GSSCC - - DNA Special Interest group - - handout
Tuesday, April 12, 2022

Shared Centimorgan Project

What is the Shared Centimorgan project?

Located at the DNA Painter website at - - https://dnapainter.com/ - - the Shared cM Project (ScP) is a collaborative data collection and analysis project created to understand the ranges of shared cM associated with various known relationships. It was designed by Blaine Bettinger. The ScP has been very successful, with more than 60,000 submissions from genealogists. The current version of the project is version 4.0, which was rolled out in March, 2020.

To access the summary of the ScP, go to the DNA Painter home page, then click on the "Tools" tab in the upper left. On the next screen, click on the "Shared CM Tool" button. This takes you to a page with the colored relationship chart at the top. In the upper left corner are several links (in very small print). Click on the link that reads, "More about this project." That will take you to the summary page explaining the ScP project. From the summary page, you can access and download a pdf version of the 56-page document about the ScP, if you wish.

There is a wide range of shared cM between the minimum, average, and maximum values for given relationships. By collecting and organizing this data, the ScP helps genealogists to estimate the most likely DNA relationship, and thereby identify the most likely generations where the most recent common ancestor is most apt to be found. Obviously, there will be overlap among various possible relationships. And of course, there will always be outliers. If you have a possible outlier scenario, be sure to try to disprove that it is an outlier situation, rather than simply proceeding as if is an outlier. Avoid confirmation bias!

At DNA Painter, there is an interactive version of the Shared cM tool, where you can enter a cM value and see which relationships that cM value falls into. If you click a relationship box, the histogram for that relationship will show in a pop-up. The histograms are available for every relationship in the relationship chart. Each histogram has an easy-to-understand explanation at the bottom that explains how to interpret the histogram. Note - - A histogram is a graphic representation that organizes a group of data points into user-specified ranges. Similar in appearance to a bar graph.

You can add your data to the project by clicking on the "submission portal" and entering information about the known relationship; total shared cM of DNA; longest segment; number of shared segments; any known endogamy or cousin marriages; source of your information (AncestryDNA, MyHeritage, FT-DNA, etc.); and your e-mail address. As more genealogists submit centimorgan information for their known cousin relationships, the database grows and the distribution of cM values for that relationship becomes more clearly defined. Every person who has ever submitted even a single relationship has helped create this tool for the benefit of the entire community. To access the form to add your data to the ScP, click on the link that reads, "Click here to contribute data to the shared cM project."

Cousin relationships

Cousins are people who share a common ancestor that is at least 2 generations away, such as a grandparent or great-grandparent. The number associated with your cousin has to do with how many generations away your common ancestor is. For example:

First cousins share a grandparent (2generations)
Second cousins share a great-grandparent (3 generations)
Third cousins share a great-great-grandparent(4 generations)
Fourth cousins share a 3rd-great grandparent (5 generations)

Quick Tip: Count how many "greats" are in your common ancestor's title and add 1 to find out what number cousin your relative is. Note that grandparents have no "greats" in their titles, so cousins who share grandparents are first cousins because 0 + 1 = 1. However, keep in mind that this trick only works if you are both the same number of generations removed from the common ancestor.

What does it mean to be a cousin "once removed?" To be "once removed" from a cousin means you are separated by one generation. The number before "removed" will always represent the number of generations you are separated ("removed") from the cousin. Thus, cousins "once removed" are either from one generation above you or one generation below you. You are "once removed" if you are separated by one generation and "twice removed" if you are separated by two generations, and so on.

Quick Tip: Your parent's first, second, and third cousins are also your first, second, and third cousins—but once removed. This is because your parents and their generation are one above yours. Likewise, your grandparents' first, second, and third cousins are also your first, second, and third cousins, this time twice removed. This pattern continues throughout each generation. So, for example, a first cousin once removed is either the child of your first cousin or the parent of your second cousin.

What is the Shared Centimorgan tool?

The Shared Centimorgan tool shows the colored chart at the top of the ScP summary page. You can click on any of the designated relationships to bring up the histogram which shows the bell curve of potential quantities of shared centimorgans that fall within that relationship, based on the accumulated data of the thousands of genealogists who have contributed data to the project. The histogram indicates the most likely cM range for that relationship, and the extreme high and low cM limits that have been associated with that relationship.

Immediately above the colored ScP chart, you will find a small box where you can enter the number of cM of shared DNA with one of your matches. The tool will then display a chart of all the relationship possibilities suggested by that amount of shared DNA, displayed in descending order from most likely relationships to less likely relationships. Below the display of possible relationships, the ScP chart is shown, with all the boxes that represent possible relationships colored in, while the remainder of the chart is grayed out.

How can the Shared Centimorgan tool help me analyze my DNA results?

The Shared cM Project (ScP) is an invaluable tool for genetic genealogists. It helps you see how the amount of your shared DNA with any given match translates into possible genealogical relationships. Knowing the most likely possible relationships is helpful information when analyzing your DNA results. Using the Shared cM tool can help to estimate the level of cousinship you share with your match, and therefore can point to the ancestral generation in which the probabilities are highest to find your common ancestor.

If you are consistently sharing less-than-typically reported amounts of DNA with three people who all appear to be your second cousins by matching to a particular ancestral couple, however, you may want to look at a more distant generation of that family. While you are technically sharing enough DNA to be connected at the second cousin level to this couple, you may want to consider that you share more distant relationships with these matches. As stated above, there will always be outliers. But, if you have a possible outlier scenario, be sure to try to disprove that it is an outlier situation, rather than simply proceeding as if is an outlier.

Confirmation bias

Proceeding as if your DNA matches are your second cousins with an outlier result, or trying to prove they are second cousins without also trying to disprove it - - that is confirmation bias. Confirmation bias assumes an outcome and clouds judgment, potentially leading one to ignore or devalue contradictory evidence. Avoid confirmation bias!

The Shared cM tool cannot, however, point absolutely to the correct generation in which to search for a common ancestor with your DNA matches. Using the tool and reviewing the histograms can only suggest where to look. Use ThruLines at Ancestry and the Theory of Family Relativity at MyHeritage as additional clues. Then do genealogy by tracing down the descendants in all the collateral lines for each generation to find your DNA matches in real time, so you can see the confirmed cousin relationship. Genetic genealogy requires lots of genealogy!

Sources of information

1. DNA Painter, Jonny Perl - - https://dnapainter.com/tools/sharedcmv4

2. The Genetic Genealogist, Blaine Bettinger - - https://thegeneticgenealogist.com/

3. The DNA Geek, Leah Larkin - - https://thednageek.com/the-limits-of-predicting-relationships-using-dna/

4. Your DNA Guide, Diahan Southard - - https://www.yourdnaguide.com/?s=shared+centimorgan+project