



**Forensic Science Regulator**  
*O v e r s e e i n g   Q u a l i t y*

## **QUALITY MANAGERS CONFERENCE**

**4<sup>th</sup> February 2014**

**Birmingham**

<https://www.gov.uk/government/organisations/forensic-science-regulator>

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# Agenda

## Morning plenary

10:45	Welcome	June Guinness OBE
10:50	Australian Standards Framework	Dr Linzi Wilson-Wilde
11:15	DNA contamination - a global issue	Dr Ingo Bastisch
11:45	A review: forensic quality standards framework	Andrew Rennison
12:00	Quality Standards	Jonathan Vaughan

## Breakout sessions

Fingerprints	Chair: Gary Pugh OBE	Unexpected item in the reporting area	Chair: Dr. Roger King
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## Afternoon plenary

15:50	The court dependence on the quality of forensic science	HHJ Andrew Goymer
16:15	Forensic Science Regulation	Prof. Bernard Silverman
16:20	Closing remarks	Andrew Rennison



**Forensic Science Regulator**

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# Morning plenary

# ANZPAA NIFS

## “THE AUSTRALIAN STANDARDS FRAMEWORK”

Dr Linzi Wilson-Wilde OAM

2014



# FORENSIC SCIENCE STANDARDS GLOBALLY



# ISSUES AND RISKS



## DUPLICATION

Duplication of procedures between forensic science laboratories



## NO AGREEMENT

Lack of agreed formal standards across LEAs & forensic science agencies



## CONSISTENCY

Forensic Standards would help ensure that methodologies and training is consistent across jurisdictions



## RISK

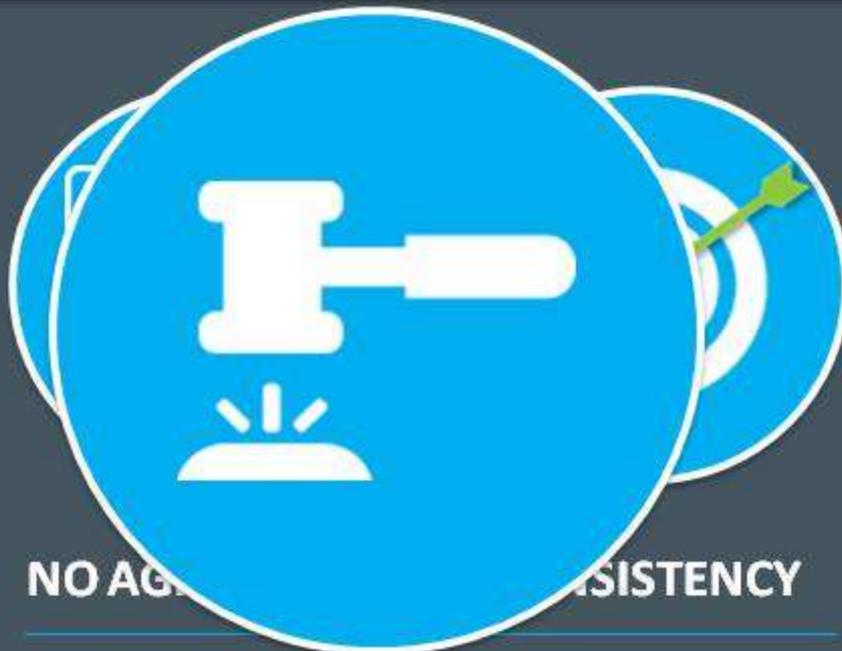
Significant risk that forensic standards will be developed without stakeholder involvement

# ISSUES AND RISKS



## DUPLICATION

Duplication of procedures between forensic science laboratories



## NO AGREED STANDARDS / INCONSISTENCY

Lack of agreed forensic standards across LEAs & forensic science agencies  
Forensic standards would help ensure that methodologies and training is consistent across jurisdictions  
This has led to variations in practice between different laboratories which threatens reliable justice outcomes



## RISK

Significant risk that forensic standards will be developed without stakeholder involvement

# PURPOSE OF STANDARDS

1

## GUIDANCE

Standards provide guidance

PURPOSE

2

## PRODUCTS & SERVICES

Ensure they are reliable  
Perform consistently to an expected level  
Provide confidence in their outcomes

3

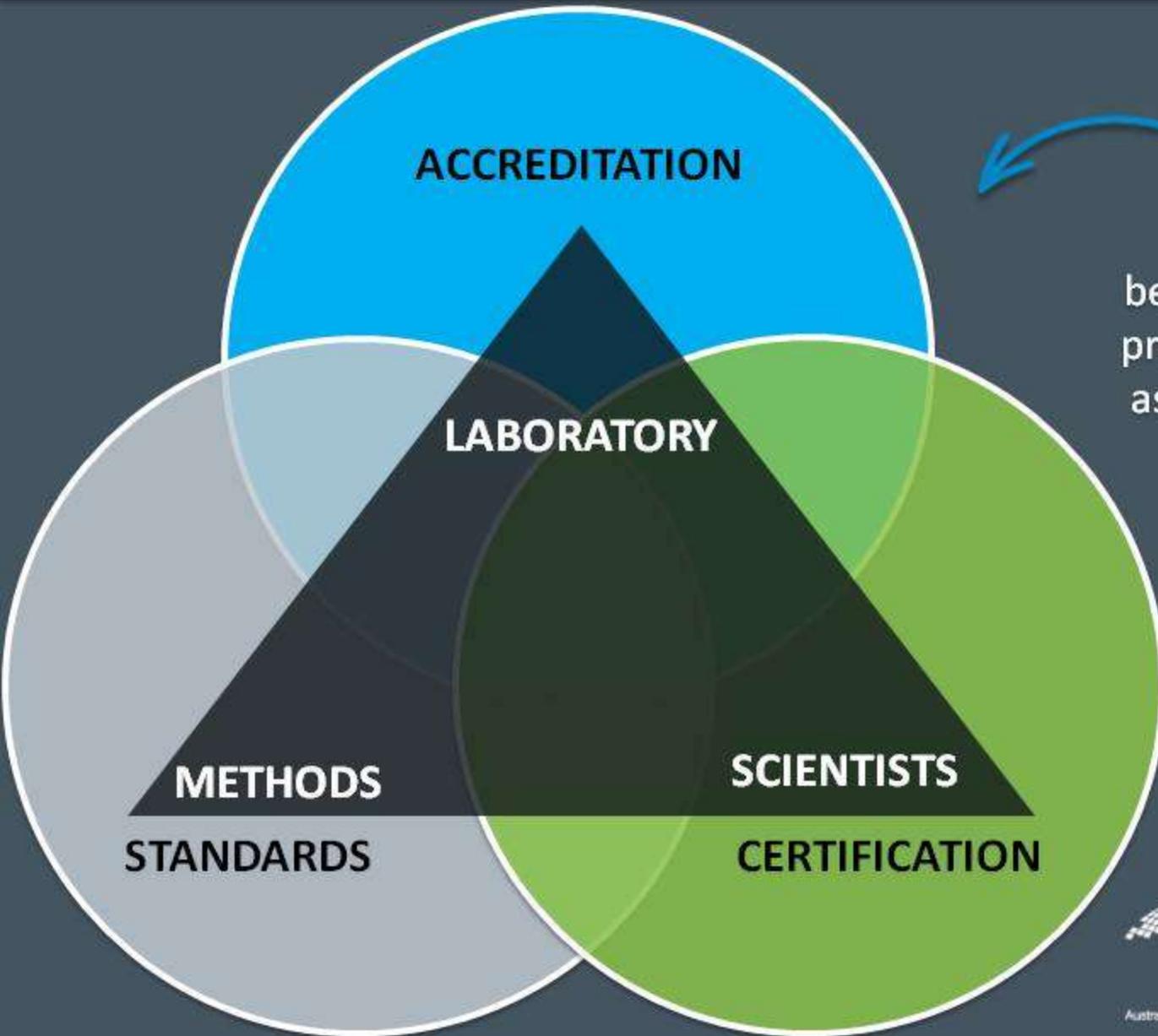
## REVIEWED

Regularly reviewed to keep pace  
with new technologies

# FORENSIC STANDARDS **BENEFITS**

- 1** Consistency of practice and procedures
- 2** Defined reliability and quality criteria
- 3** Ensure standard practices across agencies
- 4** Acceptable in a judicial setting
- 5** Provides additional guidelines for accreditation
- 6** Provides judicial confidence in laboratories

# FORENSICS AND THE QA PROCESS



The relationship between the forensic processes and quality assurance processes

# KEY OBJECTIVES

- 1** Do not replace procedure documents, laboratory methods or forensic facility policies
- 2** Engage key stakeholder groups to ensure transparency and acceptance
- 3** Resolve competing interests to maximise consensus
- 4** Practitioners determine the appropriate method to apply to a particular forensic process

“

# AUSTRALIAN PROCESSES AND LESSONS LEARNT

”

# WHAT STAKEHOLDERS UNDERSTAND

**1** Standards development rules

**2** Terminology

**3** Takes longer than you think

**4** More complicated than you think

**5** Always things you did not think of

**6** It is a compromise

# WHAT STAKEHOLDERS **DO NOT** UNDERSTAND

**1**

**Standards development rules**

**2**

**How to comment**

**3**

**What a standard is**

“

# CASE STUDY

## THE SEATBELT LIFECYCLE

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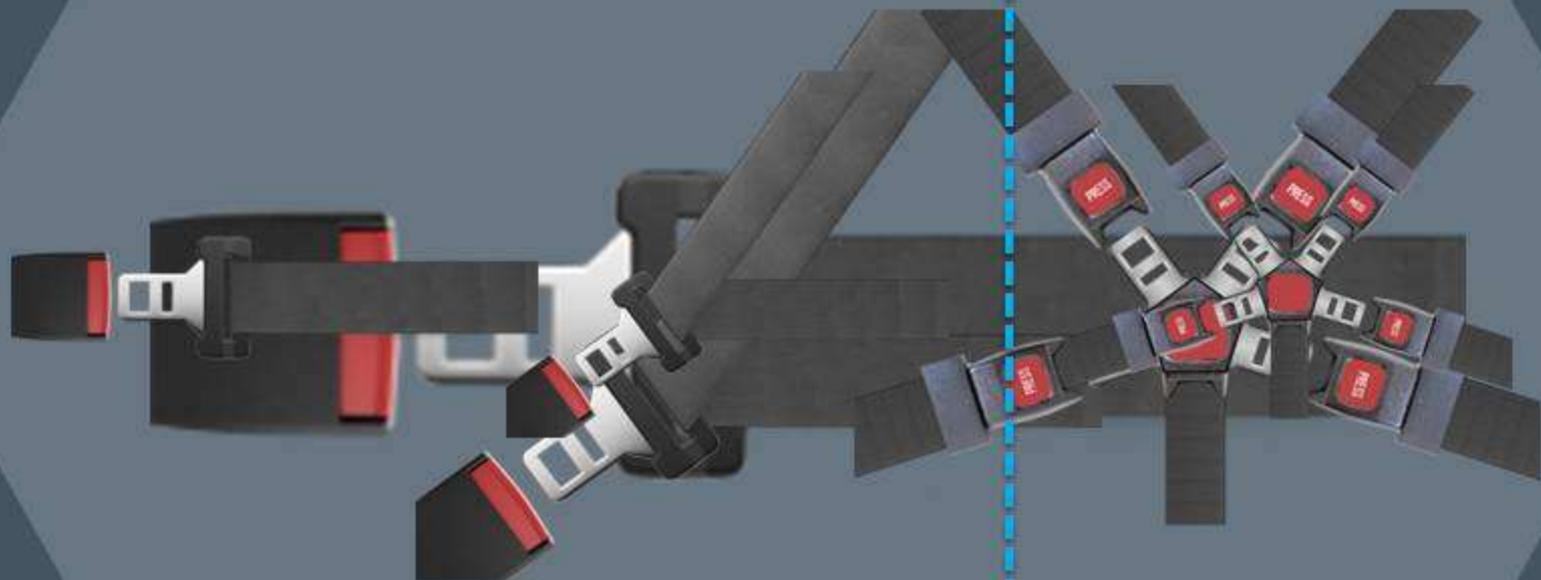




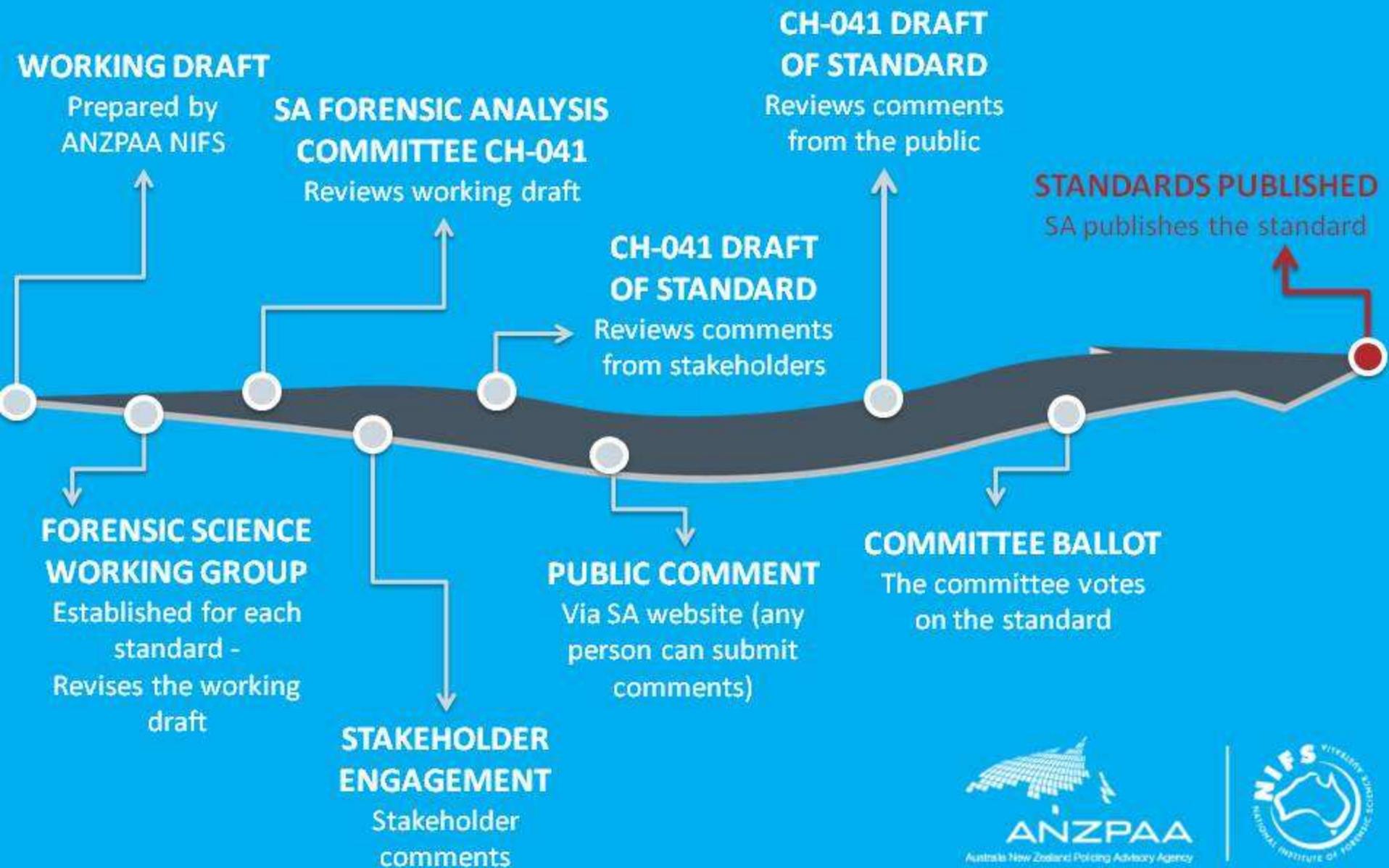


# THE CHALLENGE

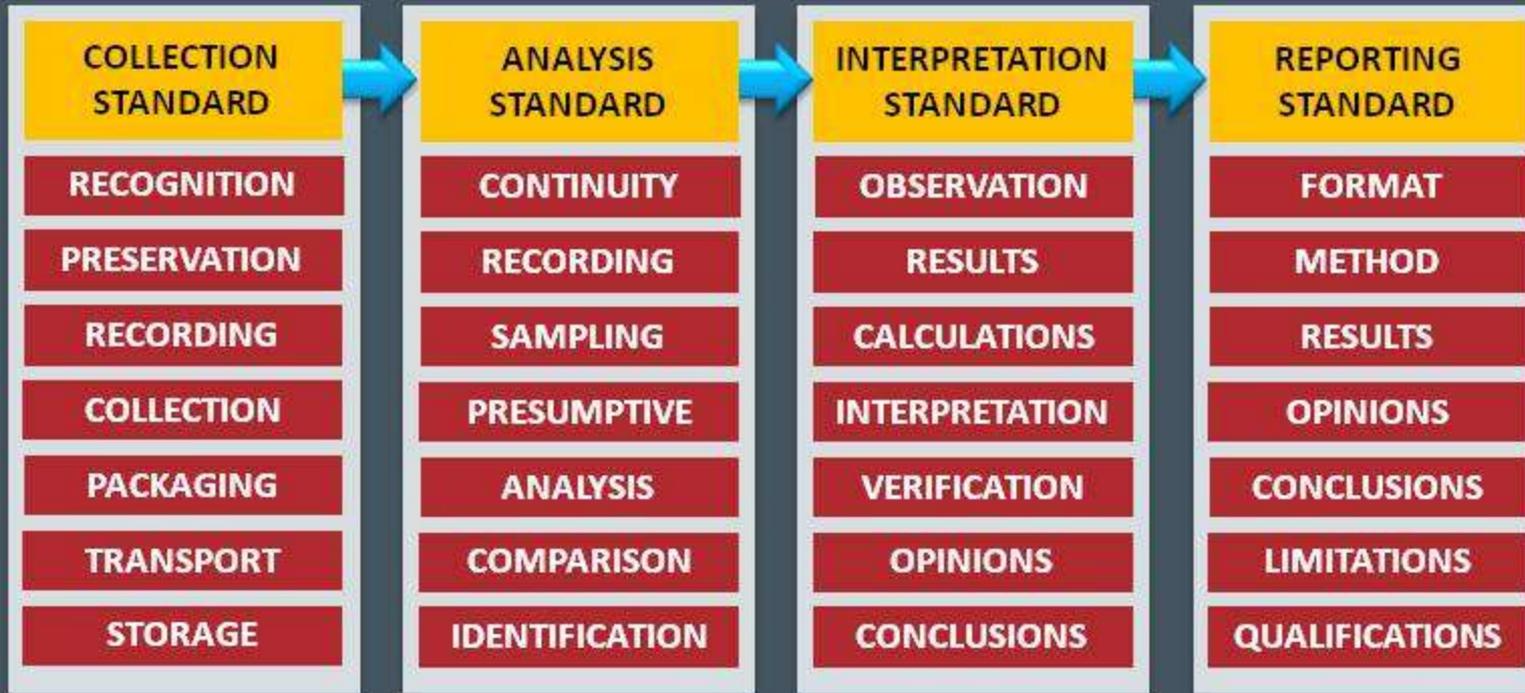
THE STANDARD BAR



# AUSTRALIAN FORENSIC STANDARDS PROCESS



# AUSTRALIA'S STANDARDS FRAMEWORK



The 'core' forensic standards cover the universal aspects of forensic science practice

## DISCIPLINE SPECIFIC STANDARDS

SPECIFICATIONS FOR PRODUCTS USED TO COLLECT AND ANALYSE BIOLOGICAL MATERIAL

EXAMINATION OF IGNITABLE LIQUIDS IN FIRE DEBRIS



“

# FORENSIC ANALYSIS THE CORE STANDARDS

”

# COLLECTION STANDARD



## RECOGNITION

Recognising and preserving material of forensic interest

## RECORDING

Recording and collection of material from a scene

## EQUIPMENT

OH&S, packaging and labelling

## TRANSPORTATION

Transport, storage and security of material

## STORAGE

Storage requirements for different types of material

# ANALYSIS STANDARD



## TESTING

Presumptive and preliminary tests

## ACCEPTANCE

Acceptance and rejection of physical material for analysis

## CONTINUITY

Item continuity: management and security

## RECORDING

Recording material received

## EXAMINATION

Order of examination and preservation of evidence

## SAMPLING

Representative and sub samples – statistical sampling

## METHODOLOGY

Analysis and examination of physical material

## IDENTIFICATION

Method selection, comparative testing and recording results

# INTERPRETATION STANDARD



## PRINCIPLES

Defines underpinning principles, highlights professional judgement, technique limitations

## TRANSFORMING

Transforming data and observations into information that may be reported as results

## REVIEW

Review of information (results) and opinions

## INTERPRETATION

Presumptive and preliminary tests

## FORMULATION

Estimating probability and inconclusive opinions

## OPINIONS

Review of opinions

## REPORTING

Reporting of results

# REPORTING STANDARD



## GENERAL

General considerations concerning the scope and format of reports

## CASE FILE

Case file technical and administrative review

## FORMATTING

Formatting of reports

## REPORTS

Considers issue and control of reports

## CONTENTS

Guidance on report contents; Limitations; Reporting of opinions, facts and results

## OPINIONS

Guidance on reporting of investigative, evaluative, definitive, qualified and inconclusive opinions

## CHARACTERISTICS

Class and individual characteristics

## REVIEW

Report and testimony review

[www.anzpaa.org.au](http://www.anzpaa.org.au)



# DNA contamination – a global issue



**Dr. Ingo Bastisch**

Head of the human DNA laboratory at the BKA

**Birmingham, 04 Feb 2014**

# The evidential value of a DNA profile

	Stain	
<b>SE33</b>	28,2	29,2
<b>D21S11</b>	28,0	31,0
<b>VWA</b>	17,0	18,0
<b>TH01</b>	9,3	9,3
<b>FGA</b>	22,0	22,0
<b>D3S1358</b>	17,0	18,0
<b>D8S1179</b>	12,0	13,0
<b>D18S51</b>	13,0	14,0
<b>D1S1656</b>	15,0	16,3
<b>D2S441</b>	10,0	11,0
<b>D10S1248</b>	14,0	15,0
<b>D12S391</b>	21,0	22,0
<b>D22S1045</b>	15,0	15,0
<b>D16S539</b>	11,0	13,0
<b>D2S1338</b>	23,0	27,0
<b>D19S433</b>	14,0	15,0

Likelihood ratio that a person with this profile was the donor of that stain compared to a random unrelated person

$$LR = 2,8 \times 10^{21}$$

Or 1 in about 1 sextillion persons

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# The evidential value of a mixed DNA profile

	Stain			
SE33	28,2	29,2	17,0	25,2
D21S11	28,0	31,0	28,0	31,0
VWA	17,0	18,0	14,0	16,0
TH01	9,3	9,3	7,0	9,3
FGA	22,0	22,0	24,0	26,0
D3S1358	17,0	18,0	15,0	16,0
D8S1179	12,0	13,0	12,0	13,0
D18S51	13,0	14,0	12,0	15,0
D1S1656	15,0	16,3	13,0	16,0
D2S441	10,0	11,0	14,0	15,0
D10S1248	14,0	15,0	12,0	15,0
D12S391	21,0	22,0	18,0	19,0
D22S1045	15,0	15,0	11,0	16,0
D16S539	11,0	13,0	9,0	10,0
D2S1338	23,0	27,0	20,0	23,0
D19S433	14,0	15,0	14,0	15,0

Likelihood ratio that a person with this profile was the donor of that mixed stain compared to two other random unrelated persons

$$LR = 1,03 \times 10^{11}$$

Or 1 in about 100 billion persons

**Loss in evidential value:  
A factor of 10 billion**

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# The evidential value of a mixed DNA profile but one identified as contamination

	Stain		Contamination	
SE33	28,2	29,2	17,0	25,2
D21S11	28,0	31,0	28,0	31,0
VWA	17,0	18,0	14,0	16,0
TH01	9,3	9,3	7,0	9,3
FGA	22,0	22,0	24,0	26,0
D3S1358	17,0	18,0	15,0	16,0
D8S1179	12,0	13,0	12,0	13,0
D18S51	13,0	14,0	12,0	15,0
D1S1656	15,0	16,3	13,0	16,0
D2S441	10,0	11,0	14,0	15,0
D10S1248	14,0	15,0	12,0	15,0
D12S391	21,0	22,0	18,0	19,0
D22S1045	15,0	15,0	11,0	16,0
D16S539	11,0	13,0	9,0	10,0
D2S1338	23,0	27,0	20,0	23,0
D19S433	14,0	15,0	14,0	15,0

Likelihood ratio that a person with this profile and the contaminant were the donors of that mixed stain compared to random unrelated person and the contamination

$$LR = 1,53 \times 10^{19}$$

Or 1 in about 10 pentillion persons

**Loss in evidential value:  
A factor of 100**

	LR	LR
Single stain	$2,8 \times 10^{21}$	2,800,000,000,000,000,000,000
Mixed stain contamination known	$1,53 \times 10^{19}$	15,300,000,000,000,000,000
Mixed stain contamination not detected	$1,03 \times 10^{11}$	103,000,000,000

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# Last year's presentation

## Forensic consumables: Reducing the Risk

Dr Kevin Sullivan

Forensic Science Regulator's Quality Managers Conference  
1st March 2012

FOR PRIVATE CIRCULATION ONLY

Draft PAS 377:2012

### Draft PAS 377:2012

#### Specification for consumables used in the collection, preservation and processing of material for forensic analysis

Requirements for product, manufacturing and  
forensic kit assembly

#### Draft 2.1 for SG meeting

This is a working draft and must not be circulated beyond the Steering Group

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PAS 377 Draft 2.2\_post SG meeting (03.02.12) SG 1 © BSI and Home Office 7-Feb-12

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## This year

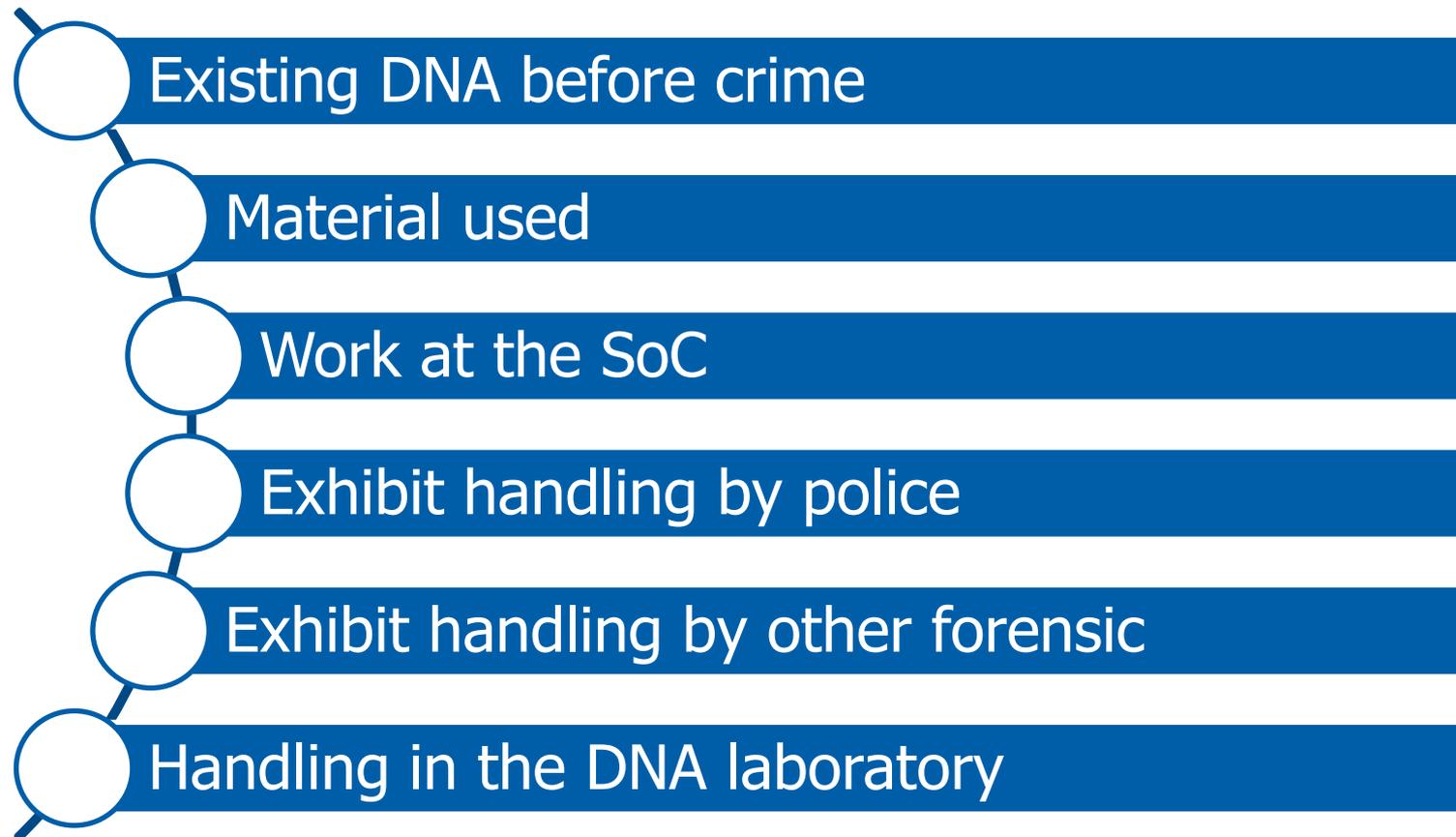
- Staff/police elimination
- ISO Standard 18385  
„Minimizing the risk of contamination in products used to collect and analyse biological material for forensic DNA purposes“
- Cooperation with the International Commission on Missing Persons (ICMP) regarding
  - International manufacturer database
  - International database for unsourced profiles
- How we deal with it in Germany

## A study...

- In 2009 a study by a German police office
- Checking unmatched touch DNA profiles in the database
- Collection of samples from officers involved
- About 30 % of those profiles could be matched to an officer involved in sample collection
- Is this an exception????

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# Better question: Which parts of the process have a risk of contamination



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## But why?

- Touch samples help law enforcement regularly to find the right perpetrator
- But often nothing or only little material is collected
- Any contamination will be detected
- Especially when using the newest typing kits

# Measures

- Easiest: Use better material
- More problematic: Handling of items
  - Lack of precaution
  - Lack of knowledge
  - Lack of training
- Even if this is solved one can never avoid and it should not be regarded as inappropriate work
- Only way to deal with it is to discover

# Solution is detection

- Not all gaps in the process can be closed
- Need to compare to profiles of staff involved  
(this should also include all staff who have access to areas where evidence is handled, stored or processed otherwise)
- Best is automatic comparison to a regional staff elimination database

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# ISO Standard 18385

- Minimizing the risk of contamination in products used to collect and analyse biological material for forensic DNA purposes
- More detailed than PAS 377 and internationally accepted
- Will reduce risks of contamination **but not eliminate them**

# Monitoring for contaminations by the manufacturing process

- The Forensic Science Service had two databases:
  - Manufacturer elimination database
  - Database for unsourced profiles
- Discussion already with FSS in order to find global solution
- International Commission on Missing Persons (ICMP) programmed web-database search tool for accessing both
- FSS unsourced profile database was already transferred to ICMP

# The German model for dealing with potential contaminations

- Some introduction first

16 States

16 State Crime Investigation offices (LKA)

Federal Crime investigation office (BKA)

40-50 labs

1 central database

Data owned by submitting state



# Investigation of stain-stain matches

- Every high profile crime or
- 5 matches in high volume crime
- Check for contamination of lab or police personnel
- Check for investigative value
- Check for manufacturer based contamination
- 2 levels of checks
  - 1st within investigation/within laboratory
  - 2nd discuss jointly if not solved on 1st level

# Summary

- Contaminations take place
- Do not ignore
- Implement measures to prevent
  - Equipment
  - Training
- Implement measures to detect
- In addition implement a follow up of scene-to-scene serial matches if not linked otherwise

# Thank you for your attention

Ingo Bastisch

BKA (Federal Criminal Police Office)

 [ingo.bastisch@bka.bund.de](mailto:ingo.bastisch@bka.bund.de)

 +49 611 55-16030



# Forensic Science Regulator

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Review

Andrew Rennison M.Sc.

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# Context

- DNA expansion programme
- Neoliberal policies
- Europe
- Expert witnesses
- National Academy of Sciences
- Government spending



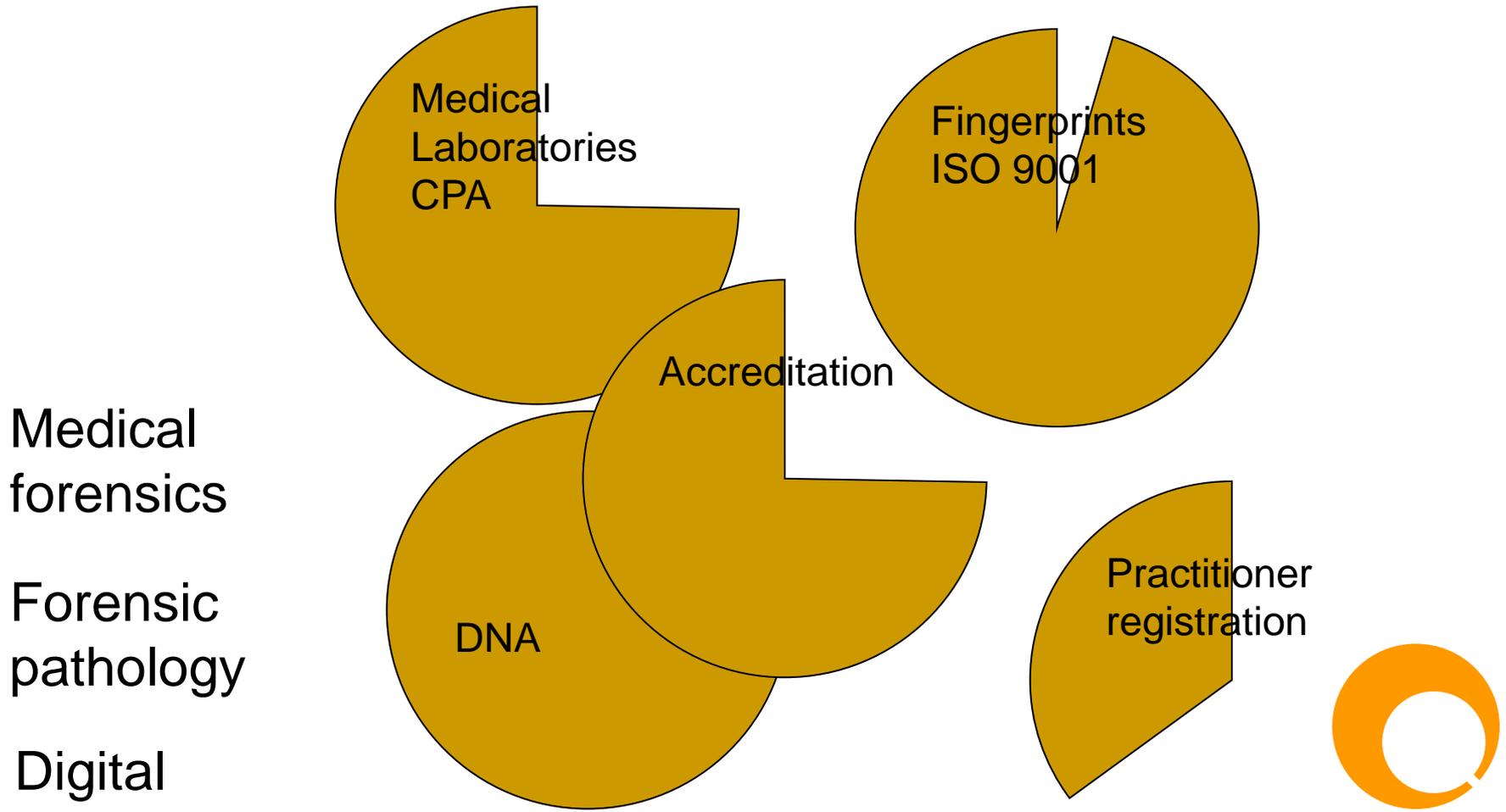
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# Background

- Quality failings
- Royal Commission
- Reviews
- House of Commons Science and Technology Committee
- Commercial market



# Standards 'ad hococracy'



# Regulating quality

- Competent organisation
  - Competent practitioners
  - Reliable and valid methods
  - Impartiality
- Compliance mechanism (UKAS)
  - Guidance and standards
  - Professional bodies



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# Standards framework

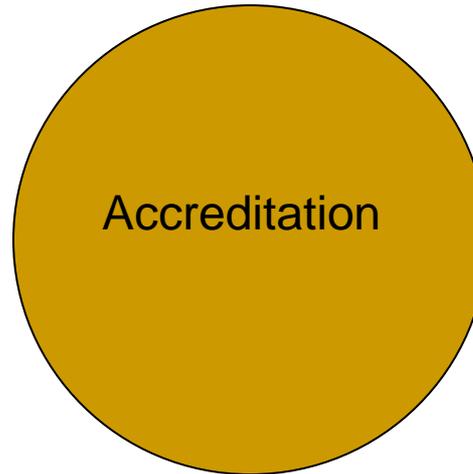
Forensic  
pathology

Professional  
bodies

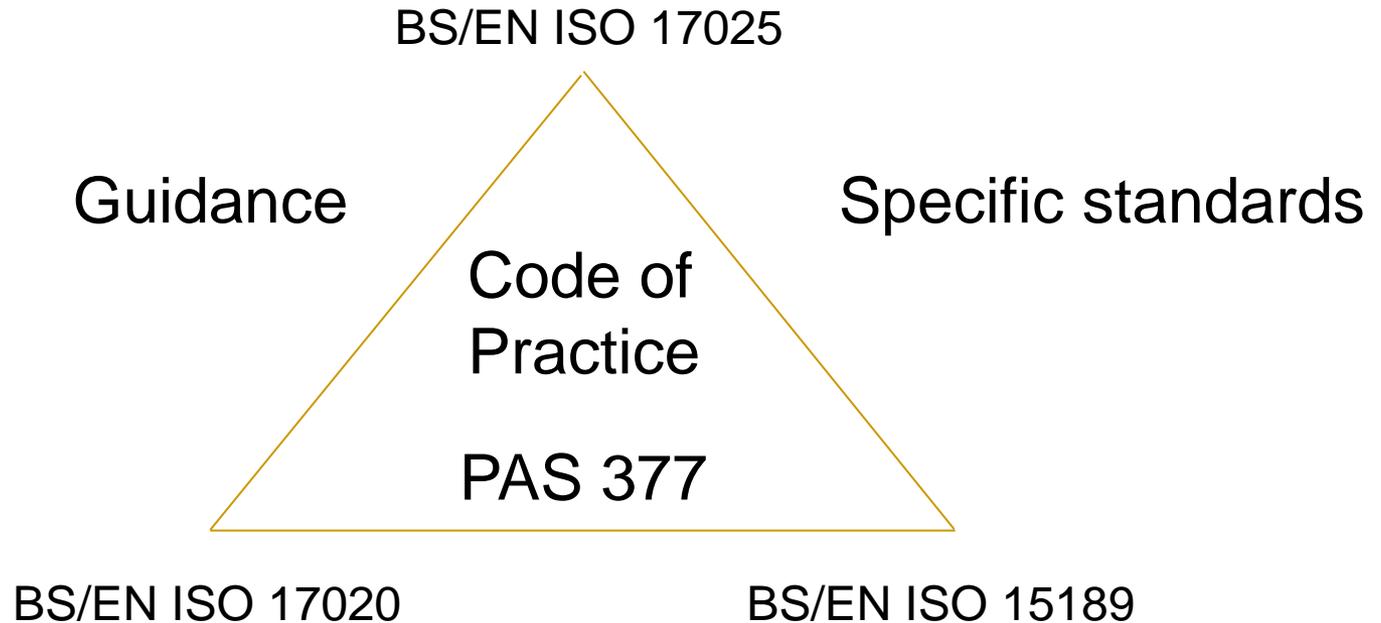
Codes of practice

British standard for consumables

Guidance



# Standards framework



BS PAS 377:2012 Specification for consumables used in the collection, preservation and processing of materials for forensic analysis. Requirements for product, manufacturing and forensic kit assembly.



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# Professional bodies

- Royal College of Pathologists
- Royal College of Physicians  
(Faculty of Forensic and Legal Medicine)
- Royal Anthropological Institute
- Forensic Science Society
- Fingerprint Society
- Institute for Archaeologists
- UK and Ireland Association of Forensic Toxicologists
- UK Association of Forensic Nurses



# Codes of practice 2013 / 14

- Fingerprints
- Crime scenes
- Contamination
- Digital / video
- Fire scenes
- Evidence interpretation
- Shoe marks
- Firearms discharge residue
- Human contact trace – BPA
- Drugs
- Entomology
- DNA
- Firearms
- Fibres
- Tool marks
- Medical
- Nuclear
- Exhibit handling





Home Office

# Quality Standards

# Accreditation Landscape

Forensic Area	Number of Forces Accredited	Seeking Accreditation Applications (Predicted Date)
DNA	28	[3] Cheshire (Feb14), Hampshire (Feb14), North Wales (April 14)
Fingerprint Enhancement Lab	10	[7] Dyfed-Powys (Feb 14), Avon & Somerset (March 14), Norfolk/Suffolk (April 14), Devon & Cornwall (May 14), West Yorkshire (Nov 14), City of London (Jan 15)
Other-Footwear, drugs, glass & ballistics	6	[8] Cheshire (Footwear-Feb14), Bedfordshire/Hertfordshire/Cambridgeshire (Footwear-March 14), West Yorkshire/North Yorkshire/South Yorkshire/Humberside (Footwear-May 14)

# Achievements

- Improved working methods
- A network of Quality Managers
- Auditing (UKAS, Internal and a national register for inter-force auditing)
- A focus on competence
- A national proficiency test for DNA screening

# Why Accreditation?

Performance

Consistency

Continual  
Improvement



# Forensic Science Regulator

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## End of morning plenary

### Remaining Agenda

### Breakout sessions

Fingerprints	Chair: Gary Pugh OBE	Unexpected item in the reporting area	Chair: Dr. Roger King
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### Afternoon plenary

15:50	The court dependence on the quality of forensic science	HHJ Andrew Goymer
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16:20	Closing remarks	Andrew Rennison

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