Proficiency Testing

1.0 Principle, Spirit, and Intent

The implementation of a robust and standardized proficiency testing program is an important component of a forensic anthropology service provider's quality assurance system.

Proficiency tests have a wide range of quality assurance applications. While proficiency tests can be used to evaluate individual proficiency, their larger intent is to verify that a laboratory's forensic analytical operations are effective and that the quality of the work is being maintained.

2.0 Purpose and Scope

These guidelines recommend best practices for a proficiency testing program as it pertains to forensic anthropology. Competency testing, an integral part of the forensic training process, is administered to assess technical skills, knowledge, and abilities, but is not addressed in this document.

Practitioners of forensic anthropology should implement these guidelines to the fullest extent as applicable, practical, and appropriate. In the absence of specific guidelines or in the case of conflicting procedures, the principle, spirit, and intent should be met.

3.0 General Principles

3.1 Definition and Uses of Proficiency Tests

Proficiency testing is the evaluation of practitioner performance against pre-established criteria. External proficiency testing may be used for inter-laboratory comparisons, while internal proficiency testing may be used for intra-laboratory comparisons. The intended purposes and outcomes of proficiency testing must be balanced against resource expenditures (including time), productivity, its effectiveness as a quality assurance measure, and satisfying accreditation or other regulatory requirements.

A proficiency testing program is one of many quality assurance measures that allow the laboratory to demonstrate its ability to:

- Confirm continued competent performance
- Compare performance with other laboratories
- Compare performance amongst analytical staff

- Identify areas for improvement
- Ensure customer confidence in the reliability of the laboratory's work product

Proficiency tests assess the quality of operations. At the laboratory level, proficiency testing may reveal:

- Ambiguities, inadequacies or other problems with standard operating procedures (SOPs)
- Gaps in training programs
- Problems with equipment and equipment maintenance, calibration and performance check programs
- Instability of examination materials
- Problems with methods

Additionally, on a profession-wide level, proficiency tests are useful for:

- Generating uncertainty of measurement data
- Identifying inter-laboratory trends or trends in laboratory systems
- Generating inter-observer error data and trends

3.2 Types of Proficiency Tests

3.2.1 External vs. Internal Tests

An external proficiency test is obtained from and reported to a provider external to the laboratory's quality assurance system. An internal proficiency test, however obtained, is reported within the laboratory's quality assurance system.

3.2.2 Open vs. Blind Tests

An open proficiency test is one in which the analysts are aware they are being tested, while a blind proficiency test is one in which the analysts are unaware they are being tested. While both are used in the forensic science community, open proficiency tests are more common and more practical.

4.0 Best Practices

4.1 Laboratory Proficiency Testing Program

The laboratory's proficiency testing program should include policies, guidance, and procedures for:

- Identifying and defining the analytical tests the laboratory performs (e.g., estimating biological profile, trauma analysis)
- Establishing criteria for the evaluation of proficiency tests

- Providing instructions for testing in infrequent or specialty examinations (e.g., histology, scanning electron microscope)
- Scheduling tests (it is recommended that each analyst is proficiency tested annually, with at least one analyst participating in an external proficiency test annually)
- Securing the tests from deliberate or accidental loss of integrity
- Selecting analysts for external proficiency testing
- Selecting the individual(s) administering the test(s)
- Retaining proficiency test records (it is recommended that test records be retained for at least five years)
- Reviewing proficiency test, to include corrective action procedures and root cause analysis when failures occur.
- Administering and documenting proficiency tests

As applicable, the documentation of a laboratory's proficiency testing program should include, at a minimum:

- The test set identifier (i.e., unique identification number)
- How samples or testing materials were obtained or created
- Identity of the individual administering the test
- Identity of the analyst taking the test
- Date of analysis and completion
- Originals or copies of all data and notes supporting the conclusions
- Proficiency test results
- Any discrepancies noted
- Indication that performance has been reviewed and feedback provided to the analyst taking the test
- Details of the corrective actions taken (when necessary)

In addition, the laboratory should:

- Periodically conduct an independent review and assessment of proficiency testing results using subject matter experts
- Periodically perform intra- and inter-laboratory comparisons of proficiency test results
- Review overall performance in proficiency testing and, when necessary, take corrective action

4.2 Test Formats, Materials and Procedures

The following should be considered when developing, administering, and taking proficiency tests:

- The laboratory's SOPs should be followed
- Tests should be sufficiently rigorous and represent the challenges of forensic casework
- Tests should use a hands-on format and produce an analytical result

- The proficiency test should be a single task within the area being tested (e.g., estimating sex from the head of a femur)
- Tests should be graded pass/fail
- Whenever possible, the laboratory should obtain external proficiency testing materials from accredited proficiency test providers
- Human anatomical specimens, high quality casts and reproductions, and graphic exemplars (photographs, radiographs, and other imagery) are acceptable as proficiency test materials depending on the circumstances and nature of the task being tested
- Proficiency test materials should maintain uniformity and not change over time, and material should be reviewed following a regular schedule to assess the material for deterioration or damage
- Acceptable ranges for analytical measurements and final results should be defined
- It is acceptable to forego *a priori* correct results in favor of determining 'pass' standards *post facto*; that is, after all proficiency tests are completed and the range of results is tabulated
- Successful completion of a proficiency test means either obtaining the defined response or completing corrective actions pursuant to laboratory policy and/or directives from external agencies, as appropriate
- Corrective action pertaining to test failures, including root cause analysis, should be fully documented

5.0 Unacceptable Practices

The following practices are considered unacceptable and should be avoided when administering or taking proficiency tests:

- Automatically attributing proficiency test failures to lack of individual proficiency
- Over-reliance on proficiency test results to evaluate laboratory quality or individual proficiency
- Unconditionally excusing or providing waivers to analysts from taking annual proficiency test(s)
- Using proficiency test results to determine methodological error rates
- Using only non-analytical tasks (e.g., proper opening and sealing of an evidence bag) as a proficiency test
- Putting evidence, personnel or other resources at risk while performing proficiency testing
- Failing to secure or control information in proficiency tests
- Using non-validated or discredited methods in proficiency tests

6.0 Additional Considerations

Adherence to the guidelines in this document is not necessarily sufficient to satisfy accreditation requirements. For accreditation requirements, please refer to the relevant accrediting organization.

Implementing a proficiency testing program can be accomplished independent of accreditation.

For small laboratories and sole providers, forming partnerships and cooperation agreements is recommended.