Human Factors in Forensic DNA Interpretation - A series of draft recommendations

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Concepts underpinning Human Factors in Forensic DNA Interpretation
Summary of Draft Report

3.5 years in the making
12 chapters
350+ pages
700+ citations
45 draft recommendations
Draft Report

Chapters

- Interpretation
- Quantitative and Qualitative Ways to Express DNA Results
- Reporting
- Pre-Trial Preparation and Testimony
- How and When Questions in DNA Analysis
- Quality Control & Quality Assurance
- Education, Training, and Professional Credentialing
- Management
- Work Environment
- Research Culture and Research Needs
Expert Working Group Series on Human Factors in Forensic Science

Latent Print Examination and Human Factors: Improving the Practice through a Systems Approach

A comprehensive discussion of how human factors relate to all aspects of latent print examinations.

Published Feb 9, 2012: https://doi.org/10.6028/NIST.IR.7842

Forensic Handwriting Examination and Human Factors: Improving the Practice through a Systems Approach

A comprehensive discussion of how human factors relate to all aspects of forensic handwriting examinations.

Published Jun 1, 2021: https://doi.org/10.6028/NIST.IR.8282r1
The recommendations to be presented during this presentation are in draft form and may not represent the final language used within the published report.

Recommendations are important, but the full text discussions emulate the extensive in-depth conversations that working group members engaged in throughout the formulation of this content. Each draft recommendation presented today will be accompanied by a glimpse of the rationale of the surrounding draft text.
Quantitative & Qualitative Ways to Express DNA Results

Words are hard, the right words are even harder
Chapter Highlights

- Source Attribution – Why this problematic
- The Likelihood Ratio
- Other Quantitative Forms
- Qualitative Expressions of DNA Comparisons
Quantitative & Qualitative Ways to Express DNA Results

**DRAFT RECOMMENDATION 4.5:**

DNA analysts should report the numerical value of the DNA comparison when assigning likelihood ratios rather than using qualitative terms such as match, included, consistent with, and cannot be excluded that end-users can misunderstand. It is acceptable to express excluded if the DNA analyst is transparent about how they reached that opinion and outline the limitations of such a conclusion.
How & When Questions in DNA Analysis

HUMAN FACTORS in Forensic DNA Interpretation

Transfer, Persistence, Prevalence and Recovery
Chapter Highlights

• Applying Knowledge about DNA Transfer
  • Proposed responses to how or when questions

• A Path Forward
  • Education
  • International Experiences
  • Invest in Research
  • Understand the Risks
DRAFT RECOMMENDATION 7.1:
DNA experts should only provide background information about the mechanics of DNA transfer, persistence, prevalence, and recovery, and should not opine about the possibility or probability of direct or indirect transfer having occurred for any given DNA sample(s) in a case.
HUMAN FACTORS in Forensic DNA Interpretation

Education, Training, & Professional Credentialing

Who needs assistance with training?
DNA Technical Leader Survey Q7.4

In choosing content for your laboratory’s DNA analyst training program, did your laboratory follow recommendations from any of the following groups?

<table>
<thead>
<tr>
<th>Group</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>FBI Quality Assurance Standards (QAS)</td>
<td>82%</td>
</tr>
<tr>
<td>SWGDAM</td>
<td>83%</td>
</tr>
<tr>
<td>OSAC</td>
<td>35%</td>
</tr>
<tr>
<td>ISFG</td>
<td>19%</td>
</tr>
<tr>
<td>ISO</td>
<td>53%</td>
</tr>
<tr>
<td>Other</td>
<td>8%</td>
</tr>
<tr>
<td>Not sure</td>
<td>2%</td>
</tr>
<tr>
<td>None of the above</td>
<td>0%</td>
</tr>
</tbody>
</table>
DNA Technical Leader Survey Q7.8

Would you like to see more national training efforts similar to programs offered by the National Forensic Science Technology Center (NFSTC)?

- YES - 53
- NO - 8
- Not Sure - 25
- Unfamiliar with NFSTC - 11
• There are addressable gaps in the current state of educating and training for U.S.-based DNA analysts
• Solutions needed to move towards increased standardization and independence from local FSSPs
• There are steps that the community can take to move towards standardization before a National Forensic DNA Training Consortium (NFDTC) is established
Desired Knowledge, Skills and Abilities

General Education – Molecular Biology, Biochemistry, Genetics, Statistics

GAP

On the job training – LIMS, Evidence intake, Robotics, Moot Court
DRAFT RECOMMENDATION 9.2:

To reduce variability in education and training practices and increase quality and consistency of forensic DNA testing and interpretation, a federal nonregulatory agency or non-profit organization should develop a National Forensic DNA Training Consortium with the mission to provide standardized and high-quality education and training for technical (e.g., DNA analysts, DNA Technical Leaders) and quality personnel. This National Forensic DNA Training Consortium should offer the training needed for onboarding new forensic science service provider personnel as well as continuing education opportunities. Both offerings should include assessment components, written and practical as appropriate.
Research Needs

HUMAN FACTORS in Forensic DNA Interpretation

How can research be more approachable.
DRAFT RECOMMENDATION 12.1: Researchers and education and training providers should invest effort to empirically determine how much research engagement, and in what form, is sufficient to ensure DNA analysts demonstrate appropriate levels of research-related awareness.
DRAFT RECOMMENDATION 12.2: All individuals and entities involved in forensic DNA analysis research should participate in Open Science practices and take steps to resolve barriers to increase the transparency and accessibility of research for consumers at all stages of research within the field of DNA analysis.
Expert Working Group Next Steps...

• This EWG is currently between Stage III and Stage IV of the report development process and will be entering the final external and internal reviewer feedback adjudication process

• Anticipated publication of the final report is the end of June 2023
Resources

OSAC's Forensic Biology Process Map for Human DNA Analysis

FIND MORE HERE
https://www.nist.gov/spo/forensic-science-program/process-mapping

FIND MORE HERE
https://forensiclibrary.org/

Research Forensic Library @ FIU

FIND MORE HERE
https://forensiclibrary.org
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