.* at 466.

⁴⁴² Deborah Schooler et al., *Cycles of shame: Menstrual shame, body shame, and sexual decision-making*, 42 J. SEX. RES. 324, 332 (2005).

for short or no periods and reduced PMS.⁴⁴³ So long as this view perpetuates, cycle-shortening and cycle-stopping methods will continue to be popular.⁴⁴⁴ Women who experience menstruation normatively and routinely may begin to have body shame leading to poor sexual

The idea that menstruation is bad has led to the promotion of birth control methods that allow for short or no periods and reduced PMS. So long as this view perpetuates, cycle-shortening and cycle-stopping methods will continue to be popular.

decision-making as a result of the increasing emphasis on the desirability of menstrual suppression through hormonal contraception.⁴⁴⁵ When women lack information about menstruation and are influenced to view menstruation as a negative experience, the choice to use such methods is not fully informed.

D. Analysis: The need for FEMM

Given that so few women know simple facts about approximately when in the menstrual cycle ovulation occurs, what the signposts are for ovulation, and when fertility begins to decline, there is a clear need for hormonal health education. First, familiarity with her cycle allows a woman to identify when a possible underlying health problem exists, which can allow her to get necessary treatment in a timely manner; unfamiliarity with her cycle means health problems can go unrecognized and worsen over time.

Second, knowledge about fertility can help reduce unintended pregnancies, especially among young adults, because it empowers women and men to understand when not to have sex in order to avoid pregnancy.⁴⁴⁶ On the other hand, education can prevent the heartache of women who fear they are infertile but in reality do not understand when to time intercourse. It is startling that even women who are trying to get pregnant and especially those who have been trying for years are not aware of a woman's fertile period. The authors of the study of the women who visited fertility clinics in Australia stated that the discrepancy between the number of women who thought they correctly identified the fertile window and the number of women who actually did identify it "raises questions about the quality and accuracy of the information sources women are accessing and also the fact that the educational needs of women to integrate fertility-awareness information into knowledge and practice is not being

Education can prevent the heartache of women who fear they are infertile but in reality do not understand when to time intercourse.

⁴⁴³ Margaret L. Stubbs, *Cultural Perceptions and Practices around Menarche and Adolescent Menstruation in the United States*, 1135 ANNALS N.Y. ACAD. SCI. 58, 63 (2008).

⁴⁴⁴ *Id.*

⁴⁴⁵ Schooler et al., *supra* note 442, at 332.

⁴⁴⁶ See, e.g., BERGER ET AL., *supra* note 386, at 6.

addressed.”⁴⁴⁷ They recommend “[e]ducation of doctors (particularly general practitioners) in fertility-awareness methods and greater utilization of trained teachers by doctors and fertility specialists for women having trouble conceiving,” particularly in light of the 1997 study’s findings that 80 percent of women who had received natural family planning instruction could identify the fertile period.⁴⁴⁸

The authors of the study of Latina and black women using fertility awareness methods determined “that accuracy of use is driven largely by knowledge.”⁴⁴⁹ Even though the women did not use the methods correctly, there was a “silver lining”—they were at least “both tracking their cycle and abstaining from unprotected sex during what they perceived to be their fertile window.”⁴⁵⁰ This indicates that education focused on correct information about a woman’s cycle and the fertile period is needed.

FEMM recognizes that women cannot make truly informed decisions about what method to use without fully understanding their fertility. FEMM provides women with the tools they need to recognize the signs of their own fertility, thereby empowering them to make informed

FEMM provides women with the tools they need to recognize the signs of their own fertility, thereby empowering them to make informed decisions whether they are trying to achieve or to avoid pregnancy.

decisions whether they are trying to achieve or to avoid pregnancy. The fertility education they receive through FEMM is not abstract; they apply it by interpreting the observable events of their own cycles. Women are able to learn to recognize their fertility regardless of educational level and literacy status, important because many of the women most in need of FEMM—those

in developing countries—have not attained education beyond primary school⁴⁵¹ or are illiterate.⁴⁵²

Fertility literacy is another central component of FEMM’s education approach. Fertility literacy means awareness of factors that impact fertility. Women are unable to make informed choices about family planning and health care if they are not aware how their behaviors—such as delaying childbearing and smoking—are affecting their own fertility and health.

FEMM’s education approach also addresses the stigma and lack of information surrounding

⁴⁴⁷ Hampton et al., *supra* note 403, at 1081.

⁴⁴⁸ *See id.*

⁴⁴⁹ Guzman et al., *supra* note 398, at 236.

⁴⁵⁰ *Id.*

⁴⁵¹ *See* U.N. DEP’T OF ECON. & SOC. AFFAIRS, THE WORLD’S WOMEN 2010: TRENDS AND STATISTICS 51 (2010), http://unstats.un.org/unsd/demographic/products/Worldswomen/WW_full%20report_color.pdf.

⁴⁵² *See* CIA World Factbook, Literacy, <https://www.cia.gov/library/publications/the-world-factbook/fields/2103.html> (last visited Sept. 30, 2013).

menstruation. With the ability to track the progress and the vitality of the underlying hormonal processes, women understand how these processes govern their cycle's sequence of menses, ovulation, and the luteal phase, all indications of women's health. Health experts recommend that menstruation be used as a vital sign for reproductive health.⁴⁵³ Once young women understand that menstrual bleeding serves as a vital sign for their reproductive health, rather than raising concerns about bodily dysfunction, they can overcome or avoid developing feelings of shame about their reproductive cycle. This allows women to exercise their right to informed choice in making reproductive health care choices.

VI. Informed choice: Making informed health and family planning decisions

Every women's health education program should prioritize providing women with the information they need to make informed choices about their health care. Informed choice is "a process by which a woman can freely make decisions about possible health interventions and places decision-making in women's hands so that they can exercise their rights. The foundation of informed choice is information which is 'accurate, unbiased, complete and comprehensible'."⁴⁵⁴ An informed choice is "a voluntary, well-considered decision that an individual makes on the basis of options, information, and understanding."⁴⁵⁵ Informed choice has a firm basis in international law and declarations of political will, and it is established as necessary in the reproductive health field.

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Informed choice is most frequently discussed in the area of family planning. Informed choice policies and guidelines in this area often focus primarily on provision of information about family planning methods, including side effects and other methods available.⁴⁵⁶ While this information is important, it leaves out a necessary first step: because "[a]ll contraceptive methods prevent pregnancy by either influencing parts of the menstrual cycle or by keeping the man's sperm from reaching the woman's ovum (egg)," understanding how the menstrual cycle

⁴⁵³ See *Using the Menstrual Cycle as a Vital Sign*, *supra* note 75, at 2245.

⁴⁵⁴ *Ethical Aspects of the Introduction of Contraceptive Methods for Women*, ¶ 4, in FIGO COMMITTEE FOR THE STUDY OF ETHICAL ASPECTS OF HUMAN REPRODUCTION AND WOMEN'S HEALTH, *ETHICAL ISSUES IN OBSTETRICS AND GYNECOLOGY* 101 (2012) [hereinafter FIGO GUIDELINES].

⁴⁵⁵ ENGENDERHEALTH, *CHOICES IN FAMILY PLANNING: INFORMED AND VOLUNTARY DECISION MAKING* 4 (2003), <http://www.engenderhealth.org/files/pubs/counseling-informed-choice/choices.pdf>.

⁴⁵⁶ See, e.g., Upadhyay, *supra* note 373, at 1.

works and how a pregnancy occurs is critical to understanding how family planning methods work.⁴⁵⁷ A woman cannot fully comprehend the information a provider gives her—and thus cannot make a truly informed choice—if she does not understand how her body functions. Knowledge of hormonal health is therefore required for making informed choices. Unfortunately, as discussed above,⁴⁵⁸ women do not have proper knowledge of their hormonal health.

Family planning is not the only area in which knowledge of hormonal health allows women to make more informed choices. Many of a woman’s health decisions from menarche to menopause can be informed by an understanding of the healthy functioning of the menstrual cycle and ovulation and her observations of her own cycle patterns.⁴⁵⁹ However, this section focuses primarily on informed choice in family planning because as it currently stands most women lack the information necessary to make choices that are informed—and thus there is a corresponding need that can be met by FEMM.

A. Law and policy

1. International law

The International Covenant on Economic, Social and Cultural Rights (ICESCR), an international human rights treaty, enumerates “the right of everyone to the enjoyment of the highest attainable standard of physical and mental health.”⁴⁶⁰ The Committee on Economic, Social and Cultural Rights, the treaty-monitoring body (TMB) charged with monitoring the ICESCR, has commented that States are thus obligated to “support[] people in making informed choices about their health,”⁴⁶¹ although TMBs do not have the authority to bind States Parties to their observations and recommendations.⁴⁶²

Women and men have “[t]he same rights to decide freely and responsibly on the number and spacing of their children and to have access to the information, education and means to enable them to exercise these rights.” -Article 16, CEDAW

Article 10(h) of the Convention on the Elimination of All Forms of Discrimination against Women (CEDAW) requires States

ON TO CONTRACEPTIVE METHODS: A REFERENCE FOR REPRODUCTIVE
pdf/MenCyc.pdf.

al Rights art. 12, opened for signature Dec. 19, 1966, 993

U.N.T.S. 3.

⁴⁶¹ Committee on Economic, Social & Cultural Rights, *General Comment No. 14*, ¶ 37, U.N. Doc. E/C.12/2000/4 (Aug. 11, 2000).

⁴⁶² See, e.g., CTR. FOR REPROD. RIGHTS, *GAINING GROUND: A TOOL FOR ADVANCING REPRODUCTIVE RIGHTS LAW REFORM 17* (2007), available at http://reproductiverights.org/sites/default/files/documents/pub_bo_GG_advocacy.pdf; OFFICE OF THE UNITED NATIONS HIGH COMMISSIONER FOR HUMAN RIGHTS, *THE UNITED NATIONS HUMAN RIGHTS TREATY SYSTEM: AN INTRODUCTION TO THE CORE HUMAN RIGHTS TREATIES AND THE TREATY BODIES*, available at <http://www.ohchr.org/Documents/Publications/FactSheet30en.pdf>.

Parties to ensure women and men equal “[a]ccess to specific educational information to help to ensure the health and well-being of families, including information and advice on family planning.”⁴⁶³ Article 16 guarantees women and men “[t]he same rights to decide freely and responsibly on the number and spacing of their children and to have access to the information, education and means to enable them to exercise these rights.”⁴⁶⁴ The CEDAW Committee, the TMB for CEDAW, has stressed the importance of informed choice and informed consent. In an interpretation of Article 16, the Committee states, “In order to make an informed decision about safe and reliable contraceptive measures, women must have information about contraceptive measures and their use.”⁴⁶⁵ The Committee also issued a general recommendation on Article 12 on health that states, “Women have the right to be fully informed, by properly trained personnel, of their options in agreeing to treatment or research, including likely benefits and potential adverse effects of proposed procedures and available alternatives.”⁴⁶⁶ The recommendation also states that “acceptable services are those which are delivered in a way that ensures that a woman gives her fully informed consent.”⁴⁶⁷ The Committee calls for “all health services to be consistent with the human rights of women, including [. . .] informed consent.”⁴⁶⁸

The Convention on the Rights of the Child (CRC) recognizes the child’s right to health in Article 24.⁴⁶⁹ In implementing this right, States “shall take appropriate measures [t]o ensure that all segments of society, in particular parents and children, are informed, have access to education and are supported in the use of basic knowledge of child health and nutrition.”⁴⁷⁰ They should also “develop preventive health care, guidance for parents and family planning education and services.”⁴⁷¹ The CRC’s TMB, the Committee on the Rights of the Child, has stated, “Children require information and education on all aspects of health to enable them to make informed choices in relation to their lifestyle and access to health services. [. . .] Sexual

States should “develop preventive health care, guidance for parents and family planning education and services.” -Article 24, CRC

⁴⁶³ Convention on the Elimination of All Forms of Discrimination against Women art. 10(h), *opened for signature* Dec. 18, 1979, 1249 U.N.T.S. 13.

⁴⁶⁴ *Id.* art. 16(1)(e).

⁴⁶⁵ Committee on the Elimination of Discrimination against Women, *General recommendation No. 21: Equality in marriage and family relations*, (13th Sess., 1994), ¶ 22, in *Compilation of General Comments and General Recommendations Adopted by Human Rights Treaty Bodies*, at 342, U.N. Doc. HRI/GEN/1/Rev.9 (Vol. II) (May 27, 2008).

⁴⁶⁶ Committee on the Elimination of Discrimination against Women, *General recommendation No. 24: Article 12 of the Convention (women and health)*, (20th Sess., 1999), ¶ 1, in *Compilation of General Comments and General Recommendations Adopted by Human Rights Treaty Bodies*, *supra* note 465, at 362.

⁴⁶⁷ *Id.* ¶ 22.

⁴⁶⁸ *Id.* ¶ 31(e).

⁴⁶⁹ See Convention on the Rights of the Child art. 24(1), *opened for signature* Nov. 20, 1989, 1577 U.N.T.S. 3.

⁴⁷⁰ *Id.* art. 24(2)(e).

⁴⁷¹ *Id.* art. 24(2)(f).

and reproductive health education should include self-awareness and knowledge about the body, including anatomical, physiological and emotional aspects.”⁴⁷²

2. ICPD

The Programme of Action of the International Conference on Population Development echoes CEDAW. Paragraph 7.12 states, “The aim of family-planning programmes must be to enable couples and individuals to decide freely and responsibly the number and spacing of their children and to have the information and means to do so and to ensure informed choices and make available a full range of safe and effective methods.”⁴⁷³ It continues, “The principle of informed free choice is essential to the long-term success of family-planning programmes.”⁴⁷⁴

“The principle of informed free choice is essential to the long-term success of family-planning programmes.” -¶ 7.12, ICPD Programme of Action

Paragraph 7.23(b) calls on all family planning programs to “[p]rovide accessible, complete and accurate information about various family-planning methods, including their health risks and benefits, possible side effects and their effectiveness in the prevention of the spread of HIV/AIDS and other sexually transmitted diseases.”⁴⁷⁵ The Programme of Action laments that “reproductive health eludes many of the world’s people because of such factors as: [. . .] inappropriate or poor-quality reproductive health information and services.”⁴⁷⁶

3. FIGO guidelines

The International Federation of Gynecology and Obstetrics (FIGO), a global organization of “professional societies of obstetricians and gynaecologists,”⁴⁷⁷ has formulated a series of non-binding guidelines on ethical issues.⁴⁷⁸ According to FIGO, informed choice requires provision of information to women considering contraceptive use on “proper use, contra-indications, effectiveness in preventing pregnancy, need to continue to protect against sexually transmitted infections, possible side-effects, [and] possible interaction with other drugs or conditions.”⁴⁷⁹

⁴⁷² Committee on the Rights of the Child, *General comment No. 15 (2013) on the right of the child to the enjoyment of the highest attainable standard of health (art. 24)*, ¶ 60, U.N. Doc. CRC/C/GC/15 (Apr. 17, 2013).

⁴⁷³ International Conference on Population and Development, Sept. 5–13, 1994, *Report of the International Conference on Population and Development*, Ch. I, Res. 1, Annex, ¶ 7.12, U.N. Doc. A/CONF.171/13/Rev.1 (Oct. 18, 1994) [hereinafter ICPD Programme of Action].

⁴⁷⁴ *Id.*

⁴⁷⁵ *Id.* ¶ 7.23.

⁴⁷⁶ *Id.* ¶ 7.3.

⁴⁷⁷ FIGO, <http://www.figo.org/> (last visited Sept. 30, 2013).

⁴⁷⁸ See FIGO GUIDELINES, *supra* note 454.

⁴⁷⁹ *Ethical Aspects of the Introduction of Contraceptive Methods for Women*, ¶ 5, in FIGO GUIDELINES, *supra* note 454, at 101.

The woman must be told that “at any time she can decide to stop using the method she chooses,” including having her IUD or implant removed.⁴⁸⁰ In sterilization cases, FIGO guidelines state that first the person considering sterilization be informed that there are alternatives to sterilization, that it is permanent, and that “[I]f circumstances may change and the person may later regret” sterilization.⁴⁸¹

B. Information about family planning methods

The inability to make informed choices about family planning methods is aggravated by most women’s serious lack of information about how various family planning methods work and what their risks are when they are making a decision to use one. Informed choice requires that family planning providers give clients information about available family planning methods, including information about potential side effects, recommended actions in the event that undesirable side effects do occur, and time to return of fertility after stopping use. Informed choice involves a partnership between the family planning provider and the patient, wherein the provider provides information and the patient makes the choice using this input.⁴⁸²

1. Developing countries

In practice, provision of comprehensive information about family planning methods is not a reality in developing countries. USAID considers informed choice to be the

extent to which women have been informed about contraceptive methods[, which] is measured using three indicators: 1) percentage of currently married women using a clinical method who were informed of the side effects (at the time of obtaining the method), 2) percentage of currently married women using a clinical method who were informed of other methods (by a health/family planning worker), and 3) percentage of sterilized women who were informed before the operation that sterilization is permanent.⁴⁸³

⁴⁸⁰ *Id.* ¶ 6.

⁴⁸¹ *Ethical Considerations in Sterilization*, ¶ 8, in FIGO GUIDELINES, *supra* note 454, at 98.

⁴⁸² See Young Mi Kim et al., *Promoting Informed Choice: Evaluating a Decision-Making Tool for Family Planning Clients and Providers in Mexico*, 31 INT’L FAM. PLAN. PERSP. 162, 162 (2005).

⁴⁸³ SHANE KHAN ET AL., DHS COMPARATIVE REPORTS NO. 16: CONTRACEPTIVE TRENDS IN DEVELOPING COUNTRIES 5 (2007).

A 2007 USAID examination of family planning indicators found that “[i]n seven of the 29 countries with information on side effects, a majority of women were not informed about the potential side effects of their current method.”⁴⁸⁴ Data from this examination is in the table below, reproduced from the USAID report. An independent examination of 94 DHS surveys from 53 developing countries conducted by the authors shows that most women cannot make truly informed decisions because they are not provided with the necessary information.⁴⁸⁵ Two examples are detailed below: India, with one of the worst records on informed choice among the 53 countries surveyed, and Cambodia, with one of the best records, yet still without universal informed choice.

Table 5.6 Informed choice and use of contraception

Among currently married women who are currently using a modern method of contraception and who adopted the method in the past five years, percentage who were informed of the side effects of the method when they obtained it, and percentage who were informed of other contraceptive methods; and among currently married women who were sterilized in the past five years, percentage who were informed that sterilization is permanent, DHS surveys 2000-2005

Country/year	Informed of side effects	Informed of other methods	Number of women	Informed that sterilization is permanent	Number of women
Sub-Saharan Africa					
Benin 2001	49	66	211	*	7
Burkina Faso 2003	66	74	568	*	4
Cameroon 2004	58	65	267	*	31
Ghana 2003	64	65	433	(96)	32
Kenya 2003	60	62	1,096	91	72
Madagascar 2003-04	55	62	624	(95)	24
Malawi 2000	70	62	320	91	323
Mali 2001	62	50	453	*	16
Mozambique 2003	64	75	812	(81)	40
Namibia 2000	49	54	613	86	109
Nigeria 2003	51	59	223	*	8
Rwanda 2001	*	*	9	*	9
Uganda 2000	68	71	491	81	58
Zambia 2001	77 ^a	u	782	(100)	44
North Africa/West Asia/Europe					
Armenia 2000	69	21	46	94	46
Egypt 2003	42	43	3,225	u	0
Jordan 2002	63	70	1,581	97	70
Morocco 2003	25	36	3,244	81	68
South/Southeast Asia					
Bangladesh 2004	30	35	3,284	78	72
Cambodia 2000	71	65	1,057	86	58
Indonesia 2002-03	32	39	10,224	86	287
Nepal 2001	59	45	1,266	75	457
Philippines 2003	59	60	1,648	90	264
Latin America/Caribbean					
Bolivia 2003	70	78	2,136	89	300
Colombia 2005	52	61	6,274	87	2,375
Dominican Rep. 2002	40	u	4,320	73	1,986
Haiti 2000	53	55	979	91	58
Nicaragua 2001	54	68	2,896	89	695
Peru 2000	69	78	5,062	92	1,009

Note: Figures in parentheses are based on 25-49 unweighted cases. An asterisk indicates that a figure is based on fewer than 25 unweighted cases and has been suppressed.

u = Unknown (not available)

^a Ever told of side effects

Table 5.6, Shane Khan et al., DHS Comparative Reports No. 16: Contraceptive Trends in Developing Countries⁴⁸⁶

In India, sterilization camps were initiated under the direction of Prime Minister Indira Gandhi

⁴⁸⁴ *Id.* at 50.

⁴⁸⁵ Data from STATcompiler, <http://statcompiler.com>.

⁴⁸⁶ KHAN ET AL., *supra* note 483, at 50 tbl.5.6.

in 1975,⁴⁸⁷ and in these camps, rural Indians were often paid and sometimes forced to undergo vasectomies, leading to the sterilization of more than 6 million people within one year.⁴⁸⁸ Currently, the people of India are offered financial incentives to be sterilized,⁴⁸⁹ which indicates the absence of informed choice⁴⁹⁰ and disregard for the internationally recognized right to determine the number and spacing of one's children. The DHS data are revealing: in rural areas of India, only 21.2 percent of women undergoing sterilization were told about other methods of family planning, and only 29.7 percent in urban areas were told,⁴⁹¹ even though sterilization is a drastic, non-reversible procedure. Very few women were informed about side effects or other problems: in rural areas, 26.5 percent of women who had undergone sterilization, 34.8 percent of pill users, 48.5 percent of IUD users, and 36.2 percent of injectable users were informed about side effects; and in urban areas, 34.5 percent who had undergone sterilization, 37.7 percent of pill users, 57.2 percent of IUD users, and 57.1 percent of injectable users were informed about side effects.⁴⁹² Even fewer women in each category were informed what to do if they experienced side effects.⁴⁹³

In Cambodia, 74.7 percent of women who had undergone sterilization were told about other methods of family planning, and 68.3 percent of pill users, 83.8 percent of IUD users, 72.9 percent of injectable users, and 74 percent of implant users were told about other methods.⁴⁹⁴ 80.8 percent of women who had undergone sterilization, 70.2 percent of pill users, 93.4 percent of IUD users, 76.9 percent of injectable users, and 89.8 percent of implant users were told about possible side effects, and fewer were told what to do in case they experienced side effects.⁴⁹⁵

Women in developing countries also are not well-informed about the mode of action of the contraceptive methods they use. For example, in a study in Turkey, 66 percent of women receiving family planning counseling did not know how the contraceptive they were currently using worked.⁴⁹⁶

⁴⁸⁷ MARA HVISTENDAHL, UNNATURAL SELECTION: CHOOSING BOYS OVER GIRLS, AND THE CONSEQUENCES OF A WORLD FULL OF MEN 87–88 (2011).

⁴⁸⁸ *Id.* at 88.

⁴⁸⁹ See Jim Yardley, *India Tries Using Cash Bonuses to Slow Birthrates*, N.Y. TIMES, Aug. 21, 2010, available at <http://www.nytimes.com/2010/08/22/world/asia/22india.html>; Apurva, *In Rajasthan, get sterilised, grab a chance to win Nano*, INDIAN EXPRESS, July 2, 2010, available at <http://www.indianexpress.com/news/in-rajasthan-get-sterilised-grab-a-chance/811766/>.

⁴⁹⁰ See Ushma Upadhyay, *supra* note 373, at 12–13.

⁴⁹¹ INT'L INST. POPULATION SCI. & MACRO INT'L, NATIONAL FAMILY HEALTH SURVEY (NFHS-3), 2005–06: INDIA: VOLUME I 143 tbl.5.17 (2007).

⁴⁹² *Id.*

⁴⁹³ *Id.*

⁴⁹⁴ NAT'L INST. OF STATISTICS ET AL., CAMBODIA DEMOGRAPHIC AND HEALTH SURVEY 2010 82 tbl.7.9 (2011).

⁴⁹⁵ *Id.*

⁴⁹⁶ Pinar Topsever et al., *Counselling and knowledge about contraceptive mode of action among married women; a cross-sectional study*, 6 BMC WOMEN'S HEALTH 1, 5 (2006).

2. Developed countries

Women in developed countries also are not well-informed about contraceptive methods, even the ones that they are using or have used. A European study showed that European women do not know much about the mechanisms of family planning methods, even the ones they have used.⁴⁹⁷ Fewer than two percent of women could identify all possible modes of action of

A lack of understanding of what hormonal contraception is implies a lack of understanding both of the differences among contraceptive methods and of how hormonal contraception works.

hormonal contraceptives and IUDs, although highly educated women fared better than less educated women.⁴⁹⁸ 72.6 percent of the women desired information from the family planning provider about possible post-fertilization effects and 75.3 percent of women wanted to know about post-implantation effects.⁴⁹⁹ In an

American survey, almost half of women of reproductive age did not know what “hormonal contraception” refers to, and many of the women who were familiar with the term could not identify any hormonal methods.⁵⁰⁰ A lack of understanding of what hormonal contraception is implies a lack of understanding both of the differences among contraceptive methods and of how hormonal contraception works.

Women of Mexican origin living along the U.S.-Mexico border and using oral contraceptives had low knowledge about how those contraceptives work.⁵⁰¹ Nearly three in 10 stated they did not know how the pill works.⁵⁰² Many were able to say that the pill “tricked the body into believing it is pregnant,” but even then, they were not aware how this worked: one woman said the egg is tricked and so it does not attract the sperm.⁵⁰³ Most of the women knew the term “hormones” but did not know how they worked.⁵⁰⁴ The most frequent incorrect response was that hormones acted as a spermicide.⁵⁰⁵ The authors of the study indicate that just knowing that the body is tricked into thinking it is pregnant, although easy to communicate to patients, “is obviously not sufficient to prepare women to make informed decisions about their contraception, to evaluate side-effects or to assess the validity of what they hear from the

⁴⁹⁷ See Cristina Lopez-del Burgo et al., *Knowledge and beliefs about mechanism of action of birth control methods among European women*, 85 *CONTRACEPTION* 69, 73 (2012).

⁴⁹⁸ *Id.*

⁴⁹⁹ *Id.*

⁵⁰⁰ See *CONTRACEPTION IN AMERICA: UNMET NEEDS SURVEY EXECUTIVE SUMMARY 20–21* (2012),

http://www.contraceptioninamerica.com/downloads/Executive_Summary.pdf.

⁵⁰¹ Michele Shedlin et al., *Knowledge and beliefs about reproductive anatomy and physiology among Mexican-Origin women in the USA: implications for effective oral contraceptive use*, 15 *CULTURE HEALTH & SEXUALITY: AN INT’L J. FOR RES. INTERVENTION & CARE* 466, 471–72 (2013).

⁵⁰² *Id.* at 471.

⁵⁰³ *Id.*

⁵⁰⁴ *Id.*

⁵⁰⁵ *Id.*

media, friends and other non-medical sources.”⁵⁰⁶

A study across five European countries (France, Germany, Italy, Spain, and the United Kingdom) found that 55 percent of the women who had been sterilized had not received adequate information and counseling about alternative reversible contraceptives.⁵⁰⁷ Fewer than 30 percent of the women undergoing sterilization in France, Spain, and the UK were told about alternatives.⁵⁰⁸

A study across five European countries found that 55 percent of the women who had been sterilized had not received adequate information and counseling about alternative reversible contraceptives.

3. Exclusion of methods

Also problematic is the exclusion of information about knowledge-based methods from family planning programs and campaigns, despite the emphasis of the ICPD Programme of Action on the need for availability of a wide range of methods.⁵⁰⁹ Doctors have the greatest influence on women’s choice of method and most commonly recommend the pill and the male condom.⁵¹⁰ Knowledge-based methods are often overlooked, even though they are appealing to women who might not want to use methods with chemicals or hormones.⁵¹¹ Reasons that knowledge-based methods are not taught to family planning clients include providers’ insufficient knowledge and training, providers’ bias, time constraints, and patient confusion.⁵¹²

C. Analysis: The need for FEMM

FEMM fills the gap left by the many family planning programs that provide a wide array of artificial family planning methods but do not provide a safe, effective, natural method. Furthermore, FEMM partners with and instructs doctors and nurses so that they may provide support to women who are using FEMM and to introduce FEMM to more women. FEMM aims to reduce providers’ misconceptions about fertility awareness and to equip them to teach it to their clients in an unbiased way.

It is also startling that so few women know how their contraceptive methods work or are

⁵⁰⁶ *Id.*

⁵⁰⁷ See Skouby, *supra* note 359, at S48.

⁵⁰⁸ *Id.*

⁵⁰⁹ See ICPD Programme of Action, *supra* note 473, ¶ 7.12.

⁵¹⁰ Sarah Johnson et al., *Current methods and attitudes of women towards contraception in Europe and America*, 10 REPROD. HEALTH 1, 7 (2013).

⁵¹¹ See, e.g., Witt et al., *supra* note 393, at 103.

⁵¹² Kelly et al., *supra* note 380, at 36, 38–39; Stephen R. Pallone & George R. Bergus, *Fertility Awareness-Based Methods: Another Option for Family Planning*, 22 J. AM. BD. FAM. MED. 147, 148 (2009).

warned about the potential side effects and health concerns associated with them. FEMM informs women about the risks of side effects and contraindications and also educates them about how some methods work to suppress the healthy functioning of the body, guided by the understanding that this information is essential for women to make an informed choice. Necessary to understanding the modes of action of contraceptives is knowledge about a woman's cycle, which FEMM teaches. FEMM and other knowledge-based methods are the only family planning methods that have no risk of side effects or health problems and do not alter a woman's fertility. Because of this, FEMM does not promote any other family planning methods, but it recognizes that other methods are widely available and that many women will choose them; regardless, FEMM empowers all women to make more informed choices by providing this information.

Finally, because FEMM empowers women to understand how their bodies work, to identify menstrual irregularities, and to understand how to achieve or avoid pregnancy, it can be used

Because FEMM empowers women to understand how their bodies work, to identify menstrual irregularities, and to understand how to achieve or avoid pregnancy, it can be used by countries to fulfill their obligations under relevant international treaties.

by countries to fulfill their obligations under relevant international treaties. The provision of health information and education called for in human rights treaties necessarily

includes information about hormonal health, the menstrual cycle, ovulation, and fertility. Women who participate in FEMM are better able to make informed choices about family planning and to exercise their right to determine the number and spacing of their children. FEMM provides women with information and medical care that improves health outcomes by identifying underlying health problems, allowing for timely treatment.

VII. Addressing the campaign to reduce unmet need: The need for a new approach

Family planning has significant political and funding implications, and with so much at stake, it is necessary that the focus be on what women and men really need and want. In July 2012, the Bill and Melinda Gates Foundation and the United Kingdom co-hosted the London Summit on Family Planning.⁵¹³ Spearheaded by Melinda Gates, "the plan was to raise sufficient money to take a giant step toward reducing the existing unmet need for family planning services and to strengthen the political commitment to do so."⁵¹⁴ The Summit resulted in \$4.6 billion in financial commitments through 2020, including \$2 billion from developing countries, on top of

⁵¹³ Susan A. Cohen, *London Summit Puts Family Planning Back on the Agenda, Offers New Lease on Life for Millions of Women and Girls*, GUTTMACHER POL'Y REV., Summer 2012, at 20, 20.

⁵¹⁴ *Id.*

countries' already existing commitments to family planning.⁵¹⁵ As defined by the WHO,

[t]he percent with an unmet need for family planning is the number of women with unmet need for family planning expressed as a percentage of women of reproductive age who are married or in a union. Women with unmet need are those who are fecund and sexually active but are not using any method of contraception, and report not wanting any more children or wanting to delay the birth of their next child.⁵¹⁶

According to a 2012 report by UNFPA and the Guttmacher Institute, 222 million women have an "unmet need for modern contraception."⁵¹⁷ This is the same figure currently used by the WHO.⁵¹⁸

With origins in 1960s surveys on knowledge, attitudes, and practices (KAP), the concept of unmet need was firmly rooted in family planning advocacy and funding appeals by the 1994 International Conference on Population and Development in Cairo.⁵¹⁹ Some economists suggest the concept was invented as an advocacy tool to increase funding for family planning programs given objections from countries that were resistant to expanding their programs due to women's lack of desire to use contraceptives.⁵²⁰ Nearly every agency and organization involved in reproductive health and family planning, including the WHO, UNFPA, International Planned Parenthood Federation, and Marie Stopes International, emphasizes unmet need.

⁵¹⁵ *Id.*

⁵¹⁶ WHO, Sexual and reproductive health, Unmet need for family planning, http://www.who.int/reproductivehealth/topics/family_planning/unmet_need_fp/en/ (last visited Sept. 30, 2013).

⁵¹⁷ UNFPA & GUTTMACHER INST., ADDING IT UP: COSTS AND BENEFITS OF CONTRACEPTIVE SERVICES ESTIMATES FOR 2012 1 (2012), <http://www.guttmacher.org/pubs/AIU-2012-estimates.pdf>.

⁵¹⁸ See WHO, Family planning, Fact sheet No. 351, <http://www.who.int/mediacentre/factsheets/fs351/en/> (last visited Sept. 30, 2013) [hereinafter WHO, Fact sheet].

⁵¹⁹ See John B. Casterline & Steven W. Sinding, *Unmet Need for Family Planning in Developing Countries and Implications for Population Policy*, 26 POP. & DEV. REV. 691, 692–97 (2000).

⁵²⁰ See, e.g., Posting of Lant Pritchett to Development Impact, <http://blogs.worldbank.org/impacetevaluations/node/531> (Apr. 8, 2011, 12:04 EDT) ("I am convinced the 'unmet need' numbers were created to counter the objection many countries had to expanding family planning programs that women didn't really want it."). See also Posting of Dominic Montagu to Development Impact, <http://blogs.worldbank.org/impacetevaluations/node/531> (Apr. 7, 2011, 23:33 EDT) ("A need with no demand might make sense for political activism, but not for programs or policies.").

A. Unmet need: A faulty concept

There are several problems with the concept of unmet need for family planning.⁵²¹ First, the definition obscures why women are not using contraceptives. It is not a matter of *need* due to cost, lack of access, or lack of awareness. Many family planning organizations frame unmet need as a supply problem, incorrectly emphasizing great demand in the face of immense lack of access.⁵²² However, data indicate that fewer than 5 percent of married women with unmet need in 28 countries cited cost as a barrier, and fewer than 5 percent of married women in 16 countries cited access as a barrier, with numbers reaching 10 to 20 percent in seven sub-Saharan African countries.⁵²³ In 19 countries only 0 to 2 percent of women with an alleged unmet need for contraception had no knowledge of contraception, with numbers only reaching 10 to 15 percent in countries where this reason was most prevalent.⁵²⁴ For unmarried women with unmet need, these were also not prominent reasons for contraceptive nonuse.⁵²⁵ The infrequency of access, cost, and awareness reasons for not using contraception indicates the reality that increasing funding for and provision of contraceptives

The definition of unmet need for family planning obscures why women are not using contraceptives. It is not a matter of need due to cost, lack of access, or lack of awareness.

⁵²¹ For an excellent overview of the problem with the concept of unmet need, see Lant Pritchett, *No Need for Unmet Need*, Presentation at the Johns Hopkins School of Hygiene and Public Health Population Center Seminar Series (Feb. 12, 1996).

⁵²² See, e.g., UNFPA, STATE OF WORLD POPULATION 2012: BY CHOICE, NOT BY CHANCE: FAMILY PLANNING, HUMAN RIGHTS AND DEVELOPMENT 10 (2012), http://www.unfpa.org/webdav/site/global/shared/swp/2012/EN_SWOP2012_Report.pdf (“An estimated 222 million women in developing countries lack access to modern contraceptives.”) [hereinafter UNFPA, STATE OF WORLD POPULATION 2012]; THE PARTNERSHIP FOR MATERNAL, NEWBORN & CHILD HEALTH, KNOWLEDGE SUMMARY #20: ACCESS TO FAMILY PLANNING 2 (2012), http://www.who.int/pmnch/topics/part_publications/ks20_high.pdf (“More than 222 million women globally lack access to family planning in 2012.”); Bill & Melinda Gates Foundation, What We Do: Family Planning Strategy Overview, <http://www.gatesfoundation.org/What-We-Do/Global-Development/Family-Planning> (last visited Sept. 30, 2013) (“[M]ore than 220 million women in developing countries who don’t want to get pregnant lack access to effective methods of contraception and voluntary family planning information and services.”); Int’l Planned Parenthood Fed’n, Vision 2020, 10 steps to a fairer world, <http://ippf.org/vision2020> (last visited Sept. 30, 2013) (“222 million women and girls world-wide still lack access to the contraceptives they want and need.”); Pathfinder Int’l, Contraception & Family Planning, <http://www.pathfinder.org/our-work/focus-areas/contraception-family-planning/> (last visited Sept. 30, 2013) (“[M]ore than 222 million women currently want, but lack access to family planning[.]”); Marie Stopes Int’l, <http://www.mariestopes.org/> (last visited Sept. 30, 2013) (“222 million women without access to family planning: we exist to serve them[.]”).

⁵²³ See GILDA SEDGH ET AL., WOMEN WITH AN UNMET NEED FOR CONTRACEPTION IN DEVELOPING COUNTRIES AND THEIR REASONS FOR NOT USING A METHOD 37 (2007), <http://www.guttmacher.org/pubs/2007/07/09/or37.pdf>. See also Mohammed Mahmoud Kotb et al., *Women in Cairo, Egypt and their risk factors for unmet contraceptive need: a community-based study*, 37 J. FAM. PLAN. & REPROD. HEALTH CARE 26, 26 (2011) (“Although modern family planning methods are readily available in Egypt at low cost, a considerable proportion of women still have an unmet contraceptive need.”).

⁵²⁴ See SEDGH ET AL., *supra* note 523, at 37.

⁵²⁵ *Id.* at 40–41.

does not translate to increased contraceptive uptake—many of the women identified as having unmet need simply do not *want* to use contraceptives and would not use it even if it were available and high-quality.⁵²⁶ The reasons most often given by married women for not using contraception were side effects, health concerns, and inconvenience, with numbers at 20 to 50 percent of women in 26 of 36 countries surveyed.⁵²⁷ Fear of side effects is not limited to physical complications but also includes lost time and financial resources in dealing with the side effects, possible loss of work productivity, and possible interference with spousal sexual relations.⁵²⁸

Opposition based on personal religious or cultural beliefs or the partner's beliefs was a reason provided by 30 to 45 percent of women in Chad, Guinea, Mauritania, and Nigeria, and by more than 20 percent in 15 other countries.⁵²⁹ For unmarried women with unmet need, the most commonly cited reasons for not using contraception were “perceived low risk of pregnancy because of infrequent sexual activity, a perception that they should not or need not use contraception because they are not married, and concerns about side effects or health consequences of contraception.”⁵³⁰ Thus, the concept of unmet need for contraception clearly includes women who cannot be considered as having a “need,” since it is something they do not want,⁵³¹ contrary to the claims of UNFPA.⁵³²

Opposition to contraception based on personal religious or cultural beliefs or the partner's beliefs was a reason provided by 30 to 45 percent of women in Chad, Guinea, Mauritania, and Nigeria, and by more than 20 percent in 15 other countries.

Second, declaring that these women have a *need* for contraception—even though they do not *want* to use it—is, as development economist Lant Pritchett has commented, “symptomatic of the of the [sic] deep disrespect for women and their agency that the demographically driven family planning programs have often displayed.”⁵³³ As Matthew Connelly details in *Fatal*

⁵²⁶ See WORLD BANK, UNMET NEED FOR CONTRACEPTION AT A GLANCE 1 (2010), <http://siteresources.worldbank.org/INTPHAAG/Resources/UnmetNeedforContraceptionAAG040610.pdf>.

⁵²⁷ See SEDGH ET AL., *supra* note 523, at 37–38.

⁵²⁸ Casterline & Sinding, *supra* note 519, at 711.

⁵²⁹ SEDGH ET AL., *supra* note 523, at 37.

⁵³⁰ *Id.* at 39.

⁵³¹ It also includes women who “identify their current pregnancy as unintended; or are experiencing postpartum amenorrhea after an unintended pregnancy.” See UNFPA & GUTTMACHER INST., *supra* note 517, at 4. These women, by definition, do not have an unmet need for contraception, so it is disingenuous to include them in the calculation. See Pritchett, *supra* note 521, at 12–13.

⁵³² See UNFPA, Reproductive Health, Ensuring That Every Pregnancy is Wanted, <http://www.unfpa.org/rh/planning.htm> (last visited Sept. 30, 2013) (“At least 200 million women want to use safe and effective family planning methods, but are unable to do so because they lack access to information and services or the support of their husbands and communities.”).

⁵³³ Posting of Lant Pritchett, *supra* note 520.

Misconception, family planning programs in developing countries arose not out of a concern for women's health but out of a concern on the part of wealthy Westerners to reduce population growth in these countries, regardless of the number of children women (and men) wanted.⁵³⁴ Consequences of this attitude included coercive mass sterilization camps in India⁵³⁵ and coercive IUD insertion and other population control policies and programs in such countries as India, Pakistan, Puerto Rico, and Taiwan.⁵³⁶ The attempts of unmet need's proponents to convince women of the merits of using contraception—for example, by saturating local media with advertisements touting use of contraceptives as a component of responsible parenthood or promoting a small family norm⁵³⁷—are paternalistic efforts to tell women what they really “need.”

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Third, reflecting the first two points, unmet need proponents use a narrow definition of family planning by measuring unmet need for “modern contraception,” which they define to include “male and female sterilization, IUDs, implants, injectables, pills, male condoms and other supply methods, such as spermicides and female condoms.”⁵³⁸ They consider knowledge-based and

fertility awareness methods to be “traditional” methods of contraception,⁵³⁹ and thus women who use these methods are included in the number of women who have unmet need.⁵⁴⁰ They claim that these methods “are more likely to fail than modern methods.”⁵⁴¹ This ignores that modern knowledge-based methods are based on modern science, as it lumps modern

⁵³⁴ See, e.g., MATTHEW CONNELLY, FATAL MISCONCEPTION: THE STRUGGLE TO CONTROL WORLD POPULATION 9–14 (2008). See also Posting of Lant Pritchett, *supra* note 520.

⁵³⁵ See CONNELLY, *supra* note 534, at 221–22, 227–28, 317–19, 324–26 (2008); HVISTENDAHL, *supra* note 487, at 77–78 (2011).

⁵³⁶ See CONNELLY, *supra* note 534, at 10–11, 113–14, 218–27.

⁵³⁷ See, e.g., Melanie A. Wakefield et al., *Use of mass media campaigns to change health behaviour*, 376 LANCET 1261, 1266 1 (2010); John Cleland et al., *Family planning: the unfinished agenda*, 368 LANCET 1810, 1810 panel 1 (2006) (“The keys to effective and sustainable family-planning programmes are well established: [. . .] legitimisation of the idea of smaller families and modern contraceptives through mass media etc[.]”).

⁵³⁸ UNFPA & GUTTMACHER INST., *supra* note 517, at 4. See also Leontine Alkema et al., *National, regional, and global rates and trends in contraceptive prevalence and unmet need for family planning between 1990 and 2015: a systematic and comprehensive analysis*, 381 LANCET 1642 app. § 1.2 (2013) (“Modern methods of contraception include female and male sterilization, oral hormonal pills, the intra-uterine device (IUD), male and female condoms, injectables, the implant (including Norplant), vaginal barrier methods and emergency contraception. Traditional methods of contraception include rhythm (periodic abstinence), withdrawal, prolonged abstinence, breastfeeding, douching, lactational amenorrhoea method (LAM) and folk methods.”).

⁵³⁹ See WHO, Fact sheet, *supra* note 518.

⁵⁴⁰ See, e.g., Charles F. Westoff, DHS ANALYTICAL STUDIES NO. 28: UNMET NEED FOR MODERN CONTRACEPTIVE METHODS 1 (2012), <http://measuredhs.com/pubs/pdf/AS28/AS28.pdf>.

⁵⁴¹ UNFPA & GUTTMACHER INST., *supra* note 517, at 4.

knowledge-based methods in with older, less successful practices like the rhythm method and withdrawal. By lumping together modern and traditional natural methods, family planning proponents deliberately exclude solutions that actually can address the reasons they claim so many women have “unmet need.” However, it is clear that many women who are trying to use fertility awareness or natural family planning methods do not have sufficient training to do so and are classified as having unmet need,⁵⁴² indicating the need for proper education of these women who are already using such methods.

B. Analysis: The need for FEMM

Examining where the concept of unmet need for contraception errs is important because it shows that the current family planning funding and policy focus is failing women. The \$4.6 billion committed to family planning at the London Summit and the \$8.1 billion per year that Guttmacher has identified as necessary to “fully meet[] the contraceptive needs of all women in the developing world with appropriate services”⁵⁴³ will not do much to reduce “unmet need” if the focus remains on increasing access to contraception that women do not want to or cannot use. The emphasis on including family planning in the post-2015 sustainable development framework⁵⁴⁴ will divert attention from real development solutions if it focuses on unmet need. These funds and policy agendas will not help women who do want to delay or space their pregnancies or who do not want any more children but cannot or do not want to use the “modern” contraceptives they prioritize. Further, results-oriented family planning programs that set targets for new contraceptive users and increased contraceptive uptake may be tempted to use coercive or unduly influential tactics to meet these targets if women are resistant to participate, which highlights a potential human rights abuse consequence of the incorrect unmet need approach.⁵⁴⁵

FEMM addresses the failures of the unmet need approach, including its disregard of the reasons women do not want to use contraception and its paternalistic attitudes about what women’s fertility should be in developing countries. FEMM is compatible with all religions and cultures and does not pose any health concerns or potential side effects. FEMM empowers women to make their own fertility decisions through understanding how their bodies work, and enables them to know how to both avoid and achieve pregnancy. FEMM can educate women who are improperly using what they think are natural family planning or fertility

FEMM is compatible with all religions and cultures and does not pose any health concerns or potential side effects.

⁵⁴² See Arévalo, *Expanding NFP*, *supra* note 172, at 281.

⁵⁴³ UNFPA & GUTTMACHER INST., *supra* note 517, at 13.

⁵⁴⁴ See UNFPA, STATE OF WORLD POPULATION 2012, *supra* note 522, at 100–02.

⁵⁴⁵ See *id.* at 13 (highlighting that family planning targets should not be allowed).

awareness methods but are in fact acting on insufficient or incorrect information.⁵⁴⁶ Further, evidence shows that women are interested in using natural family planning or fertility awareness methods, and FEMM is able to meet their needs.⁵⁴⁷

VIII. Conclusion

The case for FEMM is clear. Comprehensive education on women's hormonal health is needed at a time when it is evident that women around the world do not understand how their bodies work or the importance of understanding and monitoring their hormones and other reproductive biomarkers. Women experiencing irregular cycles, depression, weight gain, and other common symptoms relating to hormonal imbalances require health care that treats the underlying health problems and not just the symptoms. Women's health is much more than contraception and, when the time comes, managing pregnancy and childbirth. Women desiring to avoid pregnancy deserve more than just an offering of artificial contraceptive methods that have mechanisms of action that interrupt the healthy functioning of the body and that may cause side effects. It violates their rights to have to make family planning decisions with incorrect or insufficient information.

FEMM answers this need for comprehensive education by teaching women how to observe and understand the biomarkers of their own cycles, and how to use this knowledge to achieve optimum health and to plan their families. This knowledge allows each woman to understand how methods of family planning work and which method is best for her. With this knowledge and information, she can become an active participant in her health care and health decisions, and can work with her health care provider to achieve long-term health care outcomes.

Women around the world can benefit from FEMM, regardless of country, income level, educational background, literacy, or marital status. Countries can implement FEMM in their national health care programs to meet international legal obligations and political commitments to providing women with health education and information. Policies and funding must reflect the needs and desires of women and what will actually work to meet them. This may involve examining education and preventive approaches to women's health care, such as FEMM. When women are educated through FEMM, they are empowered to make their own health-focused decisions, resulting in a healthier world.

⁵⁴⁶ See Arévalo, *Expanding NFP*, *supra* note 172, at 281.

⁵⁴⁷ See, e.g., Clinton J. Leonard et al., *Survey of attitudes regarding natural family planning in an urban Hispanic population*, 74 *CONTRACEPTION* 313 (2006); Rafael T. Mikolajczyk et al., *Factors influencing the choice to use modern natural family planning*, 67 *CONTRACEPTION* 253 (2003); Joseph B. Stanford, *Women's interest in natural family planning*, 46 *J. FAM. PRAC.* 65 (1998).