Plan D – Know your cycle to help determine your fertility

Now that you've decided that you'd like to try for a baby, you are about to embark on a fascinating journey of self-discovery. The first step for you will be to become very familiar with your own body and its unique cyclical patterns. This may help you to identify your fertile times and increase your chances of conceiving.

1. What is natural family planning?

Observing and charting the changes your body goes through during the menstrual cycle gives you vital clues about your fertility status. Natural Family Planning employs various methods to help you understand and chart your fertility signals and fertile times.

- Ovulation (or Billings) Method uses observations of your cervical mucus;
- Temperature Method uses observations of your basal body temperature (BBT);
- Symptothermal Method uses observations of both your cervical mucus and BBT, as well as secondary signs such as cervical changes. The Symptothermal Method is considered the most effective method for identifying when you are most fertile.

2. Fertility facts

The Menstrual Cycle: The menstrual cycle follows the periodic changes that occur in a woman's body as a result of fluctuations in the levels of various hormones. It is generally 28 days long but the exact length can vary from woman to woman, or cycle to cycle. The length of the cycle is measured from the first day of bleeding (spotting doesn't count), which is called day 1, to the first day of bleeding of the next menstrual period.

Your cycle is composed of the following phases:

Menses: This is your period (from the first day of menstruation).

- Follicular phase: The follicular phase, or the *pre-ovulatory* phase, extends from the beginning of the cycle to ovulation. During this phase, the ovarian follicles (which eventually give rise to the egg which is expelled at ovulation) develop and mature, and your body prepares for ovulation. This phase is generally around 14 days, but can vary from woman to woman or cycle to cycle. Most of the variation in cycle lengths is due to variations in the length of the follicular phase.
- Ovulation: Ovulation, when the dominant ovarian follicle ruptures and releases the egg, or ovum (which can then be fertilized), usually occurs around day 14 of a 28-day cycle.
- Luteal phase: This is the *post-ovulatory* phase, the time from ovulation until the end of the cycle, and is generally 14 days. The length of this phase is fairly constant for most women.

Hormones: Your menstrual cycle is driven by hormones produced in your ovaries. Hormones are chemical messengers which are released into the bloodstream and which regulate the activity of many bodily functions, including reproductive processes.

Oestrogen: is one of the major female sex hormones released by the ovaries and is the dominant hormone in the pre-ovulatory phase. Increasing oestrogen levels leading up to ovulation causes:

- growth of ovarian follicles
- production of increasing amounts of 'fertile' mucus (which aids the movement of sperm into the uterus and is capable of supporting viable sperm for 3 to 5 days)
- the cervix to soften and rise, and its opening to widen to allow the passage of sperm
- thickening of the lining of the uterus (endometrium) to prepare to receive the fertilised egg (if there is one)

As oestrogen levels decrease following ovulation, the cervix lowers, hardens and closes, and the mucus becomes 'infertile' and hostile to sperm.

Progesterone: In the post-ovulatory, luteal phase of the cycle, the corpus luteum (the remains of the ovarian follicle after ovulation – see below under 'Luteinising Hormone') starts to secrete increasing amounts of the second major female sex hormone, *progesterone*, which causes:

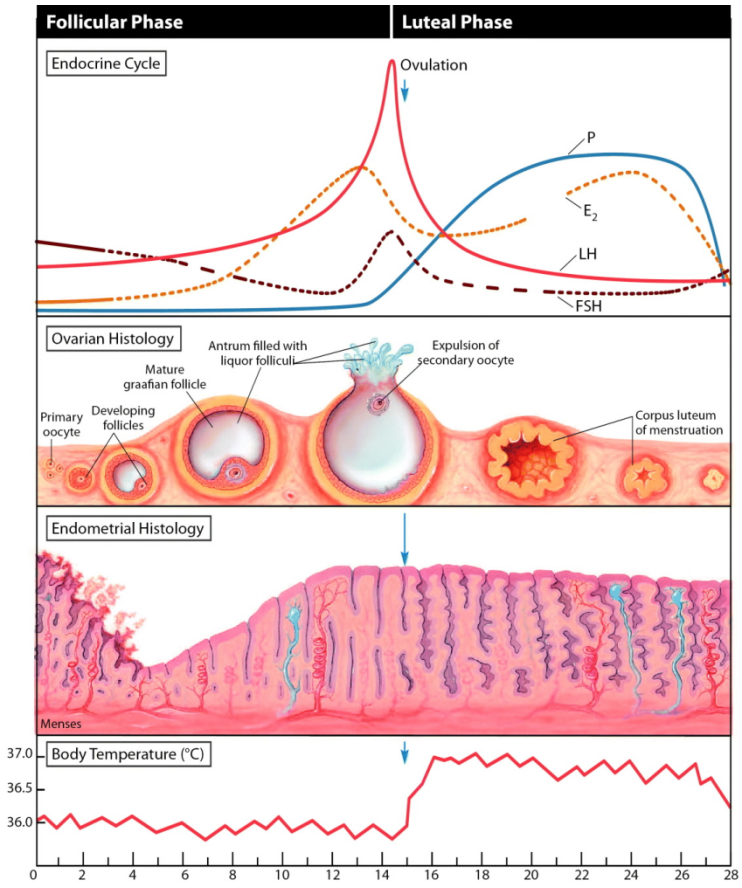
- the lining of the uterus to continue thickening, fully supplied with blood and nutrients so that it is ready for the egg
- the body's temperature at rest (basal body temperature, or BBT) to rise after ovulation (measurable with a BBT thermometer)
- the cervical mucus to lessen and thicken and become 'infertile'
- the ovary to stop releasing eggs

Progesterone is also the dominant hormone during pregnancy should conception occur.
Luteinising Hormone (LH): Just before ovulation, a sudden surge of LH causes the release of the ripest egg from its follicle, leaving a crater on the surface of the ovary which becomes the *corpus luteum*. The role of LH is to:

- allow the final maturation and growth of the dominant follicle
- trigger ovulation
- develop the corpus luteum and support its secretion of progesterone

The lifespan of the corpus luteum is about 12 to 16 days, so ovulation is nearly always approximately 2 weeks before the start of the next period. If pregnancy doesn't occur, the corpus luteum shrivels up and stops producing hormones, the uterine lining breaks down and, with blood, leaves the uterus during menstruation.

Figure 1: Basal Body Temperature Assessment



The Fertile Window: Studies show that there is essentially a 6-day window of fertility, ending with the day of ovulation. The most fertile day is generally a day or two before ovulation, with the chance of conception highest in the presence of the most fertile type of cervical mucus. According to the World Health Organization,

the probability of pregnancy is greatest (66.7%) on the day of peak mucus but decreases to 8.9% three days after the peak mucus day.

Although the egg is viable for (at most) 24 hours after ovulation, sperm can live in the woman's reproductive tract for approximately 3 days, which means intercourse 3 or more days before, and up to the day of ovulation, could result in pregnancy. Studies suggest that conception on the day after ovulation rarely occurs.

3. The symptothermal method

If you are using either the ovulation method or the symptothermal method, you must learn to make observations about your cervical mucus throughout your cycle. Observing the changes to your cervical mucus is the most reliable way to assess your fertility and approaching ovulation. With each trip to the bathroom, you observe the presence and characteristics of the mucus, and record your observations. At mid-cycle, near the time of ovulation, you will notice an increase in the amount of cervical mucus, which becomes clear and very stretchy, in response to increasing levels of oestrogen. This type of mucus means that you are at your most fertile.

In addition to charting mucus, you will take and record your basal body temperature (BBT) as your other primary fertility sign. BBT typically rises slightly but noticeably in response to the increase in progesterone in the luteal phase of the cycle.

Other cyclical changes, such as changes in your cervix, are secondary fertility signs that can be used as cross-checks and may be particularly useful if your mucus or BBT pattern is hard to determine. The cervix itself exhibits signs of ovulation, so you may use observations about changes in the position and feel of your cervix to give you added information about your fertile times. Some women also experience a pain in the area of one or both ovaries around the time of ovulation called 'mittelschmerz', meaning 'pain in the middle', which may last from several hours to a day or two.

4. Cervical mucus

Fertile mucus is that which allows conception to occur, and normally appears just before and during ovulation. As oestrogen levels start to increase around 5 to 6 days before ovulation, mucus increases greatly and so does its elasticity. Fertile mucus provides protection to sperm from the vagina's natural acidity, nourishing and guiding them up into the uterus, and allowing them to live for up to 3 days. Infertile mucus is present at other times of the cycle, when conception cannot occur. During the luteal phase, progesterone causes the cervical mucus to thicken, become less watery and lose its elasticity, so that it prevents the passage and survival of sperm and becomes 'infertile'. Each woman has a unique pattern of mucus changes as well as a characteristic type of mucus prior to ovulation. The important thing is to become familiar with your own pattern of mucus changes.

In a typical cycle, there may be some *dry* days after menstruation, when there is no or little apparent mucus. Then some *possibly fertile* mucus appears, which is usually damp or sticky. This changes to *fertile* mucus, which is more profuse, wetter and more lubricative. Most women then experience mucus that resembles *raw egg-white*, which is stretchy (a quality known as 'spinnbarkeit'), wet and slimy to the touch. After ovulation, the mucus may become thick and tacky again, or disappear until menstrual bleeding begins. Not all women experience all these stages, as cycle lengths and mucus production vary.

Dry days: After menstruation we have dry days, when there is no apparent mucus at the vaginal entrance and no staining or dripping in your underwear. There is a sensation of dryness, rather than wetness, lubrication or discharge. Mucus collected from the cervix will be scant, sticky and thick. This mucus forms a plug across the cervix which may come out in a blob, usually when you are on the toilet. During these dry days, you are not fertile.

Infertile mucus days: may replace the dry days, when the mucus is thick, crumbly, opaque and flaky, and doesn't increase in quantity.

Increasing mucus days: At this time, mucus increases in response to rising oestrogen levels and is evident externally. The mucus is pasty, tacky and opaque. The chances for conception at this time are still extremely low.

Fertile or wet days: As ovulation approaches, the mucus becomes more watery, fluid, thin, wet, slippery, clear and more profuse. It appears clearer, milky-white or translucent and can even be tinged with blood. This type of mucus generally aids conception.

Extremely fertile mucus: This type of mucus is gelatinous, like raw egg-white, and can stretch in long strands (spinnbarkeit). The mucus is wet and slippery and holds together in a jelly-like mass. This type of mucus is usually most abundant 1 or 2 days before ovulation and represents the time of peak fertility. You are generally considered infertile again 3 days after the peak day of mucus ('peak' is defined as the last day of fertile mucus, not necessarily the day of maximum stretch).

Mucus checking: The easiest routine is to check your mucus when you visit the toilet. This is most convenient and ensures that you are checking regularly and will detect any sudden changes. It is best to use your clean fingertips, rather than toilet paper, to check your mucus at the mouth of the vagina. If you keep a record of the amount and texture of your mucus, you will soon be able to discern your unique cyclical pattern.

Semen from intercourse can interfere with mucus checking, so it's best to wait 24 hours after intercourse before checking your mucus.

Keeping records: It's important for you to record your observations of the *type*, *pattern*, *amount* and *description* of mucus, so that you can become familiar with your pattern and compare one cycle to the next. It may take a few cycles for your pattern to emerge, but after a while the differences should become clear.

Cervical mucus can be affected by things like:

- drugs
- nutritional deficiencies
- curettage
- underactive or overactive thyroid
- stress
- polycystic/cystic/infected ovaries
- retained tampon
- vaginal lubricants, deodorants, douches or sprays
- spermicides

5. Basal body temperature (bbt)

Basal body temperature (BBT) is the temperature of your body at rest. It helps to tell you if ovulation has occurred and if you have entered the post-ovulatory infertile phase. It is particularly helpful to know when ovulation occurs in relation to your mucus pattern.

The increase in BBT that occurs around the time of ovulation is due to the increased production of progesterone, which generates greater heat in the body. Typically, the BBT remains stable, with small fluctuations, during the first half of the cycle (pre-ovulatory phase). It drops slightly just before ovulation, and then rises by between 0.1°C and 0.5°C and stays up until just before or during the menstrual period, when it falls again. This is known as a 'biphasic' pattern. The amount of the temperature rise varies from woman to woman, depending partly on your hormone levels. Some women may ovulate without a clear rise in temperature (this is known as a 'monophasic' pattern).

Ovulation is generally thought to occur at the *beginning* of the temperature rise, or 'thermal shift'. This is usually the lowest reading, as the temperature usually drops slightly just before ovulation (which you may or may not catch, depending on the timing of when you take your temperature). The BBT shift can usually be detected within 24 hours of ovulation, although occasionally ovulation can occur up to 3 days prior to the rise or a couple of days after. When using this method, you can be fairly confident that you have finished ovulating and that you are in the post-ovulatory infertile phase when you record 3 consecutive temperatures that are at least 0.1°C higher than the previous 6 readings.

If ovulation doesn't occur then the temperature won't rise, and if menstruation doesn't occur, then the temperature won't come down. If your BBT remains elevated for more than 20 days and is continuing to rise, you may be pregnant. A temperature rise can also be caused by infection, medication or drugs, jetlag,

overheating in bed (for example, from an electric blanket), activity before taking your temperature (such as visiting the toilet), disturbed sleep, hangover, stress, shift work or rising later than usual. That is why you must wait 3 days to see if there is a *sustained* rise of at least 3 consecutive higher readings before you can be sure that ovulation has occurred.

Figure 2: The biphasic pattern of basal body temperature.

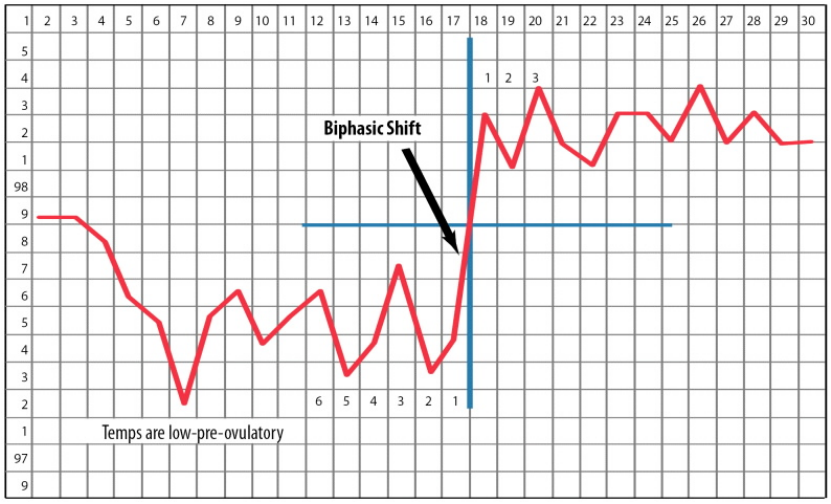
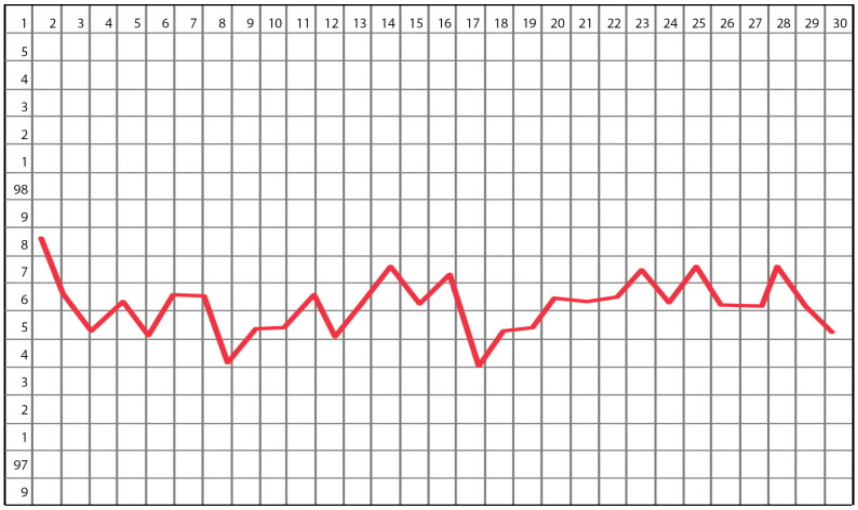


Figure 3: The monophasic pattern of basal body temperature.



Conditions for taking your temperature: It will be easiest if you buy a basal (sometimes called 'fertility') or digital thermometer. If you use a mercury thermometer, be sure to shake it down the night before, so it is ready to be used in the morning.

- Each morning, take your temperature before getting out of bed, before doing any activity, having conversation or having anything to eat or drink. If using a mercury thermometer, take your temperature for 3 minutes. Do this every morning, even during menstruation.
- If you need to do something, such as go to the toilet, before taking your temperature, move slowly and gently and take your temperature as soon as possible after returning to bed; when marking the temperature on a graph, note any special circumstances.
- At least 4 hours of sleep is required for your body to reach your at-rest state, so if your night was short or disturbed, note it down.
- Read your temperature at around the same time each day (body temperature is much higher later in the

day and lower earlier, regardless of how much sleep you had). You need to decide on a set, usual rising time, based on your usual habit. If you rise earlier than usual, adjust the temperature *up* by 0.05°C for each half-hour, and if you rise later than usual, adjust the temperature *down* by 0.05°C for each half hour before recording it.

Don't forget to record your results. Use the "*ovulation calculator"* to chart your results and track your cycle

6. Cervical changes

Changes in your cervix are often thought of as secondary fertility signs. They are not as clear-cut or reliable as mucus or temperature observations, but can act as a double-check.

The most obvious cervical change that occurs is that as you approach ovulation, increased oestrogen production softens the cervix, whereas during the infertile phases it feels smooth and firm (like the tip of your nose). As well, as you approach ovulation the cervix rises by about 2-3 cm, then descends again after ovulation; the opening of the cervix (the *os*) opens from 1 mm to 3 mm to allow easier passage of sperm, and closes during infertile phases. It also becomes wetter around ovulation.

Therefore, in the *pre-ovulatory* and *post-ovulatory infertile phases*, the cervix is hard, low, shut and dry; whereas in the *fertile phase*, it is soft, high, open and wet.

You can feel your cervix gently with clean fingers once or twice per day. This should enable you to start recognizing the changes in the feel and position of your cervix.

7. Other fertility signs

Some women notice other physical symptoms around the time of ovulation. These may include slight discomfort or mild cramping in the lower abdomen (mittelschmerz), bloating, breast tenderness and vaginal spotting.

8. Ovulation detection devices

There are a couple of other types of devices and tests that can be used to help identify your fertile times, but these tend to be expensive and are not really necessary if you are accurately charting your mucus and BBT.

Ovulation prediction kits detect luteinising hormone (LH) in your urine and can be useful for confirming the timing of ovulation (but they are quite expensive and can't be recycled). Urinary LH readings can help to more narrowly identify the fertile window when used in conjunction with the symptothermal method. Focusing intercourse on days of peak mucus as well as peak or high readings on an LH monitor has been shown to result in greater pregnancy rates.

The LH surge occurs on average about 16 to 24 hours before ovulation, although this can vary quite a bit (from about 16 hours to 48 hours before ovulation). These tests only identify a small part of the fertile window, and in some cases, the time of greatest probability of conception may have already passed by the time you detect your LH surge.

Saliva microscopes are small, reusable hand-held microscope 'fertility testers' which are commercially available for home-use. Under the microscope, you can see the characteristic 'ferning' pattern (palm-like crystallisation pattern) of saliva or cervical mucus that coincides with the fertile period (the ferning pattern is due to the crystallisation of salts in your saliva, which increase with greater oestrogen). You either lick or smear saliva on a small plastic slide, wait for it to dry, and look through the lens to observe the pattern. If you see the ferning pattern, you are considered fertile.

Ferning first appears between days 8 to 10 of a typical cycle and reaches a peak around the time that you ovulate. Immediately after ovulation, it decreases or disappears completely. However, it can be difficult to detect a distinct beginning and end to the fertile time using this method, and results can be unclear (for example, no obvious ferning pattern or some ferning throughout the cycle). It is therefore recommended that this method only be used in conjunction with other, more reliable methods for detecting your fertile times.

9. Having problems?

Not all women will experience typical menstrual cycles and fertility signs for every cycle. Your fertile times can be affected by:

- stress
- drugs (prescription or otherwise)
- travel
- ill health
- perimenopause (the period leading up to menopause)
- diet and weight changes
- fasting
- excessive exercise
- other major changes in circumstances

These factors will affect each woman differently, and the more familiar you are with your regular pattern, the more accurately you'll be able to assess if they've had any impact on a particular cycle. Also, certain conditions such as polycystic ovary syndrome, ovarian cysts or other ovary problems, thyroid problems or diabetes can affect cycles and fertility.

Stress: High stress levels can affect ovarian, tubal and other reproductive functions, such as hormone balance. They also affect other organs and systems, such as the adrenals, digestion and absorption of nutrients, and immune function which can, in turn, have an indirect effect on fertility.

Stress can delay or prevent ovulation. It can cause menstrual irregularity and chemical alterations in the vaginal secretions, and can affect sperm production in the male.

If you feel overly stressed, stress reduction should be part of your long-term preparation for conception, just like nutrition and exercise.

Low thyroid function: In its mild form, low thyroid function often goes undetected, but thyroid problems can cause menstrual abnormalities and even infertility. Low temperatures recorded in the pre-ovulatory phase of your cycle may alert you to this condition.

When to seek help: What has been described here is the typical or 'ideal' ovulation pattern of cervical mucus changes, post-ovulatory BBT rise and cervical changes. Every woman, however, has her own unique pattern, so if your pattern doesn't exactly follow what has been outlined here, it shouldn't concern you too much provided that you can still detect your fertile times and evidence of ovulation. If, however, you chart for several cycles and can't detect ovulation or find the results too unclear, you may want to consider talking to your healthcare provider.