



**Louis A. Vargas**  
**Director, Quality Assurance**  
421 East 26<sup>th</sup> Street, 13<sup>th</sup> Floor, New York, NY 10016  
Telephone: 212-323-1905 Fax: 646-500-6707  
Email: [lvargas@ocme.nyc.gov](mailto:lvargas@ocme.nyc.gov)  
Official Website: [www.nyc.gov/ocme](http://www.nyc.gov/ocme)

**ROOT CAUSE ANALYSIS REPORT**  
**RCA# 2019-01**  
**September 10, 2019**

**Executive Summary**

On June 17, 2019, the Office of the Chief Medical Examiner (OCME) Quality Assurance Director was informed of an event which occurred in the Department of Forensic Biology. The event involves a potential contamination which led to a DNA HIT notification and arrest. After careful review, the QA Director determined that this was a “significant event” within the meaning of Title 17, Chapter 2, Section 17-207 of the Administrative Code of the City of New York. On August 5, 2019, OCME assembled a Root Cause Analysis (RCA) Committee to identify the causal factors and corrective actions to be taken for this event, which was identified as RCA# 2019-01.

Although the RCA committee was unable to confirm if contamination had occurred, recommendations were made to prevent similar events, if such an event did occur. These recommendations included the following: implementation of a checklist to aid in the reporting of DNA matches and reminding Forensic Biology staff on various points needed to verify DNA matches before reporting them. The committee also recommends that managers clarify the language in the Verifying and Reporting DNA Matches procedure.

**Background**

The Department of Forensic Biology is a laboratory operating within the Office of Chief Medical Examiner and has the mission of performing DNA testing on physical evidence from criminal cases within the City of New York. Staffed by more than 181 criminalists, supervisors and managers, the Department of Forensic Biology performs serology and DNA testing on nearly every category of crime including homicide, sexual assault, felony assault, robbery, burglary, hate crimes, and weapons possession.

The Combined DNA Index System (CODIS) is a software database maintained by the FBI to aid in criminal investigations. The CODIS hierarchy includes DNA databases at the local, state and national levels. After a DNA profile is obtained and found to be suitable for entry, Forensic Biology uploads it to CODIS. If a match between an evidence sample and a known individual is identified at any level, CODIS generates a Candidate Match Detail Report. The laboratories verify the match and then case information is released. If a match is confirmed, Forensic Biology reports the match to the New York City Police Department (NYPD) and District Attorney (DA) offices through a web-based application named DNA HITS. A reported match may be classified as a “warm hit” or “cold hit”. A warm hit is when an individual and evidence were previously thought by law enforcement to have been linked and the DNA results confirm this. A cold hit is

when the individual and evidence did not have a previous link or relationship. When a cold hit occurs, the DNA is providing a new investigative lead for law enforcement.

See Appendix A for a diagram of the workflow.

### **Event Description**

On July 6, 2018, a Forensic Biology criminalist prepared samples for testing. The criminalist cut samples for two cases, the suspect exemplar submitted for comparison to a sexual assault case and an evidentiary sample submitted for a burglary case. The burglary case did not have a listed suspect and the sexual assault case was an acquaintance sexual assault case with a named suspect.

On July 30, 2018, the DNA profile obtained from the burglary case was compared to the Local DNA Index System (LDIS) and a match was found to the suspect submitted for comparison to the acquaintance sexual assault case.

On December 7, 2018, Forensic Biology issued a DNA HIT for the burglary case and the suspect was arrested on December 19, 2018. The arrest was made solely based on the DNA results even though no other aspects of the crime linked the suspect to the incident. The suspect posted bail and was released the next day.

On June 17, 2019, while preparing for grand jury testimony, Forensic Biology staff discovered that the same criminalist had processed the suspect exemplar for the sexual assault case and the evidentiary sample for the burglary case on the same day, two hours apart, but with no other cases processed in between. This suggests the possibility that the match could be due to contamination. Because the laboratory could not determine with 100% certainty if this was a true cold hit or a contamination event, Forensic Biology recalled the DNA HIT out of extreme caution.

On June 18, 2019, Forensic Biology staff alerted the Queen's District Attorney's Office to the issue. On June 28, 2019, staff confirmed that the Queens District Attorney's Office had found that the defendant had a good alibi and dismissed the burglary case.

See Appendix B for a detailed chronology of events.

### **Review of Remedial Actions Taken by Forensic Biology**

The committee reviewed the immediate remedial actions taken by the laboratory after being informed of the potential contamination. The actions taken are listed below:

- Forensic Biology staff immediately notified the Queens District Attorney's Office of the issue and issued additional reports which stated that based on additional information, the results were inconclusive due to possible quality control issues and could not be used for comparison purposes.
- The DNA HIT was recalled.

- The remaining case sample for the burglary case, a “drawer handles” swab, was tested but an insufficient amount of DNA was obtained to perform DNA typing.
- Three retrospective studies were conducted.
  - Retrospective study #1: All samples cut by the criminalist were evaluated for potential contamination. No issues were identified, and all cold hits were confirmed to be true cold hits.
  - Retrospective study #2: All 2018 cases written as cold hits by the reporting analyst were reviewed. No issues were identified, and all cold hits were confirmed to be true cold hits.
  - Retrospective study #3: All 2018 cases reviewed by the technical reviewer that were cold hits were assessed for accuracy. No issues were identified, and all cold hits were confirmed to be true cold hits.

The RCA committee found the actions taken by the laboratory to be appropriate.

### **Causes and Contributing Factors**

The RCA committee reviewed the evidence and was not able to determine if the match was a contamination event or an actual match for several reasons. As stated earlier, the remaining swab for the burglary case was tested but an insufficient amount of DNA was obtained in order to verify the match. The technical reviewer involved in the event was unable to recall details of the case/DNA HIT since the event occurred in 2018. And lastly, the committee was unable to interview the criminalist that prepared the samples or the reporting analyst involved in this event. Both individuals resigned their employment in late 2018. Their resignations are unrelated to this incident.

The RCA committee examined the workflow and the event timeline and employed cause and effect analysis to identify the causes and contributing factors for the potential contamination. Using this methodology, the RCA committee identified the following causal factors:

1. *The reporting analyst did not apply the criteria used to verify a DNA HIT when he entered the match information in DNA HITs.*

#### **Evidence:**

The RCA committee reviewed the laboratory’s workflow for testing and reporting DNA matches. In addition, the root cause analysis officer reviewed the standard operating procedures describing these processes.

During the review of the reporting workflow, the committee learned that if a DNA profile is determined to be suitable for entry into CODIS, it is entered to the local CODIS database and uploaded to the state and national levels for comparison to other DNA profiles. If a match is identified, a Forensic Biology analyst will review the match report, compare the DNA profiles, and confirm the match. Before reporting the match in DNA

HITS, quality control checks must be performed by the reporting analyst and technical reviewer.

When verifying a DNA HIT, the reporting analyst must apply certain criteria and verify that the hit is an actual hit and not a potential contamination event. The first set of checks prompts the reporting analyst to determine if the cases were examined by the same analyst on the same day or processed for DNA typing on the same test batches. These checks eliminate the possibility of contamination during laboratory testing. The second set of checks prompts the reporting analyst to determine if the evidence was collected or processed by the same NYPD member. This eliminates the possibility of contamination by law enforcement. If the reporting analyst determines that any of the conditions are true, then the reporting analyst's supervisor must be notified immediately.

The committee learned that the reporting analyst did not perform this check. If the reporting analyst had performed these checks, he would have learned that the same analyst had prepared the samples on the same day and notified his supervisor for further investigation before reporting the DNA HIT. During the review of this event, the committee learned that the reporting analyst resigned his OCME employment effective December 14, 2018. Consequently, he was not interviewed for this root cause analysis and the committee was unable to determine why the procedure was not followed.

2. *The technical reviewer did not apply one of the DNA HIT verification criteria when he reviewed the DNA HIT information.*

Evidence:

After the reporting analyst has confirmed the match and verified the hit by applying the DNA HIT verification criteria, he will enter the match information in the DNA HITS application. The technical reviewer then performs a second quality control check and confirms the match, verifies the hit by applying the DNA HIT verification criteria, and reviews the information entered into the DNA HITS application by the reporting analyst. If the technical reviewer determines that there are no issues, the DNA HIT is approved and notification is made to the NYPD and DA offices.

In this event, the committee learned that the technical reviewer did not apply all of the DNA HIT verification criteria as part of his review. During an interview with the technical reviewer, he stated that he was aware of all the required verification checks but did not know why he did not perform the check of whether cases were examined by the same analyst on the same day. He was unable to recall any unusual circumstances that may have impacted his performance and believed that the error was an oversight on his part. The technical reviewer was asked if there were any issues related to workload, fatigue, or rushing and he responded "no".

The root cause analysis officer confirmed with managers that the technical reviewer had completed all required training and that there were no issues with his past performance. Based on the available evidence, the committee found that the oversight was likely

human error. The technical reviewer has years of experience reviewing and reporting matches and no issues with his past performance were identified.

3. *Staff infrequently report cold hits.*

Evidence:

The committee learned that most hits reported by Forensic Biology are warm hits. Forensic Biology managers estimate that up to 90% of all reported suspect to case hits are warm hits. Although DNA HIT verification criteria are applied to both warm hits and cold hits, applying the criteria is especially important in the event of a cold hit. Eliminating the possibility of a contamination event is a critical quality control measure if the individual and evidence did not have a previous link. The infrequent reporting of cold hits may have contributed to the reporting analyst or technical reviewer not applying the cold hit criteria.

The committee also noted that the application of the DNA HIT verification criteria relies on individuals remembering to apply the cold hit criteria when needed. Taken together, the infrequent reporting of cold hits and the reliance on memory presents a risk for the consistent application of this critical quality control measure.

See Appendix C for the cause and effect analysis.

### **Corrective Action Plan**

The RCA committee recommends the following actions to address the identified causal factors:

1. Managers must implement a DNA HIT checklist to support reporting analysts and technical reviewers in the writing and reporting of all DNA HITS. The checklist is a memory aid that will serve to remind staff to perform all the hit verifications. The checklist will also assist in countering distractions and minimizing overconfidence from mostly reporting warm hits.
2. Laboratory Management must link the newly created DNA hit checklist to the Case Management Checklist utilized daily by analysts and technical reviewers during report writing and review. This will make the criteria for verifying DNA hits more accessible to staff and reduce the possibility of relying on memory.

The RCA committee also offers the following suggestions for consideration by management:

3. Managers should review the Verifying and Reporting DNA Matches procedure and revise the procedure for clarity regarding case types and the quality control steps that must be taken when reporting matches.
4. Managers should also review the sample preparation procedure, specifically the section which describes the cleaning of instruments during examination and sampling. Training should also be reviewed to make sure it is effective and consistent with the procedure.

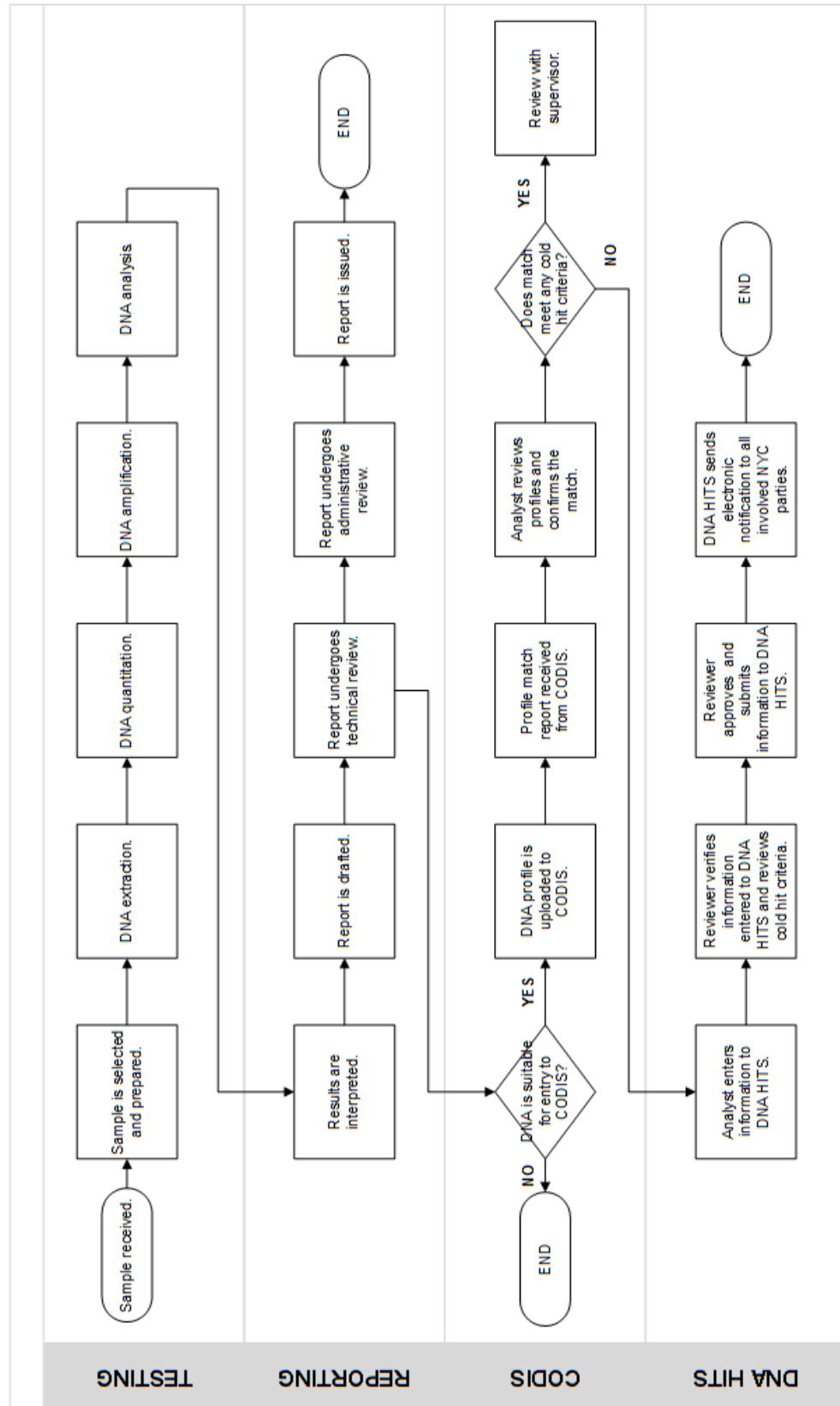
### Summary of Corrective Actions

Causal Factor	Recommended Corrective Actions	Completion Date
<p>The reporting analyst did not apply the DNA HIT verification criteria when he entered the match information in DNA HITs.</p> <p>The technical reviewer did not apply one of the DNA HIT verification criteria when he reviewed the DNA HIT information.</p>	<ol style="list-style-type: none"> <li>1. Implement a DNA HIT checklist to support reporting analysts and technical reviewers in the writing and reporting of cold hits.</li> <li>2. Provide feedback to the technical reviewer.</li> </ol>	<p>8/29/19</p> <p>8/29/19</p>
<p>Staff infrequently report cold hits.</p>	<ol style="list-style-type: none"> <li>1. Link the DNA Hit checklist to the Case Management Checklist utilized daily by analysts and technical reviewers during report writing and review.</li> <li>2. Review the DNA HIT verification criteria and the new DNA HIT checklist with staff.</li> </ol>	<p>8/29/19</p> <p>8/29/19</p>
<p>Suggestion (not tied to an identified causal factor)</p>	<ol style="list-style-type: none"> <li>1. Review the Verifying and Reporting DNA Matches procedure and revise the procedure for clarity regarding case types and quality control steps.</li> </ol>	<p>8/29/19</p>
<p>Suggestion (not tied to an identified causal factor)</p>	<ol style="list-style-type: none"> <li>1. Review the procedure and training for cleaning instruments during sample preparation and examination.</li> </ol>	<p>8/6/19</p>

The Quality Manager and Laboratory Director will monitor the implementation and effectiveness of improvements.

Appendix A

**OFFICE OF CHIEF MEDICAL EXAMINER  
FORENSIC BIOLOGY: GENERAL TESTING AND CODIS/DNA HITS OVERVIEW**



## Appendix B

## CHRONOLOGY OF EVENTS

DATE	SOURCE OF INFORMATION	EVENT
6/26/18	LIMS	Forensic Biology received a DNA sample from a suspect to be compared to an acquaintance sexual assault case.
7/6/18	LIMS	A Forensic Biology criminalist processed samples for testing. The criminalist cut the suspect sample for the sexual assault case at 11:52am. The same criminalist cut the “rear bedroom window” swab for a burglary case, at 1:37pm. No other case samples were cut in between.
7/23/18	LIMS	The DNA profile from the suspect sample associated with the sexual assault case was entered into LDIS.
7/30/18	email	The DNA profile obtained from the burglary case was compared to LDIS and a match was found to the DNA profile of the suspect from the sexual assault case.
12/7/18	DNA HITS	Forensic Biology staff reviewed the match between the burglary case and the suspect sample associated with the sexual assault case. Forensic Biology staff issued DNA HIT #27122.
12/13/18	Laboratory report	Forensic Biology issued a report indicating that the suspect’s DNA associated with the sexual assault case is the same as the DNA profile for Male Donor A from the burglary case.
12/19/18	email	Suspect turned himself in due to warrant issued for his arrest. The suspect was released the following morning upon posting bail.
6/17/19	LIMS/email	A Forensic Biology analyst discovered the potential contamination while preparing for grand jury testimony.  Because the laboratory could not determine if this was a true cold hit or contamination, DNA HIT #27122 was recalled.
6/17/19 - 6/18/19	LIMS	Forensic Biology staff contacted the case Assistant District Attorney (ADA) and their supervisor and notified them of the issue.
6/20/19	Laboratory report	Forensic Biology issued additional reports for both cases stating that previously reported results were inconclusive due to quality control reasons.
6/21/19	LIMS	The case ADA’s supervisor left a message stating that the defendant had a good alibi and that the case will be dismissed.
6/28/19	Nonconformity report	Forensic Biology staff confirmed that the Queens District Attorney’s Office had dismissed the case.



### Appendix C

#### NYC OFFICE OF CHIEF MEDICAL EXAMINER

#### Cause Map for RCA# 2019-01

Potential contamination event which led to DNA HIT and arrest.

