



Forensic Science Regulator's Quality Managers Conference 4 February 2014

## FINGERPRINT COMPARISON SESSION

### REPORTING OUTCOMES

The Forensic Science Regulators Quality Standards Specialist Group have defined four outcomes following a fingerprint comparison:-

- Identified
- Excluded
- Insufficient
- Inconclusive

**Q: What are the strengths and weaknesses of moving to reporting outcomes in this way?**

The definitions in the fingerprint comparison appendix to the Regulators Codes are reproduced below. To aid your discussions you may wish to consider the following:

1. Is there a need to change and why?
2. Is there a need to align with other forensic science disciplines?
3. Is there a need for consistency and how this can be achieved?
4. Do the definitions reflect a definite conclusion that an opinion of whether the donor is or isn't the source or it cannot be determined?
5. Do any of the outcomes require further clarification and why?
6. What are the implications for implementation?

### **DEFINITIONS - FINGERPRINT REPORTING OUTCOMES (4)**

**IDENTIFIED/IDENTIFICATION (IDENT):** A practitioner term used to describe the mark as being attributed to a particular individual. It is the opinion of the practitioner that there is sufficient quality and quantity of ridge flow, ridge characteristics and / or detail in agreement with no unexplainable differences to conclude that two areas of friction ridge detail were made by the same person.

**INCONCLUSIVE:** The determination by a practitioner that the level of agreement and / or disagreement is such that, it is not possible to conclude that the areas of

friction ridge detail originated from the same donor, or exclude that particular individual as a source for the unknown impression.

The outcome may be inconclusive for a number of reason; those reasons should always be made clear as part of reporting the final outcome.

**INSUFFICIENT:** The opinion that the ridge flow and / or ridge characteristics revealed in the area of friction ridge detail (mark) are of such low quantity and/or poor quality that a reliable comparison cannot be made. The area of ridge detail contains insufficient clarity of ridges and characteristics or has been severely compromised by extraneous forces (superimposition, movement etc) to render the detail present as unreliable and not suitable to proffer any other decision.

**EXCLUSION/EXCLUDED:** Is the opinion of a practitioner that there are sufficient features in disagreement to conclude that two areas of friction ridge impressions did not originate from the same donor or person.

### **STATUS of the MARK**

**UNIDENTIFIED:** The status of a mark after it has been compared to a nominated individual (elimination or suspect) or has been searched on a database and has not been attributed to any individual.

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### **REPORTING OUTCOMES OUTPUTS:**

Table 1	<p><b>Strengths:</b> clarity and consistency for our CJ partners and internal customers. Standardisation of terminology across all forces. Fits in with the SFR framework. Transferable between disciplines i.e. Footwear.</p> <p><b>Weaknesses:</b> the recipient needs an understanding of the definitions.</p>
Table 2	<p><b>Strengths:</b> excluded is more definite than not identified.</p> <p>Weaknesses - excluded is open to misunderstanding/interpretation - not identified added to list?</p> <p>Terms not being used on SFR</p>
Table 3	<p>Want there to be a fifth definition. Attributed.</p> <p>Want there to be a fifth category. Identified but not verified, useful for disclosure purposes for Forces using sample indents and SFR.</p> <p>Standardises terminology.</p> <p>Clearer for practitioners.</p>

	Impact on tracking systems of new terminology (back record conversion)
Table 4	<p><b>Strengths:</b>  Consistency across the profession. More readily understood by external stakeholders. Having clear definitions for terminology for practitioners. A good starting point for moving forward towards greater consistency of language.</p> <p><b>Weaknesses:</b>  Definitions as listed are too limited to specific circumstances e.g. inconclusive outcome could also cover a circumstance where examiners have come to different conclusions about a mark e.g. identified and insufficient therefore consensus has not been achieved.  Getting buy-in across the profession in terms of uptake.  Definitions as listed are difficult to understand.  Need greater flexibility to respond to increasingly informed questions from CPS/Crown office who are looking for more information about what results actually mean and what inference can be drawn from them.</p>
Table 5	<p><b>Strengths:</b> Consistency across organisations.  Customer clarity around outcome e.g. CJS / courts. Allows absolute outcomes for validation purposes.</p> <p><b>Weaknesses:</b> A partial mark may be deemed inconclusive initially. Insufficient and inconclusive definitions need to be clearer to ensure everyone would use these consistently. The subtleties of the definitions may be lost on lay people.</p>
Table 6	<p>Question raised by this. Is there scope to freehand in addition to reporting these outcomes for instances where neither of the four fit or if extra information is required to support say 'inconclusive' or 'insufficient'. Are these for streamline reporting only or for full interpretation statements?</p> <p><b>Strengths:</b> ID and excluded simple and straightforward.</p> <p><b>Weaknesses:</b> May need to revisit 'inconclusive' and 'insufficient'; may get calls back asking what is meant by say 'insufficient' if there has been no scope to add freehand. The term 'Insufficient' has historic other meaning. ID May be weakness if doesn't include cases of arbitration in house due to disclosure requirements.</p>
Table 7	<p><b>Strengths:</b> Broad definitions, akin to other forensic disciplines, assist the CJ system. Less ambiguity - common fingerprint language for</p>

	<p>practitioners and courts. Used in Europe &amp; US.</p> <p><b>Weaknesses:</b> Outcomes versus Status of Marks when reporting on SFR - suitability. Investigative teams understanding e.g. A mark that is excluded to one individual May be inconclusive to another.</p> <p>Supplementary reporting outside of outcomes. Use of Excluded/Inconclusive, e.g. at present the exclusion option refers to donor not exemplar prints possibly increasing the use of Inconclusive.</p>
Table 8	<p>We have to be mindful of what the definitions may mean to persons outside of the fingerprint community e.g. when reporting to officers.</p> <p>Weakness - open to misinterpretation if the definition is not informative enough.</p>

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## ERROR

Error is defined as:

*An outcome that is unexpected or wrong when the true answer is known. Errors can be categorised into various types, such as technical and administrative errors. If an error occurs then it can have a detrimental effect on the outcome of a comparison or search. There are various processes that can be used to minimise the different types of errors occurring, but these processes may vary from bureau to bureau.*

**ADMINISTRATIVE ERROR:** *The incorrect data or information is recorded or assigned.*

**TECHNICAL ERROR:** *The incorrect result or reported outcome derived by the practitioner's judgment and opinion from the examination of the mark and print, e.g. a false inclusion /exclusion.*

**Q: What are the issues that need to be addressed by the fingerprint profession to report and manage errors?**

To aid your discussions you may wish to consider the following:

1. Which quality processes could identify errors - Audit / QC- -known donor test / Blind verification/ Selective dip sampling/ Universal dip sampling / Competency tests /Proficiency Tests?
2. Which methods can be used to determine error rates and which can only be listed as types of errors identified?
3. Has the impact or severity of the outcome for different type of errors been categorized for fingerprint examination?
4. Should there be an agreed list/format for recording different types of errors, impact levels and trends?
5. Should errors and error rates be collated nationally as part of performance monitoring?

## ERROR OUTPUTS:

Table 1	<p>How do you determine and accept an error has occurred? Do minor admin errors need to be reported? Clarity on admin error - typing mistake/incorrect information. Trend analysis. Transparency - technical errors, missing ident compared to incorrect ident. Errors kept quiet in forces etc. Categorise different types of errors. Could help with determining how to deal with error and action to be taken.</p>
Table 2	<p><b>Technical errors:</b>          In live fingerprint case work the true answer is not known. In a validation study, using known truth data, the true answer is known. How can it be possible to have a technical error when the true answer is not known? This is the issue which needs to be managed when considering error management in fingerprint comparison in live casework - when does variance in examiner outcomes become technical error or can it ever be described as such? At best these are managed as development / competency issues in training or PDR.          Technical error rates can only be measured through PT / competency testing.          National measurement of technical errors from national PT tests using known truth data would provide useful benchmarking of competence.</p> <p><b>Administrative errors:</b>          Managed as per any other non-conforming work in the quality management system with root cause analysis and appropriate corrective action.</p>

Table 3	<p>Need a support mechanism for the examiner. QMS needs policy for identifying and dealing with errors. Should differences of opinion be dealt with outside of the force to avoid unintentional bias? Robust dip testing reveals errors more effectively than when an examiner knows they are being tested. Need preventative measures to stop as many errors as possible from occurring in the first place. Should have an agreed defined format for recording and reporting errors to enable national data collation. Encourages sharing of best practise in response to errors. Need to further encourage a culture of willingness to be open about mistakes.</p>
Table 4	<p>A clear transparent process where fingerprints are treated no differently to other disciplines.</p>
Table 5	<ol style="list-style-type: none"> <li>1. Any and all of the suggested methods plus others as appropriate for the organisation.</li> <li>2. Use risk based assessment to categorise types of errors for FP examination.</li> <li>3. Use a qualified error rate based on the dip sampling etc.</li> <li>4. Depends on type of error</li> <li>5. No. Each organisation would be accredited in its own right and it is down to these organisations to establish competence and deal with any issues and errors.</li> </ol>
Table 6	<p>Honesty when errors occur. More national consideration in reporting errors. Would like to understand national error rates. Mustn't forget ID of fingerprint is an opinion. You don't know who has put mark down unless it's a pt so it is always opinion unless pt.</p> <p>Validation of software and electronic systems to highlight if entry issues are to be highlighted. Internal disputes sorted by QMS should be shared nationally....hence open and honest Identification of training needs if issues highlighted External bodies looking at you! Duty-bound to report if they see anything untoward.</p> <p>Competency of staff, training issues...al fall part of checking system. Is an area of dispute reported as an error? Areas of concern say dissimilarities. Would this be classed as an error?</p> <p>Accredited system could highlight this as a possible non conformance. Accreditation and robust dip sampling should tease out these issues. Culture of "errors" needs changing..... Not to be seen as a bad thing all of the time. Share errors so others learn from this.</p>

Table 7	National or Local arbitration debate. Error rates - a national or local approach. Definition - missed identification or erroneous (technical and/or administrative). Need to be clearly categorised and all work to the same uniform approach as this data may be disclosed to judiciary to prevent disparity. More in depth detail for LEA & FSP's to work within when undertaking their work for ISO 17025. Embrace a cultural change, utilise the new reporting outcomes. Not always black/white anymore.
Table 8	Distinguish between false positives and false negatives and apply suitable systems to identify both. A range of different processes should be adopted e.g. dip sampling, auditing, PT, second and third check etc. There must be a process to manage any errors identified to review the cause and take appropriate action. There is a danger in publishing error rates as this could deter people reporting them. It could use to misuse of the data / inappropriate comparison. Errors could be reviewed as part of UKAS visits.

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## DIFFERENCES OF OPINION (REPORTING OUTCOME/CONCLUSION)

In the second trial in the R V Smith case, the judge said in her summing up:  
*'One thing that is patently obvious from what you have seen and heard you may think is that fingerprint analysis is in the eye of the beholder. It is admittedly subjective. Experience no doubt sharpens the expert's powers of observation, but there is much room for differences of opinion between acknowledged experts. In this case, very unusually, you have fingerprint experts who are almost completely at odds with the interpretation of the other side. I have already given you directions about how to approach expert evidence. Your task is to determine which, if any, of either group of experts you accept'*

**Q: What should the process be for managing differences of opinion in fingerprint examination?**

To aid your discussions you may wish to consider the following:  
(N.B. Differences of Opinion means a different Reporting Outcome)

1. Is a formal review process required?
2. Is just an internal review process acceptable for all or some difference of opinion?
3. Does your group believe that a national arbitration panel for the purpose evaluating and reporting on fingerprint disputes should be formed?
4. List the strengths and weaknesses of a body of this type
5. If supported, how should it be formed and administered?

### DIFFERENCES OF OPINION OUTPUTS:

Table 1	Document the opinions/reasons of the individual's findings. Independently report findings. Check complex comparisons independently. Review findings after three checks. If any difference of opinion put another tier of checking in place. All findings disclosable. Panel decision accepted? Who sits on panel? Consider using outside bureau.
Table 2	Issue is mainly around external challenges as Forces have internal processes. Have some concerns about a panel as there is a danger that it devalues the opinion of Forces. The decision of the panel can be taken into consideration and disclosed if necessary but the final decision about whether to continue with the original ident should sit with the CC/SSM/senior person in that Organisation. Who picks the panel, what is the benchmark and how is their competence assessed?
Table 3	A formal review process is required internally to resolve any disputes prior to reporting. A review process should be undertaken between any experts (prosecution / defence) prior to trial. An option to enlist other Force Bureaus should be available. A National Arbitration Panel will be useful, particularly for smaller bureaus (who due to their size may use this instead of an internal process) and to demonstrate impartiality. This may lead to an increase in referrals for review - which would be good.
Table 4	Disagreement of interpretation will occur despite consistencies of training, PT's and competencies. Needs to be an independent arbitration process Formal process will be required. Who will form this panel? A truly national register whether within police or not within police, if those panel members are competent. Proof of competence should dictate if on panel. Have a set criterion of panel members, Perhaps select at least one independent, can't have more than one from one force, one non-



	force/independent member. Could FSR dictate the panel? Experts having diff of opinion should discuss firstly before the arbitration panel in case an agreement can be made.
Table 5	Fully auditable arbitration process. Consensus agreement - visualise. Areas of dispute - visualise. Use recognised methodology to articulate ACE - examples include Pianos, GYRO system, Photoshop illustration, and forensic comparison software. Detailed SOP developed to enable this effectively. Expert Meeting approach already recognised by the judiciary - Follow Criminal Procedure rules. Panel to consist of mixed professionals from LEA, Defence, FSP, COP etc. Blind Examination with no context or decision knowledge. Improved training for expert witness testimony - electronic presentation of evidence.
Table 6	Disputed identifications - should be submitted externally to avoid contextual bias. National arbitration system needs to be able to respond quickly. Would the panel need to be separately accredited and have their process validated? Would the judiciary accept the findings of the panel, especially if their decision was not unanimous? Should it actually be a 'panel'? If people are "independently" discussing it, there is still a risk of compromise to achieve a consensus of opinion rather than giving a truly independent view.
Table 7	There needs to be an open and transparent process of shared learning where the rationale for decisions reached, cogency of explanations for differences observed and basis for conclusions reached explored fully between examiners. The inclusion of some form of technical panel review is welcomed though this shouldn't have arbitration as its main focus but rather to provide completely independent viewpoints from examiners who are in no way connected to the case. This can be internal or external as required. There should be open and transparent disclosure to the criminal justice system in terms of reported outcomes and also across the profession so that learning and experience can be shared.

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## **ADDITIONAL MATERIAL FOR POST SESSION USE**

The following is included for you to use as discussion/workshop material in your bureau.

### **REPORTING OUTCOMES- SIMPLE EXERCISES**

#### **Example 1**

Upon analysis mark is seen to be a whorl pattern, 2 characteristics only. Suspect provided for comparison and has all whorl type fingerprints.

**Q.** What is your conclusion to the person of Interest (POI)? Qualify your answer.

#### **Example 2**

A couple of characteristics appear to be consistent with an area around the delta, but a coincident sequence cannot be established. There are a number of characteristic features that are significantly different. As the mark appears to be placed on a flat surface with very little movement no rational explanation can be offered to explain why differences could have occurred. The differences appear in both the mark and the print and can be observed within clear areas of ridge flow.

**Q.** What is your conclusion to the person of Interest (POI)? Qualify your answer.

#### **Example 3**

Upon analysis, mark is thought to be tri radiate area of right palm, clear loop pattern under right ring finger and 50+ characteristics. Suspects fingerprints do not include palm prints for comparison.

**Q.** What is your conclusion to the person of Interest (POI)? Qualify your answer.

#### **Example 4**

Upon analysis, mark is thought to be tri radiate area of right palm, clear loop pattern under right ring finger and 50+ characteristics. Suspects fingerprints compared manually and no characteristics in agreement were found.

**Q.** What is your conclusion to the person of Interest (POI)? Qualify your answer.

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[Answers are either excluded or inconclusive]

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## PROFICIENCY TEST (PT)

**Q.** What is a PT?

- a) Is it an internal competency check for individuals?
- b) Is it an external competency check for the organisation process?
- c) Is it a collaborative exercise?

**PROFICIENCY TEST (PT):** Is the determination of the calibration or testing performance of a laboratory by means of inter laboratory comparison, i.e., tests to evaluate the competence of analysts and the quality performance of a laboratory.

**Q.** What area or part of the process should a PT assess? Comparison

- a) Analysis
- b) Comparison
- c) Evaluation
- d) Verification
- e) Interpretation
- f) Reports
- g) Other

## PROFICIENCY TESTING (PT) AND VALIDATION

To carry out competency, proficiency and validation of fingerprint comparison, there is a requirement to use marks from known donors, sometimes referred to as 'ground truth' as the true answer is known.

**Q.** Do you believe that a national collection of known source marks for the purpose of testing and validation should be available?

- a) What are the strengths and weaknesses of such a service?
- b) If supported, how could it be formed and administered?

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## Note Taking

Accreditation to ISO 17025 will require a level of documentation which may be new to the fingerprint community.

**Q.** Does note taking serve a dual purpose – continuity for the CJS and audit to meet standards?

**Q.** How should note taking as required feature in the processing of casework?

- Q.** Where will the greatest impact be?
  - Q.** What are the practical difficulties?
  - Q.** What are the perceived risks?
  - Q.** What cultural impact could it have?
  - Q.** How can implementation be facilitated?
-