

# Genetic Testing – The next generation of preventive healthcare

By [eHealth Network](#)



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The entire structure and functioning of the body are dependent on our genes. For example, genes, a short section of DNA, contain instructions that instruct cells to make molecules called proteins. Different proteins carry out most of the functions inside human body. For example, various hormones, enzymes, antibodies, etc. all are proteins whose synthesis instructions are encoded in the genes.

Genes also carry information that determines our hair colour, height, eye colour, etc.

With genes playing such an important role in the overall crux of our being, they also can help prevent diseases. How, we might ask? The answer is through **genetic testing**.

A technologically advanced prevention tool that can personalise an individual's health, thereby reducing the costs associated with non-communicable diseases (NCDs). It identifies the changes in one's genes, proteins, chromosomes, thus determining a person's susceptibility to genetic disorders.

There are different types of genetic tests available for various concerns.

- Diagnostic testing
- Presymptomatic and predictive testing
- Carrier testing.
- Pharmacogenetics.
- Prenatal testing.
- Newborn screening.
- Preimplantation testing.

These tests help us understand the genetic variations related to our health traits, the kind of food we're sensitive to, our body's metabolism rate, the medicine we should be consuming, etc.

We can also receive information on the hereditary health risks, fitness and skincare routine we should ideally follow.

In pregnant women between the 10th and 12th week of pregnancy, genetic testing ensures if the foetus is developing well and is healthy. Newborn screening shows whether the toddler has any metabolic or congenital abnormality. Generally, the procedure and results are better understood under a geneticist's guidance.

The two predominant kinds of the test are clinical genetic testing and personal genomics testing.

**Clinical Genetic Testing** - It is the laboratory analysis of the DNA or RNA to pre-empt the possibility of any disease. The purpose of this test is to anticipate an illness before the symptoms even arise and get a definite diagnosis. An individual who has symptoms of a genetic disorder might undergo a diagnostic test for precise detection.

**Also read:** [Why to-be-parents should opt for a Reproductive Genetic Testing](#)

**Personal Genomic Testing**- This kind plays a vital role in the field of personalised and preventive healthcare. It can help anticipate an individual's susceptibility to a disease, the kind of drugs and the type of treatment, best suited to their health.

Thus, the test allows one to receive an analysis of their DNA:

- An understanding of the complete genetic make-up
- Enables in personalising lifestyle by making changes in diet and fitness plan
- Delaying or preventing the onset of diseases by observing symptoms & planning regular health checkups

**How Genetic testing helps in reducing the growing burden of non-communicable and lifestyle diseases.**

## Prevention of NCDs

With work and academic pressure piling over, many don't bother keeping their health a top priority. People spend hours sitting in front of their laptops working or binge-watching, thus leading a mostly sedentary life. Multiple NCDs arise due to unhealthy eating, no exercise, substance (drugs, tobacco, and alcohol) abuse, etc. Thus, causing heart disorders, fatty liver, diabetes and many other health conditions.

Exposure to environmental toxins, air pollution, have increased incidence of asthma, cancer and other health conditions in society.

However, in most lifestyle diseases, we can avoid the risks by modifying our diet, adding a suitable fitness regime, taking necessary precautions, etc. NCDs cause severe trauma and out-of-pocket expenses for the family -an increased level of awareness and education about early detection and prevention can reduce them.

It also allows doctors to treat the patient more effectively, and in most cases, the individual can live a long and healthy life.

A personalised genetic test identifies biological markers present in an individual that may be associated with an increased risk for specific diseases, thus, reducing the likelihood of NCDs.

## Level of awareness among the general population of India regarding genetic testing

### Awareness & Perception amongst the Indian mass

In India, the majority don't have an idea about genetic testing. People mostly know the term famously in the context of DNA tests with relevance to paternity testing and forensic investigation.

Masses do not know the relevance of genetic testing in terms of health and fitness. Even the elite class, the educated section including clinicians, are not entirely aware of the potential benefits of genetic testing.

When an individual move to the interiors, people from rural areas have little to no information on genetic testing. And the reasons are evidently because of a lack of access to quality healthcare and limited diagnostic centres or hospitals there. The concept of genetic testing is a foreign entity in these areas.

### Reasons for lack of awareness

Lack of Awareness and Acceptance – both are bottlenecks in the implementation of genetic testing in routine healthcare.

- A few reasons for the absence of mass popularity of genetic testing are:
  - No education about this field except at higher levels
  - Lack of studies done on Indian population and hence no propagation of knowledge
  - Not many market players in this domain
  - No mass education and awareness program
  - A large fraction of the Indian population (not literate) don't access websites or read newspapers. Even if the information is present, it does not reach the masses effectively
  - No awareness on channels more accessible to the general public like TV, radio, Social media, in a language known to them
  - Not propagated through influential personalities
  - Less awareness at clinician level – no prescription, thus, no understanding at the general population level
  - Financial concern

### Genetic testing for planning an effective fitness regime and diet

#### Fitness and Diet

Certain genetic variants determine one's response to a specific type of exercise and how it affects their body. For example, people who have a specific variant in the Fat mass and obesity (FTO) gene that increases body weight are more likely to benefit from physical exercise. At the same time, some are genetically wired to feel fatigued and are best suited for light workouts.

Genetic variations also affect a person's food taste, likes and dislikes, food intolerances, etc.

An excellent example of genetic controlled tasting ability is the presence of phenylthiocarbamide (PTC) in food like cauliflower, Brussel sprouts, wine, pepper, kale, etc. Based on one's genes, they can either find the element very bitter or tasteless. The single gene TAS2R38 is responsible for an individual's ability to taste PTC.

Gene variations are also partially responsible for metabolism rate, absorption of food, catabolism, storage, biosynthesis, and excretion.

Our genes determine whether we're allergic to gluten or are lactose intolerant. Overall, a genetic test gives a detailed understanding of the patient's genetic make-up, thus helping a nutritionist form a personalised diet plan.

#### Nutrigenetics

Nutrigenetics is the study of how genes determine the effects nutrients have on the body and health. Response of the body to the food we eat is based on our nutrigenetic profile. This is because specific genes are associated with nutrient absorption and utilization, food intolerances and sensitivities, and nutritional requirements and deficiencies. **Sports Genomics Concept.**

This is a relatively new branch of genetics in the discipline. Sports genomics is the study of the genetic make-up or architecture that contribute to an athlete's performance. The same principle is applicable to every individual who plan to personalize their fitness routine as genes influences our response to many exercise related traits.

**Also read:** [Genetic Testing: Best Preventive Care for Cancer](#)

As mentioned previously, genetic tests help us smartly eradicate guesswork and approach fitness in the best way. The reports make us conscious about our endurance to a workout plan. Based on this, experts might recommend either a high-intensity or a more extended training session.

#### The future of genetic testing in India

India is slowly starting to look at genetic testing as an essential preventive healthcare tool. Many more diagnostic centres have begun entering this domain. Healthcare is evolving every day, and genetic testing will go a long way in revolutionising it.