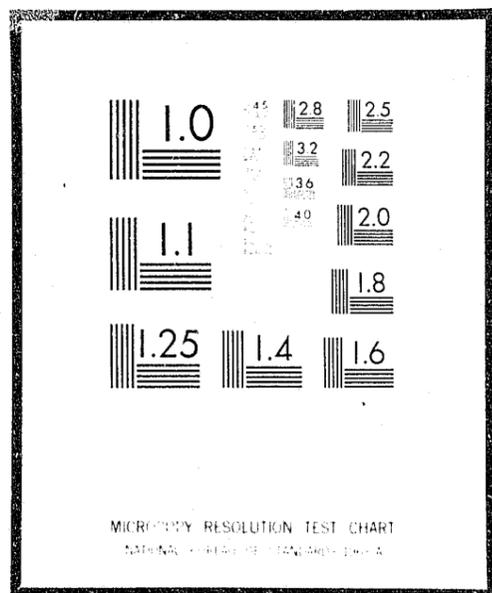


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2/5/76

EXPAND CRIME LABORATORY AND INCREASE TRAINING OF POLICE PERSONNEL

EVALUATION REPORT FOR FIRST YEAR
(OCTOBER 1, 1973 - SEPTEMBER 30, 1974)

PREPARED BY:
DALLAS AREA CRIMINAL JUSTICE COUNCIL

18514 sup.

Expand Crime Laboratory and Increase Training of Police Personnel
Evaluation Report for First Year (October 1, 1973 - September 30, 1974)

Background Information

The original conception of this study was stimulated by a continuing need to improve county and city anti-crime efforts, particularly in stranger-to-stranger crime and burglary, through utilization of the Dallas County Institute of Forensic Sciences. Also, stimulating this study was the continuing need to increase the training of investigative personnel in the Dallas Police Department and Dallas County Sheriff's Office in critical aspects related to the preservation and retrieval of physical evidence.

During 1973, 83,038 index offenses were reported in Dallas County; the Dallas County Institute of Forensic Sciences conducted various examinations on evidence submitted for 947 index offenses. Of these 947 index offenses, the categorical breakdowns were as follows:*

<u>Index Crime</u>	<u>Number of Offenses</u>
Murder	238
Rape	530
Robbery	18
Burglary	85
Theft (over \$200)	11
Assault	65
Auto Theft	0
	<u>947 offenses</u>

*Approximately 90 percent of all cases from which physical evidence is examined are referred to the Institute from the Dallas Police Department (City of Dallas).

Also during 1973, there were 5,621 felony narcotic (includes marijuana) offenses in Dallas County; of these 5,621 offenses, 3,716 were referred to the Crime Lab upon which 7,733 examinations were made.*

By comparison, the numbers of index offenses reported was far greater than the number of index offenses for which physical evidence was examined, and this, as emphasized later in this report, is especially noticeable in the crime categories of burglary and robbery. It is hoped that through a continuing education process in the forensic sciences for both lab personnel and law enforcement officers accoupled with the expanding scientific capabilities of the Crime Lab, this imbalance will be decidedly corrected.

Project Implementation

First Quarter--October 1, - December 31, 1973
Second Quarter--January 1 - March 31, 1974
Third Quarter--April 1 - June 30, 1974
Fourth Quarter--July 1 - September 30, 1974

The Crime Lab Project was originally scheduled to begin on September 1, 1973, however, the Lab was not notified of the grant award until September 24. Consequently the official project commencement date was reset to October 1, 1973. Three full-time employees were authorized by the Grant and all three were hired by the end of the project's second quarter (January-March, 1974).

The majority of the equipment was received by the end of the second quarter which is also considered by project personnel to be the end of the project's gear-up period. All equipment approved in the first year grant award, was received by the end of the project's fourth quarter (July-September, 1974) except for the computer terminal which became operational on October 1, 1974. (See Attachment B for further information concerning project equipment.

*Several types of examinations may be performed for any single case depending upon the nature of the case.

The proposed reference library, consisting of a total of 100 volumes containing materials on ballistics, toxicology, instrumentation, chemistry, biology and miscellaneous subjects, was completed by third quarter's end with the exception of a few volumes.

Also authorized by the grant were funds to be used in the preparation of a physical evidence manual and handouts for the instruction of law enforcement officers; this manual and the handouts were to cover the following subject areas:

- 1) crime investigation rules
- 2) crime investigator techniques
- 3) practical points of crime investigation
- 4) information covering the requirements for proper investigation of certain categories of crimes and deaths

As of the end of the project's first year (September 30, 1974), the decision has been made to use a modified version of a physical evidence manual which has already been published² rather than to write another manual. Project personnel have added an appendix to this existing manual which outlines physical evidence-collection procedures used at the Institute which differ from those procedures already in the manual. As of this report, the rough draft of the appended manual has been prepared but is not yet in final form. Project personnel expect the manual to be in final form by December 31, 1974.

Two handouts (See Attachment A) were prepared and distributed by project staff during the fourth quarter. Five hundred copies of one of these handouts entitled "Physical Evidence Analysis Capability," was distributed to law enforcement officers, district attorneys, recruit class members, etc.; this handout listed the analyses capabilities of the Institute and also offered selected examples of types of cases in which these capabilities may prove valuable.

²Crime Scene Search and Physical Evidence Handbook (Prescriptive Package). Washington, D.C., National Institute of Law Enforcement and Criminal Justice. October, 1973

The other handout was entitled "Procedures for Collecting Gunshot Residues," of which approximately 50 copies were distributed to the command staff of the Dallas Police Department. This handout is intended for the specific use of the police officers who may be called upon to collect washings from the hands of a victim or the possible assailant so that such washings may be analyzed by atomic absorption.

Travel, as authorized under the grant, was divided for the purposes of (1) a five-day training course for two scientists who will operate new equipment, (2) a six-week special training session in physical anthropology for one scientist and (3) travel by senior professional members of the Crime Lab staff to other forensic science training centers to obtain ideas leading to improved techniques and procedures (approximately 5 or 10 such visits were anticipated).

Regarding (1) above, two scientists have received training for new equipment (Gas Chromatograph/Mass Spectrometer), one completing the training course during the project's first quarter and the other during the second quarter.

Travel required for one scientist to receive training in physical anthropology was completed during the project's fourth quarter when the Chief Field Agent returned from an eight-day training course; although a six-week training session was proposed in the grant application, practical considerations such as the workload of the instructor, etc., have allowed for only an eight-day training course. The Project Manager had hoped that further instruction in physical anthropology could be received but, as of this report, there is no further training scheduled. Grant personnel feel, however, that the newly acquired expertise in physical anthropology has proven valuable in the identification of certain homicide victims, i.e., ability to identify bones either human or non-human, determination of age, sex, race, and stature from examination of skeletal remains.

Visits to forensic labs by senior professional staff members have been made in every quarter of grant operation except during the project's first quarter. During this first year, senior professional staff members have visited forensic science laboratories in California, Colorado, Delaware, Florida, Georgia, Illinois, North Carolina, and Ohio; the purposes for this travel have been (1) for appraisalment of current analytical procedures used in various labs and (2) for gathering information concerning plans for laboratory personnel, equipment, and space in future budgets.

Evaluation Analysis

Quarter 1--October 1 - December 31, 1973*
Quarter 2--January 1 - March 31, 1974
Quarter 3--April 1 - June 30, 1974
Quarter 4--July 1 - September 30, 1974

PREFACE:

In the evaluation analysis that follows, project objective #1 states that "new services" will be provided and project objective #2 states that laboratory "productivity" will be increased. Distinction should be made between these two project objectives.

Objective 1 refers to the following:

- 1) performance of examinations that the lab has previously been unable to perform
- 2) performance of examinations to a level of sophistication which would make the results of the examinations both valuable as investigative leads and admissible in court as evidence in a case

Objective 2 refers to the following:

- 1) examinations performed prior to the grant award which, because of the acquisition of additional personnel, equipment, and training, can now be performed more quickly and in most cases, more precisely

*Only partial statistics are available for the project's first quarter since it is considered to be the primary portion of the gear-up period in terms of being under-equipped and unprepared to fully pursue project goals.

Also, in direct reference to project objectives 1 and 2, Attachment B of this report lists all equipment authorized in the first year grant award along with a brief description of its use.

Project Objective 1

To provide services not now available nor available in the predictable future through local funding

During the first year of project operation, 14 new services were provided by the Crime Lab; Table I lists these services and offers a very general summary of the nature of these services.

TABLE I

SERVICE	DESCRIPTION OF SERVICE AND USE
1. <u>Precision determination of specific gravity</u> Implication relative to Criminal Justice:	1. <u>Analysis of glass and fibers:</u> a) glass: more positive comparison of known samples of glass and those suspected of being from the same source; also determination of density in glass evidence b) fibers: more positive identification and comparison of synthetic or polymer fibers c) hairs: comparison of hair specimens (scale patterns, etc) Placement of suspect at a crime scene or clearing an innocent person.
2. <u>Precision determination of refractive index of glass evidence</u> Implication relative to Criminal Justice:	2. <u>Analysis of glass:</u> more positive comparison of known samples of glass and those suspected of being from the same source. Placement of suspect at a crime scene or clearing an innocent person
3. <u>Petrographic examination of mineral and biological substances</u> Implication relative to Criminal Justice:	3. a) analysis of soils and building materials: ability to make basic and detailed advanced comparisons of soils, safe insulation, building materials, etc b) examination of hair specimens c) examination of fiber specimens Placement of suspect at a crime scene or clearing an innocent person
4. <u>Handloading capabilities</u>	4. <u>Reloading of cartridges:</u> Handloading capabilities enable ballistics personnel to: a) reproduce varying bullet velocities to determine range of fire b) duplicate ammunition that is no longer commercially available

TABLE I (CONT'D)

SERVICE	DESCRIPTION OF SERVICE AND USE
4. (Continued) Implication relative to Criminal Justice:	c) reduce velocity of test findings when high velocity weapons are fired for safe collection of test bullets Ability to make the above determinations depends upon ability to handload test rounds of fire because actual reproduction of velocity can be determined only by measurement. Provide investigative leads and interrogative aids in crimes.
5. <u>Microscopic comparison of documents</u> Implication relative to Criminal Justice:	5. <u>Document Comparison:</u> ability to compare written materials such as fraudulent documents, checks, and suicide notes. Provide investigative leads and interrogative aids.
6. <u>Forensic serology.</u> Implication relative to Criminal Justice:	6. Determination of blood group substances/analysis of blood and other body fluid stains: Blood evidence is found in all types of Impact crimes; it can provide investigative leads, interrogative aids, eliminate innocent persons as suspects and provide the basis for expert testimony in court.
7. (a) <u>Microflash examinations</u> Implication relative to Criminal Justice:	7. (a) <u>Examinations of bullets in flight:</u> ability to take photographs of fire-arm mechanisms and the flight (i.e., trajectory) of bullets which will be made These photographs may be presented to the jury in those cases where such visual aids could prove helpful in understanding a case at trial.

TABLE I (CONT'D)

SERVICE	DESCRIPTION OF SERVICE AND USE
<p>7. (b) <u>Rapid preparation of gelatin blocks for ballistic testing</u></p> <p>Implication relative to Criminal Justice:</p>	<p>7. (b) Testing with gelatin blocks: 1) tests at the Forensic Institute have shown that when gelatin blocks are used to back-up clothing, there is better reproduction of firearm residue patterns and bullet defects in clothing which gives a more accurate determination of range of fire. 2) tests also show that gelatin blocks are a good medium for the reproduction of the changes in body tissues due to the velocity of the bullet in passage</p> <p>Use of gelatin blocks for these purposes is valuable in the interpretation of wounding from firearms.</p>
<p>8. <u>Rapid section of body tissues (using Cryostat/Microtome)</u></p> <p>Implication relative to Criminal Justice:</p>	<p>8. <u>Prove/disprove diagnoses made at the autopsy table:</u> ability for the medical examiner to render immediate decisions concerning the natures of certain deaths.</p> <p>An immediate determination of cause of death, i.e., whether by homicide for disease processes, allows for maximum capitalization of investigators' time. That is, needless hours will not be wasted on cases where death by disease processes has been positively determined.</p>
<p>9. <u>Sensitive and precise quantitation of active ingredients of illicit drugs.</u></p>	<p>9. Under Sec.s 205(e), 2.06 (c), and 4.02 (d) (b) of the Texas Controlled Substances Act which in essence states that, any controlled substance (which is defined) having certain other substances in combination and proportion that will vitiate the abuse potential of the controlled substance is excepted from the Act. Rapid and sensitive detection with precise measurements will fulfill the legal requirements as set by law without overloading the laboratory.</p>

TABLE I (CONT'D)

SERVICE	DESCRIPTION OF SERVICE AND USE
<p>9. Continued</p> <p>Implication relative to Criminal Justice:</p>	<p>These measurements will provide intelligence data for drug investigators as to level of drug traffic being investigated.</p>
<p>10. <u>Study of metabolites of drugs in body tissues and fluids:</u></p> <p>Implication relative to Criminal Justice:</p>	<p>10. Metabolites of drugs provide excellent measurements of the relative length of time a drug has been in a body prior to death, and in some cases the identification of the drug itself.</p> <p>Such measurements will help establish the role the drug played, if any, in the death of a subject by providing metabolism information as to the length of time prior to death, the drug was introduced into the body.</p>
<p>11. <u>Microscopic examination with the forensic comparison microscope for toolmarks and ballistics</u></p> <p><u>Adoption of forensic comparison microscope to permit comparative viewing of hairs and fibers</u></p> <p><u>Photomicrographic (attachment of a camera to the eyepiece of the microscope) capability added to the forensic comparison microscope and the document microscope</u></p> <p>Implication relative to Criminal Justice:</p>	<p>11.a) <u>Toolmarks:</u> comparison of toolmarks with tools and other irregular objects</p> <p>b) <u>Ballistics:</u> comparison of bullets with suspects' weapons</p> <p><u>Hairs and fibers:</u> direct comparative viewing of hairs or fibers thought to be from the same source</p> <p>a) This ability will enable the scientists to determine if a weapon or tool was the object involved in a burglary, robbery, or murder.</p> <p>b) Placement of a suspect at a crime scene or clearing an innocent person</p>

TABLE I (CONT'D)

SERVICE	DESCRIPTION OF SERVICE AND USE
11. Continued	Hairs and fibers: Placement of a suspect at a crime scene or clearing an innocent person.
<p>12.a) <u>Sensitive analysis of gunshot residues.</u></p> <p>b) <u>Determination of bismuth.</u></p> <p>Implication relative to Criminal Justice:</p>	<p>12.a) <u>Detection of residues:</u> Primer particles, found in gunshot residues, may be detected on the clothing and/or hands of a suspect or on the hands of a suicide victim which lends heightened accuracy in examination of those wounded or dead as a result of a firearm injury.</p> <p>b) <u>Presence of bismuth:</u> Bismuth is a common primer component found in gunshot residues and may be detected on the clothing and/or hands of the suspect or on the hands of a suicide victim.</p> <p>Possible connections of a suspect with a weapon or cartridge. Such analyses lend heightened accuracy in examination of those wounded or dead as a result of firearm injury. These analyses have also proven useful in determining the range of fire and whether the dead individual had recently discharged a firearm.</p>
<p>13. <u>New capability for identifying useful information concerning tire tread requests.</u></p> <p>Implication relative to Criminal Justice:</p>	<p>13. <u>Analysis of tire tread marks:</u> duplication of tread marks can be taken from a crime scene and compared to tread marks of a suspect's car</p> <p>Lends investigative leads</p>
<p>14. <u>Immediate availability for all laboratory personnel of reference volumes</u></p> <p>Implication relative to Criminal Justice:</p>	<p>14. <u>Referral to the library:</u> The reference library contains various volumes of pertinent material (see p. 3), to which lab scientists can refer for information, clarification, or interpretations relative to their work.</p> <p>Provides information, clarification, and interpretation relative to crime lab work.</p>

Project Objective 2

To increase laboratory productivity and to increase the speed of reporting results to law enforcement agencies.

During the first year of project operation, 18 new procedures were used by the Lab. Since the Lab has had the capability to perform similar examinations in the past, these 18 are only itemized below rather than explained as in objective 1.

NEW LABORATORY PROCEDURES:

- Determination of tin in gunshot residues.
- Determination of blood group substances in the MN system. (The MN system is one of many systems used to classify blood types and is especially useful in determination of paternity)
- Reloading various caliber ammunition for test firing.
- Species determination by electrophoresis.
- Determination of ABO blood group in bones and tissue.
- Identification of vitamins.
- Identification of central nervous system stimulant - pentylene tetrazole.
- Gas Chromatograph-mass spectrometer analysis of pain and plastic specimens.
- Analyses for alcohol using gas chromatograph, resulting in decreased time for set-up and running of test, and therefore more rapid reporting of findings.
- Analyses using the gas chromatograph-mass spectrometer save 70-90% technician time and precise, sensitive determinations and quantitations can be made using very small amounts of specimens.
- More rapid and precise analyses of narcotics using spectrophotofluorometer.
- Chronographic study of velocity of bullets at inshoot and outshoot.
- ABO blood grouping of hair.
- Lactic dehydrogenase enzyme detection in blood specimens.
- More rapid and precise determination of optical qualities of fibers, glass, and hairs.

Hemoglobin determination in stains.

Determination of sulfa drugs

Head space sampling of biological specimens.

Also in reference to objective 2, it was intended that initiation of this project would enable lab personnel to increase the speed of reporting test results to area law enforcement agencies, specifically the Dallas Police Department.

Table II compares the required time to report test results as estimated in 1972 before project implementation to the average required time to report test results at the end of the project's first year; examination of the data presented shows that project efforts have substantially reduced the time required to report test results.

NUMBER OF ANALYSES, TEST TIMES, AND REPORTING TIMES

Type of Analysis		Number of Examinations	Analysis/Test Time (Avg.)	Write-Up Time (Avg.)	Time to Report to DPD	Time to Obtain Information on Case Disposition
Soil, glass, fibers	1972	96	6 hours	30 Min.	2 days	1 week +
	Qtr. 1	--	--	--	--	--
Soil, glass, fibers Soil, hairs, fibers Glass Soil, hairs, fibers Glass	Qtr. 2	40	30 Mins.	30 Mins.	10 Mins.	1-2 days
	Qtr. 3	181 249	20 Mins. 30 Mins.	30 Mins. 30 Mins.	10 Mins. 10 Mins.	1-2 days
	Qtr. 4	151 567	20 Mins. 30 Mins.	30 Mins. 30 Mins.	10 Mins. 10 Mins.	1-2 days
	1972	24	8 Hrs.	30 Mins.	2 days	1 week +
Toolmarks	Qtr. 1	--	--	--	--	--
	Qtr. 2	--	--	--	--	--
	Qtr. 3	37	3 Hrs.	30 Mins.	10 Mins.	1-2 days
	Qtr. 4	86	3 Hrs.	30 Mins.	10 Mins.	1-2 days
	1972	0	n/a	n/a	n/a	n/a
Document Comparisons	Qtr. 1	--	--	--	--	--
	Qtr. 2	33	60-90 Mins.	60 Mins.	24 Hrs.	1-2 days
	Qtr. 3	33	60-90 Mins.	60 Mins.	24 Hrs.	1-2 days
	Qtr. 4	243	60-90 Mins.	60 Mins.	24 Hrs.	1-2 days
	1972	0	n/a	n/a	n/a	n/a
Bismuth/Tin	Qtr. 1	--	--	--	--	--
	Qtr. 2	Analytical equipment not available at this time.				
	Qtr. 3	24	10 Mins.	30 Mins.	24 Hrs.	1-2 days
	Qtr. 4	58	10 Mins.	30 Mins.	24 Hrs.	1-2 days

Project Objectives 3 and 4

To provide training of law enforcement officers and forensic scientists in physical evidence and scientific crime and death investigation

To provide in-service training for personnel involved in the scientific investigation of crime and death in the Institute of Forensic Sciences

The importance of a continuing education process in the forensic sciences for both forensic scientists as well as law enforcement officers has been consistently acknowledged by the project management staff. New equipment requires well-skilled operators who know their equipment and methods of examining evidence; on the other hand, police investigators need also to be well-trained in order that they will recognize the types of physical evidence which the Institute has the capabilities to examine and realize the importance of preserving evidence at a crime scene. It is also necessary that police officers, other than investigators, understand the value of evidence and crime scene protection.

For these reasons, training in the forensic sciences has been undertaken in this project and will be given to a combined total of 1,700 Institute personnel and law enforcement officers per year as outlined below.

<u>TYPE OF TRAINING</u>	<u>PERSONS INVOLVED</u>	<u>CURRICULUM OUTLINE</u>
Cadets	Police Cadets (Individuals) Police Cadets (Classes)	Medical Examiner Investigation of death including visit to scene, autopsy and handling of specimens in Toxicology Laboratory. General exposure to Physical Evidence handling.
Recruits	Sheriff's Office) Dallas Police Dept.) Other County and) Regional Officers)	4 hours classroom exposure to scientific investigation of death by Medical Examiner and investigation of crime by Criminal Investigation Laboratory

<u>TYPE OF TRAINING</u>	<u>PERSONS INVOLVED</u>	<u>CURRICULUM OUTLINE</u>
In-Service	Line officers. Investigators (General). Investigators (Crime Scene Search) . Supervisory Personnel. .	More detailed discussion and lecture of scientific investigation of death and crime. Evidence handling and analysis
Related Criminal Justice Agencies	District Attorney Prosecutors Fire Department Paramedics Fire Department Arson Investigators	Same as In-Service with more emphasis on testimony by expert witness Same as Recruits Same as General Investigators with more emphasis on arson-related evidence
	Operation Get-Involved (Dallas Police Dept.)	Same as Cadets, but with emphasis on how citizens can help reduce stranger-stranger crime.

Table III displays training statistics for the project's first year of operation; no training took place during the project's first quarter as this quarter was the initial period of project implementation and efforts were directed toward organization. Groups included under the category "Others" in Table III are such groups as the Explorer Scouts, public library classes, high school chemistry classes, hospital administration residents, medical technologists, etc.

Statistics in Table III show that 1,832 lab personnel and law enforcement officers received training during the project's first year which will exceed the project's yearly goal of 1,700 in-service and law enforcement personnel.

TABLE III

DALLAS COUNTY - CRIME LAB

NUMBER OF PERSONS RECEIVING TRAINING

	NUMBER OF PERSONS RECEIVING TRAINING			
	Law Enforcement	Lab Personnel	Other	Total Number of Persons Trained
First year of grant				
1st Qtr	--	--	--	--
2nd Qtr	93	20	145	258
3rd Qtr	250	353	197	800
4th Qtr	<u>385</u>	<u>731</u>	<u>46</u>	<u>1162</u>
TOTAL	728	1104	388	2220
Total Number of Law Enforcement Officers and Lab Personnel trained	1,832			

Project Objective 5

To provide for long-term planning for future programs, and to establish communication and liaison with other centers involved in forensic science endeavors

As described in the "Project Implementation" section of this report (See p. 5), senior professional staff members have visited forensic laboratories in California, Colorado, Delaware, Florida, Georgia, Illinois, North Carolina, and Ohio pursuant to project objective 5.

Effectiveness Measures

According to the project's first year design, measures of actual project effectiveness would be increases in the numbers of cases in certain crime categories for which physical evidence was submitted to the Crime Lab. Hence, the project's first year goals were set to address this expectation. Table IV displays Impact and drug abuse crime category statistics for 1972 and goals intended for the end of the project's first year.

TABLE IV

Crime	Approximate Number of Cases in Which Physical Evidence Submitted (1972)*	Goal for First Year of Project
Murder	192 (all cases)	192 (all cases)
Rape	60	180
Robbery	12	24
Burglary	85	170
Drug Abuse	2400	3000
Assaults	N/A	N/A

Table V displays statistics compiled for the project's first year addressing the number of cases from the entire county (includes the City of Dallas): for which physical evidence was examined. Examination of these statistics shows that project personnel

*This table was taken from the evaluation component of the first year grant application. For this reason, 1972 figures were used because the grant was written and funded in 1973, hence, 1973 figures would not have been complete.

were able to exceed first year goals in every crime category except in burglary where 56 more cases were needed to meet project goals.

A closer look at the categories of robbery and burglary shows that very few cases became "Crime Lab cases" in consideration of the fact that these are the most frequently committed crimes of the Impact crime categories. Recent seminars at the Crime Lab for law enforcement personnel have been specifically directed toward recognition, preservation and gathering of physical evidence at robbery and burglary crime scenes. It is hoped that these emphases will stimulate an increase in submissions of physical evidence for these types of cases.

TABLE V

NUMBER OF CASES FROM THE ENTIRE COUNTY FOR EXAMINATIONS OF PHYSICAL EVIDENCE

	NUMBER OF CASES						TOTAL
	MURDER	RAPE	ROBBERY	BURGLARY	DRUG ABUSE	ASSAULTS	
First year of grant							
1st Qtr	54	131	7	20	1782	17	2011
2nd Qtr	71	137	9	30	2028	15	2290
3rd Qtr	65	150	6	18	2189	19	2447
4th Qtr	117	221	8	46	1655	19	2066
TOTAL	307	639	30	114	7654	70	8814

Attachment C breaks out the Impact crime categories giving the number of cases examined (by the Crime Lab), the number of cases reported, and the percent of cases examined (by the Crime Lab) for (Impact) cases referred by the Dallas Police Department i.e., cases from the City of Dallas only.

For the project's second year of operation (October 1, 1974-September 30, 1975), two additional effectiveness measures have been added which are (1) dispositions of cases involving index crimes under the Impact Program and (2) total number of cases involving stranger-to-stranger crime for which evidence was submitted to the Lab for examination. These added measures will more exactly circumscribe this project's effect.

Summary

During this first year of project operation, all project objectives and goals, with the exception of the goal for burglary case examinations, have been accomplished and some have been decisively exceeded. To recapitulate project-to-date accomplishments, the following are notable: (1) new laboratory techniques have been developed; (2) the speed of reporting results of examinations to the Dallas Police Department has been increased; (3) in-service training to Lab personnel and training of law enforcement officers in the forensic sciences has taken place; (4) visits to other forensic labs have been made in the interest of long-term planning concerning future programs; (5) a physical evidence manual is being prepared for law enforcement officers as well as periodical preparation of timely handouts; (6) pursuance of various training courses by lab personnel for the purpose of broadening the base of lab services; and (7) an increasing number of requests from area law enforcement agencies for analyses to be performed.

It is expected that the Institute of Forensic Sciences will continue to be successful in meeting requirements in regard to the "Expand Crime Lab and Increase Training of Police Personnel" grant award.



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Criminal Investigation Laboratory

July 29, 1974

PHYSICAL EVIDENCE ANALYSIS CAPABILITY

BLOOD AND BODY FLUIDS

1. Identification of blood group substances in the ABO, Rh, and Mn systems in blood, blood stains, and clothing
2. Determination of secretor status and blood grouping of secretors from saliva samples (including cigarette butts, toothpicks) and certain other body fluids
3. Determination of ABO blood group substance in bones and tissue
4. Identification of certain enzymes in blood and blood stains to reduce population frequency of particular specimen

EXAMPLE:

A suspect in custody for stabbing a complainant has dark stains on his clothing. The clothing should be submitted, wrapped separately, for examination; a blood specimen should be obtained from the suspect with his permission or by court order. The blood from the suspect will be compared with results of examination of the complainant's blood for ABO, Rh, MN and several enzymes. It can be determined if the blood on the suspect is his or probably came from the complainant.

BUILDING MATERIALS AND SAFE INSULATION

1. Comparison of color, appearance and composition of various materials for common origin including:
 - a. Safe Insulation
 - b. Plasterboard
 - c. Wood (det'n of species)
 - d. Asphalt products
 - e. Bricks
 - f. Insulation
 - g. Plastic products

EXAMPLE:

A burglary suspect is caught outside a building where entry was gained through the wall. His clothing is submitted. Particles of brick, plasterboard, paint and fiberglass insulation found on his clothing match the corresponding materials from the building. It is unlikely that such a combination of common material will be from any other source than the burglarized building.

DOCUMENT EXAMINATION AND COMPARISONS

1. Comparison of handwriting specimens for identification with particular individual
2. Examination of fraudulent or altered documents
3. Tire tread examinations for identification of tire manufacturer and comparison of tread mark with suspect vehicle
4. Comparison of fraudulent checks with National Fraudulent Check File

EXAMPLE:

Fraudulent checks with different endorsement are submitted for comparison with a suspect's handwriting. The handwriting specimen from the suspect is obtained by dictating to the suspect what to write, and on documents similar to the fraudulent checks. Comparison can show if the suspect endorsed any of the checks.

FIREARMS

1. Comparison of bullets and weapons
2. Identification of ammunition type and possible weapon
3. Test pattern firing to determine probable range of firearm discharge

EXAMPLE:

A bullet is obtained at autopsy in a murder case. Examination reveals it to be fired from a .38 caliber Smith & Wesson revolver. Later a suspect found with such a weapon is arrested and the weapon submitted. The gun is test-fired and the bullet compared with the autopsy bullet. The examiner finds that this revolver did, in fact, fire the autopsy bullet.

GLASS

Determination of physical and optical properties of minute glass fragments for possibility of common origin

EXAMPLE:

A vehicle with broken dual headlamps is suspected of being used in a hit and run. Glass from each lamp is compared with glass particles left at the scene. One fragment is found to have the same properties as the interior lamp but different from the outer lamp. The glass at the scene could have come from the inner of the dual headlamps.

GUNSHOT RESIDUES

1. Analysis of hand wipings from victims and suspects for metallic elements characteristic of gunshot residues
2. Analysis and examination of clothing of victims for powder residues and metallic residues pertaining to range at which firearms was discharged

EXAMPLE:

Two suspects are apprehended near the scene of a shooting; neither has a weapon. Hand wipings obtained from each are analyzed. It is determined that suspect #1 has no detectable residues, but suspect #2 has significant lead, antimony and barium on the back of the right hand. This is consistent with #2 having discharged a firearm recently.

HAIRS AND FIBERS

1. Comparison of microscopical characteristics of head hair to determine if human, possible the racial origin, and the possibility of common origin
2. Comparisons of other hairs such as pubic hair for possible common origin only
3. Grouping of fibers as to mineral, animal, sythetic or vegetable, and identification as to actual fiber type

EXAMPLE:

A suspect is arrested near the scene of a rape. His shirt has foreign hair and fibers on the shoulder. The blond hair is compared with his brown head hair and determined to be caucasoid in origin, different from his hair. The foreign fibers are nylon fibers commonly used in rugs. It is determined by comparison that the hair could have come from the victim's head, and the nylon from the rug at the scene.

PAINT

1. Comparison of color, layer sequence and composition of paint chips and smears for common origin
2. Examination of automobile paint chips to identify manufacturer and determine common origin

EXAMPLE:

A pry tool found on a suspect is submitted with paint from a burglary where a residence door was pried open. The smears and chips on the tool are determined to be different in color and layer sequence from the paint at the scene. The paint on this tool, therefore, did not come from the source represented by this burglarized home.

PHYSICAL MATCH OR FIT

Comparison of specimens such as headlamp lens, tool handles and tips, torn tape or paper, and pieces of cloth for singular, unique association of two pieces which were, at one time, attached

EXAMPLE:

A suspect is found with a tool handle in his car. Comparison with a hammer head and partial handle left at a malicious mischief scene reveals that the handle was at one time attached to the hammer head.

SEMINAL STAINS

1. Identification of stains on clothing or swabs as being seminal stains and if human in origin
2. Detection of spermatozoa on swabs, stains, smears and clothing
3. Determination of ABO blood types in stains and swabs in the absence of blood contamination

EXAMPLE:

Stains are noted on a handkerchief in possession of a rape suspect. Analysis in the Laboratory shows them to be seminal stains containing intact spermatozoa as well as two blood stains. The seminal stains are further analyzed and found to be from a group A secretor; the suspect is group A. The blood stains are determined to be group O, however, containing menstrual blood.

SOIL

Comparison of composition as to possibility of common origin

EXAMPLE:

Soil is found on the shoes of a suspect. Comparison with soil from the scene reveals the two soils to be the same in color but different in composition. The two soils could not have come from the same source.

TOOLMARK COMPARISONS

Identification of tool and comparison of toolmarks for singular, unique association of tool with toolmark. Includes pry marks, cut marks (bolt cutter, wire cutters), percussion marks and plier marks.

EXAMPLE:

A pair of bolt cutters found in a suspect's vehicle is submitted for comparison with recent crimes involving cut locks. It is determined that this bolt cutter was used to cut the padlock in a construction burglary a week earlier.

MISCELLANEOUS CAPABILITIES

1. Locksmithing and determination if locks were compromised
2. Metallurgical examinations
3. Arson-related analyses

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ATTACHMENT B

Criminal Investigation Laboratory

GUNSHOT RESIDUE PROCEDURES

HANDWASHINGS

Handwashings of suspects for gunshot residue analysis should be performed as soon as possible. These residues are easily lost or removed

1. If no plastic gloves are available, the officer performing the handwashing must wash his hands carefully before proceeding.
2. Moisten the cotton swab provided with only 2 or 3 drops of solution from the plastic bottle.
3. Swab the area of the left index finger, thumb and web as shown in the attached diagram.
4. Replace the swab in the test tube provided.
5. Label and initial the test tube as being from the left hand back.
6. Repeat the procedure for the right hand back, the left palm and right palm. Each hand area requires separate washing with separate sample tubes.

CAUTION: Do not add solution to the swab AFTER using it to remove residues.
 Do not dip the swabs into the solution bottle at any time.

EQUIPMENT	DESCRIPTION OF SERVICE AND USE
1. Optical Equipment	1. Microscopy equipment is utilized in the examination and comparison of soils, safe insulation, building materials, glass, hairs, fibers, body fluids, and various other substances.
2. Forensic Microscopes (2)	2. Two microscopes are included here: <u>1st Microscope:</u> This microscope has the capability to compare toolmarks with tools and makes other types of comparisons, particularly those involving irregular objects. <u>2nd Microscope:</u> This microscope is specifically designed for comparison of written materials, including documents, checks, suicide notes, etc.
3. Flameless Atomizer for Atomic Absorption	3. The flameless atomizer is an attachment for atomic absorption equipment already in use at the Crime Lab. The flameless atomizer adapts the equipment for the analysis of tin and bismuth which are common primer components found in gunshot residues.
4. Ballistics Equipment	4. Various pieces of ballistics equipment enable scientists (a) to determine bullet velocities, (b) to determine the wounding capabilities of firearms, (c) to make more accurate determinations of range of fire, (d) to reproduce the changes in body tissues due to the velocity of the bullet in passage, and (e) to photograph mechanisms of firearms and the flight of bullets.
5. Gas Chromatograph - Mass Spectrometer - Computer (See also 10 b)	5. The GC/MS provides rapid identification of many of the substances, i.e., drugs submitted by police agencies; it also provides rapid analysis of many of the substances encountered in tissue toxicology.

EQUIPMENT	DESCRIPTION OF SERVICE AND USE
5. GC/MS (cont'd)	5. The GC/MS requires less time for the preparation of substances to be analyzed. With the computer hookup, direct readout of information and direct interpretation of patterns is provided. The GC/MS also affords highly specific methods for analyzing certain of the hallucinogens and amphetamine derivatives.
6. Spectrophotofluorometer	6. This instrument is particularly useful in the identification and quantitation of morphine in blood; the instrument is essential for toxicologic proof of death due to an overdose of heroin or morphine. The spectrophotofluorometer can also be adapted for the rapid identification of certain other drugs such as LSD in the condition it is often obtained in narcotics seizures.
7. Cryostat-Microscope	7. The cryostat and microscope provide a quick method to prove or disprove by microscopy the diagnoses made at autopsy tables; with this equipment, the medical examiner can determine whether death was caused by a disease process or by a homicidal attack.
8. Gas Chromatograph	8. The gas chromatographic technique provides a rapid and accurate determination for alcoholic content in the body.
9. Dictating Equipment	9. Dictating equipment decreased the time needed to report results of examinations performed in the Laboratory and increases accuracy of reporting examination results.

EQUIPMENT	DESCRIPTION OF SERVICE AND USE
10. a. Computer Terminal to Dallas County Regional Data Processing System b. Computer Terminal to City of Dallas Data Processing System	10. This equipment provides Impact case disposition data from the Judicial Information System so that evidence can be destroyed and storage space made available and so that court schedules will be known for cases where testimony is required from Lab personnel. This computer capability is an integral component of #5 (Gas Chromatograph-Mass Spectrometer) this terminal is on-line to the City of Dallas computer system via telephone lines and the hook-up provides the actual analysis of the patterns developed by the GC/MS (i.e. the city computer stores information necessary to identify specific drugs and chemicals from data supplied by GC/MS).
11. Video-Tape Capability	11. This equipment provides the capability of video-taping crime scenes and autopsies and is used in training law enforcement officers in proper investigation of crime and death scenes.
12. Photographic Duplication Equipment	12. This equipment is used for duplication of 35 mm photographic transparencies for distribution to law enforcement agencies; these transparencies are of crime scenes and of specimens submitted to the Lab and aid law enforcement agencies in proper interpretation of the reports produced by the Lab. Photographs are also enlarged for courtroom presentation of evidence.
13. Visual Aid Projection Equipment	13. This equipment is used for "in-house" training and for the training of law enforcement officers.

EQUIPMENT	DESCRIPTION OF SERVICE AND USE
14. Human Articulated Skeleton	14. The skeleton is used for classroom work with law enforcement personnel, for autopsy room work for various demonstrations, and to aid prosecuting attorneys in preparing cases for presentation in the courtroom.
15. Teaching Microscope with Phase Contrast Adapter	15. This microscope is used for inter-departmental teaching and continuing education of scientists since two individuals can simultaneously see the same view under the microscope. The Phase Contrast Adapter is an attachment for this microscope which enables the direct evaluation of slides for the presence of sperm in examinations of specimens from individuals alleged to be victims of rape.

ATTACHMENT C

DALLAS POLICE DEPARTMENT MURDER CASES EXAMINED

	MURDER CASES		
	NUMBER EXAMINED	NUMBER REPORTED	% EXAMINED
1st Qtr	39	60	65.0%
2nd Qtr	57	57	100.0%
3rd Qtr	59	59	100.0%
4th Qtr	<u>75</u>	<u>75</u>	<u>100.0%</u>
TOTAL	230	251	91.6%

DALLAS POLICE DEPARTMENT RAPE CASES EXAMINED

	RAPE CASES		
	NUMBER EXAMINED	NUMBER REPORTED	% EXAMINED
1st Qtr	117	136	86.0%
2nd Qtr	119	144	82.6%
3rd Qtr	122	134	91.0%
4th Qtr	<u>172</u>	<u>192</u>	<u>89.6%</u>
TOTAL	530	606	87.5%

ATTACHMENT C (Cont'd)

DALLAS POLICE DEPARTMENT ROBBERY CASES EXAMINED

	CASES		
	NUMBER EXAMINED	NUMBER REPORTED	% EXAMINED
1st Qtr	7	870	0.8%
2nd Qtr	5	697	0.7%
3rd Qtr	5	588	0.9%
4th Qtr	<u>6</u>	<u>920</u>	<u>0.7%</u>
TOTAL	23	3075	0.7%

DALLAS POLICE DEPARTMENT BURGLARY CASES EXAMINED

	CASES		
	NUMBER EXAMINED	NUMBER REPORTED	% EXAMINED
1st Qtr	10	6306	0.2%
2nd Qtr	16	6374	0.3%
3rd Qtr	14	5925	0.2%
4th Qtr	<u>28</u>	<u>6656</u>	<u>0.4%</u>
TOTAL	68	25,261	0.3%

ATTACHMENT C (Cont'd)

DALLAS POLICE DEPARTMENT ASSAULT CASES EXAMINED

	CASES		
	NUMBER EXAMINED	NUMBER REPORTED	% EXAMINED
1st Qtr	12	1085	1.1%
2nd Qtr	14	883	1.6%
3rd Qtr	12	917	1.3%
4th Qtr	<u>13</u>	<u>975</u>	<u>1.3%</u>
TOTAL	51	3860	1.3%

END