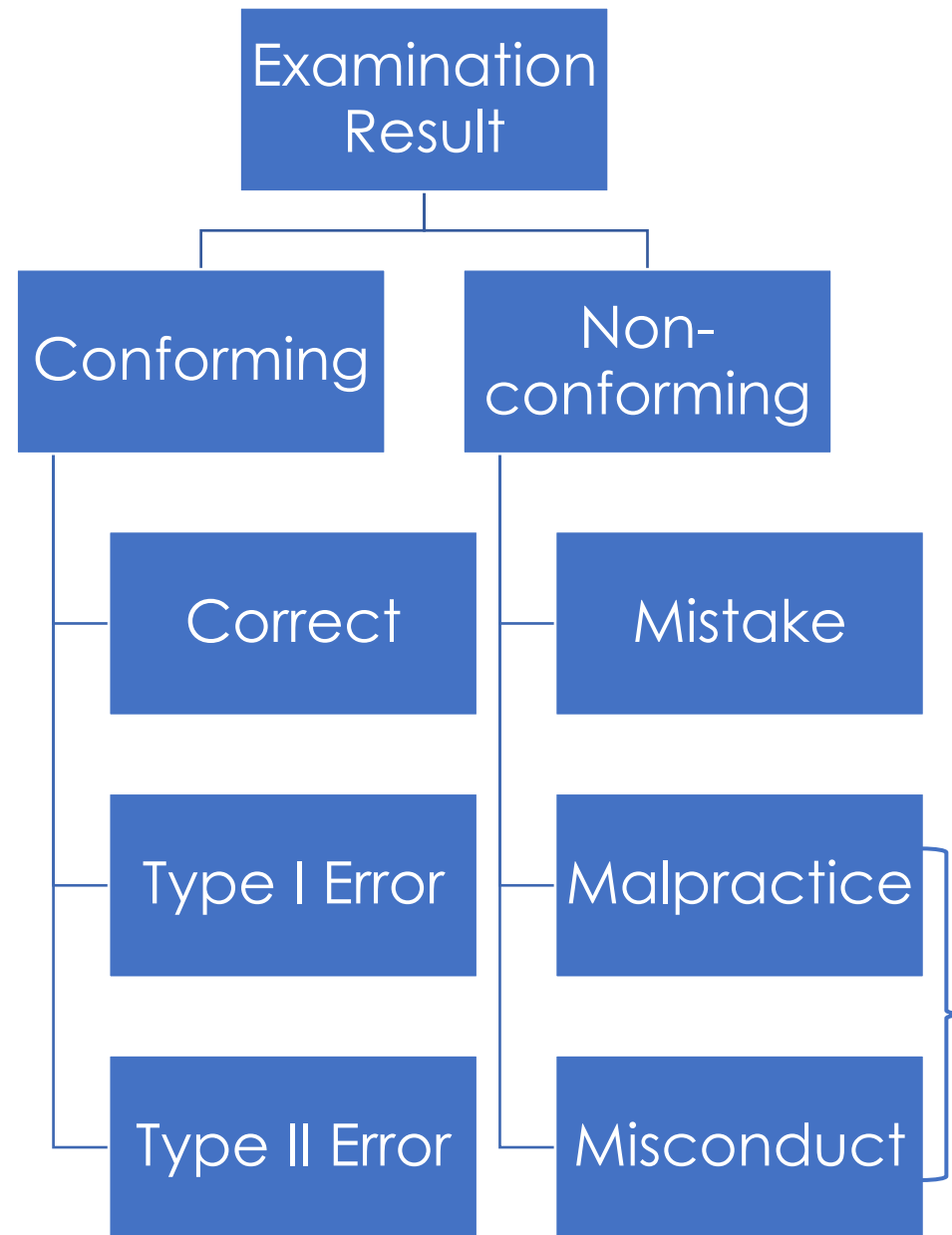# Why blind proficiency testing?

- 2009: National Academy of Sciences recommended that forensic proficiency testing programs include blind tests.

- 2016: National Commission on Forensic Science recommendation to the Attorney General recommended that all DOJ FSPs "seek proficiency testing programs that provide sufficiently rigorous samples that are representative of the challenges of forensic casework."

- 2016: President's Council of Advisors for Science and Technology wrote "test-blind proficiency testing of forensic examiners should be vigorously pursued, with the expectation that it should be in wide use, at least in large laboratories, within the next five years."

Other fields use blind tests

- Two 1970s studies in drug testing labs found that false negatives were higher in blind test compared to declared tests (La Motte et al, 1977).

- A 2001 study comparing blind and declared proficiency tests in blood lead testing programs at two large state laboratories found error rates were higher in the blind tests and suggested that laboratories were making special efforts when analyzing known proficiency test samples (Parsons et al, 2001).

- Today, Mandatory Guidelines for Federal Workplace Drug Testing Programs require participating laboratories to conduct blind testing

Adapted from Mejia et al, FSI-Synergy, 2020

Examination Result
- Conforming
  - Correct
  - Type I Error
  - Type II Error
- Non-conforming
  - Mistake
  - Malpractice
  - Misconduct
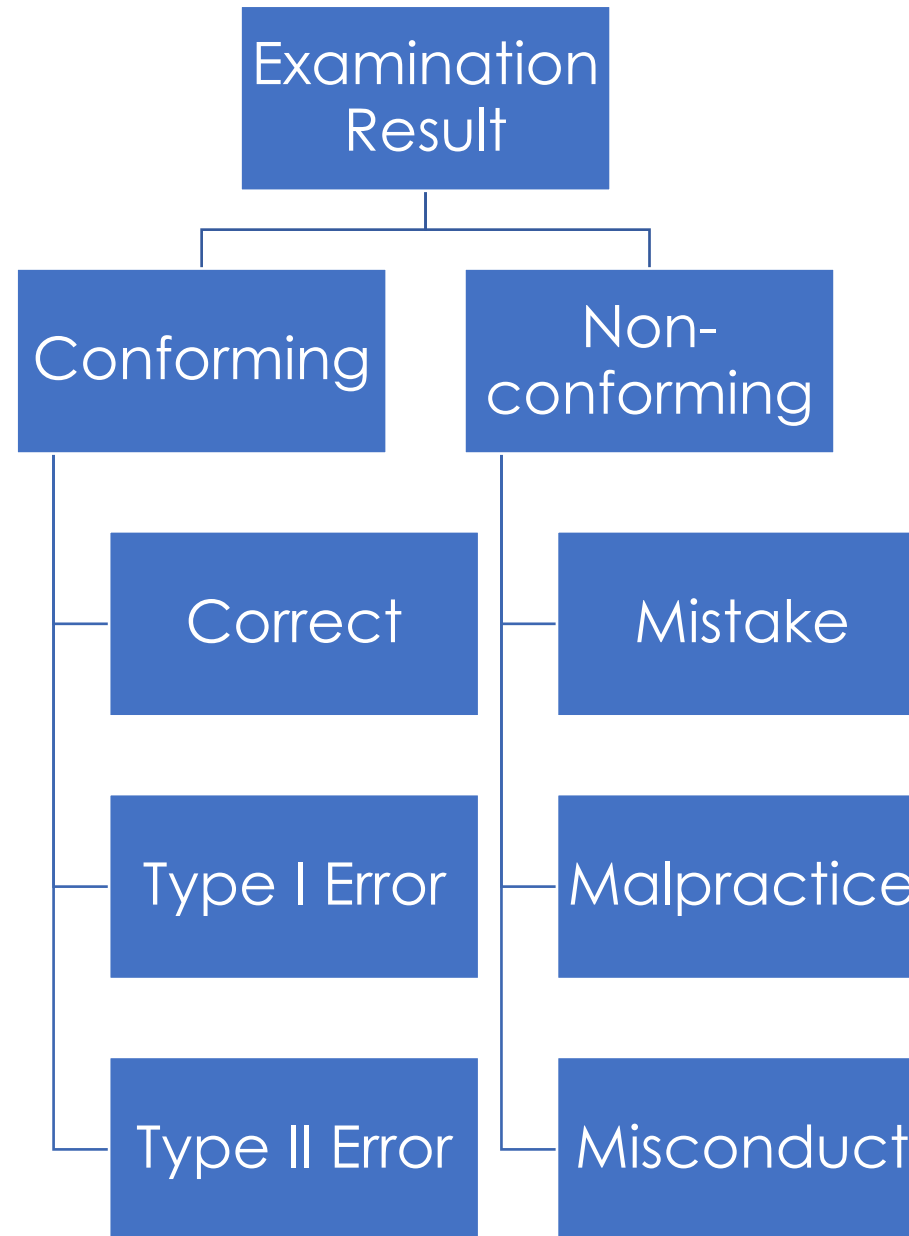
Only blind testing can catch

Adapted from Mejia et al, FSI-Synergy, 2020

Which forensic labs use blind proficiency tests?

FIGURE 2
Percent of publicly funded forensic crime labs that conducted proficiency testing, by type of test, 2002, 2009, and 2014
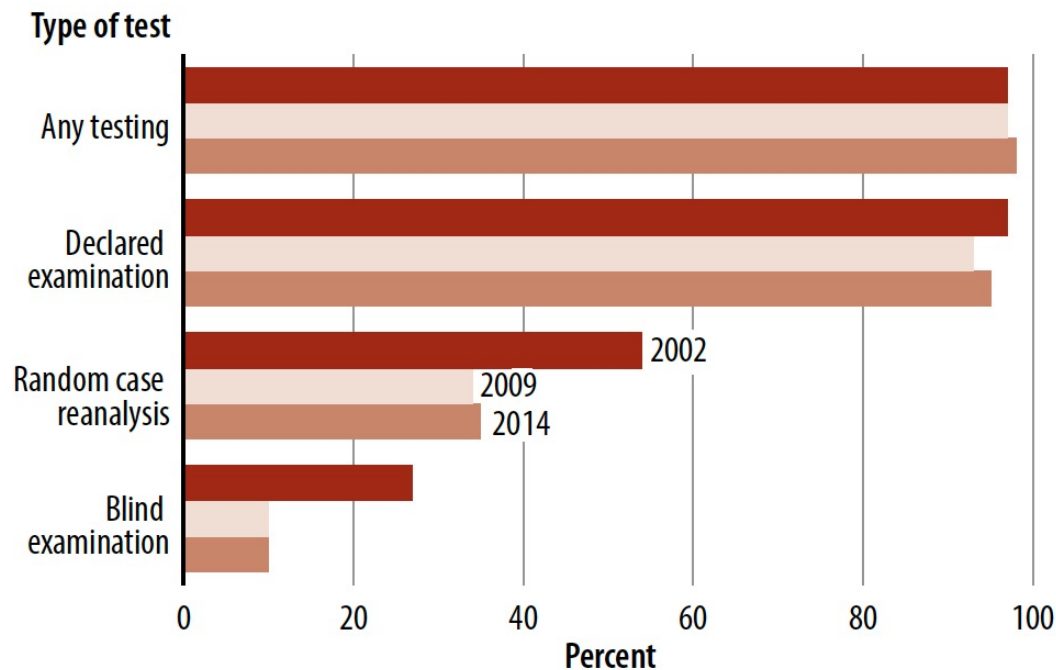
TABLE 2
Percent of publicly funded forensic crime labs that conducted proficiency testing, by type of test, jurisdiction, staff size, and number of forensic functions performed, 2014

		Type of proficiency testing	
	Number of labs	Blind	Random case reanalysis
All labs	409	10%	35%
Type of jurisdiction			
Federal	39	39%	49%
State	193	7	35
County	98	8	32
Municipal	79	5	30
Number of full-time employees*			
100 or more	27	11%	61%
50–99	51	13	38
25–49	90	21	45
10–24	134	5	28
9 or fewer	107	4	26
Number of forensic functions			
8 or more	72	11%	44%
5–7	156	8	34
2–4	132	9	32
1	49	19	32

Meeting on blind proficiency testing

- October 2018, hosted at Allegheny County Office of the Medical Examiner (houses county crime laboratory)

- Participants
  - QA staff and lab directors from 7 forensic laboratory systems
  - Representatives of AFQAM
  - Faculty, graduate students, and a post doc from 2 universities representing fields ranging from psychology to statistics.

- Two days of presentations and discussions gauging interest in and obstacles to implementing blind proficiency tests at state and local laboratories

Mejia et al, FSI-Synergy, 2020

Developing blind proficiency tests

- Realistic tests cases can be complex to create
- Development of realistic submission materials is difficult
- Cost may be prohibitive

Images: Allegheny County Office of the Medical Examiner, South Dakota DC Forensic Laboratory websites

Submitting and managing blind proficiency tests

- Test must be submitted to the lab by an outside LEA

- Not all LIMS are equipped to easily flag and track test cases

- Labs must ensure results are not released as real cases

Logistics and culture (1)

- Proficiency tests could impact metrics, so labs need to decide how/whether to include them

- Blind testing challenges the cultural myth of 100% accuracy

HFSC At A Glance

Last 12 months compared to prior 12 months

Total Average Turnaround Time	Requests Received	Total Average Process Time
↓34%	↑37%	↓34%

Backlog Pending Requests
Avg TOTAL TAT
Avg PROCESS TAT

Apr'14-Jun'14, Jul '14 - Sep '14, Oct '14 - Dec '14, Jan '15 - Mar '15, Apr'15 - Jun '15, Jul '15 - Sep '15, Oct '15 - Dec '15, Jan '16- March '16, Apr '16-Jun '16, Jul '16 - Sep '16, Oct '16 - Dec '16, Jan '17 - Mar '17, Apr '17 - Jun '17
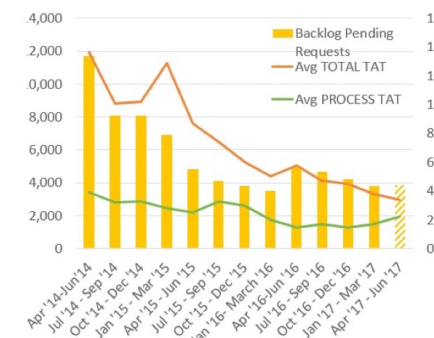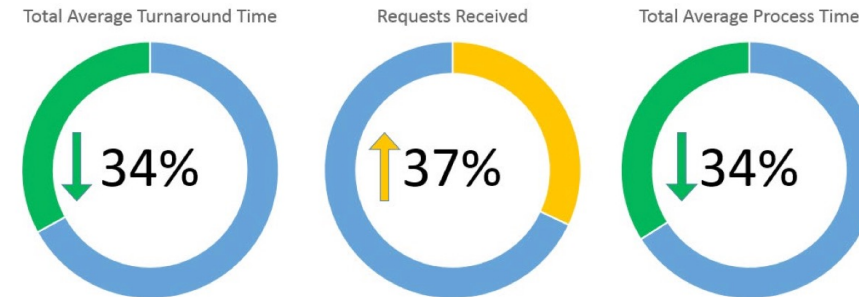
In the month of April, the Houston Forensic Science Center continued a longstanding trend of decreasing turnaround times despite an ongoing increase in requests for our services. Turnaround time in April dropped 34 percent compared to the same month last year, while requests received increased by 37 percent compared to April 2016. Overall, since taking over management of the Houston Police Department's forensic services in April 2014, backlogged requests have dropped from 12,000 to fewer than 4,000 at the end of April 2017. Overall average turnaround time has also dropped from more than 140 days to 34 days on HFSC's three-year anniversary.

In next month's newsletter, these graphics will change as we try to present the information in a new way that may be more applicable to our current work.

Total average TAT include all sections averaged from the start of the last 12 months measuring the turn around time from the request by the agency to report. This is compared to the same preceding 12 month period. In the last 12 months TAT was 34 days on average and 67 days in the preceding 12 months. Requests received is the total of all requests received in the 12 month period. This was 37,000 in the last 12 months and 26,901 in the preceding 12 months. Total average process time approximates the time from when the laboratory starts processing to reporting. Average process time was 15 days in the last 12 months and 23 days in the preceding 12 months.

KULR8.com

NEWS   WEATHER   SPORTS   WAKE UP   CONNECTIONS   COVID-19

Forensic experts testify on day three of Hernandez murder trial

Audrey Mayer   Mar 17, 2021 Updated Mar 22, 2021

Proficiency matters to finders of fact

- Online survey of potential jurors (matched to demographics of US)
- Read mock transcript from burglary case with one piece of evidence – forensic bitemark analysis or latent print analysis
- Same evidence each time, varied the proficiency of the examiner.

	Unknown	Low	High	High-No Test
Guilty (%)	75.2	65.1	77.7	79.2
Likely committed (1-100)	79.36	75.23	80.97	81.44
Evidence persuasive (1-7)	6.16	5.89	6.25	6.3

Adapted from Crozier et al, Forensic Science Intl, 2020

Stakeholders

Laboratories	Clients	Professional Association	External Organizations
• Examiners • Quality Assurance Staff • Laboratory Management	• Law Enforcement • Prosecutors • Defense Attorneys • Judges • Jurors	• AFQAM • ASCLD • OSAC • AAFS	• Accreditation Bodies • Proficiency Test Providers • Researchers at CSAFE, RTI, and other academic institutions

Mejia et al, FSI-Synergy, 2020

Houston Forensic Science Center

- Started blind quality control program in 2015
- September 2015-Dec 31, 2018
  - 978 blind QC samples submitted
  - 901 fully analyzed
  - 51 discovered as blinds by analysts
- Benefits
  - Tests full pipeline
  - More realistic gauge of effectiveness
  - Enables multi-disciplinary tests

Hundl et al, Journal of Forensic Sciences, 2019

Houston Forensic Science Center

Discipline	Blind QCs submitted per month*
Toxicology	14
Firearms – blind verification	1
Firearms – blind QC	1
Seized drugs	30
Forensic biology	10
Latent print processing	3
Latent print comparison	10
Multimedia – digital forensics	1
Multimedia – audio/visual	1

* Approximately 5% of casework completed during 2017

Hundl et al, Journal of Forensic Sciences, 2019

HFSC – proficiency testing costs in USD

	Blind		External/Declared	
	2017	**2018**	**2017**	**2018**
Toxicology	16,716	28,901	1,720	1,765
Firearms	0	0	2,300	2,245
Seized drugs	5,300	165	3,200	3,060
Forensic biology	1,840	0	8,606	8,262
Latent prints	0	20	6,130	6,060
Digital forensics	0	378	2,786	2,490
Audio/visual	NA	221	4,550	4,125
Miscellaneous	1210	334	NA	NA

Hundl et al, Journal of Forensic Sciences, 2019

HFSC blind QC for latent print comparison

- Over 2.5 years, 376 latent prints submitted as part of 144 cases

- Used LQ metrics to classify prints

- 92% of prints submitted of sufficient quality to enter into AFIS

- Of those, for prints with a source present in AFIS, 47% of print searches generated candidate list with source present

Gardner et al, Forensic Science International, 2021

Results

Examiner conclusions	True association	Not associated
Preliminary association	123 (correct association)	0 (false positive)
Not associated	154 (false negative)	68 (correct exclusion)
No AFIS search	24 (potential false inconclusive)	6 (potential false inconclusive)

- Recall: tests the pipeline – not just examiner comparisons
- Additional analyses in paper

Gardner et al, Forensic Science International, 2021

What next?

- Results of survey of latent print examiners on blind proficiency testing
- Survey of laboratory managers on blind proficiency testing
- Compile a directory of laboratories currently doing or planning blind proficiency testing
- Resume discussions of collaborations over test materials, studies (meetings/presentations)
- Engage with proficiency test providers about materials

Questions?

- In order of appearance:
  - Robin Mejia: rmejia@andrew.cmu.edu
  - Brandon Garrett: bgarrett@law.duke.edu
  - Callan Hundl and Maddisen Newman at HFSC, quality@houstonforensicscience.org
  - Brett Gardner: BG2DD@Virginia.edu
  - Or anyone else at CSAFE