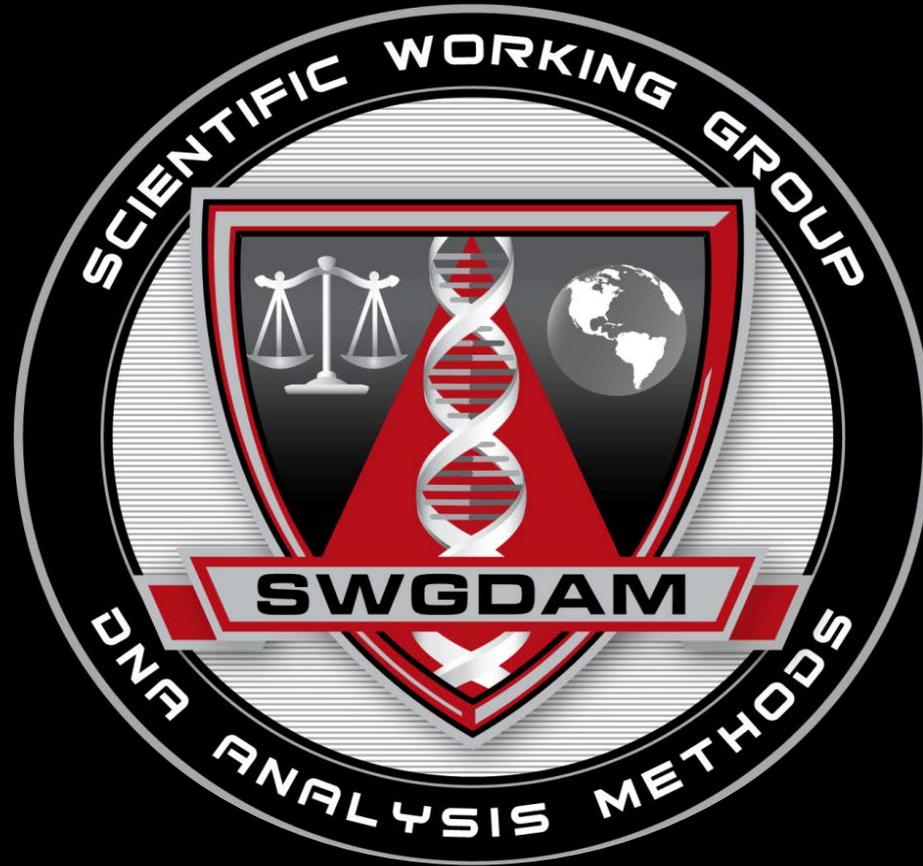


History of DNA QA Standards & SWGDAM

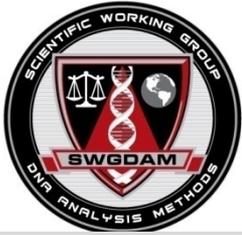


January, 2013



Timeline

- 1986 First use of forensic DNA analysis in criminal case in United States: *Pennsylvania v. Pestinikas*
- 1987 First person convicted as a result of DNA evidence – Tommy Lee Andrews
- 1988 First TWGDAM Meeting held at FBI Academy in Quantico, VA
- 1989 *Frye* hearing in *People v. Castro* resulting in ruling that DNA evidence was generally accepted but evidence in *Castro* inadmissible because approved procedures were not followed
- 1989 TWGDAM Guidelines published in *Crime Laboratory Digest*; *State v. Schwartz* recognizes TWGDAM Guidelines
- 1989 *DNA: Report of New York Forensic DNA Analysis Panel*
- 1990 *United States v. Yee* pre-trial hearing on admissibility of DNA evidence
- 1990 New York (Assemblyman Zaleski) Legislation on DNA
- 1990 Office of Technology Assessment Report: *Genetic Witness: Forensic Uses of DNA Tests*
- 1991 Revised TWGDAM Guidelines Published
- 1992 National Research Council Report: *DNA Technology in Forensic Science* (NRC 1)
- 1994 Passage of Federal DNA Identification Act
- 1995 Federal DNA Advisory Board Established
- 1996 National Research Council Report: *The Evaluation of Forensic DNA Evidence* (NRC 2)
- 1996 Publication of Privacy Act Notice on National DNA Index System
- 1998 *Quality Assurance Standards for Forensic DNA Testing Laboratories*
- 1998 National DNA Index System Implemented
- 1999 *Quality Assurance Standards for Convicted Offender DNA Databasing Laboratories*
- 1999 TWGDAM renamed Scientific Working Group on DNA Analysis Methods (SWGAM)



Timeline

1986 -1987

First use of DNA analysis in a criminal case, First person convicted as a result of DNA evidence

1988 -1989

First TWGDAM Meeting held at Quantico, VA, *People v. Castro*, TWGDAM Guidelines, *State v. Schwartz*, NY Report, CLIA

1990 -1991

US v. Yee, OTA Report, Revised TWGDAM Guidelines, NY Ass. Zaleski DNA

1992
NRC 1

1994 - 1995

Federal DNA Identification Act, DNA Advisory Board

1996
NRC 2

1998 -1999

QAS for Forensic DNA Testing Laboratories, NDIS, QAS for Convicted Offender DNA Databasing Laboratories

2000

DAB designates SWGDAM to recommend revisions to QAS



Technical Working Group on DNA Analysis Methods

- In November 1988, TWGDAM held its first meeting at the FBI Academy
 - 31 scientists representing 16 forensic laboratories in the U.S. and Canada and 2 research institutions
 - 1st SWGDAM Chair was James J. Kearney, Chief of the Forensic Science Research and Training Center at the FBI Laboratory



Technical Working Group on DNA Analysis Methods

Purpose

- “To pull together a select number of individuals from the forensic science community who are actively pursuing the various DNA analysis methods
- To discuss the methods now being used
- To compare the work that has been done
- To share protocols
- To establish guidelines where appropriate”



Technical Working Group on DNA Analysis Methods

- At the first meeting, a subcommittee was established to formulate suggested guidelines for a QA program in crime laboratories conducting RFLP DNA analysis
- Chaired by James Mudd, the group developed guidelines “intended to serve only as a guide to laboratory managers in establishing their own QA program for DNA RFLP analysis.”



Technical Working Group on DNA Analysis Methods

- Published in the Crime Laboratory Digest April-July 1989 issue, the QA guidelines “were designed using established quality functions to follow systematically the DNA RFLP typing procedure and cover all significant aspects of the laboratory process. In addition, they provide the necessary documentation to ensure that the DNA analysis process is operating within the established performance criteria, and they provide a measure of the overall quality of the results.”



Technical Working Group on DNA Analysis Methods

The Introduction to the 1989 Guidelines:

- “With the advent of DNA typing technology in the forensic laboratory, the forensic examiner now has the potential to individualize various body fluids and tissues. In addition, since the tests performed by crime laboratories can have a significant impact on the outcome of a trial, it is important that any test procedure used by the laboratory possess a high degree of accuracy and reproducibility. Consequently, the use of appropriate standards and controls is essential in order to ensure reliable results.
- As any technology becomes more discriminating and practiced, it is essential that the quality of the analytical data be more closely monitored. A detailed and flexible quality assurance program can assist in establishing a basis for scientifically sound and reliable forensic analysis.”



Technical Working Group on DNA Analysis Methods

The 1989 Guidelines covered the following areas:

- Planning and Organization
- Personnel
- Documentation
- Validation
- Equipment, Materials and Facilities
- Evidence Handling Procedures
- Analytical Procedures
- Case Work Documentation, Interpretation, Report Writing and Review
- Proficiency Testing
- Audits
- Safety



Technical Working Group on DNA Analysis Methods

- The 1989 Guidelines were supplemented in 1990 with the “Guidelines for a Proficiency Testing Program for DNA Restriction Fragment Length Polymorphism Analysis”
- In 1991, the revised and expanded “Guidelines for a Quality Assurance Program for DNA Analysis” were jointly prepared by TWGDAM and the California Association of Criminalists Ad Hoc Committee on DNA Quality Assurance



DNA: Report of the New York State Forensic DNA Analysis Panel

- The Panel concluded that “Questions about the quality of the work being done by private laboratories have not been satisfactorily answered, and the laboratories’ adherence to accepted scientific procedures has not been demonstrated.”
- The Panel endorsed the development of national standards:
“The creation of national standards would enable one state to search the databases of every other jurisdiction. Further, by establishing national standards against which to measure laboratories’ performances, the important goal of ensuring that appropriate quality controls are observed by laboratories would be furthered.”



Genetic Witness: Forensic Uses of DNA Tests

- “One nonregulatory Federal initiative to examine quality control and quality assurance issues is being spearheaded by the Federal Bureau of Investigation’s (FBI) Technical Working Group on DNA Analysis Methods (TWGDAM). Consisting of individuals representing forensic facilities at or near implementation of DNA profiling techniques, one TWGDAM document outlines a multifaceted program to ensure quality RFLP analysis. Although some predict the TWGDAM guidelines are likely to be the nucleus around which national consensus on standards for quality assurance will evolve, others are less sanguine. Some critics object to the closed nature of the initial decision making or lack of representation in the group of certain interested parties. A few argue that the FBI—largely an investigative and enforcement body—is an inappropriate lead player, and thus they oppose any role for the FBI in quality assurance mechanisms and standards. On the other hand, the TWGDAM guidelines represent a first step in a probable multistage process to achieve consensus on quality assurance programs. In particular, because its members are forensic practitioners, TWGDAM proposals are likely to address concerns and solutions of this stakeholder.”



DNA Technology in Forensic Science (NRC 1)

On Standards

- “Quality assurance can best be described as a documented system of activities or processes for the effective monitoring and verification of the quality of a work product (in this case, laboratory results). A comprehensive quality-assurance program must include elements that address **education, training, and certification of personnel; specification and calibration of equipment and reagents; documentation and validation of analytical methods; use of appropriate standards and controls; sample handling procedures; proficiency testing; data interpretation and reporting; internal and external audits of all of the above; and corrective actions** to address deficiencies and weigh their importance for laboratory competence.



DNA Technology in Forensic Science (NRC 1)

Recommendations

- “Each forensic-science laboratory engaged in DNA typing must have a formal, detailed quality-assurance and quality-control program to monitor work, on both an individual and a laboratory-wide basis.
- The Technical Working Group on DNA Analysis and (sic) Methods (TWGDAM) guidelines for a quality-assurance program for DNA RFLP analysis are an excellent starting point for a quality-assurance program, which should be supplemented by the additional technical recommendations of this committee.
- The TWGDAM group should continue to function, playing a complementary role to that of the National Committee on Forensic DNA Typing (NCFDT). To increase its effectiveness, TWGDAM should include additional technical experts from outside the forensic community who are not closely tied to any forensic laboratory.”



Federal DNA Identification Act

House Report 103-45

- “The purpose of the DNA Identification Act of 1993 is to promote the use of DNA identification technology for law enforcement purposes, in accordance with appropriate quality control and privacy standards.”
- “The NRC recommended a comprehensive quality assurance program. It found that the TWGDAM guidelines are an excellent starting point, and it noted the importance of professional societies such as ASCLD. The NRC went on to recommend that the Federal Government establish a mandatory accreditation program for laboratories, to be developed and administered by the Department of Health and Human Services in consultation with the Department of Justice....”
- “The DNA Identification Act does not mandate accreditation. Nor does it follow the NRC’s recommendation that the advisory committee be convened under the auspices of an agency not related to law enforcement. **However, the Committee intends to monitor closely the FBI’s DNA program and the deliberation of the DNA advisory policy board, in the event that further legislation is necessary to ensure high standards in forensic DNA analysis.**”



Federal DNA Identification Act

Section 14131 . Quality assurance and proficiency testing standards

- Not later than 180 days after September 13, 1994, the
- The FBI Director shall appoint an advisory board on DNA quality assurance methods from among nominations proposed by the head of the National Academy of Sciences and professional societies of crime laboratory officials.
 - The advisory board shall include as members scientists from State, local, and private forensic laboratories, molecular geneticists and population geneticists not affiliated with a forensic laboratory, and a representative from the National Institute of Standards and Technology.
- The advisory board shall develop, and if appropriate, periodically revise, recommended standards for quality assurance, including standards for testing the proficiency of forensic laboratories, and forensic analysts, in conducting analyses of DNA.



Federal DNA Identification Act

Section 14131 . Quality assurance and proficiency testing standards

- The FBI Director, after taking into consideration such recommended standards, shall issue (and revise from time to time) standards for quality assurance, including standards for testing the proficiency of forensic laboratories, and forensic analysts, in conducting analyses of DNA.
- The standards described in paragraphs (1) and (2) shall specify criteria for quality assurance and proficiency tests to be applied to the various types of DNA analyses used by forensic laboratories. The standards shall also include a system for grading proficiency testing performance to determine whether a laboratory is performing acceptably.
- Until such time as the advisory board has made recommendations to the FBI Director and the Director has acted upon those recommendations, the quality assurance guidelines adopted by the technical working group on DNA analysis methods shall be deemed the Director's standards for purposes of this section.



Federal DNA Identification Act

- Federal DNA Advisory Board empaneled and first meeting held in May 1995
- Board developed draft standards over the next two years; public comment at Board meeting in February 1997
- Recommendation of standards to FBI Director



The Evaluation of Forensic DNA Evidence (NRC 2)

Recommendation 3.1

- “Laboratories should adhere to high quality standards (such as those defined by TWGDAM and the DNA Advisory Board) and make every effort to be accredited for DNA work (by such organizations as ASCLD-LAB).”

From the Chapter on **Ensuring High Standards of Laboratory Performance**

- “The DNA Identification Act of 1994 establishes a federal framework for setting national standards on QA and proficiency testing...The standards for QA and the standards for testing proficiency of forensic laboratories are to be developed by the DNA Advisory Board...”



Federal DNA Identification Act

- Issuance of *Quality Assurance Standards for Forensic DNA Testing Laboratories* effective October 1, 1998
- Issuance of *Quality Assurance Standards for Convicted Offender DNA Databasing Laboratories* effective April 1, 1999



Federal DNA Identification Act

- Federal DNA Advisory Board's term ended in December 2000 and at that time, it designated the Scientific Working Group on DNA Analysis Methods (SWGDM) with recommending revisions to the Standards to the FBI Director



National Research Council

The Council issued report in 2009 entitled *Strengthening Forensic Science in the United States: A Path Forward*
Summary Assessment:

“Unlike many forensic techniques that were developed empirically within the forensic science community, with limited foundation in scientific theory or analysis, DNA analysis is a fortuitous by-product of cutting-edge science. Eminent scientists contributed their expertise to ensuring that DNA evidence offered in a courtroom would be valid and reliable (e.g., in the 1989 New York case, *People v. Castro*), and by 1996 the National Academy of Sciences had convened two committees that issued influential recommendations on handling DNA forensic science. As a result, principles of statistics and population genetics that pertain to DNA evidence were clarified, the methods for conducting DNA analyses and declaring a match became less subjective, and quality assurance and quality control protocols were designed to improve laboratory performance.”



National Research Council

Summary Assessment:

“DNA analysis is scientifically sound for several reasons: (1) there are biological explanations for individual-specific findings; (2) the 13 STR loci used to compare DNA samples were selected so that the chance of two different people matching on all of them would be extremely small; (3) the probabilities of false positives have been explored and quantified in some settings (even if only approximately); (4) the laboratory procedures are well specified and subject to validation and proficiency testing; and (5) there are clear and repeatable standards for analysis, interpretation, and reporting. DNA analysis also has been subjected to more scrutiny than any other forensic science discipline, with rigorous experimentation and validation performed prior to its use in forensic investigations. As a result of these characteristics, the probative power of DNA is high.”



TWGDAM/SWGDAM

TWGDAM Chairs

- James Kearney (FBI)
- Bruce Budowle (FBI)

SWGAM Chairs

- Richard Guerrieri (FBI)
- W. David Coffman (Florida Dept of Law Enforcement)
- Ted Staples (Georgia Bureau of Investigation)
- Anthony Onorato (FBI)