

Final Report and Recommendations
Regarding Vance's
Comprehensive Operational
Assessment of the
Massachusetts State Police
Crime Laboratory System

Prepared for:

The Commonwealth of Massachusetts
Executive Office of Public Safety

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I. Executive Summary

The scientific methodologies being employed at the Massachusetts State Police Crime Laboratory (MSP Crime Lab) are scientifically sound and conform to generally accepted practices in the forensic science community and are consistent with national best practices. The policies and procedures in effect in the MSP Crime Laboratory are current and likewise conform to generally accepted practices in the forensic science community. In short, our review revealed no deficiencies in the science being conducted at the MSP Crime Lab.

In fact, our assessment revealed that some of the current practices exceed the requirements set forth in internal policies and procedures and accepted best practices and national standards. As such, they are unnecessary. They lead to delays and decrease productivity. To some degree, this explains why the output per analyst is lower than the national average, as discussed in our recommendations.

We did identify a number of important areas which need improvement if the MSP Crime Laboratory is to move forward. While the DNA analyses are scientifically sound and consistent with good forensic practices, the management of laboratory operations in this area must be improved in order to become more efficient and effective and assure continued quality analysis. Other disciplines within the laboratory are also discussed in our report, in the context of the overall improved effectiveness and quality management of the entire laboratory. Our review and evaluation of the MSP Crime Laboratory yielded an extensive set of findings and recommendations that emphasize:

- **Organization of the Laboratory management structure** to improve accountability, communication, and the overall expertise and knowledge base of the Laboratory
- **Establishment and clarification of processes** to ensure adherence to regulatory requirements as well as efficiency
- **Formalization of quality assurance (QA) accountability and procedures** to ensure QA processes focus on superior quality and are not used in a punitive manner
- **Investment in staff retention** to create a loyal base of employees that demonstrates high morale and low turnover
- **Professional development of staff** as well as their involvement in industry-specific activities to improve their knowledge level and raise the Laboratory's overall level of professionalism and expertise

The recommendations contained in this assessment fall within several categories:

- ⇒ **Laboratory management**
- ⇒ **Quality assurance**
- ⇒ **CODIS**
- ⇒ **DNA units**
- ⇒ **Forensic Science Advisory Board**
- ⇒ **Backlog reduction**

- ⇒ **State-wide computer forensics group**
- ⇒ **Case management unit**

The recommendations within each of those categories are summarized as follows.

Laboratory Management

The MSP Crime Laboratory should consolidate all forensic functions, seek the appropriate ASCLD/LAB accreditations for each of the functions, and should conduct a national search for a Laboratory Director who meets critical educational and experiential requirements. Firearms and toolmarks, crime scene processing, and other appropriate disciplines should be encouraged to not only move forward with accreditation, but, along with the other currently accredited disciplines, to serve as ASCLD/LAB inspection staff volunteers. The Laboratory should also develop policies with the help of external reviewers such as the Forensic Science Advisory Board. Management should increase communications within the laboratory which is essential to maintaining high morale. Additionally, increased and focused internal and external training opportunities are essential to maintaining high quality forensic analyses.

Quality Assurance

A comprehensive and fully integrated quality assurance management program, driven by a comprehensive quality manual and single, proactive Quality Assurance Manager who meets critical experiential and educational requirements, must be developed. The Quality Assurance Manager must report directly to the Laboratory Director. The focus must be on right people in right places doing right practices all the time. Quality assurance (QA) representatives answerable to the Quality Assurance Manager and, ultimately, the Laboratory Director, should be placed in all the discipline units, and ensure that the external and internal audit processes and quality practices of the laboratory and various units are appropriately applied in a timely manner. The lack or misuse of corrective actions have resulted in numerous problems that could have been avoided with the proper root cause investigation and timely resolution by QA assigned personnel. Regular, objective audits and reviews must be conducted.

CODIS

The MSP Crime Laboratory must appoint an appropriately qualified CODIS Administrator with significant forensic DNA experience. The appointment of two Assistant CODIS Administrators, with DNA casework analysis experience, will also assist in addressing the significant NDIS (National DNA Index System), collection, and outsourcing needs of the unit. CODIS policies must be reviewed and updated, and audits should ensure that policies and practices are aligned. A familial search policy should be developed.

DNA Units

The DNA units should remain flexible and responsive to the needs of the Laboratory's customers. The DNA units should utilize technology (expert systems) to assist in the processing of DNA analyses. Both casework and CODIS sample production could be enhanced with the use of expert systems, additional personnel, and integration of laboratory operations. Retention of personnel is vital to laboratory effectiveness since lack of experience generally increases processing time and increases opportunities for administrative and technical mistakes. Improved communication among supervisors and between supervisors and employees must be established since lack of consistency and dissemination of important information has created inefficiencies. DNA auditor training and DNA audit participation, although time consuming, will help to ensure exposure to best forensic DNA practices. Compensation for DNA staff must be improved.

As discussed in our recommendations, the Laboratory is suffering from a substantial DNA backlog, well beyond those in other jurisdictions. Partnerships, process mapping, technological improvements, outsourcing, and leadership and support from the government must be utilized to ensure that cases that require DNA analysis are expedited and that the backlog is reduced.

Forensic Science Advisory Board

The current Forensic Science Advisory Board is appropriate, but not adequately staffed to address some of the most important challenges facing the MSP Crime Laboratory. The current board should continue, but it should be augmented with a scientific subcommittee and individuals appropriate for specific issues that are important to the Laboratory. Specifically, a scientific subcommittee should be established. One aspect that should be a part of the scientific subcommittee's charge is the review of audits and corrective action plans related to laboratory operations.

State-Wide Computer Forensic Group

Computer forensic requests will only continue to increase with the widespread use of computers, cell phones and other digital personal equipment. The MSP and the Commonwealth of Massachusetts are not equipped to handle the current requests for forensic services, and current capacity at the MSP only involves the analysis of Windows-based Personal Computers. Far too many other types of digital evidence are not analyzed because of the lack of a coordinated, state-wide effort. The first step in this effort should include contact with the Boston Division of the FBI to determine interest in forming such a group with federal assistance and personnel.

Case Management Unit (CMU)

The CMU should be responsible for the actual "management" of potential DNA and CODIS cases. They should be responsible for the coordination of samples through the Criminalistics, DNA, and eventually CODIS units, and this requires the input, cooperation, supervision, and coordination of the personnel in these units. The CMU should be tasked with ensuring that appropriate personnel and priorities are placed on case samples as they move through processing. The ability to interface with appropriate databases such as the District Attorney's case tracking database would help to coordinate

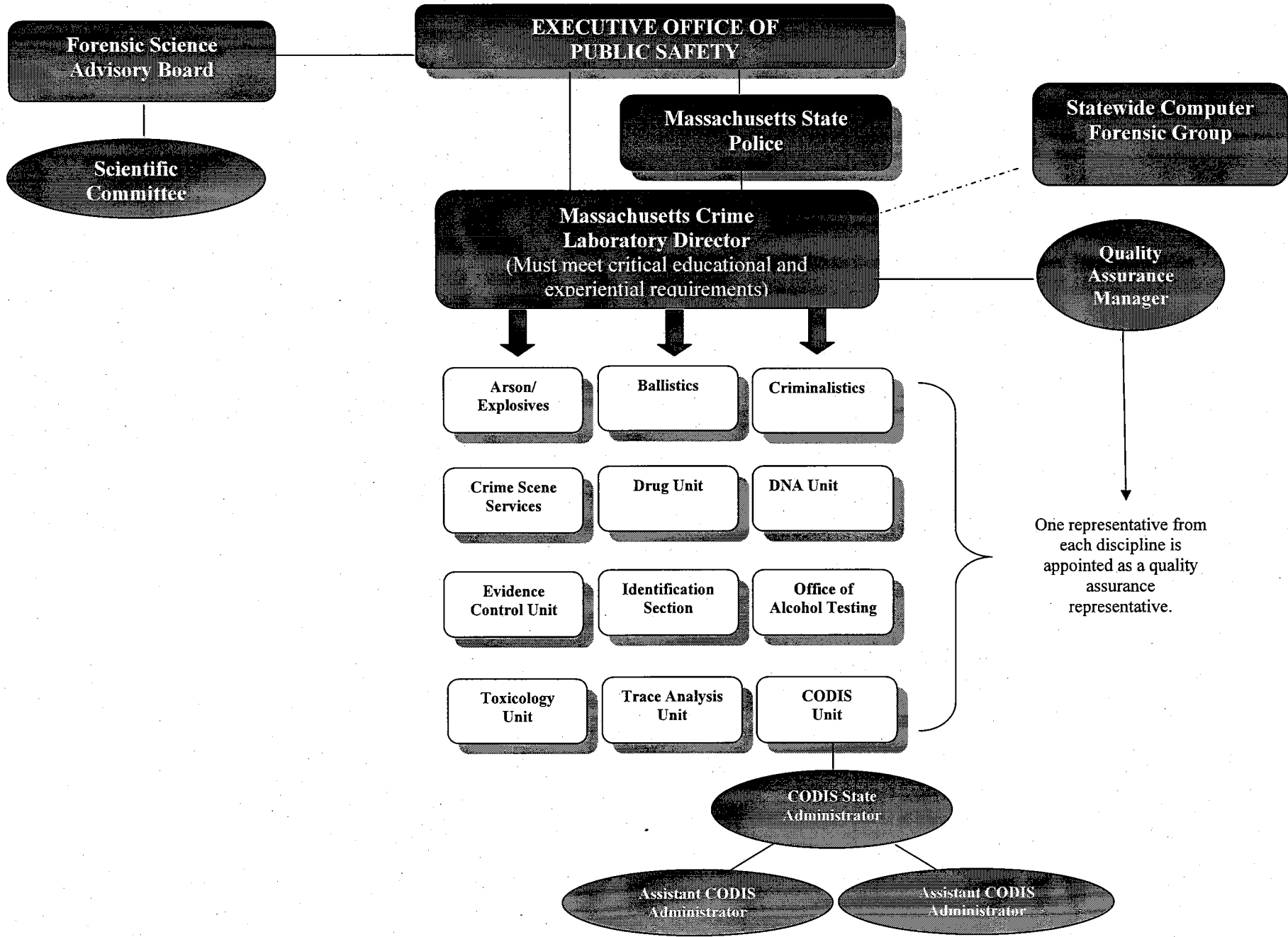
processing efforts. The Laboratory must develop and implement a prioritization system for casework analysis.

Proposed Organizational Structure of the Laboratory

Many of our recommendations focus on streamlining the organization to increase chain of command accountability, and clarity of the reporting structure. We believe that re-organization of the MSP Crime Laboratory is essential to ensuring that the work performed by the Laboratory is as efficient, accurate and timely as possible. While setting high expectations for job performance can be motivational, those expectations have to be reinforced through empowered supervisors, formalized quality assurance processes, and through investment in employees' knowledge base and professionalism as well as investment in scientific and professional affiliations for the Laboratory itself.

As a result of our recommendations, the organizational structure of the MSP Crime Laboratory would change considerably as demonstrated on the next page.

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Organizational changes alone will not improve the overall efficiency of processes. Formalized processes alone will not resolve the barriers that currently exist due to an unclear chain of command and quality assurance structure.

On the following pages, please find our detailed explanations of each of these findings. Each of these recommendations is offered with a clear understanding of the MSP Crime Laboratory's profoundly important role in the Commonwealth's criminal justice system. Decision-making processes around each of these recommendations must also be weighed with that understanding in mind. With the appropriate organizational modifications and investment in the Laboratory's staff, we believe the MSP Crime Laboratory System will not only overcome current operational inefficiencies but could become a standard bearer in the forensic science industry.

II. Scope of Work/Methodology

Vance conducted an independent, comprehensive review of the operational aspects, policies, procedures and best practices of the MSP Crime Laboratory. The scope of work performed for this assessment includes, but was not limited to, the following:

- Recommendations for improved operational effectiveness, efficiency, and quality
- Comparative analysis of laboratory outputs (particularly DNA) to other forensic systems
- Examination of existing standards with recommendations for improvements
- Review of all system data for meaningful report generation (benchmarks)
- Throughput analysis for effectiveness and quality
- Financial analysis of system and unit costs compared to other forensic systems
- Recommendations for improved operational effectiveness

The Vance team assembled to conduct this assessment and review consisted of the following core team:

- Robert N. Sikellis, JD (Project Leader)
- Dwight E. Adams, Ph.D. (Former Director, FBI Laboratory)
- Lawrence A. Presley, MS, MA, D-ABC (Former Unit Chief, FBI Laboratory)
- Robert W. Knapp, JD

A number of others, including Alissa Gindlesperger, BS, Tanya DeGenova and Michael Moore, were tasked with specific assignments during the review.

In conducting our review of the MSP Crime Laboratory, we focused on key areas which we believed were most critical to the achievement of the Laboratory's objectives:

- Organizational structure
- Roles and responsibilities
- Policies and procedures
- Quality assurance structure and processes
- Communication and documentation
- Professional competency
- Available resources including technology and professional affiliations
- Compensation

Our examination of each of these areas was considered essential to the overall improvement of the function and efficiency of the MSP Crime Laboratory. However, a critical factor in the request for this assessment was the recent concerns raised about the Combined DNA Index System (CODIS) Unit. While limiting the scope of this assessment to the handling of CODIS results would have been short-sighted, we found it useful to utilize this recent situation as a definable problem that offered insight into the

workings of the MSP Crime Laboratory as well as its shortcomings. In maintaining a broad perspective intended to improve the overall efficiency and quality of the crime laboratory's work, we believe we have identified key areas for improvement and developed critical recommendations that, if acted upon, will greatly decrease the chances for similar problems related to CODIS results in the future while enhancing the overall efficiency, productivity, and professionalism of the laboratory itself.

The Vance team approached our review of the MSP Crime Laboratory by employing investigative methods that elicit the most comprehensive understanding of the MSP Crime Laboratory's current operational processes, including:

- Interviews with key staff members and stakeholders
- Review of internal documents – including policies, procedures, audits and protocols
- Comparison/contrast with crime laboratories in other states for best industry practices
- Establishment of a confidential "hotline"

For additional details concerning the methodology employed by the Vance team please refer to **Attachment A**.

Our review also assessed the quality of the science being conducted in the MSP Crime Laboratory. Please refer to **Attachment B**.

III. Background

The forensic services for the Commonwealth of Massachusetts are shared among several agencies including the MSP, the Office of the Chief Medical Examiner, the Department of Public Health, and the Boston Police Department. Even within the MSP, forensic services are not unified under a common laboratory organization and quality assurance program. The MSP Crime Laboratory has been in operation since 1953. The MSP Crime Laboratory currently operates includes limited forensic disciplines, including drugs, arson, explosives, toxicology, trace analysis, and DNA. Additional forensic disciplines found within the MSP, but not organized under the Laboratory Director, are Crime Scene Services, Firearms identification, Latent print identification and computer forensics. The MSP Crime Laboratory is located in Maynard, Massachusetts. The laboratory system also includes satellite laboratories in Danvers, Sudbury, and Springfield. These laboratories provide virtually all biological and chemical forensic services in the Commonwealth of Massachusetts (excluding parts of Suffolk County). Refer to **Attachment C** for a current Massachusetts State Police forensic services group organizational chart. The Laboratory is an ASCLD/LAB accredited entity for only those disciplines under the current laboratory system.

The MSP Crime Laboratory has experienced increased demand for services over the past 10 years and has expanded its capacity recently with the opening of the new 68,000 square foot facility in Maynard, Massachusetts. In 2004, the Laboratory had a staff of 71 individuals. At that time, the Laboratory was situated in only 8,000 square feet of office and laboratory space. In 2005, an additional 12,000 square feet of space was added with an addition of 24 new chemist positions. The Laboratory currently employs 115 employees (34 DNA Chemists, 66 "Other" Chemists, and 15 Support staff) and had an annual appropriation of \$16.2 million for Fiscal Year 2007. As a result of increased capacity and the need to provide corresponding forensic services under strict accreditation guidelines, the Laboratory is faced with compelling yet complex choices and priorities to address service output.

Our recommendations are directed at deficiencies found in the organization of the MSP Crime Laboratory and recommendations for improved leadership in key areas. By all accounts and with few exceptions, the men and women of the MSP Crime Laboratory are true professionals with a very strong commitment to serving the Commonwealth of Massachusetts.

IV. Introduction to Recommendations

Our recommendations begin with a series of recommendations dealing with a reorganization of the MSP Crime Lab. Only later in our recommendations do we discuss some real issues presently being faced by the MSP Crime Lab, as well as some historical problems (the CODIS issue being one). This is not a failure to prioritize our recommendations, but a firm belief that only with the type of reorganization recommended here will the MSP Crime Laboratory begin to correct its problems, both past and present, and raise the MSP Crime Laboratory to the next level.

A recurrent question in many crime laboratory reorganizations across the country – and a theme that has consistently come up in our review here as well – is: What level of independence from law enforcement oversight should a crime laboratory have?

Where a forensics lab is organizationally placed, and what agency or organization (if any) has ultimate oversight of the lab, is, in our opinion, purely a political decision well outside the scope of our review.

Therefore, we specifically do not address as part of this recommendation the placement of the MSP Crime Laboratory in the overall state system and do not suggest movement of the MSP Crime Laboratory from under the overall oversight of the Massachusetts State Police to any other agency or entity or a cabinet level position. In fact, our recommendations contemplate that the authority of the Laboratory Director would be subject to appropriate oversight from the Massachusetts State Police command structure and the Executive Office of Public Safety. (It is worth mentioning that the Massachusetts Governor's Crime Commission in 2004 made a recommendation that the management of forensic services under the Executive Office of Public Safety should be an area of focus for that Cabinet level office. In fact, that has happened with the oversight by the Undersecretary. Later in this report, we provide further recommendations to assist the Undersecretary in this oversight.)

It is a political decision because from a scientific best practices perspective it should make little difference so long as the laboratory is organized in a fashion such as is outlined in the recommendations below. Two premiere state laboratory systems (which we used for comparison purposes throughout this assessment) are the crime laboratories in Virginia and Florida. They are instructive on this point. Even though they operate under different organizational hierarchies, both are regarded as national models and both excel in performance.

The Virginia Department of Forensic Sciences reports to the Secretary of Public Safety, not directly to any one law enforcement agency. They provide services to over 400 different law enforcement agencies while technically remaining independent of any of them.

Florida's laboratory system, on the other hand, reports to the Commissioner for the Department of Law Enforcement (similar to the Massachusetts State Police). Florida, like Virginia, serves multiple other law enforcement agencies remarkably well even though they are not as "independent" as Virginia as they report directly to one law enforcement agency.

The common characteristic in both these systems and what has lead to their success has little to do with where they ultimately fit in a hierachical organizational chart. The characteristic which has lead to their success is that both are consolidated laboratories being run by a strong director under a single, proactive and robust quality assurance system and manager, one of the key recommendations in this report.

V. Findings and Recommendations

1. All Forensic Science Disciplines and Services Must Be Consolidated and the Unified Laboratory Placed under the Control of One Laboratory Director

All forensic disciplines are currently dispersed among several Massachusetts State Police entities. It is critical that all forensic disciplines be consolidated under a unified command structure under the leadership of a single Laboratory Director responsible for one fully integrated laboratory and quality management system. This is not only consistent with best practices, but vital to moving the MSP Crime Laboratory to the next level and avoiding the problems it has had in the past.

Achieves:

- **Consolidation under a strong Laboratory Director**
- **Lays Groundwork for Success**

The new Laboratory Director should have full authority over the entire operation of the Laboratory. Full authority should include operations, personnel, budget, and priority systems. The new Laboratory Director should have full authority over the entire operation of the Laboratory. Full authority should include operations, personnel, budget, and priority systems. All such authority, of course, would still be subject to appropriate oversight from the Massachusetts State Police command structure and the Executive Office of Public Safety.

The unification of all forensic functions under one system, one Laboratory Director and one robust quality assurance program (discussed below) is a key element to the current and future success of the MSP Crime Lab. Such a lab, designed as outlined in the following recommendations, would not have had the problems recently experienced by the MSP Crime Lab, or the problems it is currently facing. It is important to understand that consolidation/unification of the MSP Crime Lab's forensic disciplines by itself does not achieve the ultimate objective of our recommendations. It is the fact that it lays the bedrock upon which the balance of the recommendations will be laid, particularly a strong Laboratory Director working with an experienced Quality Assurance manager to develop a consolidated and robust quality assurance program that makes this recommendation critical.

In other laboratories across the nation that have undergone such consolidation, including the FBI Laboratory, an entrenched culture of "sworn versus non-sworn" had to first be overcome for the consolidation to be successful. The Commonwealth will face a similar

challenge. True unification will be resisted. This resistance will need to be addressed swiftly and decisively by the leadership at the Massachusetts State Police and the Executive Office of Public safety.

We were advised that one reason why consolidation had not been implemented in the past was the concern that consolidation will negatively impact the MSP Crime Laboratory's current ASCLD/LAB accreditation. Consolidation will not have such an impact. Instead, the Laboratory will simply acknowledge in their annual review that the organizational structure of the Laboratory has changed. In the next accreditation cycle (5 years from now), all disciplines within the Laboratory would be included in the assessment. This recommendation and implications on accreditation were reviewed with a member of ASCLD/LAB Board of Directors who confirmed it would not adversely impact the MSP Crime Laboratory's current accreditation.

This recommendation will have the additional benefit of consolidating all evidence control procedures under a common evidence process and quality system. This was also a recommendation to MSP by the National Forensic Science Technology Center (NFSTC) in 2002.

2. Expansion and Accreditation of All Forensic Science Disciplines Must Become a High Priority

Not all of the current MSP Laboratory disciplines are accredited. These non-accredited disciplines therefore are not governed by a unified quality management system. This has caused and will continue to cause undesirable deviations and undocumented or insufficiently documented practices. This lack of unified quality management will continue to result in inefficiencies and ineffectiveness in handling casework. For example, varying chain of custody documentation records can be confusing, appear incomplete, and create problems for cross-discipline exchanges of evidence. Additionally, widely different chain of custody documentation can be confusing to a judge or jury.

Achieves:

- **In-house knowledge base**
- **Reduced outsourcing**
- **Uniform and Increased quality assurance**

All forensic disciplines including firearms, fingerprints, crime scenes, and digital evidence should become accredited in the new consolidated Laboratory. A strong quality management system with standardized documentation requirements will ensure the best and most uniform forensic practices. Accreditation will reinforce these practices by means of comprehensive and extensive external reviews.

Achieving full accreditation will not be without its challenges, but will become more realistic once the Laboratory is under the direction of a single Laboratory Director with an integrated quality management system. A unified Laboratory structure under a rigorous quality management system will not prevent all errors or improve the work of individual employees whose performance is sub-par. However, the accreditation process and the subsequent yearly audits, proficiency tests, and other measures will ensure that best practices are being followed and measured or evaluated externally.

During some of our interviews with leaders of non-accredited disciplines, it became apparent that there is a significant lack of regard and understanding of the accreditation process. In fact, one unit leader stated that "accreditation was not necessary" and that his unit was producing 30% less cases because of accreditation efforts. He saw no problems in working cases without validated procedures in place, and thought that proficiency testing was too cumbersome. All employees within the MSP Crime Laboratory should be educated on the operational and perceived benefits of accreditation, and embrace an effective and integrated high quality management system.

In addition, the MSP Crime Laboratory should develop in-house expertise, including toolmark examinations. Toolmark examinations are very similar to firearms examinations and certainly important to burglary and other criminal cases, yet the expertise is not resident in-house. Toolmark training and expertise could reasonably be accomplished through the cooperation of other laboratories such as the Boston Police Department Laboratory. This option should be explored, because outsourcing toolmark cases is likely not as efficient or effective as in-house expertise. Sending toolmark cases to the FBI Laboratory requires extra time, and if testimony or toolmark expertise is needed, it requires the coordination and constraints of remote resources.

3. A National Search for a Laboratory Director Should Be Conducted

The MSP Crime Laboratory must conduct a national search for its next Laboratory Director. The quality of applicants (both internal and external) for this position will be greatly enhanced by first consolidating all forensic disciplines under a unified structure prior to posting for the position. The present organizational structure at the MSP Crime Laboratory is not likely to attract the strongest candidates. To oversee and

Achieves:

- **Strong and Focused Lab Leadership**
- **Forensic expertise at the top of the organization**

properly manage a consolidated laboratory with a robust quality assurance system, as recommended in our report, the next Director of the MSP Crime Laboratory should have the following qualifications:

- Ph.D. or a minimum of a Masters Degree in natural or physical science,
- Five years or more forensic laboratory experience,
- Significant laboratory management experience, and
- Proven leadership skills.

The Director should have participated in ASCLD/LAB accreditation efforts, and be knowledgeable regarding quality management systems in forensic laboratories. This person must be capable of and possess experience in reviewing audits and reviews, assessing corrective action reports, and developing a vision for the future.

Importantly, it is anticipated – if not recommended – that a Laboratory Director with the experience and qualifications discussed above will recognize the need to rely on well qualified subject-matter experts in a number of key areas likely to be outside the scope of their expertise, including, among other things, finance and budget issues.

4. All Quality Assurance Functions Should Be Consolidated under a Single, Proactive, and Robust Quality Assurance System and Manager for the Entire Laboratory

One of the biggest concerns we identified in the MSP Crime Laboratory is that it lacks an effective quality assurance program. Problems are not easily identified, and when identified are not readily and effectively dealt with. To date, the quality assurance function has effectively been a record keeping of quality practices, not the kind of robust leadership found in successfully run laboratories around the country.

Achieves:

- **Empowered Quality Assurance**
- **Effective, non-punitive corrective actions**

The recent problems in the CODIS and DNA units would not have occurred if the MSP Crime Laboratory had a robust, fully integrated, and proactive quality assurance system to identify the problems and a manager who was empowered and knew how to effectively deal with them. Even under the new organizational structure we are proposing, one without the other will not suffice.

The Laboratory Director and Quality Assurance Manager must work in unison to ensure that the quality management system becomes operative and embedded in the organization, and the quality assurance system and manager must be robust and empowered. The Quality Assurance Manager, working directly with the Laboratory Director, must ensure uniform quality and accountability for the entire Laboratory system under a dynamic quality management system as it moves towards ISO 17025 accreditation.

The Quality Assurance Manager for the Laboratory must be more proactive and more integrated into the external and internal audit processes of the Laboratory, including DNA and CODIS. In addition, the Biology and Chemistry Sections need an objective and independent review of their Laboratory operations and audits. Corrective action remedies must be monitored, reviewed, and approved by the Quality Assurance manager.

The entire quality management system must be redesigned with appropriate authority given to the Quality Assurance Manager and his/her representatives to actively engage in, evaluate, direct, monitor, and close out corrective actions, discussed more fully below, in Recommendation 6. The current Quality Assurance Manager is perceived as mainly a keeper of records, and does not have dedicated staff for the handling of quality assurance measures. Lab Supervisors III's should be part of, but not supplant, quality assurance measures such as corrective actions. Once corrective actions have been completed, further actions to address the same issues must be handled as management issues, and not remain a quality assurance issue. Training issues must be recognized as such and appropriately addressed.

5. The Quality Assurance Manager Should Report Directly to the Laboratory Director

The current practice within the MSP Crime Laboratory is to have quality assurance and its leadership distributed throughout the Laboratory. The importance of a quality assurance program and its leader cannot be overstated. This position requires an experienced scientist and leader with a vision that will help lead the MSP Crime Laboratory into the future through a strong quality management system and international accreditation.

Achieves:

- **QA accountability**
- **Support and empowerment of the QA Manager**

Consistent with national best practices, direct reporting to the Laboratory Director will provide the Quality Assurance Manager with the authority necessary to effectively carry out their duties, authority which the Laboratory Director must recognize.

6. Corrective Actions Should Be Part of a Strong Quality Management System and Addressed in a Timely Manner

It cannot be overstated: the current quality management system is badly broken. A prime example concerns the manner in which the MSP Crime Laboratory deals with many corrective actions. A corrective action in a laboratory setting is an action taken to eliminate the causes of an existing non-conformity, defect, or other undesirable situation in order to prevent recurrence [ISO 8402]. A proper corrective action requires a root cause investigation, plan, deadline, appropriate authority review, and follow-up audit. In successful laboratories around the country, a corrective action becomes a learning opportunity for improvement, not a punitive or negative management tool. It is important to understand that activity warranting corrective action is different from insubordination other disciplinary matters.

Achieves:

- **Reduced technical problems**
- **Timely QA corrections**

Up until this point, the quality assurance and corrective action functions were fully and completely placed under the Technical Manager within Forensic Biology. Many corrective action issues were handled in a manner that was detrimental to the supervisor and employee. Corrective actions were not assigned clear deadlines, did not always receive extensive root cause determinations, and virtually eliminated any objective input or activity from the Quality Assurance Manager. One supervisor suggested that forensic biology employees were “paralyzed by fear” because of the inappropriate use of corrective actions. Numerous employees recognized and were affected by what was perceived as the “unfair treatment” of DNA analysts caught in the middle of unacceptable corrective actions.

We saw numerous examples of this. For instance, one employee was given what were labeled corrective actions and suspended indefinitely from ‘evidentiary handling.’ Although this employee may well have committed transcription errors, the root cause was not identified through an appropriate investigation into sample aliquot mix-ups and handling techniques with low copy sperm cells. For almost a year, this employee was placed on a ‘corrective action plan’ with no deadline, no adequate and timely follow-up investigation, and no resolution.

This example, as well as many more we identified, demonstrates an improper handling of these issues. The employee is not learning, is rendered unproductive and resentful, and both the employee and Laboratory suffer. Corrective actions and ‘variances’ (an administrative extension of corrective actions) were used in a punitive rather than corrective or learning manner. A common consequence of corrective actions and variance violations resulted in the assignment of the individual to the Co-DNA or CODIS units.

This also made assignment to these units appear to be punitive or undesirable when in fact they are critical technical assignments.

All corrective actions should be monitored by the Quality Assurance Manager and Laboratory Director. All laboratories must have well-defined written procedures to deal with corrective actions for technical problems identified by proficiency testing or in other ways. Corrective actions, however, are not to become a substitute for personnel actions. We note in our review that deficiencies in personnel qualifications were being inappropriately addressed (or ignored completely) as “corrective actions.”

7. Quality Assurance Representatives Should Be Appointed within Each Discipline

Currently, there is not a unified quality assurance program throughout the Laboratory. Nor is there quality assurance representation in each discipline.

Each forensic discipline should have a quality assurance representative who is a leader in the discipline and willing to devote the time and energy to promote quality initiatives and practices throughout the MSP Crime Laboratory. Their main function should be to serve as the leader within their respective disciplines and to assist the Quality Assurance Manager with the Laboratory-wide effort in accreditation and the move toward international ISO 17025 accreditation.

Achieves:

- **Staff involvement and investment in QA**
- **Improved QA coordination among disciplines**
- **Improved QA accountability across the organization**

8. Audits and Reviews Should Be Objective and Avoid All Appearances of a Conflict of Interest

In some instances, the MSP Crime Laboratory has used auditors who have a conflict of interest. For example, the MSP Crime Laboratory has used and possibly continues to use personnel from a private DNA testing laboratory for outsourcing DNA samples. They have then utilized this same company as external auditors of the DNA process. At the very least, this creates the appearance of a conflict of interest. More likely, in our estimation, it affected the quality of the audit.

Achieves:

- **Improvements in the technical accuracy and efficiency of the laboratory resulting from objective evaluation**

In fact, the audit of CODIS operations performed in July 2006, by an employee of this private DNA company found only one deficiency involving the lack of written procedures for taking corrective actions, yet two months later (September 2006), an audit performed by the Office of the Inspector General for the U.S. Department of Justice found significant deficiencies in actual DNA profile interpretations by an unqualified individual charged with administering the state DNA database.

Audits and reviews must be objective and must avoid all appearances of a conflict of interest.

9. A CODIS State Administrator with Significant Forensic DNA Casework Analysis Experience Should Be Appointed

While the MSP Crime Laboratory has taken a number of positive corrective steps following recent problems with the Combined DNA Index System (CODIS), more must be done to ensure past problems are not repeated.

The MSP Crime Laboratory must hire a full time and appropriately qualified CODIS administrator who would be responsible for oversight of the CODIS unit within the MSP Crime Laboratory.

Achieves:

- **Significant in-house CODIS knowledge and experience**
- **Ability to standardize CODIS policies and procedures**
- **Reduced CODIS issues**

We recommend the appointment of a qualified CODIS leader that exceeds current national standards. In light of its past CODIS issues, the Commonwealth of Massachusetts should become a leader in forensic science and should adopt a heightened standard. From a practical perspective, the standard we recommend here, although exceeding the current national standards, is very likely to become required in the next year. The types of qualifications which would be important to such a position include:

- Master's degree or higher in chemistry, molecular biology, forensic science or related field
- Minimum of three years of responsible professional experience in forensic science, plus at least two years of supervisory and laboratory management experience, or an equivalent combination of relevant education and experience
- Must have qualified in a court of law as an expert witness in the field of forensic DNA analysis
- Meet DNA Advisory Board's (FBI) qualifications for "Technical Leader" as defined in the Quality Assurance Standards for Forensic DNA Testing Laboratories
- Provide information (educational and work history as well as references) that clearly and convincingly demonstrates the qualifications for this position
- Must successfully pass a background investigation

The issues the Administrator should be involved with will include: writing CODIS protocols and procedures; developing, recommending and/or implementing changes in policies and procedures for the improvement of the overall CODIS operation; conducting technical reviews; writing appropriate CODIS reports; testifying in court and conferring with and/or advising police investigators and prosecutors as needed; ensuring and documenting quality control procedures; planning and coordinating the operational activities of the CODIS unit including the supervision of subordinates and delegation of responsibilities; administering the collection of DNA samples and outsourcing of samples as necessary; developing and maintaining training programs for new employees and subordinate personnel; and, serving as the CODIS Administrator as the system administrator of the MSP Crime Laboratory CODIS network at the state level.

All CODIS activities should be monitored by the Quality Assurance Manager and system, and all CODIS audits should be resolved by the quality management system. CODIS should be fully integrated into the Laboratory's quality management system, and appropriate management and operational checks implemented to ensure high quality and accountability. Some of the current management changes appear to be moving the unit in the right direction already.

The recent CODIS review by the FBI demonstrates the need for a strong CODIS Administrator capable of assessing DNA profile results, especially involving mixtures. The Administrator must take an active, participatory role in the National DNA effort to include involvement in all State Administrator CODIS meetings hosted by the FBI. The

State Administrator must, in turn, keep all CODIS and support personnel fully informed of policy changes and current issues.

Further discussion on the background which lead to the most recent CODIS problems in the MSP Crime Laboratory is merited because it is instructive moving forward and because almost by itself demonstrates the need for a unified laboratory under a strong director with a robust quality assurance program.

In 1999, the Director of the MSP Crime Laboratory requested a needs assessment. Overall, the Laboratory was found to be in need of documentation mechanisms, protocols, review processes, and most elements of a quality management system. One of the areas identified that was in need of support involved CODIS administration.

There was no actual professional selection of the person who should administer CODIS. One analyst was offered the CODIS manager position but declined, choosing instead to perform DNA casework analysis instead. The former CODIS Administrator was then assigned to the CODIS position.

The former CODIS Administrator was not qualified for the position. He had neither adequate DNA training nor sufficient full time staff. The MSP Crime Laboratory must have known of the problems, given the series of reports which identified issues in CODIS.

In 2000, a DNA audit found problems with the administration of CODIS. Other CODIS issues were identified in 2003, 2004, and 2006 audits. No effective corrective actions were taken. While given the present positive direction in which the MSP Crime Laboratory is heading and the seriousness with which they are now approaching past problems, we are hopeful that such a scenario is unlikely to be repeated. No further comment is necessary on the likelihood of success for a system that is unable or unwilling to take necessary corrective action.

We were advised that the former CODIS Manager's position was protected by union rules, and although management tried to create an appropriate job description and post it, it was challenged and eventually the posting was withdrawn. No further steps appear to have been taken.

Further, the CODIS unit was largely perceived as a "dumping ground" for employees who were viewed as incompetent or "unwanted" by other units. Although mistakes were observed being made within the unit, there were no appropriate corrective actions and very little review by anyone outside of CODIS activities. One CODIS employee described the atmosphere as one of isolation. CODIS employees' activities went largely unchecked.

Recent changes are positive, but they do not go far enough. Recent internal reviews of CODIS operations suggest that many of the issues have been resolved. There have been

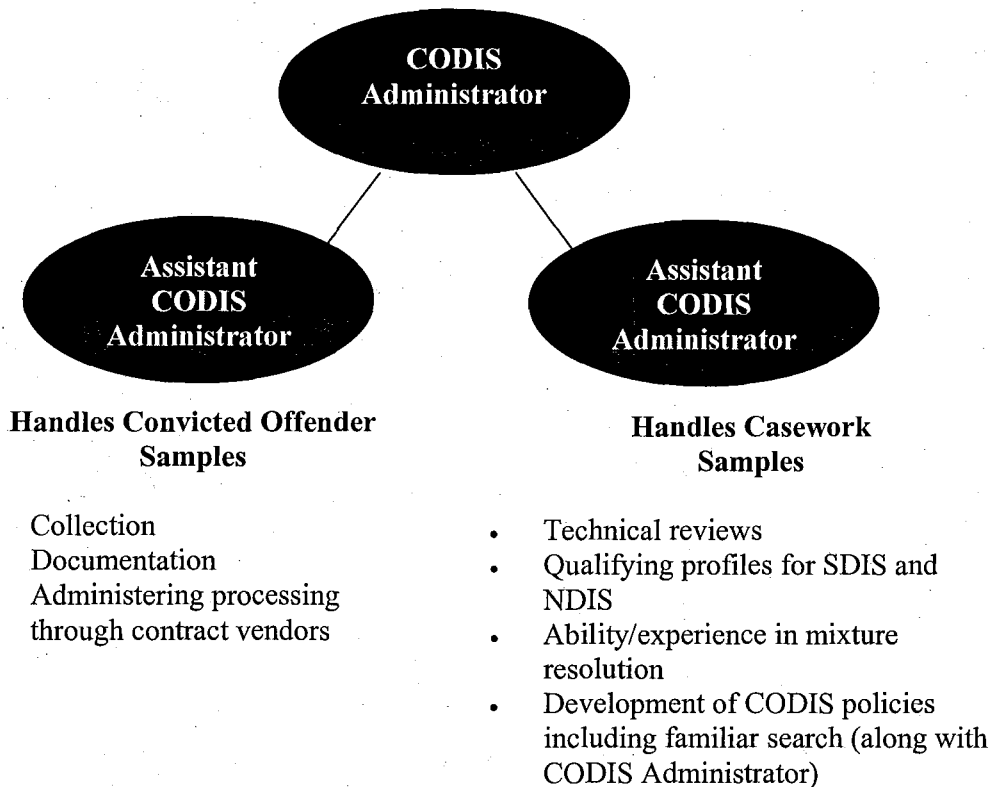
additional “hit” reports issued, additional CODIS inaccuracies and incomplete records rectified, and some outstanding (over 30 day) reports remain pending.

10. The MSP Crime Laboratory Should Appoint Two Assistant CODIS Administrators, with Significant Forensic DNA Casework Analysis Experience

Consistent with national best practices, the Laboratory should appoint two Assistant CODIS Administrators with significant DNA casework analysis experience. One would be responsible for handling convicted offender samples and the other would be responsible for handling casework samples. Their duties and responsibilities would be divided as follows:

Achieves:

- Improved analysis quality
- Reduction of mistakes



The delineation of duties will help ensure that past missteps will not be repeated. The FBI's review of April 2007 provides further details regarding the current state of Candidate Matches and their disposition. We will not repeat those findings here. They clearly support the need for the above positions.

11. Utilization of Partnerships, Process Mapping, Technology, Outsourcing, and Governmental Leadership Should Be Considered to Resolve the Current DNA Processing Backlog

The reduction of forensic DNA backlogs is a national problem. The backlog faced by the MSP Crime Laboratory however is of crisis proportions. As of our review, we were advised that the MSP Crime Laboratory has 899 unassigned and unworked criminal cases, approximately 4,000 unassigned and unworked sexual assault kits, 2,000 assigned DNA cases, but unworked DNA cuttings. In addition, there exist in cold storage (old and unassigned) DNA cuttings from more than 10,000 cases. Potential cases having DNA evidence total more than 16,000 at present time.

Achieves:

- **Reduced and ultimately resolved backlog of DNA samples that require analysis**
- **Increased efficiency to avoid future backlog**

Immediate efforts by Massachusetts State Police leadership and the Executive Office of Public Safety should be made to address this backlog. This backlog cannot be dealt with under current staffing levels.

This recommendation and others offer alternatives in addition to the obvious need for increased funding and personnel.

Across the nation, the successful reduction of forensic DNA backlogs requires the focused attention and resources of state and local crime laboratories. Experts agree that the national backlog of rape and homicide cases is "massive" and that one of the largest barriers to processing DNA evidence in rape and homicide cases is the backlog at local laboratories which prevents their timely results. They also agree that state and local laboratories are "overworked, understaffed, and insufficiently funded," and state and local laboratories should "reevaluate their degree of investment in their forensic crime laboratories" if they want to meet the needs of the criminal justice system.

Other states are struggling with DNA backlogs and inadequate staffing as well. For example, the Wisconsin Department of Justice (DOJ) released an internal review of the State Crime Laboratory's resources for DNA analysis. DOJ's report concluded that the State Crime Laboratory would need 37 new DNA-related staff positions to eliminate the DNA backlog by 2010 if those positions were provided for as part of the normal budget process. DOJ's report concluded, however, that only 31 new positions would be needed if a special appropriation were passed to enable DOJ to fill the positions by July 1, 2007.

In 2006, the Wisconsin State Crime Laboratory received 2,226 DNA cases for processing from law enforcement, yet was only able to complete 1,152 cases. At the close of 2006, 1,785 DNA cases were unprocessed. In the absence of a special appropriation, DOJ projects the backlog will grow by over 1,000 cases in 2007.

Process Mapping

In 2004, the FBI Laboratory under the supervision of one of the Vance team members participated in the establishment of a Process Map of all DNA operations. Process Mapping describes a series of connected actions that achieve a product or outcome. Organizations often use it to gain an understanding of their existing functional processes and a clear sense of their needs. This enhances their ability to develop a deliberate course of action to improve the timeliness and quality of services. Process mapping does help crime laboratories improve their current forensic processes and operational management.

Through external facilitation and extensive internal staff participation, a more uniform operational plan for evidence processing can be developed. This includes workflow diagrams and decision trees, in an effort to assist examination teams with analytical processing decisions and potentially increase both the efficiency and effectiveness of operations. Since Process Mapping was completed by the FBI, significant savings in processing times have been realized.

This same approach was taken by the state of Wisconsin along with some unique partnerships with academia. In 2005, the Attorney General for Wisconsin along with an institution of higher education joined forces to assist the state's crime laboratory in addressing an increased DNA workload. In an August 4, 2005 press release, the Attorney General promoted the use of process mapping by stating: "Today we are embarking on the next phase in the science of DNA evidence processing. Through this unique partnership with Fox Valley Technical College, the Wisconsin Department of Justice and Wisconsin law enforcement agencies statewide will see enhancements on two fronts: 'process mapping' of the DNA sections and improved evidence gathering training for law enforcement officers at crime scene investigations."

Similar approaches should be considered by the MSP Crime Laboratory as money and personnel alone will not solve the critical state at which DNA testing in Massachusetts has reached. Instead, partnerships, process mapping, technological improvements (robotics,

expert systems), outsourcing, and leadership from the highest levels of government are necessary to overcome a seemingly insurmountable problem.

According to leading experts:

“Although the availability of funding can help laboratories address the challenges they face, in order to make the best use of this funding, laboratories should consider their specific needs and managers should be aware of technology improvements that consolidate and streamline their workflow. To achieve this many laboratories have participated in a series of workshops to enhance their planning and develop a clear understanding of future needs. Several organizations offer “process mapping” services (see *Forensic Magazine*® April/May 2006) which help to identify the need for facility design improvements, additional equipment, laboratory workflow enhancements, and additional personnel. Process mapping may also reveal gaps in testing processes and areas where small adjustments may result in great improvements to laboratory efficiency. Additional resources are available to assist laboratories in the validation of new technologies such as the outsourcing of validation services and the development of a new software package (available in summer 2007 from Applied Biosystems). These resources guide laboratories through the validation process in an expeditious manner facilitating experimental design, data analysis, and data management. Although forensic scientists face many challenges, laboratories have met them with innovative thinking, improved science, and a better understanding of their workflow and needs. Exciting developments are on the horizon that will increase sample throughput at a lower cost while requiring less personnel resources. The ability of law enforcement to maximize the use of DNA in every case to provide investigative leads promises to facilitate the swift resolution of criminal cases and the identification of the missing.” - “The Evolution of Forensic DNA Laboratories and The Challenges They Face,” Dennis J. Reeder, Lisa Lane Schade, and Lisa Calandro, *Forensic Magazine* April/May, 2007.

In a May 2007 Auditor General report of the Royal Canadian Mounted Police Laboratory, it was noted that as a result of increased backlog issues, “The RCMP should develop mechanisms for identifying bottlenecks in the process and should determine the systems, procedures, and resources required to eliminate the backlog.” Process mapping is one such approach that can serve to assist the MSP Crime Laboratory in meeting the current demands.

12. The MSP Crime Laboratory Should Explore, Fund and Validate an Expert System for DNA Analysis Reviews

As discussed above, there is presently a backlog of cases in the MSP Crime Laboratory, which can properly be characterized as monumental. Unless steps are taken immediately, the backlog of DNA samples will continue to grow.

Achieves:

- Automated DNA review
- Improved efficiency
- Reduced DNA sample backlog

There are other measures which should be considered that will not require additional personnel, but involve technological advancements. One such measure is what is known as an "expert system." Expert system software programs are capable of automated review of DNA data. With this computer intervention for DNA analysis review, it is expected that this one system can help to eliminate backlogs by reducing the amount of human review. There are currently three expert systems available. They include:

- GeneMapper ID v. 3.2 from Applied Biosystems
- FSS-I cubed from Promega Corporation
- True Allele System 2 from Cybergentics

Regardless of the system chosen, the MSP Crime Laboratory should immediately begin the evaluation and validation process to include single source samples and mixture analysis. The Florida Department of Law Enforcement (FDLE) has evaluated these systems and is currently implementing them for DNA applications. The MSP Crime Laboratory should consider contacting David Coffman, the FDLE's Chief of Forensic Services.

13. The MSP Crime Laboratory Should Ensure Resources are Available to Continue in its Efforts to Reduce the DNA Backlog

The MSP Crime Laboratory currently sends convicted offender samples to Orchid Cellmark in Nashville, Tennessee using National Institute of Justice (NIJ), Convicted Offender Outsource funds. Current funds allocated by NIJ include \$383,000 to analyze 13,669 samples under this program with approximately 8,000 more to send out before the funds are exhausted.

Achieves:

- Reduced backlog over time with ultimate resolution of backlog
- Develop in-house capabilities

Current plans by the MSP Crime Laboratory are to analyze convicted offender samples in-house. The MSP Crime Laboratory projects collecting approximately 1,000 convicted offender samples per month or 12,000 samples per year under the current "all felons" legislation. These numbers are consistent with Virginia and are far below current output from Florida. Number of Convicted Offender samples received and analyzed by Florida is 46,899 per year and by Virginia are 14,863 per year. Virginia, with the assistance of robotics, is capable of analyzing approximately 15,000 samples per year with a staff of one supervisor, three analysts, and two administrative personnel. Florida, with a staff of one supervisor, five analysts, and six data entry specialists are capable of adequately addressing the current output of over 45,000 samples per year with a projected output of 120,000 samples per year.

In 1998, Virginia entered into a contract with the Bode Technology Group of Springfield, Virginia to run backlogged convicted offender samples for three years. This effort was partially funded through a grant provided by NIJ, which allowed the Department to continue outsourcing the analysis of convicted offender samples into the summer of 2004. As a result, Virginia essentially has no backlog of convicted offender or arrestee samples. The Department remains current (i.e., there is no backlog) on the analysis of these samples in-house and Virginia's databank now contains more than 259,000 offender and arrestee profiles with an annual contribution of over 14,000 convicted offender samples. This approach is consistent with the current plan discussed with the MSP Crime Laboratory to reduce their backlog with NIJ funds and begin in-house analysis. Adequate resources for this endeavor are critical and cannot be redeployed if backlogs are eliminated.

It is also important to stress the need to continue to analyze all convicted felon samples and not merely concentrate on violent offenders. Both Florida and Virginia have shown the robustness of CODIS and the demographics of the convicted offender population. Nearly 50% of all CODIS hits recorded by Virginia were made against a convicted offender with a previous non-violent burglary or robbery charge. In fact, 80% of all CODIS hits would be missed if the database merely contained violent offenders.

14. Key MSP CODIS and DNA Personnel Should Visit another Laboratory System for Best Practices Review

Our assessment has revealed that some of the current practices of the MSP Crime Laboratory exceed the requirements of the internal policies and procedures and national standards, and are not required by sound scientific principles. As such, they are excessive and unnecessary. They lead to delays and decrease productivity, without increasing the quality of the results.

The new MSP Crime Laboratory Director must assess this situation and how best to remedy it. The Director should consider having some of his/her key personnel visit another laboratory system. Florida represents one example of a premiere state forensic system. Under the leadership of Dave Coffman, Florida has become a leading operation for a state system similar to Massachusetts. It would be beneficial to have key employees for the MSP Crime Laboratory visit the operations in Florida and observe first-hand a state that has overcome many of the same obstacles currently faced in Massachusetts.

Achieves:

- **Increased staff knowledge of best practices**
- **Implementation of time-tested procedures and methods**
- **Improved operational efficiency**

15. DNA Staffing and Compensation Should Be Improved

Recruitment and retention of staff continues to be a serious issue for the MSP Crime Laboratory. This is particularly the case with DNA analysts. Analysts, particularly trained analysts, are in high demand and short supply. Therefore, the effort to recruit, train and retain quality employees begins with the ability to offer a competitive entry-level salary with the prospects of promotion and salary increases.

Achieves:

- **Improved staff retention**
- **Increased in-house expertise and knowledge base**

The Massachusetts State Police Human Resources Division has recently conducted research into a new job series in order to address these personnel issues. We applaud the efforts of MSP Human Resources to look for solutions to a problem plaguing most laboratories in the U.S. That review correctly points out the following:

- Retention problems may stem partly from the lack of a career ladder and the potential to increase pay due to longevity, educational degree and complexity of work performed.
- There appears to be no connection with compensation and the necessity for specific degrees and experience in some of the more demanding jobs, especially those associated with accredited disciplines.

The recommendations listed in the 2007 MSP Human Resources Division review are good, but do not go far enough. For example, retention of new employees has been shown to be a significant problem especially for DNA analysts. However, the proposed changes in reclassification provide for a new title for entry level analysts (Forensic Scientist Trainee vs. Chemist I), but do not enhance the compensation of the employee (see table).

It is apparent from all materials provided, anecdotal stories and the MSP Human Resources Division's review document that new employees are leaving following becoming trained and that compensation is a primary factor, not job title. Additionally, current employees at the higher levels may decide that these enhancements are insufficient when compared with other jurisdictions and MSP will be unable to retain these critical positions.

Table 1. Comparison of Current Title and Pay to Proposed Title and Pay for Sample MSP Crime Laboratory Positions

Current Title	Current Pay	Proposed Title	Proposed Pay
Chemist I	\$39,163	Forensic Scientist Trainee	\$39,163
Chemist II	\$43,227	Forensic Scientist I	\$44,945
Chemist III	\$47,338	Forensic Scientist II	\$51,855
		Forensic Scientist III	\$55,970

Entry-level salaries are low. When compared to other states, particularly states with a lower cost of living, these salaries are not capable of retaining an experienced work force. Oklahoma, for example, has a beginning salary for its analysts at \$40,178. The cost of living index (MERIC average index 4th quarter 2006) for Oklahoma is 89.1 (ranked 3rd), as compared to Massachusetts with an index of 123.3 (ranked 41st). These data are consistent with the U.S. Census Bureau Cost of Living Index for selected metropolitan areas for 2007. The following data demonstrate what is already well understood by those living in the Boston area:

Table 2. Comparison of Cost of Living Index across Key States

	Cost of Living Index Range	Rank
Florida	92-117	33
Oklahoma	88-90	3
Massachusetts	118-137	41
Virginia	90-129	35

Salary comparisons with Virginia and Florida also demonstrate a significant discrepancy with Massachusetts for retention purposes. The range of salaries for DNA analysts in Virginia is from \$41,178 (entry level) to \$76,032 (senior analysts).

Table 3. Sample Salary Comparison across Key States

	Virginia	Florida	Massachusetts
Entry level salary	\$41,178	\$42,000	\$39,163
Senior level (non-supervisory) salary	\$76,032	\$71,000	\$57,279

There is a consistent view that low salaries result in the lack of retention of employees. Although this is not the only retention issue, salary is a significant issue. This lack of employee retention results in the continuous training of new employees, and the lack of highly experienced personnel for complex cases. A significant number of DNA analysts have less than 5 years of experience.

A one year residency requirement for all new hires would likely enhance the retention of local recruits who will likely stay for their whole career (due to family ties, school ties, and so on). Some states also offer retention pay increases over the first five years of employment.

Many states are requiring certification (mainly American Board of Criminalistics [ABC]) for promotion to level II or III. This certification could be used as a relevant and critical component to enhance the singular expertise of several forensic science disciplines, and warrant higher salary compensation.

It was also noted by many DNA analysts that the option to participate in crime scene investigations was and is a very attractive feature of working at the MSP Crime Laboratory. Most DNA analysts in other crime laboratories do not participate in crime scenes, so this opportunity within the MSP Crime Laboratory is a strong plus and likely a positive factor in retaining personnel.

16. The Need for NERFI Training Should Be Evaluated

The MSP Crime Laboratory presently trains its DNA analysts through the Northeast Regional Forensic Institute (NERFI). Without passing judgment on NERFI, our interviews revealed that numerous DNA analysts considered the training good in theory but not particularly helpful in practice. In most cases, the MSP Crime Laboratory protocols were not sufficiently used and applied to make the training meaningful, and resulted in extensive retraining. There were also issues regarding credit for the NERFI course.

The NERFI training should be reviewed to determine if it is effective and relevant to the needs of the MSP Crime Laboratory. In-house training may prove to be more effective, certainly less expensive, and promote positive relationships and mentoring opportunities. It may also allow for a more acute initial understanding of an analyst's abilities and motivation.

17. DNA Analysts' Duties for Casework and Convicted Offender Samples Should Be Delineated

Only approximately one half of the new MSP Crime Laboratory hires completes the requisite training and begins casework after approximately one year. This of course has led to a tremendous increase in the numbers of cases worked for the remaining analysts.

In 2006, the Laboratory was able to increase the number of DNA cases worked from 200 per year to 500. However, when compared to other states and the FBI Laboratory, the MSP Crime Laboratory only produces less than 4 cases per analyst per month. This is compared to a national average of approximately 8-10 cases per month.

One of the keys to success in both Florida and Virginia in DNA analysis of casework and convicted offender samples has been the delineation of duties of DNA analysts. Too often, the MSP Crime Laboratory has had to take analysts from one function (casework) and move them to another priority function (CODIS) only to then see the casework backlog spiral out of control. The only solution is to dedicate employees to both functions.

For the most part, the MSP Crime Laboratory does not meet its own turnaround targets for completing service requests. Although it can process urgent service requests in less than

Achieves:

- **Increased efficiency in DNA casework**
- **Achievement of in-house turnaround targets**
- **Improved prioritization**

5 days, they account for only 1 percent of all service requests. In the remaining 99 percent, the MSP Crime Laboratory is unable for the most part to meet the “less than 60 day” target it has set. While average turnaround times have improved for some types of analysis, DNA analysis requests have worsened—from 77 days in November 2006 to 145 in May 2007—despite increased spending and additional staff. Today, the average turnaround for serology and DNA casework is over 350 days.

Table 4. Comparison of DNA Case Output

	Florida	Virginia	Oklahoma	FBI
# DNA analysts	62	48	8	
# DNA cases per analyst/month	9	8	6	8

Production in other disciplines within the Laboratory is also important and comparative data are provided for evaluation purposes:

Table 5. Comparison of Case Output across Various Forensic Disciplines

Ave #days to complete	Florida	Virginia	Oklahoma	Massachusetts
AFIS	48	-	69	90
Computer Evidence	51	-	-	180
Chemistry	72	-	9	122
Firearms	139	-	53	-
Latent Prints	90	-	69	90
Trace Evidence	226	-	127	253
Serology /DNA	188	215	240	359
Toxicology	36	29	38	29

18. Communication between Laboratory Management and Staff Should Be Standardized and Improved

Another area for improvement in the MSP Crime Laboratory is the need to increase communication, both internal and external. Without the value of knowledge and information-sharing, the organization is at risk for:

- Failure to perform key tasks under the assumption those tasks have been completed;
- Performance of critical tasks with a lack of information that could shape the performance or outcome of the task;
- Negatively impacting the ability of external stakeholders to meet their objectives due to lack of accurate and timely information-sharing;
- Duplication of work that leads to inefficiencies.

Achieves:

- **Improved quality**
- **Articulation of the Laboratory's work and mission to the public**
- **Increased sense of teamwork among the staff**

Improvement in communication can be accomplished by the establishment of communication and documentation protocols that will not only facilitate information-sharing but will become such an expected part of daily routine that the omission of communication will act as an indication of a potential breakdown.

For example, several DNA analysts suggested that supervisors are not consistent with their interpretations of DNA reports and protocols. Supervisors have given several inconsistent answers to the same protocol or report issue. This leaves employees confused and unsure about the "correct" procedure or report. Some employees may be given one answer while others learn about the answer from fellow employees or proceed with an "incorrect" assumption. This can lead to continued variances and deviations which are perpetuated, and become particularly frustrating for newer employees. While a robust quality assurance program will go a long way in rectifying this problem, increased communication will also be of valuable assistance.

Supervisors must meet regularly to address common protocol and reporting issues raised by employees to ensure consistent interpretations of policies and procedures. The supervisors must then decide what interpretation should be disseminated, and publish it appropriately to all employees. This will help to prevent confusion and uncertainty among all employees.

There are many other examples of the need for improved interpretation. For example, when an employee or visitor enters the MSP Crime Laboratory in Maynard, neither the

employee nor visitor is greeted with any indication of the tremendous work that is being accomplished behind the walls at that facility. The MSP Crime Laboratory should begin to highlight that work and the successes brought about by the work through photography, graphs, charts and other means. Non-sensitive information suitable for public consumption should not only serve to provide visitors with an understanding of the tremendous efforts by many dedicated employees, but it should also serve as a means to communicate to employees and provide a sense of accomplishment and satisfaction. Another example simply involves regular staff meetings, newsletters, or other forms of communication that serves to connect the entire laboratory and create a sense of teamwork rather than promote isolation and the perception of a caste system within the Laboratory.

Regular internal communication can also promote a sense of internal identity. Communication via regular staff meetings, newsletters, or other forms of communication serves to connect the entire laboratory and creates a sense of teamwork. The absence of regular communication promotes isolation and the perception of a caste system within the Laboratory.

19. Management of the DNA Units Must Be Flexible and Responsive to Effective Case Management. Criminalistics and DNA Cross-Training May Become an Effective Case Management Approach

██████████ was recently re-categorized as Forensic Research Scientist (March 2007), Research, Development and Training and was formerly Technical Manager Forensic Biology which covered DNA, Criminalistics (serology), and CODIS. ██████████ ran a fairly tight and highly territorial Biology section, ██████████

Achieves:

- **Improved productivity**
- **Cross training of staff**
- **Increased streamlining**

██████████ was clearly over extended in management scope over several critical DNA, Criminalistics, and CODIS units, and burdened with significant training and validation issues. Although very knowledgeable regarding DNA, ██████████ was not as knowledgeable regarding serology. This created inefficiencies in processing Criminalistics cases. Many of the DNA units' personnel have less than 5 years experience which also created inefficiencies in processing complex DNA cases.

The tight reign on biology created a territorial management hierarchy which made it difficult to split and reorganize around needed tasks. Some DNA units' personnel were very busy while others were not fully occupied. For example, approximately 40,000 cases

currently require CODIS technical reviews, but inadequate across-unit cooperation inhibits the resolution of this issue. The territorial boundaries around the several DNA units should be structured to allow for crossover and combining depending on the specific needs of the Biology section. All DNA examiners should be fully occupied at all times.

Cross training with Criminalistics units could also streamline the processing of cases. This would eliminate the need for a second complete review of a case for DNA analysis, and assign one examiner as the single focal point for all Criminalistics and DNA analysis on a case. This would also allow for the efficient and comprehensive communication and testimony with regard to the case. A supervisor who has been cross-trained will likely enhance the management and processing within the Biology units. Cross training between Criminalistics and DNA is already in progress, and expansion of this work approach may prove to be the more efficient and effective case management approach. In addition, storing the evidence in the Criminalistics and DNA areas and not at a different location (Sudbury) would provide more efficiency in handling and processing the evidence.

20. Creation of a Scientific Subcommittee to Assist the Forensic Science Advisory Board

The current Forensic Science Advisory Board is not adequately staffed to address some of the most important challenges facing the MSP Crime Laboratory. The current board should be augmented with a subcommittee (or subcommittees if necessary) designed for specific issues that meet regularly culminating in a presentation and recommendations to the Advisory Board.

A scientific subcommittee of the Forensic Science Advisory Board should be established. This scientific subcommittee should include practitioners, customers and subject matter experts including, but not limited to, prosecutors, law enforcement personnel from state and local jurisdictions, scientists, personnel policy experts, and privacy experts. The Commonwealth of Massachusetts is rich in extremely well qualified individuals to serve in this capacity and in so doing, assist the MSP Crime Laboratory in becoming the best possible Laboratory. The difference in the make-up of this committee versus the current Advisory Board is that the committee can be comprised of specific subject-matter experts to address particular issues.

Achieves:

- **Review of key forensic issues such as familial DNA searches**
- **Increased interaction with key industry experts and criminal justice stakeholders**
- **Improved public and industry image**

One example of an issue that should first be reviewed by a committee rather than the entire Advisory Board is policy formulation on familial DNA searches, which is discussed more fully in the next recommendation. Another example of an issue that should be a part of the scientific subcommittee's charge, rather than the entire Advisory Board, is the review of audits and corrective action plans related to Laboratory operations. This should be a regular presentation by the quality assurance manager to the committee with final reports and recommendations being presented to the Advisory Board.

Jurisdictions across the United States and beyond utilize advisory boards in different fashions. The Executive Office of Public Safety may want to consider these examples in determining how best to structure the Forensic Science Advisory Board, in addition to establishing the subcommittee as recommended.

Other advisory boards include:

Minnesota – the Advisory Board was created by the state legislature in 2006 to develop and implement a reporting system for employee negligence or misconduct in forensic science. The scope of this particular board is narrow and would not serve as a good model for Massachusetts.

Maryland – the Advisory Board was established by the Governor's Executive Order and was charged with improving practices of forensic science in the state. The board reviews policies, practices, quality assurance, equipment and personnel issues. The board advises the Governor on how the state should implement recommendations for improved forensic services. This broad mandate is more in line with the type of board recommended for Massachusetts.

Los Angeles – the District Attorney's Office created the Crime Lab Advisory Board to ensure the continued improvement and quality of forensic services in their county. Participants include representatives from the District Attorney's Office, victim's rights groups, law enforcement, scientific and academic communities and the legal community. Their goal is to assist in funding and policy formulation for existing laboratories in Los Angeles. This particular example differs from all others in that the board was established by and is chaired by representatives of the District Attorney. Although an advisory board is being recommended for Massachusetts, we believe that representatives from the District Attorney's for the state should participate in an advisory board, but not lead in this effort.

Virginia – the state legislature created the Scientific Advisory Committee with members representing a broad array of backgrounds and disciplines.

Royal Canadian Mounted Police (RCMP) – two separate boards have been established in Canada. One was specifically created to provide advice on the operations of the National DNA Databank and report directly to the RCMP Commissioner. The second advisory

board (RCMP Forensic Laboratory Services Advisory Group) had a broader mandate and was established in 2000 to address policies, practices, and operational issues.

In fact, Massachusetts already has the requirement for a type of advisory board (Forensic Science Advisory Board) in the following section of Chapter 6:

Section 184A. There shall be in the executive office of public safety a forensic sciences advisory board, hereinafter called the board, which shall advise the secretary on all aspects of the administration and delivery of criminal forensic sciences in the commonwealth. The board shall consist of the undersecretary of public safety for forensic sciences, who shall also serve as chairperson of the board, the attorney general, the colonel of the state police, the chief medical examiner for the Commonwealth, the president of the Massachusetts Chiefs of Police Association, the president of the Massachusetts Urban Chiefs Association, the president of the Massachusetts District Attorney's Association, a district attorney designated by the Massachusetts District Attorney's Association and the commissioner of the department of public health or their respective designees. The Governor shall also appoint three scientists experienced in the delivery, management or oversight of forensic services, including forensic pathology, DNA or other crime lab services. The members shall serve without compensation. The board shall meet no less than quarterly and as otherwise convened by the undersecretary. The board shall coordinate its responsibilities with the medico-legal investigation commission and shall not infringe upon the commission's authority as established in section 184 of this chapter.

21. A Policy on Familial Searches Must Be Developed

DNA results of course do not always match a specific individual. Often, there may be a "near match," possibly suggesting (depending on the closeness of the match) that while the person it "nearly" matches is not the perpetrator, it may be a close blood relative.

Whether to use a "near match" as an investigative tool, and under what circumstances, should be a top priority of the newly formed Scientific Committee of the Forensic Science Advisory Board.

Achieves:

- **Industry input regarding the release of an offender's identifying information**
- **The opportunity to standardize lab policy**

Like the Commonwealth of Massachusetts, no state presently has a current law, practice or policy regarding familial searches. The FBI has issued an interim policy which allows each state to release an offender's identifying information under certain circumstances (see **Attachment D**). The MSP Crime Laboratory should consider consulting with Dr. Frederick Bieber, Harvard Medical School, who has written extensively on this issue.

22. Promulgation of Laboratory Policies Should Receive Adequate Review before Implementation

There appears to be no procedure allowing for internal and, where appropriate, external review in developing and implementing significant policies and procedures.

Achieves:

- **Input from key stakeholders in the policy implementation process**

Prior to promulgation and implementation, significant policies and procedures should undergo adequate review by both internal and external groups. The scientific subcommittee of the Forensic Science Advisory Board could be tasked with many of these more important reviews, as should, where appropriate, the Executive Office of Public Safety and legal counsel for the Massachusetts State Police.

23. Encourage DNA Personnel to Become DNA Auditors and Reward their Professional Development

Encouraging DNA staff at the MSP Crime Laboratory to become DNA Auditors will not only benefit the individual employee, but will also benefit the MSP Crime Laboratory system. The employee becomes more knowledgeable of the quality standards, and practices and procedures of other laboratories, and those practices could be applied to the MSP Crime Laboratory.

Achieves:

- **Increased staff knowledge base**
- **Improved staff morale through professional development opportunities**

This small effort, consistent with national best practices, can pay big dividends for personnel growth and development as well as enhance overall quality within the MSP Crime Laboratory system. Senior employees trained as auditors can also lead in an effort to increase mentoring of new employees during their training. The current method of isolating new employees during the training period only serves to create a caste system. In addition, the MSP Crime Laboratory should also explore ways to bring in experts from

other national and state laboratories to provide training for all employees including trainees. The training should include such areas as DNA mixtures, interpretation difficulties and state-wide CODIS efforts. Attendance at relevant workshops at national American Academy of Forensic Sciences and regional meetings should be supported and encouraged by the Laboratory.

24. Encourage Forensic Science Personnel to Actively Participate in the ASCLD/LAB Assessment Process by Becoming an Assessor and Reward their Professional Development

Similarly, the MSP Crime Laboratory should encourage all forensic science personnel to participate in the ASCLD/LAB assessment process. Like with the DNA personnel above, this too will not only benefit the individual employee but the entire MSP Crime Laboratory system.

Achieves:

- **Increased staff knowledge base**
- **Improved staff morale through professional development opportunities**

25. The MSP Crime Laboratory Should Consider Forming a Statewide Computer Forensic Group under the Consolidated Laboratory Similar to the FBI-sponsored Regional Computer Forensic Laboratories

Current capacity at the MSP Crime Laboratory only involves the analysis of Windows-based Personal Computers. Computer forensic requests will only continue to increase with the widespread use of computers, cell phones and other digital personal equipment. The forensics efforts across the Commonwealth are scattered amongst multiple agencies, no one of them, we are advised, fully or adequately

Achieves:

- **Increased capacity for handling computer forensic requests**
- **Improved digital analysis capabilities**
- **Access to digital forensics training resources**

equipped to handle the current requests for forensic services, let alone an increased demand.

The first step in this effort should include evaluating interest in forming a statewide computer forensics group similar to the FBI-sponsored Regional Computer Forensic Laboratories (RCFL) with federal assistance and personnel. This approach has been duplicated in 14 jurisdictions across the United States and is a force multiplier capable of addressing the needs of federal, state and local law enforcement agencies across the Commonwealth. This will also allow for a one-stop, full service forensics laboratory and training center devoted entirely to the examination of digital evidence in support of criminal investigations, including:

- Terrorism
- Child pornography
- Crimes of violence
- The theft or destruction of intellectual property
- Internet crimes
- Fraud

RCFL Examiners combine the talents and experience of federal, state, and local law enforcement agencies. Normally, an RCFL consists of 15 people: 12 of the staff members are Examiners and 3 staff members support the RCFL. The RCFL's duties may include—

- Seizing and collecting digital evidence at a crime scene
- Conducting an impartial examination of submitted computer evidence
- Utilizing accepted best practices
- Testifying as required



Locations include Chicago, Greater Houston, Heart of America (Kansas City), Intermountain West (Salt Lake City), Kentucky, Miami Valley (Dayton, Ohio), New Jersey, North Texas, Philadelphia, Northwest (Portland, Oregon), Rocky Mountain (Denver, Colorado), San Diego, Silicon Valley (Menlo Park, California), and Western New York (Buffalo, New York).

According to the National Program Office of the RCFL, this partnership with federal, state and local law enforcement agencies not only provide a force multiplier, but also enable participants to receive much needed training in computer forensics including such courses as:

- **A Plus** – This course covers training on Windows OS, Intel-based PC hardware installation and maintenance, and how to prepare for CompTIA A+ Certification tests.
- **ASCLD/LAB Accreditation Training** - This course is designed to assist the laboratory to receive American Society of Crime Laboratory Directors/Laboratory Accreditation Board accreditation.
- **Seizing and Handling of Digital Evidence I** - This course offers practical experience and exposure to a myriad of different types of digital evidence that are typically present during the serving of a search warrant. This course gives investigators the knowledge they need to take apart computer systems; document configuration; itemize evidence items, and; how to safely package and transport digital evidence.
- **Seizing and Handling of Digital Evidence II** - This course explains the different types of digital evidence that are typically present during the serving of a search warrant and offers practical tools on how to take apart computer systems; documenting configuration; itemizing evidence items, and, how to safely package and ship digital evidence.
- **Seizing and Handling of Digital Evidence III** - This course for investigators explains the different types of digital evidence that are typically present during the serving of a search warrant, and offers practical tools on how to take apart computer systems; document configuration; itemize evidence items, and; how to safely package and ship digital evidence.

Other courses include: Linux Media Forensics Advanced, Microsoft Advanced Forensics, and NET+ Certification Preparation Course

26. The MSP Crime Laboratory Must Create a Priority System for Casework Analysis

The Massachusetts State Police Crime Laboratory working with the District Attorneys must create a prioritization system for casework analysis.

Consistent theme in interviews with representatives from the District Attorneys offices' were the following:

- Lack of communication or delayed communication with the Laboratory.
Many prosecutors mentioned the desire to have a single point of contact for each case and that single point of contact should be the individual most familiar with the results. Too often, prosecutors advise the courts on the progress of a case only to find out later that the final report will be delayed still further. As one prosecutor stated, "the lab analysts are much more accurate in their estimates of how long it will take than the lab administrators, but the existing case management policy at the lab does not allow them to speak directly to the analysts."
- Lack of understanding the needs of the prosecutors primarily by Laboratory administrators
- Understaffing and inadequate turnaround on the majority of cases
- Lack of sound case management protocols and priorities focusing on the customer
- Rigorous scientific procedures utilized and the excellent testimony and responsiveness in many cases.

Achieves:

- **Improved timeliness**
- **Streamlined, formalized communications with other key stakeholders in the statewide criminal justice system**

In contrast, the MSP Crime Laboratory personnel have an overall impression that District Attorneys offices and investigators have a non-productive and significant influence in prioritizing DNA casework and CODIS. However, the MSP Crime Laboratories' own practice generally requires contact with investigators or District Attorneys to activate a case. The extent of District Attorney and investigator influence in the prioritization of cases and CODIS reports can only properly be determined by an extensive review of the cases.

There appear to be misperceptions about case processing and prioritization from both external and internal sources, which merits further investigation. Developing an appropriate policy by the MSP Crime Laboratory must include communications with District Attorneys, investigators, the MSP Crime Laboratory Case Management Unit (CMU) personnel and other MSP Crime Laboratory personnel. This will likely provide

improvements for case processing and prioritizing. Increased communications among internal and external personnel should be fostered, and formalized by policies and protocols.

The CMU should have the ability to directly interface with the District Attorney database for cases. This would document communications between the District Attorney's offices and the DNA/Criminalistics units, and facilitate the processing of cases samples.

The MSP Crime Laboratory does not give stakeholders —law enforcement agencies and prosecutors — adequate opportunity to be involved in how the MSP Crime Laboratory prioritizes its casework.

27. The Case Management Unit (CMU) Must Be Fully Integrated into the Streamlining of Cases through the Criminalistics, DNA, and CODIS Units

The CMU was originally designed to streamline cases through the DNA units; however, this function has not been fully realized. Several DNA analysts commented that they did not receive new batches of cases in a timely manner, sometimes waiting weeks without any significant casework batches. Several DNA analysts also reported that the processing of known and questioned sample analyses were not coordinated, resulting in unnecessary case delays. For example, "rush cases" for unknown samples were expeditiously handled, yet the known exemplars were not, and consequently the DNA analyst had to wait for the known exemplar profiles before completing the final report.

Achieves:

- **Facilitation of case processing**
- **Improved coordination among units**
- **Increased productivity**

The CMU personnel reported that CODIS were interjected into the queue for DNA analysis when there were apparently low numbers of samples in batches. Unknown subject rape cases, breaking and entering, and other CODIS samples were processed based on a largely arbitrary resource allocation determination. This significantly and negatively affected the number of CODIS cases being entered into the DNA analysis queue, and eventually being entered into CODIS. Many of these samples also required Criminalistics processing, and could not be moved forward to DNA analysis without stain characterization.

The CMU should be responsible for the actual “management” of potential DNA and CODIS cases. They should coordinate samples through the Criminalistics, DNA, and eventually CODIS, and this requires the input, cooperation, and supervision of personnel from each of those units. CMU should be tasked with ensuring that appropriate personnel and priorities are placed on case samples as they move through processing. This will increase the overall efficiency of all the affected units, and produce a significant reduction in backlogs.

VI. Conclusion

The issues facing the MSP Crime Laboratory will continue to worsen if immediate changes are not made. These issues can only be effectively spear-headed by a strong Laboratory Director overseeing a consolidated MSP Crime Laboratory overseeing a robust quality assurance program.

This is not the first review of the MSP Crime Laboratory. Nor is it likely to be the last. What is notable, though, is the extent to which recommendations have repeatedly been made, but ignored. For example, audits in 2000, 2001, 2003, 2004 and 2006 all pointed to deficiencies in the administration of the state's CODIS database. These problems were also widely known in the forensic community around the country. These deficiencies included lack of audits or independent outside reviews, serious questions concerning the qualifications of personnel and the administration of CODIS, incomplete and improper documentation, and profile mistakes. Had many of these issues been addressed when first identified, the MSP Crime Laboratory would likely not have faced the serious CODIS crisis it recently encountered. These problems, allowed to fester, lead to a crisis which unnecessarily undermined public confidence in a critical law enforcement function.

In addition, there currently exist other issues and deficiencies that cannot be ignored, not the least of which is a very serious backlog of cases awaiting DNA testing. It will take the effort of top leaders in the Commonwealth of Massachusetts to remedy and will require a multi-faceted approach. Most importantly, it will take the focused effort of an empowered Laboratory Director.

VII. Attachments

Attachment A – Details on Vance’s Methodology

During Phase 1 of the assessment, Vance conducted interviews with Massachusetts Crime Laboratory staff, stakeholder organizations and individuals/groups with an interest in the Massachusetts Crime Laboratory. The list of individuals interviewed includes:

1. Amy Barber, Chemist II, DNA, MSP Crime Laboratory
2. William M. Bennett, District Attorney, Hampden County
3. Erica Blair, Chemist II, Criminalistics, MSP Crime Laboratory
4. Jude Laura Bryant, Chemist II, DNA, MSP Crime Laboratory
5. Buckley, Sergeant, Massachusetts State Police (Digital Evidence and Multimedia Section, MSP Crime Laboratory)
6. Patricia Byron, Chemist II, DNA, MSP Crime Laboratory
7. Jeanmarie Carroll, Assistant District Attorney, Chief Sexual Assault & Domestic Violence Unit
8. Stephen Cha, Chemist I, CODIS, MSP Crime Laboratory
9. Rachel Chow, Chemist II, DNA, CODIS, MSP Crime Laboratory
10. Dorothea Collins, Chemist II, DNA, MSP Crime Laboratory
11. John Cronin, Director of Administrative Services, Department of State Police Forensic Services Group, MSP Crime Laboratory
12. Timothy J. Cruz, District Attorney, Plymouth County
13. David A. Deakin, Chief, Family Protection and Sexual Assault Unit, Suffolk County District Attorney's Office
14. Mark Delaney, Colonel, Massachusetts State Police (Headquarters)
15. Matthew Dindinger, Chemist II, DNA, MSP Crime Laboratory
16. Jana Doherty, Chemist II, Criminalistics, MSP Crime Laboratory
17. Joseph Early, District Attorney, Worcester County
18. Jennifer Elliot , Chemist II, DNA, MSP Crime Laboratory
19. Kenneth Gagnon, Technical Manager, Forensic Chemistry, MSP Crime Laboratory
20. Kathleen Gould, Chemist II, DNA, MSP Crime Laboratory
21. Hillary Griffiths, Chemist II, DNA, MSP Crime Laboratory
22. Sandra Haddad, Chemist III, DNA, MSP Crime Laboratory
23. LaDonna Hatton, Undersecretary for Forensic Services, Executive Office of Public Safety
24. Brian Heaton, Program Coordinator, CMU, MSP Crime Laboratory
25. William Hebart, Quality Assurance Manager, MSP Crime Laboratory
26. Sarah Hughes, Chemist II, DNA, MSP Crime Laboratory
27. Richard Iwanicki, Trooper, CODIS, MSP Crime Laboratory
28. Edward N. Karcasinas, Jr., First Assistant District Attorney, Worcester County District Attorney’s Office
29. Thomas Kerle, Captain, , Massachusetts State Police (Digital Evidence and Multimedia Section, MSP Crime Laboratory)

30. Kelly King, Chemist II, Criminalistics, MSP Crime Laboratory
31. Cailin Lally, Chemist III, DNA, MSP Crime Laboratory
32. Thomas Landry, Chief Trial Counsel, Worcester County District Attorney's Office
33. Christine Lemire, Chemist II, DNA, MSP Crime Laboratory
34. Gerald T. Leone, District Attorney, Middlesex County
35. Elizabeth Levandowsky, Chemist II, DNA, MSP Crime Laboratory
36. Kate MacDougall, Assistant District Attorney, Essex County
37. Robert Martin, Supervisor III, Biology, Massachusetts State Police Crime Laboratory
38. Stephen Matthews, Lieutenant Colonel, Massachusetts State Police (Headquarters)
39. Justin Maxwell, Chemist I, DNA, CODIS, MSP Crime Laboratory
40. John McAvoy, Assistant District Attorney, Middlesex County
41. Maureen McCabe, Chemist I, DNA, MSP Crime Laboratory
42. Mary Kate McGilvray, Acting Director, MSP Crime Laboratory
43. Frank Moore, Major, Massachusetts State Police (MSP Crime Laboratory)
44. Robert Nelson, Chief Homicide, Norfolk County
45. Michael H. O'Connell, Assistant District Attorney, Plymouth County
46. Paul Petrino, Sergeant, CODIS, MSP Crime Laboratory
47. Stephana Petrino , Chemist II, DNA, MSP Crime Laboratory
48. Gwen Pino, Supervisor I, CMU, MSP Crime Laboratory
49. Rebecca Post, Chemist III, DNA, MSP Crime Laboratory
50. Jennifer Preisig, Supervisor I, Biology Technical Leader, Criminalistics, MSP Crime Laboratory
51. Dawn Romano, Chemist II, DNA, MSP Crime Laboratory
52. Marian Ryan, Assistant District Attorney, Middlesex County
53. Lynn Schneeweis, Chemist II, DNA, MSP Crime Laboratory
54. Joanne Sgueglia, Forensic Research Scientist (formerly TM Biology), MSP Crime Laboratory
55. Kristen Sullivan, Deputy Technical Leader, DNA, MSP Crime Laboratory
56. Brett J. Vottero, First Assistant District Attorney, Hampden County
57. Nicole Walicki, Chemist II, DNA, MSP Crime Laboratory
58. Josh Wall, First Assistant, Suffolk County
59. Sharon Walsh, Technical Leader, DNA, MSP Crime Laboratory

Additional interviews and contacts were made with:

1. Frederick Bieber, PhD., Associate Professor of Pathology, Harvard Medical School
2. Tom Callaghan, Chief of the CODIS Unit, FBI Laboratory
3. Dave Coffman, Chief of Forensic Services, Florida Department of Law Enforcement
4. Rich Guerrieri, Chief of the DNA Analysis Unit, FBI Laboratory
5. Pete Marone, Director, Virginia Department of Forensic Science
6. Stuart G. Smith, Major, Special Programs, Utah Department of Public Safety

7. Andrea Solorzano, Assistant Laboratory Director, Oklahoma State Bureau of Investigation
8. Robert Stacey, Chairman of the Board, American Society of Crime Laboratory Directors, Laboratory Accreditation Board (ASCLD/LAB)

In addition, all documentation within the scope of our review were obtained and reviewed. They included, among others:

1. Most recent pre- and post-ASCLD/LAB documentation including all findings and resolutions.
2. All self-assessment documentation for the past three years.
3. All internal or external audit reports for the past three years.
4. Organizational chart to include funded staffing levels in each component and current on board complement.
5. Laboratory policies and procedures that address workflow, priorities, training, quality assurance and organizational structure.
6. Mission statements for laboratory and all components.
7. All documentation addressing problems in workflow, output, financial, organizational and management issues within the past three years.
8. All written protocols, policies and procedures for the State CODIS system including the "CODIS Operating and Procedures Manual" dated April 21, 2006.
9. Top ten (volume of requests) law enforcement agencies that use the MSP as their laboratory service provider.
10. Top ten state prosecutors that routinely use the services provided by MSP crime laboratory.
11. State Police Chemist reclassification power point.
12. "The Journey from Backlog to Critical: The MSP Crime Lab System's Phased Approach To Eliminating Backlog" by Carl Selavka, February/March 2006 issue, Forensic Magazine.
13. "A graphical simulation model of the entire DNA process associated with the analysis of short tandem repeat loci" in Nucleic Acids Research 2005 volume 33: 632-643.
14. All "needs assessment" evaluations, both internal and external.

In addition, the following specific scientific DNA processes, protocols, and reports were reviewed:

1. DNA-01 Organic Extraction of DNA Ver. 2.3
2. DNA-02 Differential Extraction of DNA Ver. 1.2.2
3. DNA-11 Chelex Extraction of DNA from Blood and Saliva Ver. 2.1
4. DNA-12 Extract Concentration Protocol Ver. 1.3
5. DNA-14A Estimation of DNA Quantity by Real Time PCR Ver. 1.0

6. DNA-14B Estimation of DNA Quantity using ABI 7500 Real Time PCR System Ver. 1.0
7. DNA-15 Amplification of DNA using AMPFLSTR Profiler Plus, Cofiler, and Identifiler Typing Kits Ver. 3.0
8. DNA-16 Capillary Electrophoresis of Amplified DNA Fragments on the ABI 310 Genetic Analyzer Ver. 2.0
9. DNA-16B Capillary Electrophoresis of Amplified DNA Fragments on the ABI 3130xl Genetic Analyzer Ver. 1.2
10. DNA-17 STR Fragment Analysis on the ABI 310 Genetic Analyzer Ver. 2.0
11. DNA-18 Independent Double Read Guidelines for STR Results Ver. 3.0
12. DNA-19 Interpretation Guidelines for Forensic STR DNA Analysis Ver. 1.2.1
13. DNA-19A Mixture Interpretation Guidelines Ver. 1.0
14. DNA-20 DNA Case File and Report Preparation Guidelines Ver. 2.2
15. DNA-23 STR Fragment Analysis on the ABI 3130xl Genetic Analyzer using GeneMapper ID Software Ver. 2.0

Finally, a confidential employee "hotline" was established. The following notice was sent to each employee of the MSP Crime Laboratory and conspicuously posted:

MSP Crime Lab Hotline

Toll free: (866) 464-1702

To: All MSP Crime Lab employees

As all of you are aware, the Executive Office of Public Safety has taken a number of steps to address recent concerns at the Massachusetts State Police Crime Laboratory ("the Lab"). Vital to our mission is restoring the confidence in the important work being conducted at the Lab.

Among other things, we have hired a private consulting firm to conduct a thorough and independent assessment of the processes and procedures in place at the Lab.

As part of the assessment, which will include meeting with most or all of you individually, the firm we have hired, at our request, has established a "Hotline" program. This has been established to provide each of you with an additional way

to communicate any concerns you may have about any matter which you believe impacts the integrity of the Lab, its processes or results.

You may do this in a completely anonymous manner. The information from the hotline will be provided first to the private consulting firm, and then to me. No one else, including State Police personnel, will be provided with the information obtained from the hotline except to the extent it is included in the firm's final report or as required by law. If you choose to leave your name, I will keep your identification confidential to the greatest extent possible.

You can call from any phone free of charge. The system is available to all employees, 24 hours a day and will be available until May 30, 2007 by calling toll free (866) 464-1702.

EOPS is committed to addressing any issue brought to our attention through a call to the Hotline program in a prompt, fair and sensitive manner.

LaDonna J. Hatton
Undersecretary for Forensic Sciences
Executive Office of Public Safety
One Ashburton Place
Boston, MA 02108
617.727.7775 x25512

No relevant calls were received.

Attachment B – Details on Vance’s Methodology to Review DNA Analysis Protocols and Processes

As stated in the Executive Summary, *our review of procedures, policies and practice at the MSP Crime Laboratory found no deficiencies in the science.* This is consistent with past audits and inspections by the American Society of Crime Laboratory Director’s Laboratory Accreditation Board (ASCLD/LAB), the National Forensic Science Technology Center (NFSTC) audits, additional external audits.

We took a number of steps to conduct our review in this regard prior to reaching our conclusion, including the following:

We reviewed specific scientific DNA processes, protocols, and reports, including the following:

1. DNA-01 Organic Extraction of DNA Ver. 2.3
2. DNA-02 Differential Extraction of DNA Ver. 1.2.2
3. DNA-11 Chelex Extraction of DNA from Blood and Saliva Ver. 2.1
4. DNA-12 Extract Concentration Protocol Ver. 1.3
5. DNA-14A Estimation of DNA Quantity by Real Time PCR Ver. 1.0
6. DNA-14B Estimation of DNA Quantity using ABI 7500 Real Time PCR System Ver. 1.0
7. DNA-15 Amplification of DNA using AMPFLSTR Profiler Plus, Cofiler, and Identifiler Typing Kits Ver. 3.0
8. DNA-16 Capillary Electrophoresis of Amplified DNA Fragments on the ABI 310 Genetic Analyzer Ver. 2.0
9. DNA-16B Capillary Electrophoresis of Amplified DNA Fragments on the ABI 3130xl Genetic Analyzer Ver. 1.2
10. DNA-17 STR Fragment Analysis on the ABI 310 Genetic Analyzer Ver. 2.0
11. DNA-18 Independent Double Read Guidelines for STR Results Ver. 3.0
12. DNA-19 Interpretation Guidelines for Forensic STR DNA Analysis Ver. 1.2.1
13. DNA-19A Mixture Interpretation Guidelines Ver. 1.0
14. DNA-20 DNA Case File and Report Preparation Guidelines Ver. 2.2
15. DNA-23 STR Fragment Analysis on the ABI 3130xl Genetic Analyzer using GeneMapper ID Software Ver. 2.0

As part of this phase of the assessment, analysts were observed performing organic DNA extractions. The procedures were followed carefully and correctly. The protocols associated with all of the above processes were also critically reviewed. The scientific and technical aspects of the protocols are sound and are aligned with generally accepted practices in the forensic community.

In addition, a number of randomly selected case files were also reviewed. All of the case files were thorough and well-documented. The controls in each case were performed properly and the procedures used were appropriate for the types of samples in each case. The only issues noted with any of the cases were occasional technical problems with equipment (i.e., power failure of the thermal cycler during an amplification causing the amplification to fail and a problem with the Capillary Electrophoresis instruments, necessitating re-running samples or re-starting the machine). None of these problems are uncommon in a forensic laboratory. Nothing in these cases deviated from the MSP Crime Laboratory's protocols or generally accepted practices in the forensic community.

Vance also assessed contamination issues and determined that contamination does not appear to be an issue. In fact, our assessment is that the levels of contamination are consistent with or better than those experienced by other forensic DNA laboratories.

Finally, DNA analysts interviewed appeared to have significant subject-matter knowledge and took pride in the quality of their work product.

The conclusion we reach is that the DNA analysis protocols and processes used by the Massachusetts State Police Laboratory are scientifically sound and conform to generally accepted practices in the forensic science community.