WORKING WITH LAW ENFORCEMENT TO IMPLEMENT RAPID DNA

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FORENSIC DNA SOLUTIONS

Data Management/Reporting
Solutions for Law Enforcement

DNA Analysis
DNA Casework
• Casework
• Post Conviction
• Cold Cases
• Databanking
• Missing Persons
DNA Investigative Services

Forensic Intelligence Solutions
Forensic Intelligence
• Rapid DNA
• Mixture Deconvolution
• Post-Blast Exploitation

Collection Products
• Buccal DNA Sample Collection System
• Crime Scene Evidence Collection

Lab Management
Validation & Consulting Services
IQAS Proficiency Testing

Bode Technology
• Demand for DNA

• Rapid DNA

• Validation and Implementation

• Working with law enforcement
DEMAND FOR DNA

Demand is increasing
- Sexual Assault Kit Testing
  - Media/ Politics/ Advocacy
  - $200M in Funding
- CSI Effect
- 40X ROI

Economics of DNA
- Reduction in TAT increases backlog
- 1% reduction in TAT results in a 1% increase in demand

Speaker, Paul. West Virginia University

DNA DEMAND INCREASE

Drivers of Demand

- Law Enforcement Demand/Impact

- Rapid DNA
  - Direct use by LE
  - Increased presence from vendors

“I wish we had this technology back in 1987 when I started,” said Bensalem Township Police Director Frederick Harran. “It is really ‘Star Wars’ stuff.”
RAPID DNA

- 2017: Passage of rapid DNA act
- 2018: CODIS development
- 2019: Pilot efforts
- 2020: Implementation

**Implementation v. Timeline**
1) Technology is ready and available
2) Law Enforcement wants to use
3) Companies need to sell
RAPID DNA INTEGENX

RapidHIT-200

- Run details
  - #Samples: 1-7
  - Sample Type: Reference/Evidence
  - Run time: 2 hours

RapidHIT-ID

- Run details
  - #Samples: 1
  - Sample Type: Reference/Evidence
  - Run time: 90 minutes
ANDE Rapid DNA Device

• Run details
  • A-chip: Reference samples
    • 5 samples per run
  • I-chip: Evidence
    • 4 samples per run

• Run time: 90-minutes

Applications in Miami-Beach
Shooting: Matched suspect to swabbed gun
Hit & Run: Matched suspect to gear shift
Use of rapid DNA instruments targeted towards law enforcement agencies, *but*...

Can they upload to CODIS?

What do officer’s need to know about DNA?

Is the profile court eligible?

Who is going to testify to that DNA profile?

How much training is required?

Can an accredited lab compare evidence to this profile generated in a police department?
WHAT CAN YOU DO WITH A RAPID DNA PROFILE?

• Currently **cannot** be uploaded into CODIS
• FBI issued Rapid addendum to QAS effective Dec 2014
  • applies to accredited labs
  • booking station standards in development
• Additional/revised standards included in new draft QAS document – pending approval
• SWGDAM & FBI QAS:
  • Reference samples ONLY
WHERE DOES THAT LEAVE LAW ENFORCEMENT AGENCIES?

- Wait???
- Investigative lead only?
- Technology ahead of policy
  - Establish best practices within the community ahead of developing laws and standards
WORKING WITH LAW ENFORCEMENT

- Provide recommendations on validation
- Guidance on best practices for use
- Laboratory support
  - Familiarize with data
  - Modified Rapid DNA Analysis
WHAT ABOUT EVIDENCE SAMPLES?

• No clear “Rules” for processing of evidence samples
  • Vendors selling cartridges to run evidentiary items
  • Handling legally collected samples

• Implement best practices
  • NO MIXTURES
  • Secondary evidence items should be processed via Rapid DNA
  • Use rapid addendum to FBI QAS and draft standards as a guide
VALIDATION/SUPPORT OF RAPID INSTRUMENTS FOR LAW ENFORCEMENT

- Bensalem Township PD – IntegenX RapidHIT-ID
- New Castle PD – ANDE (performed by ANDE)
- Validation overview
  - Sensitivity
  - Precision and Reproducibility
  - Accuracy
  - References
  - Mixtures
  - Casework Samples (single source)
• Produced accurate, reproducible, precise and sensitive results

• Successful run: CODIS-ready file with profile information was generated

• Inhibitors: no effect on ability to obtain a full profile

• No instances of contamination were observed

• Concordance testing: success
<table>
<thead>
<tr>
<th></th>
<th>1st Pass Success</th>
<th>2nd Pass</th>
<th>Failed samples</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bensalem</td>
<td>14/17 (82%)</td>
<td>2/3</td>
<td>1</td>
</tr>
<tr>
<td>Bode #1</td>
<td>9/20 (45%)</td>
<td>6/11</td>
<td>5</td>
</tr>
<tr>
<td>Bode #2</td>
<td>8/10 (80%)</td>
<td>2/2</td>
<td>0</td>
</tr>
<tr>
<td>“Gold Standard” Bode Buccal</td>
<td>91%</td>
<td></td>
<td>0.11%</td>
</tr>
</tbody>
</table>

How will LE handle failed samples?

• Option 1: Rerun sample

• Option 2: Ask IntegenX/ANDE for assistance

• Option 3: Ask lab for assistance
Modified Rapid DNA Analysis

Samples requiring human interpretation and review

- Develop SOPs/standards
- Should be performed in an accredited laboratory by trained DNA analyst
- Training Program
- Proficiency Testing
RECOMMENDATIONS TO LAW ENFORCEMENT

• Documentation of:
  • Training Program
  • Validation of Rapid DNA Instrument/System/Modified Rapid
  • Instrument Maintenance
  • Service/Repair
  • Reagents
  • Runs/Instrument Monitoring

• Proficiency Testing (lab)
  • Once a year (~3 samples) for Bode staff to stay proficient in modified rapid DNA analysis
Search for 4 Missing Men in Bucks County Continues

By Lauren Mayk
RECENT CASE EXAMPLE – BUCKS COUNTY, PA

- 4 men missing
- Suspected to be on an 80+ acre farm
- One individual was in local database as previous suspect
- Blood found on a backhoe and analyzed
- Searched against their database for match
RECENT CASE EXAMPLE – BUCKS COUNTY, PA

• Search turnaround within 1-day
  • No match

• Found 4 bodies on farm next day

• Tooth brushes/ samples drove down

• Results identifying victims reported within 24 hours of sample receipt

[In the meantime, Cosmo Dinardo confessed to killing 4]
• Starting in April 2018

• Same day services
  • Comparisons of single-source ref samples to other forensic samples
  • Confirmation testing for CODIS hits
  • Legal paternity cases

• Validation/Consultation

• Law Enforcement Implementation
SUMMARY

• Rapid DNA is HERE!

• Law enforcement are actively using Rapid DNA
  • Help LE implement Rapid DNA responsibly to help solve crime
  • Communicate
  • Define Roles

• Familiarize with instrument/ data