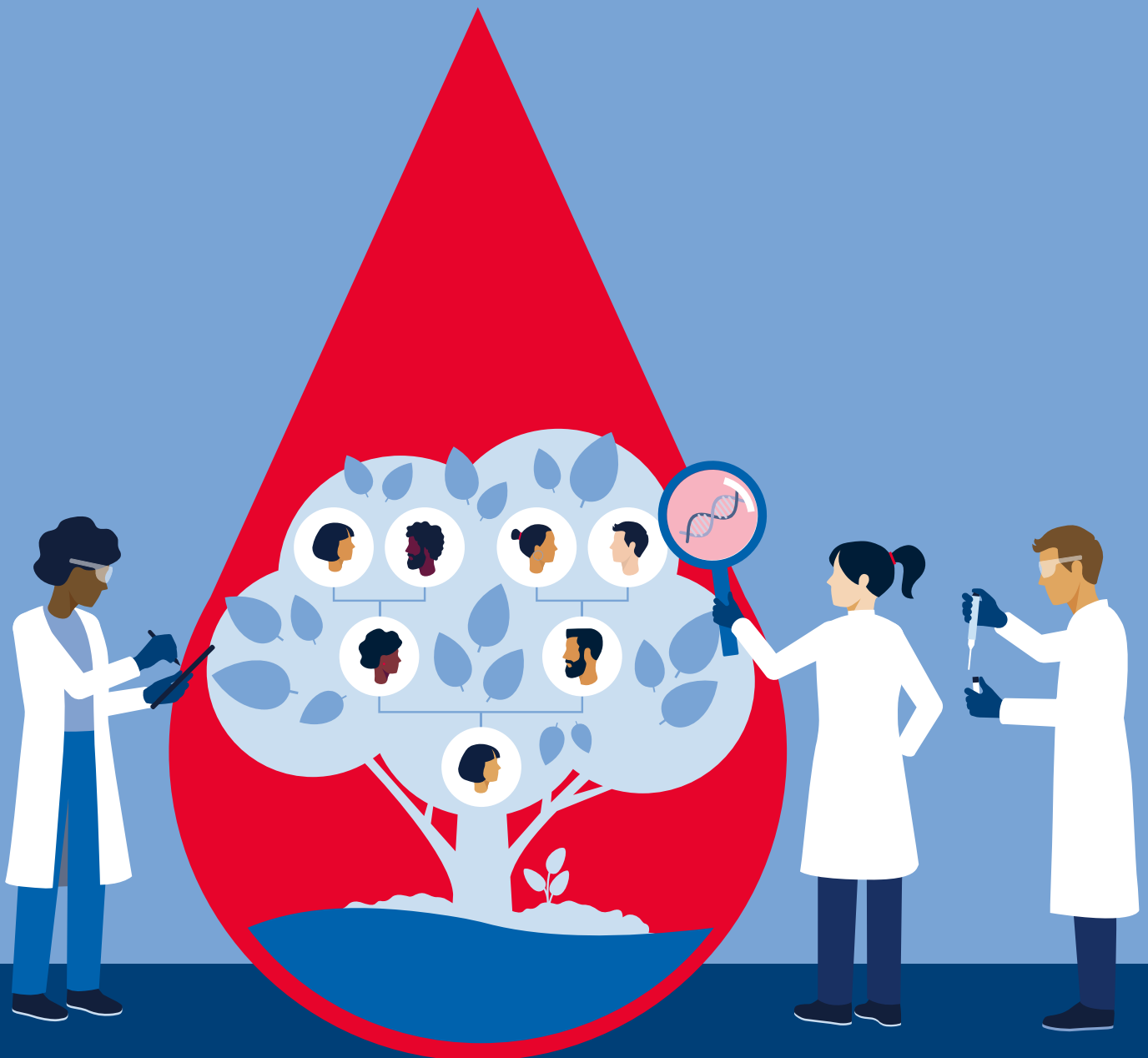


A Law Enforcement Guide to Forensic Investigative Genetic Genealogy

Generate new leads for unsolved cases



Introduction

Forensic Investigative Genetic Genealogy (FIGG) combines consumer DNA testing with traditional genealogical research to generate investigative leads in violent crime and unidentified human remains cases. Unlike traditional forensic DNA typing, which focuses on short tandem repeat (STR) markers, FIGG analyzes single nucleotide polymorphisms (SNPs) and compares these against

a database of genetic data from genealogy websites to identify potential relatives. The first and most publicized example of this approach was the 2018 arrest and subsequent conviction of Joseph DeAngelo, also known as the Golden State Killer. Since then, more than 550¹ cases have been resolved using FIGG.

The rise of FIGG

In the past two decades, genetic testing has become accessible to the general public through the growth of 'direct to consumer' (DTC) companies such as Ancestry.com and 23andMe. Although each of these companies maintains a database of the tests taken by their own customers, data cannot be compared across databases and most are not open to FIGG searching. In 2010, **GEDmatch**[®] (**GE**nealogy **D**ata **M**atching) was created to facilitate comparisons across data from multiple DTC companies. Anyone who takes a compatible DTC test can voluntarily upload their data for free to GEDmatch. The power of this data has enabled genealogy enthusiasts to research their family trees in more detail, helped adoptees to trace their birth families and reunited refugees from conflict zones with relatives. The success of genetic genealogy in



Figure 1. Why, when, how and where? Four key questions for law enforcement.

tracing relatives encouraged law enforcement to consider using the same approach to generate new leads in unsolved cases where DNA is available.

Why do we need FIGG?

Traditional national DNA databases are based on short tandem repeats (STRs) analyzed on capillary electrophoresis (CE) platforms. These databases store DNA profiles collected under applicable laws from offenders, suspects or arrestees in criminal cases or for unidentified human remains

investigations. The best-performing of these databases yield matches to a possible suspect up to 70% of the time, but in many countries, match rates are much lower and without a match, cases grind to a halt. FIGG can generate new leads to keep investigations going.

When can you use FIGG ?

FIGG is a powerful tool, but it is not for every case. To protect the privacy rights of volunteers uploading their profiles, databases that permit access by law enforcement restrict searching to unidentified remains cases and certain types of violent crime where other investigative leads have been exhausted. These databases provide a range of user privacy options so each user has control over how their data is used.

The GEDmatch database further protects the data and promotes responsible use of FIGG by requiring law enforcement, forensic labs and their genealogy

partners to search GEDmatch via a dedicated and secure portal – **GEDmatch PRO™**. Users of GEDmatch PRO are vetted and sign up to stringent terms of service which are periodically reviewed and updated to keep pace with regulatory requirements.

FIGG is an emerging technique and as such the regulatory and legislative environment surrounding its use varies between countries. Research your local situation before using FIGG in your investigations.

How does the FIGG process work?

Traditional STR profiles do not contain enough or the right type of data to perform a FIGG search. Instead, DNA from the original evidence material is used to generate a SNP profile which can be uploaded to GEDmatch PRO. Every night each uploaded profile is compared to the GEDmatch database generating match lists, from which genealogists develop family trees and uncover the names of possible candidates for law enforcement

to investigate further. Currently, most law enforcement agencies contract out to experienced genealogists for this piece of the workflow, but some have developed genealogy skills in-house. The final step in the process is to confirm identity using a traditional STR profile using DNA taken from the person or persons of interest revealed by FIGG, Figure 2.

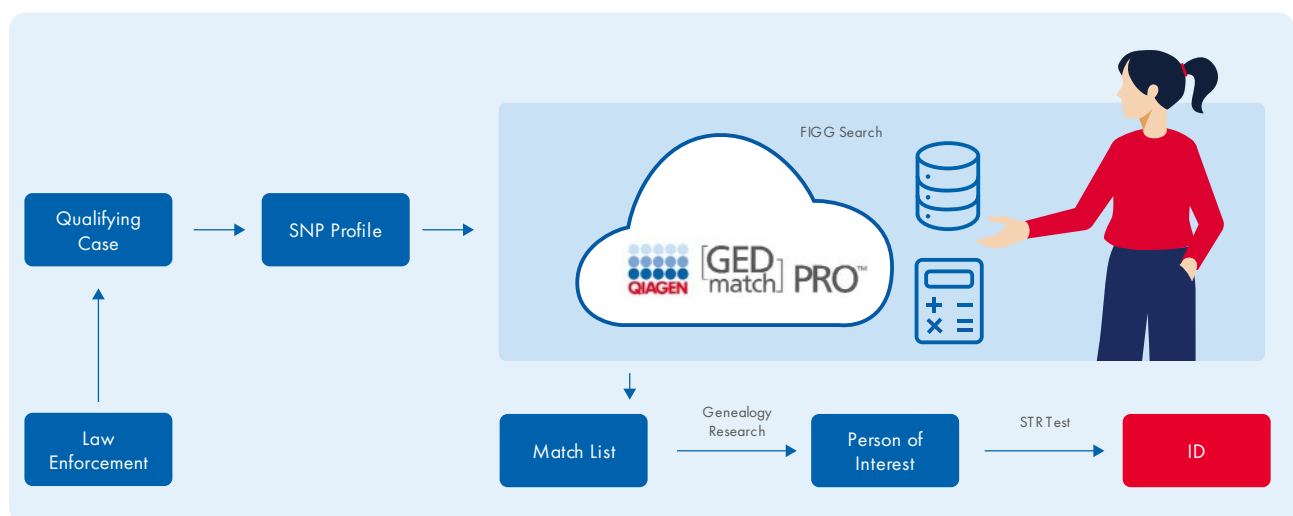


Figure 2. The Forensic Investigative Genetic Genealogy (FIGG) workflow.

Where can you generate a FIGG SNP profile?

Many forensic labs are implementing the technology necessary to generate a FIGG SNP profile. Our ForenSeq Kintelligence workflow was designed specifically to generate a FIGG SNP profile and connects seamlessly with GEDmatch

PRO. If your regular laboratory partner does not yet offer this service, let us connect you with a knowledgeable provider who is familiar with the challenges associated with forensic investigations and can save you time, money and sample.

Your partner for FIGG

FIGG is a powerful tool for solving violent crimes, including homicides and sexual assaults, or for identifying unidentified living or deceased persons, including human remains. As custodians of the GEDmatch database and an established solution provider to the forensic DNA community, QIAGEN is committed to the responsible use of genetic genealogy data to help law enforcement close investigations. Work with us to find out if and how FIGG can work for you.

Free Account in GEDmatch PRO

Secure and controlled law enforcement access to consented profiles in GEDmatch

Sign up with your government-issued email



Free FIGG training for law enforcement professionals

On-demand and in-person training from investigators, genetic genealogists, DNA analysts and crime analysts

Receive a certification of completion



References

¹ This number is based on cases that have been publicly disclosed or covered by the media. The true number is likely higher.



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