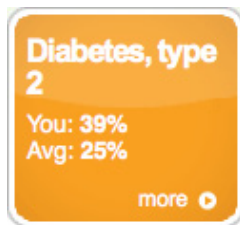


## Navigenics Health Compass: Sample genetic counseling session with a patient

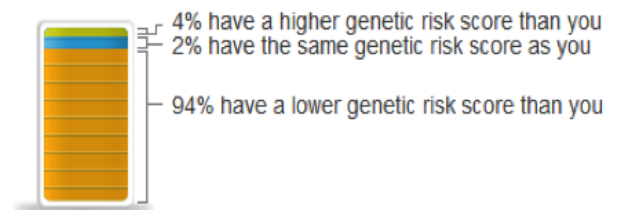
**Case History:** 40 year-old male (Bob) returns to discuss his results with a focus on type 2 diabetes



**Patient:** I am concerned about several of the orange conditions in my report, but particularly about type 2 diabetes. My risk seems very high. One in three is high, don't you think, doctor?

**Genetic Counselor (GC):** Let's take a closer look at those results. Based on the genetic markers we looked at, you do have a higher-than-average risk for type 2 diabetes. The likelihood that you will develop diabetes in the course of your life is estimated at 39%, while the average lifetime risk for a male is 25%.

Another way to look at your risk is to compare yourself to other people in the general population to see if you have more, less, or about the same amount of genetic risk. Here you see that you have the same genetic risk for type 2 diabetes as 2 percent of the population while 4 out of 100 have more genetic risk and 94 out of 100 have less.



**Patient:** That makes sense, but I can't figure out why my risk is so high when no one in my family has type 2 diabetes.

**GC:** That is a good question. Type 2 diabetes is very common affecting one out of four men during their lifetime. When you say no one in your family has type 2 diabetes, does that include aunts, uncles and grandparents?

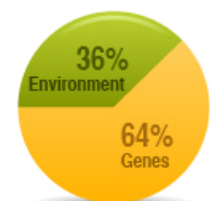
**Patient:** Well, I'm not sure, but my dad's brother and I think maybe my mom's mother may have some type of diabetes.

**GC:** I see. Some people are not aware that they have diabetes in their family until they ask relatives specific questions that can give some helpful clues. It's also important to ask if anyone with diabetes developed it as an adult, or during childhood, and how they treat their diabetes.

Given that type 2 diabetes is common, it does not surprise me to learn that you may have a few family members affected by type 2 diabetes. Remember also that you share about 50% of your genetic code with your parents and siblings, so it's not clear whether they are also at high risk for type 2 diabetes. The good news is that type 2 diabetes is not strictly a genetic disease.

### Causes: type 2 diabetes

Genes account for much of the risk for type 2 diabetes, but environment and behavior are key triggers, too. Studies of twins show how much of a condition's cause is hereditary and how much is due to other factors.



Environmental factors also influence a person's risk for the condition. This pie chart shows how both genetics and environment contribute.

**Patient:** What do you mean by environment here?

**GC:** Environmental means any factor that is not genetic, including lifestyle choices such as what you eat, how much you exercise, and your body fat percentage.

**Patient:** My doctor just checked my blood sugar level and it was normal. I exercise 4 days a week for at least one hour. And I don't eat that many sweets. What more could I be doing?

**GC:** Well, it sounds like you are on the right path to preventing type 2 diabetes. All of those things will help lower your risk, although it is impossible to calculate. For now, it is important to talk to your doctor about your genetic risk estimate. Your doctor may consider monitoring you more closely with annual glucose screening. I am going to order a fasting glucose level on you, just to make sure that it is within normal range. Also, I realize that you are within a reasonable weight range, but if you feel you are a little heavy, losing five to seven pounds can also help to reduce your risk. Make sure to talk to your doctor first before making any changes in your diet or exercise program.

**Patient:** OK. What about my 15 year-old son? Should I also have his doctor order a fasting glucose?

**GC:** Keep in mind that type 2 diabetes is typically an adult-onset condition. Standard screening is not recommended until age 40. Unless his doctor believes that your son has other risk factors for type 2 diabetes, it may not be necessary to start screening now. One last point I'll make is that childhood obesity has been linked to developing type 2 diabetes later in life, so make sure your son stays active and eats healthy foods.

Also, remember that you pass on 50% of your genes to your children, so your son will not necessarily have the same risk as you do for this condition. But knowing that there are some genetic factors in the family that increase the chance of developing diabetes, it is important to emphasize healthy diet and exercise habits, especially from an early age.

**Patient:** Of course. My wife is diligent about making sure we all eat right! Thank you. I feel like I have a better understanding of what this risk means for me and my family.