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A Field Analysis of Laboratory Case Processing: Latent Print Comparison and Examiner Conclusions

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Abstract

Learning Overview: The goal of this presentation is to educate attendees about typical procedures and conclusions spanning one calendar year within a large latent print comparison unit. The presentation will also explore sources of variability in sufficiency and identification conclusions

Impact on Forensic Community: This presentation will expand upon a very limited research base and discuss how results can shape future research, policy, and professional practice. Audience members will be encouraged to reflect upon common practices within their own and their laboratory's casework. Research examining the efficacy and reliability of latent print comparison has expanded in recent years in response to scholars highlighting the need for additional empirical support for many forensic science disciplines and calling attention to potential contextual effects in analytic conclusions.^{1,2} A small body of research has attempted to elucidate the error rates of latent print comparison as a forensic discipline,^{3,4} and a growing body of research has examined the influence of contextual effects upon latent print comparison, suggesting that a number of task-irrelevant factors can influence conclusions.^{5,6,7} However, almost no research has examined actual latent print casework to first determine typical analysis procedures and outcomes. Beyond the potential influence of contextual effects, broad examination of actual laboratory case processing is sorely needed, yet lacking. To our knowledge, there has been only one study of real-world outcomes in latent print comparison.⁸ The current study sought to expand upon that study by achieving the following: 1) Describe the casework completed by latent comparison examiners in a large laboratory over the course of one calendar year (i.e., 2018), 2) Describe the prevalence of examiner conclusions during one year, 3) Explore whether examiner conclusions vary according to casework variables such as latent print type, offense type, or AFIS system use, and 4) Explore the extent to which there are examiner differences in examiner conclusions and case processing. Researchers examined all latent print cases with reports dated 2018 within a large crime laboratory in Texas. In total, 17 latent print examiners submitted reports in 2018. All examiners were certified by the International Association for Identification, and work experience ranged from 5 to 36 years. The presentation will provide detailed charts and statistics summarizing requests for latent print comparison and examiners' subsequent conclusions during 2018. In brief, the latent print unit addressed 3,239 analysis requests relating to 2,975 cases in 2018. Of the cases, 23.7% were person offenses. Of the 20,494 individual prints examined in 2018, 44.8% were deemed to be of sufficient quality to enter into AFIS. Few prints (1.7%) were deemed to have comparative value, but be of insufficient quality to enter into AFIS. Slightly more than half (53.5%) of all prints were determined to have no comparative value. HFSC examiners conducted 11,812 AFIS searches during 2018. Most searches were conducted at the county level (65.0%). State-level (16.9%) and federal-level (18.1%) AFIS searches were equally common. Most AFIS searches did not result in potential identifications (77.8%). Indeed, only 22.2% of AFIS searches resulted in potential identifications. As will be shown in a flowchart, 12.7% of all examined prints resulted in potential identifications. The presentation will also describe the variability within sufficiency determinations and AFIS outcomes. For example, print type was significantly associated with sufficiency determinations (i.e., prints deemed to be of insufficient quality for AFIS entry were 2.78 times more likely to be unspecified impressions). Finally, the presentation will detail individual differences among 14 latent print examiners. For example, examiners completed between 12 and 46 requests each month, examining between 66 and 269 prints. Some examiners opined that one of every three examined prints (35.8%) were of sufficient quality for AFIS entry whereas others opined that 56.5% were of sufficient quality. Moreover, some examiners concluded preliminary AFIS associations for 13.3% of entered prints whereas others were two times as likely (27.1%) to conclude that an AFIS association existed. Taken together, the current

findings are among the first to describe typical, real-world casework completed by a latent print comparison unit. Results suggest variability in examiner conclusions that may be partially explained by AFIS system, print type, offense type, and individual differences. Given the lack of research examining influences upon real-world latent print conclusions, it is critical to continue examinations of crime laboratory casework and determine the extent to which external information may be associated with conclusions.

Keywords

latent print comparison, crime laboratory, case processing

Disciplines

Forensic Science and Technology

Comments

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A Field Analysis of Laboratory Case Processing: Latent Print Comparison and Examiner Conclusions

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Opinions: My own





Introduction

National Academy of Sciences Report, 2009

President's Council of Advisors on Science and Technology Report, 2016

“Resolving latent conflict: What happens when latent print examiners enter the cage?” Rairden et al., 2018



Study Rationale

Describe the casework completed by latent comparison examiners in a large laboratory over the course of one calendar year

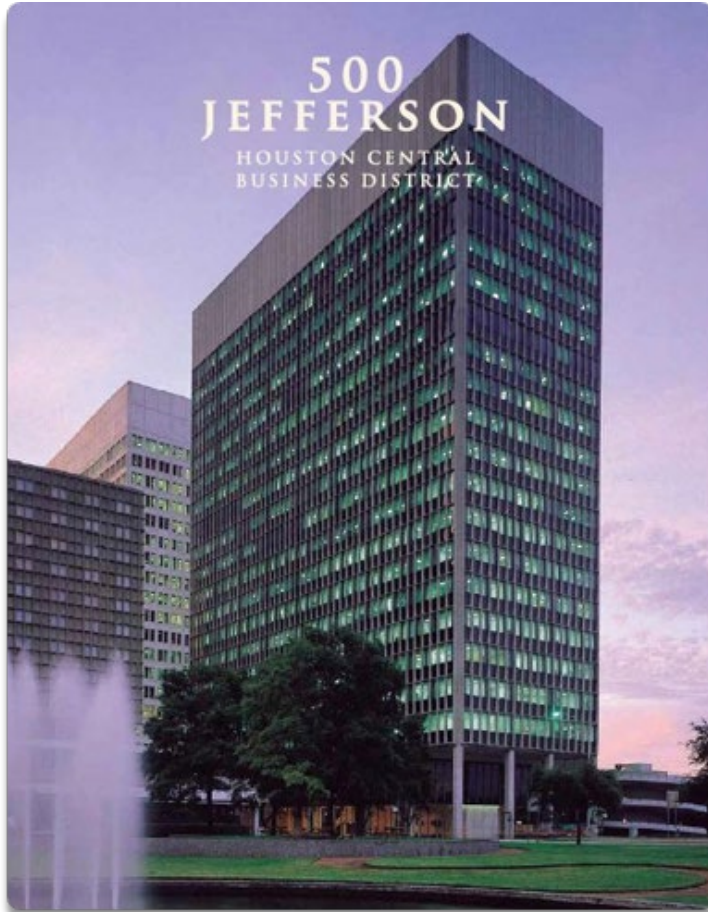
Describe the prevalence of examiner conclusions during that year

Explore whether examiner conclusions vary according to casework variables such as latent print source, offense type, or AFIS software

Explore the extent to which there are examiner differences in examiner conclusions and case processing

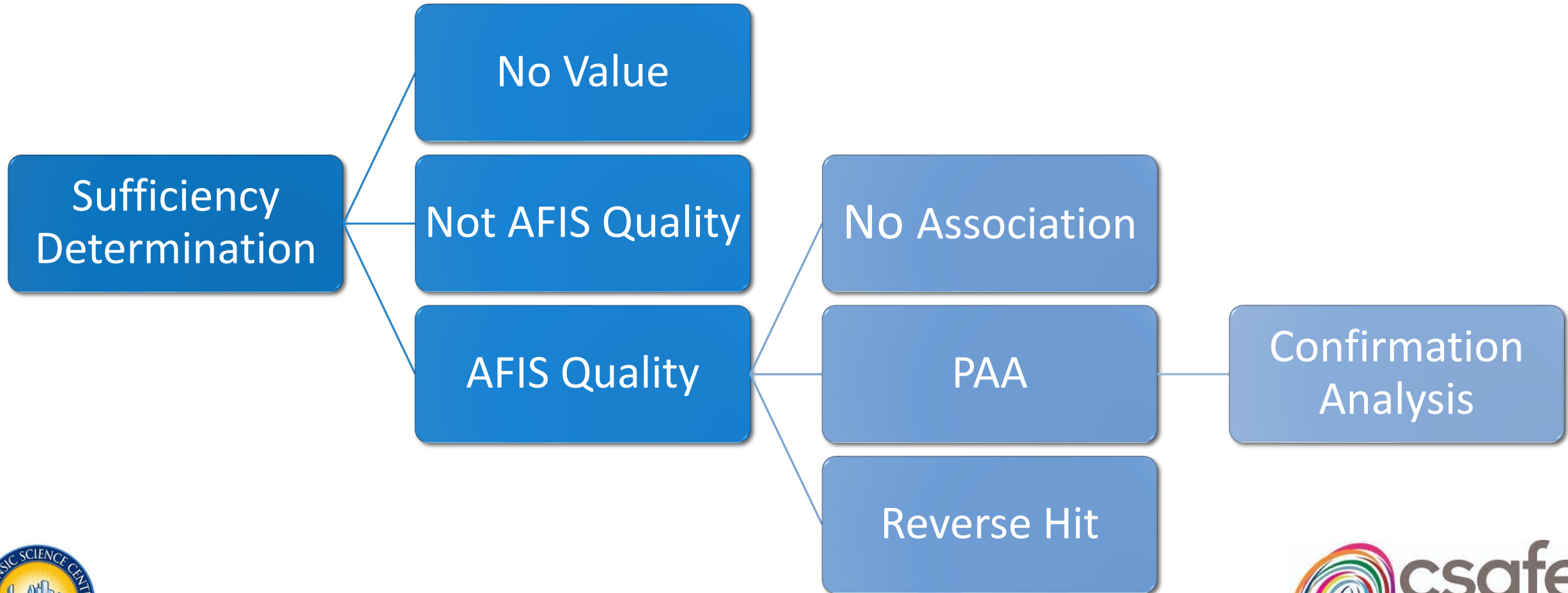


Houston Forensic Science Center



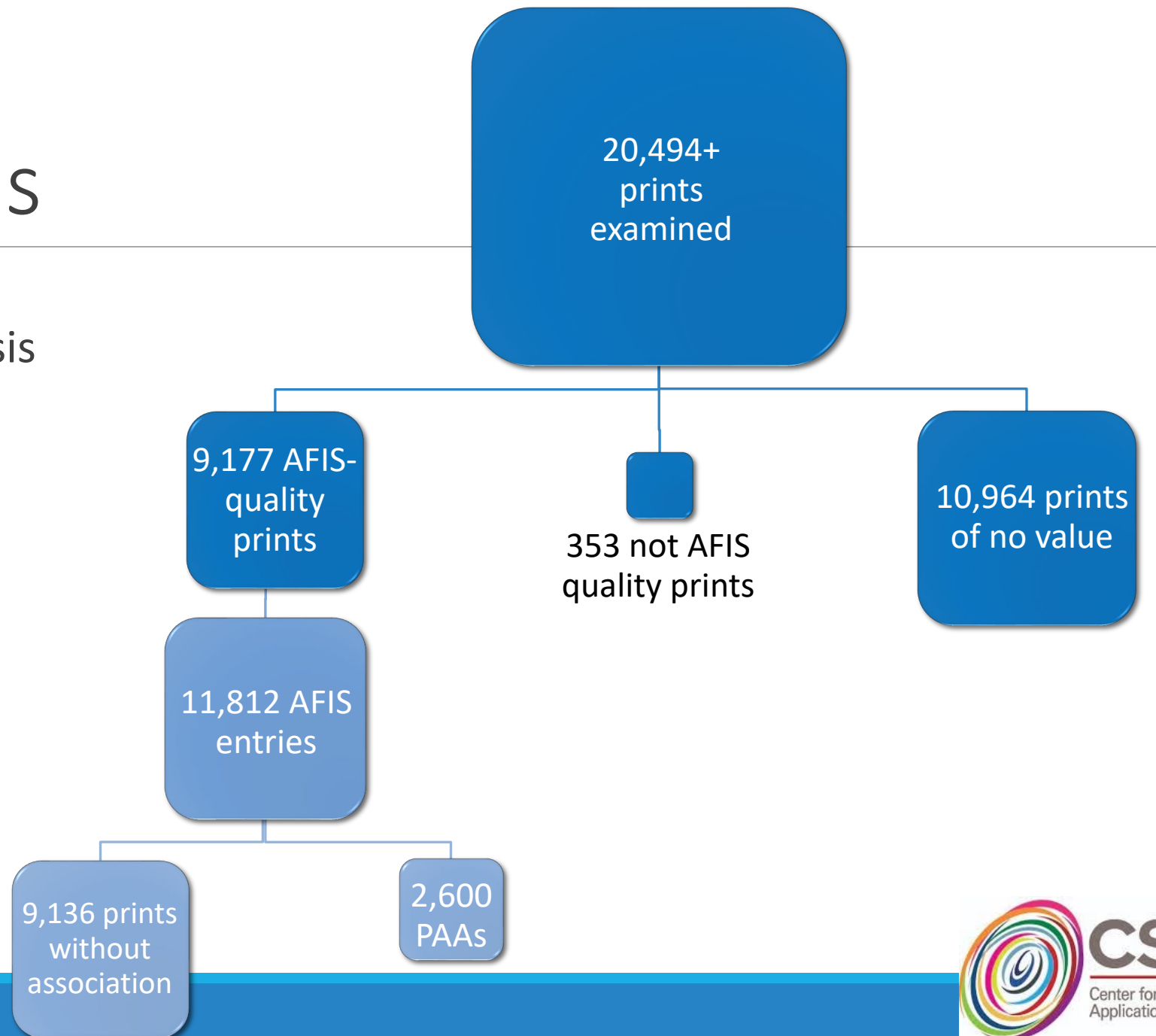
- Local government corporation
- Accredited by ANAB
- Study parameters:
 - 2018 calendar year
 - 17 latent print examiners
 - 5 to 36 years of work experience

LPC Procedures



Examiner Conclusions

- 2975 cases - 3239 requests for analysis
 - 69.1% BNT
 - 16.3% robbery
 - 4.4% homicide
 - 10.1% other
- AFIS outcomes
 - 65.0% county
 - 16.9% state
 - 18.1% federal



AFIS Outcomes

Anatomical Source	PAA	Reverse Hit	No Association	Total
Fingerprint	22.7% (n = 1,411)	2.0% (n = 127)	75.2% (n = 4,667)	100% (n = 6,205)
Palm print	27.4% (n = 708)	1.5% (n = 39)	71.1% (n = 1,837)	100% (n = 2,584)
Joint print	4.3% (n = 7)	0.0% (n = 0)	95.7% (n = 156)	100% (n = 163)
Unspecified impression	4.7% (n = 9)	0.0% (n = 0)	95.3% (n = 182)	100% (n = 191)
Total	23.4% (n = 2,135)	1.8% (n = 166)	74.8% (n = 6,842)	100% (N = 9,143)

Note. N = 9,143 prints with available data of the 9,177 total prints deemed to be of sufficient quality for AFIS entry.



Individual Differences

Examiner	Case Processing					Sufficiency Determination			AFIS Conclusion		
	Months Employed	Requests	Requests/ Month	Prints/cards Examined	Prints/ Month	% AFIS Qual.	% Not AQ	% NLoV	% PAA	% Reverse Hit	% No Hit
A	4.7	118	25.1	747	158.9	37.8%	0.1%	62.1%	22.4%	0.7%	76.9%
B	12	155	12.9	1,201	100.1	56.5%	0.3%	43.1%	17.8%	2.3%	79.9%
C	12	336	28.0	1,862	155.2	45.0%	3.3%	51.8%	27.1%	0.0%	72.9%
D	12	220	18.3	1,209	100.8	48.5%	1.3%	50.2%	17.3%	2.2%	80.5%
E	12	172	14.3	1,121	93.4	44.6%	0.2%	55.2%	13.3%	2.8%	83.9%
F	11	254	23.1	1,411	128.3	40.7%	1.5%	57.8%	25.4%	2.5%	72.2%
G	12	146	12.2	794	66.2	44.3%	1.0%	54.7%	16.8%	4.2%	79.1%
H	12	206	17.2	1,197	99.8	40.7%	2.7%	56.6%	15.2%	0.6%	84.2%
I	12	550	45.8	3,222	268.5	38.6%	0.2%	61.1%	24.5%	1.7%	73.8%
J	7	149	21.3	980	140.0	35.8%	0.1%	64.1%	13.7%	0.2%	86.0%
K	12	136	11.3	1,134	94.5	52.3%	0.4%	47.4%	23.0%	1.4%	75.6%
L	12	293	24.4	2,248	187.3	46.6%	5.4%	48.0%	18.9%	0.4%	80.7%
M	11.3	217	19.2	1,576	139.5	50.4%	2.0%	47.7%	20.4%	0.5%	79.1%
N	12	178	14.8	1,221	101.8	49.8%	1.7%	48.5%	22.8%	1.5%	75.8%
Total	M = 11		M = 20.6		M = 141.5	44.8%	1.7%	53.5%	20.7%	1.5%	77.8%

Note. Three examiners were excluded because they only completed independent casework for a single month during the data collection period





Discussion

Compared to Rairden et al., 2018

- 2014-2016 = 2,535 cases; 12 examiners
- 2018 = 2,975 cases; 17 examiners
- Similarities in offense type and AFIS quality numbers

Future directions

- Multiple lab workflow comparison
- AFIS limitations
- Increasing transparency



Thanks!

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