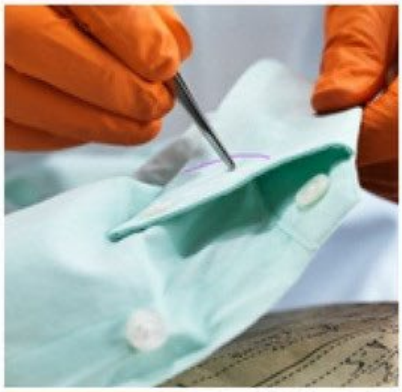
OSAC
Organization of Scientific Area Committees for Forensic Science

OSAC REGISTRY

OSAC Registry Implementation Survey: 2021 Report

February 2022



About OSAC

The Organization of Scientific Area Committees (OSAC) for Forensic Science is administered by the National Institute of Standards and Technology (NIST), a non-regulatory agency of the U.S. Department of Commerce, with the goal of strengthening the nation's use of forensic science by facilitating the development of technically sound standards and guidelines and encouraging their use throughout the forensic science community. OSAC's 800-plus members and affiliates work in forensic laboratories and other institutions around the country and have expertise in 22 forensic disciplines, as well as scientific research, measurement science, statistics, law, and policy. OSAC drafts and evaluates forensic science standards via a transparent, consensus-based process that allows for participation by all stakeholders.

For more information about OSAC see, www.nist.gov/osac.

For questions or comments about this report, email forensics@nist.gov.

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https://doi.org/10.29325/OSAC.risr0011

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Executive Summary

In 2009, the National Academies of Science (NAS) published the report "*Strengthening Forensic Science in the United States – A Path Forward*." The report contained a thorough review of the status of forensic science that was critical of the lack of consistency of the standards in the United States across disciplines and across jurisdictions. Among the 13 recommendations provided in the report was a call to improve standards in the practice of forensic science. The NAS recommended the creation of transparent, nationally recognized standards to improve consistency and reliability of forensic science.

In 2014, OSAC was created by agreement between the U.S. Department of Justice and the National Institute of Standards and Technology (NIST) to address the lack of discipline-specific forensic science standards. OSAC fills this gap by drafting proposed standards and sending them to standards developing organizations (SDOs), which further develop and publish them. OSAC also reviews proposed and published SDO standards for placement on the OSAC Registry.

The OSAC Registry is a repository of high-quality, technically sound published and proposed standards for forensic science. These written documents define minimum requirements, best practices, standard protocols, and other guidance to help ensure that the results of forensic analysis are valid, reliable, and reproducible. All the standards on the OSAC Registry have passed a rigorous technical and quality review by OSAC members, including forensic science practitioners, research scientists, statisticians, and legal experts.

Standards are only beneficial if they are used. To improve consistency within and across forensic science disciplines, ensure the confidence in the accuracy, reliability, and reproducibility of laboratory results, and positively impact admissibility and expert testimony in courts of law, OSAC encourages forensic science service providers to implement the standards on the OSAC Registry into their everyday practice.

As more published and OSAC-proposed standards are added to the OSAC Registry, OSAC wants to better understand how standards are being used, the challenges encountered in their implementation, and what support is needed. Forensic science service providers (FSSPs) who self-declare that their laboratory has implemented specific standards provide the most direct means to inform OSAC about their implementation efforts. As of September 1, 2021, OSAC has received 43 self-declaration forms from FSSPs in 12 states and two foreign countries.

In addition to self-declaration by FSSPs, the OSAC Registry Implementation Survey is another tool OSAC will use to collect implementation information on an annual basis. OSAC initiated the first survey in 2021 to measure the extent that FSSPs in the United States have implemented standards on the OSAC Registry. The survey, which opened June 10 and closed August 31, 2021, provides a snapshot and assessment of the 46 standards that were posted on the OSAC Registry as of March 2021 **(Table 1)**.

OSAC received more than 155 responses to the survey. One hundred thirty-eight (138) FSSPs reported that their organization has fully or partially implemented standards on the OSAC Registry. As expected, survey data show the disciplines that are more mature and commonly found in traditional crime laboratories are implementing standards at a higher rate. However, it is anticipated that more FSSPs will adopt standards focusing on disciplines outside of the traditional crime laboratory as they are added to the OSAC Registry.

Although the number of FSSPs implementing standards on the Registry is increasing, the survey data demonstrates that challenges to implementation still exist. OSAC is addressing these challenges by working with collaborators to develop standards training opportunities, implementation checklists, and the sharing of lessons learned from successful FSSP standards implementers. OSAC continues to engage with relevant stakeholder groups such as FSSPs, SDOs, proficiency test providers, accrediting bodies, certification bodies, and forensic science professional organizations to learn more about their specific needs and open communication pathways to facilitate future collaborations.

Table 1. *The disciplines and 46 standards represented in the 2021 OSAC Registry Implementation Survey*

Discipline	Standards on the OSAC Registry – As of March 2021
Biology/DNA (3)	ANSI/ASB Standard 020, *Standard for Validation Studies of DNA Mixtures, and Development and Verification of a Laboratory's Mixture Interpretation Protocol*, First Edition, 2018
	ANSI/ASB Standard 022, *Standard for Forensic DNA Analysis Training Programs*, First Edition, 2019
	ANSI/ASB Standard 040, *Standard for Forensic DNA Interpretation and Comparison Protocols*, First Edition, 2019
Bloodstain Pattern Analysis (1)	ASB Technical Report 033, *Terms and Definitions in Bloodstain Pattern Analysis*, First Edition, 2017
Digital Evidence (3)	ASTM E2916-19e1 *Standard Terminology for Digital and Multimedia Evidence Examination*
	ASTM E3017-19 *Standard Practice for Examining Magnetic Card Readers*
	ASTM E3150-18 *Standard Guide for Forensic Audio Lab Setup and Maintenance*
Dogs & Sensors (1)	ASB Technical Report 025, *Crime Scene/Death Investigation - Dogs and Sensors - Terms and Definitions*, First Edition, 2017
Facial Identification (3)	ASTM E3115-17 *Standard Guide for Capturing Facial Images for Use with Facial Recognition Systems*
	ASTM E3148-18 *Standard Guide for Postmortem Facial Image Capture*
	ASTM E3149-18 *Standard Guide for Facial Image Comparison Feature List for Morphological Analysis*
Fire & Explosion Investigation (2)	NFPA 921:2017 *Guide for Fire and Explosion Investigations*
	NFPA 1033:2014 *Standard for Professional Qualifications for Fire Investigator*
Fire Debris (4)	ASTM E1388-17 *Standard Practice for Static Headspace Sampling of Vapors from Fire Debris Samples*
	ASTM E1412-19 *Standard Practice for Separation of Ignitable Liquid Residues from Fire Debris Samples by Passive Headspace Concentration with Activated Charcoal*
	ASTM E1413-19 *Standard Practice for Separation of Ignitable Liquid Residues from Fire Debris Samples by Dynamic Headspace Concentration onto an Adsorbent Tube*
	ASTM E3189-19 *Standard Practice for Separation of Ignitable Liquid Residues from Fire Debris Samples by Static Headspace Concentration onto an Adsorbent Tube*
Medicolegal Death Investigation (2)	ANSI/ASB Best Practice Recommendation 007, *Postmortem Impression Submission Strategy for Comprehensive Searches of Essential Automated Fingerprint Identification System Databases*, First Edition, 2018
	ANSI/ASB Best Practice Recommendation 010, *Forensic Anthropology in Disaster Victim Identification: Best Practice Recommendations for the Medicolegal Authority*, First Edition, 2018
Odontology (2)	ANSI/ADA 1058-2010D *Forensic Dental Data Set*
	ADA 1088-2017D *Human Identification by Comparative Dental Analysis*
Seized Drugs (2)	ASTM E2329-17 *Standard Practice for Identification of Seized Drugs*
	ASTM E2548-11e1 *Standard Guide for Sampling Seized Drugs for Qualitative and Quantitative Analysis*
Toxicology (4)	ANSI/ASB Standard 017, *Standard Practices for Measurement Traceability in Forensic Toxicology*, First Edition, 2018
	ANSI/ASB Standard 036, *Standard Practices for Method Validation in Forensic Toxicology*, First Edition, 2019
	ANSI/ASB Best Practice Recommendation 037, *Guidelines for Opinions and Testimony in Forensic Toxicology*, First Edition, 2019
	ANSI/ASB Standard 053, *Standard for Report Content in Forensic Toxicology*, First Edition, 2020
Trace Materials (9)	ASTM E1610-18 *Standard Guide for Forensic Paint Analysis and Comparison*
	ASTM E1967-19 *Standard Test Method for the Automated Determination of Refractive Index of Glass Samples Using the Oil Immersion Method and a Phase Contrast Microscope*
	ASTM E2330-19 *Standard Test Method for Determination of Concentrations of Elements in Glass Samples Using Inductively Coupled Plasma Mass Spectrometry (ICP-MS) for Forensic Comparisons*
	ASTM E2926-17 *Standard Test Method for Forensic Comparison of Glass Using Micro X-ray Fluorescence (μ-XRF) Spectrometry*
	ASTM E2927-16e1 *Standard Test Method for Determination of Trace Elements in Soda-Lime Glass Samples Using Laser Ablation Inductively Coupled Plasma Mass Spectrometry for Forensic Comparisons*
	ASTM E2937-18 *Standard Guide for Using Infrared Spectroscopy in Forensic Paint Examinations*
	ASTM E3233-20 *Standard Practice for Forensic Tape Analysis Training Program*
	ASTM E3234-20 *Standard Practice for Forensic Paint Analysis Training Program*

	ASTM E3085-17 *Standard Guide for Fourier Transform Infrared Spectroscopy in Forensic Tape Examinations*
Wildlife Forensics (4)	ANSI/ASB Standard 019, *Wildlife Forensics General Standards*, First Edition, 2019
	ANSI/ASB Standard 028, *Wildlife Forensics Morphology Standards*, First Edition, 2019
	ANSI/ASB Standard 029, *Report Writing in Wildlife Forensics: Morphology and Genetics*, First Edition, 2019
	ANSI/ASB Standard 047, *Wildlife Forensics Validation Standard—Validating New Primers for Sequencing*, First Edition, 2019
Interdisciplinary (6)	ANSI/NIST ITL-1: 2011 (Update 2015) *Data Format for the Interchange of Fingerprint, Facial & Other Biometric Information*
	ASTM E2917-19a *Standard Practice for Forensic Science Practitioner Training, Continuing Education, and Professional Development Programs*
	ISO/IEC 17020:2012 *Conformity Assessment—Requirements for the Operation of Various Types of Bodies Performing Inspection*
	ISO/IEC 17025:2005 *General Requirements for the Competence of Testing and Calibration Laboratories*
	ISO/IEC 17025:2017 *General Requirements for the Competence of Testing and Calibration Laboratories*
	ISO 21043-2:2018 Forensic Sciences - Part 2: *Recognition, recording, collecting transport and storage of items*

About the Survey

Recruitment of Survey Participants

The OSAC Program Office distributed advertisements through various venues to solicit survey responses. The 2021 spring and summer quarterly OSAC newsletters, monthly OSAC *Standards Bulletins*, the OSAC website, and the OSAC *In Brief* (internal communication for OSAC members and affiliates) provided invitations for participation. Additionally, the survey was distributed to the members of forensic science professional organizations including the American Academy of Forensic Sciences (AAFS), American Society of Crime Laboratory Directors (ASCLD) and the International Association for Identification (IAI). The intended participants for this survey included FSSPs from across the United States. A series of questions, shown in the **Respondent Demographics** section below, were provided to the participants to capture their demographics.

Data Analysis

The survey requested only one response be submitted per location. For example, a state or Federal laboratory with multiple laboratories was asked to provide one response for each laboratory's city, region, or district. The OSAC Program Office compiled and collated the survey response data received from more than 155 FSSPs. Respondent's demographic information was evaluated to allow the results to be combined and sorted by organization. Data analyses were used to help visualize trends among the selections made by FSSPs, such as the number of standards implemented, level and priority of implementation efforts, and the key challenges encountered in implementation.

About this Report

This report provides a detailed look at the respondents and the implementation status of 46 standards that were posted on the OSAC Registry as of March 2021. It also serves to create a baseline to measure the year-over-year progress in the implementation of standards on the OSAC Registry.

This report is divided into six sections including[1]:

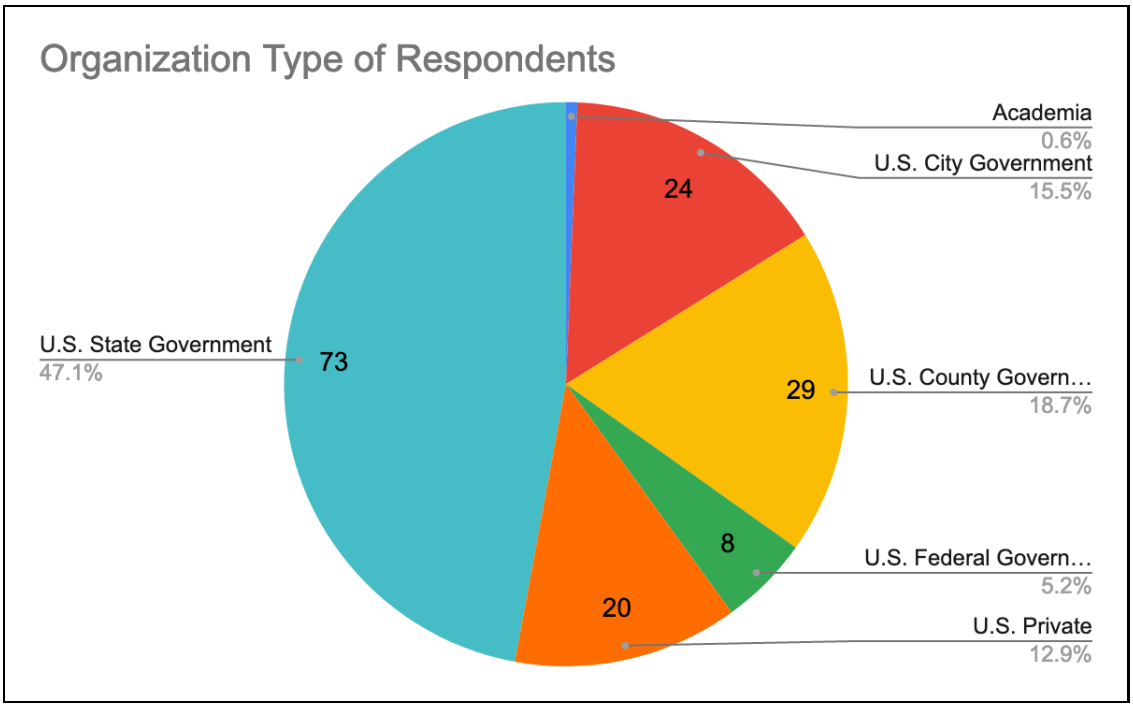
- Respondent demographics
- OSAC Registry awareness
- Priority for implementing standards
- Key challenges to implementation
- Organizations participating in full and partial standards implementation
- Implementation Summaries for each of the disciplines where standards on the OSAC Registry are available.

Respondent Demographics

Organization Types

OSAC received 155 responses from FSSPs and 27 responses from non-FSSPs to the OSAC Registry Implementation Survey. Only the responses from the 155 FSSPs were used in the data analysis. Most respondents were from U.S. State Government organizations (47.1%) with the U.S. County (18.7%) organization type being the second most common. Other U.S. organization types represented included city government (15.5%), private (12.9%), federal (5.2%), and academic (0.6%) organizations **(Figure 1)**.

Figure 1. *Organization Type Pie Chart*



[1] A preliminary report of the survey results was shared in OSAC's 2021 Fall Newsletter/Annual Report.

Geographic Regions

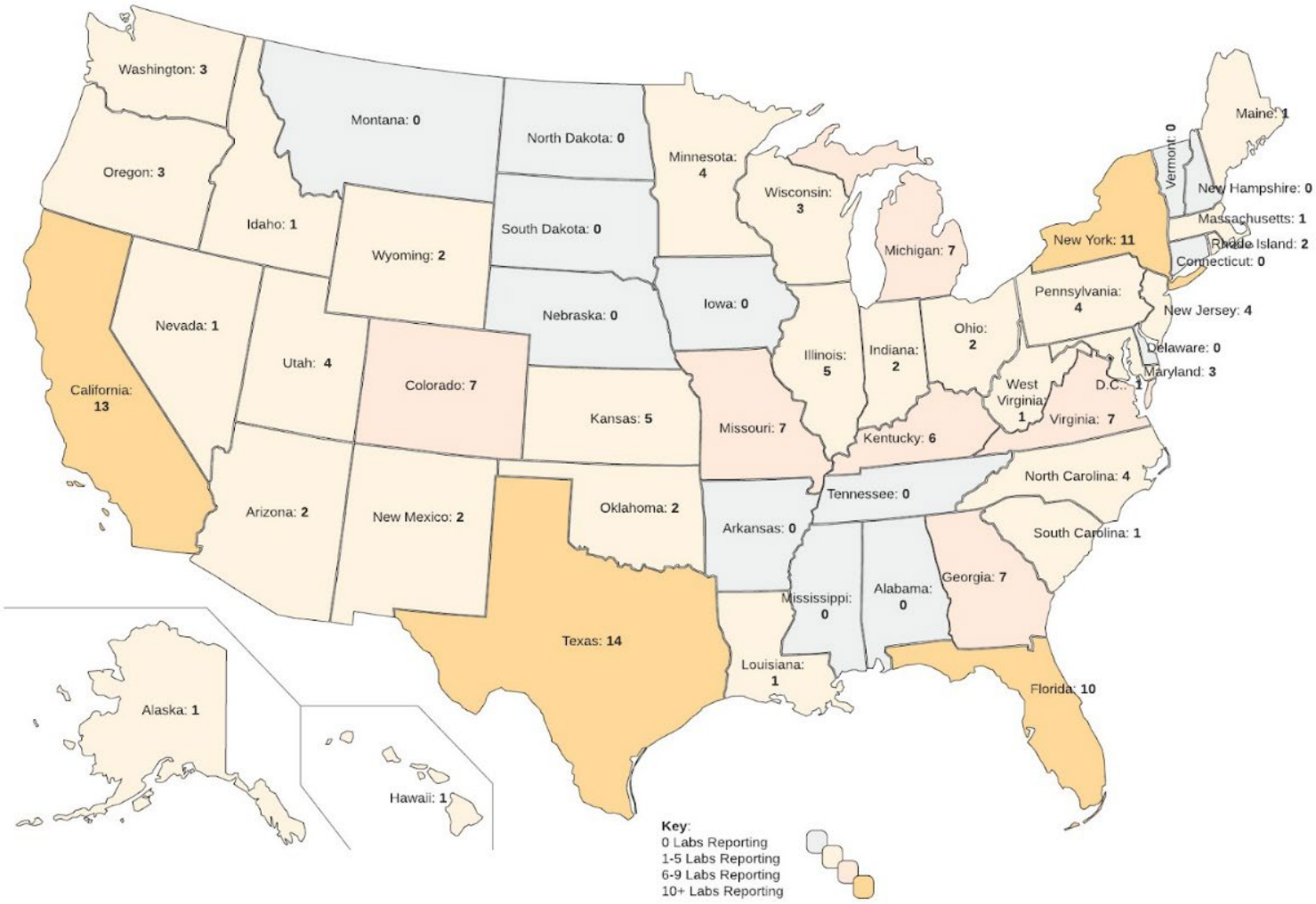
The 155 survey respondents represented 38 states in the U.S. Geographic region groups were used as defined by the U.S. census[2].The Southern region of the U.S., which includes the South Atlantic, East South Central and West South Central divisions, was most heavily represented in the survey (37%). The Western region, consisting of the Mountain and Pacific divisions, was the second most common region represented (26%). See **Table 2** for the Organization Region Chart and **Figure 2** for the Organization Region Heat Map.

Table 2. *Organization Region Chart*

Region	Number of Respondents
Northeast (includes New England and Mid-Atlantic Divisions)	**23**
New England (CT, ME, MA, NH, RI, VT)	4
Mid-Atlantic (NJ, NY, PA)	19
Midwest (includes East North Central and West North Central Divisions)	**35**
East North Central (IL, IN, MI, OH, WI)	19
West North Central (IA, KS, MN, MO, NE, ND, SD)	16
South (includes South Atlantic, East South Central and West South Central Divisions)	**57**
South Atlantic (DE, FL, GA, MD, NC, SC, VA, DC, WV)	34
East South Central (AL, KY, MS, TN)	6
West South Central (AR, LA, OK, TX)	17
West (includes Mountain and Pacific Divisions)	**40**
Mountain (AZ, CO, ID, MT, NV, NM, UT, WY)	19
Pacific (AK, CA, HI, OR, WA)	21

[2] https://www2.census.gov/geo/pdfs/maps-data/maps/reference/us_regdiv.pdf

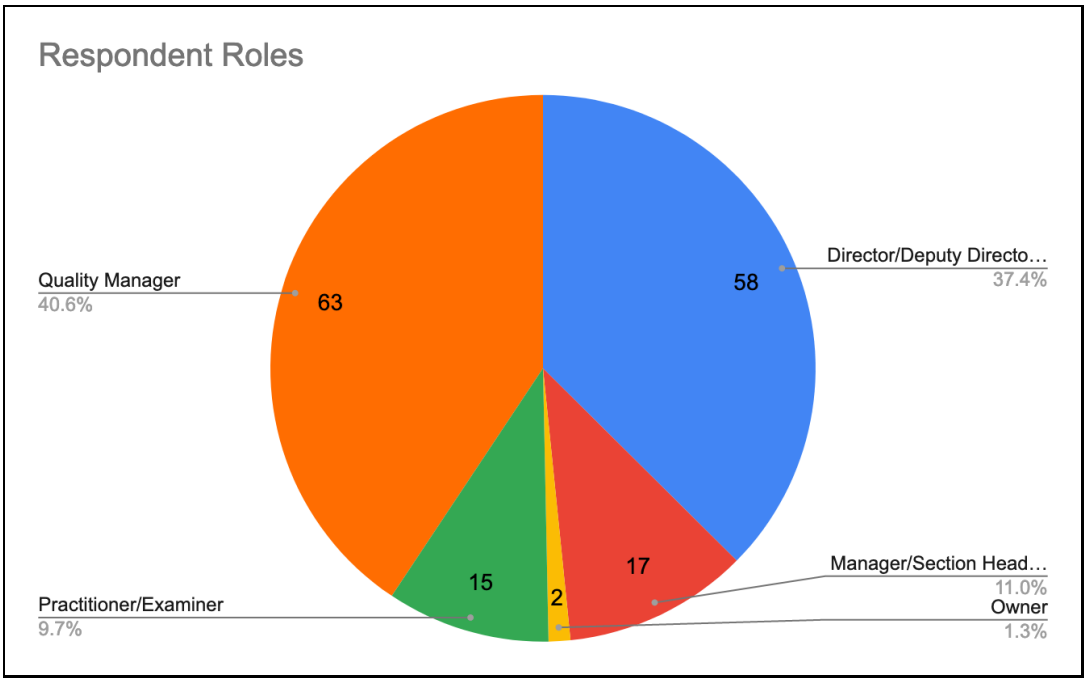
Figure 2. *Organization Heat Map*



Respondent Roles

Of the 155 respondents, more than 75% were in upper management positions with 40.6% working as quality managers, followed by 37.4% working in a director or deputy role. Other positions represented included managers/section leaders (11%), practitioners/examiners (9.7%), and organization owners (1.3%) **(Figure 3)**.

Figure 3. *Respondent Roles*



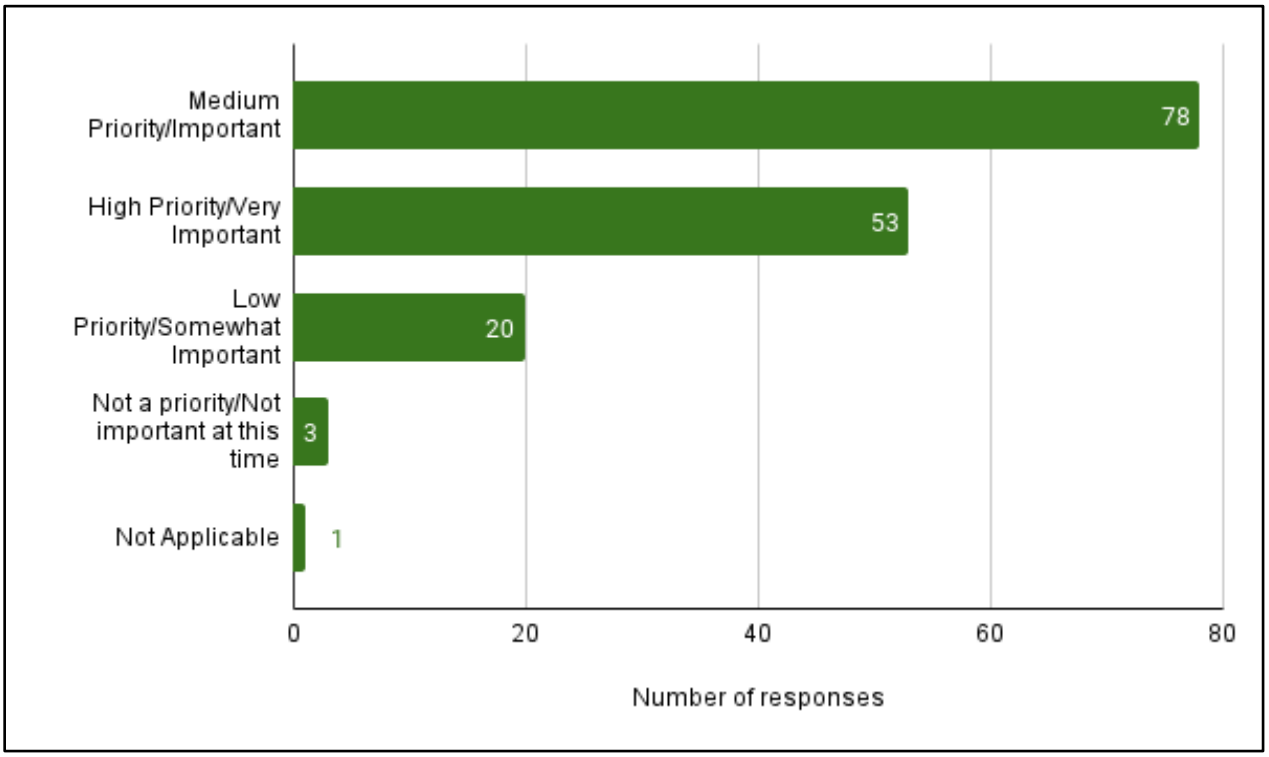
OSAC Registry Awareness

Participants were asked whether individuals in their organizations were aware of the OSAC Registry. Most respondents, 153 out of 155 (98%), acknowledged that individuals in their organization were knowledgeable of the standards on the OSAC Registry.

Priority for Implementing Standards

When asked what priority survey participants considered standards implementation for their organization, half of the respondents (50%) said it was a medium priority, or important. This was followed by 34% of respondents indicating that implementation was a high priority, or very important. Twenty-three respondents (14.8%) indicated that implementation was a low priority or not a priority at this time **(Figure 4)**.

Figure 4. *Priorities for Standards Implementation*



Key Challenges to Implementation

While 98% of survey respondents indicated that individuals in their organization were aware of the standards on the Registry, OSAC wanted to learn more about some of the challenges these forensic science service providers faced when implementing them. Survey participants were asked to select up to five key challenges from a list of 14 options. Of the responses, 71 indicated there were no major challenges and their organization supports implementation policies. See **Table 3** for the key challenges identified from the 388 responses.

Table 3. *Key Challenges to Standards Implementation*

Key challenges	Responses
No key challenges. My organization supports implementation policies.	71
My organization does not have the available personnel to allocate to this task.	63
My organization supports implementation policies but can't implement at this time.	47
My organization is not required to implement OSAC Registry standards.	40
My organization does not have the funding to support implementation.	35
My organization currently uses other guidance documents that are not on the OSAC Registry.	33
My organization does not have the available instruments and/or facility to support implementation.	23
My organization has not completed validation required by these standards.	22
My organization does not have the training to support implementation.	15
My organization does not feel the OSAC Registry standard(s) will add value over what is already implemented.	15
My organization does not understand the need for OSAC Registry standards.	10
The OSAC Registry does not have any applicable standards for my organization.	8
My organization does not know how to update our standard operating procedures/quality manual to incorporate OSAC Registry standards.	3
My organization does not agree with OSAC Registry standards.	3

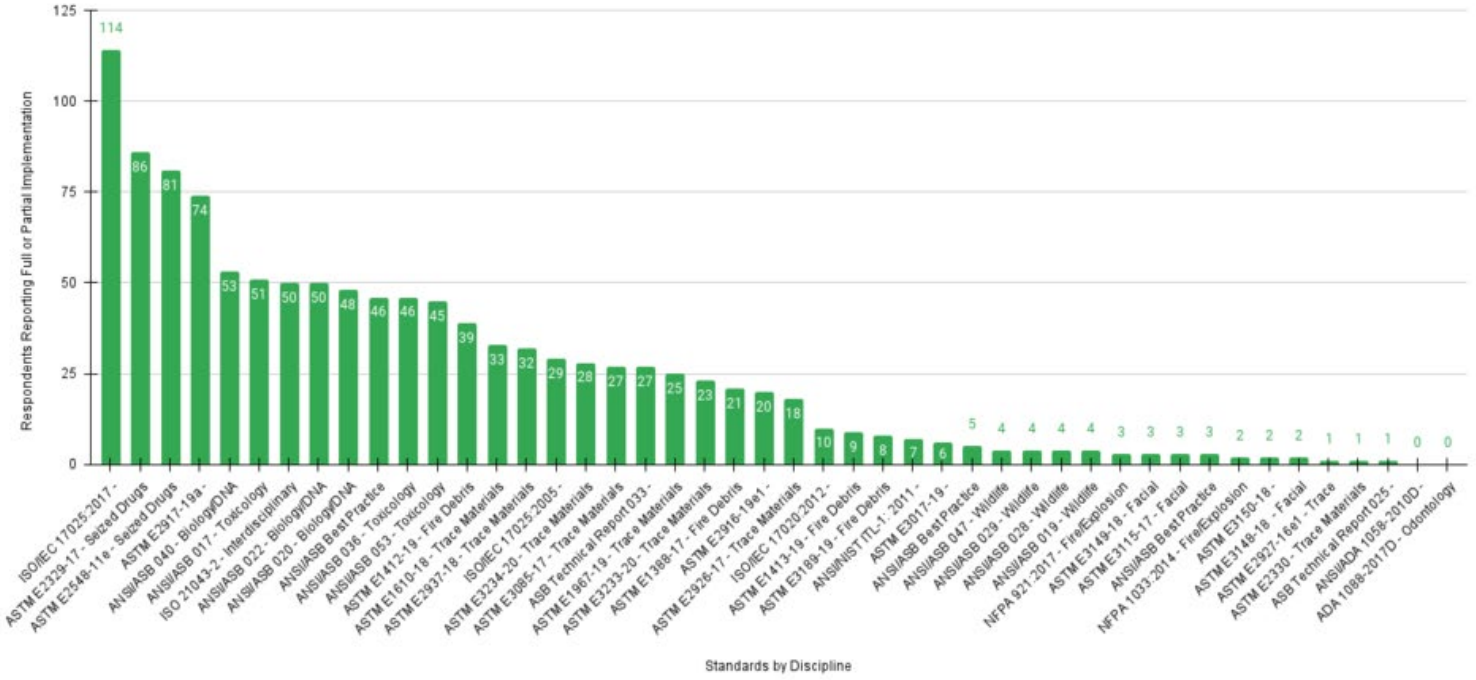
Organizations Participating in Full and Partial Standards Implementation

This survey included 46 standards that were posted on the OSAC Registry through March 2021. Of these, 44 standards have been implemented, either fully or partially. Two standards have not yet been implemented in organizations represented by the survey respondents.

The standard that has been implemented the most by respondents is ISO/IEC 17025:2017 *General requirements for the Competence of Testing and Calibration Laboratories*. This standard specifies the general requirements for the competence, impartiality, and consistent operation of laboratories and is a key standard used to accredit forensic laboratories. The survey results support this observation as 73% of the respondents noted that they have implemented ISO 17025:2017, either fully or partially, at their organization.

After ISO/IEC 17025, two seized drug standards were implemented most. These include ASTM E2329-17 *Standard Practice for Identification of Seized Drugs* (55%) and ASTM E2548-11e *Standard Guide for Sampling Seized Drugs for Qualitative and Quantitative Analysis* (52%). See **Figure 5** for the number of respondents that have indicated full or partial implementation of the 46 standards in this survey.

***Figure 5. Number of** Organizations Participating in Full and Partial Standards Implementation by Standard*



Of the 155 respondents, 17 indicated that they have not implemented, either fully or partially, any of the standards on the OSAC Registry. The remaining 138 respondents have either partially or fully implemented at least one standard on the OSAC Registry other than ISO/IEC 17025:2017.

Implementation Summary Sections

The next section of this report provides data on the specific disciplines where standards on the OSAC Registry were available as of March 2021. Each of the following discipline-specific sections begins with a list of the applicable standards and their scopes, followed by the implementation status for each standard, a rollup graph that groups the standards for quick reference, and a summary of the survey data.

Survey respondents were asked to categorize their laboratory's implementation efforts for each of the 46 standards on the OSAC Registry (through March 2021) using the selections identified below.

- Implemented Full
- Implemented Partial
- Not Yet Implemented/Undecided
- Will Not Implement
- Not Applicable

BIOLOGY/DNA

Standards on the OSAC Registry (3)

- **ANSI/ASB 020, *Standard for Validation Studies of DNA Mixtures, and Development and Verification of a Laboratory's Mixture Interpretation Protocol*, First Edition, 2018**. This standard sets forth the requirements for the design and evaluation of internal validation studies for mixed DNA samples and the development of appropriate interpretation protocols for mixtures based on the validation studies performed. This standard includes a requirement that the laboratory verify and document that the mixture interpretation protocols developed from the completed validation studies generate reliable and consistent interpretations and conclusions for the types of mixed DNA samples typically encountered by the laboratory.
- **ANSI/ASB 022, *Standard for Forensic DNA Analysis Training Programs*, First Edition, 2019**. This standard provides the general requirements for a forensic DNA laboratory's training program in DNA analysis including data interpretation.
- **ANSI/ASB 040, *Standard for Forensic DNA Interpretation and Comparison Protocols*, First Edition, 2019.** This document provides requirements for a laboratory's DNA interpretation and comparison protocol. A protocol is needed for any DNA testing methodology that includes data interpretation and/or comparison. The protocol should encompass all variables permitted in the technical protocols that may have an impact on the data generated and the variety and range of test data anticipated in casework based on the types of samples routinely accepted and tested in the laboratory.

Implementation Status by Standard (out of 155 survey respondents)

Figure 6. *ANSI/ASB 020, Standard for Validation Studies of DNA Mixtures, and Development and Verification of a Laboratory's Mixture Interpretation Protocol*

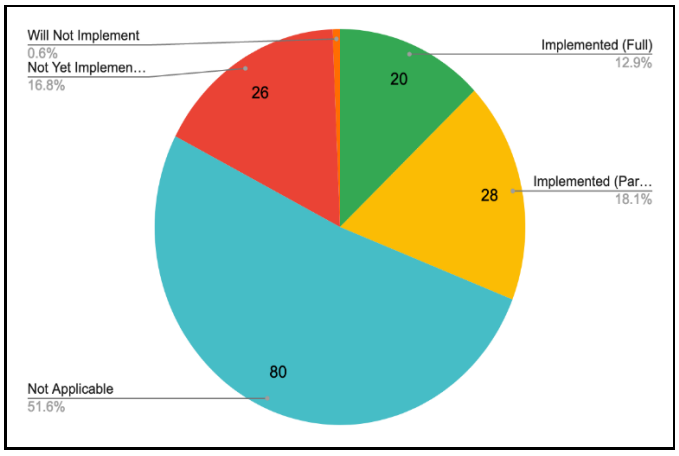


Figure 7. *ANSI/ASB 022, Standard for Forensic DNA Analysis Training Programs*

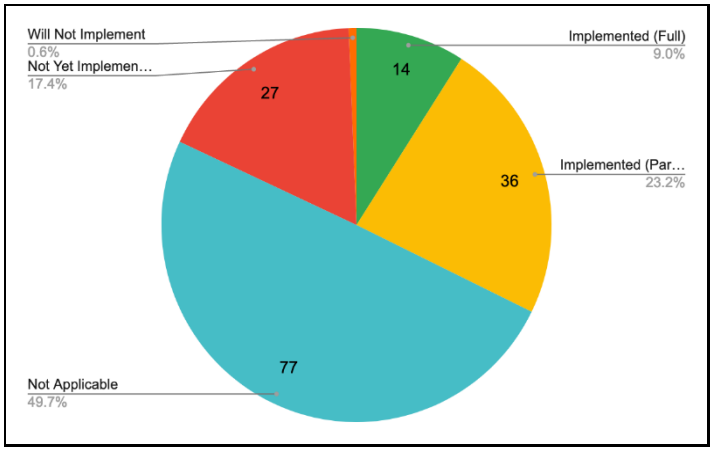


Figure 8. *ANSI/ASB 040, Standard for Forensic DNA Interpretation and Comparison Protocols*

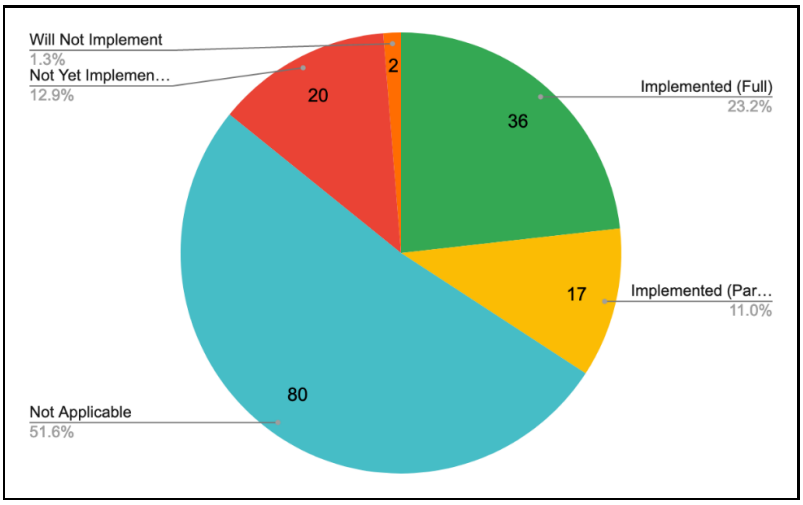
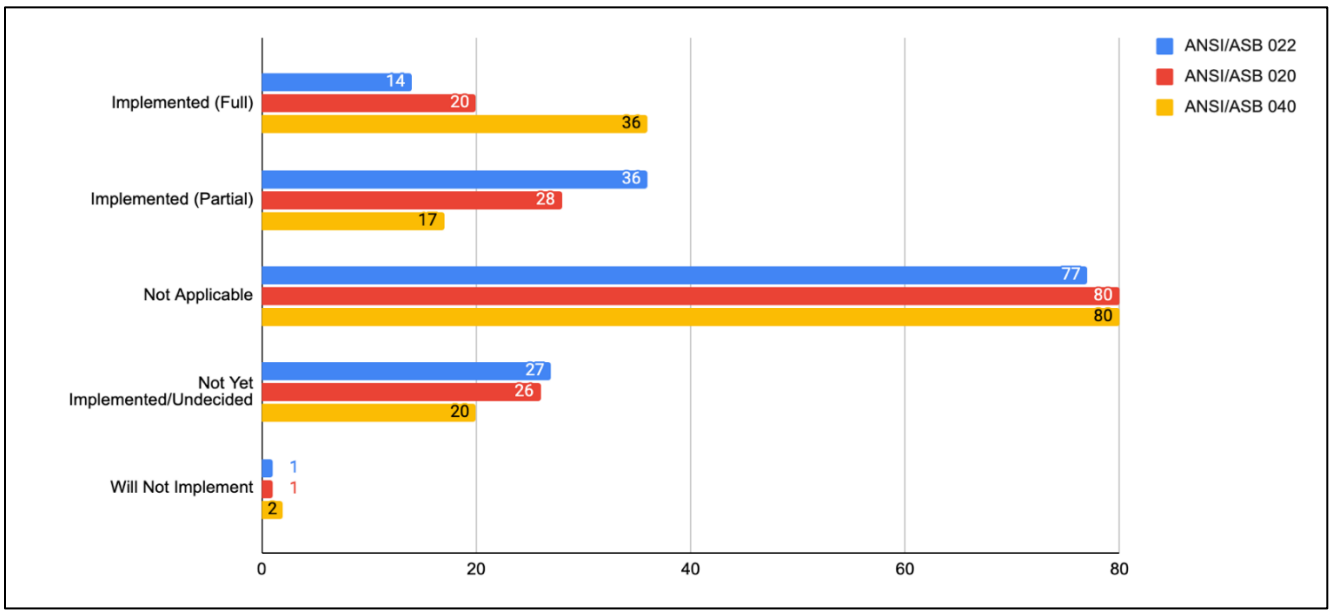


Figure 9. *DNA Summary: Rollup of total number of implementers (out of 155 respondents) of the three published DNA standards on the OSAC Registry (as of March 2021)*



Summary

Out of 155 respondents:

- 48 indicated that their organization has either fully or partially implemented ANSI/ASB 020, while 26 said their organization has not yet implemented this standard.
- 50 indicated that their organization has either fully or partially implemented ANSI/ASB 022, while 27 said their organization has not yet implemented this standard.
- 53 indicated that their organization has either fully or partially implemented ANSI/ASB 040, while 20 said their organization has not yet implemented this standard.
- At least 77 indicated that these biology/DNA standards are not applicable for implementation in their organization.

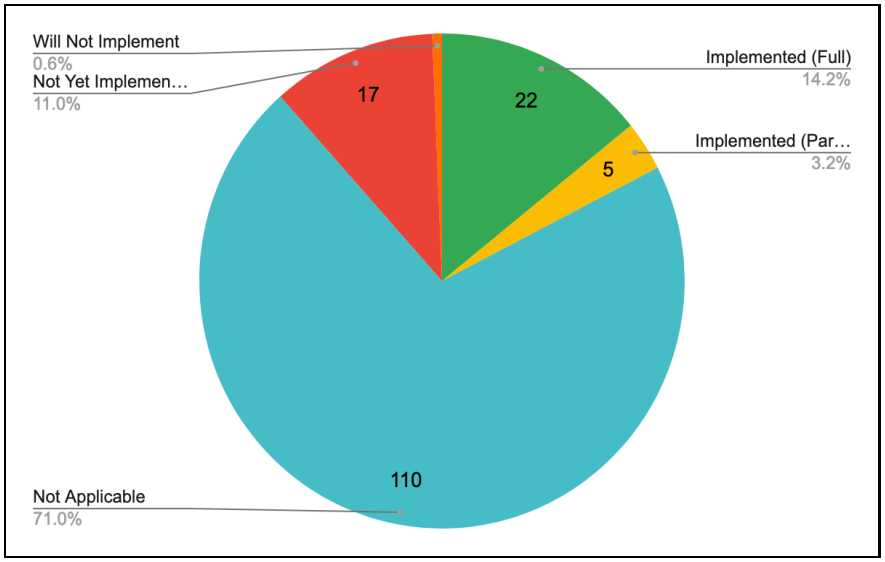
BLOODSTAIN PATTERN ANALYSIS

Standards on the OSAC Registry (1)

- **ASB Technical Report 033, *Terms and Definitions in Bloodstain Pattern Analysis*, First Edition, 2017**. This document provides a list of recommended terms and definitions to be used in published manuscripts, forensic reports discussing the conclusions of scientific examination of bloodstains, in courtroom testimony, and when teaching bloodstain pattern analysis. The target audience of this document includes crime scene investigators, forensic scientists, investigators, attorneys, judges, and researchers.

Implementation Status by Standard (out of 155 survey respondents)

Figure 10. *ASB Technical Report 033, Terms and Definitions in Bloodstain Pattern Analysis*



Will Not Implement = 1

Summary

Out of 155 respondents:

- 27 indicated that their organization has either fully or partially implemented ASB Technical Report 033, while 17 indicated their organization has not yet implemented this bloodstain pattern analysis standard.
- Nearly three quarters of all respondents (110) indicated that the bloodstain pattern analysis standard is not applicable for implementation in their organization.

DIGITAL EVIDENCE

Standards on the OSAC Registry (3)

- **ASTM E2916-19e1** ***Standard Terminology for Digital and Multimedia Evidence Examination.*** A compilation of terms and corresponding definitions used in the examination of digital and multimedia evidence to include the areas of computer forensics, image analysis, video analysis, forensic audio, and facial identification.
- **ASTM E3017-19** ***Standard Practice for Examining Magnetic Card Readers*****.** Magnetic card readers, when used for illegal purposes, are commonly referred to as skimmers. This practice provides information on seizing, acquiring, and analyzing skimming devices capable of acquiring and storing personally identifiable information (PII) in an unauthorized manner.
- **ASTM E3150-18** ***Standard Guide for Forensic Audio Lab Setup and Maintenance*****.** This guide sets forth recommendations for the creation of a forensic audio laboratory space as well as the configuration, verification, and maintenance of the equipment contained within the lab. In designing and configuring an audio laboratory, it is important to consider the acoustical environment/room of the laboratory, as well as climate control. Other than having a viable location for the laboratory, computer hardware and software applications are the most important components of this type of laboratory.

Implementation Status by Standard (out of 155 survey respondents)

Figure 11. *ASTM E2916-19e1 Standard Terminology for Digital and Multimedia Evidence Examination*

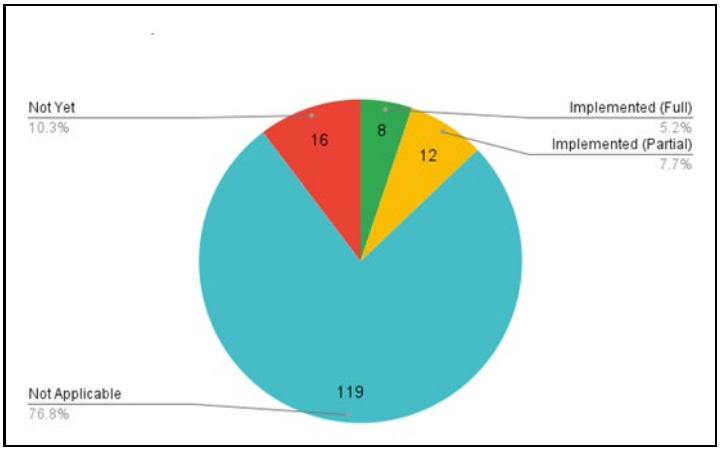
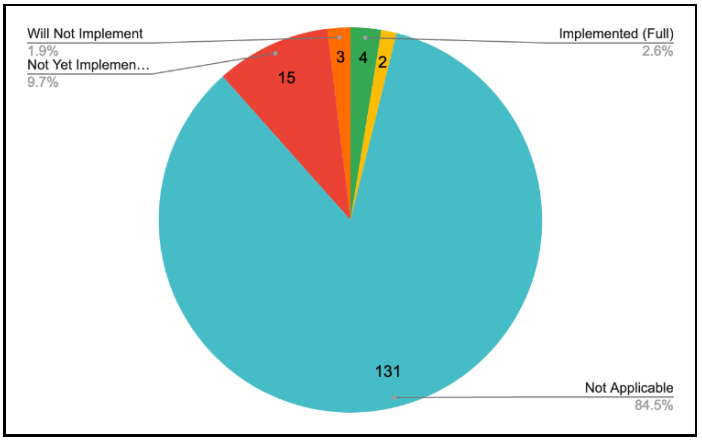
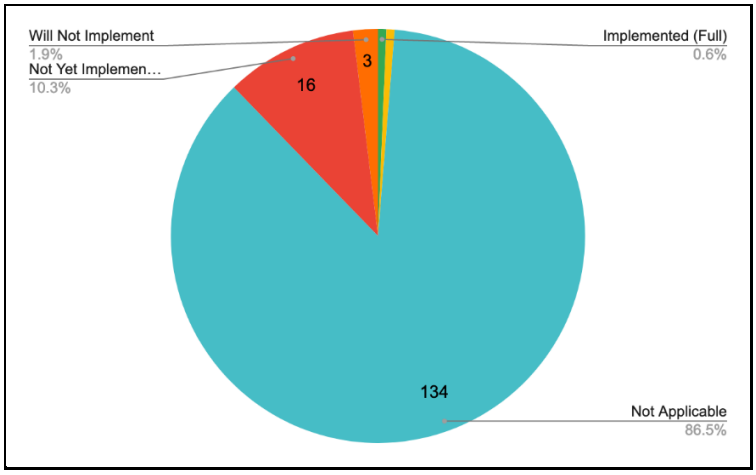


Figure 12. *ASTM E3017-19 Standard Practice for Examining Magnetic Card Readers*



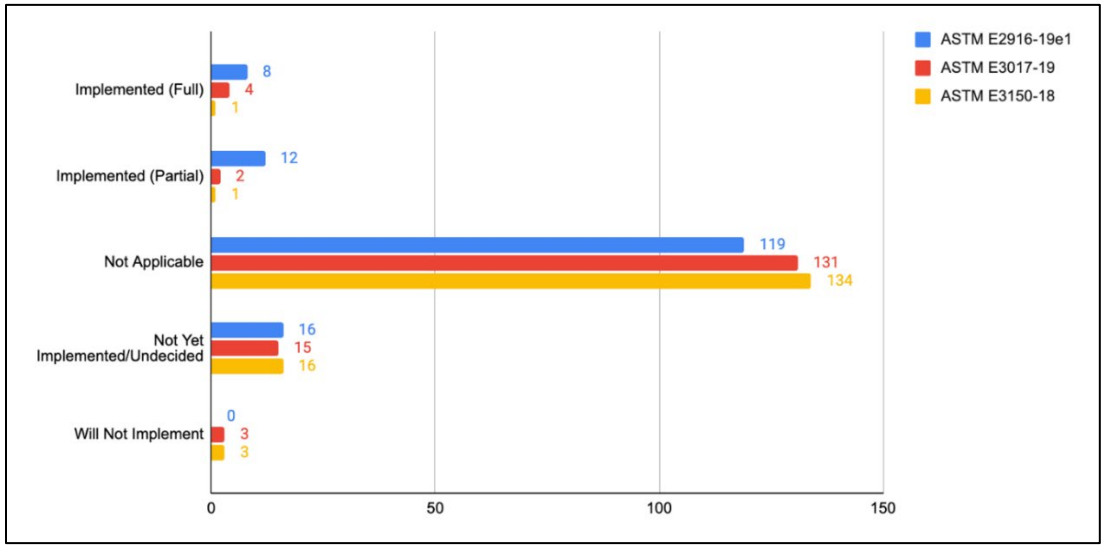
Implemented Partial = 2

Figure 13. *ASTM E3150-18 Standard Guide for Forensic Audio Lab Setup and Maintenance*



Implemented Full = 1; Implemented Partial = 1

Figure 14. *Digital Evidence Summary: Rollup of total number of implementers (out of 155 respondents) of the three published digital evidence standards on the OSAC Registry (as of March 2021)*



Summary

Out of 155 respondents:

- 20 indicated that their organization has either fully or partially implemented ASTM E2916-19e1, while 16 said their organization has not yet implemented this standard.
- 6 indicated that their organization has either fully or partially implemented ASTM 3017-19, while 15 said their organization has not yet implemented this standard.
- 2 indicated that their organization has either fully or partially implemented ASTM 3150-18, while 16 said their organization has not yet implemented this standard.
- At least 119 (more than three quarters of all respondents) indicated that these digital evidence standards are not applicable for implementation in their organization.

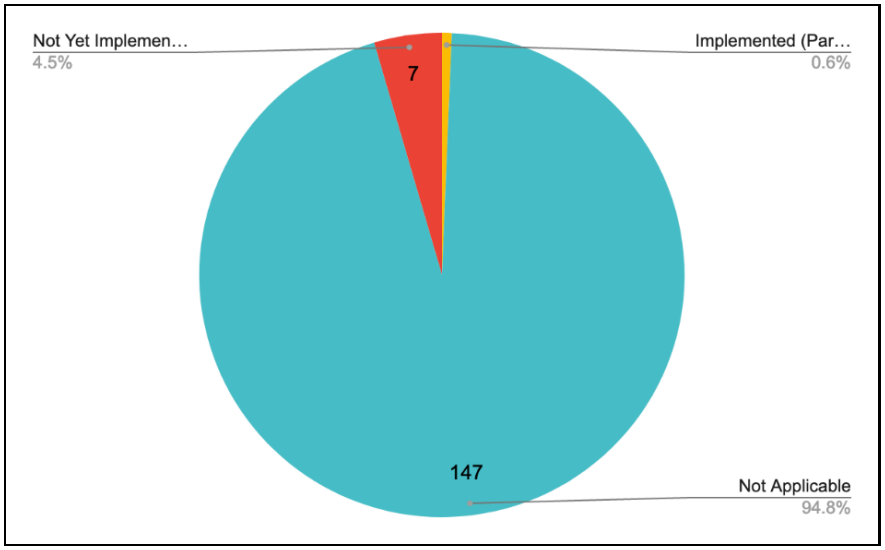
DOGS & SENSORS

Standards on the OSAC Registry (1)

- **ASB Technical Report 025, *Crime Scene/Death Investigation - Dogs and Sensors - Terms and Definitions*, First Edition, 2017.** This technical document provides the standardization of terms and definitions used in the detection dog community. The use of standardized terminology in the detection dog community promotes consistency across jurisdictions and relieves the judicial system of conflicting terms and definitions.

Implementation Status by Standard (out of 155 survey respondents)

Figure 15. *ASB Technical Report 025, Crime Scene/Death Investigation - Dogs and Sensors - Terms and Definitions*



Implemented Partial = 1

Summary

Out of 155 respondents:

- One indicated that their organization has partially implemented ASB 025, while seven respondents said their organization has not yet implemented this standard.
- 147 of all respondents (nearly 95%) indicated that this standard is not applicable for implementation in their organization.

FACIAL IDENTIFICATION

Standards on the OSAC Registry (3)

- **ASTM E3115-17** ***Standard Guide for Capturing Facial Images for Use with Facial Recognition Systems.*** This guide is intended for use by practitioners who are choosing, setting up, and operating photographic equipment designed to capture facial images for use with an automated Facial Recognition System or used for manual comparisons by a trained facial examiner. This guide provides an overview of how to achieve the specifications defined in Annex E of ANSI/NIST-ITL-1-2011, Update 2015, for capturing facial images.
- **ASTM E3148-18** ***Standard Guide for Postmortem Facial Image Capture.*** This document provides guidelines for capturing postmortem facial images of human remains in controlled (for example, morgue) and semi-controlled (for example, field) settings to facilitate automated facial recognition (FR) searches or manual facial comparisons that could contribute to forensic investigations.
- **ASTM E3149-18** ***Standard Guide for Facial Image Comparison Feature List for Morphological Analysis.*** This guide defines a standard set of facial components, characteristics, and descriptors that should be used for facial comparison.

Implementation Status by Standard (out of 155 survey respondents)

Figure 16. *ASTM E3115-17 Standard Guide for Capturing Facial Images for Use with Facial Recognition Systems*

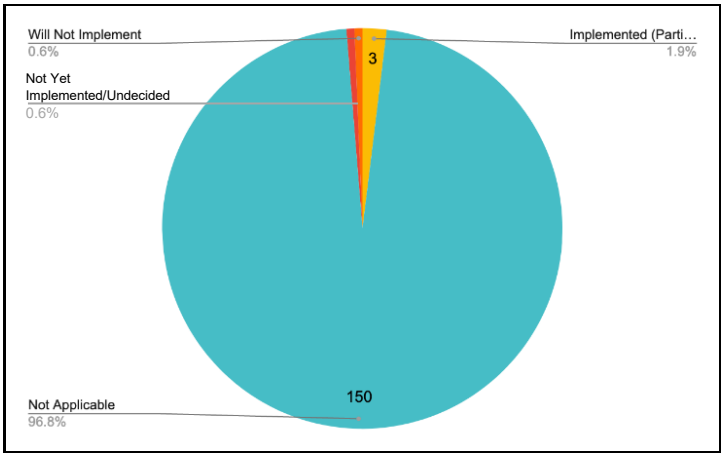
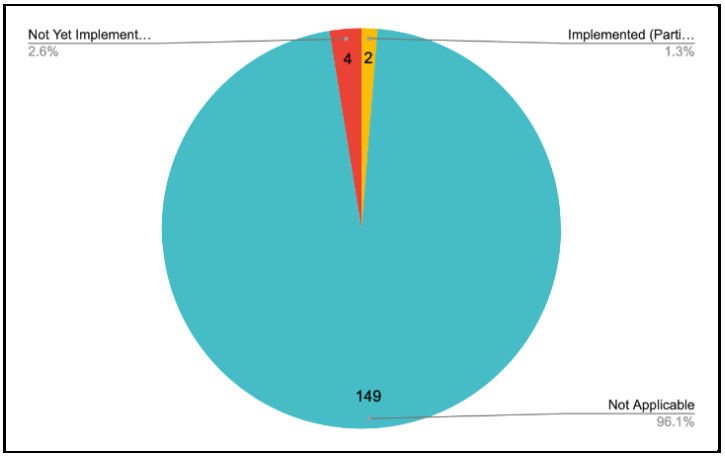
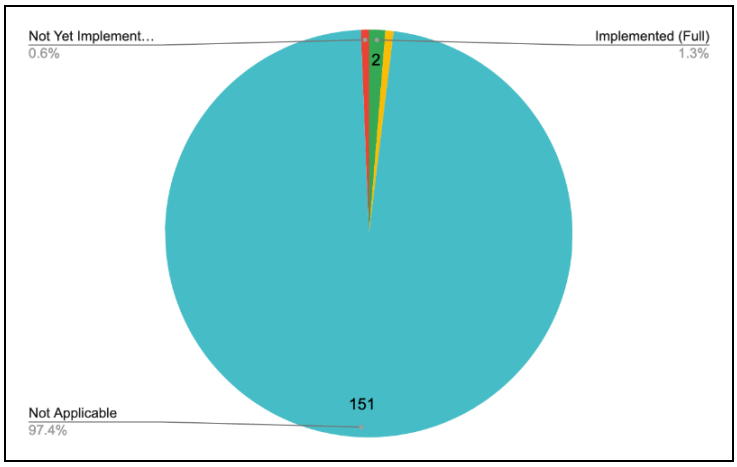


Figure 17. *ASTM E3148-18 Standard Guide for Postmortem Facial Image Capture*



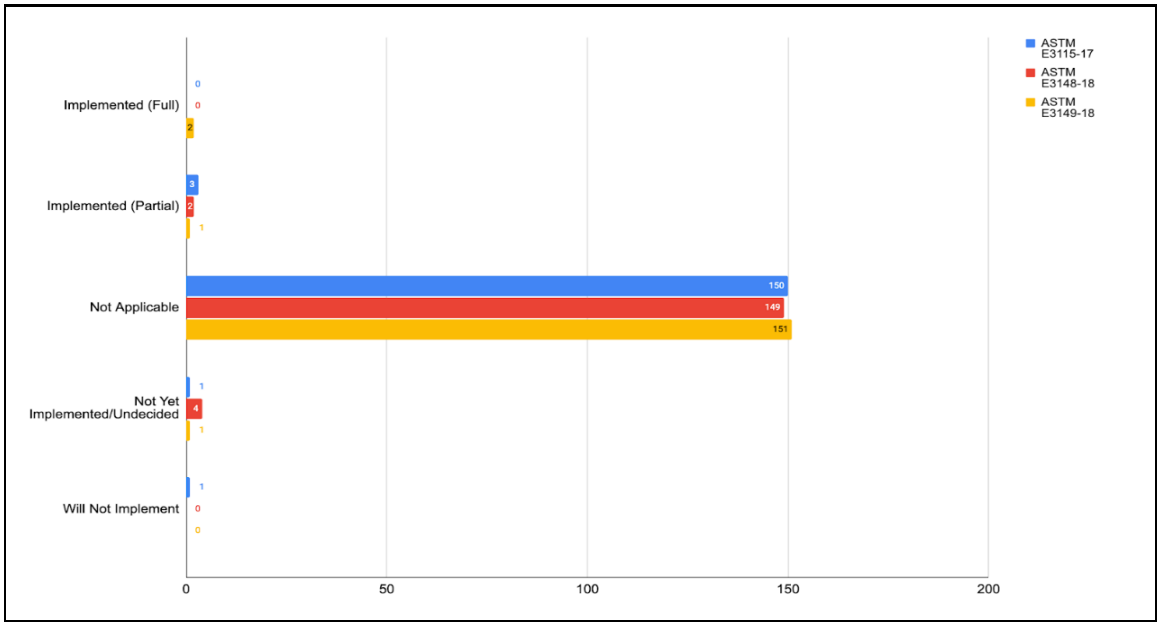
Will not implement = 1
Not Yet Implemented/Undecided = 1

Figure 18. *ASTM E3149-18 Standard Guide for Facial Image Comparison Feature List for Morphological Analysis*



Not Yet Implemented/Undecided = 1
Implemented Partial = 1

Figure 19. *Facial Identification Summary: Rollup of total number of implementers (out of 155 respondents) of the three published facial identification standards on the OSAC Registry (as of March 2021)*



Summary

Out of 155 respondents:

- Three indicated that their organization has partially implemented ASTM 3115-17, while one said their organization has not yet implemented this standard.
- Two indicated their organization has partially implemented ASTM 3148-18, while four said their organization has not yet implemented this standard.
- Three indicated their organization has partially or fully implemented ASTM 3149-18, while one said their organization has not yet implemented this standard.
- At least 149 (more than 95%) of all respondents indicated that these facial identification standards are not applicable for implementation in their organization.

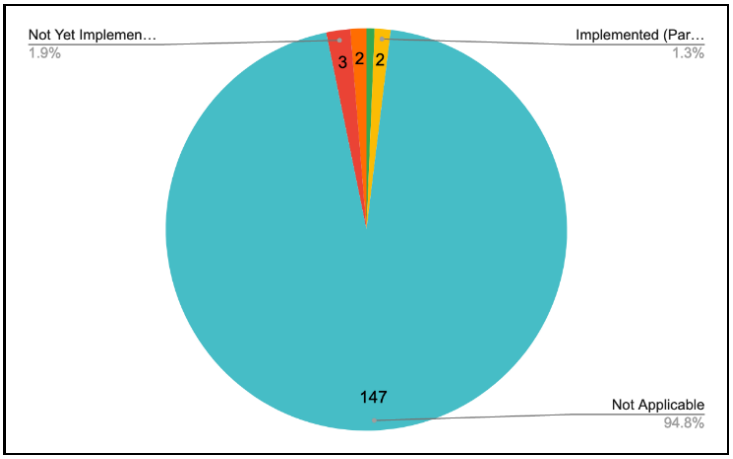
FIRE & EXPLOSION INVESTIGATION

Standards on the OSAC Registry (2)

- **NFPA 921:2017 *Guide for Fire and Explosion Investigations.*** This document assists individuals who are charged with the responsibility of investigating and analyzing fire and explosion incidents and rendering opinions as to the origin, cause, responsibility, or prevention of such incidents, and the damage and injuries which arise from such incidents.
- **NFPA 1033:2014 *Standard for Professional Qualifications for Fire Investigator*.** This standard identifies the minimum job performance requirements for fire investigators.

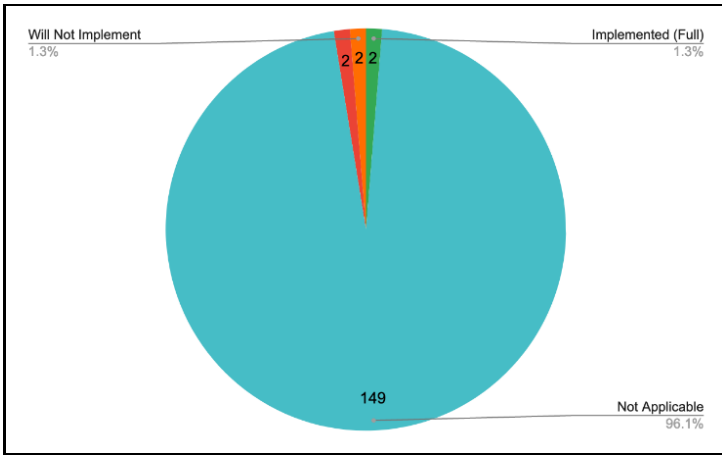
Implementation Status by Standard (out of 155 survey respondents):

Figure 20. *NFPA 921:2017 Guide for Fire and Explosion Investigations*



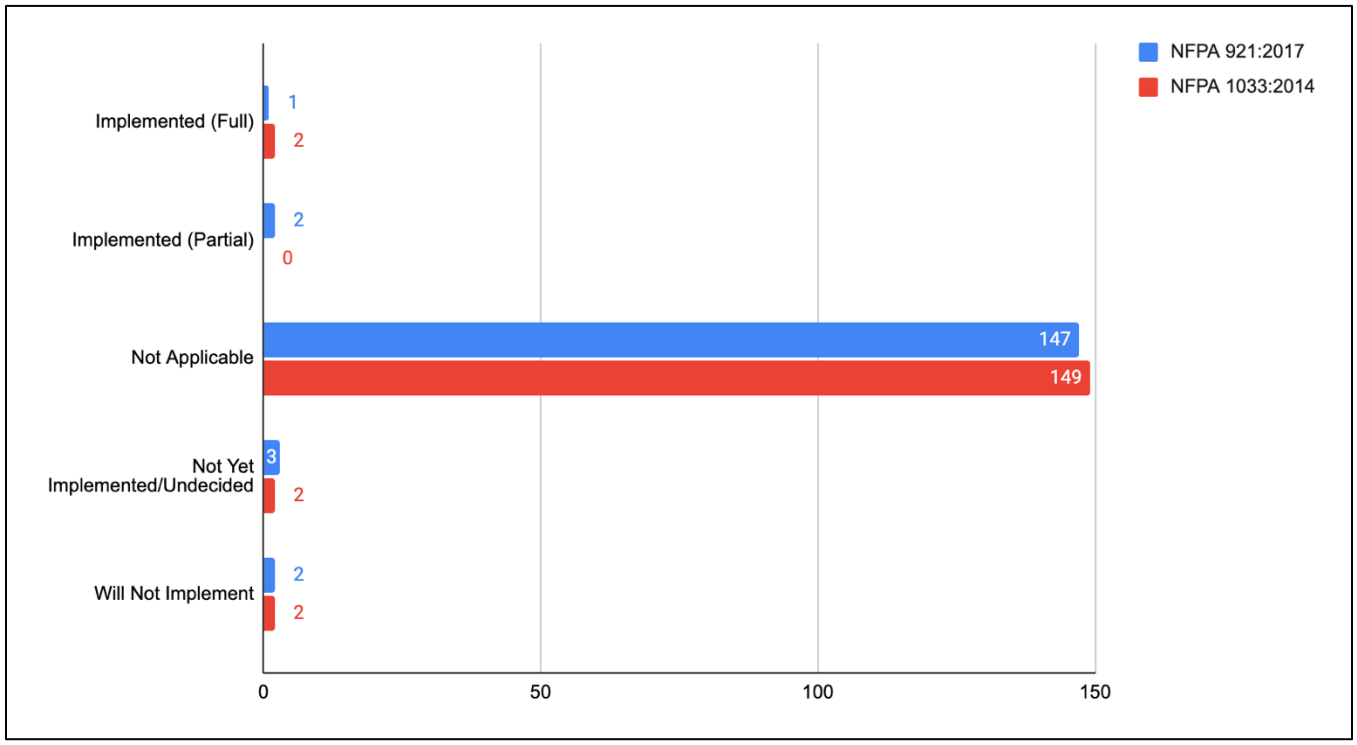
Implemented (Full) = 1 Will Not Implement = 2

Figure 21. *NFPA 1033:2014 Standard for Professional Qualifications for Fire Investigator*



Not Yet Implemented/Undecided = 2

Figure 22. *Fire and Explosion Investigation Summary: Rollup of total number of implementers (out of 155 respondents) of the two published fire and explosion investigation standards on the OSAC Registry (as of March 2021)*



Summary

Out of 155 respondents:

- Three indicated that their organization has either fully or partially implemented NFPA 921:2017, while three said their organization has not yet implemented this standard.
- Two indicated that their organization has fully implemented NFPA 1033:2014, while two said their organization has not yet implemented this standard.
- At least 147 (approximately 95%) of all respondents indicated that these fire and explosion investigation standards are not applicable for implementation in their organization.

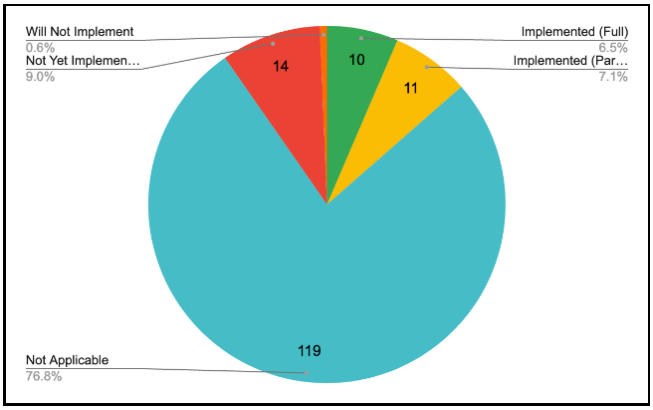
FIRE DEBRIS

Standards on the OSAC Registry (4)

- **ASTM E1388-17** ***Standard Practice for Static Headspace Sampling of Vapors from Fire Debris Samples.*** This practice describes the procedure for removing vapor from the headspace of a fire debris container for the purpose of detecting or identifying ignitable liquid residues.
- **ASTM E1412-19** ***Standard Practice for Separation of Ignitable Liquid Residues from Fire Debris Samples by Passive Headspace Concentration with Activated Charcoal*****.** This practice describes the procedure for separation of small quantities of ignitable liquid residues from samples of fire debris using an adsorbent material to extract the residue from the static headspace above the sample, then eluting the adsorbent with a solvent.
- **ASTM E1413-19** ***Standard Practice for Separation of Ignitable Liquid Residues from Fire Debris Samples by Dynamic Headspace Concentration onto an Adsorbent Tube*****.** This practice describes the procedure for separation of ignitable liquid residues from fire debris samples using dynamic headspace concentration onto an adsorbent tube, with subsequent solvent elution or thermal desorption.
- **ASTM E3189-19** ***Standard Practice for Separation of Ignitable Liquid Residues from Fire Debris Samples by Static Headspace Concentration onto an Adsorbent Tube*****.** This practice describes the procedure for separation of ignitable liquid residues from fire debris samples using static headspace concentration onto an adsorbent tube, for subsequent solvent elution or thermal desorption.

Implementation Status by Standard (out of 155 survey respondents)

Figure 23. *ASTM E1388-17 Standard Practice for Static Headspace Sampling of Vapors from Fire Debris Samples*



Will Not Implement = 1

Figure 24. *ASTM E1412-19* Standard Practice for Separation of Ignitable Liquid Residues from Fire Debris Samples by Passive Headspace Concentration with Activated Charcoal

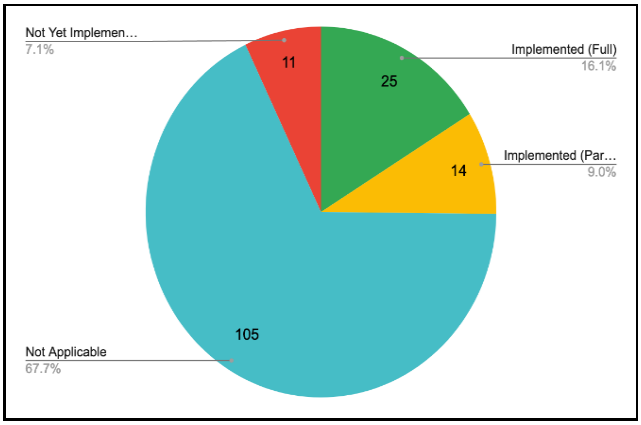
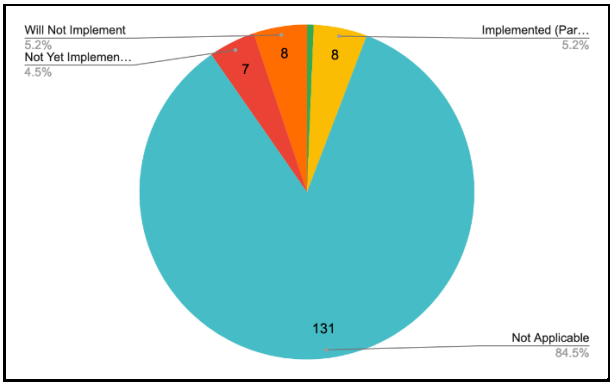
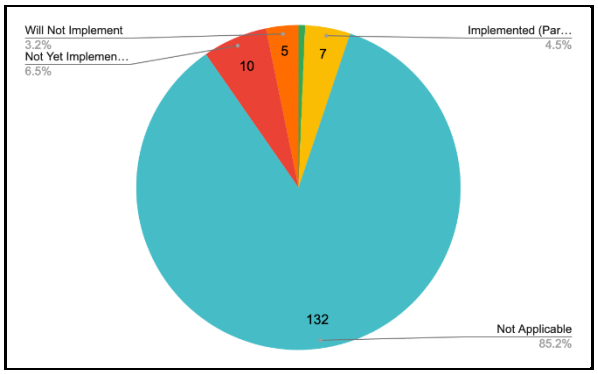


***Figure 25**. ASTM E1413-19 Standard Practice for Separation of Ignitable Liquid Residues from Fire Debris Samples by Dynamic Headspace Concentration onto an Adsorbent Tube*



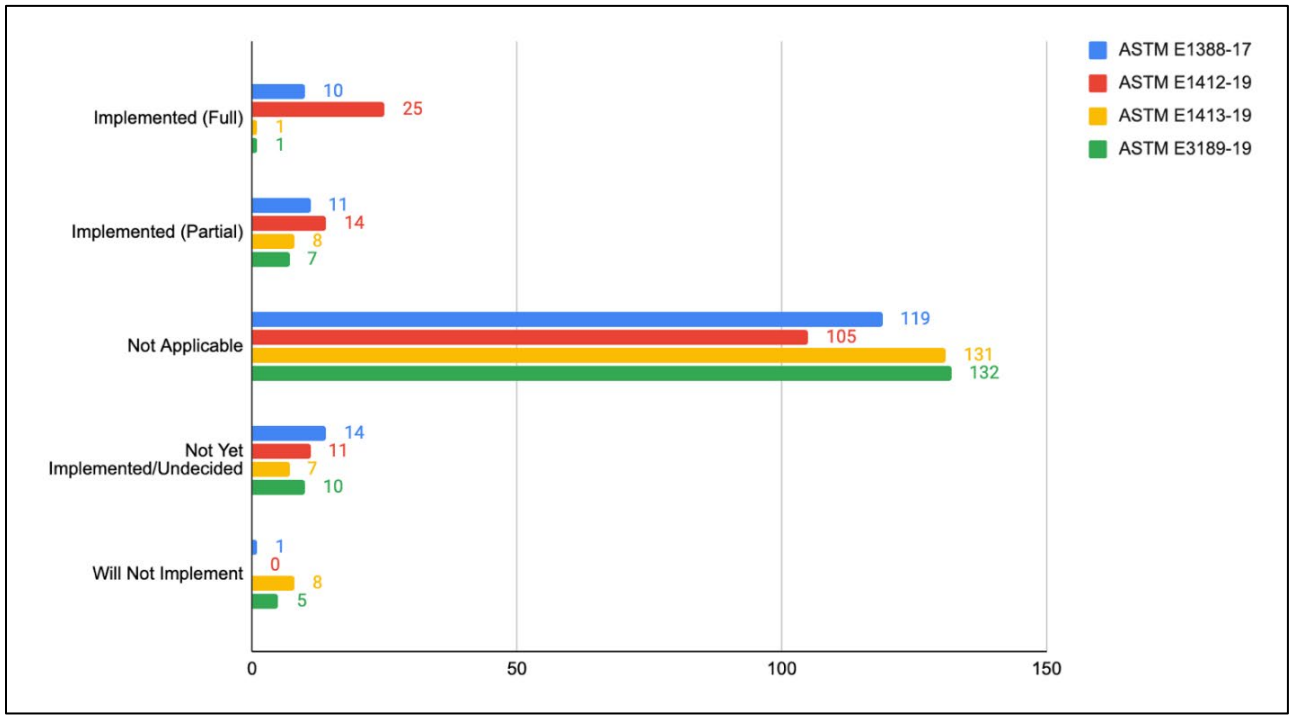
Implemented (Full) = 1

***Figure 26.** ASTM E3189-19 Standard Practice for Separation of Ignitable Liquid Residues from Fire Debris Samples by Static Headspace Concentration onto an Adsorbent Tube*



Implemented (Full) = 1

***Figure 27.** Fire Debris Summary: Rollup of total number of implementers (out of 155 respondents) of the four published fire debris standards on the OSAC Registry (as of March 2021)*



Summary

Out of 155 respondents:

- 21 indicated that their organization has either fully or partially implemented ASTM E1388-17, while 14 respondents said their organization has not yet implemented this standard.
- 39 indicated that their organization has either fully or partially implemented ASTM E1412-19, while 11 said their organization has not yet implemented this standard.
- Nine indicated that their organization has either fully or partially implemented ASTM E1413-19, while seven said their organization has not yet implemented this standard.
- Eight indicated that their organization has either fully or partially implemented ASTM E3189-19, while 10 said their organization has not yet implemented this standard.
- At least 105 (65%) of all respondents indicated that these fire debris standards are not applicable for implementation in their organization.

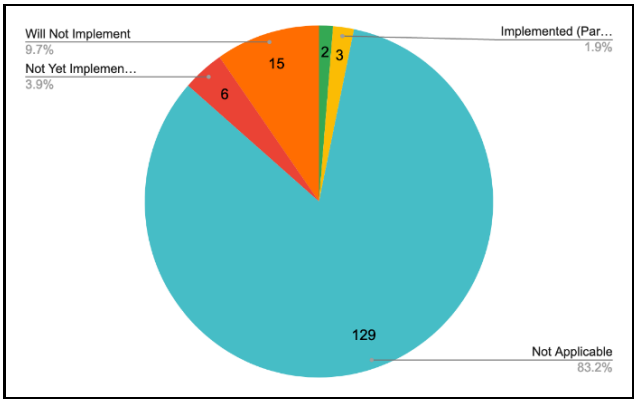
MEDICOLEGAL DEATH INVESTIGATION

Standards on the OSAC Registry (2)

- **ANSI/ASB Best Practice Recommendation 007, *Postmortem Impression Submission Strategy for Comprehensive Searches of Essential Automated Fingerprint Identification System Databases*, First Edition, 2018.** This document provides 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.
- **ANSI/ASB Best Practice Recommendation 010, *Forensic Anthropology in Disaster Victim Identification: Best Practice Recommendations for the Medicolegal Authority*, First Edition, 2018.** This document provides guidelines and best practices relevant to the role of forensic anthropology in a DVI operation. Anthropological methods, techniques and principles are typically employed in five primary capacities: 1) during the Preparedness phase of a DVI operation, 2) the Search and Recovery and preservation of remains from a mass fatality incident, 3) at the Triage Station during the initial sorting of material gathered from the field and determination of what human tissue enters the morgue, 4) at the Anthropology Station collecting quality postmortem data from each morgue sample, and 5) as a member of the ID Reconciliation Team, focused on ensuring valid and reliable positive identifications from human tissues. The focus of this document is primarily on the Triage Station and the Anthropology Station.

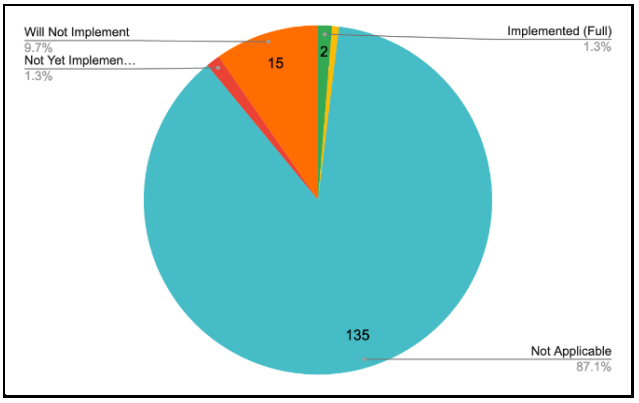
Implementation Status by Standard (out of 155 survey respondents)

Figure 28. *ANSI/ASB Best Practice Recommendation 007, Postmortem Impression Submission Strategy for Comprehensive Searches of Essential Automated Fingerprint Identification System Databases*



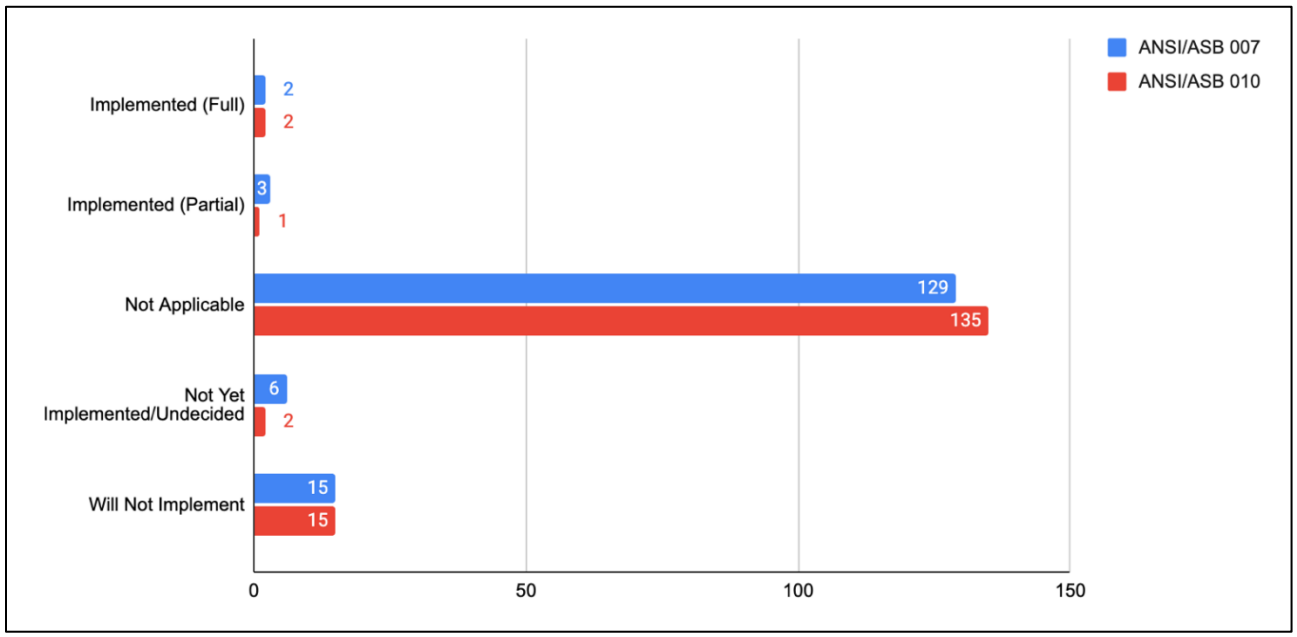
Implemented (Full) = 2

Figure 29. *ANSI/ASB Best Practice Recommendation 010, Forensic Anthropology in Disaster Victim Identification: Best Practice Recommendations for the Medicolegal Authority*



Implemented (Partial) = 1
Not Yet Implemented/Undecided = 2

Figure 30. *Medicolegal Death Investigation Summary: Rollup of total number of implementers (out of 155 respondents) of the two published medicolegal death investigation standards on the OSAC Registry (as of March 2021)*



Summary

Out of 155 respondents:

- Five indicated that their organization has either fully or partially implemented ANSI/ASB 007, while six said their organization has not yet implemented this standard.
- Three indicated that their organization has either fully or partially implemented ANSI/ASB 010, while two said their organization has not yet implemented this standard.
- At least 129 (more than three quarters) of all respondents indicated that these medicolegal death investigation standards are not applicable for implementation in their organization.

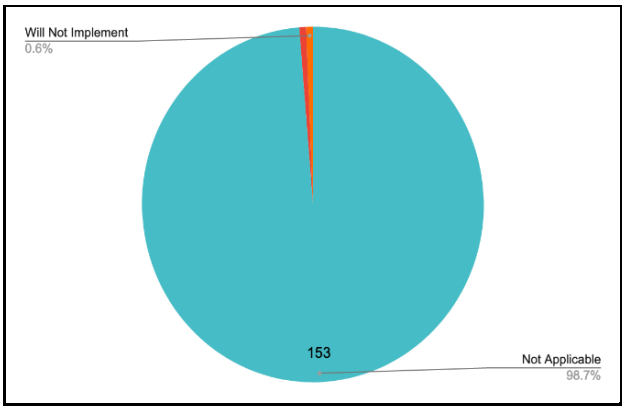
ODONTOLOGY

Standards on the OSAC Registry (2)

- **ANSI/ADA 1058-2010D *Forensic Dental Data Set.*** This standard develops uniform nomenclature for the description of forensic dental data and defines a standardized set of uniform terms to convey this information.
- **ADA 1088-2017D *Human Identification by Comparative Dental Analysis.*** This technical report provides the best available current information to forensic odontologists, forensic pathologists, medical examiners and coroners, law enforcement personnel, dental schools, emergency planners and others on the best practices recommended by the forensic odontology community. It includes guidelines on how to obtain comparative forensic dental data as well as the recommended methodologies to reconcile that data in order to establish an identification by comparative dental analysis.

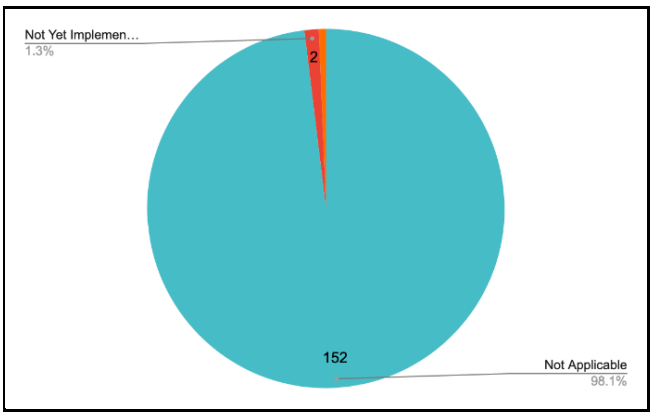
Implementation Status by Standard (out of 155 survey respondents)

Figure 31. *ANSI/ADA 1058-2010D Forensic Dental Data Set*



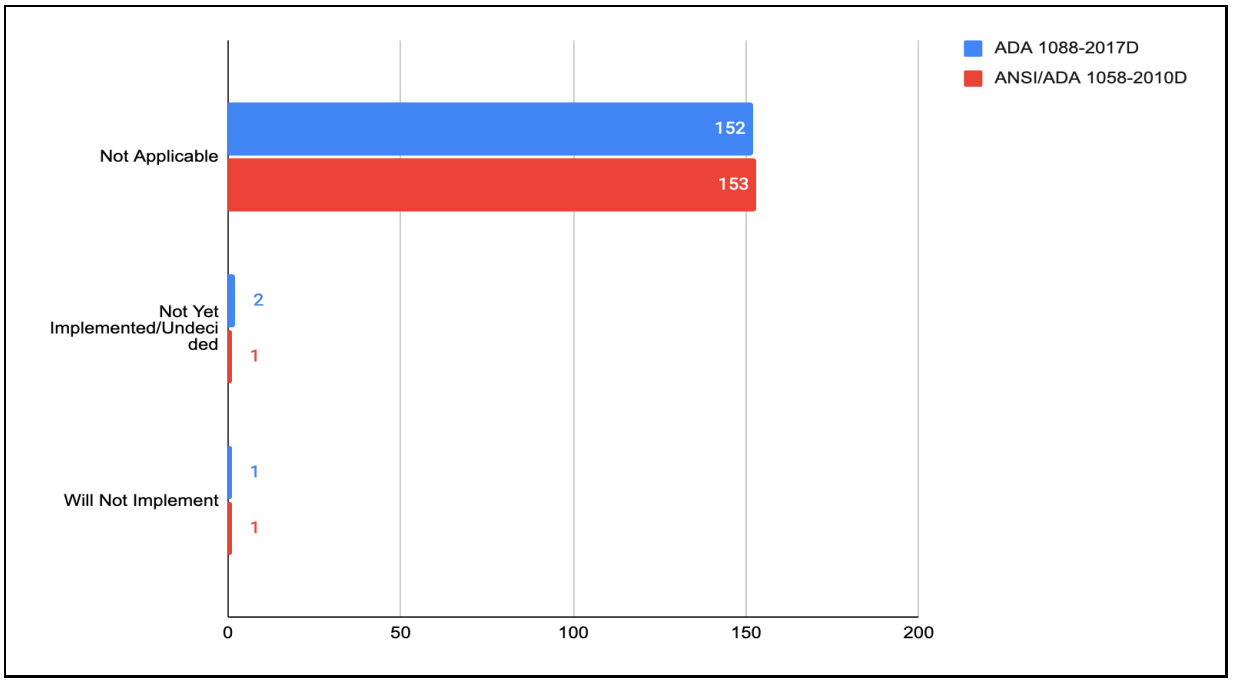
Will Not Implement = 1
Not Yet Implemented/Undecided = 1

Figure 32. *ADA 1088-2017D Human Identification by Comparative Dental Analysis*



Will Not Implement = 1

Figure 33. *Odontology Summary: Rollup of total number of implementers (out of 155 respondents) of the two published odontology standards on the OSAC Registry (as of March 2021)*



Summary

Out of 155 respondents:

- Two indicated that their organization has not yet implemented ADA 1088-2017D.
- One indicated that their organization has not yet implemented ANSI/ADA 1058-2010D.
- At least 152 (99%) of all respondents indicated that forensic odontology standards are not applicable for implementation in their organization.

SEIZED DRUGS

Standards on the OSAC Registry (2)

- **ASTM E2329-17 *Standard Practice for Identification of Seized Drugs*.** This practice describes minimum criteria for the qualitative analysis (identification) of seized drugs.
- **ASTM E2548-11e1 *Standard Guide for Sampling Seized Drugs for Qualitative and Quantitative Analysis.*** This guide covers minimum considerations for sampling of seized drugs for qualitative and quantitative analysis.

Implementation Status by Standard (out of 155 survey respondents)

Figure 34. *ASTM E2329-17 Standard Practice for Identification of Seized Drugs*

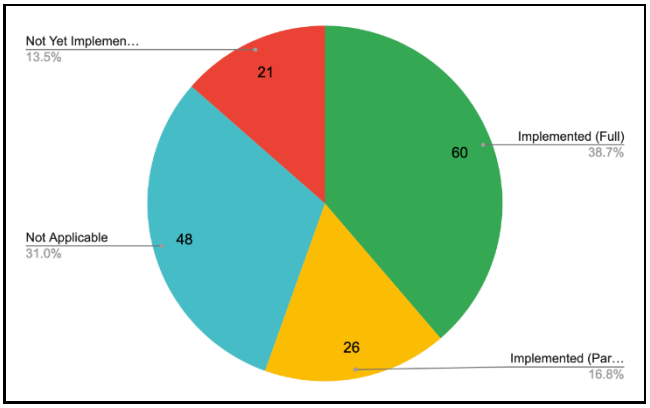
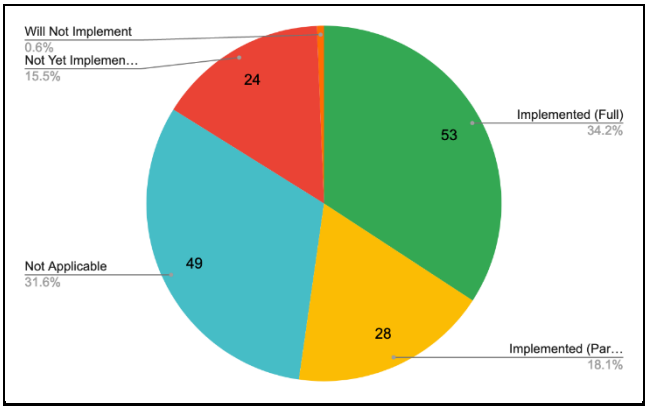
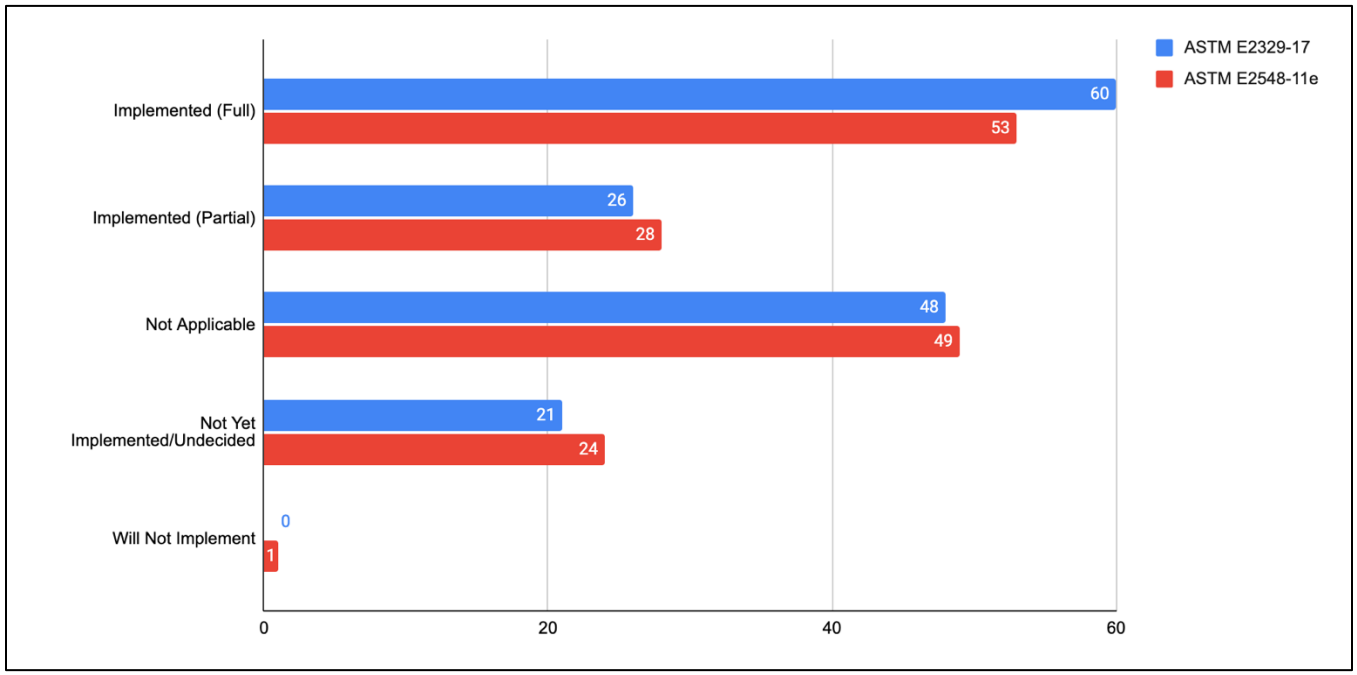


Figure 35. *ASTM E2548-11e1 Standard Guide for Sampling Seized Drugs for Qualitative and Quantitative Analysis*



Will Not Implement = 1

Figure 36. *Seized Drug Summary: Rollup of total number of implementers (out of 155 respondents) of the two published seized drug standards on the OSAC Registry (as of March 2021)*



Summary

Out of 155 respondents:

- 86 indicated that their organization has either fully or partially implemented ASTM E2329-17, while 21 said their organization has not yet implemented this standard.
- 81 indicated that their organization has either fully or partially implemented ASTM E2548-11e, while 24 said their organization has not yet implemented this standard.
- At least 48 (fewer than one third) of all respondents indicated that these seized drug standards are not applicable for implementation in their organization.

TOXICOLOGY

Standards on the OSAC Registry (4)

- **ANSI/ASB Standard 017, *Standard Practices for Measurement Traceability in Forensic Toxicology*, First Edition, 2018.** This standard defines the minimum requirements for establishing measurement traceability in forensic toxicology laboratories.
- **ANSI/ASB Standard 036, *Standard Practices for Method Validation in Forensic Toxicology*, First Edition, 2019.** This document delineates minimum standards of practice for validating analytical methods used in the field of forensic toxicology that target specific analytes or analyte classes. Specifically, it is intended for the subdisciplines of postmortem forensic toxicology, human performance toxicology (e.g., drug-facilitated crimes and driving-under-the-influence of alcohol or drugs), non-regulated employment drug testing, court-ordered toxicology (e.g., probation and parole, drug courts, child services), and general forensic toxicology (non-lethal poisonings or intoxications). This document is not intended to address method validation in the discipline of breath alcohol testing. The fundamental reason for performing method validation is to ensure confidence and reliability in forensic toxicological test results by demonstrating the method is fit for its intended use.
- **ANSI/ASB Best Practice Recommendation 037, *Guidelines for Opinions and Testimony in Forensic Toxicology*, First Edition, 2019.** This document delineates guidelines for best practices in forensic toxicology opinions and testimony. Specifically, it is intended for the subdisciplines of human performance toxicology (e.g., driving-under-the-influence of alcohol or drugs and drug-facilitated crimes), postmortem forensic toxicology, non-regulated employment drug testing, court-ordered toxicology (e.g., probation and parole, drug courts, child services), and general forensic toxicology (e.g., non-lethal poisonings or intoxications).
- **ANSI/ASB Standard 053, *Standard for Report Content in Forensic Toxicology*, First Edition, 2020.** This document delineates the requirements for reporting results from forensic toxicology analyses. Specifically, it is intended for the subdisciplines of human performance toxicology (e.g., driving- under-the-influence of alcohol or drugs and drug-facilitated crimes), postmortem forensic toxicology, non-regulated employment drug testing, court-ordered toxicology (e.g., probation and parole, drug courts, child services), and general forensic toxicology (e.g., non-lethal poisonings or intoxications). The document does not apply to the reporting of breath alcohol testing results.

Implementation Status by Standard (out of 155 survey respondents)

Figure 37. *ANSI/ASB Standard 017, Standard Practices for Measurement Traceability in Forensic Toxicology*

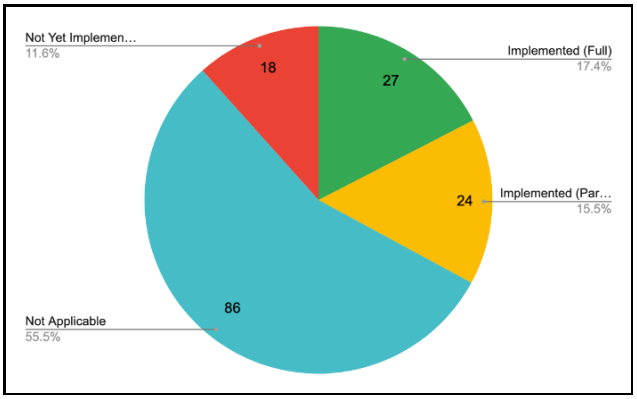


Figure 38. *ANSI/ASB Standard 036, Standard Practices for Method Validation in Forensic Toxicology*

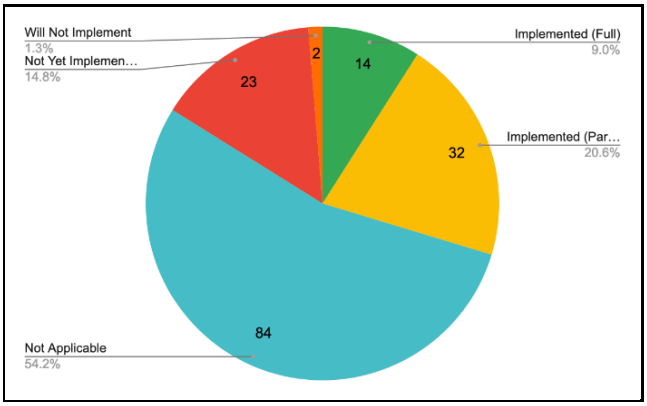
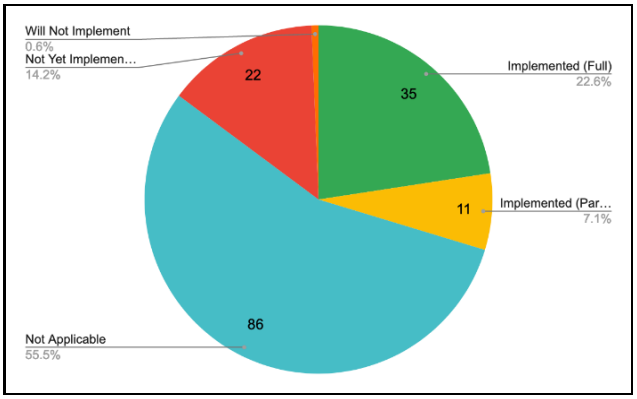
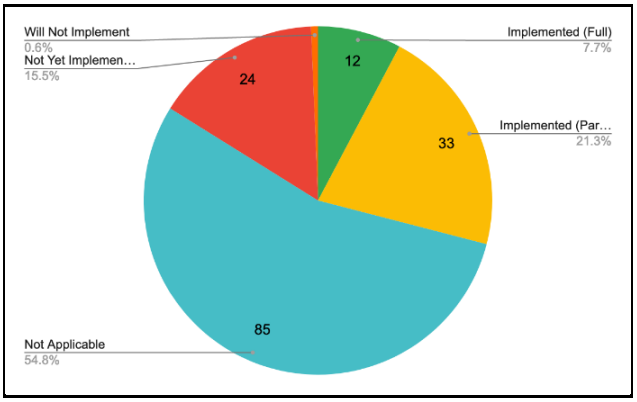


Figure 39. *ANSI/ASB Best Practice Recommendation 037, Guidelines for Opinions and Testimony in Forensic Toxicology*



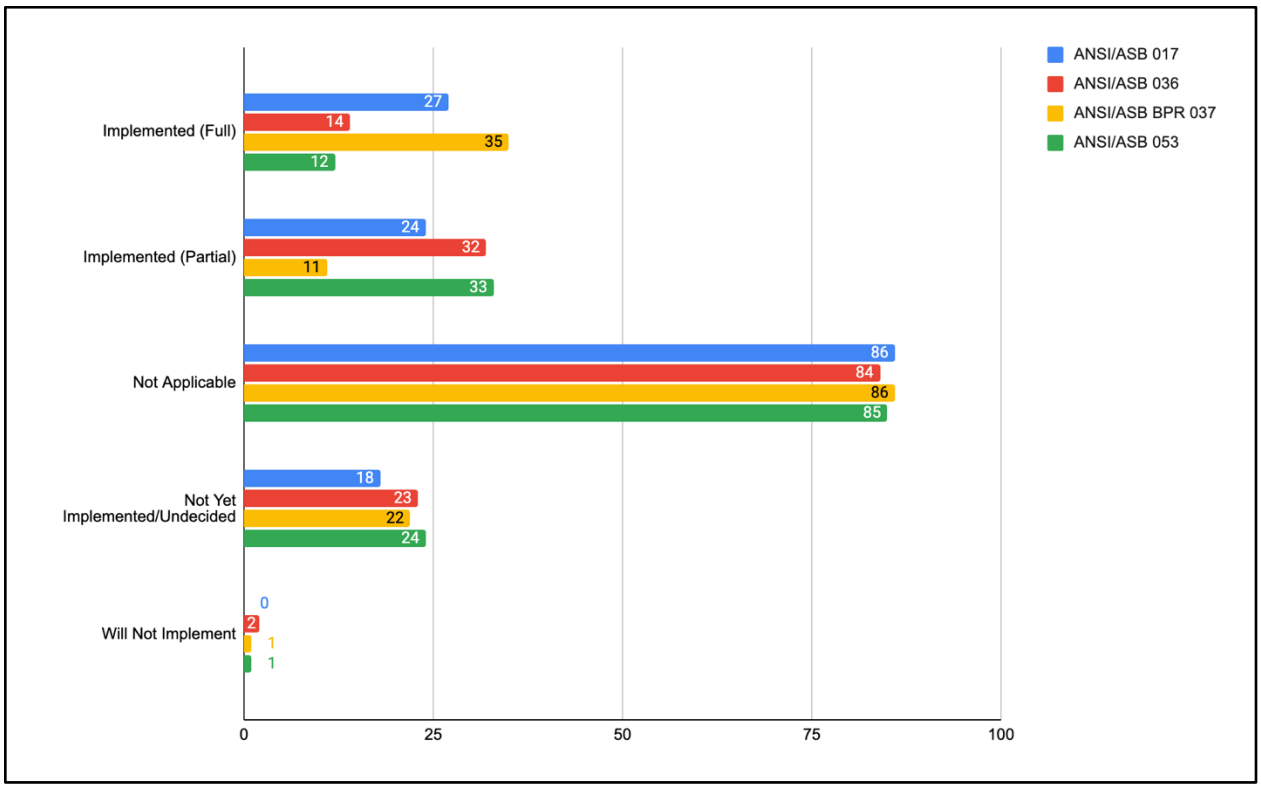
Will Not Implement = 1

Figure 40. *ANSI/ASB Standard 053, Standard for Report Content in Forensic Toxicology*



Will Not Implement = 1

Figure 41. *Toxicology Summary: Rollup of total number of implementers (out of 155 respondents) of the four published toxicology standards on the OSAC Registry (as of March 2021)*



Summary

Out of 155 respondents:

- 51 indicated that their organization has either fully or partially implemented ANSI/ASB 017, while 18 said their organization has not yet implemented this standard.
- 46 indicated that their organization has either fully or partially implemented ANSI/ASB 036, while 23 said their organization has not yet implemented this standard.
- 46 indicated that their organization has either fully or partially implemented ANSI/ASB 037, while 22 said their organization has not yet implemented this standard.
- 45 indicated that their organization has either fully or partially implemented ANSI/ASB 053, while 24 said their organization has not yet implemented this standard.
- At least 84 (more than half) of all respondents indicated that these forensic toxicology standards were not applicable for implementation in their organization.

TRACE MATERIALS

Standards on the OSAC Registry (9)

- **ASTM E1610-18** ***Standard Guide for Forensic Paint Analysis and Comparison.*** This guide is intended as an introduction to standard guides for forensic examination of paints and coatings. It assists individuals who conduct forensic paint analyses in their evaluation, selection, and application of tests that can be of value to their investigations. This guide describes methods to develop discriminatory information using an efficient and reasonable order of testing. The need for validated methods and quality assurance guidelines is also addressed. This document is not intended as a detailed methods description or rigid scheme for the analysis and comparison of paints, but as a guide to the strengths and limitations of each analytical method. The goal is to provide a consistent approach to forensic paint analysis.
- **ASTM E1967-19** ***Standard Test Method for the Automated Determination of Refractive Index of Glass Samples Using the Oil Immersion Method and a Phase Contrast Microscope.*** This test method covers a procedure for measuring and comparing the refractive index (η) at a fixed wavelength (λ) and temperature (T) (η_{λ}^{T}) of glass from known sources to recovered fragments from a questioned source.
- **ASTM E2330-19** ***Standard Test Method for Determination of Concentrations of Elements in Glass Samples Using Inductively Coupled Plasma Mass Spectrometry (ICP-MS) for Forensic Comparisons.*** This test method covers a procedure for quantitative determination of the concentrations of magnesium (Mg), aluminum (Al), iron (Fe), titanium (Ti), manganese (Mn), rubidium (Rb), strontium (Sr), zirconium (Zr), barium (Ba), lanthanum (La), cerium (Ce), neodymium (Nd), samarium (Sm), and lead (Pb) in glass samples. This procedure is applicable to irregularly shaped samples as small as 200 micrograms, for the comparison of fragments of a known source to the recovered fragments from a questioned source. These elements are present in soda lime and borosilicate glass in µg/L to % levels. This procedure is applicable to other elements, other types of glass, and other concentration ranges with appropriate modifications of the digestion procedure (if needed for full recovery of the additional elements), calibration standards and the mass spectrometer conditions. Calcium and potassium, for example, could be added to the list of analytes in a modified analysis scheme. Alternative methods for the determination of concentrations of elements in glass are listed in the references.
- **ASTM E2926-17** ***Standard Test Method for Forensic Comparison of Glass Using Micro X-ray Fluorescence (µ-XRF) Spectrometry.*** This test method is for the determination of major, minor, and trace elements present in glass fragments. The elemental composition of a glass fragment can be measured through the use of µ-XRF analysis for comparisons of glass. This test method covers the application of µ-XRF using mono- and poly- capillary optics, and an energy dispersive X-ray detector (EDS).

- **ASTM E2927-16e1** ***Standard Test Method for Determination of Trace Elements in Soda-Lime Glass Samples Using Laser Ablation Inductively Coupled Plasma Mass Spectrometry for Forensic Comparisons***. This test method covers a procedure for the quantitative elemental analysis of the following seventeen elements: lithium (Li), magnesium (Mg), aluminum (Al), potassium (K), calcium (Ca), iron (Fe), titanium (Ti), manganese (Mn), rubidium (Rb), strontium (Sr), zirconium (Zr), barium (Ba), lanthanum (La), cerium (Ce), neodymium (Nd), hafnium (Hf) and lead (Pb) through the use of Laser Ablation Inductively Coupled Plasma Mass Spectrometry (LA-ICP-MS) for the forensic comparison of glass fragments. The potential of these elements to provide the best discrimination among different sources of soda-lime glasses has been published elsewhere. Silicon (Si) is also monitored for use as a normalization standard. Additional elements may be added as needed, for example, tin (Sn) can be used to monitor the orientation of float glass fragments.
- **ASTM E2937-18** ***Standard Guide for Using Infrared Spectroscopy in Forensic Paint Examinations.*** This guide applies to the forensic IR analysis of paints and coatings and is intended to supplement information presented in the Forensic Paint Analysis and Comparison Guidelines written by Scientific Working Group on Materials Analysis (SWGMAT). This guideline is limited to the discussion of Fourier Transform Infrared (FTIR) instruments and provides information on FTIR instrument setup, performance assessment, sample preparation, analysis, and data interpretation. It is intended to provide an understanding of the requirements, benefits, limitations and proper use of IR accessories and sampling methods available for use by forensic paint examiners. The following accessory techniques will be discussed: FTIR microspectroscopy (transmission and reflectance), diamond cell and attenuated total reflectance. The particular methods employed by each examiner or laboratory, or both, are dependent upon available equipment, examiner training, specimen size or suitability, and purpose of examination. This guideline does not cover the theoretical aspects of many of the topics presented.
- **ASTM E3085-17** ***Standard Guide for Fourier Transform Infrared Spectroscopy in Forensic Tape Examinations.*** Infrared spectroscopy (IR) is a valuable method for the identification and comparison of pressure sensitive tapes. This guide provides basic recommendations and information about infrared spectrometers and accessories, with an emphasis on sampling techniques specific to pressure sensitive tape examinations. The particular method(s) employed by each examiner or laboratory will depend upon available equipment, examiner training, sample suitability, and sample size.
- **ASTM E3233-20** ***Standard Practice for Forensic Tape Analysis Training Program*****.** This standard is intended as a practice for use by laboratory personnel responsible for training examiners to perform forensic examinations and comparisons on pressure sensitive tapes and adhesives. It contains a list of training objectives with recommended methods of instruction, reading assignments and structured exercises to provide practical experience for the trainee.
- **ASTM E3234-20** ***Standard Practice for Forensic Paint Analysis Training Program*****.** This document is intended as a practice for use by laboratory personnel responsible for training examiners to perform forensic examinations and comparisons of paint. It contains a list of training objectives with recommended methods of instruction, reading assignments and structured exercises to provide practical experience for the trainee.

Implementation Status by Standard (out of 155 survey respondents)

Figure 42. *ASTM E1610-18 Standard Guide for Forensic Paint Analysis and Comparison*

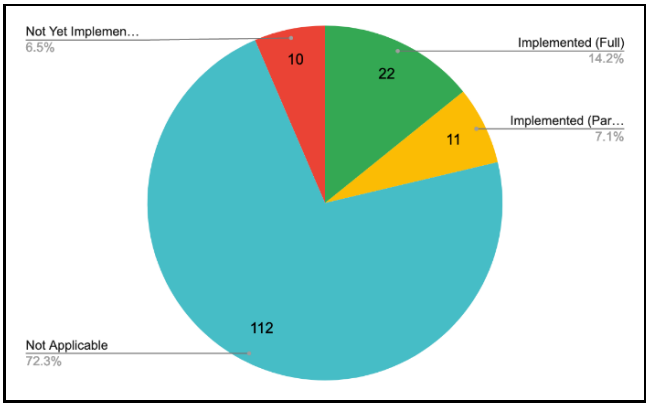
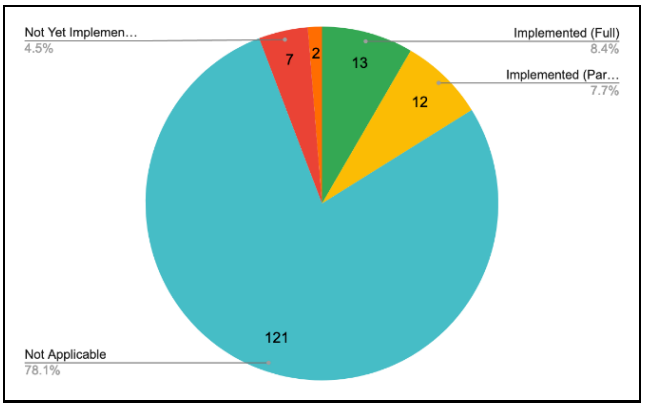
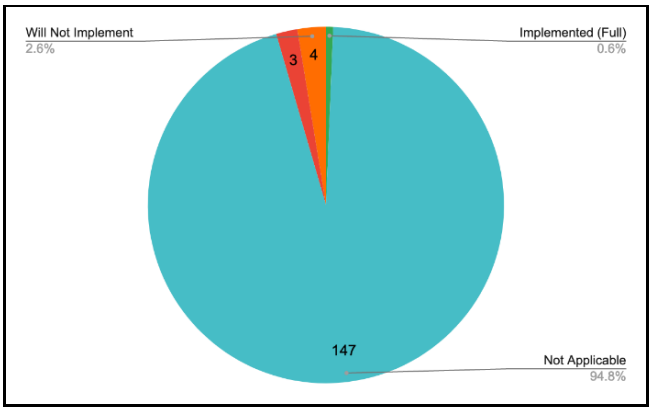


Figure 43. *ASTM E1967-19 Standard Test Method for the Automated Determination of Refractive Index of Glass Samples Using the Oil Immersion Method and a Phase Contrast Microscope*



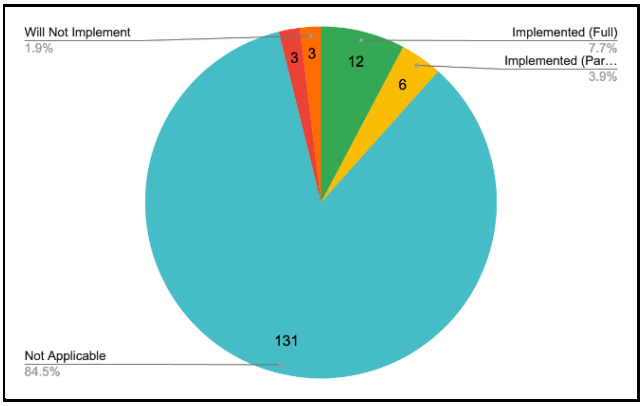
Will Not Implement = 2

Figure 44. *ASTM E2330-19 Standard Test Method for Determination of Concentrations of Elements in Glass Samples Using Inductively Coupled Plasma Mass Spectrometry (ICP-MS) for Forensic Comparisons*



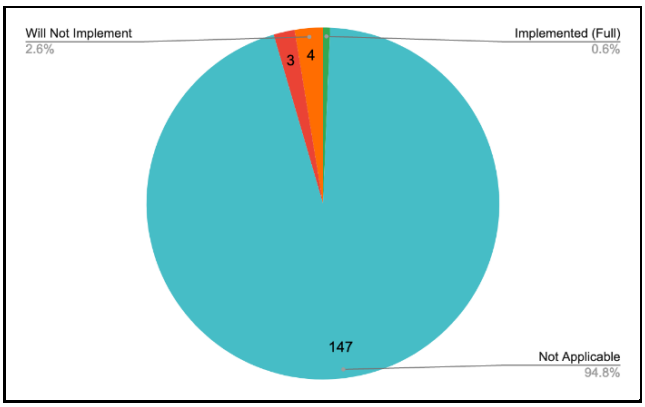
Implemented (Full) = 1

Figure 45. *ASTM E2926-17 Standard Test Method for Forensic Comparison of Glass Using Micro X-ray Fluorescence (μ-XRF) Spectrometry*



Not Yet Implemented/Undecided = 3

Figure 46. *ASTM E2927-16e1 Standard Test Method for Determination of Trace Elements in Soda-Lime Glass Samples Using Laser Ablation Inductively Coupled Plasma Mass Spectrometry for Forensic Comparisons*



Not Yet Implemented/Undecided = 3
Implemented (Full) = 1

Figure 47. *ASTM E2937-18 Standard Guide for Using Infrared Spectroscopy in Forensic Paint Examinations*

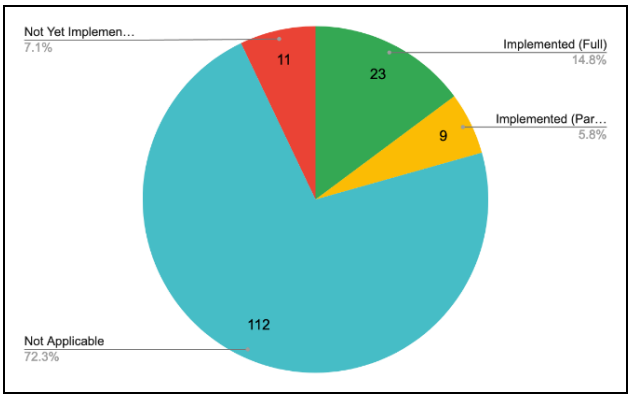
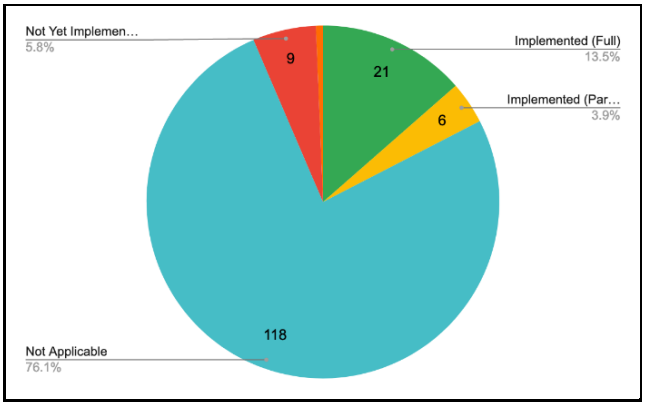
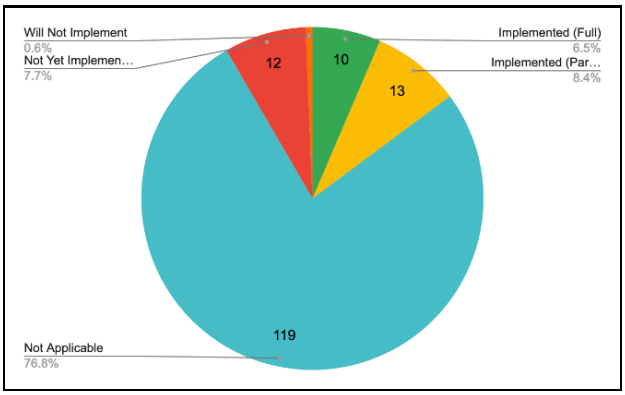


Figure 48. *ASTM E3085-17 Standard Guide for Fourier Transform Infrared Spectroscopy in Forensic Tape Examinations*



Will Not Implement = 1

Figure 49. *ASTM E3233-20 Standard Practice for Forensic Tape Analysis Training Program*



Will Not Implement = 1

Figure 50. *ASTM E3234-20 Standard Practice for Forensic Paint Analysis Training Program*

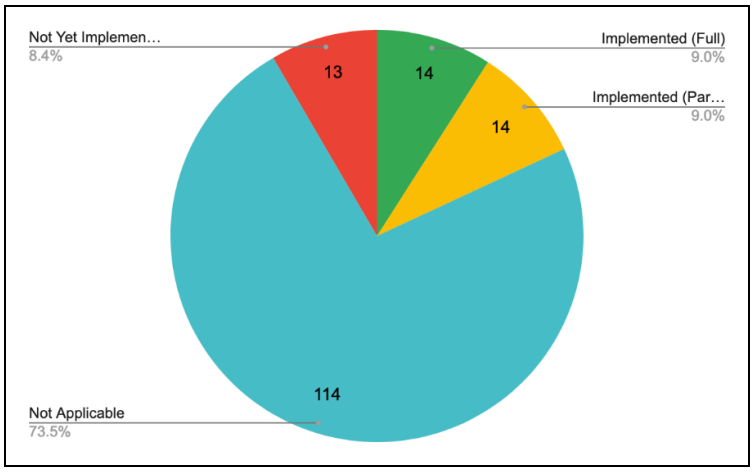
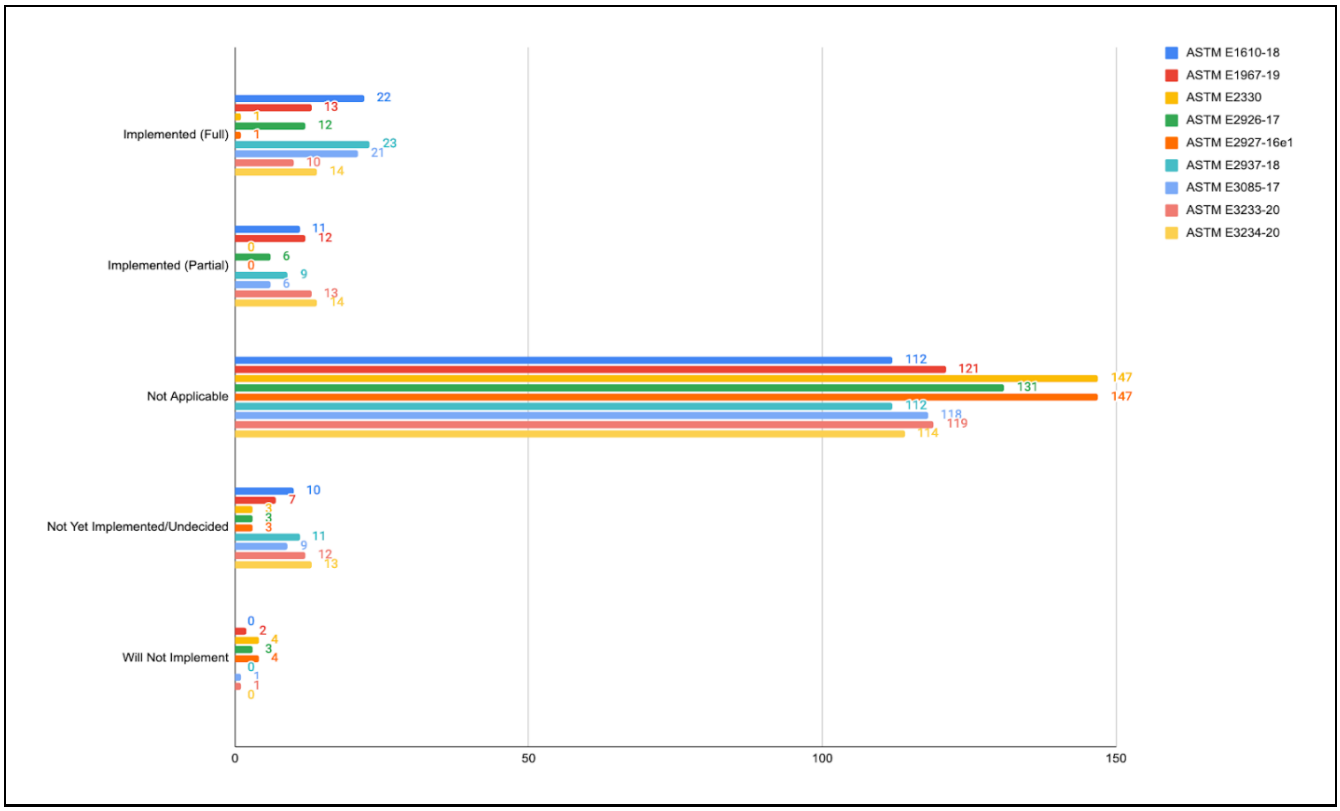


Figure 51. *Trace Materials Summary: Rollup of total number of implementers (out of 155 respondents) of the nine published trace materials standards on the OSAC Registry (as of March 2021)*



Summary

- Trace evidence disciplines are a composite of multiple types of forensic evidence. The nine standards included on the OSAC Registry at the time of the 2021 survey consisted of 4 glass standards, 3 paint standards, and 2 tape standards.
    - Trace Evidence: Glass Analysis
        - 25 indicated that their organization has either fully or partially implemented ASTM E1967-19, while seven said their organization has not yet implemented this standard.
        - One indicated that their organization has fully implemented ASTM E2330, while three said their organization has not yet implemented this standard.
        - 18 indicated that their organization has either fully or partially ASTM E2926-17, while three said their organization has not yet implemented this standard.
        - One indicated that their organization has fully implemented ASTM E2927-16e1, while three said their organization has not yet implemented this standard.
    - Trace Evidence: Paint Analysis
        - 33 indicated that their organization has either fully or partially implemented ASTM E1610-18, while 10 said their organization has not yet implemented this standard.
        - 32 indicated that their organization has either fully or partially implemented ASTM E2937-18, while 11 said their organization has not yet implemented this standard.
        - 28 indicated that their organization has either fully or partially implemented ASTM E3234-20, while 13 said their organization has not yet implemented this standard.
    - Trace Evidence: Tape Analysis
        - 27 indicated that their organization has either fully or partially implemented ASTM E3085-17, while nine said their organization has not yet implemented this standard.
        - 23 indicated that their organization has either fully or partially implemented ASTM E3233-20, while 12 said their organization has not yet implemented this standard.
- At least 112 (over 70%) of all respondents indicated that these trace standards were not applicable for implementation in their organization.

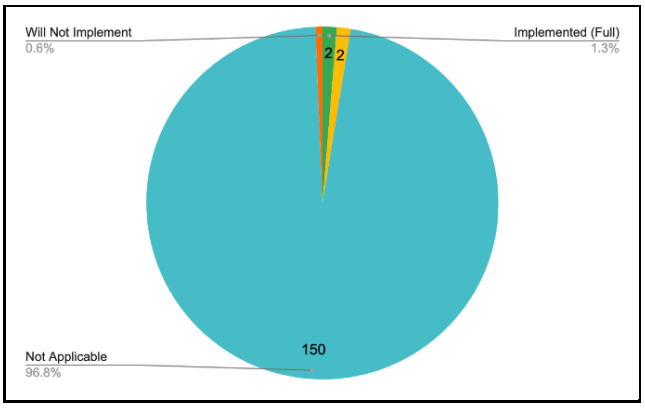
WILDLIFE FORENSICS

Standards on the OSAC Registry (4)

- **ANSI/ASB Standard 019, *Wildlife Forensics General Standards*, First Edition, 2019.** This document provides minimum standards and recommendations for practicing wildlife forensic analysts. This document covers good laboratory practices, evidence handling, and training as well as considerations of taxonomy and reference collections that are specific to wildlife forensic science.
- **ANSI/ASB Standard 028, *Wildlife Forensics Morphology Standards*, First Edition, 2019.** This document provides minimum standards for wildlife forensic analysts in the subdiscipline of morphology.
- **ANSI/ASB Standard 029, *Report Writing in Wildlife Forensics: Morphology and Genetics*, First Edition, 2019.** This document describes the information to be provided in formal written reports of wildlife forensic examinations for use in legal proceedings. Requirements for both genetic and morphological examination reports are covered. Forensic reports serve a variety of audiences and must provide a clear and concise summary of methods, results, and limitations.
- **ANSI/ASB Standard 047, *Wildlife Forensics Validation Standard—Validating New Primers for Sequencing*, First Edition, 2019.** This document provides minimum requirements and recommendations for validating new primers for mitochondrial haplotyping and/or taxonomic identification via sequencing in wildlife forensic DNA laboratories where the sequencing (Sanger) method has already been validated.

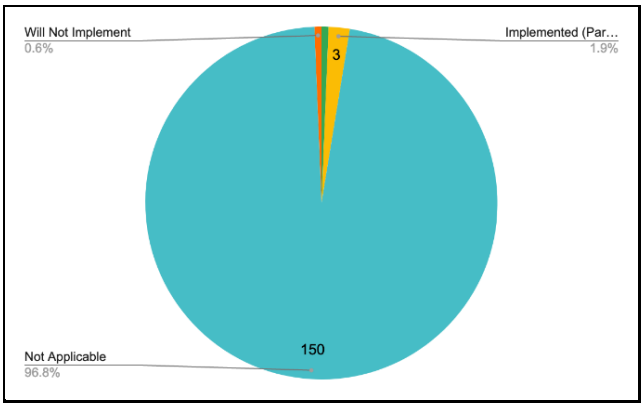
Implementation Status by Standard (out of 155 survey respondents)

Figure 52. *ANSI/ASB Standard 019, Wildlife Forensics General Standards*



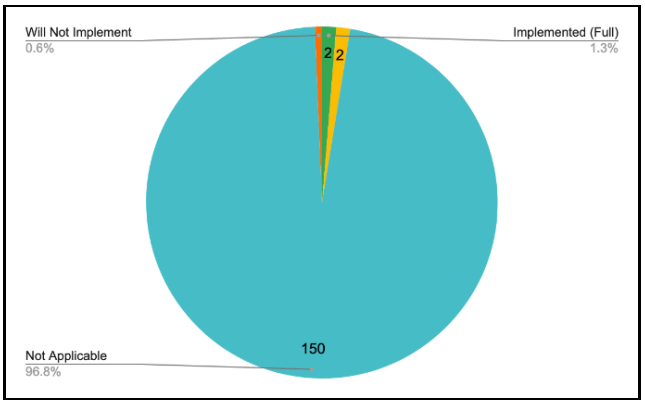
Will Not Implement = 1
Implemented (Partial) = 2

Figure 53. *ANSI/ASB Standard 028, Wildlife Forensics Morphology Standards*



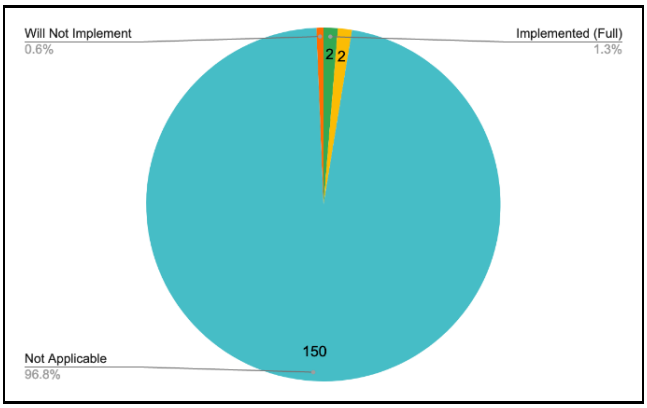
Implemented (Full) = 1
Will Not Implement = 1

Figure 54. *ANSI/ASB Standard 029, Report Writing in Wildlife Forensics: Morphology and Genetics*



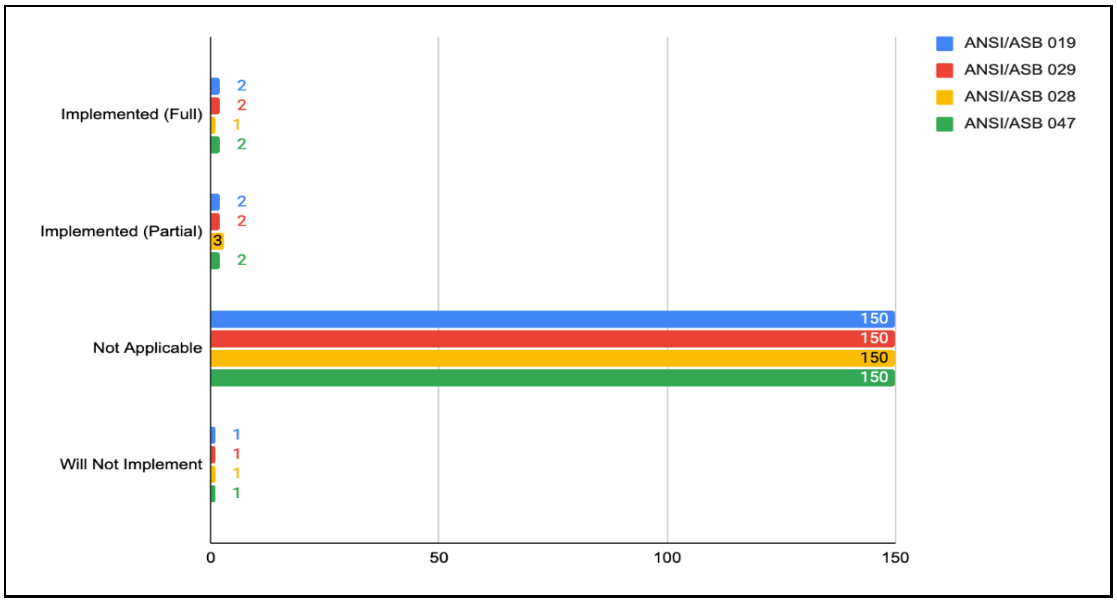
Will Not Implement = 1
Implemented (Partial) = 2

Figure 55. *ANSI/ASB Standard 047, Wildlife Forensics Validation Standard—Validating New Primers for Sequencing*



Will Not Implement = 1
Implemented (Partial) = 2

Figure 56. *Wildlife Forensics Summary: Rollup of total number of implementers (out of 155 respondents) of the four published wildlife forensics standards on the OSAC Registry (as of March 2021)*



Summary

Out of 155 respondents:

- Four indicated that their organization has either fully or partially implemented ANSI/ASB 019.
- Four indicated that their organization has either fully or partially implemented ANSI/ASB 028.
- Four indicated that their organization has either fully or partially implemented ANSI/ASB 029.
- Four indicated that their organization has either fully or partially implemented ANSI/ASB 047.
- 150 (more than 95%) of all respondents indicated that these wildlife forensic standards were not applicable for implementation in their organization.

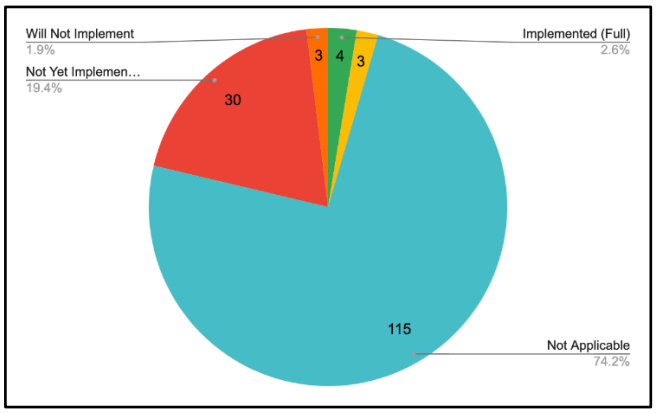
INTERDISCIPLINARY

Standards on the OSAC Registry (6)

- **ANSI/NIST ITL-1: 2011 (Update 2015)** ***Data Format for the Interchange of Fingerprint, Facial & Other Biometric Information*****.** This standard defines the content, format, and units of measurement for the electronic exchange of fingerprint, palm print, plantar, facial/mugshot, scar, mark & tattoo (SMT), iris, deoxyribonucleic acid (DNA), and other biometric sample and forensic information that may be used in the identification or verification process of a subject. The information consists of a variety of mandatory and optional items. This information is primarily intended for interchange among criminal justice administrations or organizations that rely on automated identification systems or use other biometric and image data for identification purposes.
- **ASTM E2917-19a** ***Standard Practice for Forensic Science Practitioner Training, Continuing Education, and Professional Development Programs***. This practice provides foundational requirements for the training, continuing education, and professional development of forensic science practitioners to include training criteria toward competency, documentation, and implementation of training, and continuous professional development. This information is intended for forensic science service providers to help establish a training framework with program structure and content; for forensic science practitioners as they acquire and maintain their knowledge, skills, and abilities (KSAs); and for training programs to manage and support the continuous development of their employees.
- **ISO/IEC 17020:2012** ***Conformity Assessment—Requirements for the Operation of Various Types of Bodies Performing Inspection***. This International Standard contains requirements for the competence of bodies performing inspection and for the impartiality and consistency of their inspection activities. It applies to inspection bodies of type A, B or C, as defined in this International Standard, and it applies to any stage of inspection.
- **ISO/IEC 17025:2005** ***General Requirements for the Competence of Testing and Calibration Laboratories*****.** This document specifies the general requirements for the competence, impartiality, and consistent operation of laboratories. This document is applicable to all organizations performing laboratory activities, regardless of the number of personnel. Laboratory customers, regulatory authorities, organizations, and schemes using peer-assessment, accreditation bodies, and others use this document in confirming or recognizing the competence of laboratories.
- **ISO/IEC 17025:2017** ***General Requirements for the Competence of Testing and Calibration Laboratories*****.** This document specifies the general requirements for the competence, impartiality, and consistent operation of laboratories. This document is applicable to all organizations performing laboratory activities, regardless of the number of personnel. Laboratory customers, regulatory authorities, organizations, and schemes using peer-assessment, accreditation bodies, and others use this document in confirming or recognizing the competence of laboratories.
- **ISO 21043-2:2018 Forensic Sciences –** ***Part 2: Recognition, recording, collecting transport and storage of items*****.** This document specifies requirements for the forensic process focusing on recognition, recording, collection, transport, and storage of items of potential forensic value. It includes requirements for the assessment and examination of scenes but is also applicable to activities that occur within the facility. This document also includes quality requirements.

Implementation Status by Standard (out of 155 survey respondents)

Figure 57. *ANSI/NIST ITL-1: 2011, Data Format for the Interchange of Fingerprint, Facial & Other Biometric Information*



Implemented (Partial) = 3

Figure 58. *ASTM E2917-19a Standard Practice for Forensic Science Practitioner Training, Continuing Education, and Professional Development Programs*

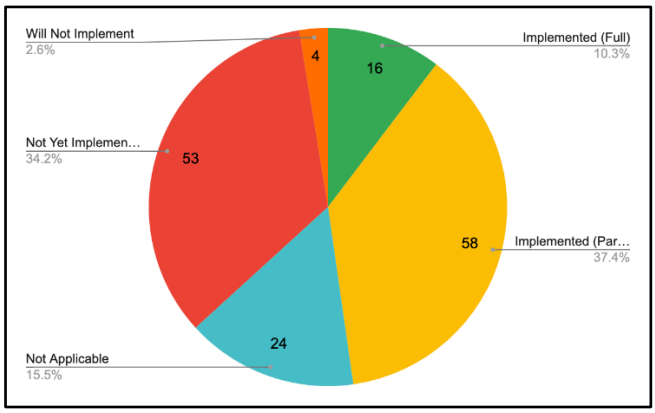


Figure 59. *ISO/IEC 17020:2012 Conformity Assessment—Requirements for the Operation of Various Types of Bodies Performing Inspection*

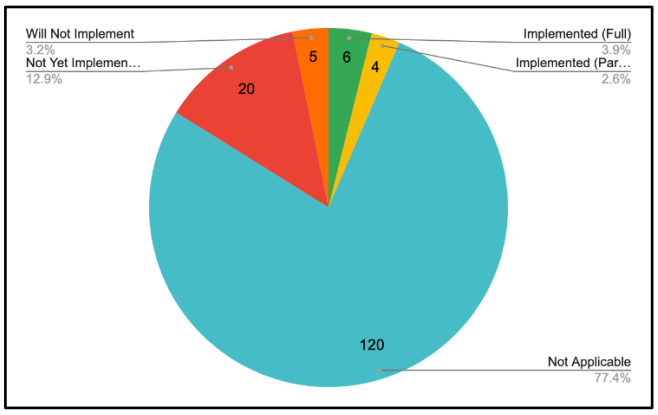


Figure 60. *ISO/IEC 17025:2005 General Requirements for the Competence of Testing and Calibration Laboratories*

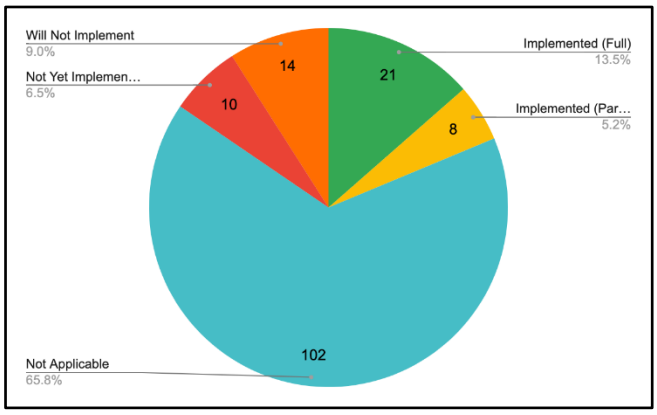


Figure 61. *ISO/IEC 17025:2017 General Requirements for the Competence of Testing and Calibration Laboratories*

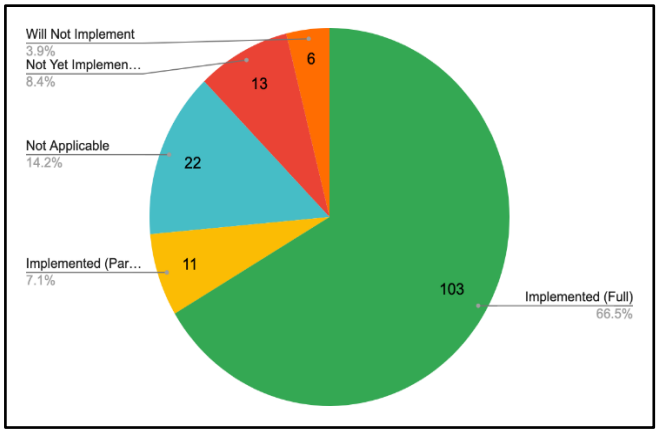


Figure 62. *ISO 21043-2:2018 Forensic Sciences – Part 2: Recognition, recording, collecting transport and storage of items*

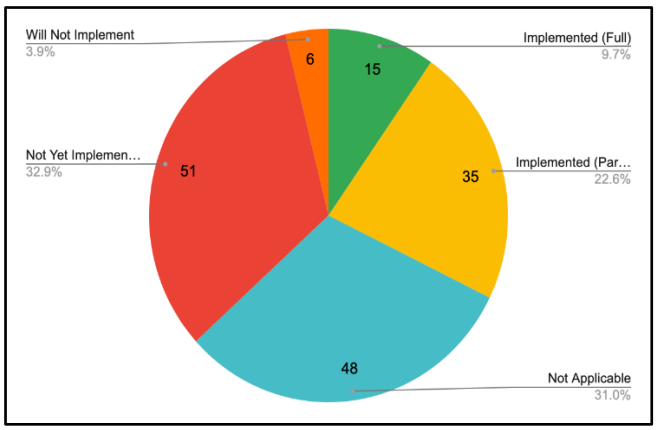
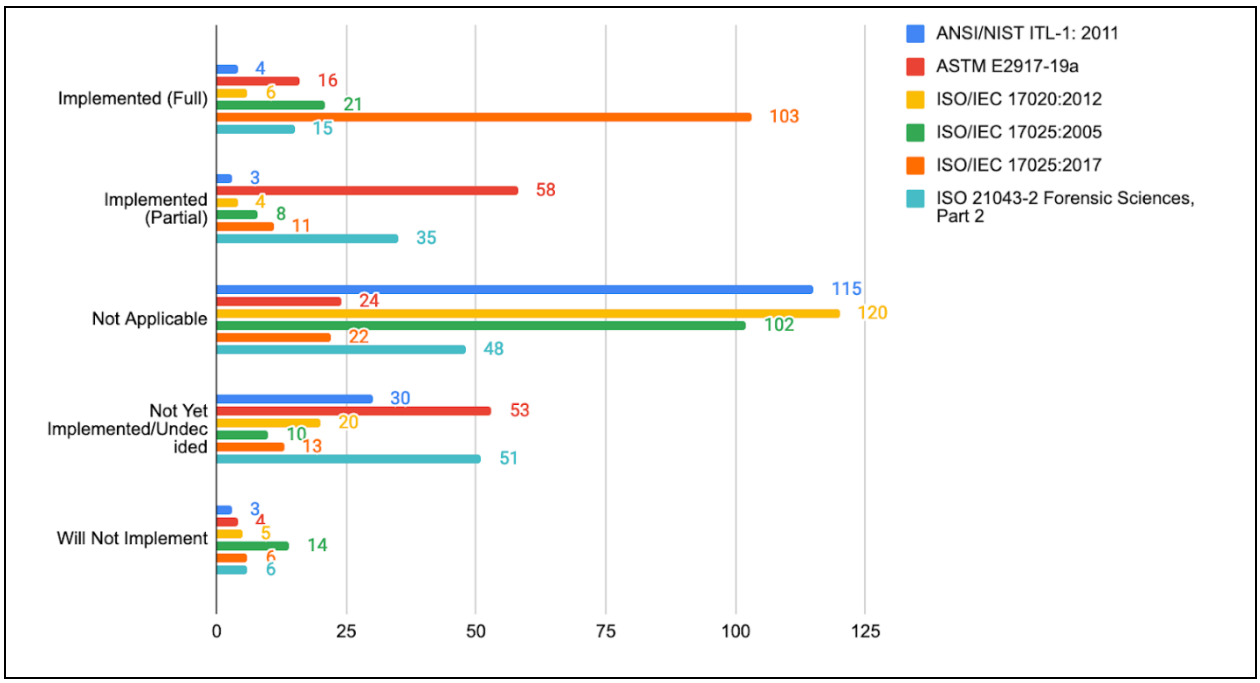


Figure 63. *Interdisciplinary Summary: Rollup of total number of implementers (out of 155 respondents) of the six published interdisciplinary standards on the OSAC Registry (as of March 2021)*



Summary

Out of 155 respondents:

- Seven indicated that their organization has either fully or partially implemented ANSI/NIST ITL-1: 2011, while 30 said their organization has not yet implemented this standard.
- 74 indicated that their organization has either fully or partially implemented ASTM E2917-19, while 53 said their organization has not yet implemented this standard.
- 10 indicated that their organization has either fully or partially implemented ISO/IEC 17020-2012, while 20 said their organization has not yet implemented this standard.
- 29 indicated that their organization has either fully or partially implemented ISO/IEC 17025:2005, while 10 said their organization has not yet implemented this standard.
- 114 indicated that their organization has either fully or partially implemented ISO/IEC 17025:2017, while 13 said their organization has not yet implemented this standard.
- 50 indicated that their organization has either fully or partially implemented ISO/IEC 21043-2:2018, while 51 said their organization has not yet implemented this standard.
- At least 22 of all respondents indicated that some of these standards were not applicable for implementation in their organization.

Key Takeaways From this Survey

- Survey responses represent forensic science service providers from 38 states, across a range of organization types, roles, and geographical regions.
- Most survey respondents (98%) are aware of the standards on the OSAC Registry.
- 85% of survey respondents consider standards implementation a priority.
- One hundred thirty-eight (138) forensic science service providers have reported using the standards on the OSAC Registry. Of the 46 standards included in this survey, 44 are being implemented.
- The disciplines practiced in traditional crime laboratories are further along in their efforts to implement the standards on the OSAC Registry, with standards related to biology/DNA, forensic toxicology and seized drugs being implemented the most.
- Survey respondents identified the top key challenges to implementation as not having personnel to allocate to the task and organizations not being able or required to implement the standards on the OSAC Registry at this time.
- As of the publication of this report (February 2022), the OSAC Registry contains 78 standards, representing 19 forensic science disciplines and interdisciplinary topics. These standards and disciplines will be a part of the 2022 OSAC Registry Implementation Survey. Additionally, the 2022 survey will proceed with the goal to expand its reach to smaller organizations, municipalities, and disciplines.

APPENDIX A. LIST OF TABLES AND FIGURES