



Forensic Science Regulator

O v e r s e e i n g Q u a l i t y

Quality Managers Conference: Quality standards for fingerprint comparison activities

This slide pack is from my third quality managers conference which focused on quality standards for fingerprint comparison activities.

Delegates from across the UK were able to hear about key aspects of fingerprint examination from end users and the work of my specialist group.

My conferences are usually oversubscribed so I apologise if you weren't able to attend, however the speakers have kindly agreed that I can share their presentations.

I would like to take the opportunity to thank all those that participated in the event, and trust if you couldn't attend, that these slides give you a flavour of the event.

Andrew Rennison M.Sc.
Forensic Science Regulator

[Road map to reform – analysis of workshops](#)
[Professor Jim Fraser - University of Strathclyde](#)

[ISO 17025 as implemented by the FBI following the Madrid bombing –](#)
[Robin Ruth - FBI](#)

[CPS – end users perspective –](#)
[Karen Squibb-Williams - CPS](#)

[ACPO –Intelligent customer of Fingerprint services](#)
[Chief Constable David Shaw –](#)
[West Mercia Police](#)

[Fingerprint Quality Specialist Group](#)
[Gary Pugh - MPS](#)

[ISO 17025 Standard the Scottish perspective](#)
[Joanne Tierney - SPSA](#)

[ISO 17025 Standard the MPS perspective](#)
[Lisa Hall - MPS](#)

[International Standards: the input from research and development](#)
[Christophe Champod - University of Lausanne](#)

Fingerprints: a road map for reform – workshops data analysis

Forensic Science Regulator Quality Managers Conference 21 March 2013

Professor Jim Fraser
Centre for Forensic Science
University of Strathclyde



	Question/Statement	Strongly agree	Partly agree	No view	Partly disagree	Strongly disagree
1	There is a need for a better understanding of fingerprint errors.					
2	There is a need for better understanding of fingerprint accuracy					
3	Contemporaneous notes are required in fingerprint examination					
4	There is a need for formal quality assurance in fingerprint examination					
5	A cultural change within fingerprint practices is essential					
7	Absolute certainty in fingerprint examination is no longer acceptable					
6	There is a need for a review of fingerprint training					

Any other comments?

Occupation/role (not essential)



8	The following subjects should be included in the future training of fingerprint <u>experts</u> :	Strongly agree	Partly agree	No view	Partly disagree	Strongly disagree
	human factors (e.g. cognitive bias)					
	Quality assurance					
	Note taking					
	Reasoning skills					
	Statistics and probability					
	Bayesian evaluation					
	Understanding errors					
	Presentation skills					
	Statement/report writing					
	IDENT 1/AFIS systems					
	Other (specify)					

Workshop 1- Senior staff, Managers

Workshop 2 - Practitioners – first survey

Workshop 2 - Practitioners second survey

Data redacted a subject to publication

Interim conclusions

- There are notable differences between the views of workshop 1 delegates and workshop 2 delegates
- Workshop 2 delegates significantly altered their views after the workshop – broadly towards workshop 1 views
- Detailed consideration these issues could aid change management
- Further data is yet to be analysed

ISO 17025 and Changes at the FBI Laboratory LPU Since the Madrid Error



Initial report - www.usdoj.gov/oig/special/s0601/PDF_list.htm

Progress review report – www.justice.gov/oig/specials/s1105.pdf



ISO 17025 Background

- Accredited to “Legacy” in 2003
- Accredited to ISO 17025 in 2008
 - Documents re-written to address ISO accreditation in 2005
 - Timing of Accrediting body’s switch to ISO
 - Major changes to the FBI Laboratory quality system
- Re-accreditation scheduled for June 2013.

Error Background

- March 2004 - FBI identifies Brandon Mayfield as source of LFP 17 via IAFIS search
- April 2004 – SNP issue “negativo” report and FBI LPU representatives meet with SNP in Madrid to discuss FBI’s identification with Mayfield
- May 6 – May 20, 2004 – Brandon Mayfield imprisoned as material witness by FBI Portland
- May 19, 2004 – defense expert identifies Mayfield, SNP identifies Daoud
- May 22, 2004 – FBI LPU representatives travel to Madrid and receive high quality copies of Daoud’s known fingerprints
- May 24, 2004 – FBI declares LFP17 to be of “no value” for identification
- June 9, 2004 - FBI LPU representatives met with SNP in Madrid to discuss aspects of latent fingerprint (placement, development technique, etc.)
- July 16, 2004 – FBI issues report identifying Daoud as source of LFP17 and LFP20
- July 17-18, 2004 - International Panel of Experts convened to review the process and make recommendations for improvement
- July 2004 – FBI Lab internal review teams begin
- September 2004 - Office of the Inspector General (OIG) initiated investigation



Prints in Question

■ IMAGES REMOVED

Mayfield

Latent

Daoud



Corrective Action

- Examiner Removal from Casework and Retraining
- International Review Teams
- Internal Review Teams

International Review Panel

■ Summary of Reports:

- The process (ACE-V) was appropriate, but misapplied (practitioner error).
- Power of IAFIS candidate list and correlation
- Knowledge of circumstances regarding the latent print should be known for the analysis (substrate, processing technique, etc.)
- Need for descriptive ACE-V records and blind verification

Internal Review Teams

1. Policy for Examining and Reporting Cases with “Less than Original Evidence”
2. Documentation and Case Notes
3. Technical and Administrative Review Policy
4. Management Structure in the LPUs
5. Training LPU Employees
6. Corrective Action Reports
7. Complete SOP Review
8. Science

Internal Review Teams

- Reviewed all relevant documents
- Interviewed LPU Chiefs
- Presented recommendations to Lab Director
- Reviewed by LPU Chiefs
- Once finalized, LPU tasked with addressing and implementing 156 recommendations

OIG Investigation

- Effort to determine the cause of the error
- Interview Process
 - Those involved in the error
 - Others in the LPU
 - External experts
- Detailed review of the ACE-V examination as applied to the particular case

OIG Conclusions

- **OIG Report primary causes of error:**
 - Examiners failed to properly apply ACE-V– **Practitioner Error**
 - Bias from known prints (circular reasoning)
 - Unusual similarity of the prints (unknown to known) – IAFIS found close non-match
 - Faulty reliance on [Level 3] details
 - Inadequate explanations for differences in appearance
- **Additional OIG Findings**
 - Application of numerical standard would not necessarily have prevented the error.
 - Did not find compelling evidence that the FBI's verification procedures introduced bias.
 - FBI Examiners were not aware of Mayfield's religion at the time they made the identification.



OIG Recommendations

- **OIG accepted all of the recommendations of the Internal Review Teams in their initial report (Part of the Corrective Action Process).**
- **Recommended Change in Management Structure as well as addressing many key issues**
 - Latent Print Units I, II, and III (all case-working) restructured into Latent Print Operations Unit (LPOU) and Latent Print Support Unit (LPSU)
 - LPOU case-working unit
 - LPSU all support functions, not case-working
 - Supervisors no longer routinely assigned cases



Key Issues

- Confirmation Bias
- Case Acceptance
- Documentation
- SOPs
- Cluster Identifications
- Blind Verification
- Training
- Re-Organization



OIG Recommendations

- Research
- Revise Standard Operating Procedures
- Case records
- Blind verification policy
- Review previous cases
- Training



Research

- Permanence Study
- Quality Metric Study
- Black Box Study
- Quantity Metric Study
- White Box Study

SOPs for Examining Friction Ridge Prints

- More detailed description of each step of ACE-V.
- Thorough analysis of latent print must be recorded before looking at known print.
- Any data relied on for comparison or evaluation that differs from initial analysis must be separately recorded.
- Supervisors select verifiers
- Verifiers must separately complete and record their ACE with similar requirements to the original examiner.
- Confidence in a distortion explanation for an apparent difference must be same degree of confidence needed for an identification.
- If L3 detail is significantly relied upon to reach a conclusion it must be recorded, and all available known prints on file must be checked to determine if that relied upon L3 detail is reliably and consistently reproduced.



Case Acceptance

- No re-examinations without approval from executive management
- No state and local cases except:
 - Services (process or technology) not available
 - Assistant Director approval
- More rigid acceptance policy for electronically transmitted images or those received on magnetic media
- No latent comparisons with photocopies or facsimiles of latent prints



Digital Submissions

- Digital images/photographs must:
 - Have a scale or other measurable item
 - Be the original capture
 - Be a minimum of 1,000 ppi for latents
 - Be a minimum of 500 ppi for knowns
 - Be a minimum 8 bit depth
 - Have lossless compression for latents
 - Indicate the source
- No IAFIS search should be conducted without scale or other measurable item



Cluster Prints

- We will note placement only if forensically relevant and requested by contributor
- One print must stand alone
- Validation studies will be conducted to establish whether characteristics can be cumulative in clusters prior to changing usage policy

Case Records

- Analysis/Comparison – photos with marked level 2 characteristics (and level 3 if relied on to reach a conclusion) are retained
- Verification – separate photo(s) with marked level 2 characteristics (and level 3 if relied on to reach a conclusion) are retained
- Complex analysis
 - Determined by Team Supervisor
 - Documented (photographs, text, and/or charted enlargements)
 - Eliminated 12-point Supervisor approval
- Conflict resolution – all facets recorded in case file



Blind Verification

- In each case where there is a single conclusion, that conclusion will be blind verified
 - One identification, one exclusion, one inconclusive
 - Applies to IAFIS identifications as well
 - Blind verifier never knows which they're getting
- Also in cases with a single “value” decision change from a previously reported print or any identification that has undergone conflict resolution
- Supervisor selects the blind verifier and provides them unmarked latent and known prints
- Blind verifier documents process on his/her own photograph(s)
- Removes confirmation bias, reduces contextual bias
 - blind verifier does not have access to case information



Review previous cases

■ IAFIS reviews

- Cases with a single latent fingerprint identified as a result of an IAFIS search
 - Digital image submitted - 16 IAFIS identifications in 14 cases were reviewed and blind verified
 - Original evidence submitted – 174 IAFIS identifications were reexamined and blind verified
- No false positives found

■ Capital offense reviews

- Over 500 subjects reviewed – 24 had FBI latent print exams– no errors detected
- Change in procedures rendered some prints that were identified to be “no value.”
- Ongoing



Training

- Manual completely re-written
- More comprehensive training on friction ridge theory and application of ACE-V
 - Includes discussion of bias issues
 - Fundamentals of the science
 - ACE-V (general knowledge and application)
- Comprehensive training on IAFIS
- Comprehensive Training on Legal Issues
- External training and continuing education



OIG Review of Progress

- All recommendations closed as of June 2011 except for one
- Capital case review is ongoing – considered resolved because FBI is conducting the reviews appropriately, but not yet closed because the reviews are ongoing.

Take Home Messages About the Error

- Although initial reaction was protective, FBI publically accepted responsibility and made painful changes
- Although change was painful at times, it made LPUs (and discipline) stronger
- Error was practitioner error – but an examiner is stronger in a strong Quality Assurance System
- Continuous vigilance to improve - the process will never (and should never) be complete
- Change in Culture



Current / Future

- Preventive versus Corrective Action
- Data – Driven Approach to Procedures
 - Assess risk and possible mitigation
 - Streamline procedures by removing unnecessary steps or requirements
- LPU Strategic Planning and Team Approach
- Current Validation Projects
 - Next Generation Identification Validation
 - Processing Procedures Validation



Process Validation

- Validation Standards in FBI Laboratory, Latent Print Units
 - 17025, 5.4.5
 - Laboratory Operations Manual, Practices for the Validation of Technical Procedures
 - SWGFAST, Standard for the Validation and Performance Review of Friction Ridge Impression Development and Examination Techniques (Latent/Tenprint) (www.swgfast.org)
- Comparison Process (ACE-V) not formally validated at time of initial ISO 17025 Accreditation or before
- Possible Validation Study Procedures:
 - Langenburg, G. 2009. A Performance Study of the ACE-V Process: A Pilot Study to Measure the Accuracy, Precision, Reproducibility, Repeatability, and Biasability of Conclusions Resulting from the ACE-V Process. *Journal of Forensic Identification*. **59**(2)
 - Ulery, et al. 2011. Accuracy and Reliability of Forensic Latent Fingerprint Decisions. *Proceedings of the National Academies of Science*. **108**(9).
- Future
 - Risk Assessment of Each Step
 - Best Way Forward in Risk Mitigation
 - Hiring Validation Project Manager to coordinate validation projects and develop validation SOPs



Questions or Comments

– Contact Information

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FINGERPRINTS EXPERT EVIDENCE & THE CRIMINAL JUSTICE SYSTEM

*Karen Squibb-Williams MA, Barrister,
Strategic Policy Adviser
March 2013*



Providing Forensic Science Services to the Criminal Justice System?



- **What does the Crown Prosecution Service want?**
 - **Consistency: local & national**
 - **Clarity: reports and statements**
 - **Compliance: with Criminal Procedure Rules & CPIA**
 - **Cost efficiency: streamlining forensic reporting**
 - **Quality**



CPS Requirements:



- The CPS Core Foundation Principles document (see handout or website) informs all potential providers of forensic analysis for use in the CJS, of what the CPS requires.
- Forensic science providers (FSPs) can include private companies, government agencies, public organisations, academic research departments and law enforcement agencies, whether based domestically or internationally.



The Core Principles:



- CPS essential considerations when deciding whether any scientific product or service could be used as evidence in a case in England and Wales.
 - **a)** Applicable statute and case law in the jurisdiction of England & Wales;
 - **b)** The Code for Crown Prosecutors, 7th Edition;
 - **c)** The CPS Core Quality Standards;
 - **d)** The Criminal Procedure Rules;
 - **e)** The Criminal Procedure and Investigations Act, 1996;
 - **f)** Streamlining Forensic Case Management and proportionate prosecutions;
 - **g)** The absence of a contractual relationship between FSPs and end-users, namely the CPS and the court.



Applicable statute and case law in the jurisdiction of England & Wales;



- **a)** All prosecutions are conducted according to the law of England and Wales, statute and common (case) law



The Code for Crown Prosecutors (7th Edition):



- **b)** All Crown Prosecutors in England and Wales (along with a number of other prosecuting authorities) must apply this when considering **every** prosecution **throughout** the life of the case.
- Application of the Code has two stages:
 - The Evidential Stage, and
 - The Public Interest Stage
- ***The Evidential stage must be satisfied before the Public Interest stage can be considered.***



The Crown Prosecution Service Core Quality Standards:



- **c)** There are 12 Core Quality standards which set out what the CPS does, how it makes decisions and what can be expected of the Service.
- Both publications can be found in full on www.cps.gov.uk



The Criminal Procedure Rules (2012)



- **d)** The Criminal Procedure Rules (CrPR) were issued in 2005 and consolidated in April 2010, then re-issued in October 2011 and further in October 2012.
- They apply to **all** participants throughout the conduct of a criminal case. Of particular relevance to forensic science service providers are:
 - Part 1: The Overriding Objective
 - Part 3: Case Management: Defence Identification of issues
 - Parts 21 & 22: Disclosure
 - Part 33: Expert Evidence



The Criminal Procedure and Investigations Act (CPIA), 1996



- **e)** In the course of any investigation, material divides into two parts, **used and unused**. Used material is the evidence in the case. Unused material is all the information generated by the investigation that is not being used as evidence. Investigators and prosecutors are obliged to consider all such unused material and apply the Disclosure test as follows:
 - Is the unused material **relevant** to the case?
 - If relevant, does the unused material either **assist the defence** case or **undermine the prosecution** case?
 - If the answer is 'yes', then the unused material must be disclosed to the defence.



Streamlining Forensic Case Management, SFR and proportionate prosecutions:



- **f)** This is a method of using consistent national case work principles to implement the requirements of the Criminal Procedure Rules when using forensic science in the CJS. It enables early identification of any forensic issues (CrPR, r3) to take place much sooner in the case preparation process. It is a separate requirement to the CPIA, Ss5 and 6 provision of a Defence Statement. The process also facilitates better compliance with CrPR, Parts 3 and 33 wherein expert witness obligations and duties of disclosure are engaged much earlier in the process than previously.



What's the Case For Streamlining?



- **Criminal Procedure Rules + Criminal Procedures Investigation Act**
 - CrPR, R3 = early identification of the issues
 - +
 - CPIA, s5 (Crown Ct), s6(Mags Ct) = Defence Statement
- **Court of Appeal + Case Law**
 - R v Reed & Reed, December 2009 – CrPR, Rules 3 & 33 (paras 129 – 131)
 - R v Balogun, February 2010 – Compliance with the spirit of CrPR (para 16)
 - R v Weller, March 2010 – Identification of the issues (paras 16 – 18)
 - R v Butler, Henderson & Oyerderin, June 2010 – CrPR, Case Management (paras 209 – 214)
 - R v T, October 2010 – Third parties reveal base methodology
 - R v Olu , December 2010 – MG Schedules (para 45)



Contracts, criminal law and the adversarial system;



- **g)** The distinction between criminal and civil justice systems must be recognised by commercial forensic science providers. It is important to understand that the Criminal Law ‘trumps’ Civil Law, including Intellectual Property Rights (IPR).
- This is particularly relevant where the scientific providers are based elsewhere in Europe and may not be familiar with or structured to accommodate the Common Law *adversarial* system in place in England and Wales.
- Specific rules apply in relation to the admissibility and reliability of evidence, along with the full disclosure of unused material - that is, any material relevant to the investigation that is not used as evidence (in accordance with the CPIA, see **e)** above).



Five Key requirements arising from the Core Foundation Principles:



1> Comply

- To **comply** with the Codes of Practice and Conduct set down by the independent Forensic Science Regulator.

2> Ensure

- To **ensure** Quality Standards and Assurance processes are applied which are nationally consistent and compliant with appropriate ISO standards, United Kingdom Accreditation Service (UKAS) accreditation, EU directives and clear development and validation processes.



3> Provide



- To **provide** clear communication and interpretation of scientific processes, procedures, strengths, weaknesses and meaning. This should be set down on a short (approximately two pages) guide in layman's terms to the key services being offered accompanied by a Q & A style document illustrating the strengths and weaknesses for the CJS of the scientific procedures offered.
- Not all Crown Prosecutors will necessarily have a detailed knowledge of forensic science. These documents will assist Prosecutors who are effectively 'gatekeepers' in the prosecution process when applying the Code for Crown Prosecutors, the CPS Core Quality Standards and the CrPR 2012 to investigations and subsequent prosecutions.



4> Engage



- To **engage** with the Streamlined Forensic Reporting (SFR) process associated with proportionate prosecution requirements.
- What does it mean?
- **Streamline:**
 - **Contour economically or efficiently**
 - **Designed or arranged to offer the least resistance to fluid flow**
- **Staged:**
 - **A period or step in a process**
- **Reform:**
 - **To make better by removing faults and defects...**



5> **Aware....**



- To be fully **aware** of and compliant with CPIA Disclosure and Expert Witness obligations, including the disclosure of details of algorithms and statistical analysis and without regard to commercial sensitivity. Following appropriate full disclosure of this information to the police and prosecution, the Court process allows for applications to be made to treat certain commercial information as ‘sensitive’ and cannot be used for any purpose other than those particular proceedings.



The Criminal Procedure Rules: Expert Case Management..



Where there is a difference of opinion between experts for the Prosecution and the Defence, it is vital that all expert statements are disclosed well before a trial commences.

- **Pre-trial Case Management:**
- Strict adherence to, and implementation of, the regime provided by the Criminal Procedure Rules 2012 will facilitate clear steps being taken in the service, consideration and agreement (or otherwise) of expert opinions.
- The primary purpose of robust pre-trial management is to narrow down the real issues, particularly those of a scientific nature, which the jury must decide upon.



Criminal Procedure Rules (CrPR) 2012, Rules 3 and 33



- Rule 3: Must assist with the ‘Overriding Objective’;

Criminal cases must be dealt with justly – applies to ALL participants

- Parties’ duty is early identification of issues + agreement
- Trial only on live issues
- Outgoing Senior Presiding Judge directive issued Dec 2009
 - applying R3 is “compulsory”

- **Rule 33: Duty to the Court;**
 - R 33.2; objective, unbiased, within expertise
- **Contents of Report;**
 - R 33.3; qualifications, accreditation, area of expertise
 - where there is a range of opinion on the matters dealt with in the report:
 - summarise the range of opinion, and
 - give reasons for his own opinion
- **Identify issues and areas of agreement;**
 - R 33.5; pre-hearing discussion of expert evidence



Identification of the Issues



- In [*R v Reed, Reed* \[2009\]](#) the Court of Appeal dealt with the complex science of admissible DNA evidence, ordered that a "primer" or guide to the basic science applicable should be provided - no reason why such a document should not be agreed and provided to a jury in all scientific or complex medical cases (para 28)
- The Court clearly set out and emphasised the importance of the use of and adherence to Rule 33 of the CrPRs (paras 128 – 131);
- Parties must provide identification of agreement and disagreement within the experts' reports.
 - That notification of those areas of disagreement thereafter must be given to the court and the case then must be brought before the judge. This obligation falls to both the prosecution and the defence.
 - The judge should then order a meeting of experts to take place (under Rule 33.5).
 - A statement under Rule 33.6 should be then drafted setting out in clear terms the agreed science, for use at trial.
 - Any non-observance of an order for such a statement will be met in most cases by a refusal by the trial judge to admit the evidence of the expert not complying.



CPS Guidance Booklet for Expert Witnesses 2010



Aims:

- To set Criminal Justice System wide standards for the use of expert witnesses.

- Raise Experts' awareness of the importance of disclosure of unused material and their role in compliance with Criminal Procedure and Investigations Act 1996.

- Raise Experts' awareness of the importance of compliance with the Criminal Procedure Rules 2010.

- The standards and guidance are intended to provide public confidence in the administration of justice



CPS Guidance Booklet for Expert Witnesses 2010



- Clear standard for prosecution disclosure obligations – compliance with CPIA 1996
- Clear standard for case management – compliance with the CrPR 2010
 - Rule 1 – overarching interests of justice
 - Rule 3 – identification of the issues
 - Rule 33 – Experts’ duties
- The Three ‘R’s’:
 - RETAIN - all materials, unless otherwise instructed
 - RECORD – everything you do
 - REVEAL – everything you have recorded
- Indicates that peer reviewability is a baseline and provide disclosure flowchart and index template
- A requirement for experts to self-certify their expertise
- Guidance on issues of competence / credibility of experts



CPS Guidance Booklet for Expert Witnesses 2010



Expert's Self-Certificate:

- Your declaration that you are an appropriately qualified expert and that you have no criminal or professional complaints against you – concluded or outstanding.
- Please refer to handout copy or obtain a copy from the CPS website; annex C on page 21.



The Future



- Task 1..... Use existing reforms to focus on CASE MANAGEMENT
- Task 2..... Build processes that comply with the Criminal Procedure Rules
- Task 3..... Recognise distinction between CrPR Rule 3 and CPIA Section 5
- Task 4..... Enable Streamlined Reporting
- Task 5..... Intelligence – v – Evidence
- Task 6..... Trial on the Issues
- Task 7..... Aim for National consistency
- Task 8 Read the Code for Crown Prosecutors, 7th Edition





Any Questions?

CPS HQ

www.cps.gov.uk

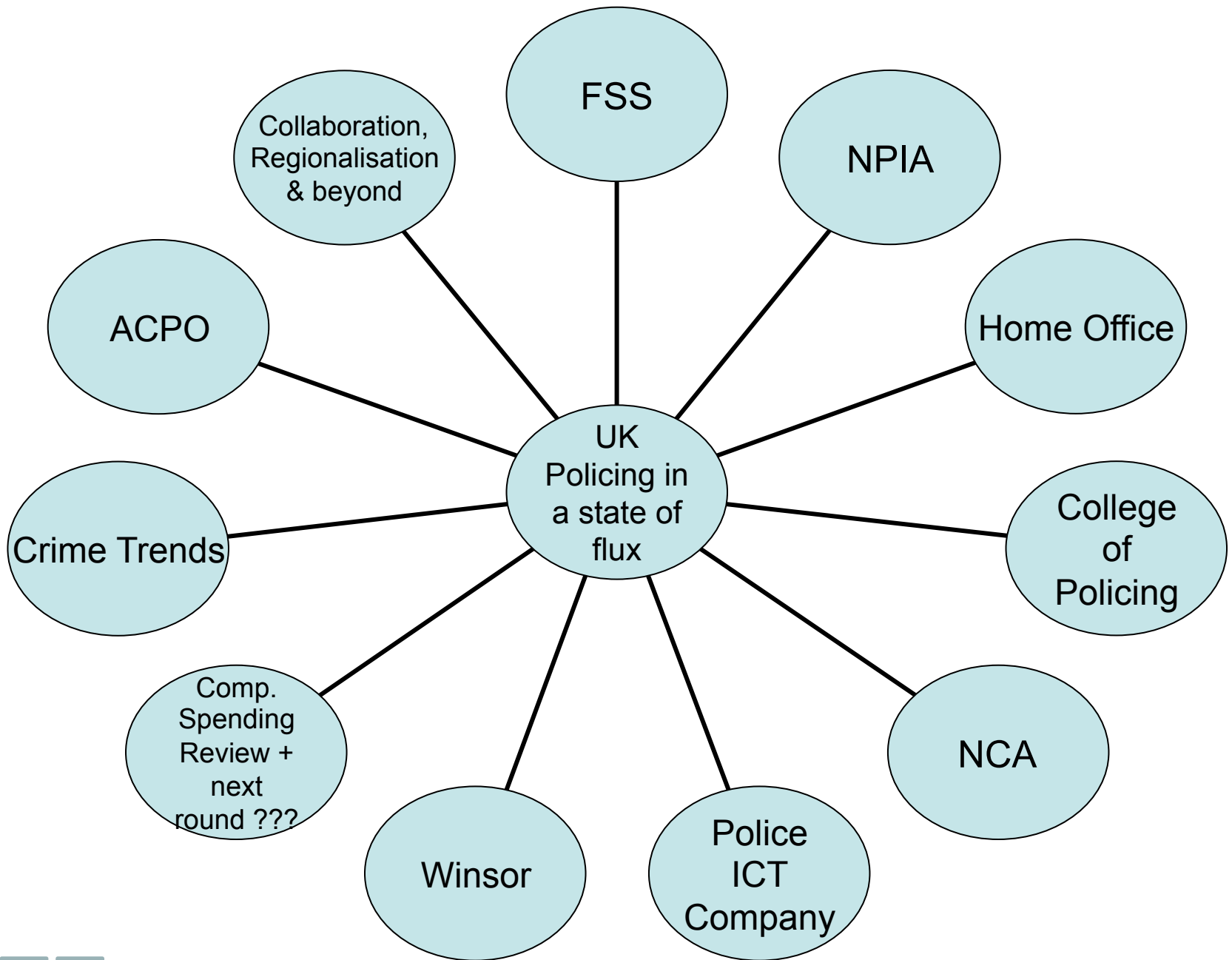
0203 357 0000

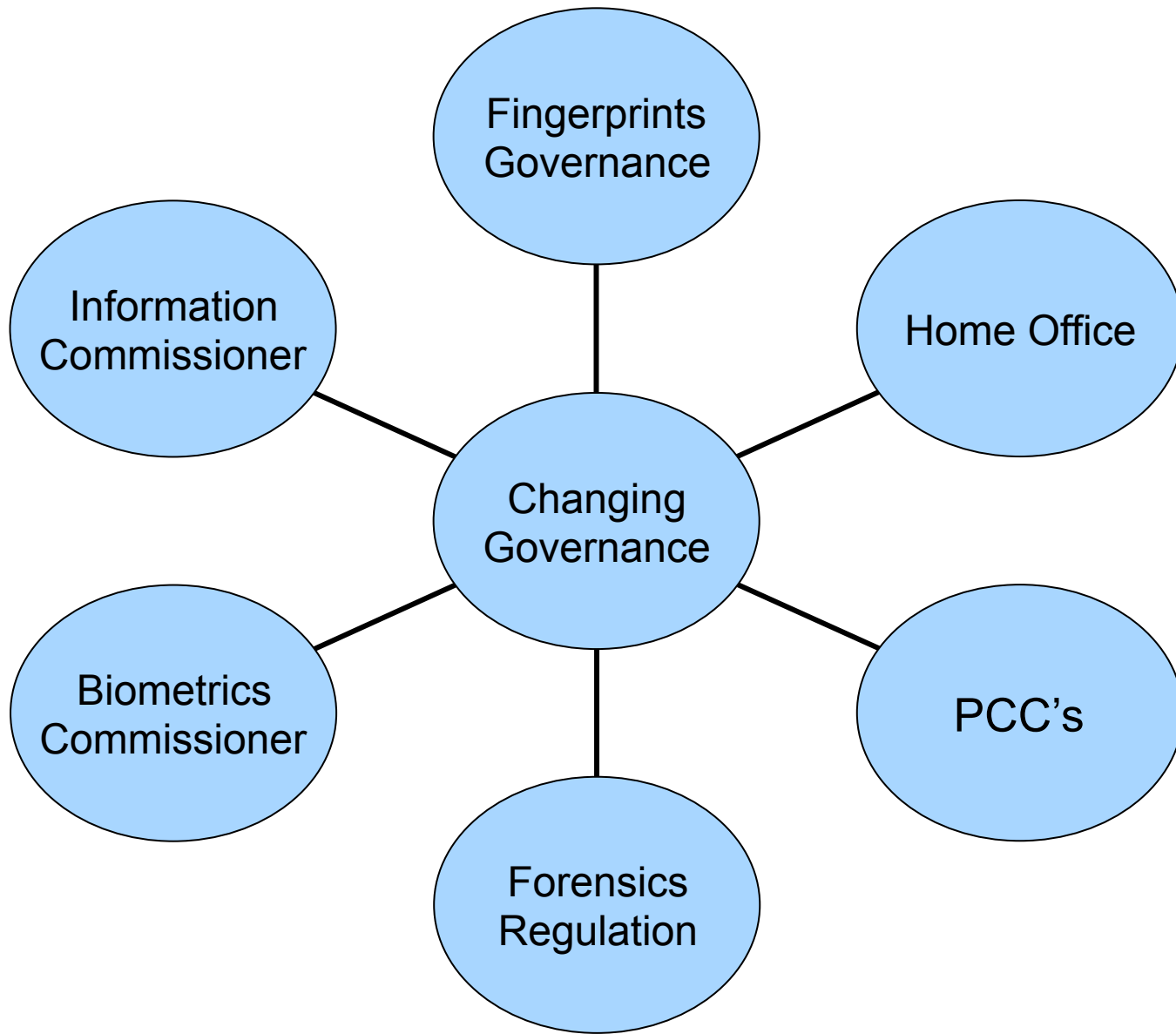


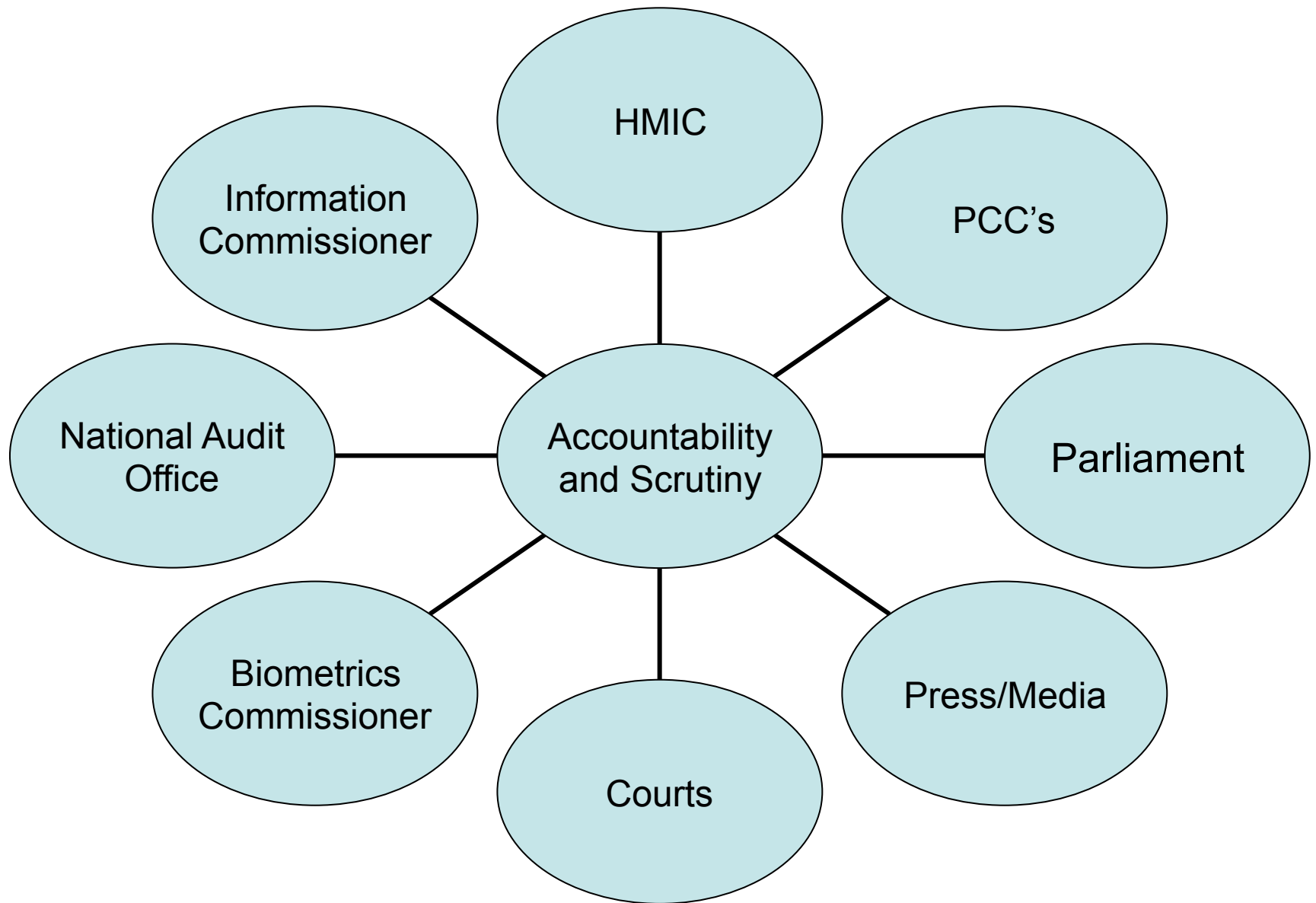
The Changing Police Landscape and its' Impact on Fingerprint Services

Chief Constable David Shaw
West Mercia Police













Thank You



Quality Managers Conference
21 March 2013

Gary Pugh
Chair, Fingerprint Quality Standards
Specialist Group

Fingerprint Quality Standards Specialist Group- Terms of Reference

- Define the scope to be included in the review of fingerprint quality standards, with options for later extension of the scope.
- Review the current options for accrediting fingerprint examination to ensure suitable quality standards.
- Recommend an option that best achieves quality standards in the delivery of fingerprint examination and expertise to the criminal justice system.
- Oversee the processes for monitoring and enforcing fingerprint quality standards, including relationships with other bodies, within forensic science.
- Propose means of remedying any shortcomings, distinguishing between measures which fall within the remit of the Regulator and those which do not.
- Make such other recommendations as appear appropriate.

Fingerprint Quality Standards Specialist Group

Membership:

Chair: Gary Pugh (Metropolitan Police Service)

Rob Bettinson (United Kingdom Accreditation Service)

Ian Borthwick (Greater Manchester Police)

Neil Dennison (West Yorkshire Police)

Professor Jim Fraser (University of Strathclyde, Centre for Forensic Science)

June Guinness (Home Office, Forensic Science Regulation Unit)

Lisa Hall (Metropolitan Police Service)

Andrew Rennison (Forensic Science Regulator)

Richard Small (West Midlands Police)

Karen Squibb-Williams (Crown Prosecution Service)

Joanne Tierney (Scottish Police Services Authority)

Fingerprint Quality Standards Specialist Group – Context

- Fingerprint Inquiry -Scotland
- Court of Appeal judgement in the case of R v Smith; which identified a real need in fingerprint examination *“to ensure that there are common quality standards enforced through a robust and accountable system”*.
- US National Academy of Sciences report “Strengthening Forensic Science in the United States: A Path Forward”
- US Scientific Working Group on Friction Ridge Analysis, Study and Technology (SWGFAST)
- EU Council Framework Decision 2009/905/JHA. Requires accreditation against BS/EN ISO 17025 for the laboratory enhancement of fingerprints.
- UK Regulator’s Codes of Practice and Conduct.

Fingerprint Quality Standards Specialist Group – Approach

Basis for Fingerprint Examination -Fingerprint examination can be described as a cognitive process which relies on the ability of a competent individual to analyse and compare areas of friction ridge detail and arrive at a decision as to whether they originate from the same person or not.

Basis of Regulation

BS/EN ISO 17025 is the standard for testing and calibration laboratories, and is endorsed by the Regulator as the basis of a quality standards framework for UK

Key Elements of the Regulatory Model

- organisational competence, (does the organisation managing the laboratory have effective quality systems)
- practitioner competence,
- method validation
- impartiality

Fingerprint Quality Standards Specialist Group

Key Areas of Development and Work Plan

- Reporting Outcomes from Fingerprint Examination
- Development of a “Fingerprint Terminology, Definition & Acronyms”
- Development of an Annex on fingerprint Examination to the Regulator's Codes of Practice and Conduct
 - Validation
 - Organisational Competence
 - Practitioner Competence
 - Impartiality

Fingerprint Quality Standards Specialist Group - Future Work

- consultation on the Annex on fingerprint Examination to the Regulator's Codes of Practice and Conduct
 - with the Fingerprint Profession through this conference, followed by
 - public consultation with interested parties; ACPO, CPS, MoJ, Judiciary, Academia, etc
- Involvement of UKAS and development of a pool of Technical Assessors
- Development of a UK Proficiency Testing Scheme

Scotland's Approach To ISO/IEC 17025



Joanne Tierney

Fingerprint Lead Scientist



FORENSIC SERVICES
SCOTTISH
POLICE
SERVICES
AUTHORITY

2000 – 2006

Unprecedented scrutiny of Fingerprinting in Scotland

Structure
& service
delivery

Competence
Organisation &
individual

Engagement
Staff &
Stakeholder

Fingerprint
Methodology

Procedures

Culture
Organisation &
individual

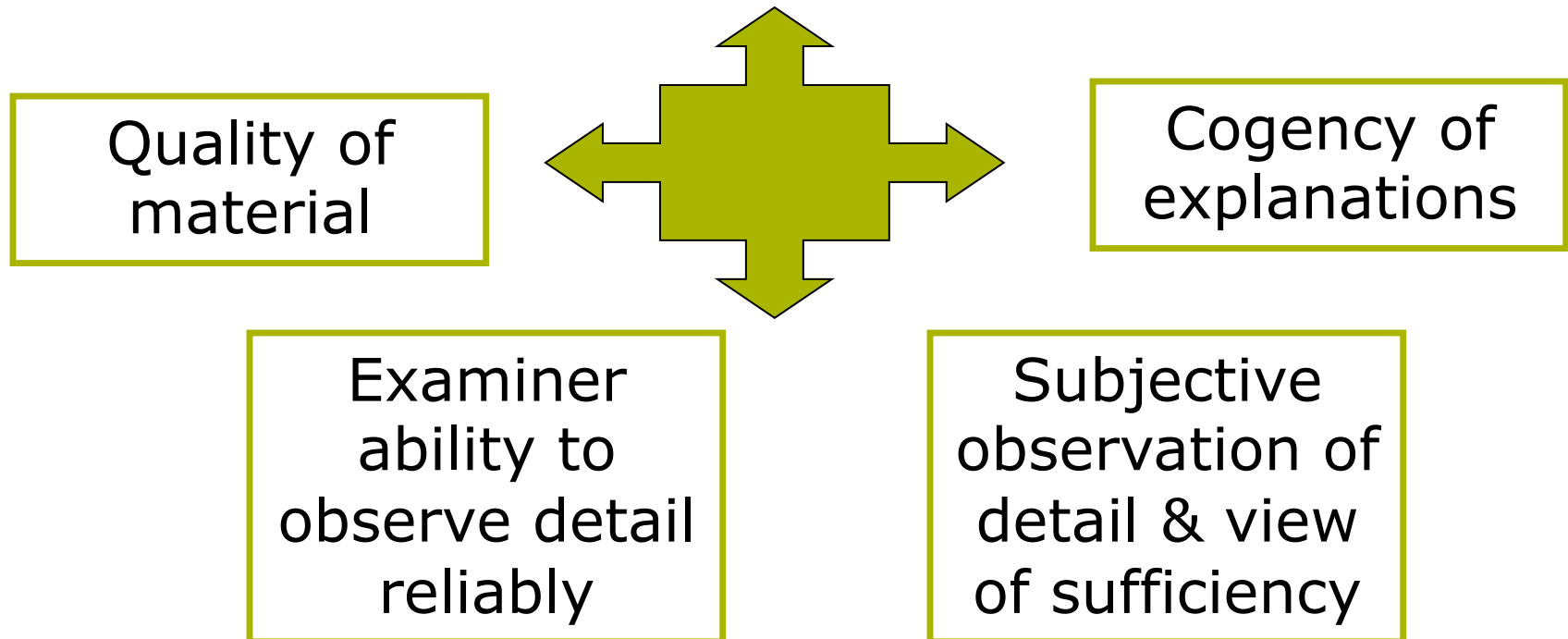
Training



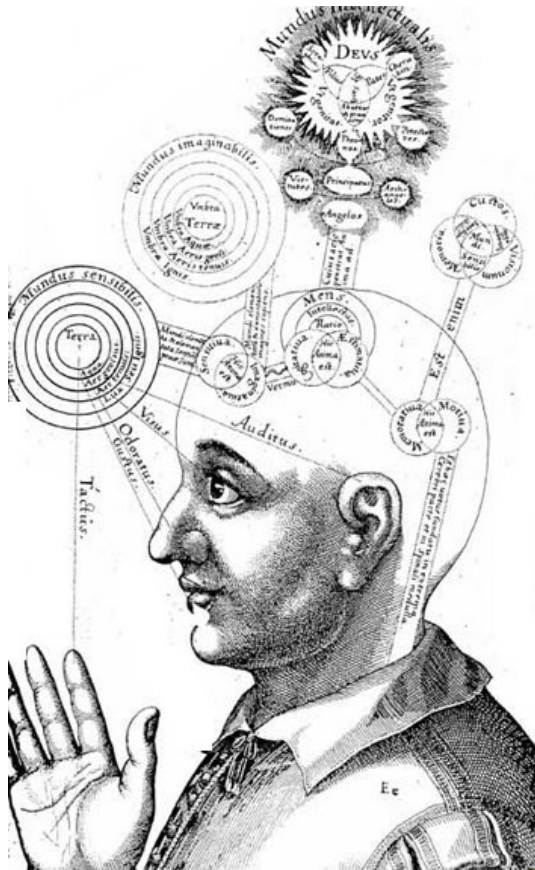
The Fingerprint Inquiry

Fingerprint Evidence should be recognised
as opinion evidence not fact

Influenced by.....



WORK STREAMS



Note
Taking

Verification

ISO 17025

Validation

Court
Reports

Competence

Human
Factors



QUALITY STANDARDS

"The activities range from.....to comparison workwhich is largely subjective in nature but which with training, can produce consistent outcomes between different forensic scientists"

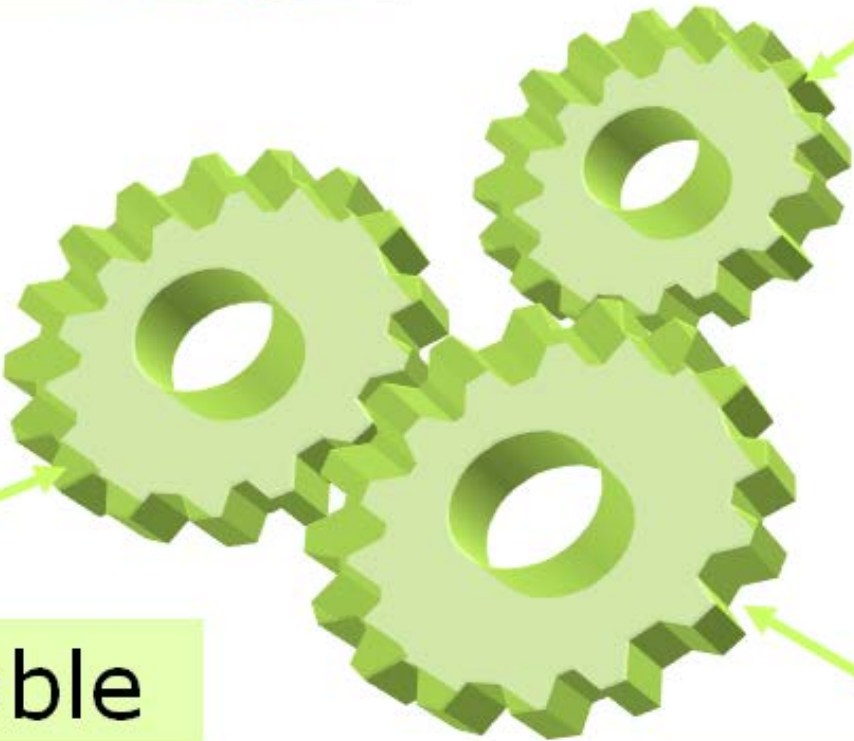


ILAC-G19:2002





Recordable



Repeatable

Reliable

Recordable:

- *Records should be sufficient to allow another competent examiner to establish the examinations undertaken and interpret the findings*

Repeatable:

- *Capable of being repeated at a different time and place by the same or another examiner*

Reliable:

- *Demonstrate that all appropriately trained staff will obtain the same results within defined limits*



Recordable

— Technical notes pages

— More detailed SOP's

— Improved court reports

Standard & Enhanced reports with supporting visuals

— R2S visual solution

— Complex Marks Process

3 phase approach

— Evidence Mgt system

Recording of key findings at analysis stage



Repeatable

Revised
Verification
Process

Standard &
Blind
Verification

No case context
information passed
to verifier

Dip
Sampling
&
Individual
Case
Review

Individual
competency
Monitoring

Individual T&C
portfolios must
demonstrate
ongoing
maintenance of
competence

External
testing



Reliable

Validation

Current
Validation
document

Validation study
being undertaken
with University of
Strathclyde

Individual
competency
Monitoring

Individual T&C portfolios
must demonstrate initial &
ongoing maintenance of
competence

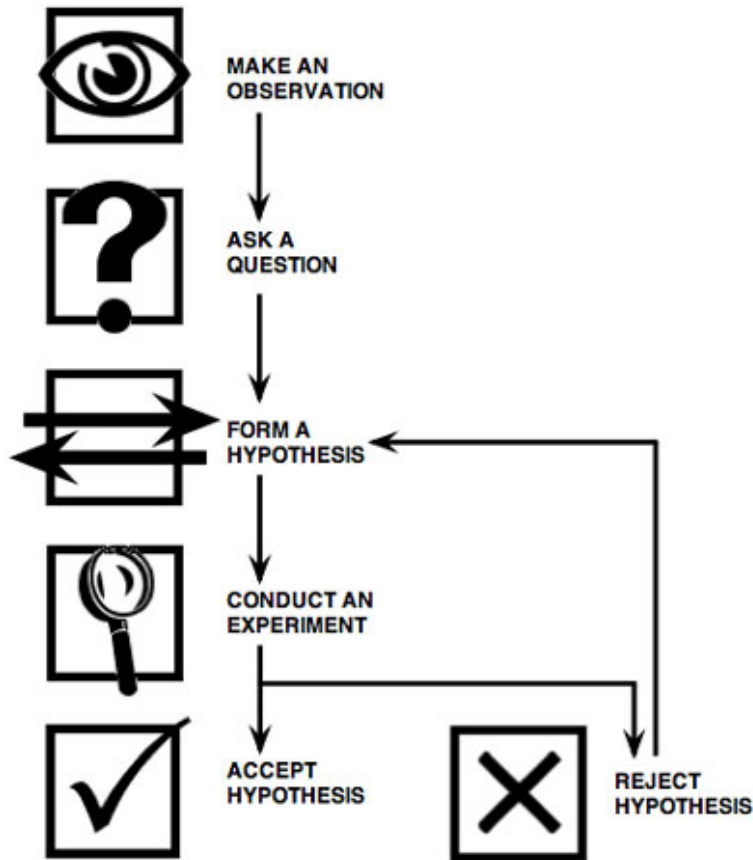
Collaborative
exercises

External
testing

Dip
Sampling



SCIENTIFIC VALIDATION



- How could we scientifically validate an inherently subjective process which is not readily reproducible?
- How could we calculate measures of uncertainty and known error rates if it all comes down to the opinion of the examiner?

VALIDATION STUDY

EARLY EXTERNAL INFLUENCES

December
2011

Publication of The Fingerprint Inquiry Report.

March 2012

Presentation by Prof. Niamh NicDaeid at the 'Fingerprints - Road Map to Reform' Workshop

Meeting with June Guinness, Forensic Regulator Team, Prof. Niamh NicDaeid, and Robin Ruth, FBI – existing validation plans in other disciplines, FBI experience, and ISO 17025 Requirements

Determined a plan based on validating reliability of outcomes rather than the inherently personal and subjective examination process



SCIENTIFIC VALIDATION

Work in Progress

Ground Truth Database

April 2012 began working with University of Strathclyde to build a scientifically valid data set

Testing

May 2013 design appropriate tests to establish error rates, uncertainty of measurement and the extent of variance in examiner outcomes against known source data

Analyse outcomes

Engage in an appropriate peer review process and publish paper(s)

Further explore significance of outcomes through further tests & studies



R2S VISUAL SOLUTION

The screenshot displays the Adobe Acrobat Pro interface. The main window shows a PDF document with the following content:

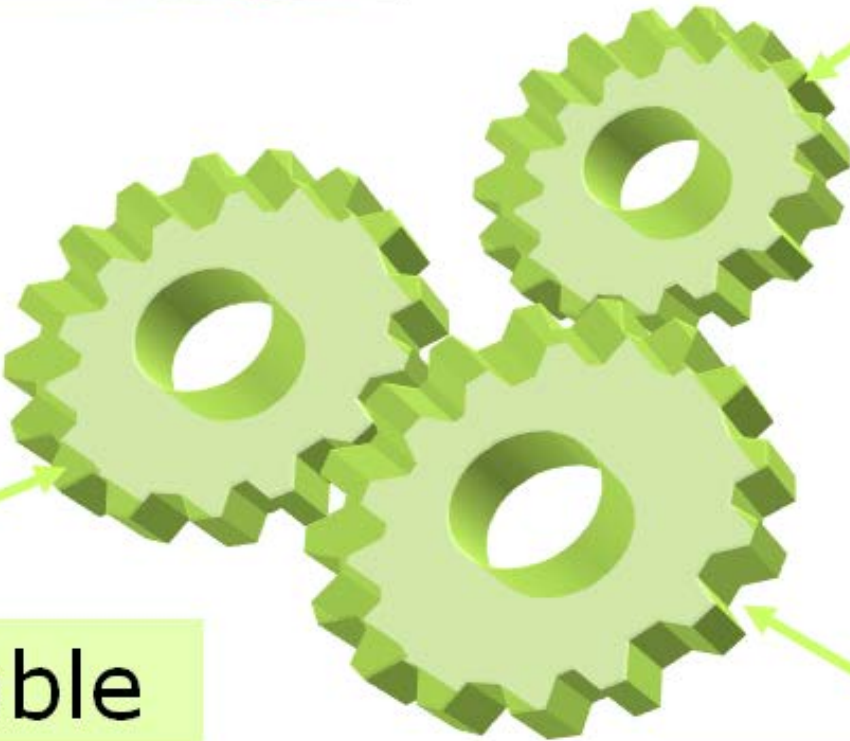
- Bookmarks (Left Sidebar):**
 - 102824 (1)
 - Case File Details
 - Scene of Crime Mark
 - SOC Analysis
 - Tenprint Mark
 - TP Analysis
 - Comparison
 - Evaluation
 - Verification
- Main Content Area:**
 - A side-by-side comparison of two fingerprints.
 - The **R2S** logo.
 - DATE: 01/09/12
 - REF: *****
 - TITLE: HMA v Joe Bloggs
- Page-Footer:**

This document was created using R2S CRIME. REF: 102824 (1) DATE: 9/1/2015 1:30:49 PM Page No. : 1





Recordable



Repeatable

Reliable



Quality Managers Conference 21 March 2013

The MPS perspective to achieving ISO 17025

Presented by
Lisa Hall

Directorate of Forensic Services



Improvement plan

Changes already implemented

- Improved training programme, leading to a professional qualification.
- Introduction of a technical error policy.
- Dip sampling procedure.
- Complex mark procedure.
- Panel review procedure.
- Proficiency testing.
- Technical audits, of insufficient, idents, exclusions, digit determination.
- Introduction of mandatory and optional CPD workshops for experts
- Research, internal and with academic partners

Changes being implemented

- Rewriting all procedures to reflect what we actually do. This includes ACE.
- Introduction of Competency register and programme for expert registration. Including competency testing and blind testing (test analysis, conclusions, verification, report writing, interpretation and oral presentation skills).
- Note taking procedure. Pilot on going. Focus on general observations and justification for conclusion.
- New reporting outcomes.
- Peer review, of reports and interpretations.
- Validation, of our people , processes and procedures.



Validation

What is validation, what does it actually mean?

An **empirical validation** of a hypothesis is required for it to gain acceptance in the scientific community. Normally this validation is achieved by the [scientific method](#) of , [experimental design](#), [peer review](#), [adversarial review](#), [reproduction of results](#), and [journal publication](#)

Fingerprint Validation can be defined as establishing scientific evidence that the fingerprint comparison process, its practitioner operatives and its procedures (from the initial analysis stage throughout the comparison and evaluation stage to the ***production of a decision outcome***) are capable of consistently delivering desirable quality and reliable outcomes.

Quality **cannot be** adequately **assured** merely **by in-process and finished-product inspection like verification or testing via audits.**



Validation

Fingerprint comparison relies on a scientific model or theory

The Forensic Science Regulator Codes of Practice and Conduct, December 2011 [1], specifies the requirement that all providers of Forensic Science Services to the Criminal Justice System (CJS), will demonstrate reliable methodologies and outcomes.

At the very least a risk assessment should address the following:

- the validity of the theory/model;
- any assumptions incorporated within the theory/model; and
- limits on the application of the theory/model.

In addition, fingerprint comparison relies on interpretive methods and the code states that any methodology adopted should be validated

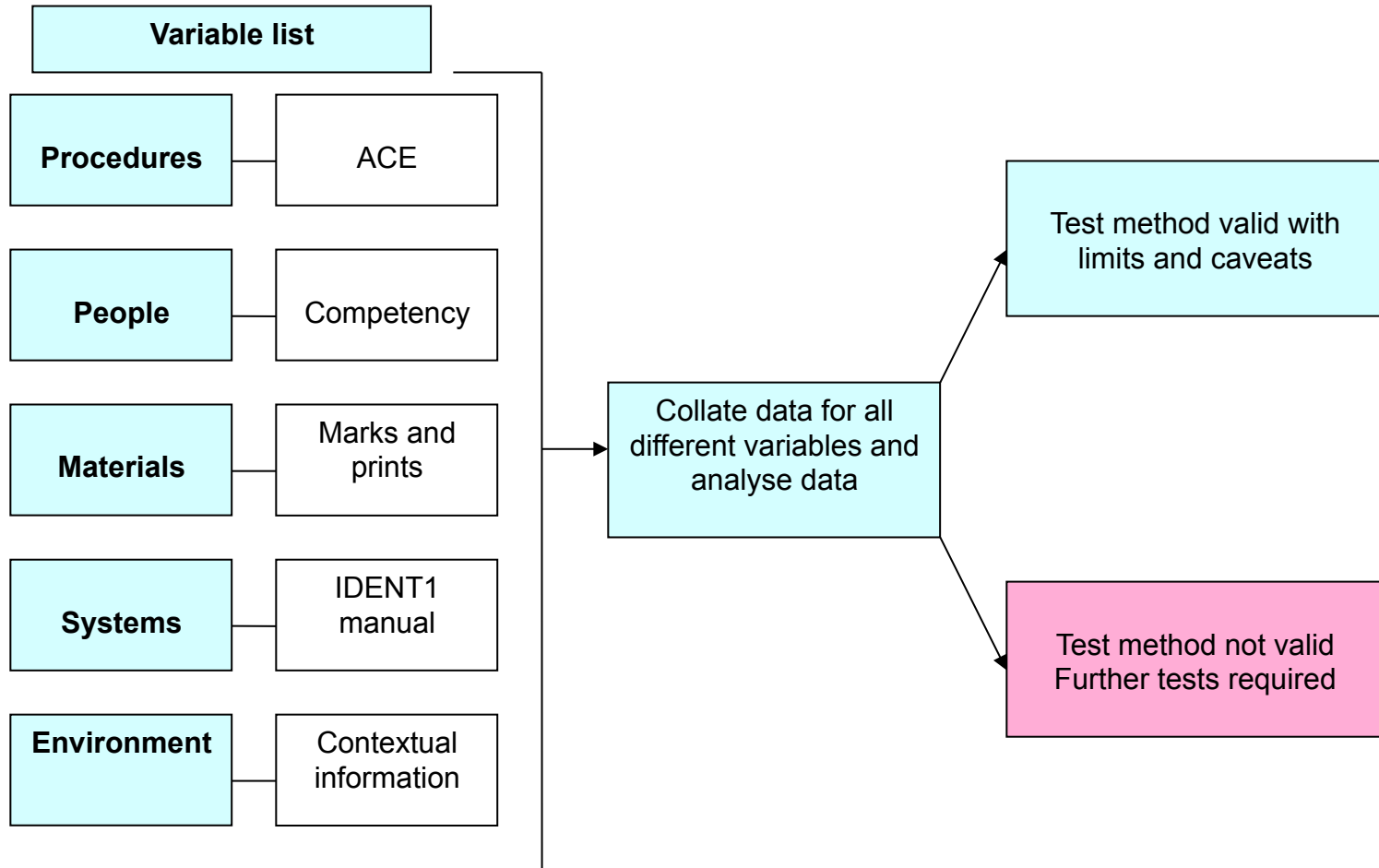
Validation should focus attention on the competence of an individual and the proficiency of a service provider

The code suggests some ways this could be achieved:

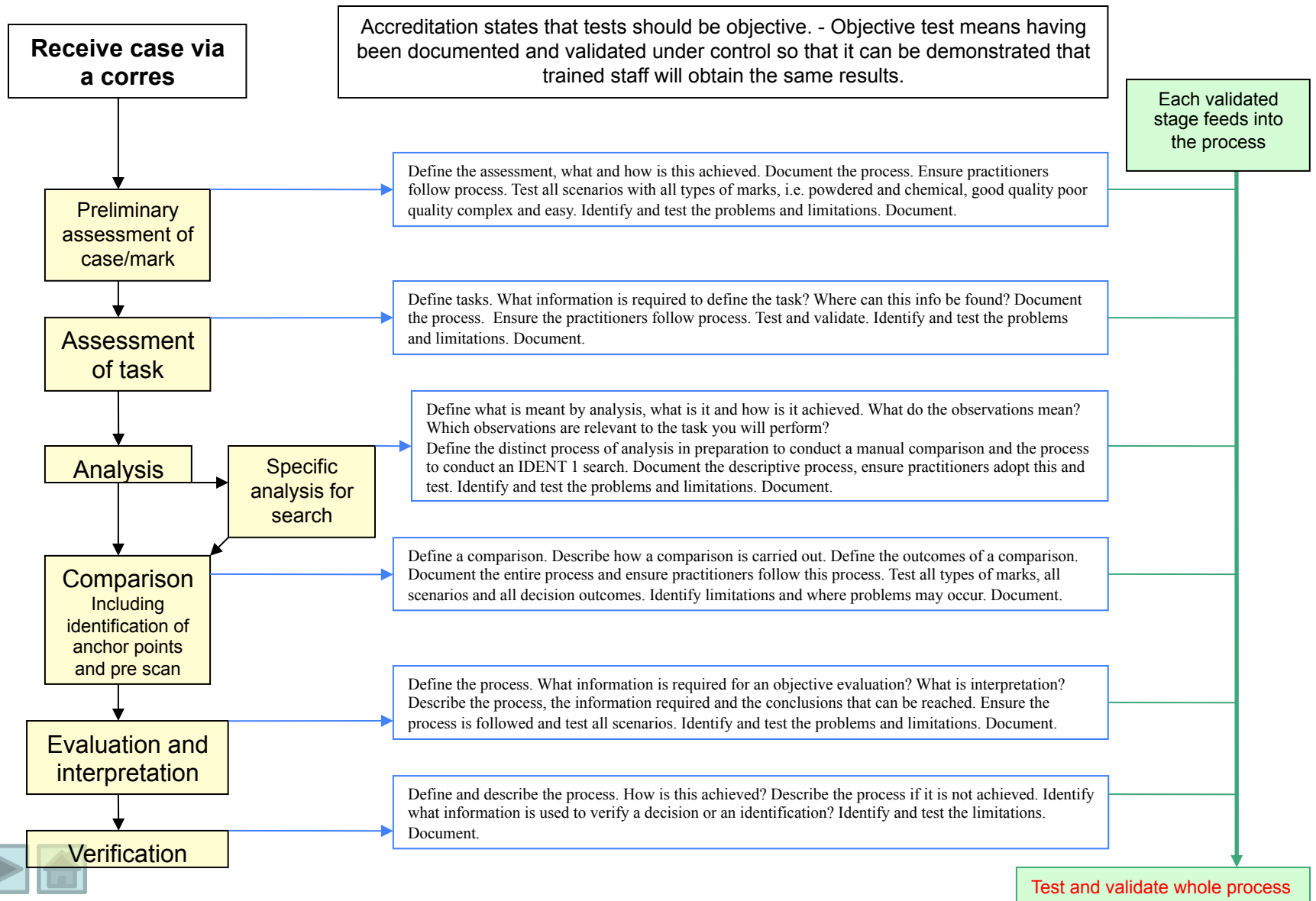
- independent confirmation of results/opinions by another competent examiner (i.e. without prior knowledge of the first result/opinion provided);
- participation in interlaboratory comparisons (collaborative exercises or proficiency tests);
- external recognition with a recognised and relevant professional body;
- design frequent in-house assessment into the process using positive and negative competence tests.



What should we test and can we how validate?

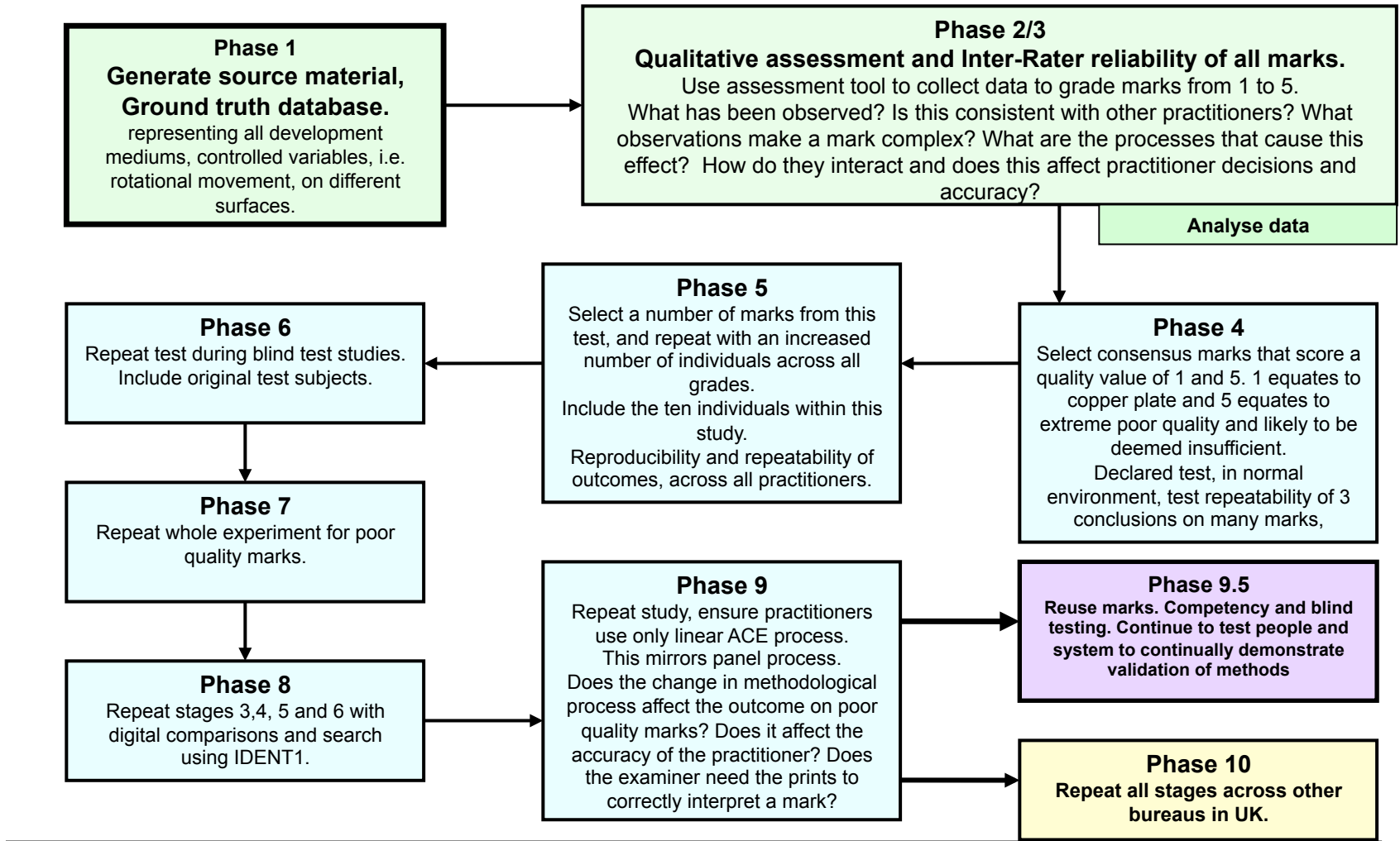


Directorate of Forensic Services



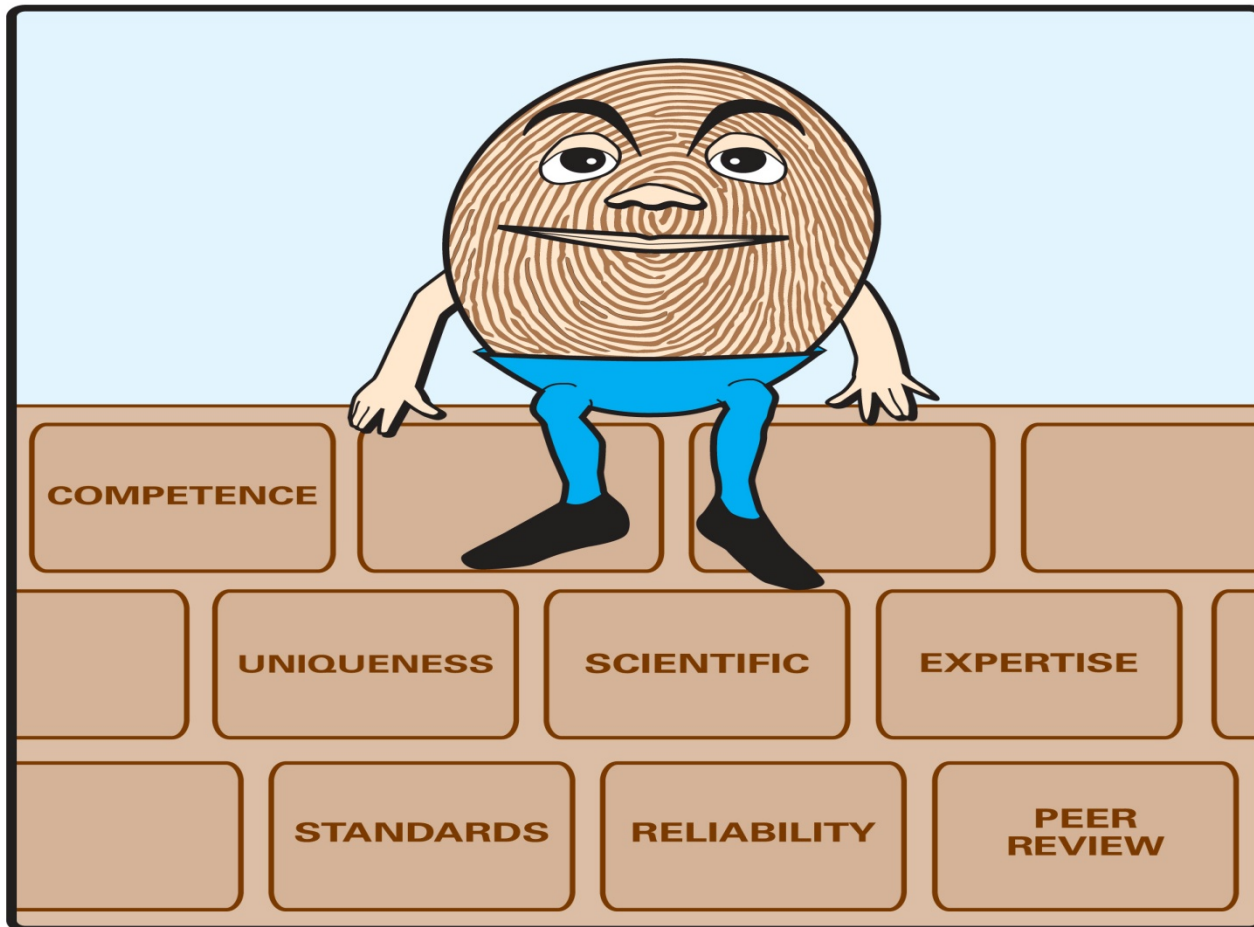
Directorate of Forensic Services

How the MPS is approaching validation.



Directorate of Forensic Services

Validation is not a one off event. It must be a continual process to secure the foundations of fingerprint comparisons



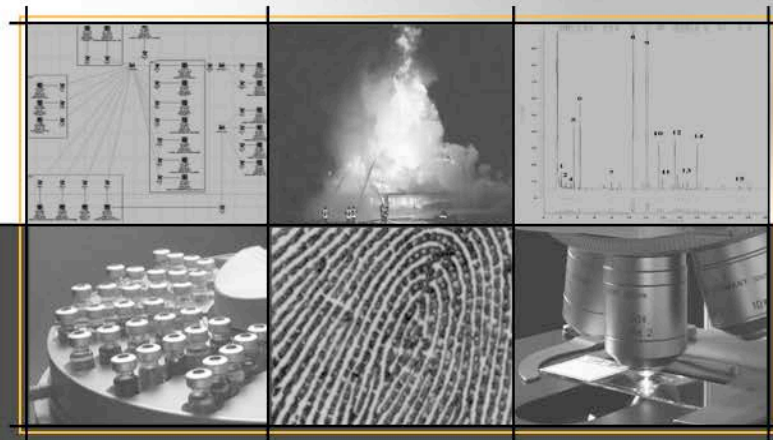
Future Challenges for Fingerprint Identification

Christophe Champod

School of criminal justice

Faculty of law and criminal sciences

University of Lausanne, Switzerland



R. A. Reiss



Quality Managers Conference
Birmingham, March 21, 2013

Objectives of this presentation

- > Offer a **personal view** on the next challenges faced by fingerprint examiners
- > I will leave aside challenges that are currently assessed and dealt with by organisations:
 - > The extent of **documentation** and associated tools for each stage of the protocol.
 - > Mitigating the risks of **contextual bias** (sequential unmasking procedures, blind verification procedure).
 - > The **validation** of fingerprint techniques.

Future Challenges

1. Managing **EU** harmonization
2. Managing the change from “**fact**” to “**opinion**”
3. Managing **differing opinions**
4. Managing the arrival of **statistical models**

ENFSI Fingerprint Working Group Survey 2012



Netherlands Forensic Institute
Ministry of Security and Justice

ENFSI

Status of the practice
and accreditation in
the fingerprint field

Survey 2012 of the
laboratories of the
Fingerprint Working Group of
the European Network of the
Forensic Science Institutes
(ENFSI-EFPWG)

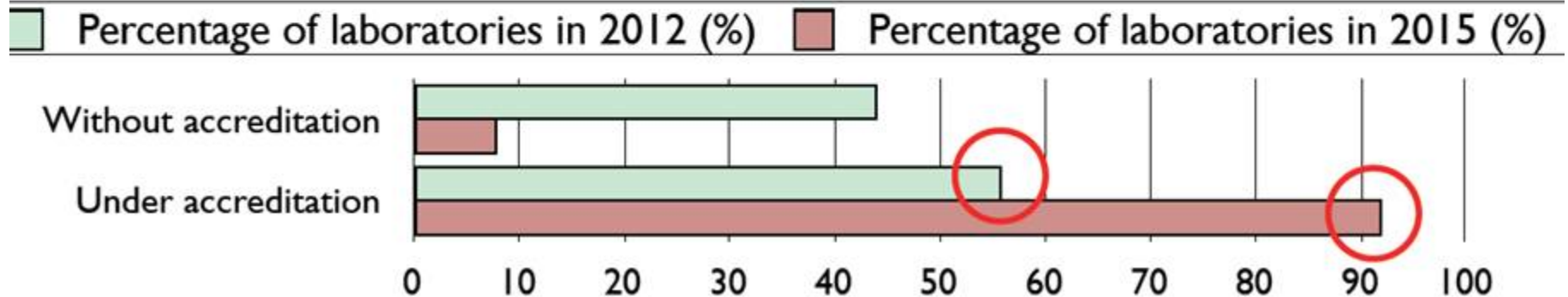
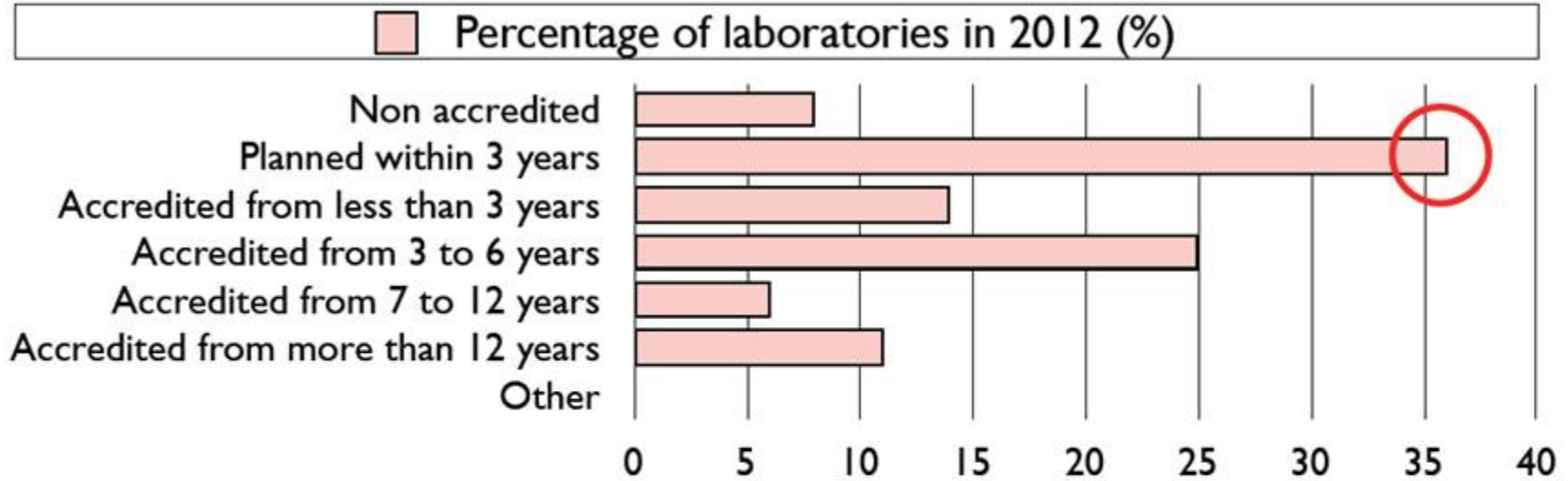
Didier Meuwly, EFPWG quality correspondent

17.10.2012, Lyon 12th ENFSI-EFPWG Annual meeting

- > Complete data can be obtained from Lena Hallberg Lena.Hallberg@skl.polisen.se, secretary of the EFPWG.
- > I shall focus on very few results presented by Didier Meuwly at the 2012 EFPWG annual meeting in Lyon.

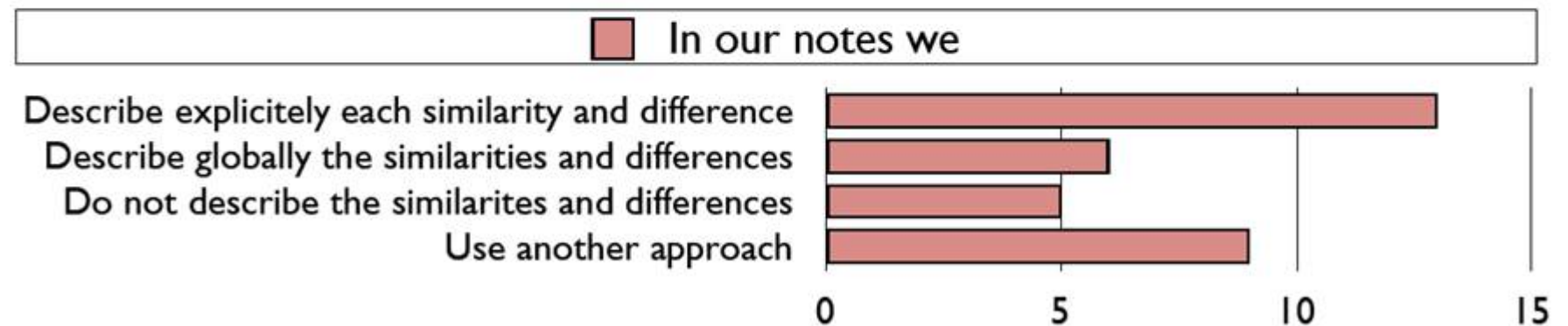
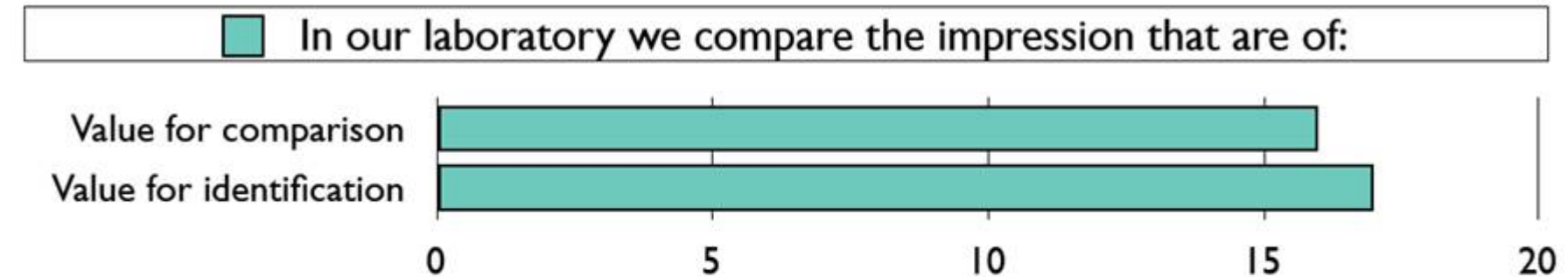
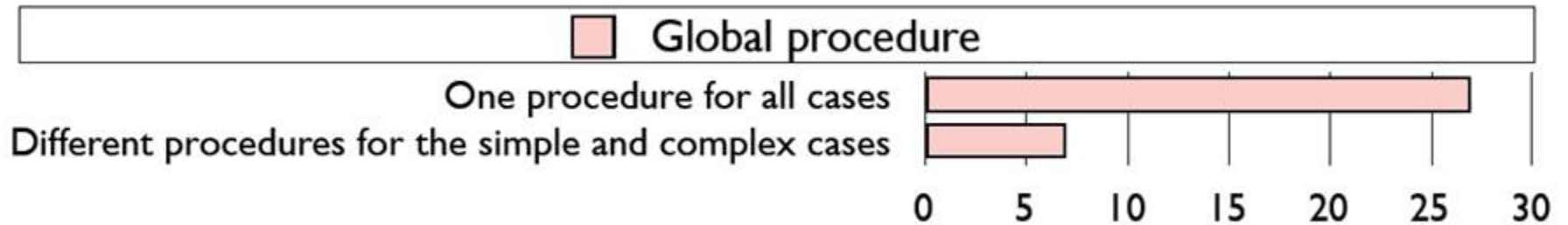
Accreditation (ISO 17025)

[from Meuwly 2012]



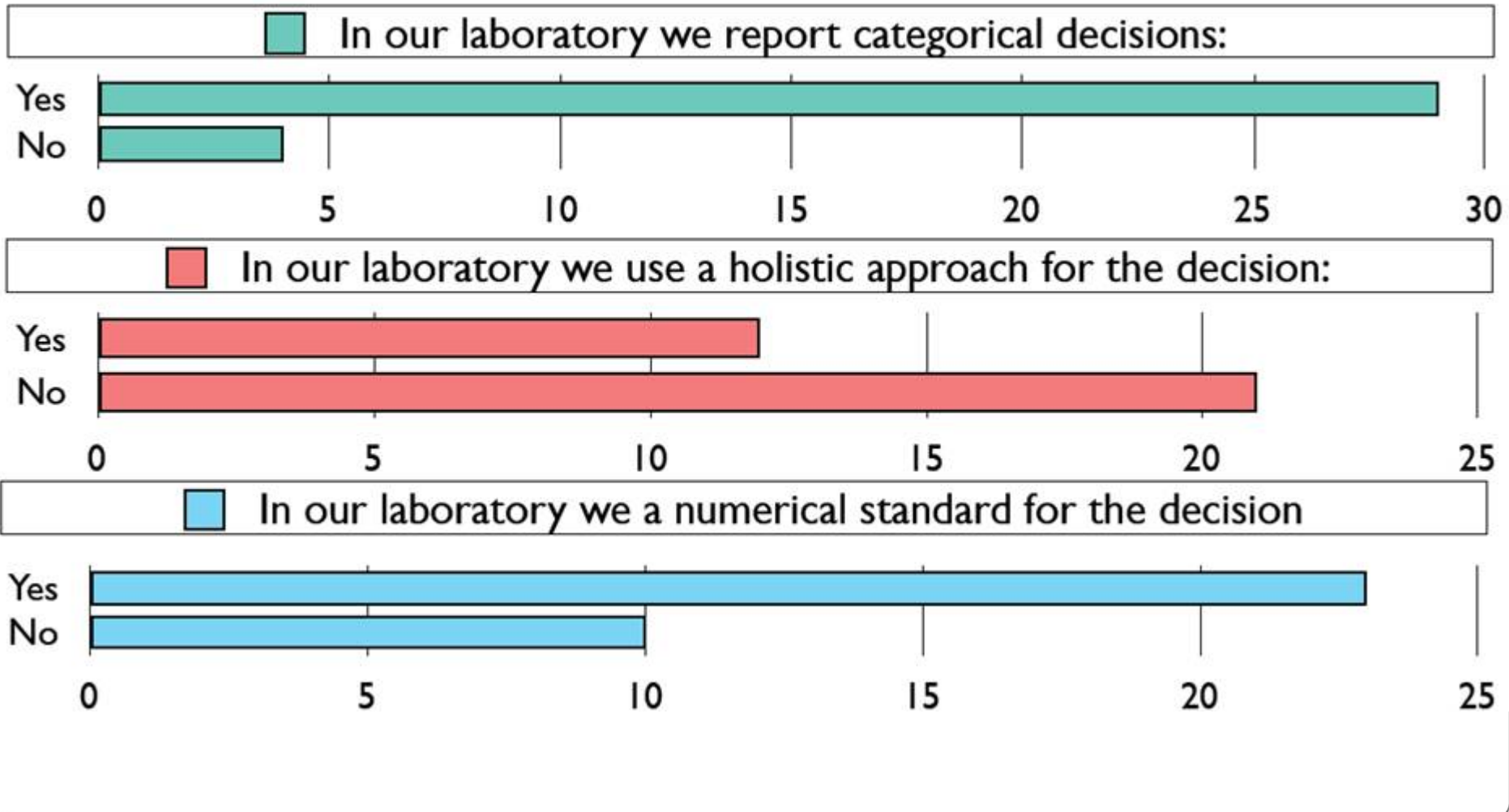
Comparison Stage

[from Meuwly 2012]

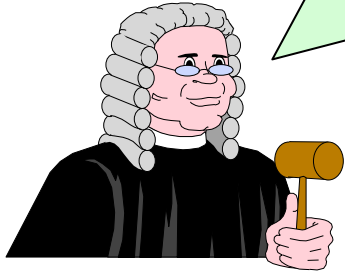


Evaluation stage

[from Meuwly 2012]



Challenge 2: Just an Opinion ?



2.45 - The **decision** whether or not a mark can be individualised is potentially a complex one calling for a series of subjective judgments on the part of the examiner. The **decision** is one of **opinion, not fact.**

A. Campbell, The Fingerprint Inquiry Report. Edinburgh: APS Group Scotland, 2011.

Opinionization

“To begin with, there is a sense in which ‘opinion’ can become an all-encompassing shield that **deflects all accountability.**”

We should require more than mere *ipse dixit*



S.A. Cole, The 'Opinionization' of Fingerprint Evidence, BioSocieties. 3 (2008) 115-113.

Recent changes in reporting

“Individualization of an impression to one source is the **decision** that the likelihood the impression was made by another (different) source is **so remote** that it is considered as a **practical impossibility**”

SWGFAST Document #10 Standard for Examining Friction Ridge Impressions and Resulting Conclusions, Ver. 2.0,

http://www.swgfast.org/documents/examinations-conclusions/121124_Examinations-Conclusions_2.0.pdf

That opens a brand new door on...



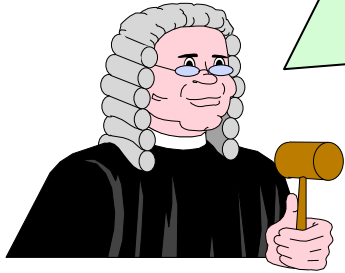
<http://leadershipfreak.files.wordpress.com/2010/03/open-door.jpg>

probabilities

Greener grass,
blue sky, really?



Just an Opinion ?



38.24 - What matters **more than the choice of language** (whether the witness says that he is 'confident', 'sure', 'certain' or 'in no doubt') is the **transparency** of the opinion.

A. Campbell, The Fingerprint Inquiry Report. Edinburgh: APS Group Scotland, 2011.

What do you mean by



A **Decision** ?

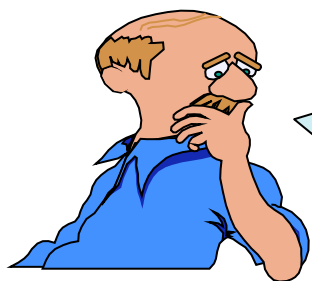
A **likelihood** so remote ?

Practical impossibility ?

I would **not** expect this
on another individual ?

Your **statement** never mention that
adverse probability, why ?

Challenge 2: Transparent opinions



There is an urgent need for fingerprint experts **to understand and to be able to articulate in court and in their statements the probabilistic nature of their decisions.**

Challenge 3: Differing opinions

- > Understanding the concept of “sufficiency” in friction ridge examination

C. Neumann, C. Champod, M. Yoo, G. Langenburg, T. Genessay, NIJ award - 2010-DN-BX-K267

- > Results presented at the annual meeting of the American Academy of Forensic Science, Feb 2013.

Understanding “Sufficiency”

- > 15 comparisons:
 - > 12 pairs latent/control prints from same source
 - > 3 pairs latent/control prints from different sources
- > Information captured through a web-based software designed to support the ACE process (Picture Annotation Software – PiAnoS – <https://ips-labs.unil.ch/pianos/index.html>)
- > Approximately 600 examiners contacted
 - > 145 completed first comparison
 - > 123 completed all 15 comparisons

Sex

- Male
- Female

Expert Status

- Certified Latent Print Examiner (i.e. IAI certified, FBI certified, or other governmental certification)
- Latent Print Examiner - trained to competency and actively working cases
- Latent Print Examiner - trained to competency but no longer actively working cases (e.g. manager, crime scenes only, or other duty that no longer re latent print case work).
- Latent Print Trainee - currently in training and not responsible for reporting out case results.
- Other, please explain:

Years of experience performing Latent Print examinations (you may include your training period).

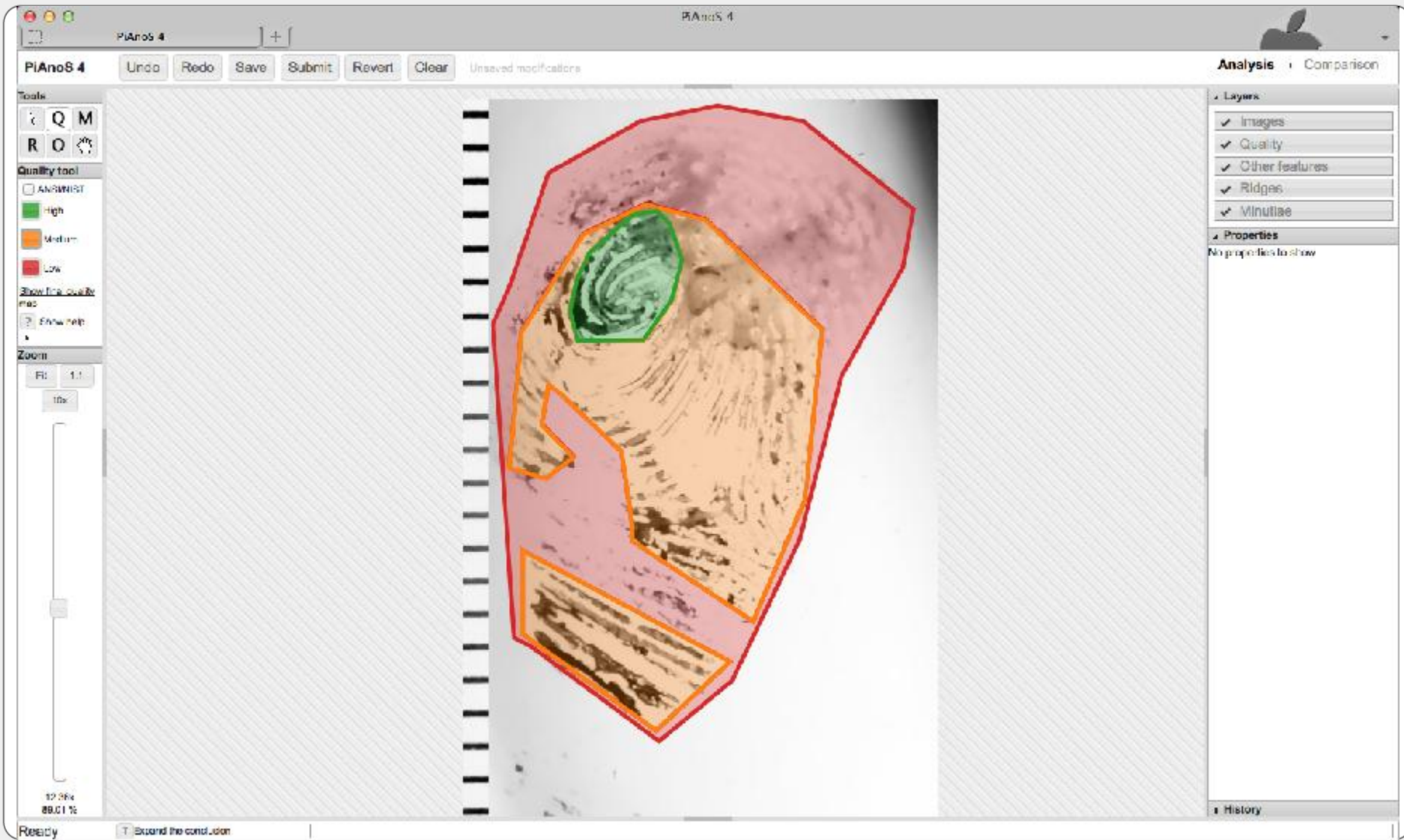
Please select ▾

Approximately how many hours per week would you estimate that you spend analyzing and comparing latent prints?

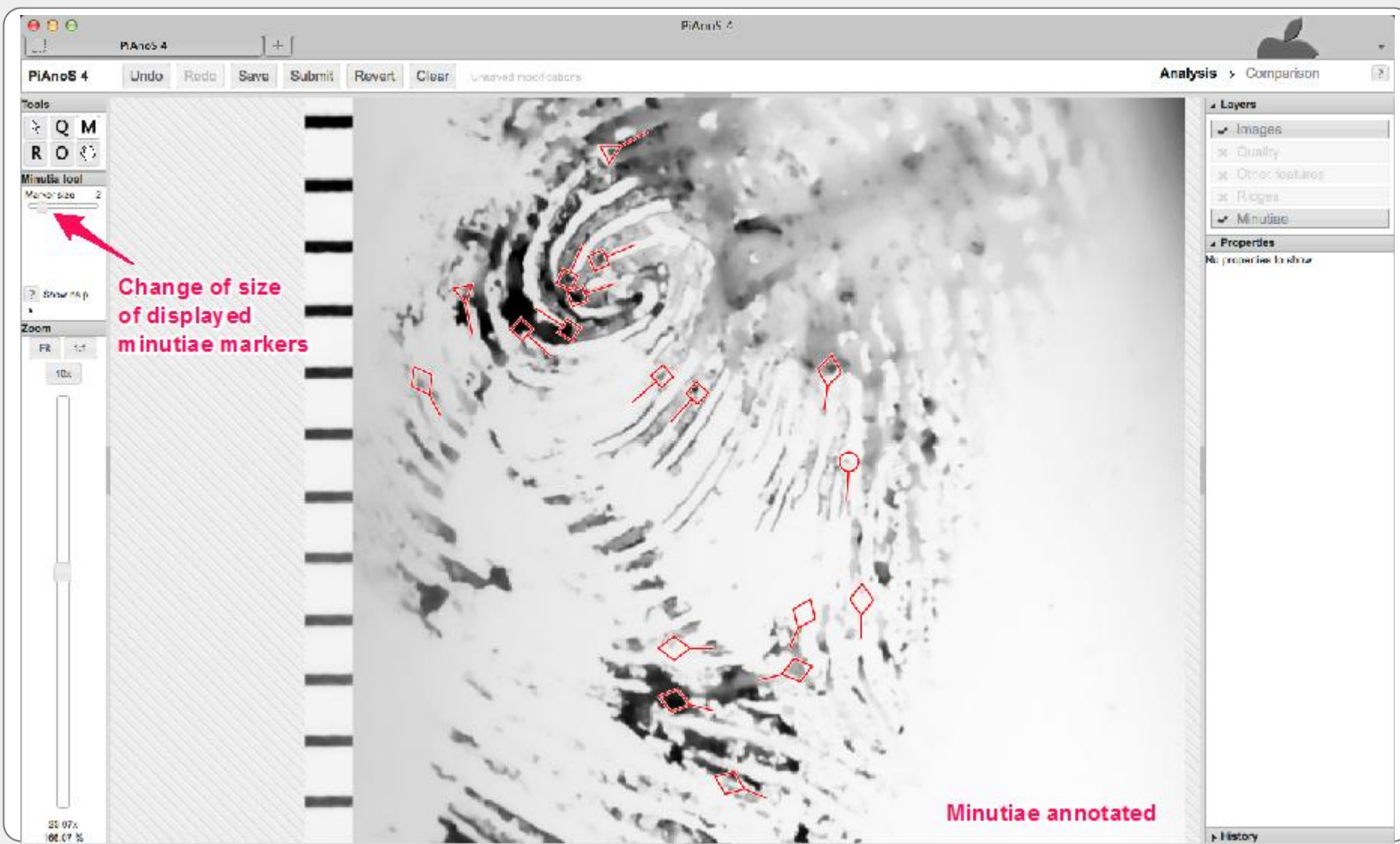
Please select ▾

Approximately how many latent print cases per month would you estimate that you complete?

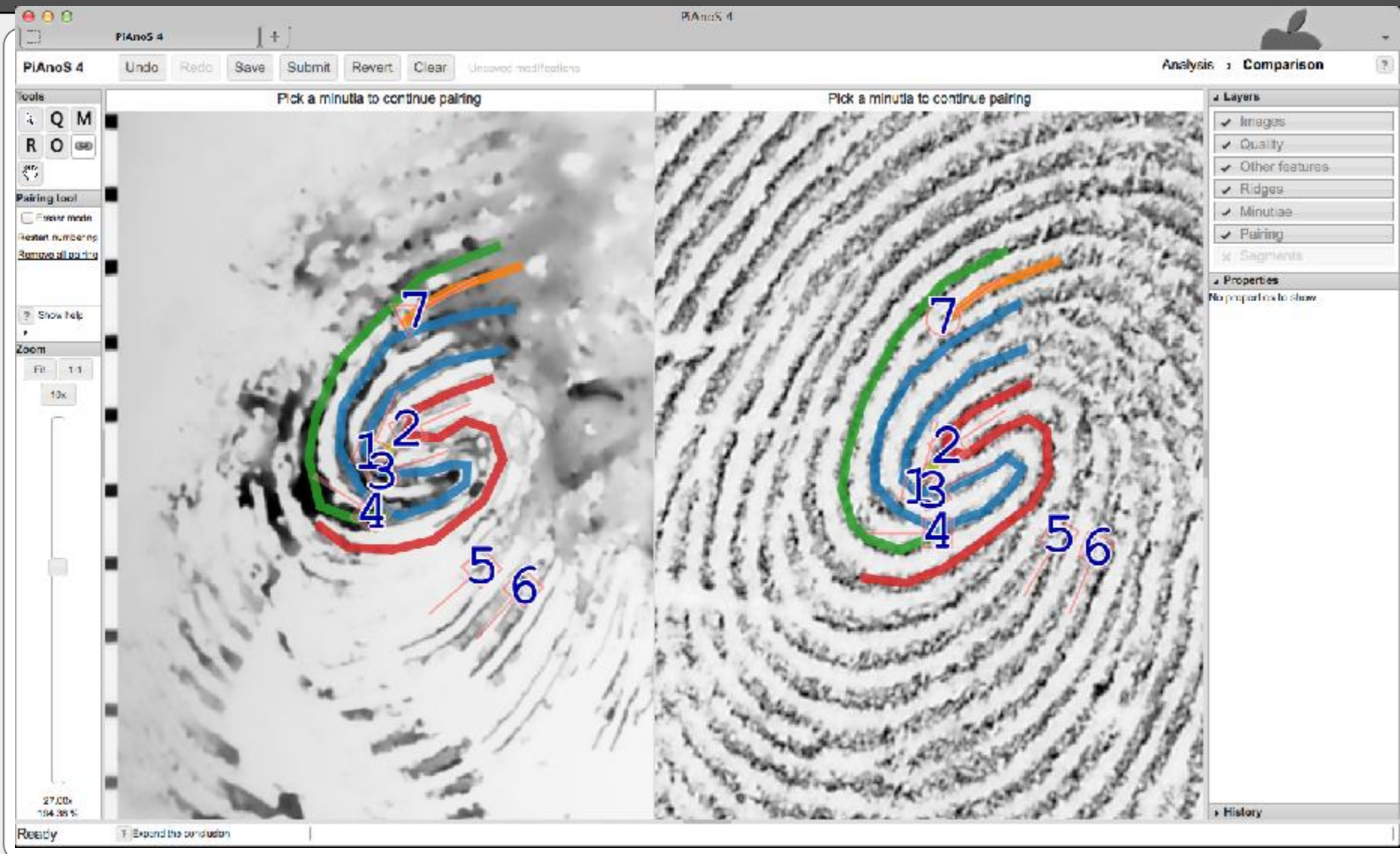
PiAnoS



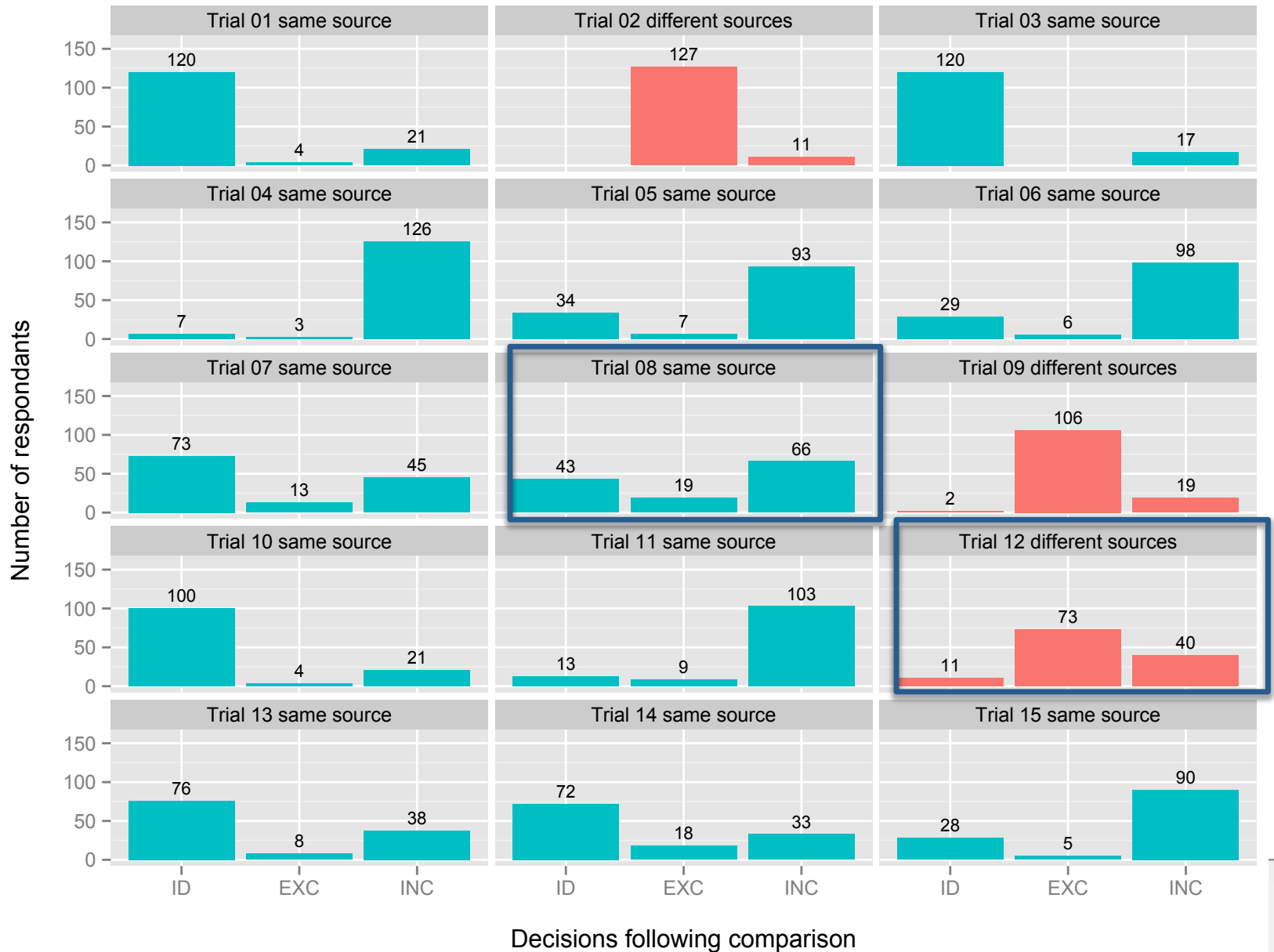
PiAnoS



PiAnoS



“Sufficiency” after the Comparison stage



Trial 8 (same source)



Decision in analysis

- NV
- VID
- VEO

Conclusion

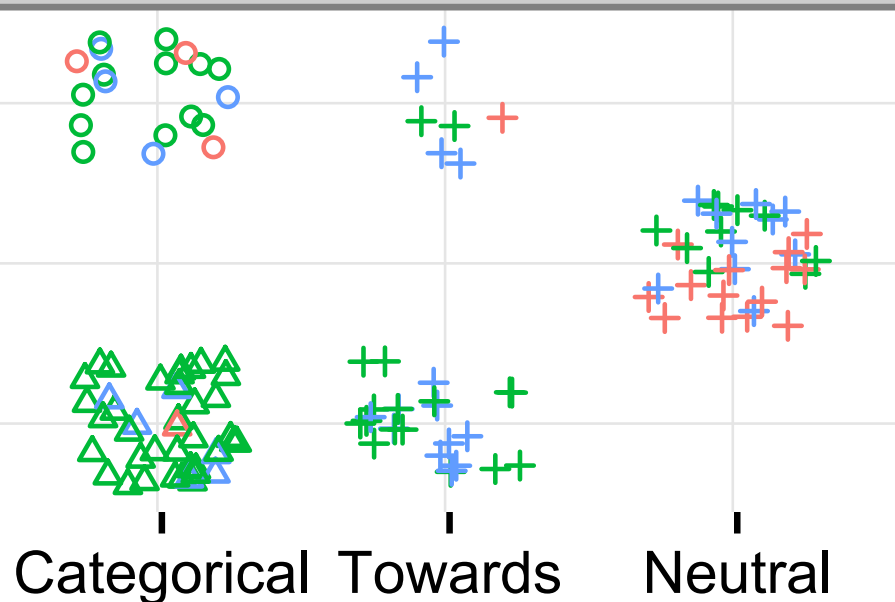
- Exclusion
- △ Identification
- + Inconclusive

Misleading

Neutral

Guiding correctly

Trial 08 same source



Trial 12 (different sources)



Decision in analysis

- NV
- VID
- VEO

Conclusion

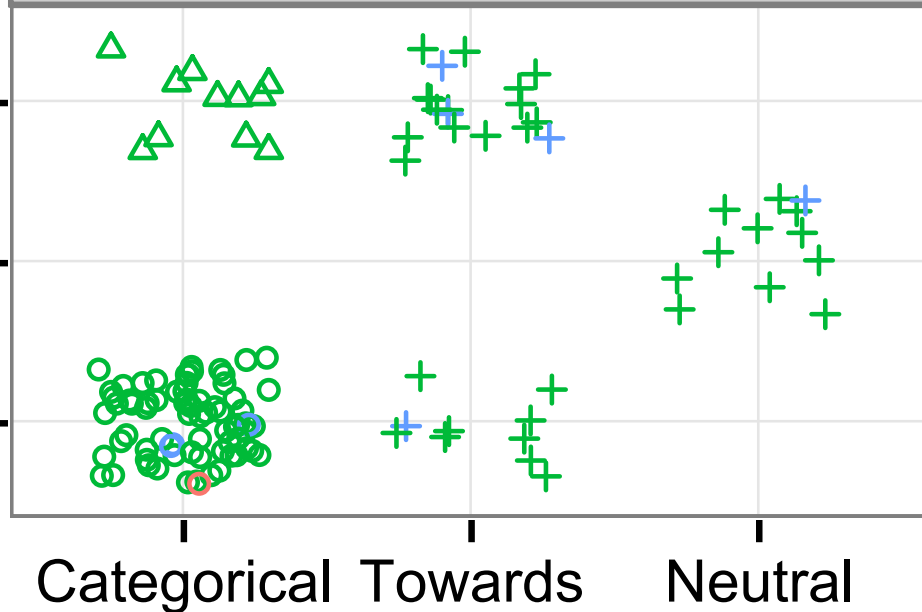
- Exclusion
- △ Identification
- + Inconclusive

Misleading

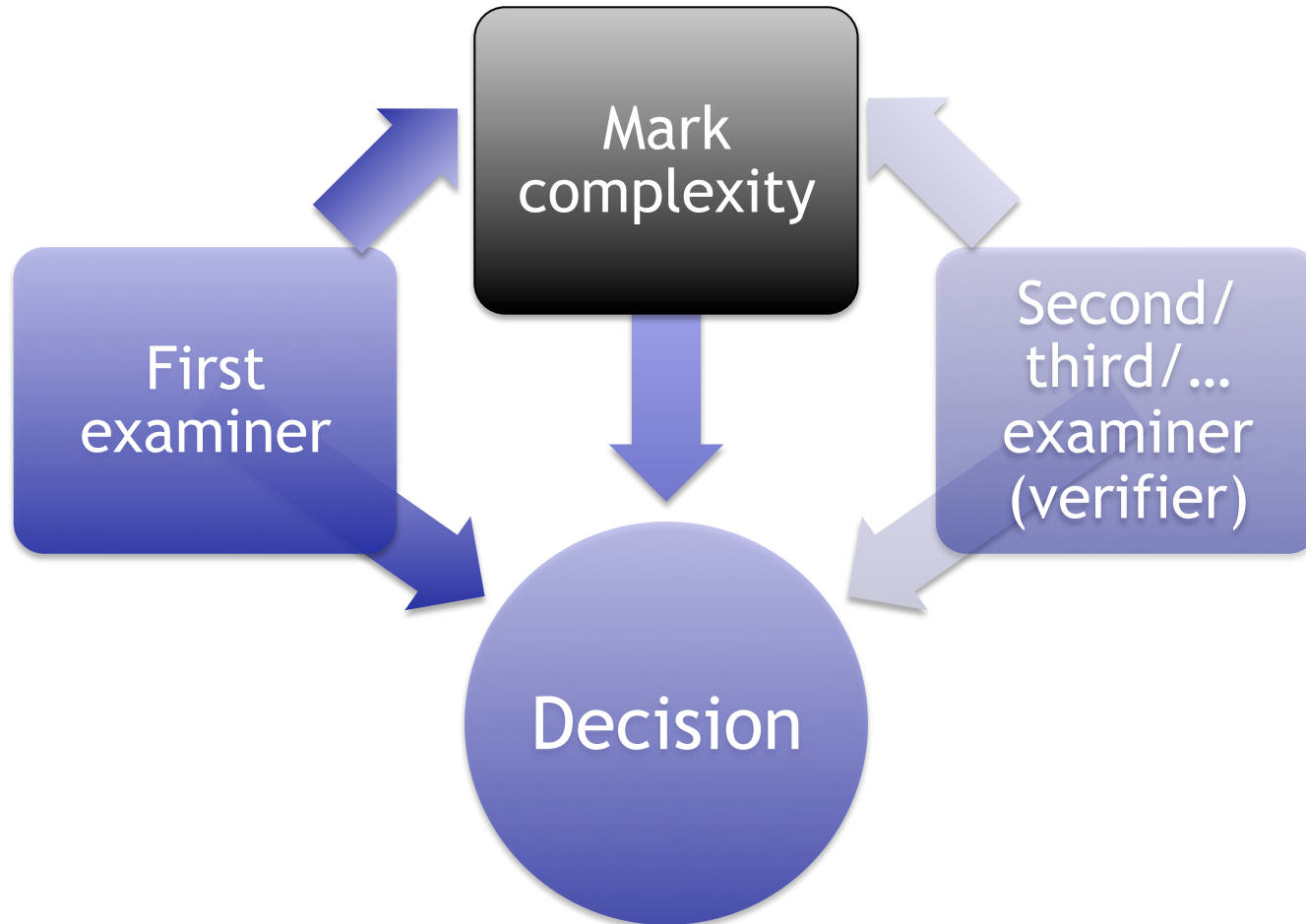
Neutral

Guiding correctly

Trial 12 different sources



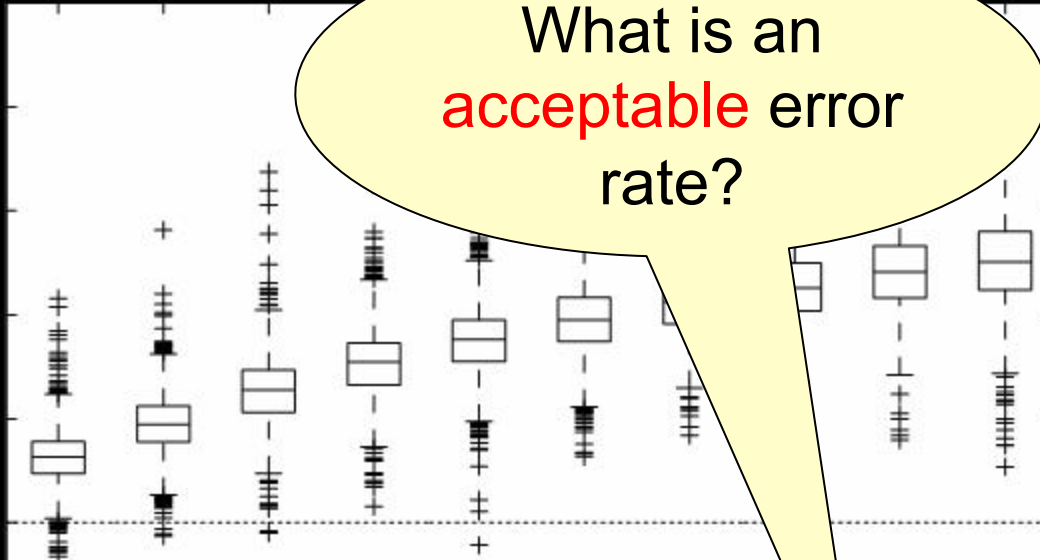
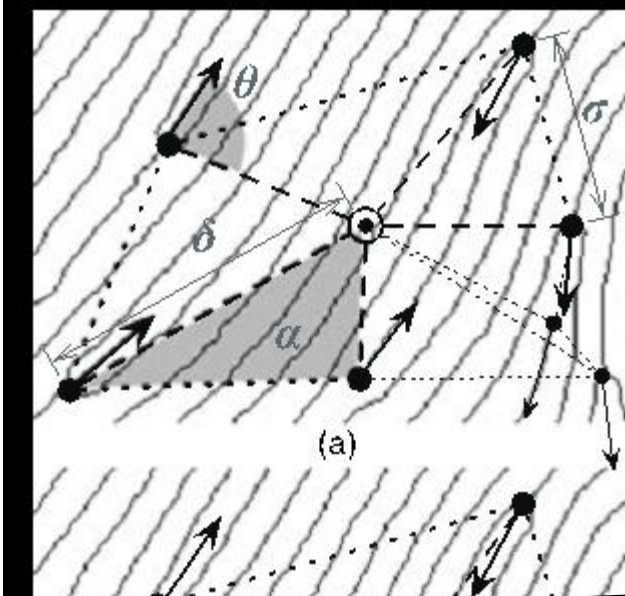
Challenge 3: Differing opinions



Challenge 4: probabilistic models

- > Help assign the weight of evidence to **the whole configuration** without decomposing the contribution of its individual minutiae.
- > The more recent efforts have been successfully presented to the **Royal Statistical Society**: C. Neumann, I. W. Evett, and J. Skerrett, "Quantifying the weight of evidence from a forensic fingerprint comparison: a new paradigm," *Journal of the Royal Statistical Society*, vol. 175, pp. 371-415 (with discussion), 2012.

Neumann & al. (2012)



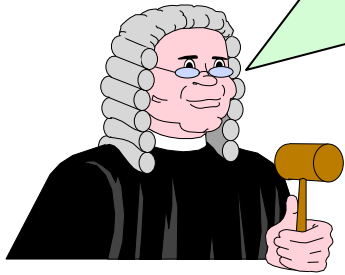
What is an **acceptable** error rate?

To be part of the **accreditation scope**, regardless of its scientific merits, it will require **operational validation**.



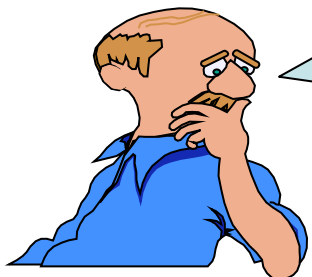
Models can be used in two ways:

41.32 [...] to provide **background data** to assist fingerprint examiners with their evaluation of marks and to enable them to express the strength of their conclusion in a transparent and verifiable manner.



A. Campbell, The Fingerprint Inquiry Report. Edinburgh: APS Group Scotland, 2011.

Backing up examiners ?



We need to precisely define **how these “experts” will operate.**

A set of **SOPs** need to be drafted before any operational implementation

To embrace it, I need to **understand** and **trust** the model

I need to be able to **explain** its **meaning** and **limitations**

Models are **inevitable** in the future

I may want to **identify** **regardless of the number** given by the model

As in DNA, **probabilities** **will be asked** by both prosecution and defence

Pilot joint project



Unil

UNIL | Université de Lausanne

Institut de police scientifique

MATCH PROBABILITIES IN FINGERPRINT COMPARISON

The situation we want to handle

My opinion is that the mark has been **identified** to the right thumb of Mr X.

The probability for the mark to originate from someone else is **so small** that I consider it to be a **practical impossibility**.

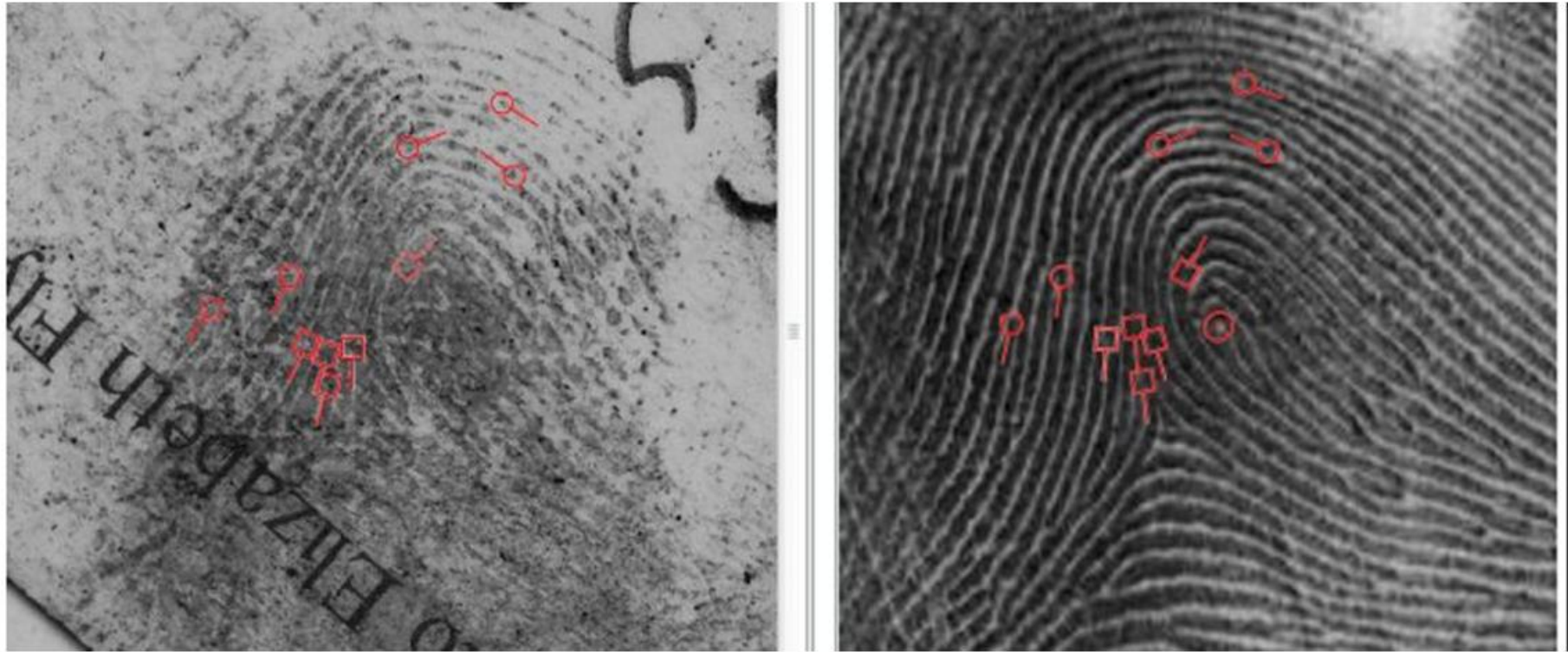
We submitted your case a statistical analysis through the **University XYZ, Prof S. Tat**

The LR obtained is $1.8e+6$, that amounts to a **match probability of $5.6e-7$**

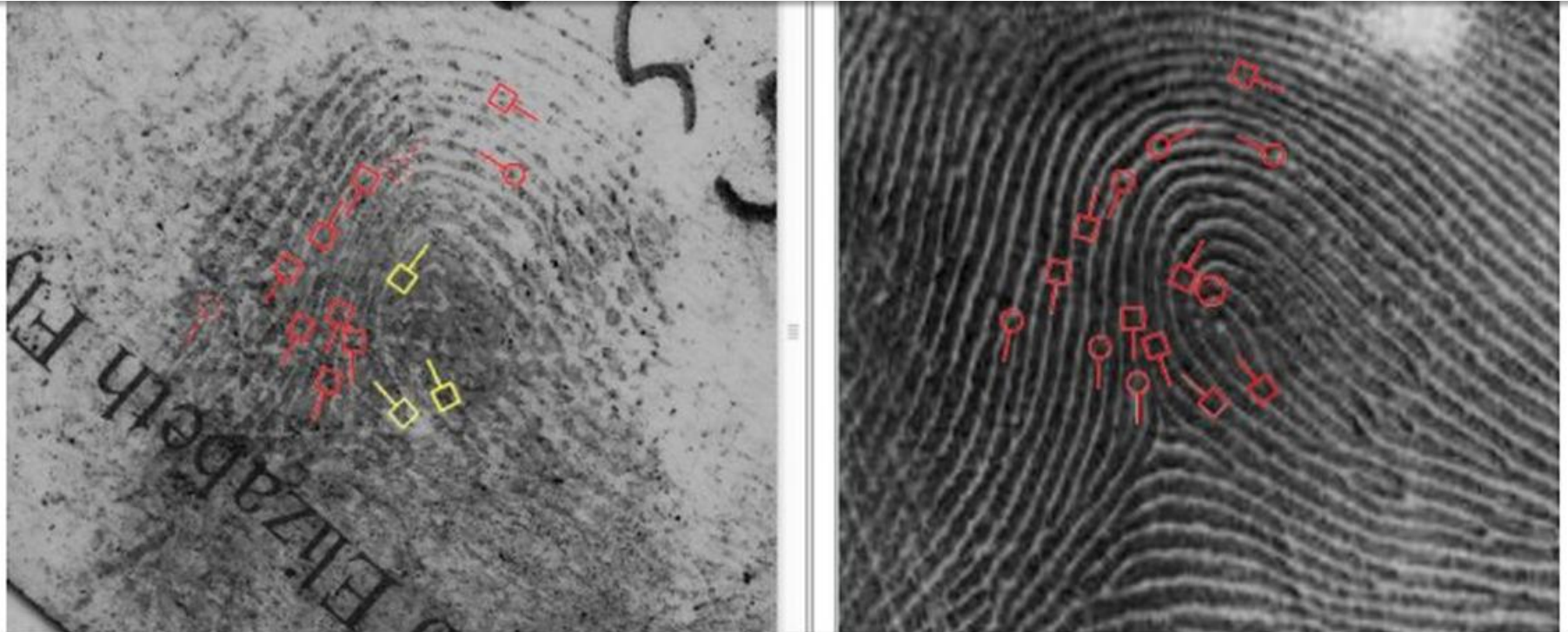
How do you get from a **match probability of $5.7e-7$** to an **identification**?



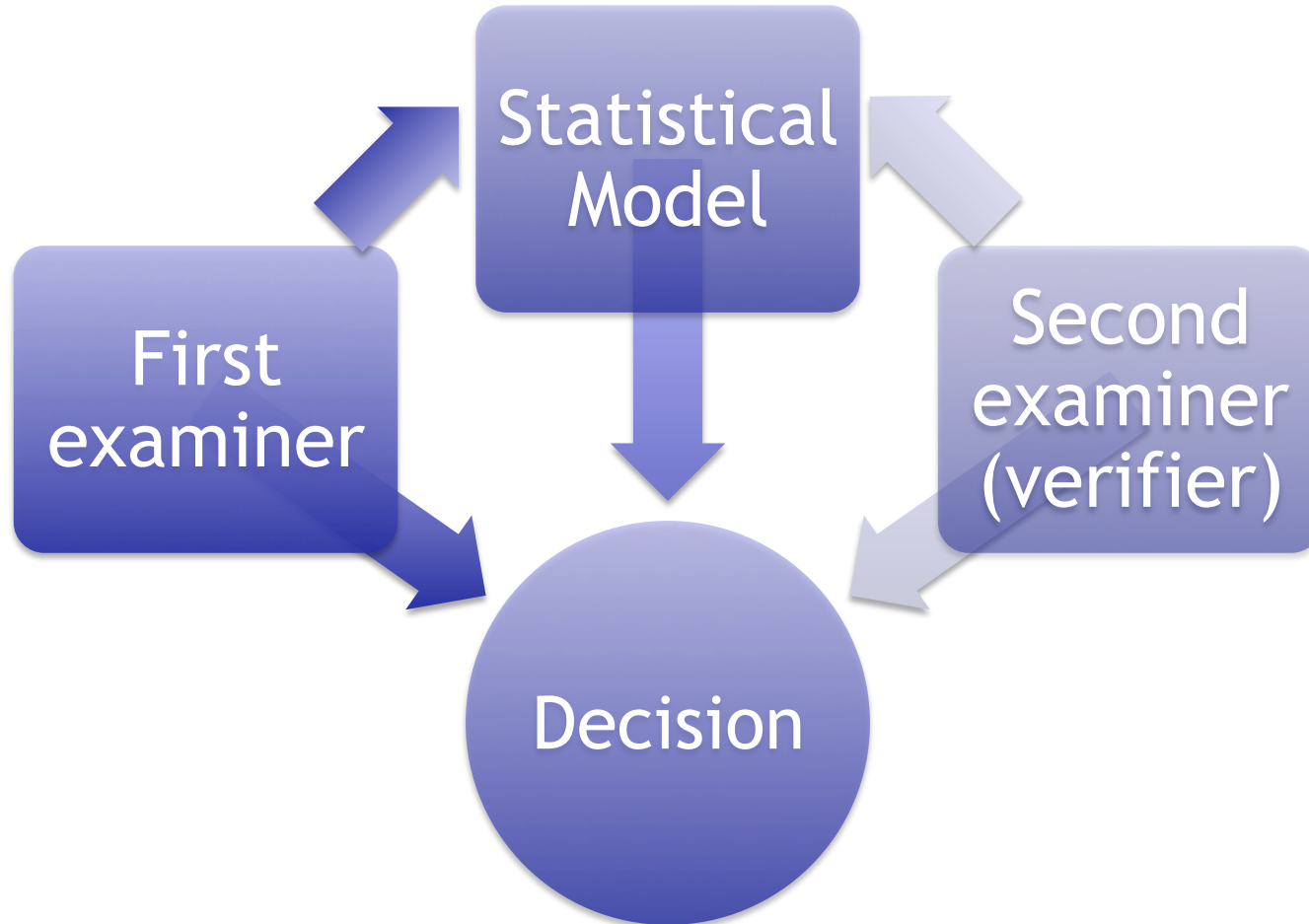
Expert 1 (LR = 5.8e10⁵)



Expert 2 (LR = 9.6e10¹⁰)

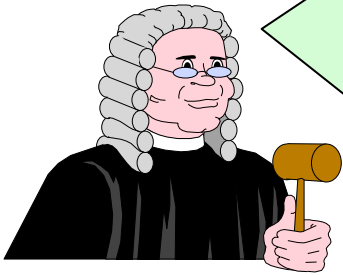


Conflict resolution procedures



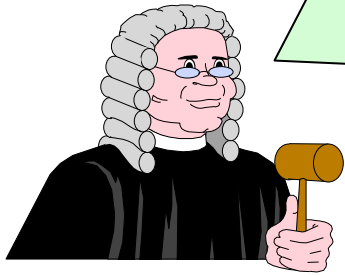
Models can be used in two ways:

41.33 [...] the possible application of probabilistic analysis to comparisons that examiners **would otherwise consider to be inconclusive**, the objective being to produce evidence that could be used in court of the probability of a match.



A. Campbell, The Fingerprint Inquiry Report. Edinburgh: APS Group Scotland, 2011.

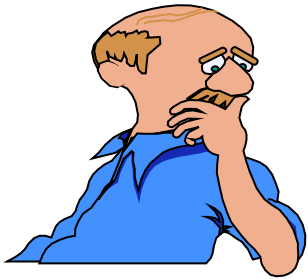
“Unable to exclude” cases



38.84 - Before a finding of ‘unable to exclude’ is led in evidence, careful consideration will require to be given to (a) the **types of mark** for which such a finding is meaningful and (b) the **proper interpretation** of the finding. An examiner led in evidence to support such a finding will require to give a **careful explanation** of its limitations.

A. Campbell, The Fingerprint Inquiry Report. Edinburgh: APS Group Scotland, 2011.

Saying more than “inconclusive”



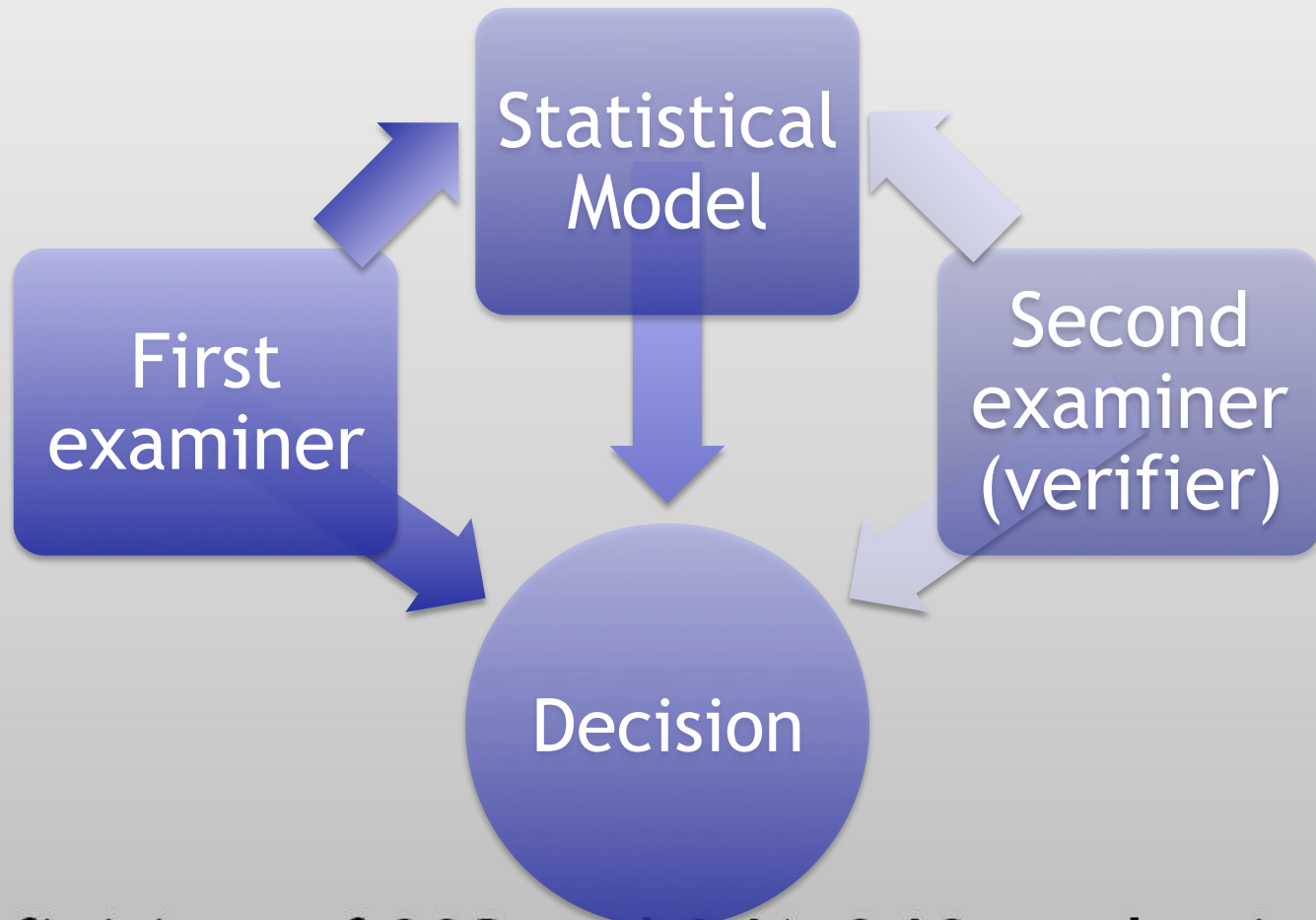
Again, we need to precisely define **the scope of usage**

Very useful source of **additional information**, either as evidence or for intelligence purposes

The statistics may convey **more weight than it deserves**

We don't want to **mislead** anyone

Challenge 4: Probabilistic models



Definitions of SOP and Q/A-Q/C mechanisms

Contact details

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