



EAST TENNESSEE STATE
UNIVERSITY

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ETSU.EDU

Division of Forensic Pathology
William L. Jenkins Forensic Center

CASE NO.: 16-82-0102
COUNTY: Sullivan

NAME OF DECEDENT: RANDALL EUGENE BUCHANAN RACE: White SEX: Male AGE: 56
DOD: 8/1/16 DOA: 8/2/16

THE BODY WAS IDENTIFIED BY: Holston Valley Medical Center

HOME ADDRESS: 417 Barnett Drive, Lot 8, Kingsport, TN 37664

COUNTY MEDICAL EXAMINER: William Hudson, M.D.
ADDRESS: HVMCH Box 238, Kingsport, TN 37662

DISTRICT ATTORNEY GENERAL: Honorable Barry P. Staubus
ADDRESS: P.O. Box 526, Blountville, TN 37617

PATHOLOGIC DIAGNOSES:

- I. Multiple drug toxicity (diazepam, clonazepam metabolite, THC, oxycodone)
 - A. Cerebral edema
 - B. Pulmonary vascular congestion and edema
 - C. Urinary retention (230 milliliters)
- II. Blunt force injuries
 - A. Head and neck
 - 1. Right hyphema (blood inside eye)
 - 2. Abrasion of left external ear
 - 3. Contusion of lower lip, on the left
 - 4. Left sided subgaleal hematoma
 - B. Torso - multiple bruises of varying ages
 - C. Extremities - multiple bruises of varying ages
- III. Incidental findings
 - A. Obesity (body mass index of 31.2 kg/m²)
 - B. Peripheral edema
 - C. Coronary atherosclerosis
 - D. Left ventricular hypertrophy (history of hypertension)
 - E. Cholesterosis of the gallbladder
 - F. Uncomplicated diverticulosis of the colon
 - G. Benign prostatic hyperplasia, mild
 - H. Bilateral hydroceles (fluid in the scrotum around the testes)

CAUSE OF DEATH: Multiple Drug Toxicity (diazepam, clonazepam metabolite, THC, oxycodone)

NARRATIVE SUMMARY/OPINION: According to reports, this 56 year-old male, Randall Buchanan, was found dead by his girlfriend, in her residence on 8/1/2016 at approximately 5:00 A.M. He was lying on the bedroom floor next to the bed, with his head in a plastic container. Vomitus was found in and around the container. He had a history of substance abuse (see below) and on the evening of 7/31/2016, reportedly had seemed to be intoxicated. He was last known to be alive at 1:00 A.M. on 8/1/2016. No note of intent was found.

NARRATIVE SUMMARY/OPINION: Continued,

His past medical history included: prescription and illicit drug abuse, had prior accidental overdoses and he was known to purchase opioids from street sources; hypertension; coronary artery disease; depression, but had no reported recent suicidal ideation nor prior suicide attempts.

His autopsy findings are listed above under diagnoses and described in greater detail in the body of his autopsy report. The blunt force injuries of his head and neck are consistent with his body position at the scene and were not life threatening. The blunt force injuries of his torso and extremities are of varying ages.

Postmortem toxicological examination of his peripheral blood (Femoral Vein) detected: a therapeutic level of diazepam (Valium and others) and its active metabolite; a subtherapeutic level of 7 amino clonazepam (an active metabolite of clonazepam (Klonopin and others)); a level of THC (active metabolite of marijuana) and its metabolites to indicated use less than 4 hours before death and of being under the influence; a toxic to lethal level of oxycodone, without its active metabolite (very recent use); the presence of caffeine. Postmortem toxicological examination of his peripheral blood did not detect any ethanol (beverage alcohol). The aforementioned drugs, except caffeine, can cause respiratory depression, with resulting hypoxia and death. Their effects may be synergistic (the effects are multiplied when used together rather than merely added).

The manner of death is accident.

The purpose of this report is to provide a certified opinion to the County Medical Examiner and District Attorney General.

Date: 9/9/2016

EHS:mt

Signature: _____

E. Hunt Scheuerman, M.D.

An autopsy examination is performed on the body received as Randall Eugene Buchanan at the William L. Jenkins Forensic Center, State of Tennessee, on Tuesday the 2nd day of August, 2016, beginning at 1:15 pm.

The body is received within a sealed body bag with an attached identification tag bearing the decedent's name.

EXTERNAL EXAMINATION

The unembalmed body (measured and weighed upon arrival) is that of a 66 inches (167.6 centimeters), 193 pounds (87.7 kilograms), obese (Body Mass Index of 31.2 Kg/M²), male, with predominantly European anthropological features and light pigmentation, who appears older than his recorded age of 56 years.

Encircling the left great toe is an identification tag bearing the decedent's name.

The body is received wearing green and black plaid boxer shorts over grey brief-style underwear. Personal effects are listed in the "Personal Effects" inventory.

Rigor mortis is fully developed. Livor mortis is red-purple posterior and blanches with pressure. The torso is cold to touch, following refrigeration.

The scalp hair is 4 inches maximum length, brown with gray, straight and has an early male pattern of balding. The irides are blue and the pupils are equal at 3 millimeters. The corneas are clear and free of arcus senilis. The sclerae and conjunctivae are congested, but free of petechiae, tache noire or chemosis. The ear lobes have bilateral creases. The oral and nasal mucosae are lined with gastric contents. The lips and frenula are unremarkable, except as indicated. The mouth is edentulous, without dentures in place. The face has a 1/4 inch maximum mustache of similar quality to his scalp hair.

The anterior neck structures are midline. The chest is symmetrical. The breasts are free of masses. The nipples have no lesions or discharge. The abdomen is protuberant.

The penis is circumcised, with both testes descended. The body hair distribution is normal.

The extremities are symmetrical, with a mild degree of pitting edema extending from the knees down. The back and anus are unremarkable.

IDENTIFYING MARKS AND SCARS:

The top of the left shoulder has a 4 inches long, well-healed, surgical scar.

The upper back has a horizontally oriented, 2 inches long, well-healed, surgical scar.

EVIDENCE OF MEDICAL INTERVENTION:

The eyes are covered with gauze and tape dressings.

EVIDENCE OF INJURY

BLUNT FORCE INJURIES

HEAD AND NECK:

The right eye has blood collected in the anterior chamber. The left external ear has a 1/8 inch long by less than 1/16 inch wide, superficial abrasion. The lower lip, on the right has a 1/2 inch in diameter, blue bruise. The left temporal region has 1-1/2 by 1-1/4 inch subgaleal hematoma with associated contusion of the left temporalis muscle. The skull has no fracture and brain has no visible evidence of blunt force trauma. The left sternocleidomastoid muscle has a 3/4 by 1/2 inch area of extravasated blood, located primarily in the fascia, not in the muscle itself. The overlying skin is unremarkable.

TORSO:

The upper abdomen, from the xiphoid region to the level of the umbilicus, has several light red-brown and yellow bruises, which range from 3/4 by 1/4 inch up to 2 by 1 inch.

EXTREMITIES:

The anterior aspect of the right lower leg, just below the knee, has a 2-1/2 by 2-1/4 inches, red-purple and yellow bruise.

The anterior aspect of the left lower leg, just below the knee, has a 1-3/4 by 3/4 inch, red-brown and yellow-green bruise.

INTERNAL EXAMINATION

BODY CAVITIES

The pneumothorax test is normal bilaterally. The great vessels and heart contain a normal amount of liquid blood. The pleural and pericardial cavities are smooth, shiny and free of abnormal collections of fluids. The peritoneal cavity has scattered, dense, fibrous adhesions in the left lower quadrant, but no abnormal collection of fluid. The organs are normally situated and have no unusual odors.

HEAD

The skull has no fractures. The epidural, subdural and subarachnoid spaces have no abnormal collections of fluids. The dura mater and falx cerebri are intact and not adherent to the brain. The leptomeninges are thin and clear. The cranial nerves have no anomalies. The cerebral arteries are patent, without atherosclerosis. The brain weighs 1520 grams. The cerebral surface has a normal gyral pattern and no focal lesions, with flattened gyri, compressed sulci and uncal grooving, without cerebellar tonsillar coning. The cerebral cut surface has a normal, non-compressed ventricular system and no focal lesions. The brainstem and cerebellum are unremarkable on external and cut surfaces. The spinal cord, examined (upper cervical), is unremarkable.

NECK

The strap muscles have no contusions or anomalies, except as indicated. The larynx and trachea are patent, with a lining of gastric contents. The hyoid bone, cricoid cartilage and the thyroid cartilage are intact. The tongue has no contusions and the muscle is a homogenous red-brown.

CARDIOVASCULAR SYSTEM

The great vessels arise and course normally. The vena cava have no thrombi. The pulmonary artery trunk and extrapulmonary artery branches have no thromboemboli or anomalies. The aorta is of normal caliber, with multiple, smooth, yellow, atherosclerotic plaques, without ulcerations.

The trimmed and empty, normally firm heart weighs 400 grams (expected 276 to 356 grams, based on Zeek's formula or a maximum of 383 grams based on Molina and DiMaio). The epicardial surface is smooth and shiny, with a normal fat pad. The cardiac configuration is normal.

The right dominant coronary artery system has normally located, patent ostia, with a small conus artery, which arises immediately adjacent to the origin of the right coronary artery. The epicardial coronary arteries have multiple, eccentric to concentric, soft to hard, yellow, atherosclerotic plaques, with maximal luminal obstructions of: left main coronary artery – 40 to 50%; left anterior descending coronary artery – 50 to 60% in its proximal and mid portions; small left circumflex coronary artery - clean; right coronary artery – 50 to 60% in its proximal and mid portions.

The cardiac chambers have no chronic dilation.

The myocardium is a homogenous red-brown.

The left ventricle has concentric hypertrophy, with the left ventricular free wall measuring 18 millimeters in thickness, the interventricular septum 20 millimeters and the right ventricular wall 4 millimeters (expected values for age are: 12.2, 13.6 and 3.9 millimeters respectively).

The endocardium is smooth and shiny, without mural thrombi or fibrosis.

The cardiac valves are unremarkable. The valve cusps are free of vegetations, fenestrations or anomalies. The valve circumferences, measured in millimeters with the expected value in parentheses are as follows: aortic – 89 (74), mitral – 120 (97), pulmonary – 88 (71) and tricuspid – 130 (117).

RESPIRATORY SYSTEM

The right lung weighs 550 grams, while the left lung weighs 490 grams (expected approximately 675 grams combined, based on ideal body weight). The normally lobed, visceral pleural surfaces are smooth and shiny, with a moderate degree of subpleural, green-black pigment deposition. The cut surfaces are red-brown and exude a moderate amount of dark, liquid blood and blood-tinged froth, without tumor nodules, cavitations or consolidations. The intrapulmonary airways, examined, are patent, with linings of gastric contents. The intrapulmonary arterial branches, examined, have no thromboemboli.

LIVER AND BILLARY SYSTEM

The liver weighs 1710 grams. The capsular surface is smooth and shiny, with blunt edges. The cut surface is a homogenous red-brown, with a normal firm consistency and no tumor nodules or definite cirrhosis. The thin walled gallbladder contains a measured 20 milliliters of red-brown bile and no stones. The mucosa has a bright yellow, reticulated pattern. The common bile duct is of normal caliber, patent and has no stones.

ALIMENTARY TRACT

The esophagus is lined by white, smooth mucosa. The gastric mucosa has the usual rugal folds and the lumen contains a measured 480 milliliters of tan liquid and partially digested food, with recognizable fragments of what appear to be egg or cheese, but no pill fragments or unusual odors. The esophagus, stomach and proximal duodenum are patent and free of ulcerations. The serosa of the small and large intestines, including the cecal appendix is unremarkable, except for multiple diverticula, without evidence of inflammation or bleeding, located in the descending and sigmoid portions of the colon. The pancreas is of normal consistency and has red-brown, lobulated parenchyma.

GENITOURINARY TRACT:

The right kidney weighs 150 grams, while the left kidney weighs 160 grams. The capsules strip with ease from the smooth subcapsular surfaces. The cut surfaces have well demarcated corticomedullary junctions, without tumor nodules, cysts or scars. The calyces, pelvises and ureters are of normal diameter and have no stones. The urinary bladder contains a measured 230 milliliters of clear, yellow urine and the mucosa has mild trabeculation.

The prostate is slightly enlarged (weighs 35 grams) and has a firm consistency, with a tan, multi-nodular cut surface. The testes have bilateral hydroceles and tan, stringy parenchyma.

RETICULOENDOTHELIAL SYSTEM

The spleen weighs 170 grams. The capsular surface is dull red-purple and smooth. The cut surface is red-brown, with a normal consistency and no tumor nodules or infarctions. The palatine tonsils are unremarkable. The lymph nodes, examined, are unremarkable. The thymus is atrophic. The bone marrow, examined (rib), is a homogenous red-brown.

ENDOCRINE SYSTEM

The thyroid is normally situated about the trachea and has a homogeneous brown cut surface. The adrenals have thin, yellow cortices surrounding dark red-brown medulla. The pituitary is not enlarged.

MUSCULOSKELETAL SYSTEM

The subcutaneous fat, at the umbilicus, measures 3 centimeters in thickness. The skeletal muscle, examined, is unremarkable. The clavicles, sternum, ribs, pelvis and spine have no palpable or visible fractures.

MICROSCOPIC EXAMINATION

SUMMARY OF SECTIONS:

1. Left ventricle, ventricular septum, right ventricle
2. Bilateral lungs, Cerebral cortex, with left hippocampus
3. Liver, Kidney, Prostate

HEART: Enlarged myocytes with large, blunt ended nuclei are associated with focal interstitial and perivascular fibrosis. No myocyte replacement fibrosis, myocyte necrosis, inflammation or significant myofiber disarray is seen.

LUNG: Vascular congestion is noted. A rare epithelioid granuloma containing foreign body giant cells, but no polarizing foreign material is seen.

LIVER: No specific pathology is seen.

KIDNEY: No specific pathology is seen.

PROSTATE: Hyperplastic glands are located in a hyperplastic stroma are associated with chronic inflammation and Psammoma Bodies, but no neoplasia.

BRAIN: No specific pathology is seen.

TOXICOLOGICAL EXAMINATION:

See attached report.

EHS:mt



WILLIAM L. JENKINS
FORENSIC CENTER

EAST TENNESSEE STATE UNIVERSITY

Body Bag Tag: Randall Eugene Buchanan
Name:

Sealed By: Cecil Nunley

Date: 8/1/16

ID Band: Right ☐ Left ☒ RIGHT TOP

16-82-0102 BUCHANAN, RANDALL
36WM

DOD: 08/01/2016 SULLIVAN

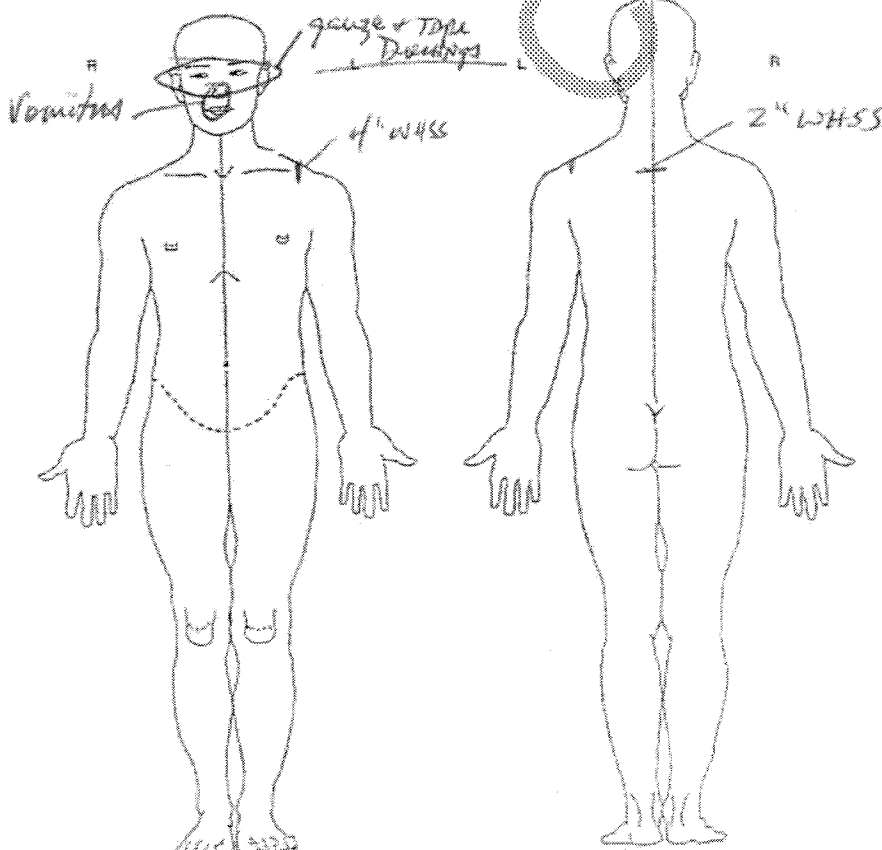
DOA: 08/02/2016 1315

EHS

Height 66 in
Weight 183 lbs

EXTERNAL EXAMINATION

Temperature	Warm <input type="checkbox"/>	Cool <input type="checkbox"/>	Cold <input checked="" type="checkbox"/>	<u>refrig</u>
Rigor Mortis	Jaw: Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	Small Muscles (eyelids, fingers): Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	Large Muscles (extremities): Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	
Livor Mortis	Fixed <input type="checkbox"/>	Blanchable <input checked="" type="checkbox"/>	Minimally evident & Easily Blanchable <input type="checkbox"/>	<u>red</u> Purple <input checked="" type="checkbox"/> Pink <input type="checkbox"/>
Posterior dependent areas	<input checked="" type="checkbox"/>	Anterior <input type="checkbox"/>	Other areas:	
Decomposition	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	Evidence of:		
Previously Embalmed	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	Evidence of:		
Organ/Tissue Donation Procurement	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	Evidence of:		
Hair	Color: <u>brn w/ gray</u>	Length: <u>4</u>	<u>early 8 Pattern</u>	Straight <input checked="" type="checkbox"/> Wavy <input type="checkbox"/> Curly <input type="checkbox"/>
Eyes	Color: <u>Blue</u>	Cornea: translucent <input checked="" type="checkbox"/> Clouded <input type="checkbox"/>	Sclera and Conjunctive: unremarkable <input type="checkbox"/> congested <input checked="" type="checkbox"/>	
Nose	Unremarkable <input type="checkbox"/>	Other: <u>See Diagram</u>	<u>BTS</u>	<u>4 P/M/C</u>
Ears	Unremarkable <input type="checkbox"/>	Other: <u>See Diagram</u>		
Mustache	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	Beard/Stubble	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	Color: <u>See Diagram</u>
Teeth	Natural <input type="checkbox"/> Irregularly Absent <input type="checkbox"/> Edentulous <input type="checkbox"/>	Repair/condition:	None <input type="checkbox"/> Good <input type="checkbox"/> Adequate <input type="checkbox"/> Poor <input type="checkbox"/>	
Dentures in place	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>			
Neck	Unremarkable <input type="checkbox"/> Other: <u>T-MC</u>			
Thorax	Well Developed & Symmetrical <input checked="" type="checkbox"/> Increased A/P diameter <input type="checkbox"/>	Other: <u>BNV</u>		
Abdomen	Flat <input type="checkbox"/> Protuberant <input checked="" type="checkbox"/> Obese <input type="checkbox"/>	Anus & Back	Unremarkable <input checked="" type="checkbox"/> Hemorrhoids <input type="checkbox"/> No Trauma <input type="checkbox"/>	
Male Genitalia	Testes descended Right <input checked="" type="checkbox"/> Left <input checked="" type="checkbox"/> No Trauma <input type="checkbox"/>			
Female Genitalia	Normal adult female <input type="checkbox"/> No Trauma <input type="checkbox"/>	Breasts well developed <input type="checkbox"/> w/out masses <input type="checkbox"/> No Trauma <input type="checkbox"/>		
Upper and Lower Extremities	Well Developed and Symmetrical Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	All Digits Present and Normal	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	
Identifying Marks and Scars	None Apparent <input type="checkbox"/>	<u>See Diagram</u>		<u>1 + 2nd Knives</u>



EKG patch (X) Surgical Scars (SS)

Scars (S) Tattoos (T)

Evidence of Medical Intervention

ET/Combi Tube ☐ ECG Patches #

NG/OG Tube ☐ Foley ☐

Curved Plastic Airway ☐

Defibrillator/Pacer Pads ☐

IV's/NP's

Subclavian: Right ☐ Left ☐

Antecubital: Right ☐ Left ☐

Forearm: Right ☐ Left ☐

Wrist: Right ☐ Left ☐

Inguinal: Right ☐ Left ☐

Hand: Right ☐ Left ☐

Pulse Oximeter ☐

Intracranial Pressure Catheter ☐

Other:

X-rays:

None ☒ Head ☐

Chest ☐ Abdomen ☐

Total Body ☐

X-rays show:

Signature: 8/2/16



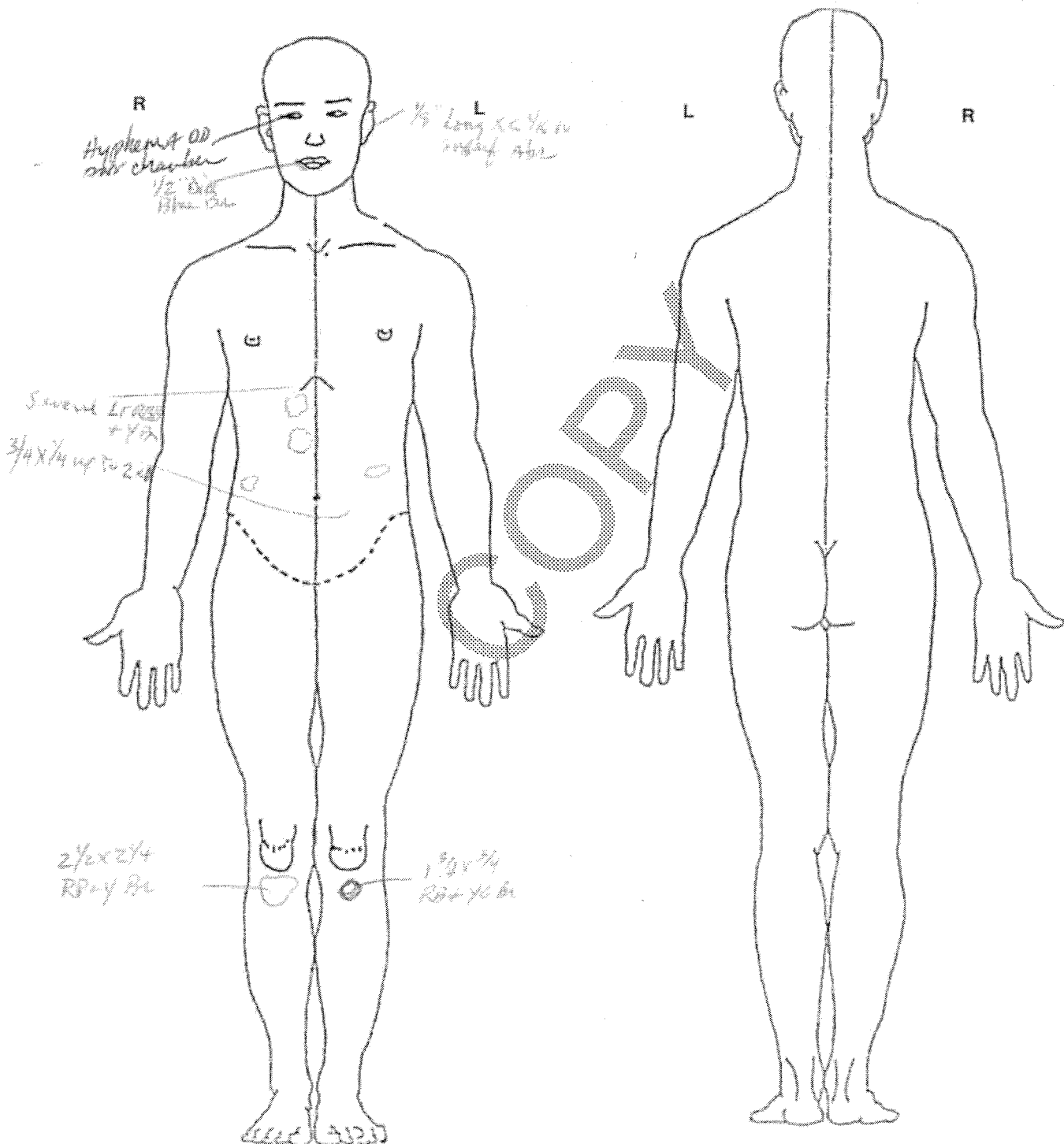
WILLIAM L. JENKINS
FORENSIC CENTER

EAST TENNESSEE STATE UNIVERSITY

16-82-0102 BUCHANAN, RANDALL
56WM

DOD: 08/01/2016 SULLIVAN

DOA: 08/02/2016 EHS



LABORATORY REPORT

Bill -
☐ PATIENT BUCHANAN, RANDALL
LAST FIRST INIT.
 ADDRESS CASE NO: 16-82-0102
CITY STATE ZIP
 SSN: _____ DATE OF BIRTH: 11/26/1959

SECTION OF TOXICOLOGY
DEPARTMENT OF PHARMACOLOGY
QUILLEN COLLEGE OF MEDICINE
 P.O. BOX 70422
 JOHNSON CITY, TENNESSEE 37614
 (423) 439-6424



Kenneth E. Ferslew, Ph.D., DABFT, Director
 Emily C. Lemieux, MT (ASCP), Supervisor

☐ DIAGNOSIS# _____
☐ MEDICAID: _____
☐ MEDICARE: _____
☐ INSURANCE: _____
NAME

☐ PHYSICIAN/# DR. EUGENE H. SCHEUERMAN
 ADDRESS FORENSIC PATHOLOGY
CITY STATE ZIP

☐ HOSPITAL/CLINIC _____
 ADDRESS _____
CITY STATE ZIP

DRUG HISTORY _____ AGE 56 SEX WM
 DATE/TIME COLLECTED DOA: 8/2/16
14:00

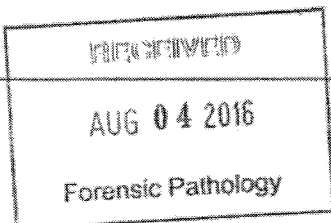
THIS SPACE FOR LAB USE ONLY

ACCOUNT NO. _____	SPECIMEN NO. <u>C-633</u>
DATE RECEIVED <u>8/3/16</u>	DATE REPORTED <u>8/3/16</u>
<input type="checkbox"/> Acetaminophen, serum (82003) <input type="checkbox"/> Carbamazepine, serum (80156) <input type="checkbox"/> Dilantin (phenytoin), serum (80185) <input checked="" type="checkbox"/> Drug Screen, blood/serum (82661) <input type="checkbox"/> Drug Screen, gastric/meconium (82662) <input checked="" type="checkbox"/> Drug Screen, urine (82660) <input checked="" type="checkbox"/> Ethanol, blood, urine (82055) <input type="checkbox"/> Ethylene Glycol, blood/serum (82693) <input type="checkbox"/> Heavy Metal Screen, urine (83015) (antimony, arsenic, bismuth, mercury) <input type="checkbox"/> Nicotine, urine (83887) <input type="checkbox"/> Phenobarbital, serum (80184) <input checked="" type="checkbox"/> Salicylate, serum (80196) <input type="checkbox"/> Theophylline, serum (80198) <input type="checkbox"/> Tricyclic Antidepressants Screen, serum/urine (80101) <input type="checkbox"/> Valproic Acid, serum (80164) Volatiles, blood/serum <input type="checkbox"/> Acetone (82010) <input type="checkbox"/> Isopropanol (84600) <input type="checkbox"/> Methanol (84600) <input type="checkbox"/> Specimen prep for drug analysis (80103) <input type="checkbox"/> Specimen collection (99000) <input type="checkbox"/> Unidentified procedure (84999) <input type="checkbox"/> Other _____	

SPECIMEN: BLOOD/URINE TOXICOLOGY

BLOOD ETHANOL: Negative
 BLOOD DRUG SCREEN: Benzodiazepines
 URINE DRUG SCREEN: Benzodiazepines, Cannabinoids, Opiates, Oxycodone

COMMENTS:



SCANNED

DIRECTOR

LABORATORY REPORT - TOXICOLOGY

White Copy/Original - Green Copy/Duplicate - Pink Copy/Duplicate - Canary Copy/Billing - Blue Copy/Lab

16-82-0102; C633; Buchanan

August 18, 2016

Analysis of the femoral blood for benzodiazepines revealed a diazepam concentration of 260 ng/ml (0.260 ug/ml) and a nordiazepam concentration (active metabolite) of 220 ng/ml (0.220 ug/ml) for a total benzodiazepine concentration of 480 ng/ml (0.480 ug/ml). These concentrations are in the routine therapeutic range (0.02 to 6.0 ug/ml, toxic 5 to 20 ug/ml, and lethal greater than 30 ug/ml) and would be the result of standard therapeutic dosage. Diazepam (Valium) is a sedative/hypnotic, anxiolytic, muscle relaxant and antiepileptic type drug. It is metabolized into several active metabolites including nordiazepam. The diazepam/nordiazepam ratio indicates that the deceased had been taking the diazepam acutely and had sufficient time to biotransform a portion of the diazepam to its metabolite prior to death.

A concentration of 9.1 ng/ml (0.0091 ug/ml) of 7-amino clonazepam (an active metabolite of clonazepam) was also detected with no detectable clonazepam. Clonazepam (Klonopin) is approved to be used as an anticonvulsant. The 7-amino clonazepam concentration would be in a subtherapeutic range (therapeutic 0.023 to 0.137 ug/ml, toxic greater than 0.100 ug/ml, and lethal unreported). The clonazepam/7-amino clonazepam ratio would indicate that the deceased had been taking the clonazepam chronically and was not an acute administration.

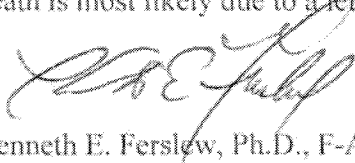
Analysis of the femoral blood also revealed a delta-9-tetrahydrocannabinol (THC) concentration of 1.3 ng/ml and a delta-9-carboxy tetrahydrocannabinol (carboxy-THC) concentration of 13.0 ng/ml. No 11-hydroxy delta-9-THC was found in the femoral blood. THC is the primary psychoactive constituent in marijuana. It is metabolized to 11-hydroxy delta-9-THC (an active metabolite) and then further metabolized to the inactive metabolite delta-9-carboxy THC. Application of the mathematical models of Huestis to these concentrations reveals the probable time intervals in which the deceased smoked marijuana. Attached is a sheet with the most probable times that the decedent smoked marijuana with 95% confidence intervals. The deceased most probably smoked 2.72 to 3.10 hours prior to death (with a confidence interval of 1.03 to 7.18 hours). Since the deceased had a measurable concentration of THC in the blood and smoked most likely within 4 hours of death, based on the pharmacodynamics of THC, the decedent would have been under the influence of THC at the time of death. These cannabinoid concentrations are not lethal.

Analysis of the femoral blood for opiates revealed a free oxycodone concentration of 330 ng/ml (0.330 ug/ml) and no detectable free oxymorphone (its active metabolite). While oxymorphone is a parent drug in and of itself (Numorphan, Opana), it can also be a biotransformation product of oxycodone (Percodan, Oxycontin, Roxicodone). The very large oxycodone/oxymorphone ratio would indicate that the oxycodone was most probably used acutely prior to death with no time for biotransformation and was an overdose. The oxycodone concentration is clearly in the toxic to potentially lethal ranges (therapeutic 0.01 to 0.10 ug/ml, toxic 0.2 to 5.0 ug/ml, and lethal 0.1 to 14 ug/ml) depending on history of use and degree of tolerance to the effects of the drug. The toxicities of oxycodone / oxymorphone may include nausea, somnolence, dizziness, asthenia, diaphoresis, constipation and urinary retention. They are also capable of producing stupor, coma, muscle flaccidity, severe respiratory depression, hypotension, and cardiac arrest.

The femoral blood was also positive for caffeine. The caffeine is most likely from ingestion of a caffeinated beverage (coffee, cola or tea).

While there is sufficient oxycodone to be potentially lethal alone, there are significant drug interactions in this case. The combination of oxycodone, diazepam/nordiazepam, 7-amino clonazepam, and cannabinoids produces increased respiratory and central nervous system depression. The effects would include dizziness, drowsiness, confusion, difficulty concentrating, and impaired thinking, judgement and motor coordination. If there is substantial depression it can be lethal.

The deceased had a history of prescription drug abuse, reportedly oxycodone. Toxicology results confirm prior drug use. Pending no other apparent cause of death and discovery of pathological findings from autopsy or other forensic evidence indicative of the aforementioned toxicities, this death is most likely due to a lethal combination of drugs.


Kenneth E. Ferslew, Ph.D., F-ABFT
Professor
Director of the Section of Toxicology

COPY

EHS
9/9/16 mt

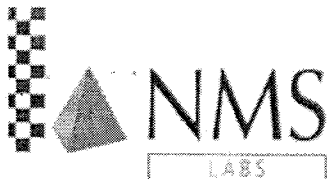
RECEIVED
AUG 19 2016
Forensic Pathology

SCANNED

THC TIME CALCULATIONS

FILE NUMBER:	16-82-0102: C0633: THC1 (Lemos)							
	Blood	Plasma	Model I					
THC conc (ng/mL)	1.3	1.911	0.49068	Time (hr):	3.10	0.344072	0.146608	0.834752
THC-COOH conc (ng/mL)	13.00	21.97		Range:			1.40	6.84
THC-COOH/THC Ratio	10	11.5						
			Model II					
			0.434962	Time (hr):	2.72	0.421238	0.013724	0.8562
				Range:			1.03	7.18

COPY



NMS Labs

3701 Welsh Road, PO Box 433A, Willow Grove, PA 19090-0437
Phone: (215) 657-4900 Fax: (215) 657-2972
e-mail: nms@nmslabs.com
Robert A. Middleberg, PhD, F-ABFT, DABCC-TC, Laboratory Director

CONFIDENTIAL

Toxicology Report

Report Issued 08/18/2016 10:01

30023

ETSU Toxicology
Dr. Ken Ferslew, Toxicology
PO Box 70422
Johnson City, TN 37614

Patient Name BUCHANAN, RANDALL

Patient ID 16-82-0102; C633

Chain 11962175

Age 56 Y DOB Not Given

Gender M

Workorder 16238809

Received 08/05/2016 13:35

Unless alternate arrangements are made by you, the remainder of the submitted specimens will be discarded one (1) year from the date of this report; and generated data will be discarded five (5) years from the date the analyses were performed.

Sample ID 16238809-001

Matrix Blood

Patient Name BUCHANAN, RANDALL

Patient ID 16-82-0102; C633

Container Type Blue Vial

Collect Dt/Tm 08/02/2016 14:00

Source Femoral Blood

Approx Vol/Weight 9 mL

Receipt Notes None Entered

Analysis and Comments

Result

Units

Reporting Limit

Notes

8062B Postmortem, Expanded w/o Alcohol, Blood (Forensic)

Analysis by Enzyme-Linked Immunosorbent Assay (ELISA)

Salicylates

None Detected

mcg/mL

120

Cannabinoids

See Comment

ng/mL

10

Comment: Based on this screening result, confirmation testing was performed. Refer to the confirmation test result(s).

Barbiturates

None Detected

mcg/mL

0.040

Analysis by High Performance Liquid Chromatography/

Time of Flight-Mass Spectrometry (LC/TOF-MS)

7-Amino Clonazepam

See Comment

ng/mL

20

Synonym(s): Clonazepam Metabolite

Comment: Based on this screening result, confirmation testing was performed. Refer to the confirmation test result(s).

Results for sample 16238809-001 are continued on next page



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Robert A. Middleberg, PhD, F-ABFT, DABCC-TC, Laboratory Director

CONFIDENTIAL

Sample ID 16238809-001
Matrix Blood
Patient Name BUCHANAN, RANDALL
Patient ID 16-82-0102; C633

Collect Dt/Tm 08/02/2016 14:00
Source Femoral Blood

Analysis and Comments	Result	Units	Reporting Limit	Notes
Caffeine Synonym(s): No-Doz The reported qualitative result for this substance was based upon a single analysis only. If confirmation testing is required please contact the laboratory.	Positive	mcg/mL	1.0	
Diazepam Synonym(s): Valium® Comment: Based on this screening result, confirmation testing was performed. Refer to the confirmation test result(s).	See Comment	ng/mL	25	
Nordiazepam Synonym(s): Chlordiazepoxide Metabolite Comment: Based on this screening result, confirmation testing was performed. Refer to the confirmation test result(s).	See Comment	ng/mL	25	
Oxycodone Synonym(s): Roxicodone®, OxyContin® Comment: Based on this screening result, confirmation testing was performed. Refer to the confirmation test result(s).	See Comment	ng/mL	10	
Scope Statement Comment: The following is a general list of compound classes included in this screen. The detection of any specific analyte is concentration-dependent. Note, not all known analytes in each specified compound class are included. Some specific analytes outside these classes are also included. For a detailed list of all analytes and reporting limits, please contact NMS Labs. Amphetamines, Anticonvulsants, Antidepressants, Antihistamines, Antipsychotic Agents, Benzodiazepines, CNS Stimulants, Cocaine and Metabolites, Hallucinogens, Hypnotics, Hypoglycemics, Muscle Relaxants, Non-Steroidal Anti-Inflammatory Agents, Opiates and Opioids.	See Comment			

50012B Benzodiazepines Confirmation, Blood (Forensic)

Analysis by High Performance Liquid Chromatography/
Tandem Mass Spectrometry (LC-MS/MS)

Diazepam	260	ng/mL	20
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Results for sample 16238809-001 are continued on next page



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CONFIDENTIAL

Sample ID 16238809-001

Matrix Blood

Patient Name BUCHANAN, RANDALL

Patient ID 16-82-0102; C633

Collect Dt/Tm 08/02/2016 14:00

Source Femoral Blood

Analysis and Comments	Result	Units	Reporting Limit	Notes
Synonym(s): Valium® Therapeutic range: 100 - 1000 ng/mL.				
Nordiazepam Synonym(s): Chlordiazepoxide Metabolite Psychiatric patients taking chronic diazepam doses ranging from 2 to 55 mg daily had steady state plasma concentrations of nordiazepam averaging 390 ng/mL (range 26 to 1600 ng/mL). The blood to plasma ratio of nordiazepam is 0.6.	220	ng/mL	20	
Oxazepam Synonym(s): Serax® When used as a drug, the therapeutic plasma concentration: 200 - 1400 ng/mL. Potentially toxic greater than 2000 ng/mL. As a metabolite of Diazepam, low concentrations may be observed. In one study, following chronic daily doses of about 70 mg of Diazepam, the steady-state serum concentrations were 50 - 400 ng Oxazepam/mL.	None Detected	ng/mL	20	
Temazepam Synonym(s): Diazepam Metabolite; Normison® When used as a drug, peak plasma concentrations range from 200 - 1100 ng/mL within 1.5 hours post-dose. As a metabolite of Diazepam, low concentrations may be observed. In one study, following chronic daily doses of about 70 mg of Diazepam, the steady-state serum concentrations were 100 - 600 ng Temazepam/mL.	None Detected	ng/mL	20	
Clobazam Synonym(s): Urbanyl®; Frisium® Following a single 20 mg oral dose, the mean peak plasma concentration: 465 ng/mL (range, 220 - 710 ng/mL) after 1.7 hours. Following a single 40 mg oral dose, the mean peak plasma concentration: 730 ng/mL at 2.5 hours. The plasma concentration decreased to 360 ng/mL at 12 hours, 180 ng/mL at 48 hours and 17 ng/mL at 96 hours.	None Detected	ng/mL	20	

Results for sample 16238809-001 are continued on next page



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Sample ID 16238809-001

Matrix Blood

Patient Name BUCHANAN, RANDALL

Patient ID 16-82-0102; C633

Collect Dt/Tm 08/02/2016 14:00

Source Femoral Blood

Analysis and Comments	Result	Units	Reporting Limit	Notes
Chlordiazepoxide Synonym(s): Librium® Therapeutic range: 400 - 2000 ng/mL.	None Detected	ng/mL	20	
Lorazepam Synonym(s): Ativan® Therapeutic range: 50 - 240 ng/mL.	None Detected	ng/mL	5.0	
Clonazepam Synonym(s): Klonopin® Therapeutic range: 10 - 75 ng/mL. Toxic: Greater than 100 ng/mL.	None Detected	ng/mL	2.0	
7-Amino Clonazepam Synonym(s): Clonazepam Metabolite Plasma concentrations following chronic therapy with 6 mg/day of Clonazepam: 20 - 140 ng/mL.	9.1	ng/mL	5.0	
Alprazolam Synonym(s): Xanax® Therapeutic range: 10 - 100 ng/mL. Potentially toxic at greater than 100 ng/mL.	None Detected	ng/mL	5.0	
Alpha-Hydroxyalprazolam Synonym(s): Alprazolam Metabolite Alpha-Hydroxyalprazolam has approximately 66% of the pharmacological activity of Alprazolam.	None Detected	ng/mL	5.0	
Midazolam Synonym(s): Versed® Peak plasma levels following a single 12.5 mg IM dose: approximately 200 ng/mL within 45 minutes of dose. Following a single 75 mcg/kg IV dose over 1 minute: 320 ng/mL at 0.25 hours 250 ng/mL at 0.5 hours 210 ng/mL at 1 hour 140 ng/mL at 2 hours 80 ng/mL at 4 hours 40 ng/mL at 6 hours 20 ng/mL at 8 hours.	None Detected	ng/mL	5.0	
Triazolam	None Detected	ng/mL	2.0	

Results for sample 16238809-001 are continued on next page



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Sample ID 16238809-001
Matrix Blood
Patient Name BUCHANAN, RANDALL
Patient ID 16-82-0102; C633

Collect Dt/Tm 08/02/2016 14:00
Source Femoral Blood

Analysis and Comments	Result	Units	Reporting Limit	Notes
Synonym(s): Halcion® Following a single 0.25 mg oral dose, the mean plasma concentration: 3.0 ng/mL (range, 2.3 - 3.7 ng/mL) within 1.5 hours. Following a single 0.5 mg oral dose, the mean plasma concentration: 4.4 ng/mL (range, 1.7 - 9.4 ng/mL) within 4 hours.				
Hydroxytriazolam Synonym(s): Triazolam Metabolite Hydroxytriazolam has 50 to 100% of the pharmacological activity of Triazolam.	None Detected	ng/mL	5.0	
Hydroxyethylflurazepam Synonym(s): Flurazepam Metabolite The mean peak plasma concentration following a 30 mg oral dose of Flurazepam was 18 ng Hydroxyethylflurazepam/mL at 1 hour post dose.	None Detected	ng/mL	5.0	
Desalkylflurazepam Synonym(s): Flurazepam Metabolite The mean peak plasma concentration following a 30 mg oral dose of Flurazepam was 23 ng Desalkylflurazepam/mL at 12 hours post dose.	None Detected	ng/mL	5.0	
Flurazepam Synonym(s): Dalmane® The mean peak plasma concentration following a 30 mg oral dose was 2.1 ng/mL at 1 hour post dose, but was undetectable at subsequent times.	None Detected	ng/mL	2.0	
Estazolam Synonym(s): ProSom® The mean peak plasma concentration following a 1 mg oral dose was 55 ng/mL (range, 40 - 70 ng/mL). The mean peak plasma concentration following a 2 mg oral dose was 98 ng/mL (range, 75 - 140 ng/mL).	None Detected	ng/mL	5.0	

50016B Opiates - Free (Unconjugated)
Confirmation, Blood (Forensic)

Results for sample 16238809-001 are continued on next page



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Sample ID 16238809-001
Matrix Blood
Patient Name BUCHANAN, RANDALL
Patient ID 16-82-0102; C633

Collect Dt/Tm 08/02/2016 14:00
Source Femoral Blood

Analysis and Comments	Result	Units	Reporting Limit	Notes
Analysis by High Performance Liquid Chromatography/ TandemMass Spectrometry (LC-MS/MS)				
Dihydrocodeine / Hydrocodol - Free Synonym(s): Hydrocodone Metabolite Adult therapeutic range: 72-150 ng/mL.	None Detected	ng/mL	50	
Codeine - Free Adult therapeutic range: 20-210 ng/mL.	None Detected	ng/mL	50	
Morphine - Free Synonym(s): Codeine Metabolite Adult therapeutic range: <73 ng/mL.	None Detected	ng/mL	50	
Hydrocodone - Free Synonym(s): Vicodin®; Zohydro® Adult therapeutic range: 6-29 ng/mL.	None Detected	ng/mL	50	
6-Monoacetylmorphine - Free Synonym(s): 6-MAM; Heroin Metabolite 6-Monoacetylmorphine is a metabolite of heroin.	None Detected	ng/mL	10	
Hydromorphone - Free Synonym(s): Dilaudid®; Hydrocodone Metabolite Adult therapeutic range: 5-20 ng/mL.	None Detected	ng/mL	10	
Oxycodone - Free Synonym(s): OxyContin®; Roxicodone® Adult therapeutic range: 13-120 ng/mL.	330	ng/mL	50	
Oxymorphone - Free Synonym(s): Numorphan®, Opana®, Oxycodone Metabolite Adult therapeutic range: 3-8 ng/mL.	None Detected	ng/mL	10	

**52198B Cannabinoids Confirmation, Blood
(Forensic)**

Analysis by High Performance Liquid Chromatography/
TandemMass Spectrometry (LC-MS/MS)

Results for sample 16238809-001 are continued on next page



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Sample ID 16238809-001

Matrix Blood

Patient Name BUCHANAN, RANDALL

Patient ID 16-82-0102; C633

Collect Dt/Tm 08/02/2016 14:00

Source Femoral Blood

Analysis and Comments	Result	Units	Reporting Limit	Notes
11-Hydroxy Delta-9 THC Synonym(s): Active Metabolite 11-Hydroxy Delta-9 THC is an active intermediate metabolite of tetrahydrocannabinol (THC) the active component of marijuana. Usual peak levels: Less than 10% of THC levels after smoking.	None Detected	ng/mL	1.0	
Delta-9 Carboxy THC Synonym(s): Inactive Metabolite Usual peak levels in Serum for 1.75% or 3.55% THC marijuana cigarettes: 10 - 101 ng/mL about 32 to 240 minutes after beginning smoking, with a slow decline. Usually not detectable after passive inhalation.	13	ng/mL	5.0	
Delta-9 THC Synonym(s): Active Ingredient of Marijuana THC concentrations in blood are usually about one-half of serum/plasma concentrations. Usual peak levels in serum for 1.75% or 3.55% THC marijuana cigarettes: 50 - 270 ng/mL at 6 to 9 minutes after beginning smoking, decreasing to less than 5 ng/mL by 2 hrs.	1.3	ng/mL	0.50	

Workorder 16238809 was electronically signed on 08/18/2016 09:34 by:

Susan B. Crookham

Susan Crookham,
Certifying Scientist