



DNA Analysis Specialist Group (DNASG)

Note of the thirteenth meeting held on 20 November 2019, via teleconference.

1. Welcome and introductions

- 1.1 The Chair welcomed all to the meeting. A list of attendees is available at Annex A.

2. Minutes of the last meeting, actions and matters arising

- 2.1 Subject to some minor changes, the minutes of the last meeting were agreed as an accurate reflection of the discussions held and were approved for publication on the Regulator's website.
- 2.2 The matters arising from the previous DNASG meeting were discussed:
- 2.3 Action 1: Members to send comments to the Regulator on the use of references in statements. The Criminal Procedure Rules require forensic scientists to reference any papers that had been used in making their opinion. One member queried whether references were required for routine reports, if no papers had been used then this was considered acceptable, however comment was made with regard to the paper referencing the 1 in 1 billion figure quoted for likelihood ratios.
- 2.4 The group discussed the wording of the likelihood ratio, in terms of around or at least 1 in 1 billion and discussed whether the guidance documents should include reference to this figure and suggested wording.

Action 1:

- 2.5 The FSRU to add reference for 1:1 billion likelihood ratio figure and recommended wording to G213.
- 2.6 A representative of the FSRU gave further examples for reference papers to include such as in persistence cases. The group had previously discussed the

difficulty with finding appropriate papers to reference. The representative from the FSRU informed the group that they held a spreadsheet of references that could be shared with the group.

Action 2:

- 2.7 Science Secretariat to send members the link to the Dropbox spreadsheet of references.
- 2.8 Action 1 from the previous meeting was closed and replaced with actions 1 and 2 above.
- 2.9 The group discussed whether key references that were in guidelines and codes needed to be repeated in statements. It was discussed that in England and Wales this was a legal requirement, while not a requirement in Scotland.

Action 3:

- 2.10 The FSRU to check reference list for G213 includes papers on persistence.
- 2.11 Action 2: Secretariat to publish the DNA SG ToR on the Forensic Science Regulator's website. The terms of reference were updated to include additions relating to GDPR, sharing of member contact details and lists of representatives attending meetings. A member of the group noted that in section seven of the ToR the FSP DNA working group was not mentioned specifically and this should be added. Representation from an FSP from England and Wales was covered by accredited suppliers.
- 2.12 Action 6: FSRU to contact the Metropolitan Police Service to nominate someone to join the Rapid DNA working group. This action was complete.
- 2.13 Action 13: FSRU to circulate relationship testing document to members for comment. This action was covered at item five.
- 2.14 Action 16: DSTL representative to circulate presentation on their work. A verbal update on this work was provided at item 7a.
- 2.15 Action 19: Secretariat to update membership list. Up to date contact information not received from all members, this action was ongoing.

3. Presentation on mixtures interpretation

3.1 The Chair presented an investigation into mixtures interpretation for streamlined forensic reports (SFR). This work was carried out for the Home Office by representatives from Cellmark, Eurofins and Key Forensics and Royal Statistical Society. The aim of the work was to consider ways to improve the way mixed DNA profiles were explained in SFRs.

3.2 Discussion followed to consider the project detail and outputs and the Chair summarised the findings of the group into the following options; FSP to perform pre-load deconvolution; FSP to perform post-load deconvolution; FINDS to perform pre-load deconvolution; improve sampling to reduce the number of mixtures; implement changes to database flags with the next round of changes to the NDNAD.

Action 4:

3.3 The Chair to send a summary of the suggested ways forward for improving SFRs for complex mixtures to the Regulator.

Action 5:

3.4 The secretariat to distribute the presentation slides to members.

4. Work Plan Review

4.1 The group reviewed the 2019-2020 DNASG workplan and the estimated timescales. It was noted that Summer 2020 would be the latest date for completion deadlines as the Forensic Science Regulator's term of office would end in November 2020.

4.2 The workshops for the Rapid DNA guidance document G229 were complete and the estimated timescale for this work was moved to summer 2020.

4.3 As the group was looking to the sub-group on body fluids to provide an update on the minimum standards for sex offence examination this aspect of the work plan should move to professional updates. For the moment this work was marked as routine.

4.4 Finalisation of the guidance document on Y-STRs, G227 was estimated to be spring 2020.

- 4.5 The estimated timescale for the relationship testing document was to be agreed after the document was reviewed in this meeting, see item 5b. Timescales for the completion of the profile interpretation document would be established after the review of this document was complete, see item 5d.

5. Work Plan Updates

a. DNA mixture proficiency Working Group.

- 5.1 The mixtures analysis and interpretation document, G224, had been reviewed by the Quality Standards Specialist Group who have until the end of November to feedback comments.
- 5.2 The working group had requested that proficiency testing (PT) where data was provided be removed from the document as this was complicated. The representative from the Forensic Science Regulator Unit had responded that the PT could be collaborative but needed to remain in the document as it was a potential area of risk.
- 5.3 The representative from Forensic Science Ireland asked who the audience for the document was. The representative from the FSRU replied that it was aimed at anyone who delivers PT and would like to develop a mixtures PT. The representative from the International Society of Forensic Genetics (ISFG) asked if anyone currently produced this kind of PT, the response was only the US National Institute of Standards and Technology (NIST) and German DNA profiling (GEDNAP).

Action 6:

- 5.4 Representative from the FSRU to add to scope of mixtures analysis and interpretation document to clarify who this document is for (G224).

Action 7:

- 5.5 Final feedback on G224 (mixture PT document) to the FSRU by the 4th of December 2019.

b. Relationship testing = G228

- 5.6 An update was given on the relationship testing document, G228. This document was awaiting some sections, including an interpretation section and it was queried who was dealing with mathematics section.
- 5.7 The glossary section was discussed, the main glossary for G228 was in the mixtures and interpretation document, G222. It was discussed that these glossaries should be consistent.

Action 8:

- 5.8 FSRU to check glossaries of DNA guidance documents to ensure they are consistent where they need to be.
- 5.9 The representative from Dstl commented that the document only referred to STR-based analysis and that it should include SNPs and genealogy testing. The representative from the ISFG agreed that SNPs should be included.

Action 9:

- 5.10 Relationship testing working group to meet to progress the relationship testing document in January 2020 with the aim to publish the document in the summer.

c. Y-STR guidance document.

- 5.11 The group discussed the Y-STR guidance document, G227. The aim was to complete this document in spring 2020.
- 5.12 A member of the group commented that the Y-STR document needed to reflect trans-people as a protected group.
- 5.13 It was noted that an interpretation section was required and the representative from the FSRU requested that the group agree a couple of paragraphs on this. The AFSP were asked to consider this section and sent out an evaluation exercise to members that included single source and low-level mixtures. The results of this exercise were discussed at their meeting a few weeks ago to identify the areas of consensus and non-consensus. Interpretation of single source profiles of white, British origin resulted in consensus. However, mixtures and non-British contributors caused differences in practice. This was discussed further at item 7.9.

- 5.14 The representative from the ISFG commented that the DNA commission would be reporting on Y-STR interpretation.

Action 10:

- 5.15 DSC to find out the progress on the DNA commission report on Y-STR interpretation and inform the group.
- 5.16 The representative from the FSRU observed that there was some useful content in the rest of the document so would like to publish with something holding in the interpretation section, this could be pending the publication of the DNA commission report.
- 5.17 It was noted that while there were some interpretation principles that the AFSPs could agree on, there were a number that were not agreed on. The Regulator asked if the basis of the differences could be established and whether there were papers that were relied on. It was proposed that if the AFSPs could not agree on principles then the Regulator would write some broad principles. The FSRU would like to publish this guidance document early next year to allow the update to the codes to be published.

Action 11:

- 5.18 Pending consensus on Y-STR interpretation FRSU to draft holding wording to allow the Y-STR guidance document to be published.

d. Profile interpretation document, G213

- 5.19 The representative from the SPA Forensic Services informed the group that the profile interpretation sub group had not yet met. The profile interpretation document had been out for reviews and comment.

Action 12:

- 5.20 Arrange meeting for Profile interpretation document (G213) working group.

e. DNA codes of Practice, C108.

- 5.21 The DNA codes of practice document would be discussed in a sub-meeting following the DNASG meeting.

f. RAPID DNA

- 5.22 The estimated timescale for the Rapid DNA document was extended to summer 2020. The initial workshops were all complete.
- 5.23 The document had been outlined and would be discussed at an extended workshop on the 22nd of November. The representative from Dstl was to Chair this workshop. The aim was to complete the document by Easter 2020 with the intention to circulate something in the new year for the rest of the group to comment on.

Action 13:

- 5.24 Update work plan.

6. Stakeholder updates

a. Forensic Information Databases Service (FINDS) update

- 6.1 The scheduled delivery date for the NDNAD2 had been amended, and the go live date would be announced shortly. It was also mentioned there was currently not possible to make changes to the current NDNAD, and any changes would be considered after the NDNAD2 had gone live.
- 6.2 Transforming Forensics (TF) had transferred the DNA futures element to FINDS and there were ten areas of focus:
1. eDNA adoption
 2. JasperSoft, data analytics tool to release full value from the NDNAD
 3. Legislative grading for NDNAD outputs
 4. NDNAD enhanced matching and flexible thresholds
 5. Presentation of NDNAD outputs
 6. Service provision alignment towards Policing Vision 2025
 7. Expansion of the NDNAD to compare familial searches centrally
 8. Expansion of the NDNAD to store and compare information from additional STR DNA tests
 9. Expansion of the NDNAD to store and compare results from massively parallel sequencing (next generation sequencing)

10. Expansion of the NDNAD to store and compare information from Y-STR DNA tests

6.3 FINDS were currently working on expansion of the NDNAD to retain information from additional STR and Y-STR DNA tests. An expert working group had been set up and agreed that the additional loci present in DNA20+ chemistries should be added to the NDNAD. Approval for this would be sought from the FIND Strategy Board, and the Biometrics and Forensic Ethics Group (BFEG). An expert working group had also been set up to consider the Y-STR DNA tests and were identifying the requirements for a UK Haplotype frequency database and an intelligence Y-STR database.

b. UKAS update

6.4 Accreditation certificates would be available to view online from December 2019 and would be managed online going forwards.

6.5 Transition assessments for the 2017 version of the 17025 was mentioned. Most organisations were being assessed against the update during their annual surveillance visit. It was confirmed 95% of the transition assessments had been booked by organisations, and 39% of transition assessments had been completed.

6.6 Initial and pre-assessments had commenced for crime scene accreditation.

7. Professional and scientific updates

a. Dstl update

7.1 Dstl had assessed the Parbon Nanolabs work on a DNA phenotyping capability, which could potentially predict people's faces from their DNA using genotyping. Dstl obtained 24 samples from Dstl volunteers and their faces were photographed as 2D and 3D images. The samples were sent to Parbon Nanolabs for them to predict their faces from the DNA samples. The results were analysed, and it was decided that Dstl would not be using this operationally at this time.

7.2 Work had been done around direct amplification, this could enable trace and touch DNA recovery in the field. It was explained that the "field" phase would be carried out outside of the UK, using a portable laboratory. The aim of the

project was to recover trace DNA from small objects, such as SIM cards, without generating mixed DNA profiles that could be difficult to interpret. This work had been published in bioRxiv and the Dstl representative would be able to share the reference with members if they wanted further information.

- 7.3 Pressure sensitive adhesive tapes used for sampling DNA were mentioned, the scene safe tapes were not always considered appropriate for paper, especially if there was a risk of tearing the paper which could be used as evidence. Pressure sensitive adhesive tapes were tested and worked well lifting DNA on all surfaces.
- 7.4 Dstl had been working on Rapid DNA since 2010, based on the Applied Biosystems™ 3500 Series instruments, they had recently published a paper on this capability and shown that results could be generated in 75-80 minutes.

Action 14:

- 7.5 Dstl representative to share links to the bioRxiv papers with the secretariat who will circulate them to the group.
- 7.6 Dstl work on genetic genealogy was progressing. Dstl had proposed a trial that would take samples from 24-30 Dstl volunteers to generate genotyping data. The trial was currently being considered by a research and ethics committee as there were health and parentage risks that could result in an adverse outcome for the volunteers.
- 7.7 Dstl was conducting analysis of the Ministry of Defence DNA database to assess the risk of adventitious matches and carrying out some work for FINDS on database analysis for the National DNA Database (NDNAD).

b. Association of Forensic Science Providers (AFSP) DNASG update

- 7.8 The AFSP DNASG meeting was held three weeks previously. A representative from Dstl had recently joined the group. The group had discussed its work on the Y-STR interpretation exercises. There was divergence between the FSPs in the selection of Y-STR sets, and in the selection of population data, with some preferring use of population data matching the person of interest and others using broader population groups. There was also divergence in the evaluation of mixtures with some providing a subjective evaluation supported

by an in-house interpretation tool, and others providing no evaluation. A summary of the issues could be provided if needed.

- 7.9 The group was examining the terminology used in mixtures guidance. The group agreed that FSPs should be using the same terminology and had begun a project to develop a common glossary.
- 7.10 The EDNAP DNA transfer exercise was mentioned. The AFSP DNASG group had members who were interested in participating in the exercises. The Regulator strongly encouraged members to participate. The ISFG representative explained that the exercises would commence in the second quarter of 2020. The first exercise would be data collection, information would be collated on different methodologies used for defined samples, for example burglary tools. The second exercise would involve ground truth data experiments. Samples or items could be sent to the participating organisations to analyse, or they could be asked to acquire specific items to analyse. The participating organisations would be provided with specific instructions and there would be no more than 30 samples to analyse. Two further exercises would run in 2021 on case assessment and evaluation of findings. The results of the exercises would be published but anonymised and it was not necessary for laboratories to participate in all four studies

c. CSFS update

- 7.11 The representative from the CSFS provided an update. The CSFS journal, Science and Justice the CSFS had a new editor and chartered practitioner status had been awarded to the first two forensic biologists.

d. European Network of Forensic Science Institutes (ENFSI) update

- 7.12 The agenda for the next ENFSI meeting, which would be held between the 6 - 8 May 2020 in Portugal, was being drafted. The steering group discussed the format in which the five working groups were run, and it was decided that this would continue. The biology sub-group had been provided with the contact details for the body fluids forum to discuss their work on the DNA transfer project. The DNA working group had submitted their monopoly bidding for funding to develop their best practice manual for DNA analysis.

- 7.13 It was confirmed the current Quality and Competence Liaison Group (QCLG) officer would be stepping down in May 2020. ENFSI would be seeking volunteers for this role which would be for three years. The QCLG liaison officer would be required to attend QCLG meetings which were held once a year. The QCLG liaison officer would then update members at the main ENFSI meeting on the work of the group.

e. International Society for Forensic Genetics (ISFG) update

- 7.14 It was announced the ISFG had a new president, Jon Butler. The next ISFG meeting would be held in Washington on the 23-28th August 2020. The ISFG had published a DNA commission report on assessing the value of forensic biological evidence. A second commission report on activity level reporting was not yet published and a report on interpretation of Y-STR profiles was in progress. The group was informed that the haploid markers meeting would be held between the 13th to the 16th May 2020 in Budapest.

f. The European DNA Profiling Group (EDNAP) update

- 7.15 The group was informed that the Netherlands Forensic Institute (NFI) had an expert system for examining DNA and they were considering incorporating EuroForMix into their expert system. This would be open source.
- 7.16 The members were provided with a brief update on the Visage project. A basic tool had been developed to determine hair, eye colour, skin colour, continental ancestry, and age of blood. The enhanced toolkit was currently being validated and would include, eyebrow colour, hair morphology, freckles and male pattern baldness. The continental ancestry would include middle eastern and north African ancestries. They were also developing a tool to determine the age of semen.
- 7.17 The EDNAP group were also working on Mitochondrial DNA in hair and were looking at looking somatic mutations along the length of the hair. The group was continuing its work on mRNA for body fluid identification which included some coding SNPs to associate the body fluid with the donor.

g. The body fluid forum update

- 7.18 The Body fluid forum meeting was held on 30th October 2019. The group had discussed the Y-STR project. The project examined the differences in the levels of DNA found in underwear in simulated social contact and sexual contact scenarios. Two dressed dummies were used and put in social and sexual contact situations. The underwear was recovered from both scenarios and samples were taken as they would be for casework and the DNA results that were generated using Y-STR profiling were compared. The results were collated and analysed. The findings of the project would be published, and the results would be presented to the forum in January 2020.

8. Emerging Technologies

a. Next Generation Sequencing (NGS)

- 8.1 Meetings had been held with manufacturers last year concerning NGS, and a summary had been produced of the technologies these manufacturers were providing at the moment.

b. Forensic Genealogy

- 8.2 A study had been completed to assess the potential effectiveness of genetic genealogy methods in identifying UK residents. Ten volunteer subjects who had privately completed a DNA ancestry/genealogy test from one of the major direct-to-consumer (DTC) providers were recruited from Eurofins Forensic Services staff. All volunteers were fully briefed on the project aims and potential implications of third-party scrutiny of their DNA records and associated genealogy and provided full consent. All GEDmatch searches and subsequent genealogical investigations were conducted by a team of five highly-experienced genetic genealogists. The Genealogists were able to identify four out of the 10 volunteers to a given name or as one of a set of siblings. The study supported the potential use of this technique in the UK, however guidance and an ethical framework would be required before this should be implemented. It was confirmed the Biometrics and Forensic Ethics Group (BFEG) had produced a paper on genetic genealogy.

Action 15:

- 8.3 Secretariat to update and circulate the BFEG paper on forensic genealogy to the group.

9. Publication of the 2014/15 FSR mixtures trial

- 9.1 A member queried when the 2014/15 FSR mixtures trial would be published. It was mentioned the AFSP DNA working group had conducted a similar study. It was suggested by the Regulator that a joint paper be published. The paper would include the 2014/15 FSR mixtures trial, what guidance had been issued since then and new technologies, and the recent AFSP DNA group work on mixtures. The members agreed this would be a good approach. It was recommended that the FSP who conducted the first trial would work with the AFSP DNA working group and the FSRU to produce the paper.

Action 16:

- 9.2 Group to coordinate publication of the mixtures trial covering both the original work and the recent work. The chair and the representative from Eurofins Forensic Services to nominate two main authors.

10. AOB

- 10.1 Members were asked if they had any items they would like to be considered by the Biometrics and Forensics Ethics Group (BFEG) at their next meeting on 16th December 2019. The members were advised to let the secretariat know of any items as soon as possible.
- 10.2 It was announced that in September a new chief of executive was appointed at Forensic Science Northern Ireland.

11. Date of the next meeting

- 11.1 The next meeting would be held on Wednesday 22 April 2020.

Annex A

Organisation Representatives Present:

Principal Forensic Services (chair)
Forensic Science Regulation Unit
Home Office Science Secretariat
Body Fluid Forum
Cellmark Forensic Services
Chartered Society of Forensic Sciences
Eurofins Forensic Services
Forensic Information Services
Forensic Science Ireland
Forensic Science Northern Ireland
International Society for Forensic Genetics
Key Forensic Services
Metropolitan Police Service
Royal Statistical Society
Scottish Police Authority(SPA) Forensic Services
United Kingdom Accreditation Service (UKAS)

Apologies:

Forensic Science Regulator
Crown Prosecution Service (CPS)