MA-08 Preventing pregnancy without a pharmacy: the real failure rates of every method

HEALING after the FALL, research library, MA-08

Researched 10 October 2026 by Claude Opus agent for THRIVING after the FALL, Book Four. Library document, unverified.

Findings by section

1. Scope, stance and how to read the figures

This report covers every way of preventing pregnancy a community could still use after the Fall, from breastfeeding to the copper intrauterine device (IUD), sterilisation and the traditional plants. It covers emergency measures only as far as they act before or around implantation. Anything that ends an established pregnancy belongs to MA-09. Infant feeding is in MA-06, and normal birth in MA-01.

The owner has not decided the book's stance on contraception and abortion. Where a village rule or the book's presentation depends on that stance, the text marks it [OWNER] and does not decide.

Two numbers describe every method. Perfect use is the chance of pregnancy in the first year when the method is used correctly every time. Typical use is the chance among ordinary users, including those who forget, skip or misuse it. The gap between them measures how much a method depends on the user's discipline. Most figures below come from James Trussell's tables, which combine trial data for perfect use with large United States surveys for typical use, corrected for under-reporting of abortion (Trussell 2011). The 2018 revision in Contraceptive Technology changed several typical-use figures, mostly downwards, because newer survey years were used (Trussell 2018). Both are given because the differences show how soft typical-use numbers are. They describe American couples with pharmacies, and should be read as orders of magnitude for village life, not forecasts [VERIFY].

2. The baseline: natural fertility and the village of 300

Without any method, about 85 of 100 sexually active women become pregnant within a year (Trussell 2011). Trussell called it a best guess, and the CDC table notes that the raw figure was about 89, lowered to 85 (CDC 2014). Fecundability falls with age: among the Hutterites, the average time to conceive was about 13 months at 30 and about 22 months at 40 (Eaton 1953, secondary [VERIFY]).

The Hutterites, an Anabaptist farming people of the North American prairies who did not practise contraception, set the ceiling of human fertility in demographic writing. In the 1950s married Hutterite women had a median of about 10 children (Eaton 1953), and Coale's index of marital fertility still uses their age-specific rates as its standard: about 0.55 births per woman per year at 20 to 24, falling to 0.41 at 35 to 39 and 0.06 at 45 to 49 (University of Padua n.d., secondary). Summed over a married life from 20 to 49 this gives about 10.9 births [VERIFY, own arithmetic].

Most traditional societies never came near that ceiling, and the reason is breastfeeding. John Bongaarts broke fertility into proximate determinants: marriage, contraception, induced abortion and postpartum infecundability. Of these,

the months of infecundity after each birth did the most to hold fertility down in populations without contraception (Bongaarts 1983, via NRC 1993). His index for that effect is Ci = 20 / (18.5 + i), where i is the months of postpartum infecundity. With no breastfeeding, i is about 2 months and Ci is about 0.98. With 18 months of infecundity, as long breastfeeding produces, Ci is about 0.55, so breastfeeding alone nearly halves the birth rate (own arithmetic from Bongaarts's formula [VERIFY]). Among the !Kung of the Kalahari, mothers nursed in short bouts with a mean interval of about 13 minutes between them, and the authors argued that this timing, more than total nursing time, suppressed the mother's ovaries and explained the long spacing of !Kung births (Konner 1980, abstract). The intervals between !Kung births were about four years [VERIFY].

For a village of 300 the plain arithmetic runs as follows [VERIFY, own inference]. A population with high fertility and few old people has roughly 60 to 70 women aged 15 to 49. At a crude birth rate of 40 to 50 per 1,000 the village sees 12 to 15 births a year. If maternal mortality returns to somewhere between 500 and 1,000 per 100,000 births, which is the range of countries without emergency obstetric care, the village loses a mother every 7 to 17 years. MA-01 records the Faith Assembly in Indiana, a church that refused medical care, where maternal mortality reached 872 per 100,000 against 9 in the rest of the state (THRIVING library, MA-01). A meta-analysis of 67 studies found that a birth less than 6 months after the previous one, compared with an interval of 18 to 23 months, carried 1.40 times the odds of preterm birth and 1.61 times the odds of low birthweight (Conde-Agudelo 2006, abstract). How the village treats spacing is [OWNER].

3. The failure table

The table gives the percentage of women with an unintended pregnancy in the first year of use. "Typical" is the 2011 figure first, then the 2018 figure. Where the WHO handbook differs it is noted.

Method	Typical 2011 / 2018	Perfect	Note
No method	85 / 85	85	best guess (Trussell 2011)
Spermicides	28 / 21	18 / 16	perfect use is the median arm of one trial
Withdrawal	22 / 20	4	perfect figure is "a guess"
Fertility awareness, all	24 / 15	see below	WHO: about 25 for periodic abstinence
Standard Days	12 (2018)	5	trial in Bolivia, Peru, Philippines
TwoDay	14 (2018)	4	trial in Guatemala, Peru, Philippines
Ovulation (Billings)	23 (2018)	3	
Symptothermal	2 (2018)	0.4	German cohort
Calendar rhythm	WHO: 9 consistent use		
Sponge, parous / nulliparous	24 / 12 (2011), 27 / 14 (2018)	20 / 9	
Female condom	21 / 21	5	
Male condom	18 / 13	2	WHO 15 typical
Diaphragm with spermicide	12 / 17	6 / 16	WHO 16 / 6
Pill (combined or progestin)	9 / 7	0.3	
Injectable (DMPA)	6 / 4	0.2	
Copper T 380A	0.8 / 0.8	0.6	
Levonorgestrel IUD	0.2 / 0.1 to 0.4		

Method	Typical 2011 / 2018	Perfect	Note
Implant	0.05 / 0.1		
Female sterilisation	0.5	0.5	
Vasectomy	0.15	0.10	Trussell: "undoubtedly too low"
LAM, first 6 months	about 2 (WHO)	under 1	

Sources: Trussell 2011, Trussell 2018, WHO 2018.

Methods that need no action after the start (IUD, implant, sterilisation) show almost no gap between perfect and typical use. Methods that need action at every act of sex fail in ordinary use in roughly one woman in six to one in four each year. Continuation matters too: at one year only 43 per cent of condom users and 42 per cent of spermicide users were still using the method, against 78 per cent with the copper IUD (Trussell 2018).

4. Lactational amenorrhoea (LAM)

What the tradition says. Most traditional societies knew that a nursing mother rarely conceived, and many reinforced it with rules such as long postpartum sexual abstinence in much of West Africa (NRC 1993 [VERIFY for specific peoples]). The knowledge was held by women and midwives.

What the record shows. In 1988 a meeting at Bellagio in Italy turned this knowledge into a rule. Its consensus statement reviewed 13 prospective studies and concluded that a woman who is fully or nearly fully breastfeeding and still has no periods has more than 98 per cent protection from pregnancy in the first six months after birth (Kennedy 1989, abstract). Field trials followed. In Manila, 485 lower-income women with long experience of breastfeeding found the method 99 per cent effective when used correctly up to six months, and 97 per cent effective during amenorrhoea up to twelve months (Ramos 1996, abstract). An eleven-site study found over 98 per cent protection (Labbok 1997, abstract), and a nine-site study of 362 women with less contact with providers had no pregnancies during LAM use (Peterson 2000, abstract). The Cochrane review of 15 studies found six-month rates of 0.45 and 2.45 per cent in the two controlled studies, and 0.88 to 1.2 per cent among amenorrhoeic full breastfeeders using no method. It also noted that the 98 per cent figure itself was not based on a systematic review (Van der Wijden 2015, abstract).

The WHO handbook states the three criteria: no monthly bleeding since birth, full or nearly full breastfeeding (more than three-quarters of feeds are breast milk), and the baby under six months old. Typical use gives about 2 pregnancies per 100 in the first six months, and correct use under 1. It advises feeding 10 to 12 times a day in the first weeks and 8 to 10 times later, including at least once at night, with day gaps of no more than 4 hours and night gaps of no more than 6 (WHO 2018, chapter 19). Hesperian's village manual gives the simpler rule of no gaps longer than 6 hours (Hesperian 2026).

What science infers. Suckling raises prolactin and disturbs the pulses of gonadotropin-releasing hormone, which suppresses ovulation. The strength of the brake depends on how often and how long the baby suckles. In a Scottish study of 27 mothers none ovulated during unsupplemented breastfeeding. Once supplements began, at a mean of 16 weeks, suckling fell sharply and ovulation returned within 16 weeks in 14 (Howie 1981, secondary). In Manila, 67 per cent of first periods before six months were preceded by no ovulation, and luteal phases during lactation were shorter, averaging 9.2 days against 13.3 (Gray 1990, abstract).

What breaks it. Each of the following ends LAM's protection and calls for another method at once: the first bleeding after day 56 postpartum, regular supplements or water and other foods given to the baby, long gaps (the baby sleeping through the night, the mother away at work), the baby reaching six months, or the mother's illness. The only study of working women found about 5 pregnancies per 100 in six months (WHO 2018, chapter 19). A woman who is

not breastfeeding may ovulate as early as about 25 days after birth, although the mean first ovulation in non-lactating women falls between days 45 and 94 (Jackson 2011, abstract).

After the Fall, LAM is the most important single method because it needs only knowledge and serves the baby too. Its weakness is the month-six gap, when a second method must be ready.

5. Fertility awareness methods

What the tradition says. Calendar abstinence grew from the work of Ogino in Japan and Knaus in Austria in the 1920s and 1930s, and the Billings ovulation method came from Australia in the 1960s [VERIFY]. Folk beliefs about safe days were often wrong.

The biology. Conception follows sex only in a six-day window ending on the day of ovulation. In 625 cycles from 221 women, the chance of conception rose from about 0.10 five days before ovulation to about 0.33 on the day itself (Wilcox 1995). A second analysis of the same cohort showed how unpredictable that window is: only about 30 per cent of women had their whole fertile window within days 10 to 17 of the cycle, and on every day from day 6 to day 21 a woman had at least a 10 per cent chance of being in her fertile window (Wilcox 2000). Calendar counting alone is therefore crude.

Standard Days Method. Women with cycles of 26 to 32 days avoid unprotected sex on days 8 to 19. A string of 32 coloured beads (CycleBeads), with a red bead for day one, white beads for days 8 to 19 and a rubber ring moved each day, makes the rule visible. In a trial of 478 women aged 18 to 39 in Bolivia, Peru and the Philippines, correct use gave 4.8 pregnancies per 100 over 13 cycles, and typical use 12 (Arévalo 2002). Forty-two per cent of the pregnancies came in the first three cycles. Women with more than one cycle a year outside 26 to 32 days are not eligible, and that excludes many women soon after childbirth or near the menopause. A string of beads can be made on any farm.

TwoDay Method. The woman checks for vaginal secretions every afternoon and evening. If she noticed any secretions today or yesterday, she treats today as fertile. In a trial in Guatemala, Peru and the Philippines correct use gave 3.5 per 100 and typical use 13.7 per 100 over 13 cycles (Arévalo 2004).

Ovulation (Billings) method. The woman watches the mucus become clear, slippery and stretchy. Unprotected sex resumes on the fourth day after the last day of that peak mucus (WHO 2018, chapter 17). A WHO trial in five countries taught 869 women of proven fertility, from illiterate to postgraduate. Ninety-three per cent recorded an interpretable mucus pattern in the first cycle, but 5 per cent became pregnant during the three teaching cycles, and the rules required an average of 17 days of abstinence per cycle (WHO 1981a, abstract). In the effectiveness phase, 725 women followed for 13 cycles had a cumulative pregnancy probability of 19.6 per cent. Per 100 woman-years, 15.4 pregnancies followed conscious departure from the rules, 3.5 inaccurate application, and only 2.8 were failures of the method itself (WHO 1981b, abstract). Most failures of the method, in other words, are decisions to take a chance. Trussell gives 3 per cent for perfect use and the 2018 table 23 per cent for typical use.

Basal body temperature and the symptothermal method. After ovulation the waking temperature rises by about 0.2 to 0.5 °C and stays up until the next period. Sex can resume on the third day after the rise. The symptothermal method combines temperature and mucus and waits for the later of two signs: the fourth day after peak mucus or the third full day of raised temperature (WHO 2018, chapter 17). A German cohort of 900 women followed over 17,638 cycles from 1985 had 1.8 unintended pregnancies per 100 women in 13 cycles overall, and 0.6 among couples who had no unprotected sex in the fertile time. The rate among couples who abstained entirely, rather than using condoms, was 0.4. About 9 per 100 dropped out each year from dissatisfaction (Frank-Herrmann 2007). These were educated, motivated couples, so the figures show the best the method can do.

Calendar rhythm. The woman records six cycles. The first fertile day is the shortest cycle minus 18, and the last fertile day is the longest cycle minus 11 (WHO 2018, chapter 17). The handbook gives 9 per 100 with consistent use.

After the Fall. All these methods need about three cycles of supervised teaching and a partner who accepts abstinence or another method on fertile days. The symptothermal method needs a thermometer reading to 0.1 °C. Mucus methods need nothing. Whether the village teaches these methods as the main option, as one option among several, or as the only acceptable one is [OWNER].

6. Withdrawal

What the tradition says. Withdrawal (coitus interruptus) is the oldest male method on record. Demographers credit it with much of the fertility decline in nineteenth-century France and England, before modern methods existed [VERIFY]. Hesperian's assessment is that it is better than no method but does not always work (Hesperian 2026).

What the record shows. Typical use fails in about 20 to 22 women per 100 a year, and the 4 per cent perfect-use figure is, in Trussell's word, a guess, because no trial has measured it (Trussell 2011, Trussell 2018). The pre-ejaculate can carry sperm. In a study of 27 men, 41 per cent had sperm in at least one pre-ejaculate sample and 37 per cent had motile sperm, and the same men tended to show it each time (Killick 2011). This suggests that withdrawal fails more for some couples than for others, which no couple can know in advance.

What science infers. Most failure is probably late withdrawal [VERIFY]. The WHO handbook advises that the man urinate and wipe the tip of the penis before sex if he has ejaculated recently (WHO 2018, chapter 18). Withdrawal costs nothing and combines well with fertility awareness: Standard Days couples who withdrew rather than abstained on fertile days did only slightly worse (Arévalo 2002).

7. Barriers: condoms, diaphragm, cap and sponge

History. Gabriele Fallopio described a linen sheath against syphilis in a book published in 1564, after his death. The figure of 1,100 men tested, often repeated, could not be traced [VERIFY]. Charles Goodyear's vulcanisation of rubber (patented in 1844) made rubber condoms possible from about the 1850s, and latex condoms came in the 1920s (Thackray 2020, secondary). Egyptian papyri of about 1850 and 1550 BC describe pessaries of honey, natron and acacia gum, and sponges soaked in vinegar or oil appear in later writings [VERIFY]. The diaphragm was popularised by the German physician Wilhelm Mensinga in 1882 and spread through the Dutch clinic of Aletta Jacobs [VERIFY].

Male condom. Typical use fails in 13 to 18 women per 100 a year, perfect use in 2 (Trussell 2011, Trussell 2018). Most failure comes from not using it every time. Condoms are the only method that protects against sexually transmitted infections. IN-14 records a fall of about 80 per cent in HIV incidence among consistent users and treats condoms as a wasting asset, best held as a strategic reserve (THRIVING library, IN-14).

Salvage and shelf life. The international standard for latex condoms (ISO 4074) sets shelf life from accelerated ageing at 50 °C, with real-time confirmation at 30 °C. Labelled shelf lives are usually three to five years. Storage should stay below 30 °C, and even brief exposure above 40 °C harms latex (UNFPA n.d.). No study was found that measured breakage in condoms years past their date, so the safety margin of an old stock is unknown [VERIFY]. Brittle, sticky, discoloured or torn condoms are discarded. Oil-based lubricants (cooking oil, butter, petroleum jelly) weaken latex within minutes and must not be used with it [VERIFY]. Polyurethane condoms do not have this problem.

For a village of 300 the scale is clear [VERIFY, own arithmetic]. Fifty couples who rely on condoms and have sex about twice a week will use about 5,000 a year. A reserve of 10,000 lasts two years. Condoms cannot be a village's main method for long. They are better held for infection risk and for gaps in other methods. Who receives them first is [OWNER].

Female condom. Typical use 21, perfect use 5 per 100 (Trussell 2011). The nitrile versions tolerate oil and heat better than latex [VERIFY]. They are rarely found in stores.

Diaphragm and cervical cap. A dome of latex or silicone covers the cervix and is used with spermicide. The WHO gives 16 per 100 for typical use and 6 for perfect use (WHO 2018, chapter 15). The Cochrane review found only one trial comparing the diaphragm with and without spermicide: typical-use pregnancy was 28.6 without spermicide and 21.2 with it, a difference the trial was too small to confirm (Cook 2001, abstract). The diaphragm stays in for at least 6 hours after the last act of sex and no longer than 24 hours. The cap stays in at least 6 hours and no more than 48 hours, because longer use carries a risk of toxic shock syndrome (WHO 2018, chapters 15 and 16). A silicone diaphragm lasts about two years with care [VERIFY] and is therefore one of the few barrier methods a village could keep using. It must be fitted by a trained person with sizing rings.

Sponge. A polyurethane sponge with spermicide works for 24 hours. It fails more often in women who have given birth: about 24 to 27 per 100 in typical use against 12 to 14 in women who have not (Trussell 2011, Trussell 2018). The traditional sea sponge soaked in vinegar or lemon has no modern trial record [VERIFY].

8. Spermicides and folk acids

What the tradition says. Acids were the folk spermicides of many cultures: vinegar, lemon or lime juice, alum. Women in parts of the Caribbean and Africa have used lime juice as a douche or on a cloth or sponge [VERIFY].

What the record shows. Modern spermicides use nonoxynol-9, a detergent. A trial of five products in more than 1,500 American women found six-month pregnancy rates from 10 per cent (suppository) to 22 per cent (gel with 52.5 mg), and 39 per cent of women stopped or were lost before the end (Raymond 2004). Over a year typical use is about 21 to 28 per 100 (Trussell 2011, Trussell 2018). Worse, nonoxynol-9 damages the vaginal lining. In a trial among 892 sex workers in Africa and Thailand, those using a nonoxynol-9 gel caught HIV more often than those using a placebo (hazard ratio 1.5), and more so with frequent use (Van Damme 2002). WHO no longer recommends it for women at high risk of HIV.

Lime juice was tested as a cheap microbicide. Undiluted or 50 per cent juice killed sperm and HIV in the laboratory but also damaged 75 to 90 per cent of cervical and vaginal cells within minutes, and semen weakened its action (Fletcher 2008). In a small safety trial, women using tampons soaked in 10 to 20 per cent lime juice developed abrasions of the vaginal lining at the higher concentrations (aidsmap 2006). Hesperian's manual is blunt: douching with herbs, powders or cola does not prevent pregnancy, inserting leaves or dung causes infection, and urinating after sex does not prevent pregnancy (Hesperian 2026).

What science infers. Any acid strong enough to kill sperm reliably is strong enough to injure the vaginal wall, and an injured wall lets infections in. A douche after sex is too late, because sperm reach the cervical mucus within minutes. A vinegar sponge before sex may help somewhat, but nothing measures how much [VERIFY]. Acid douches are ineffective and acid pessaries unproven and irritating.

9. The copper IUD

History. In 1909 Richard Richter in Germany described a ring of silkworm gut. In the 1920s Ernst Gräfenberg used silver wire rings, later of German silver, an alloy that contains copper, with pregnancy rates of about 1.6 to 3 per cent. The plastic Lippes Loop followed in 1962. In 1969 Jaime Zipper in Chile found that copper strongly increased the effect in rabbits, and Howard Tatum's plastic T, which alone failed in about 18 per cent of users, became the copper T. The TCu380A was approved in the United States in 1984 for 10 years of use (Reproductive Access Project 2024, secondary).

The Dalkon Shield. Launched in 1971 and fitted in about 2.2 million American women, it had a multifilament tail string that wicked bacteria into the uterus. Its inventor claimed 1.1 per cent pregnancy from a short study, while later use showed 3 to 5 per cent. United States sales stopped in 1974, but it was fitted abroad for years more. Septic miscarriages, infections, infertility and deaths followed, with more than 327,000 claims and bankruptcy in 1985

(Wikipedia 2026, Britannica 2026, secondary). Fear of all IUDs lasted decades, although the fault was specific to that device.

What the record shows now. The copper T 380A fails in about 0.6 to 0.8 per 100 women in the first year and about 2 per 100 over 10 years, and it remains effective for at least 12 years (WHO 2018, chapter 9). Bleeding and cramps increase for the first 3 to 6 months. The risk of pelvic infection is concentrated in the first 20 days after insertion. In WHO trial data the rate was 9.7 per 1,000 woman-years in the first 20 days and 1.4 per 1,000 afterwards (Farley 1992, secondary). The main risk is inserting through a cervix already infected with chlamydia or gonorrhoea. IN-14 notes that pelvic infection after the Fall can lead to tubal infertility and ectopic pregnancy, and that removal of the IUD is part of the treatment (THRIVING library, IN-14).

Perforation of the uterus happens in about 1 insertion in 1,000. A European study of 61,448 women found 1.1 per 1,000 for copper devices at one year and 1.6 at five years. Breastfeeding raised the risk about six times, and insertion within 36 weeks of birth raised it further, with the highest rate (5.6 per 1,000) among women who were both breast-feeding and less than 36 weeks postpartum (Heinemann 2015, MHRA 2015). Expulsion happens in roughly 1 to 4.5 per cent in the first year after interval insertion, and much more often (about 6 to 20 per cent, in some cohorts up to 27) after insertion just after delivery of the placenta (WHO 2018, chapter 9 [VERIFY for the range]).

Who can insert. A systematic review of task shifting found two randomised trials comparing nurses with doctors (Colombia 1977, Brazil 1995) and one comparing auxiliary nurse-midwives with doctors (Turkey and the Philippines, 996 women). None found differences in pregnancy, expulsion, removal or continuation. Nurses failed more often to complete an insertion in women who had never given birth. No trial tested lay health workers, and WHO guidance recommends insertion by auxiliary nurse-midwives but not by lay workers (Polus 2015). After the Fall, this places the IUD at the district infirmary, with a trained midwife or nurse who has supervised experience, not at the village dispensary.

How it works and the emergency use. Copper ions damage sperm and eggs before they meet, which is why the IUD is contraceptive and not mainly anti-implantation in ordinary use (WHO 2018, chapter 9). As an emergency method, inserted within five days of unprotected sex, it is the most effective option there is: a review of 42 studies and 7,034 women found a failure rate of 0.09 per cent (Cleland 2012). When it is inserted after fertilisation has already occurred, preventing implantation is a plausible part of its action. Whether that counts as contraception or as ending a pregnancy is a moral and legal question, not a scientific one, and how the book presents it is [OWNER]. Anything after implantation is MA-09's ground.

Salvage and stock. The copper T comes sterile in a sealed pouch with its inserter. Procurement specifications ask for a shelf life of at least seven years in hot, humid climates, and labels range from five to seven years (GHSC 2018, UNFPA n.d.). The copper itself does not expire. The question is whether the package remains sterile. Polyethylene softens at temperatures used in steam sterilisation, so re-autoclaving an out-of-date device may deform it, and no reliable data were found on re-sterilising expired or removed devices [VERIFY]. One device protects one woman for a decade or more, so no other salvaged item gives as much protection per gram [VERIFY, own inference].

10. Hormonal salvage

Pills, injectables, implants and hormonal IUDs will be found in pharmacies, clinics and homes. Typical-use failure is 7 to 9 per 100 for pills and about 4 to 6 for the three-monthly injection, with near-zero failure for implants and hormonal IUDs (Trussell 2011, Trussell 2018). The useful life of a pill stock depends on the expiry date, storage, and whether the blister packs stayed dry and cool. No rigorous study of the potency of contraceptive pills years past expiry was found [VERIFY]. A pill with lost potency fails without warning. Combined pills are also dangerous for women who smoke and are over 35, who have high blood pressure, migraine with aura or a history of clots [VERIFY].

St John's wort lowers hormone levels and has been linked with breakthrough bleeding and pregnancies on the pill, and rifampicin, used for tuberculosis, does the same (THRIVING library, TR-15, PH-01, IN-10). Women on salvaged

pills must be warned.

Emergency pills (levonorgestrel 1.5 mg once, or a combined dose of ordinary pills) reduce the risk from a single act of unprotected sex in the middle of the cycle. Of 100 women having sex once in the second or third week of the cycle, about 8 would conceive without anything, about 1 with levonorgestrel pills and about 2 with combined pills. They work only for sex in the previous five days and mainly by delaying ovulation (WHO 2018, chapter 3). Whether they also act after fertilisation is disputed: mainstream reviews find no effect on the uterine lining, and some Catholic writers argue that a post-fertilisation effect cannot be excluded [VERIFY]. How the book frames this is [OWNER].

11. Sterilisation

Female sterilisation. The fallopian tubes are cut and tied or blocked. In low-income settings this is usually done through a small abdominal incision (minilaparotomy) under local anaesthesia with light sedation, which the WHO considers safer than general anaesthesia. First-year failure is about 5 per 1,000 and ten-year failure about 18 to 19 per 1,000 (WHO 2018, chapter 11). In the United States study of 10,685 women, ten-year failure was 18.5 per 1,000 overall, 7.5 after partial salpingectomy just after birth and 36.5 with the spring clip, and about one in three failures was an ectopic pregnancy (Peterson 1996, abstract). Any pregnancy after sterilisation must be treated as ectopic until proved otherwise.

Mortality is about 1 to 4 per 100,000 in the United States, mostly from anaesthesia, and has been reported from 4 to over 50 per 100,000 in programmes in poor countries [VERIFY]. In Bilaspur in Chhattisgarh, India, in November 2014, at least 13 women died after a sterilisation camp where one surgeon operated on 83 women in a few hours. Investigators found substandard antibiotic tablets, and whether poisoned medicines also played a part remains disputed (Down to Earth 2014). Coercive programmes in India in the 1970s and Peru in the 1990s show the risk of institutional pressure [VERIFY].

Vasectomy. Cutting and tying the vas deferens through a small scrotal opening under local anaesthesia is shorter, safer and cheaper than tubal ligation. The no-scalpel technique causes fewer infections. The man is not sterile at once: sperm remain for about three months, and he must use another method for that time. Without a semen check about 2 to 3 per 100 partners become pregnant in the first year, and with one about 2 per 1,000 (WHO 2018, chapter 12). After the Fall a semen check needs a microscope, which a district infirmary may have.

Both operations are meant to be permanent. Reversal is difficult and often fails (WHO 2018, chapter 11). Who may consent, what waiting period applies, and whether the infirmary offers the operation at all are [OWNER].

12. Traditional plants and Riddle's thesis

The thesis. The historian John Riddle argued that ancient and medieval women had effective plant contraceptives and early abortifacients, that their knowledge explains low fertility in classical antiquity, and that it was lost when it passed from women's hands to physicians and the Church (Riddle 1992, Riddle 1997). His examples were silphium, pennyroyal, rue, Queen Anne's lace (wild carrot) and others. Critics answered that the evidence is indirect and that a plant which affects a rat has not been shown to work in women. Etienne van de Walle showed that "emmenagogues" were given to bring on a delayed period for many reasons, not only to end pregnancy (van de Walle 1997, not read). The THRIVING library treats the thesis as history and not as guidance (THRIVING library, TR-05).

Testing Riddle's examples against pharmacology sorts them into three groups.

Possible contraceptives, unproven in women.

Wild carrot, Queen Anne's lace (Daucus carota), seed. What the tradition says: Women in Appalachia (Virginia and North Carolina) took a teaspoon of crushed seed in water after sex, and similar use was reported in Rajasthan, India (Seattle Times 1994). What the record shows: Rodent studies conflict. Some found that seed extracts disturbed the oestrous cycle or prevented implantation, and at least one found no significant antifertility effect [VERIFY]. There

are no human trials. What science infers: If it works at all, it most likely works after fertilisation, by preventing implantation, which places it on the line between this report and MA-09 [OWNER]. Lookalike: poison hemlock (Conium maculatum), which has a smooth, hollow stem with purple blotches, whereas wild carrot has a bristly, solid green stem. The character fails in young hemlock. PH-10 rules that no wild umbellifer root is ever dug and that umbellifer seed or leaf is gathered only from a plant seen in flower and fruit in the same season (THRIVING library, PH-10). Fool's parsley (Aethusa cynapium) and water hemlock (Cicuta) are also deadly lookalikes. Grade D.

Stoneseed (Lithospermum ruderale), root. What the tradition says: Shoshone women of Nevada drank a cold-water infusion of the root daily for months as a contraceptive, as recorded among Nevada tribes in the early twentieth century (Cranston 1945, secondary). What the record shows: In mice, the dried plant suppressed the oestrous cycle when it formed about 30 per cent of the diet, but weight loss confounded the effect, extracts lost potency, and some were toxic (Cranston 1945, Drasher 1946, both secondary). The plant inhibits the release of pituitary gonadotropins. What science infers: Plausible mechanism, no human data. Lookalikes: other Lithospermum and Boraginaceae species, several of which contain pyrrolizidine alkaloids that injure the liver [VERIFY]. Grade D.

Neem (Azadirachta indica), seed oil. What the tradition says: In India, neem is used in Ayurvedic and folk medicine for many conditions, and the oil has been applied vaginally (NRC 1992). What the record shows: Undiluted neem oil immobilises human sperm within 30 seconds in the laboratory. Indian defence researchers reported that intravaginal neem oil before sex prevented pregnancy in rats, rabbits, monkeys and ten human volunteers, but the human numbers were small and the exposure unclear (Sinha 1984, via NRC 1992). Given after mating in rats it prevented implantation (Sinha 1984b, abstract). A single dose placed in the rat uterus blocked fertility for months (Upadhyay 1990, abstract). A polyherbal cream with neem was tested in India (Garg 1993, abstract). What science infers: Neem oil is the best-supported folk spermicide, but no trial gives a failure rate or measures irritation with daily use [VERIFY]. Harm: Neem oil swallowed by infants causes a Reye-like illness with vomiting, drowsiness, fits and liver failure. Malaysian doctors described 13 children, of whom one four-month-old died, and Indian reports describe further deaths (Sinniah 1981). The oil must be kept away from children and never taken by mouth. Lookalike: chinaberry (Melia azedarach), whose fruit is poisonous, is often confused with neem [VERIFY]. Grade C for spermicidal action in the laboratory, D for contraception in women.

Abortifacients, MA-09's ground, listed here only as a warning. Pennyroyal (Mentha pulegium and Hedeoma pulegioides), rue (Ruta graveolens and R. chalepensis), savin and tansy were taken to "bring down the courses". TR-15 records that about 10 ml of pennyroyal oil causes moderate to severe poisoning and about 15 ml has killed within hours, and that most cases were women trying to end a pregnancy (THRIVING library, TR-15). In Montevideo between 1986 and 1999, 86 women who had used herbal infusions to end a pregnancy were seen by the poison centre, and four died after taking rue (Ciganda 2003, abstract). These plants kill at doses near those that might affect a pregnancy. Silphium, the ancient plant of Cyrene in Libya that Riddle valued most, is extinct and its identity uncertain [VERIFY].

Male methods that work but injure. Gossypol, a pigment of cotton seed (Gossypium), was tested in over 8,800 Chinese men. It suppressed sperm in over 90 per cent but caused low potassium in about 1 per cent and permanent sterility in 10 to over 20 per cent (Coutinho 2002, abstract), and the WHO programme rejected it (Waites 1998, abstract). Thunder god vine (Tripterygium wilfordii) also caused irreversible damage in some men [VERIFY].

Nothing. Douches of vinegar or lemon after sex, urinating after sex, jumping or sneezing after sex, amulets, and drinks of most "cooling" herbs have no effect on pregnancy (Hesperian 2026). Restricted knowledge of fertility plants, held by particular healers or women's societies, exists in several traditions. This report notes it without reproducing it (THRIVING library, SY-04).

Evidence grades

Method	Grade	Basis
LAM, all three criteria, to 6 months	A	prospective trials, Cochrane review
Symptothermal	B	large prospective cohort
Standard Days, TwoDay, Ovulation	B	single-arm trials in several countries
Calendar rhythm	B	older studies, handbook estimates
Withdrawal	B	survey data only, no trial
Male condom	A	trials and survey data
Diaphragm, cap, sponge	A to B	trials, small comparisons
Nonoxynol-9 spermicides	A	randomised trial, also A for harm
Lemon, lime, vinegar	X	laboratory harm, no efficacy data
Copper IUD	A	trials, systematic reviews
Copper IUD as emergency method	A	systematic review
Insertion by nurses and midwives	A to B	three trials, moderate certainty
Hormonal salvage past expiry	D	no data
Female sterilisation, vasectomy	A to B	large cohorts
Wild carrot seed	D	single tradition, conflicting rodent data
Stoneseed	D	single tradition, mouse data
Neem oil, vaginal	C	laboratory and animal data, small human report
Gossypol, Tripterygium	X	effective but cause permanent harm
Pennyroyal, rue (as contraceptives)	X	deadly, refer to MA-09

Means ledger

Method	Hands and knowledge	Hearth	Garden and still	Village dispensary (300)	District infirmary (3,000)	Hospital before the Fall
LAM	yes, teaching only			teaching, backup supply	same	same
Fertility awareness	mucus, calendar	beads, written record		beads, BBT thermometer if salvaged	teaching staff	same
Withdrawal	yes					
Condoms				reserve stock, cool storage	reserve stock	unlimited
Diaphragm and cap		soap and water care		if salvaged, trained fitter	fitting rings, fitter	same
Spermicide			none safe	salvaged stock only	same	same
Neem oil			oil pressing [VERIFY]	not recommended as main method		

Method	Hands and knowledge	Hearth	Garden and still	Village dispensary (300)	District infirmary (3,000)	Hospital before the Fall
Copper IUD				no insertion	trained midwife or nurse, speculum, sound, tenaculum, antiseptic, disinfection, analgesia	routine
Hormonal methods				salvaged pills, warnings	salvaged injectables, implants	routine
Vasectomy					local anaesthesia, sterile kit, microscope for semen check	routine
Tubal ligation					minilaparotomy, local anaesthesia, sterile theatre, antibiotics	laparoscopy

Harm test

- **LAM.** Harmless. The risk is false security once a criterion fails.
- **Fertility awareness.** No physical harm. Pregnancy risk while learning and in irregular cycles.
- **Withdrawal.** No physical harm. Fails often. No protection against infection.
- **Condoms.** Latex allergy in a few. Breakage if old or used with oil.
- **Diaphragm, cap, sponge.** Urinary infections with the diaphragm [VERIFY]. Toxic shock syndrome if left in too long (diaphragm over 24 hours, cap over 48 hours).
- **Nonoxynol-9.** Irritation and lesions, raised HIV risk with frequent use (Van Damme 2002).
- **Lemon, lime, vinegar.** Damage to the vaginal lining (Fletcher 2008, aidsmap 2006). No benefit.
- **Copper IUD.** Pain and heavier bleeding in the first months. Pelvic infection mostly in the first 20 days. Perforation about 1 in 1,000, higher in breastfeeding women. Expulsion. If pregnancy occurs with the IUD in place, higher risk of miscarriage and infection, and a higher share of the rare pregnancies are ectopic (WHO 2018, chapter 9).
- **Hormonal salvage.** Silent loss of potency. Clotting risks with combined pills in some women. Interaction with St John's wort and rifampicin.
- **Female sterilisation.** Surgical and anaesthetic death, infection, bleeding. Ectopic pregnancy in about a third of failures. Regret.
- **Vasectomy.** Bleeding into the scrotum, infection, pain. Pregnancy if no backup during the first three months.
- **Wild carrot seed.** Poison hemlock confusion can kill. No safety data in pregnancy.
- **Stoneseed.** Unknown human toxicity, possible liver injury from lookalikes.

- **Neem oil.** Fatal in infants who swallow it. Vaginal irritation unknown.
- **Gossypol, Tripterygium.** Permanent sterility, low potassium.
- **Pennyroyal, rue and the other emmenagogues.** Liver and kidney failure, death (THRIVING library, TR-15, Ciganda 2003).

Red flags

- Fever, lower abdominal pain, abnormal discharge or pain on moving the cervix after IUD insertion, especially in the first three weeks: suspect pelvic infection and treat as in IN-14, considering removal of the IUD.
- Strings of the IUD no longer felt, or the device felt in the cervix: assume expulsion or perforation, and use another method until checked.
- A missed period with lower abdominal pain or bleeding in a woman with an IUD or after sterilisation: ectopic pregnancy until proved otherwise. Urgent transfer.
- Severe pain during insertion, or the sound passing further than expected: stop, suspect perforation, and observe for bleeding and infection.
- High fever, vomiting, diarrhoea, rash and faintness while a diaphragm, cap or sponge is in place: possible toxic shock. Remove the device and treat urgently.
- Fever, wound redness or scrotal swelling after vasectomy or tubal ligation.
- Vomiting, jaundice, confusion or bleeding after drinking any herbal "period remedy": poisoning, see TR-15.
- A baby given neem oil or any other medicinal oil by mouth.
- A breastfeeding woman relying on LAM whose baby now sleeps through the night, takes regular other food, or is six months old: protection has ended.

The case against

The figures are American. Typical-use rates come from modelled United States surveys. The difference between the 2011 and 2018 typical rates for the same methods (fertility awareness from 24 to 15, the diaphragm from 12 to 17) shows how uncertain they are. Village life may raise success for supervised methods and lower it for methods that need supplies [VERIFY].

LAM's 98 per cent is a consensus, not a systematic review. The Cochrane authors said so (Van der Wijden 2015). The studies are mostly of motivated women in programmes.

Fertility awareness trials select motivated couples. The German symptothermal cohort was largely educated and committed. Advocates point to its 0.4 per cent abstinence-only figure, and critics point to the typical rates of 12 to 23 per cent for simpler methods in other trials. Both are right about different populations.

The IUD without antibiotics is a different bargain. The modern safety record depends on screening for infection, antibiotics when infection follows, and imaging when strings go missing. Without them pelvic infection, which the IUD makes slightly more likely in the first weeks, may cause infertility or death more often [VERIFY]. The Dalkon Shield shows how a poorly tested device can harm hundreds of thousands. A salvaged stock of unknown storage history adds risk.

Sterilisation in camps kills. Mortality rises sharply where surgery is done in volume, with poor asepsis and poor drugs (Down to Earth 2014). An infirmary that offers sterilisation must be able to operate safely, and must protect consent against social pressure.

Riddle's critics may be wrong too. Some plant methods may work better than pharmacology shows, because the right species and preparations were never tested. But an untested method cannot be taught as reliable, and several plants in the same tradition kill.

The whole subject is contested. Some hold that only abstinence-based methods are right, or that methods acting

after fertilisation equal abortion. Others hold that withholding effective methods costs women's lives. This report does not decide [OWNER].

10-line summary

1. Without a method, about 85 of 100 women conceive within a year.
2. Breastfeeding by the three LAM criteria gives about 98 per cent protection for six months and costs nothing.
3. Long breastfeeding nearly halves a population's birth rate, which is why traditional societies were far below the Hutterite ceiling.
4. Fertility awareness methods range from 0.4 per cent (symptothermal with abstinence, motivated couples) to over 20 per cent typical failure.
5. Withdrawal fails in about 20 per 100 a year but needs nothing and pairs well with fertility awareness.
6. Condoms fail in 13 to 18 per 100 in typical use, are the only method protecting against infection, and run out fast.
7. Spermicides are weak, nonoxynol-9 raises HIV risk, and lemon or vinegar injures the vagina without proven effect.
8. The copper IUD fails in under 1 per 100 a year, lasts 12 years, can be inserted by trained midwives or nurses, and is the best emergency method within five days.
9. Sterilisation is near-permanent and very effective, but surgery in poor conditions kills.
10. Of the traditional plants, none has a measured failure rate in women, and the emmenagogues kill.

Open questions

- How fast does stored latex lose strength after its expiry date?
- Can an expired copper IUD in a damaged package be safely disinfected for insertion, and with what?
- How long do salvaged contraceptive pills keep their potency in cool, dry storage?
- What were the human data in Sinha's neem oil report?
- Is there any human study of wild carrot seed after sex?
- How much protection does partial breastfeeding give in the second year?
- How can a district infirmary train IUD inserters and keep their skills?
- What does the village decide about access for unmarried people and adolescents [OWNER]?

Sources to read in full

1. Trussell 2011 and the full chapter in Contraceptive Technology 21st edition (Trussell 2018), for the methods behind each figure.
2. The WHO family planning handbook, all chapters (WHO 2018).
3. Kennedy 1989 (the Bellagio consensus) and Van der Wijden 2015 (Cochrane LAM review).
4. Frank-Herrmann 2007 and Arévalo 2002 and 2004, for fertility awareness methods.
5. Polus 2015, for who can insert IUDs.
6. Hesperian's Where Women Have No Doctor, family planning chapters (Hesperian 2026).
7. Riddle 1992 with van de Walle 1997, read together.
8. NRC 1992 (Neem), appendix on contraception.
9. Bongaarts 1983 or the NRC 1993 summary, for the demography of natural fertility.

At the bedside after the Fall

A woman comes to the village attendant two months after her third birth, not wanting another pregnancy soon. The attendant asks three questions: has she bled since the birth, does the baby take anything but breast milk, and how long are the gaps between feeds by day and by night. If the answers are no bleeding, breast milk only, and no gap

longer than four hours by day or six by night, she is protected by LAM until the baby is six months old or until one of these changes. The attendant tells her what ends that protection.

Then the attendant plans for month six. The options depend on what the village holds and on the village's rules [OWNER]. If the couple can learn the cycle, she begins teaching mucus observation now, since Standard Days beads are unreliable until cycles settle into the 26 to 32 day range. If the district infirmary has copper IUDs and a trained midwife, she can be referred for insertion any time from four weeks after birth if she is not pregnant, knowing that breastfeeding raises the risk of perforation and that the first three weeks after insertion carry the risk of infection. If condoms are held in reserve, she may give a few for the gaps.

The attendant does not offer herbal douches, lemon or vinegar, does not offer any plant to drink, and warns her that "period-bringing" teas sold by others can kill. If she says she may already be pregnant, the attendant refers to the guidance in MA-09.

Protocols

Protocol 1. LAM

1. Confirm all three: no bleeding after day 56 postpartum, full or nearly full breastfeeding (more than three-quarters of feeds are breast milk), baby under 6 months.
2. Feed on demand, at least 8 to 10 times in 24 hours, with at least one night feed. Day gaps no longer than 4 hours, night gaps no longer than 6.
3. Give no water, teas or other food to the baby before 6 months (see MA-06).
4. On the day any criterion fails, start another method that day.
5. Prepare the second method by week 20 at the latest.
6. Tolerance: none. If any criterion is uncertain, treat LAM as ended.

Protocol 2. Standard Days beads

1. Eligible only if cycles are 26 to 32 days long, with no more than one cycle a year outside that range.
2. String 32 beads: one red (day 1, first day of bleeding), days 2 to 7 dark, days 8 to 19 white, days 20 to 32 dark, with a movable marker.
3. Move the marker one bead each morning. Start again at the red bead on the first day of each period.
4. On white bead days, abstain or use a condom or withdrawal.
5. A period before day 26 or none by day 32 is out of range. Two such cycles in a year mean switch method.
6. Expect a higher risk in the first 3 cycles. Check with the teacher monthly for 3 months.

Protocol 3. Symptothermal

1. Take the temperature on waking, before rising, at the same time each day, by mouth, with a thermometer that reads to 0.1 °C. Chart it.
2. Each evening record mucus: dry, sticky, or clear and slippery.
3. Fertile phase begins at the first mucus or on day 6 of the cycle in the first cycles, whichever is earlier [VERIFY for the local rule].
4. Fertile phase ends at the later of the 4th day after peak mucus or the 3rd full day of raised temperature (a rise of 0.2 to 0.5 °C held for 3 days).
5. Fever, late nights, alcohol and travel make temperatures unreliable. Mark those days and do not use them.
6. Teach over 3 cycles before relying on the method.

Protocol 4. Withdrawal

1. Urinate and wipe the tip of the penis before sex if he has ejaculated in the past hours.

2. Withdraw fully and ejaculate away from the vulva.
3. If ejaculation happens inside, consider an emergency IUD within 5 days if the infirmary can provide one [OWNER].

Protocol 5. Condom reserve

1. Store in a dark, dry place below 30 °C. Never above 40 °C, not even briefly.
2. Inspect each packet: reject if brittle, sticky, torn, discoloured, or dry inside.
3. Use only water-based lubricant or none with latex. No oil, fat or petroleum jelly.
4. One condom for each act of sex. Put it on before any genital contact. Hold the rim when withdrawing.
5. Issue first to uses where nothing else serves (infection risk, gaps between other methods, the 3 months after vasectomy) [OWNER].

Protocol 6. Diaphragm and cap

1. Fitting by a trained person with sizing rings. Refit after birth, miscarriage or a change in weight of about 5 kg or more [VERIFY].
2. Insert before sex with spermicide if available. Cap: fill one-third with spermicide, may be inserted up to 42 hours before sex.
3. Leave in at least 6 hours after the last act of sex.
4. Remove within 24 hours (diaphragm) or 48 hours (cap).
5. Wash with mild soap and clean water, dry, store in its case. Check against light for holes.

Protocol 7. Copper IUD at the district infirmary

1. Inserter: midwife or nurse trained under supervision, not a lay worker.
2. Before insertion: rule out pregnancy, ask about discharge, pain and new partners, and examine the cervix. Do not insert with pus at the cervix, pain on moving the cervix or recent infection after birth or abortion. Treat first.
3. Timing: any time in the cycle if not pregnant. Postpartum within 48 hours (trained provider) or from 4 weeks. Not between 48 hours and 4 weeks.
4. Analgesia: ibuprofen 200 to 400 mg or paracetamol 325 to 1,000 mg 30 minutes before.
5. No-touch technique: load the device in its sterile package, clean the cervix with antiseptic, pass the sound and the inserter once each, use instruments that are sterile or high-level disinfected.
6. Cut strings to 3 cm beyond the cervix.
7. Review at 3 to 6 weeks, or at once if fever, pain or discharge appear. Teach the woman to feel for the strings after each period.
8. Replace or remove at 12 years at the latest.

Protocol 8. Emergency IUD

1. Insert within 5 days of the first unprotected act, or up to 5 days after the estimated ovulation.
2. Same screening and technique as Protocol 7.
3. Where this rule applies, and how the book presents it, is [OWNER]. Anything beyond is MA-09.

Protocol 9. After vasectomy

1. Rest for 2 days, support the scrotum, keep the wound dry for 2 days [VERIFY].
2. Use another method for 3 months.
3. Semen check at 3 months if a microscope is available. Without it, the first-year risk of pregnancy is about 2 to 3 per 100.

Numbers to carry

1. 85 of 100 women with no method conceive in a year.
2. LAM: 2 per 100 in 6 months, only with all three criteria.
3. Breastfeeding for 18 months of infecundity cuts births by nearly half (Ci 0.55).
4. Standard Days: avoid days 8 to 19, cycles 26 to 32 days, 5 per 100 correct use, 12 typical.
5. Symptothermal: 0.4 per 100 with abstinence, 2 typical.
6. Withdrawal and condoms: about 20 and about 13 to 18 per 100 a year typical.
7. Copper IUD: under 1 per 100 a year, 12 years, emergency use within 5 days.
8. IUD perforation about 1 per 1,000, about six times higher in breastfeeding women. Infection risk concentrated in the first 20 days.
9. Vasectomy: backup for 3 months.
10. Pregnancy after tubal ligation: about one in three is ectopic.

References

1. Trussell J. Contraceptive failure in the United States. Contraception 2011, 83(5):397-404. https://pmc.ncbi.nlm.nih.gov/articles/PMC3638209/
2. Trussell J, Aiken ARA, Micks E, Guthrie KA. Efficacy, safety, and personal considerations. In Hatcher RA et al, Contraceptive Technology, 21st edition. Ayer Company Publishers 2018, Table 26-1 (only the table was read). https://www.datocms-assets.com/21281/1662539230-contraceptive-technologies_failure-rates-table-2018.pdf
3. Centers for Disease Control and Prevention. Providing quality family planning services, appendix on contraceptive effectiveness. MMWR Recommendations and Reports 2014, 63(RR-4). https://www.cdc.gov/mmwr/preview/mmwrhtml/rr6304a5.htm
4. World Health Organization and Johns Hopkins Center for Communication Programs. Family Planning: A Global Handbook for Providers, 2018 edition. WHO and JHU CCP 2018, chapters 3, 9, 11, 12, 13, 14, 15, 16, 17, 18 and 19 read. https://fphandbook.org/sites/default/files/chap_9_eng.pdf (other chapters at the same address with the chapter number)
5. Arévalo M, Jennings V, Sinai I. Efficacy of a new method of family planning: the Standard Days Method. Contraception 2002, 65:333-338. https://www.irh.org/wp-content/uploads/2013/04/Efficacy_SDM_2002.pdf
6. Arévalo M, Jennings V, Nikula M, Sinai I. Efficacy of the new TwoDay Method of family planning. Fertility and Sterility 2004, 82(4):885-892. https://www.irh.org/wp-content/uploads/2013/04/TwoDay_Method_Efficacy_2004.pdf
7. Frank-Herrmann P, Heil J, Gnoth C 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. Human Reproduction 2007, 22(5):1310-1319 (abstract and secondary figures read). https://pubmed.ncbi.nlm.nih.gov/17314078/
8. Wilcox AJ, Weinberg CR, Baird DD. Timing of sexual intercourse in relation to ovulation. New England Journal of Medicine 1995, 333:1517-1521 (secondary summary read). https://pubmed.ncbi.nlm.nih.gov/7477165/
9. Wilcox AJ, Dunson D, Baird DD. The timing of the "fertile window" in the menstrual cycle: day specific estimates from a prospective study. BMJ 2000, 321:1259-1262. https://pmc.ncbi.nlm.nih.gov/articles/PMC27529/
10. World Health Organization. A prospective multicentre trial of the ovulation method of natural family planning. I. The teaching phase. Fertility and Sterility 1981, 36(2):152-158 (cited as WHO 1981a, abstract only). https://pubmed.ncbi.nlm.nih.gov/7021189/
11. World Health Organization. A prospective multicentre trial of the ovulation method of natural family planning. II. The effectiveness phase. Fertility and Sterility 1981, 36(5):591-598 (cited as WHO 1981b, abstract

only). https://pubmed.ncbi.nlm.nih.gov/7308503/
12. Kennedy KI, Rivera R, McNeilly AS. Consensus statement on the use of breastfeeding as a family planning method. Contraception 1989, 39(5):477-496 (abstract only). https://pubmed.ncbi.nlm.nih.gov/2656086/
13. Van der Wijden C, Manion C. Lactational amenorrhoea method for family planning. Cochrane Database of Systematic Reviews 2015, CD001329 (abstract only). https://pmc.ncbi.nlm.nih.gov/articles/PMC6823189/
14. Ramos R, Kennedy KI, Visness CM. Effectiveness of lactational amenorrhoea in prevention of pregnancy in Manila, the Philippines: non-comparative prospective trial. BMJ 1996, 313:909-912 (abstract only). https://pubmed.ncbi.nlm.nih.gov/8876092/
15. Labbok MH, Hight-Laukaran V, Peterson AE et al. Multicenter study of the Lactational Amenorrhea Method (LAM): I. Efficacy, duration, and implications for clinical application. Contraception 1997, 55:327-336 (abstract only). https://www.irh.org/wp-content/uploads/2013/04/Labbok.multicenter_study_of_LAM_I.1997.pdf
16. Peterson AE, Pérez-Escamilla R, Labbok MH et al. Multicenter study of the lactational amenorrhea method (LAM) III: effectiveness, duration, and satisfaction with reduced client-provider contact. Contraception 2000, 62:221-230 (abstract only). https://pubmed.ncbi.nlm.nih.gov/11172792/
17. Howie PW, McNeilly AS, Houston MJ, Cook A, Boyle H. Effect of supplementary food on suckling patterns and ovarian activity during lactation. BMJ 1981, volume 283 (secondary summary only, pages [VERIFY]). No stable link checked.
18. Gray RH, Campbell OM, Apelo R et al. Risk of ovulation during lactation. Lancet 1990, 335:25-29 (abstract only). https://pubmed.ncbi.nlm.nih.gov/1967336/
19. Konner M, Worthman C. Nursing frequency, gonadal function, and birth spacing among !Kung hunter-gatherers. Science 1980, 207:788-791 (abstract only). https://pubmed.ncbi.nlm.nih.gov/7352291/
20. Jackson E, Glasier A. Return of ovulation and menses in postpartum nonlactating women: a systematic review. Obstetrics and Gynecology 2011, 117(3):657-662 (abstract only). https://pubmed.ncbi.nlm.nih.gov/21343770/
21. Killick SR, Leary C, Trussell J, Guthrie KA. Sperm content of pre-ejaculatory fluid. Human Fertility 2011, 14(1):48-52. https://pmc.ncbi.nlm.nih.gov/articles/PMC3564677/
22. Cook L, Nanda K, Grimes D. Diaphragm versus diaphragm with spermicides for contraception. Cochrane Database of Systematic Reviews 2001, CD002031, later updated (abstract only). https://pmc.ncbi.nlm.nih.gov/articles/PMC8411872/
23. Raymond EG, Chen PL, Luoto J, Spermicide Trial Group. Contraceptive effectiveness and safety of five nonoxynol-9 spermicides: a randomized trial. Obstetrics and Gynecology 2004, 103:430-439 (abstract only). https://pubmed.ncbi.nlm.nih.gov/14990402/
24. Van Damme L, Ramjee G, Alary M et al. Effectiveness of COL-1492, a nonoxynol-9 vaginal gel, on HIV-1 transmission in female sex workers: a randomised controlled trial. Lancet 2002, 360:971-977 (abstract only). https://pubmed.ncbi.nlm.nih.gov/12383665/
25. Fletcher PS, Harman SJ, Boothe AR, Doncel GF, Shattock RJ. Preclinical evaluation of lime juice as a topical microbicide candidate. Retrovirology 2008, 5:3. https://pmc.ncbi.nlm.nih.gov/articles/PMC2259360/
26. aidsmap. News report on a safety trial of intravaginal lime juice, presented at the Microbicides 2006 conference. NAM aidsmap 2006 (secondary report). https://www.aidsmap.com/node/4624
27. Hesperian Health Guides (Burns A, Lovich R, Maxwell J, Shapiro K). Where Women Have No Doctor, chapter on natural methods of family planning. Hesperian, online edition read October 2026. https://en.hesperian.org/hhg/Where_Women_Have_No_Doctor:Natural_Methods_of_Family_Planning
28. Reproductive Access Project. A history of the IUD. Reproductive Access Project 2024 (secondary). https://www.reproductiveaccess.org/2024/03/a-history-the-iud/
29. Wikipedia. Dalkon Shield. Wikipedia, read October 2026 (secondary). https://en.wikipedia.org/wiki/Dalkon_Shield
30. Encyclopaedia Britannica. Dalkon Shield. Britannica, read October 2026 (secondary).

https://www.britannica.com/topic/Dalkon-Shield
31. Heinemann K, Reed S, Moehner S, Minh TD. Risk of uterine perforation with levonorgestrel-releasing and copper intrauterine devices in the European Active Surveillance Study on Intrauterine Devices. Contraception 2015, 91:274-279 (abstract only). https://pubmed.ncbi.nlm.nih.gov/25601352/
32. Medicines and Healthcare products Regulatory Agency. Intrauterine contraception: uterine perforation, updated information on risk factors. Drug Safety Update, MHRA 2015. https://www.gov.uk/drug-safety-update/intrauterine-contraception-uterine-perforation-updated-information-on-risk-factors
33. Farley TM, Rosenberg MJ, Rowe PJ, Chen JH, Meirik O. Intrauterine devices and pelvic inflammatory disease: an international perspective. Lancet 1992, 339:785-788 (secondary summary only). https://pubmed.ncbi.nlm.nih.gov/1347812/
34. Polus S, Lewin S, Glenton C et al. Optimizing the delivery of contraceptives in low- and middle-income countries through task shifting: a systematic review of effectiveness and safety. Reproductive Health 2015, 12:27. https://pmc.ncbi.nlm.nih.gov/articles/PMC4392779/
35. Cleland K, Zhu H, Goldstuck N, Cheng L, Trussell J. The efficacy of intrauterine devices for emergency contraception: a systematic review of 35 years of experience. Human Reproduction 2012, 27(7):1994-2000 (abstract only). https://pmc.ncbi.nlm.nih.gov/articles/PMC3619968/
36. Global Health Supply Chain Program. Annex 4, product specifications and technical requirements (copper IUD shelf life). GHSC 2018. https://www.ghsupplychain.org/sites/default/files/2018-03/Annex%204_Product_Specifications_Technical%20Requirements%20Final.pdf
37. UNFPA. Shelf life and stability studies (presentation). UNFPA, undated (cited as n.d.), read October 2026. https://www.unfpa.org/sites/default/files/resource-pdf/Presentation%20-Shelf%20life%20and%20stability%20studies.%20Final.pdf
38. Peterson HB, Xia Z, Hughes JM et al. The risk of pregnancy after tubal sterilization: findings from the U.S. Collaborative Review of Sterilization. American Journal of Obstetrics and Gynecology 1996, 174:1161-1170 (abstract only). https://pubmed.ncbi.nlm.nih.gov/8623843/
39. Down to Earth. Exclusive: Chhattisgarh sterilisation deaths not due to rat poison. Down to Earth 2014 (news report). https://www.downtoearth.org.in/environment/exclusive-chhattisgarh-sterilisation-deaths-not-due-to-rat-poison-49329
40. Seattle Times. Plant-derived birth control is ancient history. Seattle Times, 30 August 1994 (news report). https://archive.seattletimes.com/archive/19940830/1927872/plant-derived-birth-control-is-ancient-history
41. National Research Council. Neem: A Tree for Solving Global Problems. National Academy Press 1992. https://www.nationalacademies.org/read/1924/chapter/13
42. Sinha KC, Riar SS, Tiwary RS et al. Neem oil as a vaginal contraceptive. Indian Journal of Medical Research 1984, 79:131-136 (not read, known through NRC 1992). https://pubmed.ncbi.nlm.nih.gov/6724648/
43. Sinha KC, Riar SS, Bardhan J et al. Anti-implantation effect of neem oil. Indian Journal of Medical Research 1984, 80:708-710 (cited as Sinha 1984b, abstract record only). https://pubmed.ncbi.nlm.nih.gov/6532974/
44. Upadhyay SN, Kaushic C, Talwar GP. Antifertility effects of neem (Azadirachta indica) oil by single intrauterine administration: a novel method for contraception. Proceedings of the Royal Society B 1990, 242:175-179 (abstract only). https://pubmed.ncbi.nlm.nih.gov/1983033/
45. Garg S, Taluja V, Upadhyay SN, Talwar GP. Studies on the contraceptive efficacy of Praneem polyherbal cream. Contraception 1993, 48:591-596 (abstract record only). https://pubmed.ncbi.nlm.nih.gov/8131399/
46. Sinniah D, Baskaran G. Margosa oil poisoning as a cause of Reye's syndrome. Lancet 1981, 1:487-489 (abstract and secondary summary only). https://pubmed.ncbi.nlm.nih.gov/6110100/
47. Riddle JM. Contraception and Abortion from the Ancient World to the Renaissance. Harvard University Press 1992 (not read, known through secondary summaries and TR-05).
48. Riddle JM. Eve's Herbs: A History of Contraception and Abortion in the West. Harvard University Press 1997 (not read, known through secondary summaries).
49. van de Walle E. Flowers and fruits: two thousand years of menstrual regulation. Journal of Interdisciplinary

History 1997, 28(2):183-203 (not read, known through secondary summaries, pages [VERIFY]).
50. Ciganda C, Laborde A. Herbal infusions used for induced abortion. Journal of Toxicology, Clinical Toxicology 2003, 41(3):235-239 (abstract only). https://pubmed.ncbi.nlm.nih.gov/12807304/
51. Coutinho EM. Gossypol: a contraceptive for men. Contraception 2002, 65:259-263 (abstract only). https://pubmed.ncbi.nlm.nih.gov/12020773/
52. Waites GM, Wang C, Griffin PD. Gossypol: reasons for its failure to be accepted as a safe, reversible male antifertility drug. International Journal of Andrology 1998, 21:8-12 (abstract only). https://pubmed.ncbi.nlm.nih.gov/9639146/
53. Bongaarts J, Potter RG. Fertility, Biology, and Behavior: An Analysis of the Proximate Determinants. Academic Press 1983 (not read, known through NRC 1993).
54. National Research Council. Demographic Change in Sub-Saharan Africa. National Academy Press 1993, chapter on proximate determinants. https://www.nationalacademies.org/read/2207/chapter/4
55. Eaton JW, Mayer AJ. The social biology of very high fertility among the Hutterites: the demography of a unique population. Human Biology 1953, 25:206-264 (not read, known through secondary summaries).
56. University of Padua. Teaching slides on natural fertility and the Coale indices (Hutterite standard). University of Padua, undated (cited as n.d.), read October 2026 (secondary). https://stem.elearning.unipd.it/mod/resource/view.php?id=724604
57. Conde-Agudelo A, Rosas-Bermúdez A, Kafury-Goeta AC. Birth spacing and risk of adverse perinatal outcomes: a meta-analysis. JAMA 2006, 295:1809-1823 (abstract only). https://pubmed.ncbi.nlm.nih.gov/16622143/
58. Cranston EM. The effect of Lithospermum ruderale on the estrous cycle of mice. Journal of Pharmacology and Experimental Therapeutics 1945, 83:130-142 (not read, known through secondary summaries, details [VERIFY]).
59. Drasher ML, Zahl PA. The effect of Lithospermum on the mouse estrous cycle. Proceedings of the Society for Experimental Biology and Medicine 1946, 63:66-70 (not read, known through secondary summaries, details [VERIFY]).
60. Thackray Museum of Medicine. The evolution of the condom. Thackray Museum 2020 (secondary, date [VERIFY]). https://thackraymuseum.co.uk/journal/the-evolution-of-the-condom/