FUTURE OF NIST IN ADVANCING POSITIVE CHANGE IN U.S. FORENSIC ENTERPRISE: POLICY CONSIDERATIONS

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"Strengthening Forensic Science In the United States:
A Path Forward"
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Strategic Questions

- If the Federal Government's contributions to the U.S. forensic enterprise have been substantially valuable to this point as a major source of funding and policy, why is the enterprise in the state that it is in?
- If the Federal Government is not reorganized per the NAS recommendation, what are the most significant programs and resources that will deliver on the NAS recommendations? Who should be responsible for them? Who should be held accountable for them?
- What do the performer and stakeholder bases want from the Federal Government, how and by when?
- Does the Federal Government possess and can it demonstrate the leadership, vision, planning, proficiency, responsiveness, accountability and persistence to meet needs, demands and expectations?
- How has success been measured to this point? How should it be going forward?

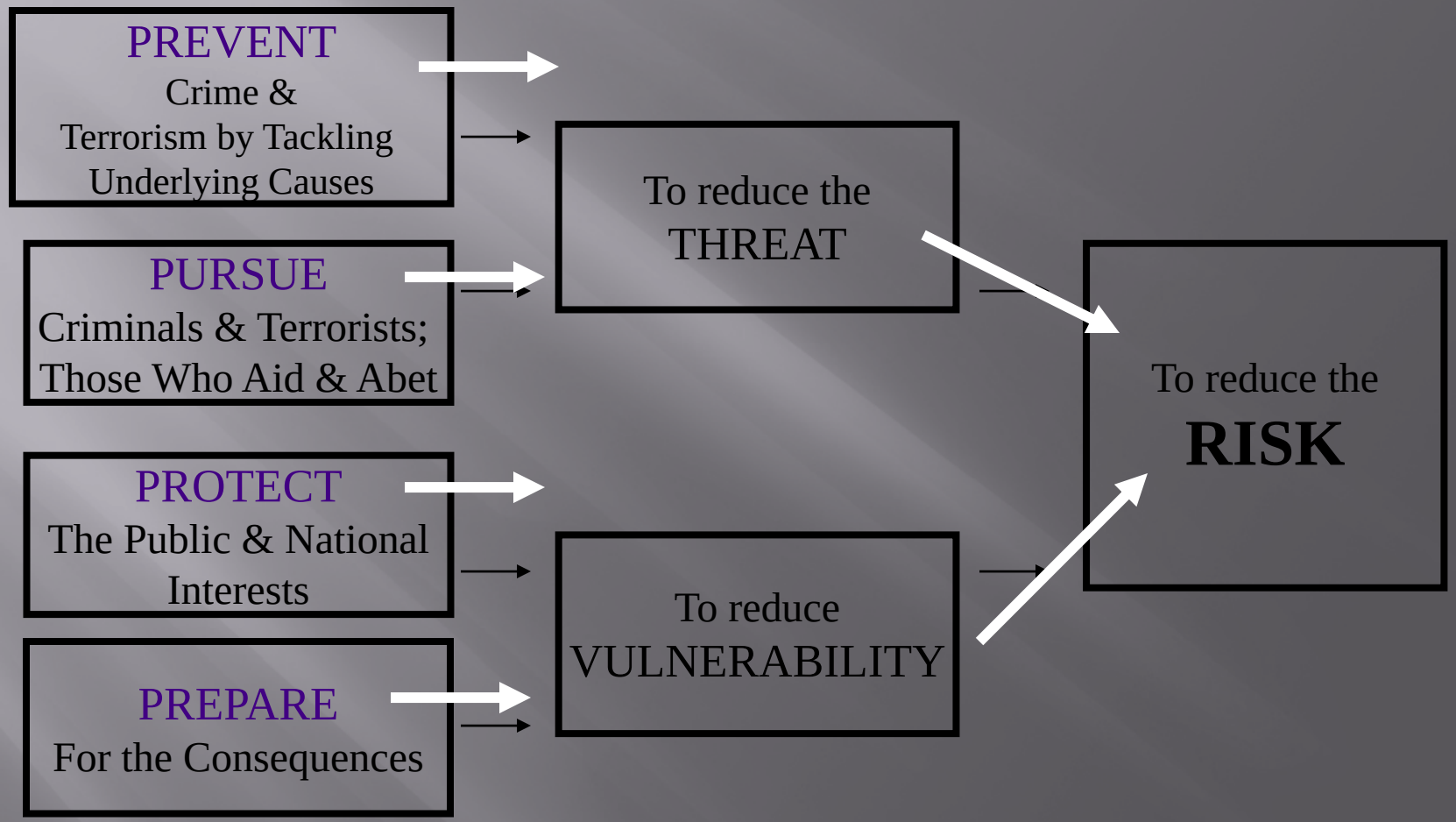
CONTEXT

A Brief "Systems of Systems" View

Term of Reference: Forensic Science

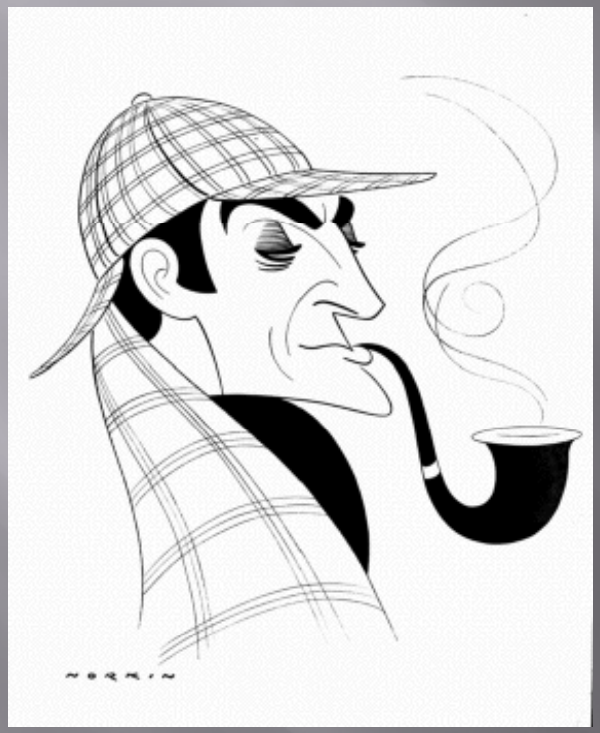
- Application of science in the investigation of legal matters
- Scientific knowledge and technology are used to serve as witnesses in both criminal and civil matters (also applied to intelligence and military and policy decisions)
- Science may not offer definitive solutions for all scenarios; it does provide a special investigative role
- Goal is “attribution” – i.e., who committed the crime

Four Mission Areas



Forensic Science is one "tool in the kit"

Key Investigative & Prosecutive Questions



- Did A Crime (Event of Interest) Occur?
- What Happened?
- How Did It Occur?
- When Did It Occur?
- Where Did It Occur?
- Why Did It Occur?
- Who Was Involved?
- What Evidence Exists? What Does It Tell Us? How Strong are the Links?
- How Reliable and Credible is the Evidence?
- What Alternative Explanations are There for the Evidence?

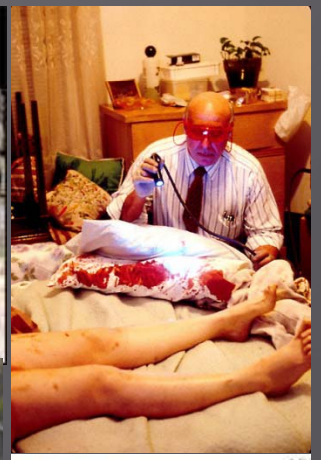
Forensic Science Can Contribute to Answering All

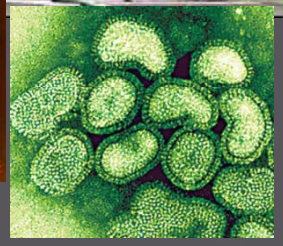
Phases of Forensic Investigations

- Intelligence & Information Gathering
- Field Investigation
- Crime Scene Investigation
- Laboratory Analysis
- Interpretation, Integration, Application
- Building, Shaping Prosecution
- Communication and Decision Making

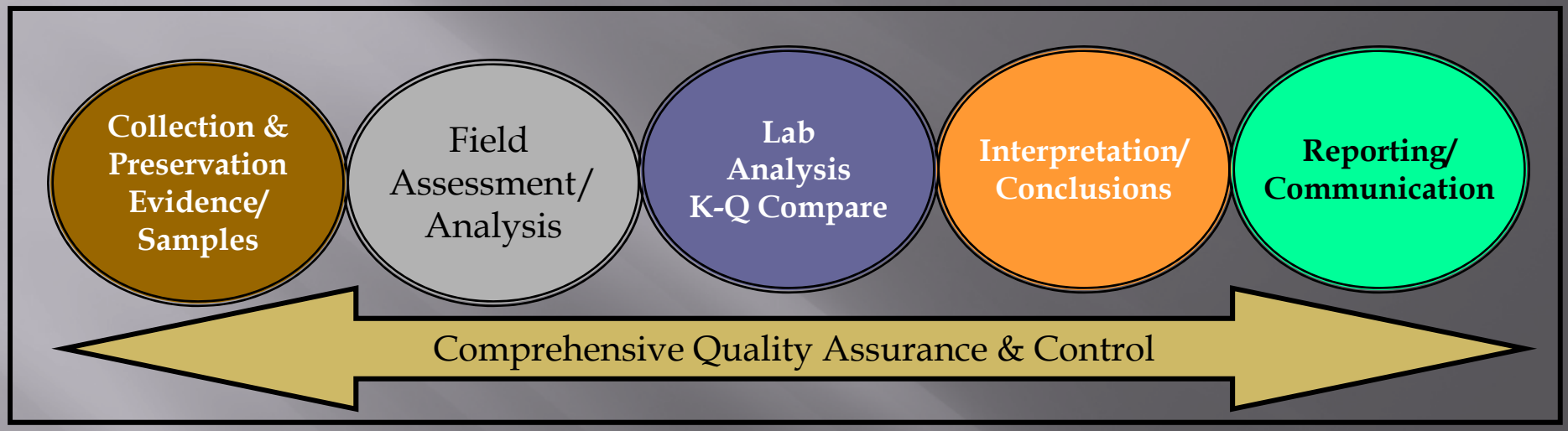
"Forensics" Integrates Science with the Investigative Process

- Biology
- Chemistry
- Materials
- Trace Evidence
- Impression and Pattern
- Engineering
- Digital-Computer
- Reconstructive
- Medical
- WMD (CBRN)





Ideal Forensic Science System



- Capabilities Matched to Submitter & Stakeholder Needs and Requests
- Appropriate Deployable Assets & Facilities with Sufficient Resources for Operation & Maintenance
- Field, Transport & Laboratory Evidence Integrity & Security
- Properly Credentialed, Trained and Certified Personnel
- Full Suite of Equipment, Fully Validated Methods: Matched to Samples Received & Questions Asked
- Comprehensive Quality Assurance & Control Program
- Appropriate Repositories and Data Bases
- Appropriate Resources: Research, Development, Validation, Standards, Technology Transfer

Expectations for Contemporary Forensic Science are Increasing

- In the U.S. and elsewhere science for justice is being increasingly scrutinized for:
  - Accuracy
  - Reliability
  - Validity
  - Credibility
  - Repeatability
  - Defensibility

In the United States and other countries, forensic science and its performers have been shown or assessed to have significant gaps, shortcomings and needs:

- Scientific basis and validation of the science or practice in some disciplines
- Credentials and training of performers
- Funding and Infrastructure
- Organizational Independence
- Understanding, Use and Scrutiny by Legal and Judicial Communities

See "Strengthening Forensic Science in the United States: A Path Forward" National Research Council (U.S.), 2009

Goals for Forensic Methods

- Robust Collection & Preservation of Evidence
- Relevant Exploitation of Sample
- High Discrimination
- Enables Comparison of K and Q Samples
- Utility Across Known, Encountered Sample Types
- Accuracy
- Reliability
- Defined & Acceptable Error Rate
- Speed & Responsiveness
- Repeatability
- Transferability
- Validity Can Be Independently Established
- Results Probative, Interpretable, Explainable, Defensible

Significant Focus: All Disciplines and Methods
Rigorous RDTE & V is Needed

Why "Quality" is So Important

- Increases confidence of those who rely on results, interpretations, findings and conclusions
- Sets high expectations for performers, services and outputs provided, interested or dependent organizations and stakeholders
- Ensures that best science and practice occurs
- Establishes culture of accountability, vigilance and continuous improvement within laboratories and with other practitioners

U.S. Forensic Science "System"

- Stakeholders
  - Federal Government
  - State Governments
  - Local Governments
  - Federal, State & Local Law Enforcement Agencies
  - Federal , State and Local Judiciaries
  - Federal, State & Local Prosecutors
  - Legal Defense Community
  - Media
  - Public
  - Victims of Crime & Families and Accused & Implicated
  - Communities
  - Special Niches
- Performers
  - Federal Laboratories
  - State Laboratories
  - Local Government Laboratories
  - Private Laboratories
  - Individuals as Experts
  - University and College Programs and Entrants
  - Technology and Method Suppliers

Strategies, Priorities & Investments Should Impact Entire System
High Benefit/Cost

The NAS Study

"Strengthening Forensic Science In the United States"

aka

"The Current State and Future of U.S. Forensic Science"

NAS: "Strengthening Forensic Science In the United States"

- Origination:
  - Science, State, Justice, Commerce and Related Agencies Appropriations Act (2006), Report Language directs "the NAS to conduct a study on forensic science"
- Timeline:
  - Fall 2006 (1st Committee meeting) – February 2009 (report published)
- Role of the NAS with Forensic Science:
  - A number of studies on methods and programs before and after "Strengthening Forensic Science"
- Charge
  - Assess current and future needs across entire community
  - Make recommendations to maximize the use and effectiveness of forensic technologies and techniques
  - Identify potential scientific advances
  - Make recommendations for programs that will increase the number of qualified forensic scientists and medical examiners available to public laboratories
  - Disseminate best practices to ensure quality and consistency in forensic technologies and techniques
  - Examine role of forensic science in homeland security
  - Examine interoperability of AFIS
  - Other issues as determined

NAS's Thirteen Recommendations

- Reorganize the Federal Government and place policy, program oversight and budget authority with new agency
- Establish standard terminology to facilitate and foster improved communications
- Increase research in the accuracy, reliability and validity of forensic sciences
- Improve the scientific bases of forensic sciences and maximize the independence of the performers
- Research and measures to understand and reduce bias
- (Leveraging NIST and extensive external base) Develop tools to advance best methods and practices for measurement, validation, reliability, information sharing, standards , accreditation tools, bases for education and training
- Mandatory accreditation of all laboratories and performer institutions and certification all practitioners and performers;
- Ensure pervasive and consistent routine quality assurance and quality control; minimize error, mistakes and bias, confirm continued reliability and validity
- Establish Code of Ethics
- Attract a sufficient supply of new performers and train them well; attract and fund research in universities
- Improve medicolegal death investigations (several, with NIH)
- Achieve broad-based AFIS interoperability through standards
- Facilitate and foster greater involvement in homeland security (with FBI and CDC)

What U.S. Forensic Science Doesn't Need & Stakeholders Shouldn't Accept

- Continuation of the same which results in no significant & sustainable systems improvements
- Simply throwing more money at "The Problem"
- An ineffective, unresponsive, indecipherable Federal bureaucracy, many programs that don't measurably advance "The Cause"
- Lack of leadership, performance and "deliverables", transparency
- Empire building
- Lack of engaging the "best and brightest" inside and outside "the Government" and a collaborative, enterprise approach
- Lack of an aggressive vision, strategy, plan for implementation, measures of effectiveness, accountability and resources for success
- Failure to adhere to at least the intent and spirit if not the letter of the NAS recommendations (perhaps absent reorganizing the Federal Government)

Thoughts on NIST and Advancing U.S. Forensic Science, Going Forward

Key Considerations for NIST Going Forward

- NIST is one of four Federal agencies identified by name in the NAS recommendations (the others are NIH, FBI and CDC); this should impart substantial significance to NIST's role
- Several of the NAS recommendations are or should be in NIST's "sweet spots"; play to and improve on agency missions and strengths, don't try to be something you're not
- Consider scrutinizing "what it has done thus far and how" against "what is needed and expected to optimize the system " and determine whether it can engineer itself accordingly (would an external review help?)
- Seek (demand?) the authority and resources to fully execute against "what needs to be done" in a thoughtfully aggressive, collaborative, strategic approach with measurable near, mid- and long-term deliverables and impacts ; against specific NAS recommendations

New Strategic Perspective:
Unifying the Enterprise?

- Approach Forensic Science from a "Systems Approach"
- Establish Validated Attributes and Limits to Forensic Methods , Outputs and Interpretation of Results and Acceptable Communication
- Increase Scientific Rigor: Advance the Science for Better Sample Exploitation, Precision, Reliability and Validity, Quality of Implemented Methods, SOPs and Protocols
- Systems Approach to Timely Development, Validation and Implementation of Standards
- Comprehensive Availability of Reference Materials, Training for Proper Use
- Advance the Systems Perspective to Scientific Quality through Strongest Possible Scientific Foundations
- Train the Forensic Enterprise to Perform Better Science and Demand Better Science of Themselves
- Educate Consumers on What the Science is , Should and Can Be ; Increase Informed Expectations and Demands on the Performers and Those Who Support

New Administration → NIST Policies and Congressional Action that Benefit & Advance Science for Justice?

- Expand research, development, test, evaluation and validation of forensic methods and protocols to ensure the proper scientific foundations
- Accelerate the creation, acceptance and implementation of standards for forensic science and practice, special focus on test, evaluation and validation
- Train performers and consumers to better understand and use science in forensic applications, with focus on scientific rigor and performance quality
- Expand the engagement of the U.S. scientific community in forensic science to include them engaging the stakeholder base

No Rational or Legitimate Reason Why the Only Real Source of Funding & Programs is DOJ

Tool Kit for Success

- Authority
- Effective, Visionary Leadership
- Implementable Strategy & Plan
- Sufficient Financial & Personnel Resources
- Proper Organizational Structure
- Credibility with Performers and Stakeholders
- Collaborative Outreach & Engagement
- Measurable Outputs with High Impact
- Transparency and Accountability
- Agility

Questions?
Discussion?