

NATIONAL ACADEMIES OF SCIENCES, ENGINEERING AND MEDICINE; COMMITTEE ON LAW AND JUSTICE: FORENSIC INVESTIGATIVE GENETIC GENEALOGY FACTS AND OPINION

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HOW ARE PROBABILISTIC GENOTYPING, FACIAL PREDICTIONS, AND GENETIC GENEALOGY BEING USED BY LAW ENFORCEMENT ACROSS FEDERAL, STATE, LOCAL, TRIBAL, AND TERRITORIAL ACTORS?

- FORENSIC INVESTIGATIVE GENETIC GENEALOGY (FIGG)
- CASE WITH FORENSIC DNA (CRIME SCENE) FROM PERPETRATOR IS ENTERED INTO CODIS (EX. SEXUAL ASSAULT HOMICIDE OF A YOUNG GIRL – PROFILE FROM SEMEN ON BODY) AND HAS NOT HIT. THIS UNSOLVED CASE IS THEN A FIGG CANDIDATE.
- CASES ALSO INCLUDE UNIDENTIFIED HUMAN REMAINS (UHR) OR MISSING PERSONS
- COLD CASES NOW PROGRESSING TO CURRENT CASES (GOLDEN STATE KILLER TO UNIVERSITY OF IDAHO QUADRUPLE HOMICIDE)
- MAJOR CRIMES AGAINST THE PERSON (HOMICIDE AND SEXUAL ASSAULTS) WITH THE SUBJECT AT LARGE, THESE ARE MAJOR PUBLIC SAFETY CONCERNS

FIGG HAS 4 MAIN PIECES

- 1. FORENSIC (CRIME SCENE) FROM PERPETRATOR (OR UHR OR MISSING PERSON) – PROFILE FOR DIRECT MATCHING (USUALLY STR)
- 2. DNA PROFILE FOR INDIRECT MATCHING (SNPS) - KINSHIP
- 3. DNA FROM RELATIVES FOR COMPARISON IN GENEALOGICAL DATABASE - AUTONOMY
- 4. GENEALOGICAL RESEARCH USING PUBLICLY AVAILABLE INFORMATION
- 5. INVESTIGATIVE LEAD – BACK TO STEP 1 AGAIN – DIRECT MATCHING

HOW RELIABLE AND ACCURATE ARE THESE METHODS IN PRACTICE?

- FIGG IS AN INVESTIGATIVE LEAD THAT IS CONFIRMED BY A STR DIRECT COMPARISON
- KINSHIP (INDIRECT COMPARISON) IS SCIENTIFICALLY SOUND, HOWEVER RELATIONSHIPS CAN VARY
- GENEALOGICAL RESEARCH CAN VARY BASED ON ACCURACY OF PUBLICLY AVAILABLE INFORMATION
- THE LEAD MUST BE FURTHER CONFIRMED BY FOLLOW UP INVESTIGATION BY LAW ENFORCEMENT (LE)
- THE THIRD SAFETY LEVEL IS THE CASE MUST PROCEED IN COURT LIKE OTHER CASES AND BE SUBJECT TO SCRUTINY
- A CONFIRMED FIGG INVESTIGATIVE LEAD IS VERY RELIABLE AS THE STR COMPARISON IS VERY WELL PROVEN AND ACCEPTED, WHAT IS NEW IS HOW THE LEAD IS OBTAINED. DIRECT STR AND SNP COMPARISON ARE VERY RELIABLE, ACCURATE AND SCIENTIFICALLY SOUND.

WHAT ARE THE RELEVANT LEGAL CONSIDERATIONS AND PRECEDENTS THAT ACCOMPANY THESE NEW TECHNOLOGIES?

- AUTONOMY – EVERYONE HAS A RIGHT TO HOW THEIR BODY AND DNA CAN BE USED, AND IF THEY PERMIT LE TO USE FIGG TO SOLVE CRIMES, THAT IS THEIR RIGHT (INCLUDING IDENTICAL TWINS)
- FORENSIC EVIDENCE DISCARDED AT A CRIME SCENE HAS NO RIGHT TO PRIVACY. LE HAS FULL RIGHT AND DUTY TO INVESTIGATE AND SOLVE THE CRIME FOR PUBLIC SAFETY AND TO PREVENT FUTURE CRIMES
- DNA AND FORENSIC EVIDENCE HAS BEEN USED FOR DECADES USING THIS PRINCIPLE
- WHAT IS NEW IS THE PUBLIC DATABASE USING RELATIVES, HOWEVER WITH THEIR INFORMED CONSENT IT CAN BE DONE IN AN ETHICALLY SOUND MANNER
- USE OF DATABASES AND PUBLIC RECORDS ARE USED ROUTINELY BY LE TO SOLVE CRIMES

WHAT ARE THE TECHNICAL AND SCIENTIFIC LIMITATIONS OF THIS TECHNOLOGY?

- SAMPLE LIMITATIONS DUE TO NATURE OF CRIME SCENE (SAMPLE QUALITY, QUANTITY, MIXTURES, CONDITIONS)
- CRIME SCENE PROFILE WHEN OBTAINED IS ETHICALLY, SCIENTIFICALLY, AND TECHNICALLY SOUND
- INDIRECT MATCHING OF RELATIVES IS ALSO NOT NEW (KINSHIP) – SCIENTIFICALLY AND TECHNICALLY SOUND
- GENEALOGICAL DATABASES (PUBLIC INFORMATION) MAY HAVE ERRORS (ADOPTIONS, MISATTRIBUTED RELATIONSHIPS), HOWEVER LEADS ARE VERIFIED BY STRS AND BY INVESTIGATIVE FOLLOW UP
- THEREFORE, ALL PHASES OF FIGG ARE ETHICALLY, SCIENTIFICALLY AND TECHNICALLY SOUND

WHAT ARE THE DISPARATE IMPACT CONCERNS RAISED BY THESE TECHNOLOGIES OR THEIR MANNER OF USE?

- WHAT ARE THE UNINTENTIONAL DISCRIMINATORY PRACTICE CONCERNS OF FIGG?
- AS THESE CASES ARE UNSOLVED, WE DO NOT KNOW WHO THE PERPETRATORS ARE. WE DO KNOW WHO THE VICTIMS ARE
- OVER 80% OF CRIMES ARE CONDUCTED BY INDIVIDUALS WITHIN SAME SOCIOECONOMIC GROUP AS THE VICTIM, HENCE A CONCERN WOULD BE THAT NOT ALL CASES CONDUCTED MAY BE CHOSEN EQUALLY
- AS THIS IS A PUBLIC SAFETY ISSUE WITH THE PERPETRATOR AT LARGE, ALL CASES MUST BE SUBMITTED AND WORKED IN AN EQUITABLE FASHION. RESOURCES MUST BE PROVIDED THAT CASES FROM DISADVANTAGED AREAS ARE PROCESSED.

WHAT CONSIDERATIONS (E.G., ACCURACY OF THESE TECHNOLOGIES, INCLUDING UNDERLYING ISSUES OF SENSITIVITY AND SPECIFICITY; PRIVACY, CIVIL RIGHTS, CIVIL LIBERTIES; AND DISPARATE IMPACT) NEED TO BE ASSESSED IN IMPLEMENTING THESE TECHNOLOGIES AND THE USE OF GENETIC MATERIAL BY LAW ENFORCEMENT?

- LIKE ALL POWERFUL TECHNOLOGY, IT MUST BE APPLIED USING BEST PRACTICES
- SHOULD BE DONE UNDER ACCREDITATION, WHICH GUARANTEES A QUALITY SYSTEM IS IN PLACE
- MUST ABIDE BY TERMS OF SERVICE TO RESPECT RIGHTS, PRIVACY AND CHOICE OF DATABASE PARTICIPANTS
- IDENTITIES OF THOSE RELATIVES WHO WERE RESEARCHED TO DEVELOP A LEAD MUST BE PROTECTED
- THIRD PARTY SAMPLES PROVIDED BY INDIVIDUALS ASSISTING LE WITH FAMILY TREES MUST BE RESPECTED AND PROTECTED
- MEDICAL AND OTHER HEALTH INFORMATION IS NOT OF USE (CAN BE PROHIBITED); WE JUST NEED THE COMPARISONS
- OTHER SAFEGUARDS ARE CURRENTLY IN PLACE IN ACCREDITED FORENSIC LABORATORIES, WHICH SHOULD RUN THE CONFIRMATION STR DIRECT COMPARISON SAMPLE.

WHAT LEGAL STANDARDS OR REGULATIONS SHOULD BE IMPLEMENTED TO ENSURE EQUITABLE, ETHICAL, AND EFFECTIVE USE OF FORENSIC GENEALOGY?

- DNA COLLECTED AT THE CRIME SCENE MUST BE STORED INDEFINITELY AS TECHNOLOGY CONTINUES TO DEVELOP; HOWEVER, ANALYZED AS QUICKLY AS POSSIBLE TO PROVIDE OBJECTIVE INVESTIGATIVE LEADS
- FIGG SHOULD BE PERFORMED ON ALL CRIMES AGAINST THE PERSON QUICKLY TO INTERRUPT RECIDIVISM AND PREVENT FUTURE VICTIMS TO PROMOTE PUBLIC SAFETY
- STRS AND SNPS ARE SCIENTIFICALLY AND TECHNICALLY SOUND, THEREFORE SHOULD BE UTILIZED
- FOLLOW BEST PRACTICES, SUCH AS THE NTVIC PUBLISHED GUIDELINES (SEE REFERENCE)

WHAT ARE INSTITUTIONAL CONSIDERATIONS FOR OPERATIONS AND PROCEDURES TO ENSURE THAT THESE TECHNOLOGIES ARE BEING USED EFFECTIVELY AND EQUITABLY?

- LABORATORIES CONDUCTING FIGG SHOULD BE ACCREDITED
- FOLLOW NTVIC PUBLISHED GUIDELINES
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TAKEAWAYS

- TRAINING/EDUCATION IS NEEDED TO ADHERE TO BEST PRACTICES INCLUDING DATABASE TERMS OF SERVICE, USE OF ACCREDITED VENDORS AND/OR BRING INTO ACCREDITED FORENSIC LABORATORIES
- MOVE TO CURRENT CASES FROM COLD CASES AS PERPETRATORS ARE AT LARGE COMMITTING MORE CRIMES TO ENABLE CRIME SOLVING USING BEST TECHNOLOGY: (INCREASE PUBLIC SAFETY, REDUCE WRONGFUL CONVICTIONS – EX, ANGIE DODGE (IDAHO FALLS 1996 HOMICIDE), CHRISTOPHER TAPP EXONERATED)
- APPLY TO ALL UNSOLVED CASES EQUITABLY AND QUICKLY

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THANK YOU!

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