**Appendix A: Limitations, Methods, and Interpretations**

The presence of a friction ridge print or impression on an item or surface indicates contact was made between the person and the item or surface. The presence of a friction ridge print does not necessarily indicate the significance of the contact.

Because analysis of what is present in a friction ridge print usually does not occur (e.g., natural friction ridge skin secretions versus food contaminants or glue), it is typically impossible to determine the time frame during which an impression or contact occurred. Exceptions to this limitation may occur, for example when other forensic analyses indicates an impression is in blood.

It is usually impossible to determine any specific person did not touch a surface. Due to a variety of factors, the recovery of identifiable friction ridge prints is often unsuccessful. On specimens or surfaces in most investigations, there are typically numerous smears, marks and/or tiny friction ridge impressions that are unsuitable for meaningful comparison.

Evidentiary friction ridge skin prints or impressions are often referred to as latent prints. Although the word latent means invisible, in modern law enforcement and forensic science terminology the term latent print includes invisible and visible impressions. Latent prints are typically deposited by chance or accident during contact with an item or surface, and also sometimes are intentionally deposited, such as when an inked print is impressed on a check or contract as proof of identity.

Friction ridge skin on humans consists of ridges, which are raised portions of skin, and furrows, which are the valleys in between the ridges. Friction ridge skin occurs on the fingers, palms, toes and soles of the feet. A friction ridge print or impression is a representation of the ridge arrangements from the friction ridge skin transferred to a surface. The transferred representation may be due to deposition of natural friction ridge skin secretions, deposition of contaminants on friction ridge skin, the lifting away of contaminants on a surface, or a three dimensional impression in a soft substance.

Items of evidence examined for latent prints may be inspected visually using various light sources, or processed with chemicals and/or powders to detect the presence of friction ridge prints. The specific sequence of examinations and processes depends on many factors, including the type of evidence and prior or planned non-latent print forensic examinations.

Friction ridge print examinations are conducted using Analysis, Comparison, and Evaluation (ACE) (1), which includes an assessment of the quantity and quality of the information present. The steps of ACE are applied to friction ridge prints as appropriate for the evidence.

Analysis is the assessment of a friction ridge print by a qualified examiner, accounting for the quantity and quality of the features detected in the print. An examiner will assess the types of features and the spatial relationships of the features to one another, which may be affected by factors such as pressure and movement when the print is transferred (2) (3). The print is deemed to be of value when the examiner determines sufficient reliable information is present, such that, when compared to another print from the corresponding area of the same source, an identification decision can be reached. A thorough analysis is conducted on friction ridge prints prior to conducting comparisons.

During Analysis, an examiner designates a friction ridge print as one of the following:

- A fingerprint, coming from any part of a finger

- A palm print, coming from any part of the palm area of a hand
- A toe print, coming from any part of a toe
- A footprint, coming from any part of the sole of a foot
- An impression, whose anatomical region cannot be determined and may have come from any of the above sources

Comparison is the direct side-by-side observation of friction ridge prints of value to determine whether the information observed during Analysis is in disagreement or agreement between two prints. When determining if features correspond, an examiner accounts for variation in the appearance of the friction ridge prints due to factors such as pressure and movement (2).

Evaluation is the formation of a conclusion based on the examiner's observations, assessments, and documentation generated during the analysis and comparison of the friction ridge prints. Decisions that may be reached include the following:

- Identification is the determination that two friction ridge prints originated from the same source because there is sufficient quality and quantity of corresponding information. While an identification to the exclusion of all others is not supported by research, studies have shown that as more reliable features are found in agreement, it becomes less likely to find that same arrangement of features in a print from another source (4).
- Exclusion is the determination that two friction ridge prints did not originate from the same source because there is sufficient quality and quantity of information in disagreement.
- Inconclusive is the determination that an identification or exclusion decision cannot be reached because there is insufficient quality and quantity of corresponding information between the two prints.

While the examination process is subjective in nature (5), quality assurance measures are applied to minimize variability and reduce the chance of error. Quality assurance examples include, but are not limited to, verification and blind verification.

- Verification is the independent application of ACE to a friction ridge print by another qualified examiner.
- Blind verification is the independent application of ACE to a friction ridge print by another qualified examiner with limited awareness of the details of the case and no knowledge of the conclusion of the primary examiner.

There is no meaningful predictive rate of error for the entire comparison process (7) (8); however, recent studies have demonstrated that examiners reach accurate and reliable conclusions under specific test conditions (6) (9) (10).

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