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**Standard for Population Affinity Estimation in Forensic
Anthropology**



Standard for Population Affinity Estimation in Forensic Anthropology

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Foreword

The term population affinity is used in this document not to the exclusion of ancestry, but as a more inclusive term encompassing the estimation of an individual's similarity to various groupings of populations (see 3.5). Forensic anthropologists employ a variety of methods that draw on reference samples (i.e., populations) grouped in a variety of ways (social race, nationality, ethnicity, and others). Interpreting assigned group outcomes likewise has a variety of approaches, depending on the case context and the method(s) used. Traditionally, the practice of estimating a group affiliation has been described as ancestry, but because ancestry is not inclusive of the terms used in methods and reporting, we propose a more encompassing term. Population affinity as a term is more appropriate because it does not refer to a particular kind of grouping (e.g., geographic/temporal), and can include both social and/or biological groupings. This shift away from the estimation of ancestry was chosen to reflect current practices and publication trends in forensic anthropology, and to distance this process from other disciplines' estimates such as DNA-based ancestry estimation.

Population affinity estimation is a component of the biological profile typically developed for comparison to the physical description of a missing person. This document is intended to assist forensic anthropologists when estimating population affinity from complete or partial adult skeletal material. The estimation of population affinity is based on skeletal phenotypic variation (see 3.4) which results from microevolutionary mechanisms over time (both recent and deep) and space (from broad to microregional).

This document does not endorse races as valid biological categories.

The dynamic nature of research and consensus in this area precludes listing specific methods and techniques.

This document was revised, prepared, and finalized as a standard by the Anthropology Consensus Body of the AAFS Standards Board. The draft of this standard was developed by the Anthropology Subcommittee of the Organization of Scientific Area Committees (OSAC) for Forensic Science. This document was originally conceived by the Scientific Working Group of Forensic Anthropology (SWGANTH).

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All hyperlinks and web addresses shown in this document are current as of the publication date of this standard.

Keywords: *ancestry; population affinity; biological profile; personal identification.*

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Standard for Population Affinity Estimation in Forensic Anthropology

1 Scope

This standard provides procedures for the estimation of population affinity from skeletal material. Specific methods and techniques are not included. This standard is not applicable to subadult skeletal remains, when cranial and postcranial features are not fully developed.

2 Normative References

There are no normative references.

3 Terms and Definitions

For purposes of this document, the following definitions apply.

3.1

biological profile

The description of an individual's estimated age, sex, population affinity, and stature derived from skeletal analysis.

3.2

morphometric data

Data that incorporates both size and shape.

3.3

non-metric data

A skeletal variant or morphological feature that is classified categorically rather than quantified by a measurement (e.g., discrete, macromorphoscopic, or discontinuous trait).

3.4

phenotype

Observable characteristics resulting from genotypic, epigenetic, and environmental factors.

3.5

population

An a priori defined group of individuals that share biological characteristics.

3.6

population affinity

A measure (e.g., distance, probability of membership) of biological similarity between the individual and reference groups.

3.7

reference group

A sample of a population used in a method.

4 Requirements

4.1 General

The estimation of population affinity shall be based on peer-reviewed, published, and validated methods that have procedures for objectively recording well-defined data (cranial and dental measurements, coordinate data, and non-metric data, etc.), which are based on reference samples appropriate to the case (e.g., contemporaneous). Appreciation of the statistical foundations of the methods used provides an understanding of their advantages and limitations.

Due to the variation in condition, preservation, and recovered skeletal elements, the methods applied are determined on a case-by-case basis. If one or more of the bones needed to apply a specific method are absent or in poor condition, the method shall not be used. All methods used shall be documented to allow verification and replication of the work performed.

Population affinity should be estimated independently of suspected or presumptive identification to minimize bias.

Estimation of population affinity from skeletal remains shall be performed even if DNA or other samples will be taken.

4.2 Procedure

4.2.1 General

Population affinity shall be estimated from the adult skeleton using morphometric and/or non-metric data. Choice of population affinity method(s) shall be dictated by the skeletal elements available and their condition/degree of preservation.

All methods applied to the estimation of population affiliation shall have an associated degree of certainty, and therefore require a quantitative analysis (e.g., error rates, probability or likelihood).

4.2.2 Non-metric Assessment

Methods using non-metric traits shall meet these requirements:

- a) appropriate reference groups;
- b) clear trait descriptions and scoring systems;
- c) a quantitative analysis.

4.2.3 Morphometric Assessment

Methods using morphometric data shall meet these requirements:

- a) appropriate reference groups;
- b) clear landmark, measurement, and data acquisition descriptions;
- c) a quantitative analysis.

4.2.4 Considerations and Adjustments

When prioritizing method selection, the practitioner should consider potentially confounding factors, such as socio-economic status, secular change, pathological conditions, trauma, taphonomy, and biomechanical demands on the skeleton.

The practitioner shall consider that a major assumption in any method is that the unidentified individual comes from one of the populations represented by the reference groups. Methods cannot allocate individuals into specific groups for which there is no reference.

The practitioner shall consider the implications of the final population affinity estimation, and whether it should be more broadly or narrowly defined. Individual methods may result in different levels of population allocation specificity. The practitioner should use professional judgment in reporting the level of specificity.

As with any other single parameter of the biological profile, population affinity should not be used as the sole basis for exclusion.

4.2.5 Reporting

Reports and/or case files shall contain documentation of the methods used to estimate population affinity, including applicable software and relevant output (e.g., probabilities of the estimate and measures of model performance). Raw measurements/coordinates and/or non-metric scores shall be recorded and maintained.

Current methods do not include global forensic samples; accordingly population affinity should not be reported as absolute. Alternatives such as “consistent with” are appropriate.

When ambiguous results are obtained, the practitioner shall caveat a final estimate accordingly. When population affinity cannot be estimated, it shall be reported as undetermined.

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