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# Postmortem Impression Submission Strategy for Comprehensive Searches of Essential Automated Fingerprint Identification System Databases

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## Foreword

Friction ridge analysis (to include fingerprints, palm prints, and footprints) is a reliable, rapid, and cost-effective means to identify unknown deceased individuals [1]. The use of postmortem impressions to rapidly identify decedents centers on the use of Automated Fingerprint Identification System (AFIS) technology. It is essential that law enforcement agencies as well as the medicolegal community understand current fingerprint technology and leverage resources to ensure postmortem impressions are appropriately searched through AFIS fingerprint databases for identification purposes. The medicolegal authority should adhere to the best practices identified in this text to the extent possible, practical, and appropriate. In the absence of specific guidance, the principle, spirit, and intent of this document should be met.

These best practices are based upon documentation originally produced by the Scientific Working Group on Disaster Victim Identification and updated by the Organization of Scientific Area Committees (OSAC) Subcommittee on Disaster Victim Identification. OSAC submitted a draft to the ASB Disaster Victim Identification Consensus Body, which used it as a base for these published Best Practice Recommendations. The final document was produced using the consensus process of the ASB, which is an ANSI accredited Standards Developing Organization.

All hyperlinks and links are valid and operational at the time of publication of this document.



**Keywords:** *forensic identification, postmortem identification, automated fingerprint identification system (AFIS), postmortem fingerprint, disaster victim identification, fingerprint submission strategy, mass fatality, friction ridge*

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# Postmortem Impression Submission Strategy for Comprehensive Searches of Essential Automated Fingerprint Identification System Databases

## 1 Scope

The purpose of this document is to provide guidance to medical examiners, coroners and investigators regarding the submission of recorded postmortem impressions for comprehensive searches of essential automated fingerprint identification system databases. While a number of factors affect the successful search of a fingerprint through an automated fingerprint system, one of the most important factors is ensuring the fingerprint is searched through appropriate antemortem fingerprint databases.

## 2 Normative References

There are no normative reference documents, Annex C, Bibliography, contains informative references.

## 3 Terms and Definitions

For purposes of this document, the following definitions apply.

**3.1**
**Automated Fingerprint Identification System**
**AFIS**
Biometric computer system that allows forensic examiners to encode, digitize, and search recovered fingerprint impressions against fingerprint record databases for identification purposes.

**3.2**
**friction ridge analysis**
The examination of impressions from fingers, palms or soles, for identification purposes.

**3.3**
**Next Generation Identification**
**NGI**
A biometric repository managed and operated by the Federal Bureau of Investigation (FBI) Criminal Justice Information Services Division (CJIS) that enhances identification services by providing an incremental replacement of the former system, the Integrated Automated Fingerprint Identification System (IAFIS). Considered one of the largest biometric databases in the world, NGI stores individual fingerprint records and other biometric data for criminal and civil matters. Advanced identification technology provides rapid, efficient, and accurate fingerprint processing.

**3.4**
**Automated Biometric Identification System**
**IDENT**
The Automated Biometric Identification System (IDENT) is the central Department of Homeland Security (DHS)-wide system for storage and processing of biometric and associated biographic information for national security; law enforcement; immigration and border management; intelligence; background investigations for national security positions and certain positions of public trust. The IDENT database is considered another one of the largest biometric databases.

**3.5**
**antemortem and postmortem records**
Antemortem (AM) records are impressions of friction ridge details collected from live subjects, and can come from any part of friction ridge skin. Friction ridge skin is present on the palmar and plantar surfaces of the hands and feet. As such, impressions from the fingers and palms of the hands as well as the toes and soles of the feet can all be used for personal identification purposes. During antemortem fingerprint recovery, the living subject is usually manipulated against the recording medium. Postmortem (PM) records are records collected from deceased subjects. During PM fingerprint recovery, the recording medium is usually manipulated against the deceased subject in the same manner as the antemortem records. Unless a manual comparison is available, an AFIS search of an unidentified postmortem fingerprint record is used as a tool to find antemortem fingerprint records in order to establish or verify the deceased subject's identity [1,2,3].

**3.6**
**10-print searches and latent print searches**
A 10-print search is conducted on a fingerprint record which is often a reproduction of all ten fingers. An automated 10-print inquiry normally requires a minutiae search of only the thumbs or index fingers. Submitted fingerprints commonly have sufficient clarity and detail to make searching of more than two fingers unnecessary. This can be performed by a computer, in a "lights out" setting if the quality of the record is high enough.

A latent print search can be utilized for searching unknown deceased records when multiple fingers are not printable or present, and/or the quality of the recording is poor. A latent print search can often be more time consuming and require additional expertise. A latent print examiner conducts an analysis of the quality and quantity of information in the print and marks the individual minutiae in the print according to each individual AFIS system's requirements. Due to the lower quality and quantity of information often found with PM fingerprints, the analysis of each impression by a latent print examiner along with the marking of the specific minutiae for AFIS searches can yield better results. The AFIS system typically returns a candidate list of possible individuals that must be manually compared by the latent print examiner to determine if there is an identification [4].

## 4 Recommendations for Searching Records

### 4.1 General

Current AFIS databases used by law enforcement agencies tasked with forensic identification exist at local, state, and federal levels of government. Unlike what may be portrayed in the movies or on television, a single comprehensive and searchable database of AM fingerprint records collected in the United States or abroad does not exist. Due to data sharing agreements, privacy concerns associated with personally identifiable information (PII), and system interoperability difficulties, AM records contained within various AFIS databases are not congruent. The individual or organization submitting PM impressions for fingerprint analysis should ensure that local, state, and federal AFIS databases are appropriately searched for identification purposes. The effective use of AFIS technology in searching PM of impressions against AM records can result in a significant increase in the identification of decedents, allowing the medicolegal community to expedite regular casework, solve cold cases, and efficiently identify human remains in mass fatality incidents (MFI) [5].

### 4.2 Preliminary Information

Before examining the remains, it is advised that fingerprint examiners should familiarize themselves about the incident. This information may consist of the following.

— Geographic location – where the remains were recovered.

— Circumstances surrounding the death (e.g. natural versus accidental versus man-made event).

— Circumstances surrounding the recovery of the remains (e.g. found under rubble, recovered from water, remains removal facilitated by implements, or machinery, etc.).

— Details regarding any identifying documents or personal effects found on the remains and if these items have been removed from the remains prior to arrival of the remains at the morgue. Separation of identifying documents or personal effects from the remains prior to examination should be avoided whenever possible.

— Determine if there are AM records available elsewhere, such as decedent's residence, place of employment, etc.

### 4.3 Postmortem Fingerprint Recovery Process

Examination quality PM fingerprint records should be recorded from human remains using PM fingerprint recovery techniques. Remains should be thoroughly examined as soon as possible, before ongoing decomposition deteriorates the friction ridge skin and limits the ability to recover quality PM impressions. (1) It is assumed that the remains have been rendered safe from any hazards and that appropriate personal protective equipment (PPE) is worn. (2) Trained fingerprint examiners [1] should be utilized for the recovery of examination quality PM impressions from the deceased and for the subsequent search/submission of recovered fingerprint records through appropriate AFIS databases.

### 4.4 Submission of Postmortem Impressions for Automated Searching

Once examination-quality PM fingerprint impressions are recorded, the submitting agency should utilize Annex B, Fingerprint Submission Template – AFIS Database Search (or fields and information contained within the template) to send PM impressions to law enforcement or appropriate authorities for AFIS database searches[2]. A PM submission should request an automated 10-print search as well as a latent print search. It is the responsibility of the submitting agency to ensure that this has taken place. Images uploaded or emailed directly to CJIS Special Processing Center (SPC) or DHS's Biometric Support Center (BSC) must meet the requirements of submission to that agency. While facsimiles are accepted by some agencies, the low quality transmission can degrade an image enough that it may not be identified through an AFIS search. Unless it is urgent, if a flatbed scanner or digital camera is unavailable, the cards should be submitted as originals to the respective agencies.



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[1] The term *trained fingerprint examiners* indicates that individuals recording or approving the fingerprint records must be able to discern the fingerprints' value for comparison purposes as a quality measure. This term does not encompass/include the training recommended for PM fingerprint recovery techniques.

[2] If a fingerprint record is submitted directly through an established electronic portal, it should conform to the ANSI/NIST-ITL standard and the relevant application profile, such as the FBI's EBTS file format.

— All bold/italicized fields in the attached submission template should be populated by the submitting agency. All [bracketed] items are specific to each case being submitted for fingerprint analysis. Include any possible known demographic information regarding the decedent or fingerprint recording anomalies[3] in the additional information section of the template.

— Complete the submission template and copy/paste into a secure email service/format such as Law Enforcement Online. To apply for a Leo.gov email address, go to https://www.cjis.gov and apply for an account through the Law Enforcement Enterprise Portal (LEEP). You may also contact the LEEP help desk at 1-888-334-4536 with questions. Recovered PM impressions should be attached as a digital image and need to be scanned at a minimum resolution of 500ppi. The image must also be saved in a lossless format (i.e. JPEG2000 or TIFF). If poor quality fingerprints are received, the submitting agency may be contacted by the recipient to rescan prints at a resolution of 1000ppi.

— The submission template and recovered PM impressions may also be mailed as a hard copy to the appropriate authorities if electronic submission attempts fail or prove burdensome in accordance with the procedures and requirements of the receiving agency. If a card is deemed to be bio-hazardous, ensure the agency you are submitting it to can receive it.

### 4.5 Automated Searching of Postmortem Impressions

It is recommended that recorded PM impressions should be submitted for AFIS database searches in the following order:

— local,

— state,

— federal,

— international (if remains are believed to have international nexus).

It is the responsibility of the submitting agency to ensure that all of these steps are accomplished in their entirety.

a. local authorities should have the capability of electronically submitting the PM impressions to their local and state AFIS fingerprint databases. It is the responsibility of the submitting agency to ensure that this has taken place. If not, the PM impressions should be forwarded to local and state authorities separately by the submitting agency.

b. local authorities may also have the capability of electronically submitting the PM impressions to the FBI. If not, the PM impressions should be electronically submitted (emailed or uploaded, not faxed) or manually submitted to the FBI CJIS SPC for search through the NGI fingerprint database. CJIS information provided on the following page:

[3] PM changes, missing or damaged digits, special reconditioning techniques, case circumstances, etc.

FBI CJIS Division
Special Processing Center
1000 Custer Hollow Road
24/7 Voice Number: (304) 625-5584
24/7 Fax Number: (304) 625-5587
Email: spc@leo.gov

NOTE: The original submitting agency is only allowed to submit the postmortem impressions to the CJIS SPC if they have a valid Originating Agency Identification (ORI) Number assigned by the FBI per 28 *CFR*, § 20.3. Medical Examiner/Coroner agencies may request an ORI number (9 character identifier) from the FBI CJIS Division by contacting their State Identification Bureau (SIB) at https://www.fbi.gov/services/cjis/identity-history-summary-checks/state-identification-bureau-listing.

c. If no match is made in the NGI database, the PM impressions should be electronically (emailed or uploaded, not faxed) submitted to the DHS Biometric Support Center for search through the DHS Automated Biometric Identification System (IDENT) AFIS fingerprint database. DHS information provided below:

DHS
Biometric Support Center – West
24/7 Voice Number: (858) 609-2609
24/7 Fax: (858) 609-2600
Email: afis@dhs.gov or lpoc@dhs.gov

If no matches are made on the federal level, it may be valuable to have local or state law enforcement reach out to neighboring states for assistance in searching the recovered PM impressions through neighboring local/state AFIS fingerprint databases.

d. If no matches are made on the local, state, or federal level, it may be valuable to reach out to the International Criminal Police Organization (INTERPOL) for search through the AFIS fingerprint databases of member countries (if remains are believed to have international nexus). INTERPOL information provided below:

INTERPOL
NCB Washington
U.S. Department of Justice
Washington, DC 20530-0001
Voice Number: (202) 616-9000
Fax Number: (202) 616-8400

e. In the event of no matches at any of the aforementioned local, state, federal, or international levels, it may be valuable to upload the unidentified PM fingerprint records to the National Missing and Unidentified Persons System (NamUs). This will allow other resources to be utilized for the assistance of identification.

NamUs AFIS/Fingerprint Unit
UNT Health Science Center
Main Number: 1-855-626-7600
www.NamUs.gov

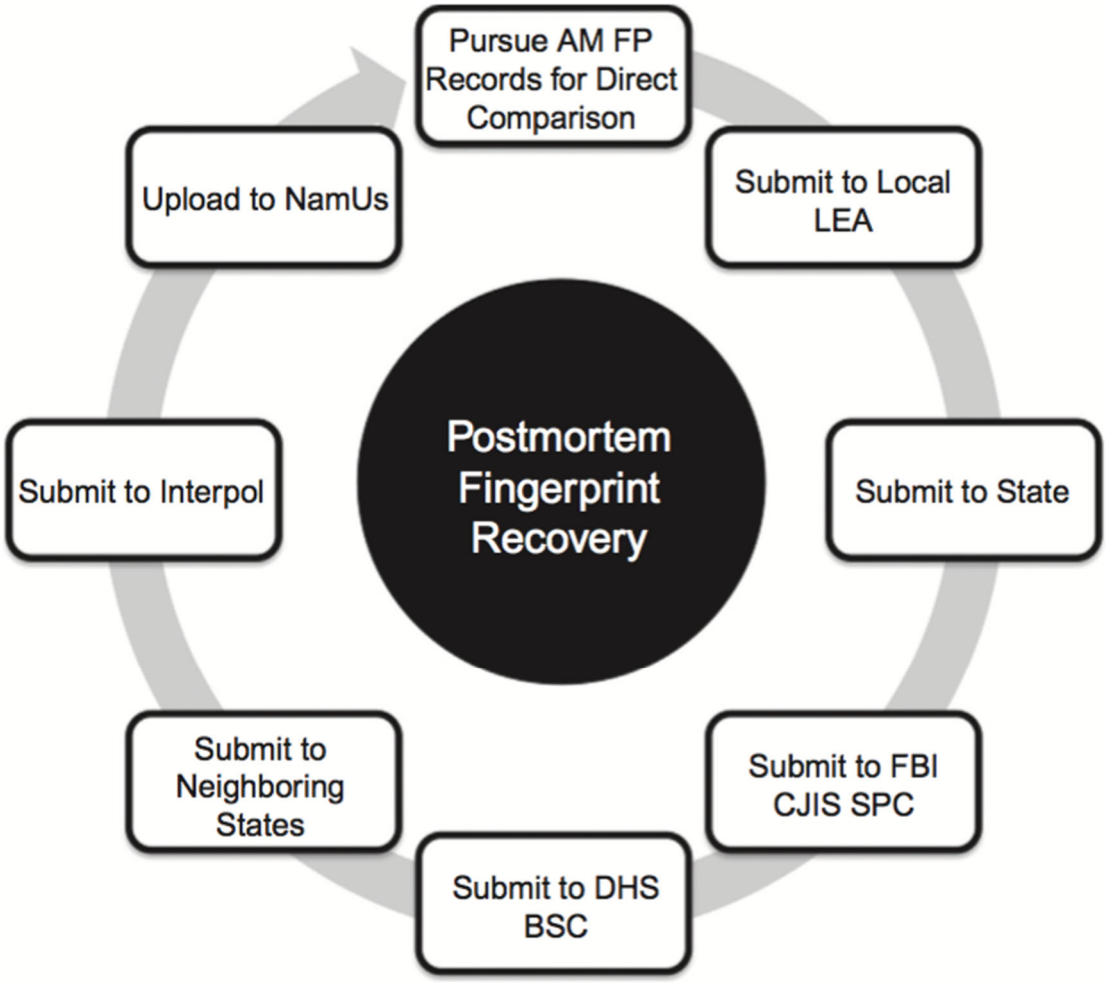


**Figure 1—Postmortem Fingerprint Submission Strategy [4]**



[4] Postmortem Fingerprint Submission Strategy. Reprinted from *Postmortem Fingerprinting and Unidentified Human Remains* (p. 93) by Mulawka M. H. and L. Miller, 2014, New York, NY: Routledge. Copyright 2014 by Taylor & Francis. Reprinted with permission [2].

# Annex A
(informative)

## Foundational Principles

The objective of Disaster Victim Identification (DVI) is to match acquired PM data from the recovered remains with AM data obtained from the victim's next of kin or other external sources to help establish a positive forensic identification. If AM data cannot be located, inquiries into local, state, and federal databases can provide an avenue to obtain AM data. If the remains have reliable primary identifiers, such as odontology, fingerprints or DNA and the identifiers have met approved standards without inexplicable discrepancies, the information can be presented to an identification board for reconciliation. These scientific means of identification are the basis for DVI.

Although their technical aspects may appear similar, PM fingerprint recovery methods can be significantly more challenging than acquiring AM fingerprint records from the living. Furthermore, the condition of PM friction ridge skin may be significantly compromised by various destructive influences due to the circumstances of death and/or severity of PM changes, such as rigor mortis, dehydration, decomposition, and deterioration. As such, the use of special reconditioning techniques may be required prior to recording the PM fingerprint impressions. The quality of the resulting PM fingerprint records may be significantly lower and thus, performing searches of PM fingerprint records can be more complex. Unless AM records for manual comparisons are available, an AFIS search of an unidentified PM fingerprint record is used as a tool to attempt to establish or verify the deceased subject's identity [1,2].

This document aims to address the National Research Council's (NRC) 2009 Report and general concern amongst the field by providing a separate standard for performing comprehensive searches of PM fingerprint records in essential AFIS databases. The reliability of fingerprints has been evaluated and researched by the scientific community to ensure they are an accurate means of identification. PM fingerprints and resultant manual comparisons and automated searches employ the same methods and reliability as with AM fingerprints. The added layers of complexity related to PM fingerprint process require more attention and investigation [6].

# Annex B
(informative)

## Fingerprint Submission Template – AFIS Database Search [2,5]

The ***Your Agency Name*** has recovered human remains and is requesting AFIS fingerprint database searches for identification purposes. Please review the information presented in Table B.1.

| **Unidentified Deceased Fingerprint Submission** | |
|---|---|
| **To:** | ***Agency Name***<br>***Email Address***<br>***Phone Number***<br>***Fax Number*** |
| **From:** | ***Your Agency Name***<br>***Email Address***<br>***Phone Number***<br>***Fax Number*** |
| **ORI:** | Agency ORI |
| **Date:** | ***[mm/dd/yyyy][hh:mm]*** hours EST |
| **Submission Type:** | Unidentified Deceased |
| **Re:** | ***Your Agency Name*** Case ***[Case#]*** |
| **Pages:** | ***[#]*** total (***[#]*** image(s), 1 email) |
| **Comments:** | Please attempt to identify the submitted postmortem impressions recovered from human remains discovered in ***[location]*** on ***[DOD mm/dd/yyyy]***. Please perform a ten-print search of all available AFIS databases (local, state, federal, etc.) and perform a latent-print search in the event of negative ten-print search results. In advance, thank you for your assistance in this matter.<br>Please provide fingerprint search results along with database search information (local, state, federal, etc.) to ***Fax Number*** or ***Email Address***. If an identification is effected, please forward the antemortem fingerprint record and any other available information about the individual, including criminal history. |

**Table B.1—Fingerprint Submission Template**

*Additional Information: Note important information such as possible demographic information for the decedent or recording anomalies such as the submitted prints are from the dermal layer of skin.*

# Annex C
(informative)

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