

DNA and Genealogy Research

How to Confirm an Ancestral Line

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Overview

Learn through a case study how to use your DNA match results to confirm your family tree. We'll discuss clustering, organizing, and diagramming your DNA matches, then how to use those as evidence of relationships.

Objective

A research objective states the purpose of the research and the identifying information of the people you are researching. If you want to verify a biological relationship, DNA evidence is required.¹

Example: Who were the biological Elder ancestors of Mark Elder, born in Seattle, Washington, son of Charles William Elder and Renee Hollingsworth? This research seeks to verify the traced patrilineal relationships in his family tree to his second-great-grandparents, Charles Elder and Elizabeth Ann Medley, using documentary and DNA evidence.

This example objective states that the purpose of the research is to verify the traced patrilineal relationship of Mark Elder to his second-great-grandparents in his Elder patrilineal line. The word biological was used in the objective to indicate that DNA evidence will be used. The word traced means that his ancestors in this line were identified previously using documentary evidence. The word patrilineal means Mark Elder's father's line, following only the fathers, back to his second-great-grandparents. Mark is identified by his birthplace and parents. Since Mark is living, his birthdate was not included for privacy. Research objectives usually include this detail.

Clustering

To find DNA matches relevant to ancestors in the research objective, clustering should be performed. This involves using lists of shared matches from DNA testing companies to find groups of matches who share DNA with each other and likely have common ancestors. Some testing companies call this "in common with" or ICW.

¹ Board for Certification of Genealogists, *Genealogy Standards*, 2nd ed. (Nashville: Ancestry.com, 2019), p. 32, standard 56: Conclusions about genetic relationships.

The Leeds Method is one way to cluster matches.² Those with matches at Ancestry or MyHeritage may wish to use the colored dot labels to mark matches' clusters.³

Example: The Leeds method was used to sort and filter Mark's DNA matches sharing from 90-400 cM into his four grandparent lines. After the matches were assigned to four clusters or groups, matches with family trees attached to their results were examined for common ancestors. Those common ancestral couples were added to column H in the spreadsheet, as shown in figure 1. The colored blocks in columns D-G indicate four separate genetic networks representing Mark's four grandparents' lines. Eighteen matches were grouped to the green cluster. This cluster was examined for common ancestors. Many matches in the green cluster have trees tracing back to Mark's great-grandparents, Daniel O'Connell Elder and Jessie Estelle Ross. The green cluster is the starting point for identifying relevant matches for this research project. Additional matches will be added through shared matches of this green cluster.

	A	B	C	D	E	F	G	H
1	Name	Relationship	Shared cM	Merrill	Hollingsworth	Henrie	Elder	MRCAs
2		H1C	397.5					Irma Henrie
3		1C1R (younger)?	392.98					
4		1C1R (younger)	384.55					Merrill/Hollingsworth
5		1C1R (younger)	383.32					Merrill/Hollingsworth
6			360.75					
7		1C1R	357.54					Merrill/Bennett
8			353.53					Elder/Ross
9			332.81					
10			311.18					
11			309.99					
12		2C1R	298.87					
13			298.76					
14			297.16					
15			291.56					
16		2C	284.43					Henrie/Westenskow
17			284.38					
18		2C	273.29					Elder/Ross
19		2C	259.48					Merrill/Bennett
20		2C	257.63					
21			255.97					
22			249.08					

Figure 1 - Excerpt from Leeds Method Analysis for Mark Elder, with match names blurred for privacy

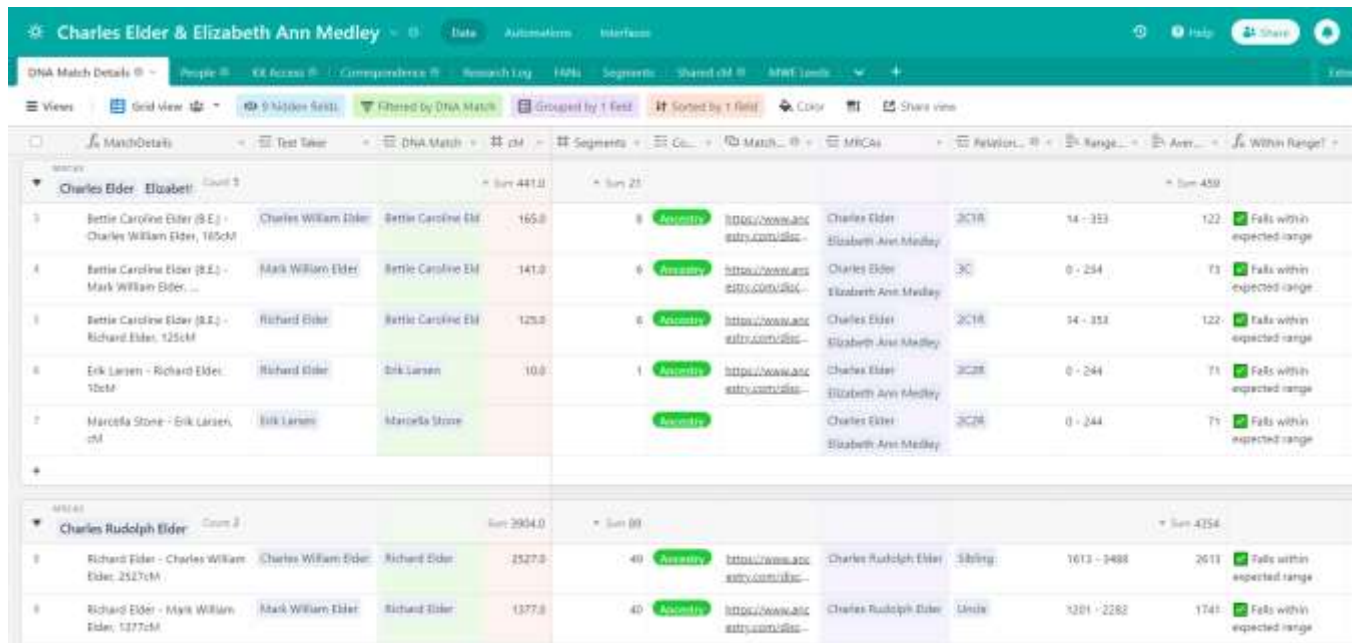
In this example, matches with trees were selected first to help identify the common ancestors of each cluster. However, several close matches sharing over 200 cM were in the cluster and did not have trees. To identify close matches without trees, contact them and ask about their ancestry, or search for information about them on Google, Facebook, and people finder websites like BeenVerified.com. Another great way to find living people is through newspaper research and obituaries.

² Dana Leeds, "The Leeds Method," 23 Aug 2018, *Dana Leeds* (<https://www.danaleeds.com/dna-color-clustering-the-leeds-method-for-easily-visualizing-matches/>; accessed 1 June 2022).

³ Alice Childs, "Color-Coding Ancestry DNA Matches," 20 Sep 2019, blog post, *Alice Childs* (<https://alicechilds.com/color-coding-ancestry-dna-matches/>; accessed 5 Dec 2022).

Organizing

Once you figure out the relationship with a DNA match, keep track of what you find. A handy place to do this is the note section of the DNA match page on the DNA testing companies' websites. As you learn more about your matches, you may start gathering a lot of information. To keep all this information about your DNA matches organized, consider using a spreadsheet or database. Airtable is a spreadsheet-database hybrid that is well-suited to keeping track of DNA matches and research results. For an Airtable DNA Research Log template, go here: <https://www.airtable.com/universe/expy4V9HzRUxtJLvh/rlp-with-dna-research-log-2022>.



Match ID	Match Name	Shared cM	Relationship	Falls within expected range
3	Bettie Caroline Elder (B.E.) - Charles William Elder, 1850M	165.0	3C1R	122 Falls within expected range
4	Bettie Caroline Elder (B.E.) - Mark William Elder...	141.0	3C	71 Falls within expected range
5	Bettie Caroline Elder (B.E.) - Richard Elder	125.0	3C1R	122 Falls within expected range
6	Erik Larsen - Richard Elder, 19CM	10.0	3C2R	71 Falls within expected range
7	Marcelle Stone - Erik Larsen, cM		3C2R	71 Falls within expected range

8	Richard Elder - Charles William Elder, 2527cM	2527.0	Sibling	1673 - 3488 2611 Falls within expected range
9	Richard Elder - Mark William Elder, 1377cM	1377.0	Uncle	1201 - 2282 1741 Falls within expected range

Figure 2 – Airtable database of Elder matches. The matches used in figures 2 and 3 have given permission for their names and DNA match information to be used in publications.

Visualizing the relationship of a DNA match with the test-taker is an important part of incorporating DNA evidence into genealogical research. Use [Diagrams.net](https://www.diagrams.net/) (free) or [Lucidchart.com](https://www.lucidchart.com/) (paid) to create a descendency diagram of DNA matches. Diagramming the matches helps you figure out the relationship – i.e. third-cousin-once removed. As you diagram the matches, you can use the [Shared cM Project tool at DNA Painter](https://www.dnainter.com/) to help you determine if the amount of shared DNA falls within expected amounts of shared DNA for that relationship.

Example: Figure 3 shows DNA matches of Mark Elder and his father Charles William Elder. The matches descend from Charles Elder and Elizabeth Ann Medley. Mark Elder is the third cousin of Bettie Elder. Mark shares 141 cM with Bettie. The Shared cM Project says that third cousins are observed to share a range of 0-234 cM.⁴ Mark and Bettie's amount of shared DNA falls within that range, supporting the conclusion that they are third cousins.

⁴ Blaine Bettinger, "The Shared cM Project Version 4.0 (March 2020)," *The Genetic Genealogist* (<https://thegeneticgenealogist.com/wp-content/uploads/2020/03/Shared-cM-Project-Version-4.pdf> : accessed 5 Dec 2022).

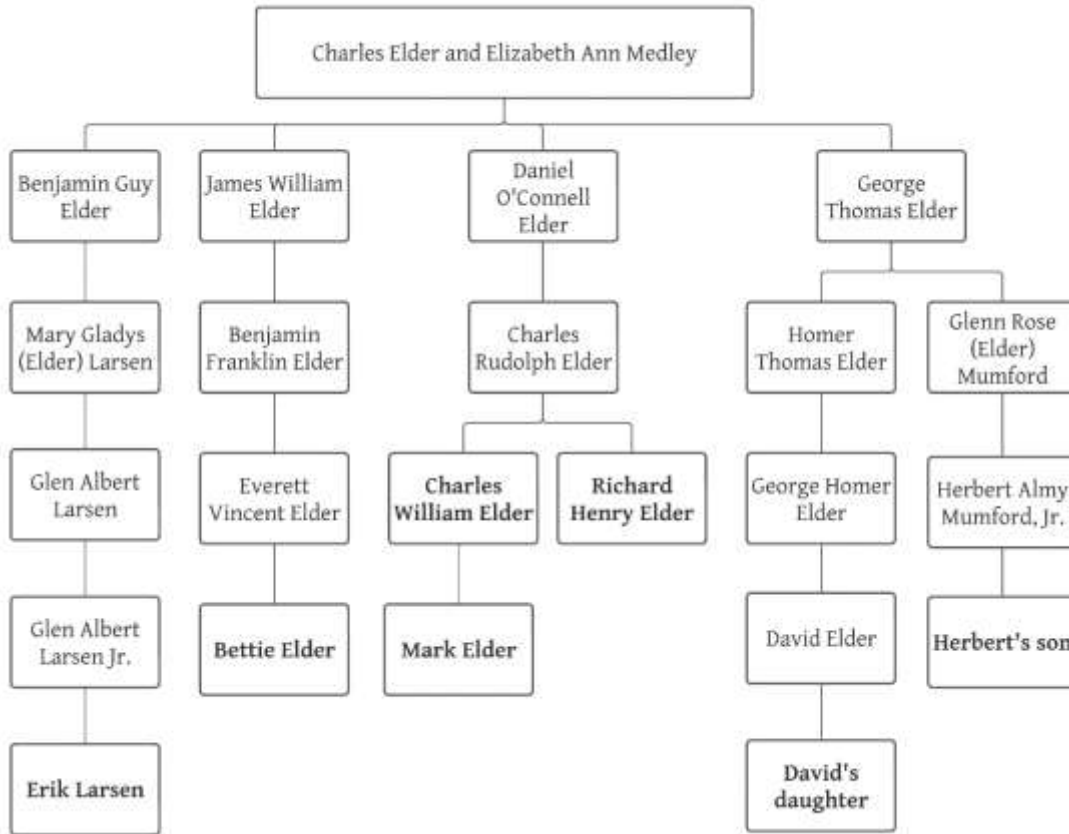


Figure 3 – Descendency diagram of DNA Matches with common ancestors Charles Elder and Elizabeth Medley

After creating a descendency diagram, be sure to gather documentation for each parent-child link in the diagram. These could include obituaries, census records, probate records, deeds, etc.

Writing

Part of confirming a traced ancestral relationship is writing about the evidence you have gathered. Written conclusions are part of the Genealogical Proof Standard (GPS).⁵ Start by writing a research report. A report begins with an objective and an analysis of the starting point information. After that, write about the documentary evidence you have found to trace back to your research subjects: census records, wills, newspaper articles, gravestones, etc. Then you can write about the DNA evidence.

Be sure to include diagrams to show relationships and tables to show amounts of shared DNA. Documentation for each fact that is not common knowledge should be included. Any conflicts should be discussed and resolved. Correlate documentary and DNA evidence. For detailed information about writing research reports, see *Research Like a Pro with DNA: a Genealogist's Guide to Finding and Confirming Ancestors with DNA Evidence*.⁶

⁵ Board for Certification of Genealogists, *Genealogy Standards*, 2nd ed. (Nashville: Ancestry.com, 2019), pp. 1-3.

⁶ Diana Elder, Nicole Dyer, and Robin Wirthlin, *Research Like a Pro with DNA: A Genealogist's Guide to Finding and Confirming Ancestors with DNA Evidence* (Highland, Utah: Family Locket Books, 2021).

Example: The Daniel O’Connell Elder family lived in British Columbia in 1911. Charles Rudolph Elder was listed as a son, born in December 1895 in the U.S.⁷ This birth information correlates with his birth certificate. The census also provides direct evidence that he was the son of “Daniel OConnell and Jessie Estella Elder.” ... Eleven DNA matches from the green Elder cluster were found to descend from Daniel O’Connell Elder and Jessie Estelle Ross through four siblings of Charles Rudolph Elder. ... No conflicts exist in the documentary evidence for Charles Rudolph Elder’s relationship to parents. Records agree that Charles Rudolph Elder was the son of Daniel O’Connell Elder and Jessie Estelle Ross. DNA matches confirm the traced relationships.

⁷ 1911 Canada census, Yale and Cariboo district, British Columbia, population schedule, sub-district 16, p. 15, dwelling 164, family 166, Daniel Olmill Ether [Daniel O'Connell Elder]; image online, *Ancestry* (<https://www.ancestry.com/> : accessed 20 May 2022); citing Library and Archives of Canada.

Next Steps

Once you have completed a research report, you may want to share it. Be sure to get permission of DNA test-takers before sharing the report online or sending it to cousins. To continue to use DNA evidence to help you uncover the parents of the end of line ancestor on that line, ask your DNA matches who descend from your known ancestors to share their DNA results with you. This increases the coverage of the ancestor with unknown parents and increases the likelihood of finding relevant DNA matches for more distant ancestors.

Additional Resources

Research Like a Pro with DNA Series at FamilyLocket.com

Step 1 Take a DNA Test

Wirthlin, Robin. “Which DNA Test Should I Take?” 8 Feb 2019. Blog post. *Family Locket*.
<https://familylocket.com/which-dna-test-should-i-take/>.

Wirthlin, Robin. “DNA – Recommended Testing Strategy.” 22 Apr 2019. Blog post. *Family Locket*
<https://familylocket.com/dna-day-april-25th/>.

Step 2 Assess

Wirthlin, Robin. “Understanding and Using Your DNA Results – 4 Simple Steps.” 22 Feb 2019. Blog post. *Family Locket*. <https://familylocket.com/understanding-and-using-your-dna-results-4-simple-steps/>.

Step 3 Organize

Wirthlin, Robin. “Seeing the Big Picture: 3 Ways to Chart Your DNA Matches.” 28 Mar 2019. Blog post. *Family Locket*. <https://familylocket.com/seeing-the-big-picture-3-ways-to-chart-your-dna-matches/>.

Step 4 Research Objective

Wirthlin, Robin. “What Do You Want to Know? 3 Steps to Focus Your DNA Research.” 16 April 2019. Blog post. *Family Locket*. <https://familylocket.com/what-do-you-want-to-know-3-steps-to-focus-your-dna-research/>.

Step 5 Analyze your Sources

Wirthlin, Robin. “DNA Sources, Information, and Evidence: Sorting it All Out.” 11 May 2019. Blog post. *Family Locket*. <https://familylocket.com/dna-sources-information-and-evidence-sorting-it-all-out/>.

Step 6 Locality Research

Wirthlin, Robin. "Where in the World Has My DNA Traveled? DNA and Locality Research." 24 May 2019. Blog post. *Family Locket*. <https://familylocket.com/where-in-the-world-has-my-dna-gone-dna-and-locality-research/>.

Step 7 Research Planning

Dyer, Nicole. "Genealogy Research Planning with DNA." 4 Sept 2019. Blog post. *Family Locket*. <https://familylocket.com/genealogy-research-planning-with-dna/>.

Methodology and Tools to use as you plan your research:

- Dyer, Nicole. "Charts for Understanding DNA Inheritance." 14 Aug 2019. Blog post. *Family Locket*. <https://familylocket.com/charts-for-understanding-dna-inheritance/>.
- Wirthlin, Robin. "10 Ways to Group Your DNA Matches into Genetic Networks." 11 June 2019. Blog post. *Family Locket*. <https://familylocket.com/10-ways-to-group-your-dna-matches-into-genetic-networks/>.
- Elder, Diana. "Pedigree Triangulation: What is it and How Can it Solve Brick Walls?" 25 July 2019. Blog post. *Family Locket*. <https://familylocket.com/pedigree-triangulation-what-is-it-and-how-can-it-solve-brick-walls/>.
- Dyer, Nicole. "The Chromosome Browser: A Tool for Visualizing Segment Data." 4 Aug 2019. Blog post. *Family Locket*. <https://familylocket.com/the-chromosome-browser-a-tool-for-visualizing-segment-data/>.
- Elder, Diana. "Segment Triangulation: Proving an Ancestral Line" 9 Aug 2019. Blog post. *Family Locket*. <https://familylocket.com/segment-triangulation-proving-an-ancestral-line/>.
- Wirthlin, Robin. "Chromosome Mapping." 25 Aug 2019. Blog post. *Family Locket*. <https://familylocket.com/chromosome-mapping-visualize-your-dna-and-identify-the-ancestors-who-passed-it-on-to-you/>.
- Wirthlin, Robin. "DNA Gedcom." 29 Aug 2019. Blog post. *Family Locket*. <https://familylocket.com/dna-gedcom-a-3rd-party-tool-that-can-help-shorten-your-search/>.

Step 8 Source Citations

Wirthlin, Robin. "DNA Source Citations." 14 Sep 2019. Blog post. *Family Locket*. <https://familylocket.com/dna-source-citations/>.

Step 9 Research Logs

Dyer, Nicole. *Airtable Research Logs for Genealogy*. Research Like a Pro Quick Reference PDF. Highland, UT: Family Locket Books, 2023. <https://familylocket.com/product/airtable-research-logs-for-genealogy-quick-reference/>.

Dyer, Nicole. "DNA Research Logs: How to Keep Track of Genetic Genealogy Searches." 11 Oct 2019. Blog post. *Family Locket*. <https://familylocket.com/dna-research-logs-how-to-keep-track-of-genetic-genealogy-searches/>.

Step 10 Report Writing

Wirthlin, Robin. "DNA Research Reports – the Ultimate Finish." 26 Oct 2019. Blog post. *Family Locket*. <https://familylocket.com/dna-research-reports-the-ultimate-finish/>.

Step 11 What's Next?

Dyer, Nicole. "Continue Your Research & Writing, Productivity, and Education." 8 Nov 2019. Blog post. *Family Locket*. <https://familylocket.com/research-like-a-pro-with-dna-whats-next/>.

Diana's 2022 case study following the Research Like a Pro with DNA process:

1. Elder, Diana. Proving a Parent-Child Link Using Ancestry DNA ThruLines and Documentary Research: Part 1." 24 Apr 2022. Blog post. *Family Locket*. <https://familylocket.com/proving-a-parent-child-link-using-ancestry-dna-thrulines-and-documentary-research-part-1/>.
2. Elder, Diana. "Proving a Parent-Child Link Using Ancestry DNA ThruLines and Documentary Research: Part 2." 15 May 2022. Blog post. *Family Locket*. <https://familylocket.com/proving-a-parent-child-link-using-ancestry-dna-thrulines-and-documentary-research-part-2/>.
3. Elder, Diana. "Proving a Parent-Child Link Using Ancestry DNA ThruLines and Documentary Research: Part 3." 4 June 2022. Blog post. *Family Locket*. <https://familylocket.com/proving-a-parent-child-link-using-ancestry-dna-thrulines-and-documentary-research-part-3/>.