



MEMORANDUM

TO: LeRonne Armstrong,
Chief of Police

FROM: Drennon Lindsey, Deputy Chief
OPD, Bureau of Investigations

SUBJECT: OPD Crime Lab Biometrics
DNA Analysis Technology
2021 Annual Report

DATE: March 11, 2022

Background

Oakland Municipal Code (OMC) 9.64.040: Surveillance Technology “Oversight following City Council approval” requires that for approved surveillance technology items (by the Privacy Advisory Commission per OMC 9.64.020 and by City Council per OMC 9.64.030), city staff must present a written annual surveillance report for Privacy Advisory Commission (PAC). After review by the PAC, city staff shall submit the annual report to the City Council. The PAC shall recommend to the City Council that:

- The benefits to the community of the surveillance technology outweigh the costs and that civil liberties and civil rights are safeguarded; or
- That use of the surveillance technology cease; or
- Propose modifications to the corresponding surveillance use policy that will resolve the concerns.

The PAC recommended City Council adoption of the “Oakland Police Department (OPD) Criminalistics Laboratory DNA Instrumentation and Analysis Software Biometric Technology Use Policy on October 1, 2020; following the PAC’s vote, the City Council adopted Resolution No. 88388 C.M.S. on December 1, 2020. This resolution approved OPD’s use of Criminalistics Laboratory DNA Instrumentation and Analysis Software Biometric Technology. OMC 9.64.040 requires that, after City Council approval of surveillance technology, OPD provide an annual report for PAC review before submitting to City Council. This report is intended to serve to comply with this mandate.

2021 Data Details

- A. A description of how the surveillance technology was used, including the type and quantity of data gathered or analyzed by the technology:

General Overview

The Oakland Police Department (OPD) Criminalistics Laboratory’s (Crime Lab) Forensic Biology/DNA unit utilizes specialized DNA collection and analysis instrumentation and software to perform forensic DNA testing. During this lengthy and complicated process, one step removes and purifies DNA from cells (digestion/extraction), another quantitates how much DNA is present and lastly, by amplifying and analyzing Short Tandem Repeats (STR) in the DNA using Polymerase Chain Reaction (PCR) and separated by Capillary Electrophoresis (CE), forensic

DNA profiles are generated. Software is involved in the following processes: (i) collection and processing of STR DNA fragment data; (ii) interpretation of DNA data into DNA profiles used for comparison purposes. At the end of all processes, a determination can be made as to whether a DNA sample collected from a crime scene can be associated with a known individual through a comparison of evidentiary (crime scene) and known reference DNA profiles. Statistical weight is provided for all inclusion comparisons.

Specifics: How DNA testing was used in 2021

*The Forensic Biology Unit analyzed 430 (see **Attachment A for Case Record IDs**) requests between January 1, 2021 to December 31, 2021. Over 2,300 items of evidence were examined, from which 5,278 samples were subjected to digestion and extraction using the Versa and EZ1 instruments. Scientist subjected 5,425 samples to quantitation analysis using the SpeedVac, Qiagility, and QuantStudio 5 instruments and 2,196 samples were subjected to amplification and typing methods using the ProFlex and 3500 instruments. The DNA profiles were processed with GMIDX or FaSTR and ArmedXpert software.*

- B. Whether and how often data acquired through the use of the surveillance technology was shared with outside entities, the name of any recipient entity, the type(s) of data disclosed, under what legal standard(s) the information was disclosed, and the justification for the disclosure(s):

Discovery to the Alameda County District Attorney's Office was provided in 29 cases. A standard discovery packet includes the reports, technical and administrative review sheets, case notes, attachments, contact log, resume, interpretation guidelines, photographs, electronic data, and any supporting documents.

- C. Where applicable, a breakdown of what physical objects the surveillance technology hardware was installed upon; using general descriptive terms so as not to reveal the specific location of such hardware; for surveillance technology software, a breakdown of what data sources the surveillance technology was applied to:

The Biometric Use Policy covers the specific technology covered. In general, the digestion, quantitation, normalization/amplification, typing, interpretation and databasing are housed in the laboratory of the Police Administration Building (PAB). Database equipment is located in a secure location elsewhere in the PAB as disclosed in the Use Policy. Currently, no equipment resides outside of these locations.

A cloud-based server location is under evaluation as a replacement for the server in the PAB. The details of this location and security would be handled under the auspices of the City of Oakland ITD policy and procedure and would meet or exceed industry standard for handling of secure servers.

- D. Where applicable, a breakdown of where the surveillance technology was deployed geographically, by each police area in the relevant year:

All evidence was analyzed at the laboratory located in the PAB. No other locations are authorized. As for the geographic location of crimes, this is not collected by the laboratory in a way that can be disseminated easily. The address may be reported on the request for laboratory services form, but it is not required for analysis to proceed. The laboratory services crimes that occur in all areas of the City of Oakland.

- E. A summary of community complaints or concerns about the surveillance technology, and an analysis of the technology's adopted use policy and whether it is adequate in protecting civil rights and civil liberties. The analysis shall also identify the race of each person that was subject to the technology's use. The Privacy Advisory Commission may waive this requirement upon making a determination that the probative value in gathering this information to evaluate the technology's impact on privacy interests is outweighed by the City's administrative burden in collecting or verifying this information and the potential greater invasiveness in capturing such data. If the Privacy Advisory Commission makes such a determination, written findings in support of the determination shall be included in the annual report submitted for City Council review:

Staff reached out to each City Council office to ask about possible community complaints or concerns related to this surveillance technology. No community complaints or concerns were communicated to staff.

The laboratory request for services form does not collect race information. It could be argued that requiring information that is not necessary for analysis, such as race, could be biasing; indeed, it would be a great invasion of privacy to capture this data since it is irrelevant to the analyses performed. Furthermore, the race of individuals subject to the DNA analysis technology's use is not revealed during evaluation of evidence as non-coding regions of DNA are typed and do not contain this information. Therefore, staff recommends that the PAC waive the requirement to identify the race of each person subject to the technology's use and make a determination that the probative value in gathering this information to evaluate the technology's impact on privacy interests is outweighed by the potential greater invasiveness in capturing such data.

- F. The results of any internal audits, any information about violations or potential violations of the Surveillance Use Policy (SUP), and any actions taken in response unless the release of such information is prohibited by law, including but not limited to confidential personnel file information:

All Forensic Biology personnel and relevant management were required to review and sign that they understood and would abide by the Surveillance Use Policy and the Impact Reports. Under accreditation, the Laboratory actively seeks feedback from its customers and no concerns were conveyed regarding violations or concerns around the SUP. Lastly, the Laboratory has a means to identify risks through Incident Response. Staff are encouraged to participate in Incident Response by filing Incident Alerts where there were concerns. No violations or potential violations were identified by any of these routes.

- G. Information about any data breaches or other unauthorized access to the data collected by the surveillance technology, including information about the scope of the breach and the actions taken in response:

The laboratory maintains an active security program where the security of alarmed portions of the laboratory are tested and results recorded. There were no unexplained alarm events and there were no faults in the alarmed systems that were tested. There were no breaches to the laboratory nor to the equipment or databases that it houses. More importantly, there were no electronic data breaches in the laboratory.

- H. Information, including crime statistics, that helps the community assess whether the surveillance technology has been effective at achieving its identified purposes:

The efficacy of the OPD Criminalistics Laboratory DNA analysis program is illustrated by citing the following compelling statistics:

The laboratory completed 430 requests in 2021. These are further broken out by crime type in Table 1 below

Table 1: OPD Crime Laboratory DNA Analysis Requests in 2021

Crime Type	Number of Requests
Homicide	92
Attempted Homicide	18
Cold Case Homicide	2
Suspicious Death	1
Rape	114
Other Sexual Assault (not rape)	57
Kidnapping	1
Assault	49
Robbery	29
Burglary	12
Carjacking	9
<i>Hit and run</i>	2
Auto Theft	1
Weapons	35
Other Person	4
Other Criminal	3
Officer Involved Shooting	1
Total	430

CODIS hits in 2021 – One hundred and twenty-four DNA profiles were uploaded to the CODIS database. The laboratory had one hundred and seventeen associations (hits); seventy-two hits to named individuals whose identity were unknown, seven hits to unsolved forensic cases, and thirty-eight hits to previously solved forensic cases.

Thus, forensic DNA analysis is an important tool to investigate and provide potential leads for a variety of crimes that occur in the City of Oakland.

I. Statistics and information about public records act requests regarding the relevant subject surveillance technology, including response rates:

There were no public record requests for DNA analysis.

J. Total annual costs for the surveillance technology, including personnel and other ongoing costs, and what source of funding will fund the technology in the coming year:

Procurement of instruments is costly and is typically amortized over many budget cycles. Ongoing maintenance is imperative to ensure reliability of the instruments is remediated quickly should a problem occur. The reagents/kits and supplies to conduct testing are also steep. The cost / benefit analysis in the form of Return on Investment (ROI) calculations place the societal cost of each homicide at \$10,000,000 and a return seen of \$135¹ per dollar spent on violence reduction. Similarly, economic studies show that investigating sexual assaults results in \$81² saved per dollar spent.

The total costs of procuring and maintaining the equipment are shown by Category of testing and platform below:

Digestion/Extraction

- EZ1: \$63,000 to purchase (x3 instruments = \$189,000) and \$3,100 to maintain; 3 instruments for \$9,300 annual*
- Versa 1100: \$85,000 to purchase and \$6,800 to maintain*

DNA Quantitation

- Qiagility: \$33,100 to purchase (x3 instruments = \$99,300) and \$2,700 to maintain; 3 instruments for \$8,100*
- QuantStudio 5: \$57,000 to purchase (x2 instruments = \$114,000) and \$5,100 to maintain; 2 instruments for \$10,200*

DNA Normalization / Amplification

SpeedVac: \$4,000 to purchase, no maintenance

ProFlex Thermalcyclers: \$14,000 to purchase (x2 instruments = \$28,000), no maintenance

DNA Typing

3500: \$135,000 to purchase, \$6,000 to maintain

DNA Interpretation

STRmix: \$66,000 to upgrade, \$22,000 to maintain

FaSTR: \$37,000 to purchase, \$8,000 to maintain

ArmedExpert: \$15,000 to purchase

¹ Abt, Thomas (2019). Bleeding Out: The devastating consequences of urban violence—and a bold new plan for peace in the streets. Chapter 11, p. 208.

² Wang and Wein (2018) Journal of Forensic Sciences, Analyzing Approaches to the Backlog of Untested Sexual Assault Kits in the USA, July 2018, Vol. 63, No. 4, pp. 1110-1121.

The cost of testing reagents/kits was approximately \$131,000, however, this does not include consumables such as scalpels, masks, gloves, plastics, slides nor serological test kits.

*Total purchase cost (born over several years): \$772,300
Total maintenance cost, 2021: \$70,400
Total testing cost reagents/kits, 2021: \$131,000
Estimate of consumables: \$140,000*

K. Any requested modifications to the Surveillance Use Policy and a detailed basis for the request:

The instruments and software listed in the September 2020 Surveillance Impact Report (SIR) and Biometric Technology Use Policy (SUP) were not replaced during 2021. The laboratory did take some instruments and software out of service and replaced with technology platforms already included in the SIR and SUP (e.g. the Proflex and 3500 instruments).

For the current year, the laboratory is in the process of replacing the three Qiagen EZ1 robots (14 sample capacity) with two EZ2 robots. The EZ2 robot has a larger capacity (24 sample capacity) and will increase the number of samples processed in the same amount of time. The EZ2 robots were purchased with FY2020 Capacity Enhancement and Backlog Reduction (CEBR) grant funds as declared in resolution 88358 for which purchase permission was granted; they are ordered, and the laboratory awaits shipment.

Later this year, when FY2021 CEBR grant funds become available, four cold storage units (freezer/refrigerator and refrigerator) will be replaced as declared in resolution 89011. The laboratory is also in the planning stages for STRmix software validation which has been disclosed in the existing SIR and SUP.

No new biometric capacities were added to the laboratory during 2021. The laboratory is proposing a few changes to the current SUP and SIR 1) to reflect the technology that has been retired or replaced and 2) to add language codifying current OPD criminalistics laboratory practices which prevent improper use of victim profiles.

Edits in the SUP and SIR address retired or replaced technology.

Codification of Prevention of Improper use of Victim Profiles

In the past, the Forensic Biology unit QC database contained DNA profiles obtained from blood samples associated with homicides, suspicious circumstance deaths, and sexual assault cases. These blood samples were anonymized, assigned a QC source number and used as positive control samples for casework analysis. The purpose of using these QC samples was to show that the testing method or DNA typing process worked by verifying that expected results were obtained. This process was performed from 1996 to 2011. In 2012, the anonymized DNA profiles obtained from these samples was included in the QC database described above for the purpose of quality checks of backlogged or re-sampled

cases. The source of the profiles is unknown to crime lab line staff. They have never been, nor will they ever be, used for the identification of an individual in a criminal matter. Nevertheless, and in an abundance of caution, these QC samples were removed from the active database and archived in a location only accessible by FBU Supervisors. Additionally, language specifying that these profiles cannot be used for associations is proposed to be added to the SUP.

The Forensic Biology unit maintains an in-house Quality Control (QC) database. The QC database contains DNA profiles obtained from the following sources:

- 1. By consent from OPD staff (current and past) and their family members. OPD personnel that may enter the chain of custody for an evidence item or has other contact within the scope of the case,*
- 2. Samples provided by accredited proficiency test providers. The samples are anonymized by the test provider; the test providers are subject to strict confidentiality requirements by the accrediting bodies. The laboratory has no access to the source of these samples.*
- 3. The purpose and use of the QC database is twofold: 1) for casework quality control checks to ensure that the process worked correctly (positive control) and 2) to determine if there is possible contamination from a known individual to a casework sample. At this time, there are no victim references in the QC database. Such profiles have never been, nor are they allowed to be, used for the identification of an individual in a criminal matter.*

OPD is committed to providing the best services to our community while being transparent and instilling procedural justice through daily police activity. This report is compliance with these OPD commitments. OPD hopes that this report helps to strengthen our trust within the Oakland community.

For any questions with this report, please contact Dr. Sandra Sachs, Criminalistics Laboratory Manager, at ssachs@oaklandca.gov.

Respectfully submitted,

Reviewed by,
Drennon Lindsey,
Deputy Chief, Bureau of Investigations

Prepared by:
Sandra Sachs, PhD, Crime Lab Manager
OPD, Criminalistics Laboratory

Bonnie Cheng, Acting Forensic Biology Unit Supervisor
OPD, Criminalistics Laboratory

Bruce Stoffmacher, Privacy and Legislation Manager
OPD, Bureau of Services

Attachments (1)

A: Criminalistics Laboratory - Requests Completed Between 01 Jan 21 and 31 Dec 21