Sperm count: normal ranges, low count, and causes

What sperm count measures

In everyday language, "sperm count" often refers to how many sperm are present in a semen sample. In laboratory reporting, two related numbers are especially important. Sperm concentration is the number of sperm per milliliter of semen. Total sperm number is the estimated number of sperm in the whole ejaculate, calculated using semen volume and concentration.

A semen analysis is usually requested when a couple has difficulty conceiving, before or after vasectomy, or when a clinician suspects a reproductive or hormonal problem. The sample is typically collected by masturbation into a sterile container after a recommended period of abstinence, often a few days. Collection timing, incomplete collection, fever, recent illness, lubricants, and delays in delivery to the laboratory can all affect results.

It is important to understand that count is not the same as fertility. Conception also depends on sperm motility, sperm shape, cervical mucus, timing relative to ovulation, tubal patency, egg quality, uterine factors, and general reproductive health in both partners.

Normal sperm count ranges

Reference values are not a guarantee of fertility; they are statistical thresholds derived from populations. The World Health Organization laboratory manual provides widely used reference limits for semen analysis. Many laboratories and clinicians use WHO-based lower reference limits as a practical guide, while recognizing that results above or below these values do not perfectly predict whether pregnancy will occur.

Commonly cited lower reference values include:

Sperm concentration: about 15-16 million sperm per milliliter or higher, depending on the reference edition and laboratory method.
Total sperm number: about 39 million sperm per ejaculate or higher.
Semen volume: around 1.4-1.5 mL or higher is often used as a lower reference range.
Total motility: roughly 40-42% or higher may be considered within reference limits.
Progressive motility: the percentage moving forward effectively; this is often reported separately because forward movement matters for reaching the egg.
Morphology: a low percentage of sperm may have "normal" shape even in fertile men, so morphology must be interpreted carefully and with the laboratory's criteria.

MedlinePlus and the NHS both emphasize that semen analysis assesses several features, not only sperm count. A person can have a normal count but reduced motility, or a lower count with relatively good motility. This is why clinicians usually look at the whole report rather than one number in isolation.

What is low sperm count?

Low sperm count is often called oligozoospermia. It generally means that sperm concentration or total sperm number is below the laboratory's reference range.
A very low count may be described as severe oligozoospermia. Azoospermia means no sperm are seen in the ejaculate on analysis, which requires careful confirmation and specialist evaluation.

Low sperm count may reduce the monthly chance of conception because fewer sperm are available to survive the reproductive tract, pass through cervical mucus,

reach the fallopian tube, and encounter an egg. However, sperm count is not an all-or-nothing measure. Some people with low counts conceive without assisted reproductive treatment, while some with counts in the reference range still experience infertility because of other factors.

Because sperm production takes roughly several months and semen parameters vary, a single abnormal semen analysis is not usually the final word. Clinicians often repeat testing, commonly after an interval, especially if there was fever, acute illness, medication exposure, high heat exposure, or collection difficulty near the time of the first sample.

How semen analysis is interpreted

A semen analysis report can feel technical, but each component answers a different question. The count estimates quantity; motility describes movement; morphology describes shape; volume reflects seminal fluid contribution from glands; and pH or other findings may suggest inflammation, obstruction, or collection issues.

Key interpretation principles include:

One result is not a diagnosis: Semen quality can fluctuate, and repeat testing may be needed.
Abstinence interval matters: Too short an interval may lower volume and total count; too long may affect motility.
Illness and fever matter: A fever in the previous weeks can temporarily reduce sperm production or motility.
Laboratory methods matter: WHO guidance standardizes examination, but reporting can still vary by lab.
Partner factors matter: Male and female fertility factors interact, so semen results should be interpreted in the context of the couple or individual’s reproductive goals.

If results are abnormal, a clinician may ask about puberty history, prior pregnancies, testicular injury, surgery, infections, medications, anabolic steroid use, alcohol and tobacco exposure, occupational toxins, heat exposure, and sexual function. Physical examination may include testicular size, the presence of the vas deferens, and signs of varicocele. Blood tests, genetic

tests, ultrasound, or referral to a reproductive urologist may be considered depending on the pattern.

Medical causes of low sperm count

Many medical conditions can reduce sperm production, impair transport, or alter ejaculation. Some causes are potentially reversible, while others require specialist management or assisted reproductive options.

Common medical contributors include:

Varicocele: Enlarged veins around the testicle can be associated with reduced sperm production and abnormal semen parameters.
Hormonal disorders: Low testosterone, high prolactin, thyroid disease, pituitary disorders, or impaired signaling from the hypothalamus and pituitary can affect sperm production.
Genetic factors: Klinefelter syndrome, Y-chromosome microdeletions, and congenital absence of the vas deferens can be associated with very low counts or azoospermia.
Testicular injury or torsion: Past trauma, torsion, or surgery may affect sperm-producing tissue.
Undescended testes: A history of cryptorchidism, especially if untreated or corrected late, can affect sperm production later in life.
Infections and inflammation: Epididymitis, orchitis, prostatitis, sexually transmitted infections, and mumps orchitis can affect sperm production or transport.
Ejaculatory or anatomical problems: Retrograde ejaculation, obstruction of the reproductive tract, or prior pelvic, prostate, bladder, or hernia surgery may reduce sperm in the ejaculate.
Cancer treatment: Chemotherapy, radiotherapy, and some surgeries can significantly affect sperm production, sometimes permanently.

Medication history is also important. Testosterone therapy and anabolic-androgenic steroids can suppress the hormonal signals needed for sperm production. Some other medications may affect semen parameters or ejaculation. No one should stop prescribed medication without medical advice; the safer step is to discuss fertility goals with the prescribing clinician.

Lifestyle, occupational, and environmental factors

Sperm production is biologically sensitive to heat, oxidative stress, endocrine signaling, and general health. Lifestyle factors do not explain every case of low sperm count, and they should not be framed as blame. Still, they can be relevant, especially when several exposures occur together.

Factors that may contribute include:

Heat exposure: Frequent hot tubs, saunas, high-heat workplaces, or prolonged laptop heat near the groin may affect sperm production in some people.
Tobacco and vaping exposures: Smoking is associated with poorer semen parameters in many studies.
Heavy alcohol use and recreational drugs: These may affect hormones, sexual function, and sperm production.
Anabolic steroids or non-prescribed testosterone: These can markedly suppress sperm production and may lead to very low counts.
Obesity and metabolic disease: Higher body weight, insulin resistance, and sleep apnea can be associated with hormonal changes that affect fertility.
Environmental toxins: Pesticides, solvents, heavy metals, and some industrial chemicals may be relevant depending on exposure level and duration.
Severe stress and poor sleep: These may indirectly affect reproductive hormones and sexual function, though they are rarely the only explanation.

A clinician can help prioritize which factors are medically meaningful. For example, someone with a very low count may need hormonal and genetic evaluation rather than only lifestyle advice. Conversely, someone with borderline results and recent heat exposure or fever may be advised to repeat testing after time has passed.

Low sperm count and pregnancy chances

Pregnancy is possible with a low sperm count, but the probability may be lower per cycle, especially if motility or morphology are also reduced. Timing intercourse in the fertile window can help maximize the chance that available sperm are present when ovulation occurs, but timing alone may not overcome severe male factor infertility.

Clinical decisions depend on several variables: the degree of low count, total motile sperm count, duration of trying to conceive, age and ovarian reserve of the partner producing eggs, history of miscarriage or prior pregnancies, and whether there are coexisting ovulation, tubal, uterine, or endometriosis-related factors. In some cases, expectant management and repeat testing may be reasonable. In others, referral to a fertility specialist or reproductive urologist is appropriate.

Possible next steps can include repeat semen analysis, targeted medical evaluation, treatment of infections or hormonal abnormalities when present, consideration of varicocele management in selected cases, sperm banking before gonadotoxic treatment, or fertility treatments such as intrauterine insemination or in vitro fertilization with intracytoplasmic sperm injection. The right option depends on diagnosis and shared decision-making with qualified clinicians.

When to seek professional advice

It is reasonable to seek medical advice if pregnancy has not occurred after 12 months of regular unprotected intercourse, or after 6 months if the egg-producing partner is 35 or older. Earlier evaluation may be appropriate if there is a known history of testicular surgery, chemotherapy, undescended testes, severe erectile or ejaculatory problems, prior abnormal semen analysis, recurrent pregnancy loss, or very irregular or absent ovulation in the partner.

For many people, the hardest part is emotional rather than technical. Male fertility testing can bring up shame, anxiety, or a sense of responsibility. These reactions are common, but low sperm count is a medical finding, not a character flaw. Asking for help early can reduce uncertainty and may identify options that would otherwise be missed.