

NIST Rapid DNA Interlaboratory Assessments

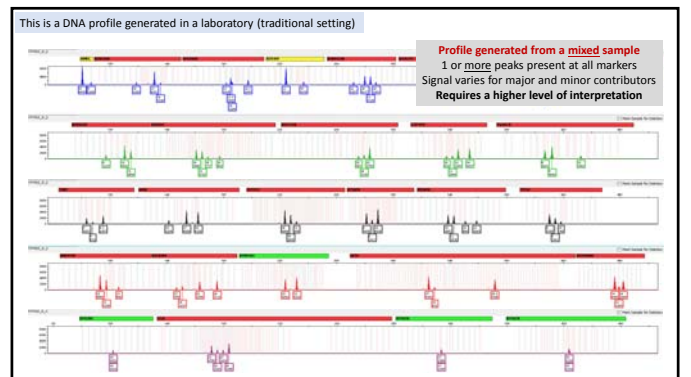
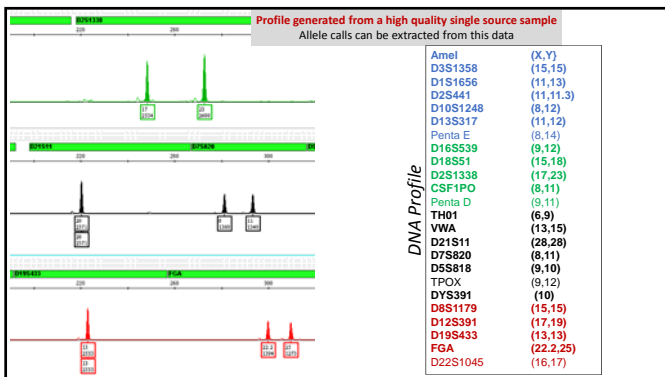
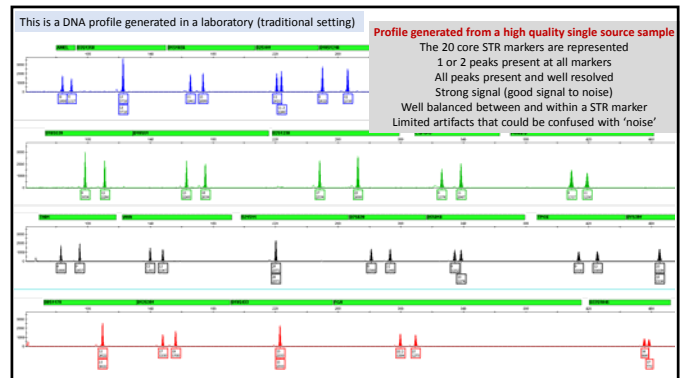
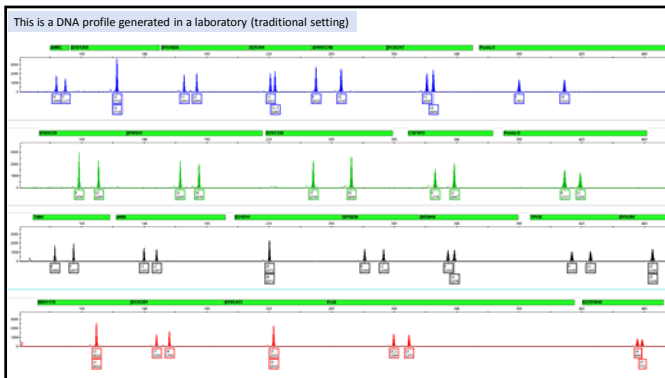
FBI Rapid DNA Symposium for
Law Enforcement Agencies and Organizations
Washington D.C., March 19, 2018

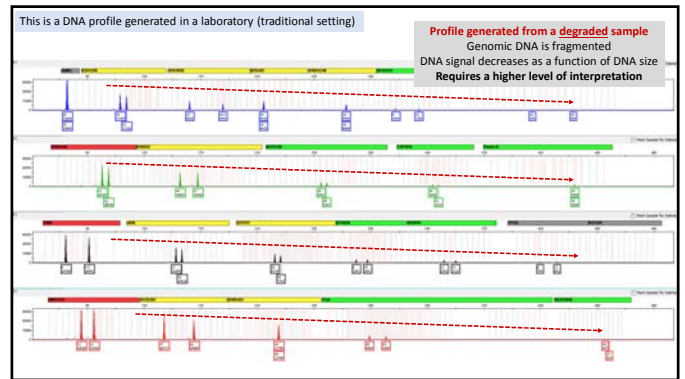
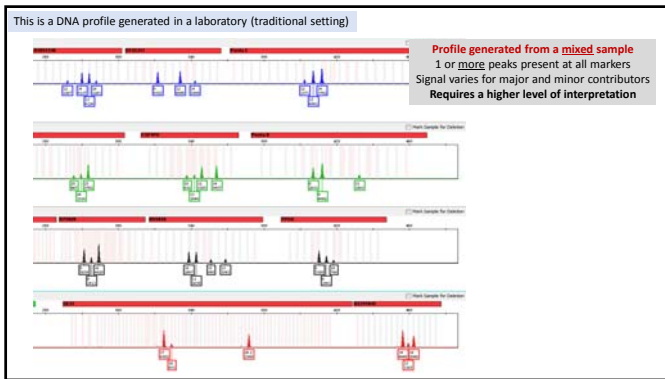
Peter M. Vallone, PhD
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Outline




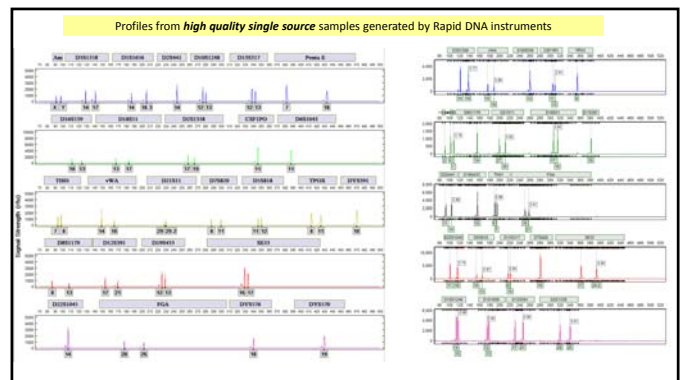
- DNA Profiles
- Rapid DNA testing
- Series of Rapid DNA interlaboratory assessments
- Summary





Rapid DNA Instruments

- Generate a DNA profile in less than 2 hours
- 'Hands off' operation ('swab in – profile out')
- Profile can be interpreted manually or by expert software

Interlaboratory Study

- **Interlaboratory studies** are collaborative exercises by laboratories to assess or improve the quality for their measurements. They can be applied with a research or teaching objective but they can also be used to assess the performance of a normalized method or the ability of a laboratory to perform a given task.
- Rapid DNA example: NIST sends out swabs to participating labs
 - Labs run the samples (possibly interpret data)
 - Return the results to NIST
 - Compare to ground truth and report success/performance

Success Criteria

- Correct typing of the US core markers
 - 13 STR markers
 - 20 STR markers (current)
- Working with high quality single source samples
 - Criteria: Correct typing of the core STR markers
 - No partial credit
 - Example in table: 44/50 = 88% success

Initial Rapid DNA Testing

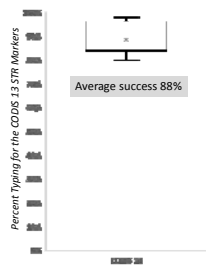
- Fall 2012 – prototype testing at NIST (DHS instruments: ANDE, IntegenX)
 - Concurrent testing at the FBI and DFSC
- Initial testing success rates were low 30%
- Feedback and rounds of optimization
 - Rapid DNA cartridge
 - Shipping
 - Rapid DNA hardware
 - Software (instrument, data collection and interpretation)
- By July 2013 success levels were > 75%; green light for interlaboratory assessments

Rapid DNA Assessment I

- August 2013
- Core 13 STR markers
- Three laboratories
 - NIST/DHS, FBI, DFSC
- ANDE (4) and IXI platforms (3)
- 50 samples per lab (single source swabs)
- 350 samples (total)

Rapid DNA Assessment I

- August 2013
- Core 13 STR markers
- Three laboratories
 - NIST/DHS, FBI, USACIL DFSC
- ANDE (4) and IXI platforms (3)
- 50 samples per lab (single source swabs)
- 350 samples (total)

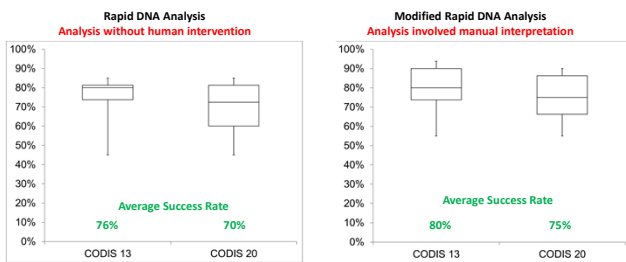


"NIST Rapid-DNA Interlaboratory Study" (https://strbase.nist.gov/pub_pres/Vallone_BCC_Talk_Sept2013.pdf)

Rapid DNA Assessment II

- Fall 2014
- Core 13 STR markers (the new core 20 STR markers were attempted by some labs)
- **Seven** labs – NIST/DHS, FBI, DFSC, DIA, NMS, SOCOM, CADDOJ
- ANDE (5) and IXI (6) platforms; **11** total
- **20** samples per lab (single source swab)
- 280 samples (total)

Rapid DNA Assessment II (7 labs, 11 instruments)



Romano, E.L., Lembrink, J., Vellano, P.M. (2015) Rapid DNA maturity assessment. *Forensic Sci. Int. Genet. Suppl. Ser. 5*: e14-e2.
 "2014 Rapid DNA Maturity Assessment Results" (https://strbase.nist.gov/pub_gres/Romano_2014-Rapid-DNA-Mat-Results-GC02015.pdf)
 "2014 Rapid DNA Maturity Assessment Results" (https://strbase.nist.gov/pub_gres/Romano_2014-Rapid-DNA-Mat-Results-GC02015.pdf)
 "2014 Rapid DNA Maturity Assessment Results" (https://strbase.nist.gov/pub_gres/Romano_2014-Rapid-DNA-Mat-Results-GC02015.pdf)
 Poster: "Rapid DNA Maturity Assessment" (https://strbase.nist.gov/pub_gres/RomanoDFG2015RapidDNA.pdf)

Rapid DNA Assessment III

- Spring 2018
- Core **20** STR markers
- **Projected: 8 labs and 2 vendors**
- ANDE and IXI platforms (**new kits, configurations**)
- **20** samples per lab (single source swab)
- Currently collecting single source swabs

