Montana Department of Justice
Forensic Science Division
Annual Report - 2020

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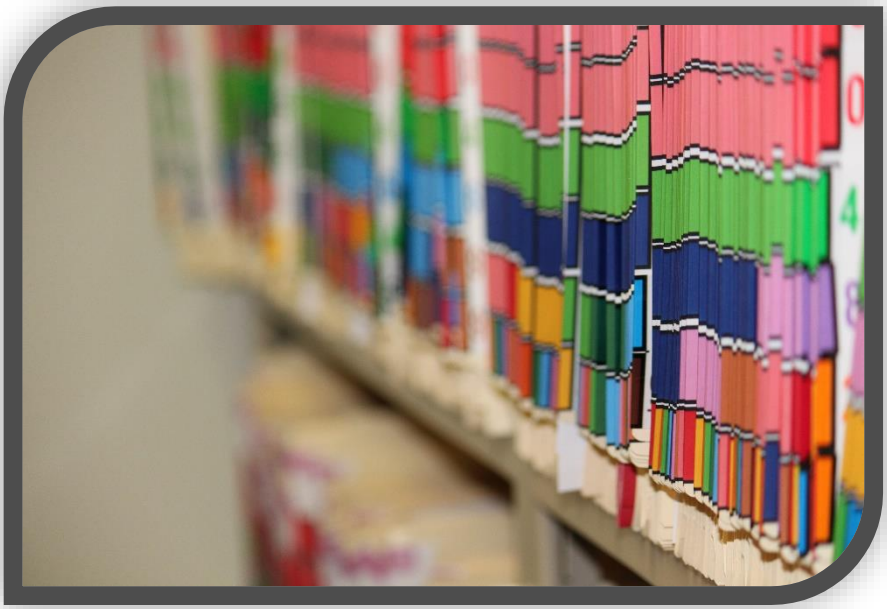


Contents

"If the law has made you a witness, remain a man of science. You have no victim to avenge, no guilty or innocent person to convict or save – you must bear testimony within the limits of science."

Dr. P.C.H. Brouardel
French Pathologist
1837-1906

Executive Summary

The Forensic Science Division was met with many challenges in 2020 between Covid-19 response, increasing case submissions, and time spent completing new initiatives. Our Medical Examiner System worked closely with various state agencies on fine tuning a mass disaster response plan due to Covid-19. With help from the DOJ IT Division providing laptops and VPN access our lab was able to start performing remote work within two weeks of the initial national outbreak.

In 2020, the Medical Examiner System completed a two-year project by becoming accredited by the National Association of Medical Examiners (NAME). The purpose of this program is improving the quality of medicolegal death investigation in Montana. Its goal is to improve the systems performance through objective evaluation and constructive criticism. All six forensic disciplines under the Division are now accredited by national or international associations. The laboratory continues to provide an expanded array of testing to fit the needs of our stakeholders. Providing accurate and objective analysis is part of our mission that can never be compromised and is something we put forth a lot of effort in ensuring. We also understand that the timeliness of our results greatly benefits our stakeholders. Improving our turn-around times are always a focus and something we will continue to work on improving. This report presents an overview of the Division, as well as detailed information regarding each of the scientific sections of the laboratory. I believe our team provides a great service to the criminal justice system and the citizens of Montana.

Scott Larson, Administrator

Forensic Science Division

The Forensic Science Division (FSD), better known as the State Crime Lab, is one of eight Divisions within the Department of Justice. It was established in Montana Code in 1977.

Our Mission is to provide ***accurate, objective, and timely forensic analysis*** in support of the Montana criminal justice community.

The Division has facilities in both Missoula and Billings. The Missoula facility has the following disciplines: medical examiners, DNA/serology, toxicology, chemical analysis, latent prints, firearms/toolmarks, quality assurance, and evidence sections. The Billings facility has the following disciplines: medical examiners, chemical analysis, and evidence sections.

Staff

The Lab continues to recruit a variety of scientists and staff with a broad range of skill sets to contribute to our mission. We have thirty-four scientists, four medical examiners, and nine administrative/support staff.

DOJ Governor's Award Nominee

The Forensic Science Division performs a multitude of scientific analyses for stakeholders across the state. An unseen and all too often underappreciated component of this work is the detail-oriented and crucial initial intake of evidence. This involves the collection, documentation, storage, and tracking of all the forensic evidence that enters and exits the laboratory. Alysa Nichols is the Evidence Technician in the Missoula facility. She works directly with various clients to accept roughly 27,000 individual pieces of evidence per year. It is imperative that information is entered promptly and without errors, at which Alysa excels. In addition, she effectively communicates any submission issues with evidence both internally and externally. She is a very valuable, reliable employee and is essential for our Division to successfully perform the work expected on behalf of the State.

Laboratory Accreditation

Accreditation is the process by which forensic laboratories throughout the world demonstrate they operate to a set of quality assurance standards. In July of 2020, the Division underwent an off-site ANAB ISO/IEC 17025 inspection which was scheduled as part of our accreditation process. The prior year we hosted eleven scientists in six disciplines from across the country as they assessed the quality of our testing and quality programs. By continuing to pass our annual inspections, we now hold accreditation until November of 2023.

The Lab was originally accredited under ASCLD/LAB's Legacy program in 2005. In 2010, we attained a higher level of accreditation to ISO/IEC 17025 standards for testing laboratories, which are the current standards for forensic labs, as well as ASCLD/LAB-*International* Supplemental Requirements. In 2017, the Breath Alcohol Section was accredited to ISO/IEC 17025:2005 standards for calibration laboratories. ASCLD/LAB merged with ANAB in 2016.

In 2020, the Medical Examiner System completed a two-year project by becoming accredited by the National Association of Medical Examiners (NAME).

Outreach

Our interactions with a broad cross-section of legislators, citizens, citizen groups, and criminal justice agencies and organizations across Montana continue to be a focus of our Division. Due to COVID-19 our involvement with these groups was considerably less than in previous years. We look forward to increasing our presence in the upcoming year. Historically lab representatives attended conferences or met with boards for the Montana Sheriffs and Peace Officers

Association, the Montana Association of Chiefs of Police, the Montana County Attorneys Association, the Montana Coroners Association, and the Attorney General's Law Enforcement Advisory Committee. When requested the Division holds open house events for legislators and the public and provides regular tours for the public. Historically our staff spends over 300 hours training law enforcement, prosecutors, defense attorneys, judges, and the public in matters tied to the forensic sciences.

National Matters

The Organization of Scientific Area Committees (OSAC) for Forensic Science works to strengthen the nation's use of forensic science by facilitating the development of technically sound forensic science standards and by promoting the adoption of those standards by the forensic science community. These standards are written documents that define minimum requirements, best practices, standard protocols, and other guidance to help ensure that the results of forensic analysis are reliable and reproducible. The Lab is proud to have personnel that have served on national committees critical to the advancement of technological standardization of forensic sciences.

Forensic Science Laboratory Advisory Board

The Forensic Science Laboratory Advisory Board was established in 1996 by Attorney General Joe Mazurek and has met nearly every year since. The Board serves as an advisory council and as an independent body to investigate complaints of negligence or misconduct. It also serves as a communication link between the Lab and its stakeholders. The board met in July via video an update and to discuss the general direction of FSD. Board members include:

- Attorney General Tim Fox
- District Judge Greg Pinski
- Yellowstone County Attorney Scott Twito
- Public Defender Division Administrator Peter Ohman
- DOJ's Division of Criminal Investigation Administrator Bryan Lockerby
- Bureau of Indian Affairs Assistant Special Agent-in-Charge William LeCompte
- Broadwater County Sheriff/Coroner Wynn Meehan
- Cascade County Sheriff/Coroner Bob Rosipal
- Yellowstone County Coroner Cliff Mahoney
- Fergus County Coroner Richard Brown
- Department of Corrections Quality Assurance Manager Kurt Aughney

We are grateful for the time and dedication of these members; their input helps improve the Crime Lab and its services.

Grant Funding

FSD takes advantage of federal grant funding whenever possible. In 2020, the following grants were received, totaling over $1.2 million. Without this financial assistance, many of these projects would not have happened.

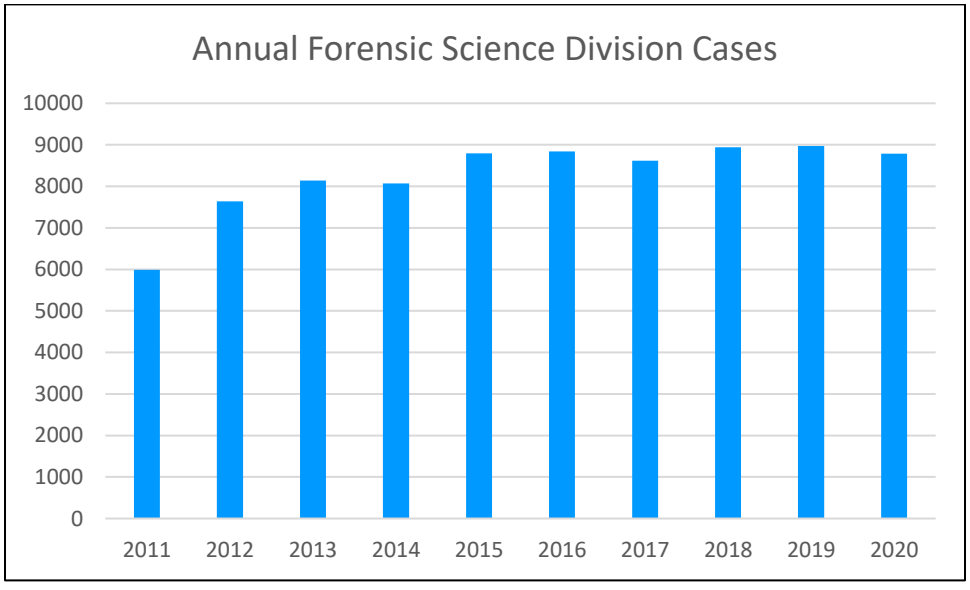
1. **BJA "Paul Coverdell Forensic Science Improvement" Grant**

- $264,968: Training/instrumentation/equipment/supplies/coroner education/Latent Print outsourcing/statistics software

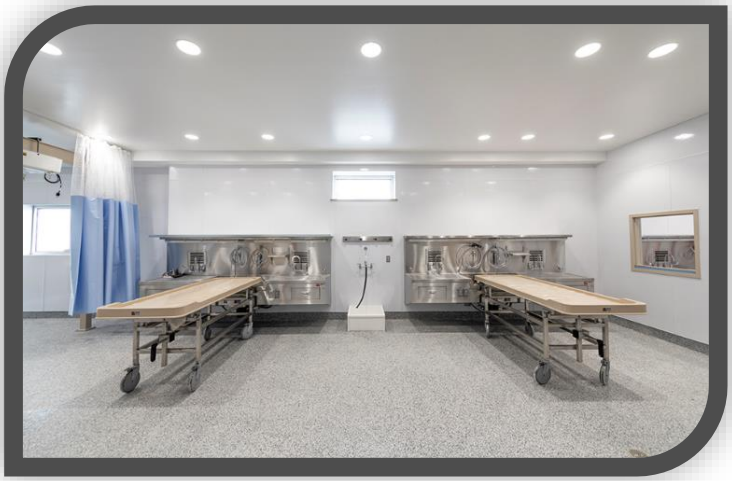
2. **BJA "DNA Capacity Enhancement and Backlog Reduction" Grant**
   - $487,181: Funding for personnel/training/supplies/outsourcing property crimes
3. **NIJ "National Forensic Science Center" Grant**
   - $85,346: Goals include the creation of a "Coroner Liaison", scholarships for hosting medical students interested in forensic pathology, and the development of national forensic training for law enforcement, attorneys, and judges.
4. **Centers for Disease Control "Overdose Data to Action (OD2A): Increasing Surveillance and Prevention to Reduce Opioid Misuse in Montana" Grant** *(awarded through the Montana Department of Public Health and Human Services)*
   - $186,662: Toxicology results portal into death case management system/drug-related autopsy reimbursement for counties/enhanced toxicology testing in complex postmortem cases/instrument maintenance
5. **BJA: Sexual Assault Kit Initiative (SAKI)" Grant** *(awarded through the Montana Department of Justice, Division of Criminal Investigations Division)*
   - $198,875: Outsourcing of 225 items of evidence in sexual assault cases from 2016-2018 that were never submitted to the laboratory.

Caseloads

As with many forensic labs nationwide, FSD has seen a steady influx in cases over the last decade. Cases can be further divided into requests for testing within specific sections. One case may generate multiple requests for services throughout the Lab or within a section. For example, a single handgun may involve test requests for the presence of latent prints, for DNA, and for firearms analyses. Cases can contain anywhere from one to more than one-hundred items of evidence. Section specific workloads are covered below.



State Medical Examiner's Office



In 2020, the Montana Medical Examiner's Office employed four forensic pathologists and two autopsy assistants. In late 2018, a new morgue facility in Billings was built; operations started in January of 2019. This new facility improved the efficiency and overall capabilities of the death investigation system.

The Medical Examiner's Office has focused on improving casework information and statistics. The Office releases an annual report, which summarizes annual case results based on manner of death, age of the decedent, deaths involving firearms, deaths attributable to alcohol or drugs, natural deaths, and report turn-around time performance. **The full report is available on the Montana Department of Justice's website under the Forensic Science Division tab.**

In 2020, we performed 747 postmortem examinations: 424 in Missoula and 323 in Billings. This represents a 27% increase over the last 3 years. Our pathologists responded to a limited number of scene investigations and recoveries. They also testified in court and gave educational presentations at the annual Montana Coroner Advanced and Basic Coroner trainings. In addition, consultations with coroners, law enforcement, county attorneys, organ and tissue procurement agencies, and funeral directors were common.

Staff

Dr. Robert Kurtzman	Chief Medical Examiner, Billings
Dr. Willy Kemp	Deputy Chief Medical Examiner, Billings
Dr. Sunil Prashar	Deputy Chief Medical Examiner, Missoula
Dr. Aldo Fusaro	Deputy Chief Medical Examiner, Missoula
Heather Krell	Autopsy Assistant, Missoula
Heather Beeler	Autopsy Assistant, Billings

Successes

1. Accredited by the National Association of Medical Examiners

Challenges

1. Statewide utilization of death case management system by county coroners

Toxicology Section

The Toxicology Section performs drug and alcohol testing in Driving Under the Influence cases (DUI or DUID), postmortem cases (assisting the medical examiner/coroner system in the determination of cause/manner of death), urinalysis testing (Department of Corrections probation/parole system and drug endangered children cases), and sexual assault cases. This section also oversees the breath alcohol calibration program, including maintaining and certifying the breath testing instruments used to detect the presence of alcohol in DUI cases. Section staff also provide over 300 hours of training per year to law enforcement, judges, prosecutors, and defense attorneys.

This report contains graphs/figures used to track the results on cases submitted by many agencies throughout Montana. This is not an exhaustive list of drugs detected and confirmed by the Lab; simply the most frequently confirmed drugs.

Staff

Beth Smalley, M.S., Toxicology Supervisor	April Mitchell, M.S., Forensic Toxicologist
Scott Schlueter, Forensic Toxicologist Diplomate-ABFT-FT	Gavin Lawson, Forensic Toxicologist
Michelle Evans, Forensic Toxicologist Diplomate-ABFT-FT	Ben Vetter, Breath Alcohol Manager
Eric Miller, Forensic Toxicologist Diplomate-ABFT-FT	Justin Lyndes, Forensic Toxicologist and Breath Alcohol Toxicologist
Crystal Everett, Forensic Toxicologist	Elizabeth Holom, Toxicology Technician
Doug Lancon, M.S., Forensic Toxicologist	

Successes

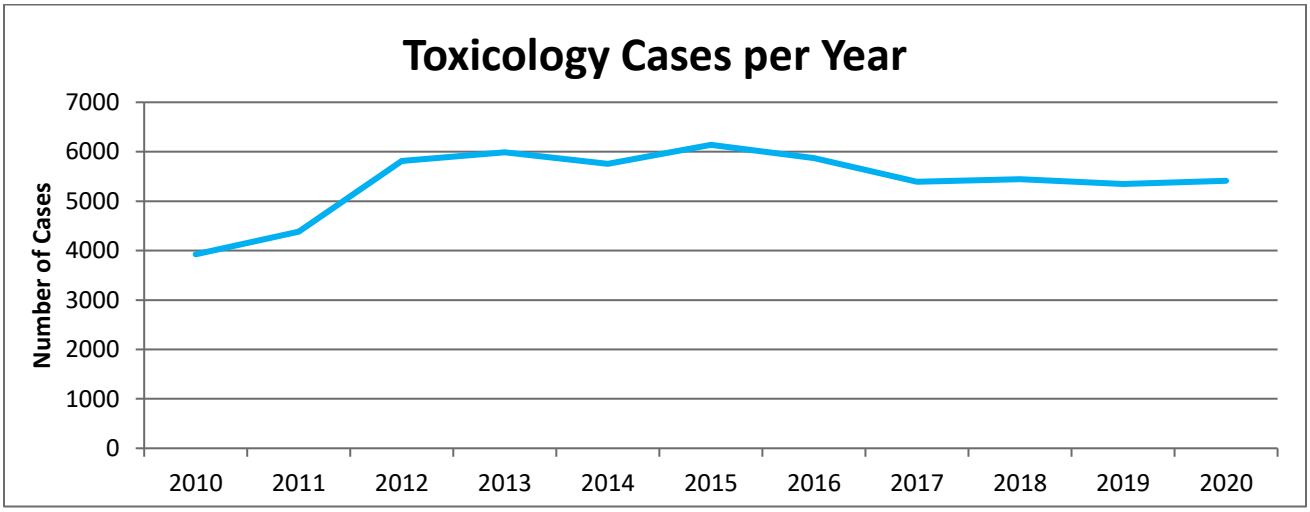
1. Validation of nine new methods and the installation of two new instruments.
2. Both sections have remained operational throughout the pandemic.
3. Utilization of video testimony lowered in-person appearances to thirty-five percent of our total court appearances. This was possible thanks to extremely reliable equipment and education for stakeholders like judges and prosecutors.
4. Support of staff pursuing personal/professional goals like graduate work.

Challenges

1. Increases in both postmortem and DUI submissions and an increase in case complexity, which means more analyst time spent per case.

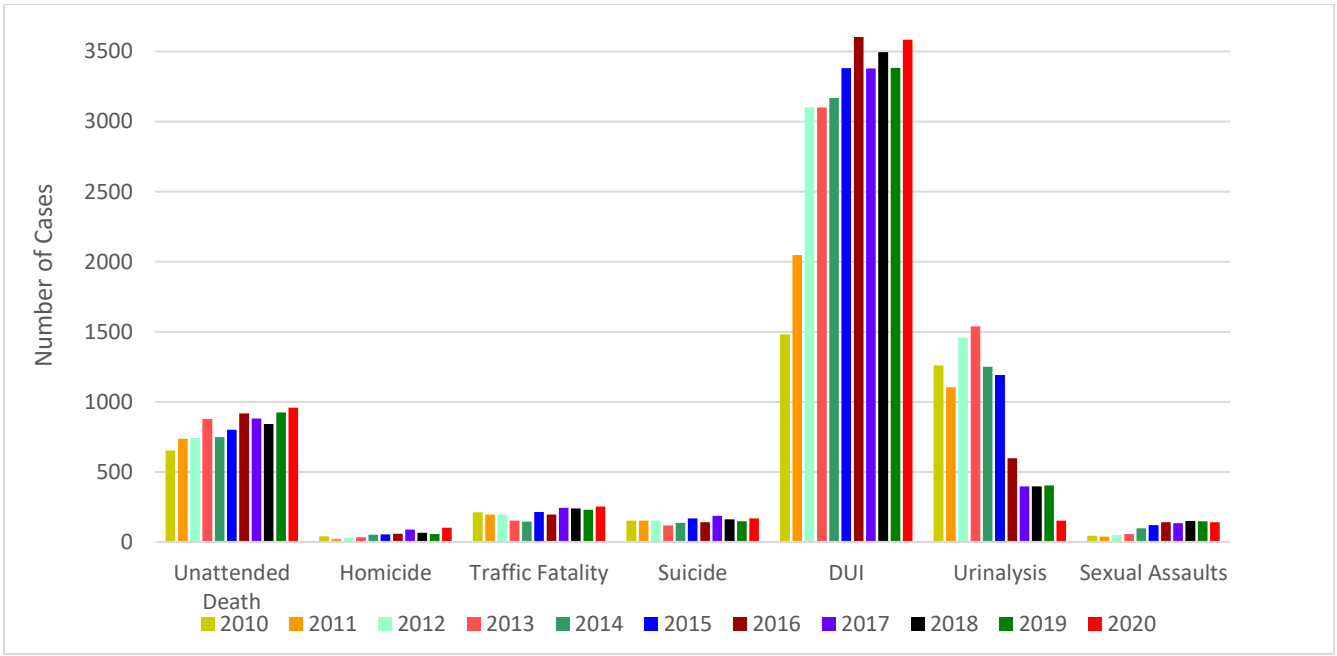
2. Several more methods are set for validation. In addition to validating new instruments, we intend to focus on methods for some emerging drugs in the region and a larger targeted panel.
3. Legalization of marijuana: its unknown impact to our case load and an emerging set of cannabinoids and products.
4. The toxicology section is outgrowing its space and will need to remodel the current space if new analysts are hired.
5. The breath alcohol group should receive finalized software for new instruments. This delay has pushed their implementation into late summer and early fall.

2010-2020 Total Toxicology Cases



Total cases are stable but decrease in UA and increase in PM. Much more difficult work to perform

2010-2020 Toxicology Results per Case Type



2020 Performance Summary

This chart reflects the median turn-around time and average number of cases per toxicologist for both Montana and national averages.

Type of Case	Median 2018	Median 2019	Median 2020	*Median National Average	2020 Cases per Montana Toxicologist	*Cases per National Average Toxicologist
Postmortem	30	39	**50**	60	**456**	141
DUI Drugs	40	47	**60**	57	**456**	174
DUI Ethanol	15	17	**25**	22	**1184**	827
Miscellaneous (UA, SA, DEC, etc.)**	27	31	**56**	Not Available	**688**	Not Available

***Numbers are based on **"Project FORESIGHT Annual Report, 2018-2019,"** from the Forensic Science Initiative, College of Business & Economics, West Virginia University
**UA= Probation/Parole, SA=Sexual Assault, DEC=Drug Endangered Children

Another standard metric within forensics is determining the percentage of cases done within a given timeframe. The current goal at this laboratory is to complete 95% of the postmortem cases within 75 days; DUI drug cases within 75 days; DUI ethanol-only cases within 30 days; and urinalysis cases within 60 days. This demonstrates that most of the cases are completed within a timeframe that fulfills our mission.

Type of Case	95% of cases completed in this timeframe			
	2017	2018	2019	2020
Postmortem	68 Days	68 Days	75 Days	90 Days
DUI Drugs	90 Days	75 Days	77 Days	93 Days
DUI Ethanol	25 Days	27 Days	28 Days	47 Days
Urinalysis	59 Days	57 Days	58 Days	73 Days

Drugs of Interest

Note: It is important to recognize that a drugs presence in a postmortem death does not necessarily mean that it was part of the cause of death. That determination is done by the Medical Examiners and coroners as part of the death certificate.

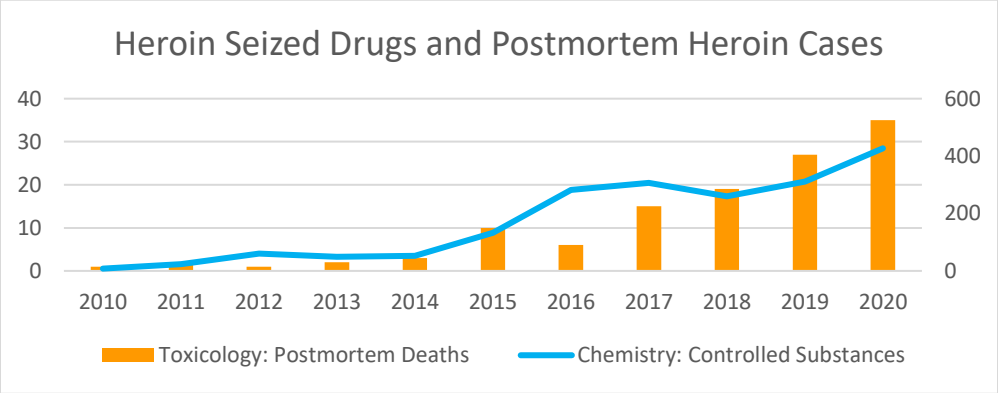
Methamphetamine: Methamphetamine, a central nervous system stimulant, has been very prevalent in Montana over the last several years. In 2020, there was a substantial increase in the identification of methamphetamine in postmortem cases (88 in 2019 and 191 in 2020). Methamphetamine intoxication was listed by the medical examiner as the cause of death in 27 cases and in 27 mixed drug intoxications. It was also found in 30% of all drug driving under the influence cases receiving full drug screens, an increase from 23% in 2019.

Case Type	2020 Cases	2019 Cases	2018 Cases	2017 Cases
Postmortem Deaths (Blood results only)	191 cases Mean: 1.57 mg/L Range: 0.02*-23 mg/L	88 cases Mean: 1.2 mg/L Range: 0.02*-9.9 mg/L	93 cases Mean: 1.5 mg/L Range: 0.02*-54 mg/L	77 cases Mean: 0.9 mg/L Range: 0.02*-12 mg/L
DUID	408 cases Mean: 0.35 mg/L Range: 0.02*-3.8 mg/L	302 cases Mean: 0.39 mg/L Range: 0.02*-3.0 mg/L	319 cases Mean: 0.35 mg/L Range: 0.02*-3.3 mg/L	310 cases Mean: 0.33 mg/L Range: 0.02*-2.2 mg/L

Heroin: Since 2014, Montana has experienced a significant rise in heroin cases.

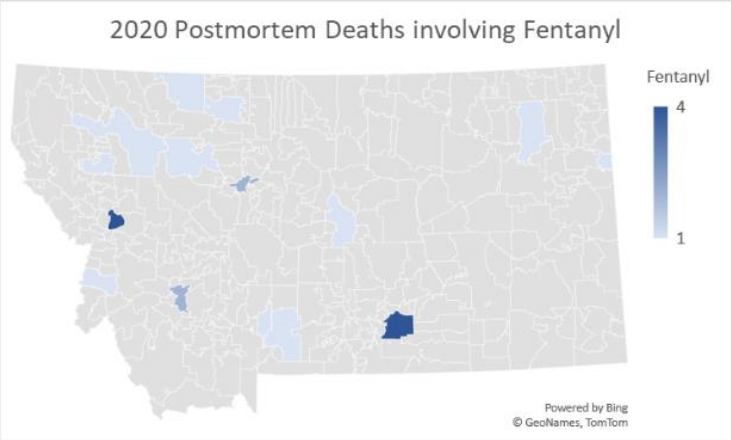
Case Type	2020	2019	2018	2017	2016	2015	2014
Postmortem Deaths	35	27	19	15	6	10	3

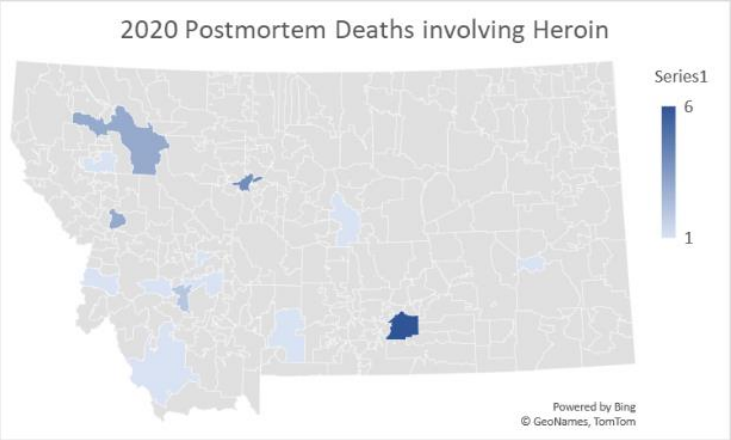
This graph compares Montana's postmortem cases involving heroin (left axis and bar graph) versus the number of cases that the Chemistry Section identified it in seized drug cases (right axis and line graph). It illustrates that increased availability of heroin leads to increased prevalence in Toxicology cases.



Fentanyl: While still prescribed and used in hospital settings, fentanyl has become increasingly available on the illicit markets. Fentanyl is a synthetic opiate narcotic analgesic and is 40-50 times more potent than heroin. There was a 116% increase in postmortem fentanyl cases from 2019 to 2020.

Case Type	2020 Cases	2019 Cases	2018 Cases	2017 Cases
Postmortem Deaths (Blood results only)	41 Mean: 9.35 ng/mL Range: 0.6-48 ng/mL	19 Mean: 10 ng/mL Range: 2.9-31 ng/mL	11 Mean: 13 ng/mL Range: 0.83-29 ng/mL	10 Mean: 6.2 ng/mL Range: 0.6-16 ng/mL
DUID	12	8	1	2





Gabapentin: Gabapentin is a central nervous system depressant and a prescription drug that has been increasingly reported as a drug of abuse in the last few years. There was a 190% increase in postmortem gabapentin cases from 2019 to 2020. The lab has plans to validate an in-house method for this drug in 2021.

Case Type	2020 Cases	2019 Cases	2018 Cases	2017 Cases	2016 Cases
Postmortem Deaths	61	21	38	42	17
DUID	5	2	3	3	2

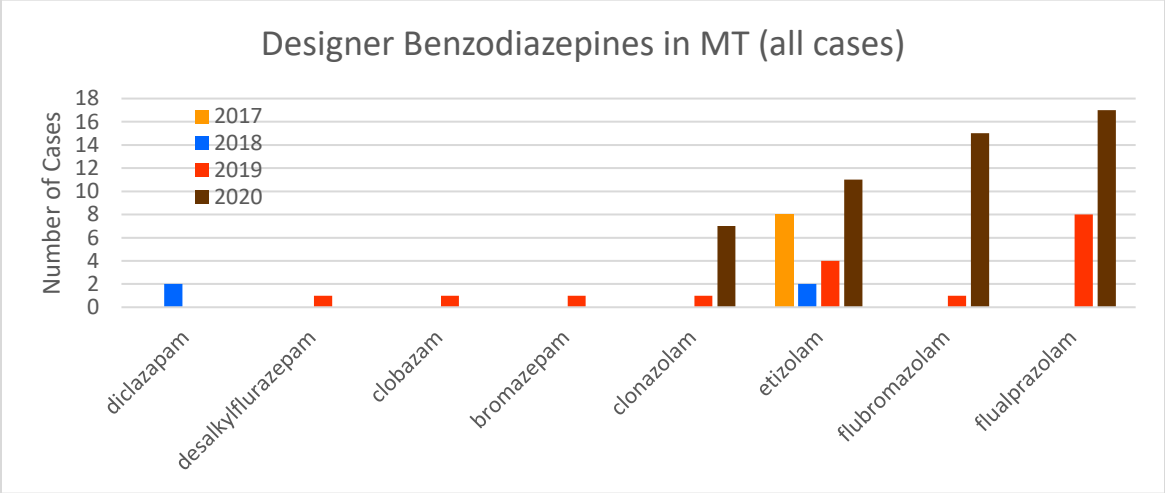
Mitragynine (Kratom): Extracted from the leaves of plants commonly found in southeast Asia and marketed as a supplement, Kratom can be legally purchased in Montana. In 2016, the DEA decided against scheduling this compound while obtaining more data on its potential medical uses. The Lab saw a substantial increase average concentration of mitragynine in postmortem cases in 2020.

Case Type	2020 Cases	2019 Cases	2018 Cases	2017 Cases	2016 Cases
Postmortem Deaths (Blood results only)	15 Mean: 1351 ng/mL Range: 20-4200 ng/mL	14 Mean:538 ng/mL Range: 21-2600 ng/mL	4 Mean: 737 ng/mL Range: 490-960 ng/mL	7	4
DUID	10	17	6	2	2

Novel Psychoactive Substances (NPS): This term refers to a subclass of drugs that are structurally similar to controlled substances with comparable pharmacodynamics effects. Typically, these drugs are illicitly manufactured and have no approved medical uses. Because these drugs are constantly changing and testing for many of these drugs is not standard, we must rely heavily on investigative information for detection.

Designer Opiates: In 2013, a national increase in synthetic opiate deaths began. This trend hit Montana in 2016 - 2017 when there were overdose fatalities involving carfentanil, furanyl-fentanyl, and U-47700. There were no confirmed cases in 2018, 2019, or 2020 despite targeted testing in high-risk cases with a newly developed in-house panel in 2020.

Designer Benzodiazepines: Designer benzodiazepines are the fastest growing category of detected NPS in Montana. These drugs are central nervous system depressants that are typically not available as prescriptions in the United States. A comprehensive panel was developed and validated in 2019, which has underscored their prevalence.



Tetrahydrocannibinol/THC (Marijuana): In 2020 voters approved an initiative to legalize use of marijuana. It has yet to be determined the impact this will have on THC testing and case submissions. The number of DUI cases testing positive for marijuana or its metabolites has increased 87% since 2017. The average THC concentration in those cases has trended upward over the last four years.

Case Type	2020 Cases	2019 Cases	2018 Cases	2017 Cases
DUID	530 cases Mean: 9.99 ng/mL Range: 1-197 ng/mL Concentration / % of Cases: 1-2.99 ng/mL — 29% 3-4.99 ng/mL — 17% 5-9.9 ng/mL — 22% 10-19.9 ng/mL — 20% >20 ng/mL — 12%	464 cases Mean: 9.4 ng/mL Range: 1-75 ng/mL	454 cases Mean: 8.6 ng/mL Range: 1-160 ng/mL	284 cases Mean: 7.8 ng/mL Range: 1-47 ng/mL

Summary of Alcohol and Drug Prevalence in Drivers *(including fatal crashes)*

*In 2013, a laboratory policy was implemented, determining drug testing in DUI cases only *if requested* and the blood alcohol was less than 0.100 g/100mL. Case reports are released with a note stating that no drug testing was performed, and customers may request testing by contacting the section. This policy continues to be necessary to manage increased workloads and to reduce reporting delays for the majority of DUI cases. Cases involving a drug recognition expert (DRE) or a fatal crash are exempt from this policy.

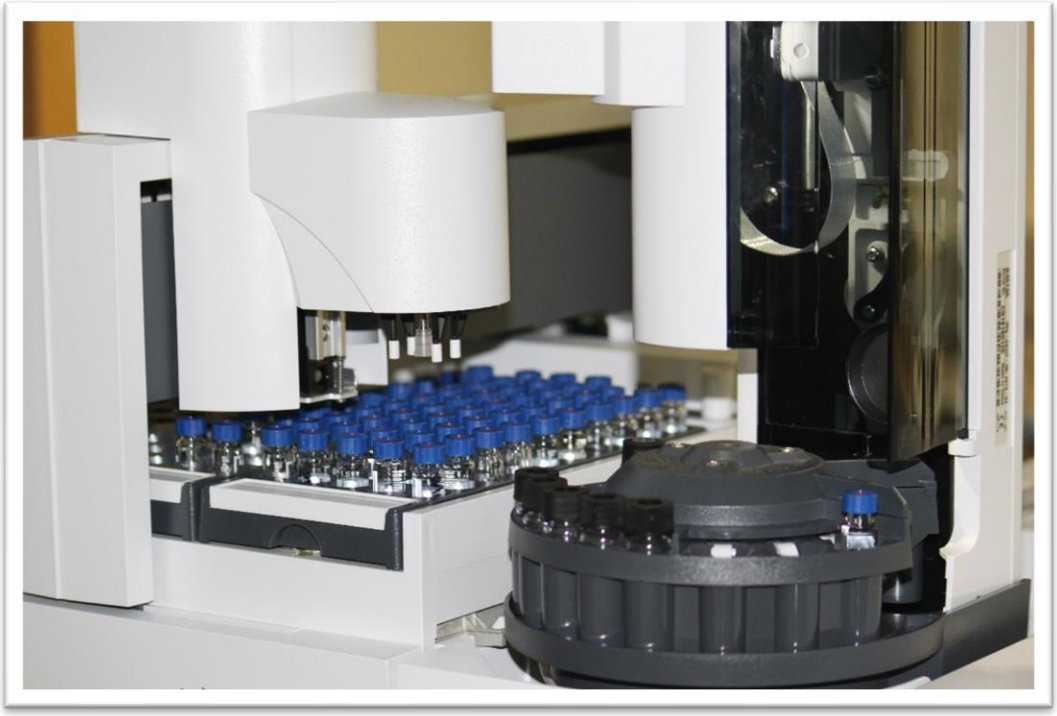
To request quarterly updates of this summary, email michelle.evans@mt.gov.

Alcohol and Drug Prevalence in Driver Blood Samples *(includes fatal crashes)*	
Blood Samples Submitted	3809
Blood Samples tested for drugs other than alcohol (drug)*	1438
Blood Samples Positive for Alcohol	74%
Blood Samples Positive for Drug(s) other than Alcohol*	29%
Alcohol Detected Only*	66%
Alcohol + Drug(s)*	9%
Drug(s) Detected Only*	11%
No Drug(s) or Alcohol Detected	4%
BAC Greater than 0.100%	65%
BAC 0.020% - 0.100%	10%
Average BAC	0.181, Range: 0.020-0.492 g/100mL

Most detected Drugs*

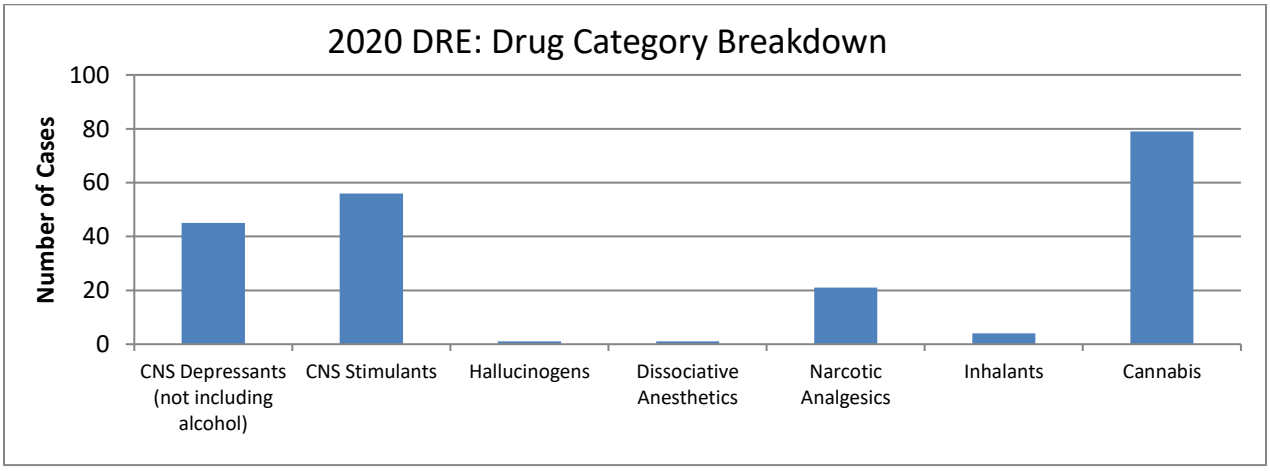
1. Cannabinoids** – 18% (all), 49% (drug)
    a. THC – 15% (all), 40% (drug) (THC: Avg = 10.4 ng/mL, Range: 1.0–197 ng/mL)
2. Methamphetamine – 11% (all), 30% (drug) (Avg = 0.364 mg/L, Range: 0.02-3.8 mg/L)
3. Citalopram/Escitalopram (Lexapro) – 2% (all), 4% (drug) We do not currently quantitate this drug
4. Diphenhydramine (Benadryl)– 1% (all), 3% (drug) (Avg = 0.182 mg/L, Range: 0.020-1.2 mg/L)
5. Clonazepam (Klonopin) – 1% (all), 3% (drug) (Avg = 0.048 mg/L, Range: 0.021-0.16 mg/L)
6. Lorazepam (Ativan) – 1% (all), 3% (drug) (Avg = 32.7 ng/mL, Range: 2.3-87 ng/mL)
7. Morphine – 1% (all), 3% (drug) (Avg = 0.108 mg/L, Range: 0.027-0.65 mg/L)
8. Alprazolam (Xanax) – 1% (all), 2% (drug) (Avg = 0.086 mg/L, Range: 0.021-0.22 mg/L)
9. Diazepam (Valium) – 1% (all), 2% (drug) (Avg = 0.314 mg/L, Range: 0.024-0.98 mg/L)
10. Methadone – 1% (all), 2% (drug) (Avg = 0.405 mg/L, Range: 0.067-1.03 mg/L)

**Cannabinoids includes any positive from THC, THC-COOH, or 11-OH-THC



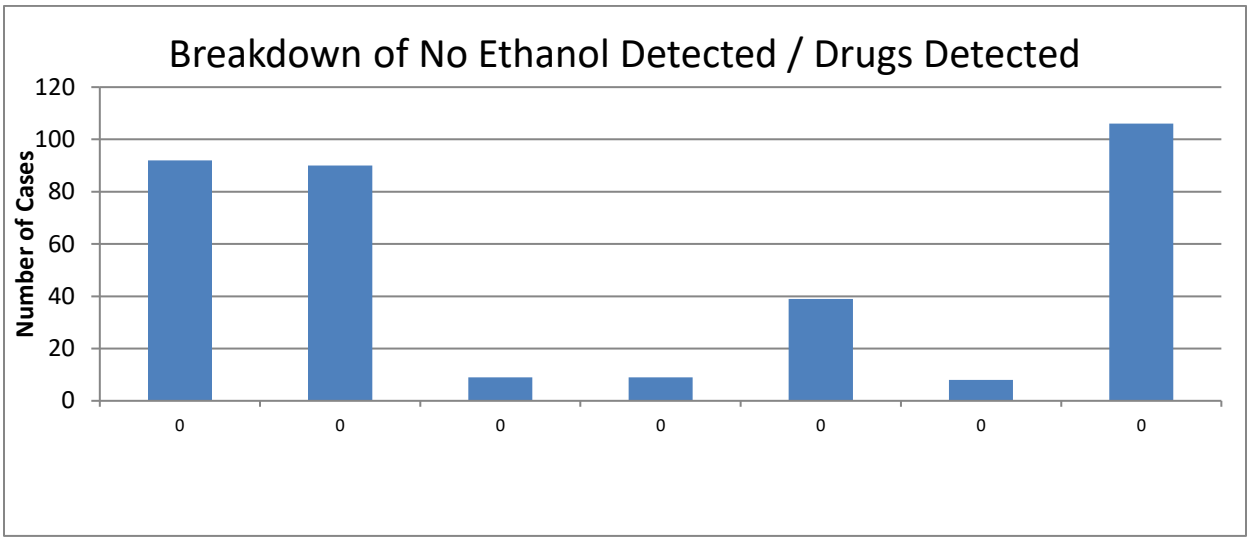
DRE (Drug Recognition Expert) Summary

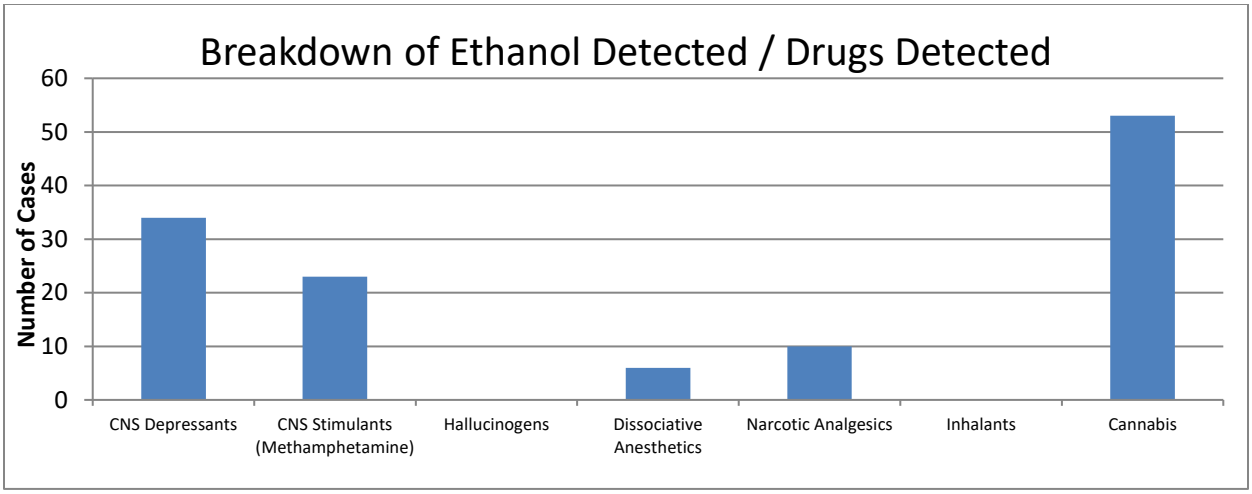
Drug testing is performed on all DRE submitted cases. In 2020, 155 DRE cases were submitted. Some cases may be positive for multiple drugs.



Crash/DUI Summary

The Laboratory received 1,070 vehicle crash cases in 2020. The mean ethanol concentration was 0.183 g/100mL. The mean THC concentration was 7.1 ng/mL. Drug testing was performed on 363 of these cases. Some cases may be positive for multiple drugs. Ethanol is not included in the CNS depressant drug group below.



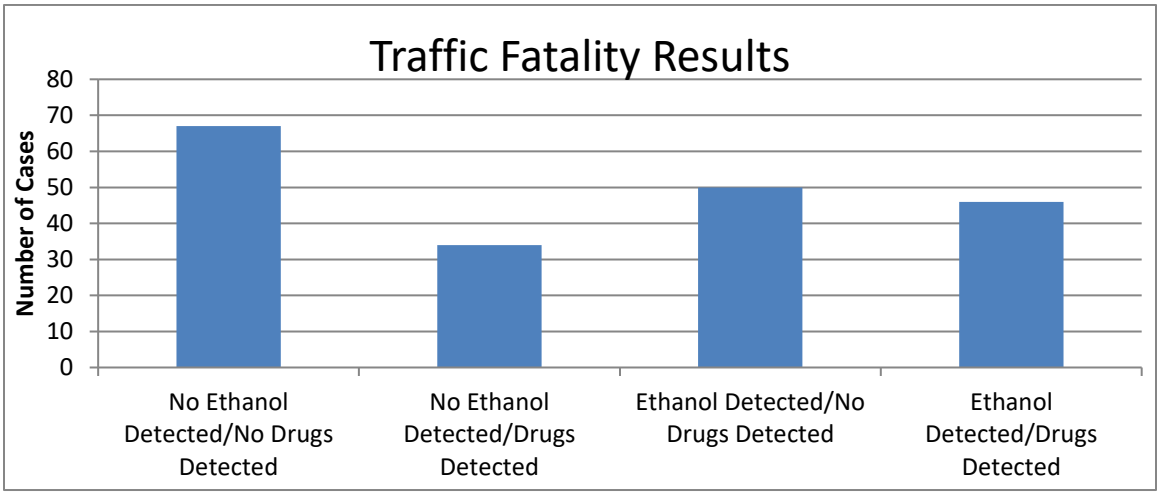


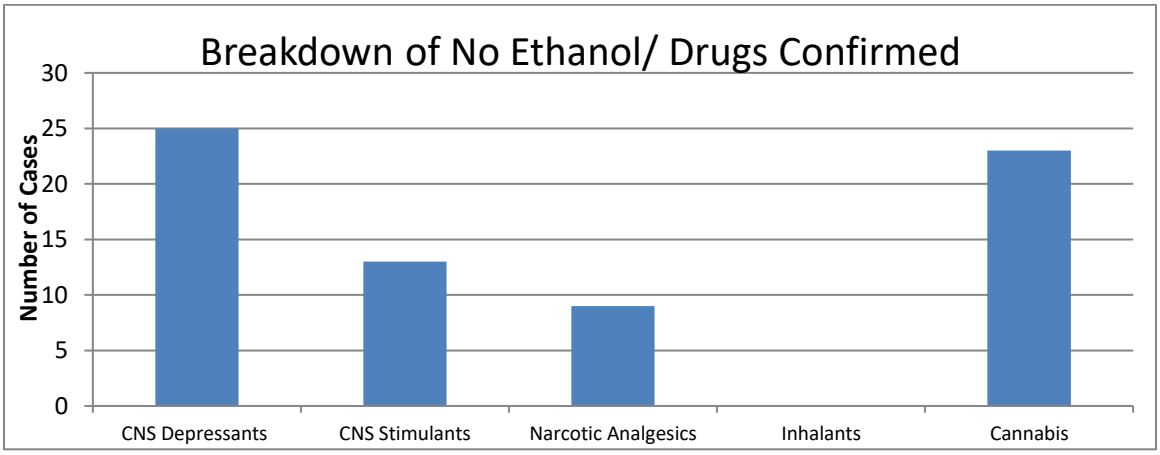
The combination of THC and alcohol poses a significant increase in the risk for impairment, even at low levels. Because these are the state's two most prevalent drugs, we will continue to monitor trends involving the combination. Drug testing is not routinely administered for cases with a BAC above 0.100 g/100mL (traffic fatalities are excluded from this policy).

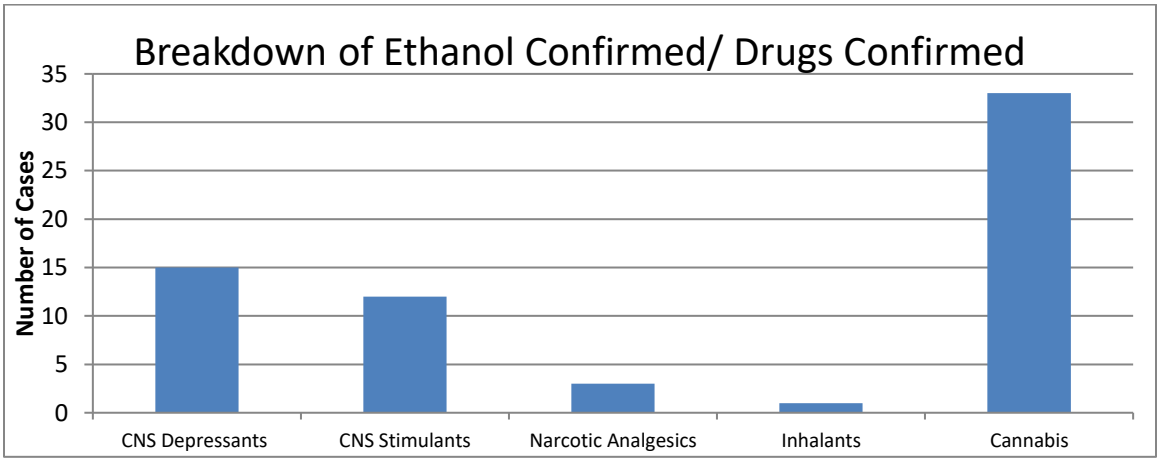
2020 Averages	DUI	Crash	Fatal	DUI + Crash + Fatal
Alcohol (g/100mL)	0.072	0.073	0.172	0.088
	+	+	+	+
THC (ng/mL)	6.8	6.6	10.4	7.5

Traffic Fatalities Summary

The Laboratory received 203 traffic fatality cases and performed toxicology testing on 199 cases. There is no distinction between a driver and a passenger in the following data. The mean ethanol concentration was 0.174 g/100mL in cases when it was detected. When it was detected, the mean THC concentration was 12.4 ng/mL. Some cases may be positive for multiple drugs. Ethanol is not included in the CNS depressant drug group below.

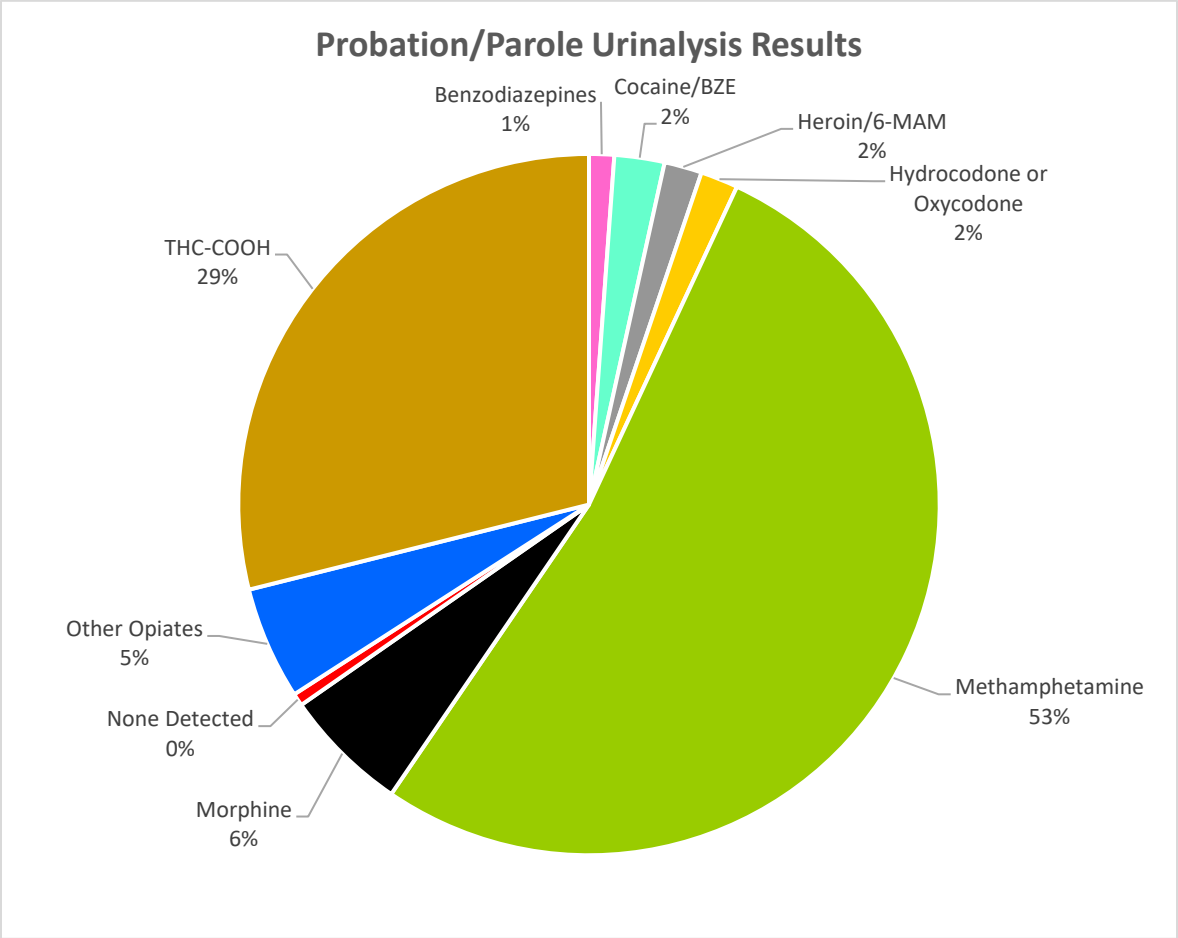

Traffic Fatality Results
Number of Cases
80
70
60
50
40
30
20
10
0
No Ethanol Detected/No Drugs Detected
No Ethanol Detected/Drugs Detected
Ethanol Detected/No Drugs Detected
Ethanol Detected/Drugs Detected

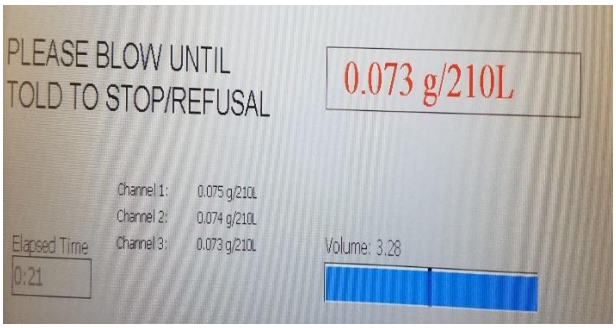

Breakdown of No Ethanol/ Drugs Confirmed
Number of Cases
30
25
20
15
10
5
0
CNS Depressants
CNS Stimulants
Narcotic Analgesics
Inhalants
Cannabis


Breakdown of Ethanol Confirmed/ Drugs Confirmed
Number of Cases
35
30
25
20
15
10
5
0
CNS Depressants
CNS Stimulants
Narcotic Analgesics
Inhalants
Cannabis

Probation/Parole Urinalysis Summary

We confirm drugs the submitting agency requested on the submission form based on their screening results. Due to policy changes at the Department of Corrections, submissions to the Laboratory have decreased over the last five years. In 2020, 152 cases were submitted. This chart outlines the drugs detected and the percentage found of each. Methamphetamine continues to be detected most often (53%) in this subset of cases.





Breath Alcohol Summary

Thanks to a grant administered by the Montana Department of Transportation through the Department of Justice and the National Highway Traffic Safety Administration, the Breath Alcohol Section purchased replacement breath instruments statewide. Validation of the Intoxilyzer 9000s will be completed in mid-2021 and deployed in the field later in the year. The new Intoxilyzer 9000 will offer more up-to-date features for officers in the field including windows operating environment, touch screen capability, and USB connectivity. It will also be able to capture multiple subject sample results from a single breath sample. More locations will have instruments, meaning shorter drives for law enforcement officers to administer tests in rural areas. Implementation of the new instruments will also result in multiple efficiencies to the Section, including data collection and the annual certification process.

The Section has three main duties it performs regularly. The first is the maintenance, repair, and calibration of all breath analysis instruments. These instruments are given to local, county, state, and federal law enforcement agencies statewide. Montana Administrative Rules require the return of all instruments to the Laboratory at least once a year for annual certification, which returns the instruments to above factory standards using the most modern forensic techniques available.

The second duty of the Breath Alcohol Section involves the training and recertification of all law enforcement officers. As part of their Montana Law Enforcement Academy requirements, all officers must pass a comprehensive 40-hour course in DUI detection, arrest, and processing. Officers from all types of law enforcement agencies, including local, county, state, and federal attend these courses. They include basic alcohol pharmacodynamics and pharmacokinetics, breath analysis instrument infrared theory and operation, and standardized field sobriety testing (SFST). All students are exposed to live alcohol dosed individuals for 'real world' hands-on training and must pass a written and practical test. This course typically has nearly 50 students and is offered at least five times each year. After achieving this level of certification, all officers must get recertified annually in order to maintain their DUI certification status.

The Section's third responsibility is to teach various groups across the state about breath alcohol testing, including prosecutors, defense attorneys, and judges. Additionally, Section personnel testify in court, for both the prosecution and the defense, in city, justice, district, and federal courts across Montana.

Chemical Analysis Section

The Chemistry/Trace Unit analyzes controlled substances, suspected clandestine laboratory evidence, and gunshot residue casework. Forensic chemists analyze samples seized in cases involving dangerous drugs and clandestine labs, including the identification of previously unseen analogues now flooding the recreational drug market. The advent of synthetic compounds and an increase in marijuana/hemp cases have increased case complexity. Since 2011, submissions to this section have more than doubled.

Staff

Misty Icard Section Supervisor – Billings ABC Board Certified	**Bahne Klietz** Forensic Chemist – Missoula ABC Board Certified
Mark Winslow Forensic Chemist – Billings	**Amber Trochta** Forensic Chemist – Missoula
Brook Knapp Forensic Chemist – Billings ABC Board Certified	**Travis Doria** Forensic Chemist – Missoula ABC Board Certified
Tanna Brown Forensic Chemist – Missoula ABC Board Certified	**Alyssa Stulz** Forensic Chemist - Missoula

Successes

1. Completed training of two new hires.
2. Outsourced 1326 items to Forensic Science Consultants (FSC) to reduce backlog to less than 60-day turn-around.
3. Validation of a derivatization method for NBOH compounds.
4. Implemented new program for tracking of critical reagents.

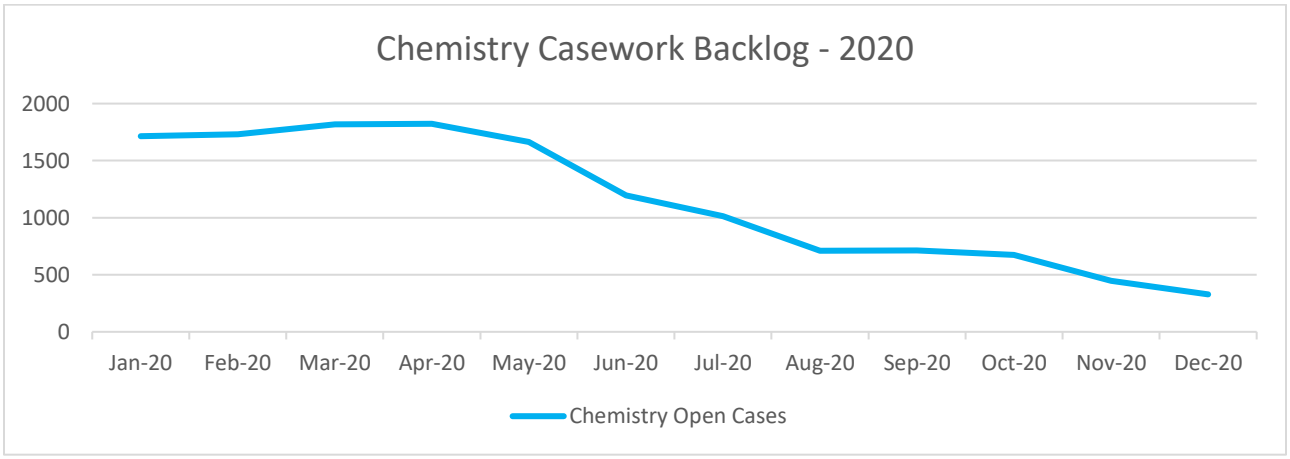
Challenges

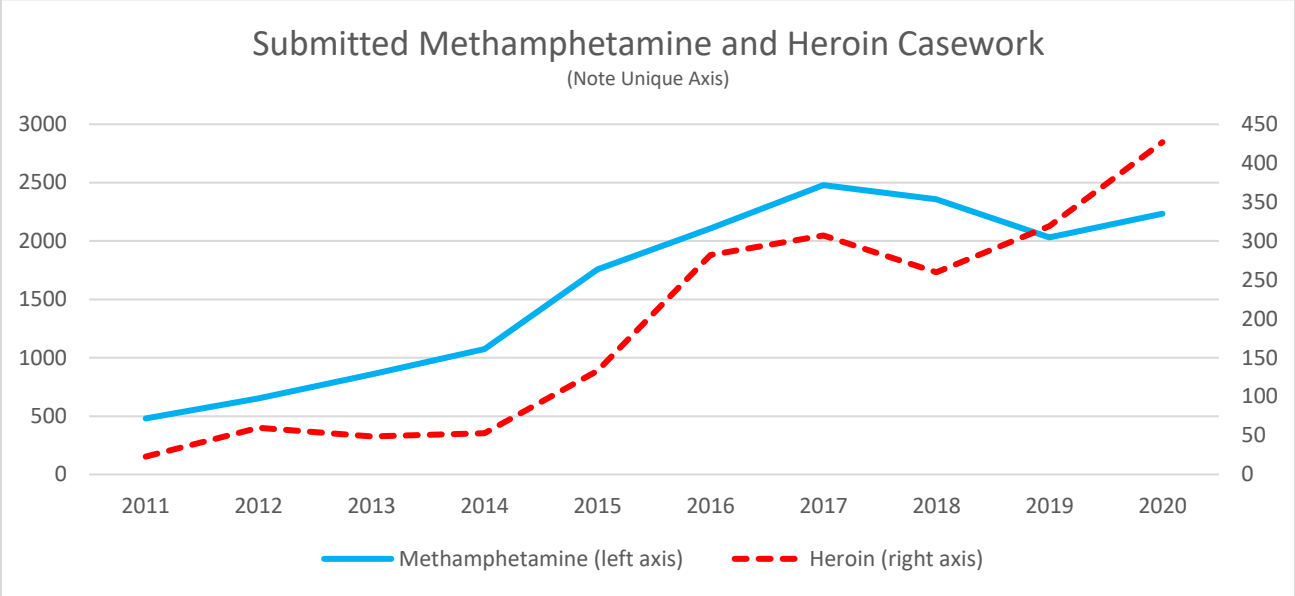
1. Maintaining current turn-around times in the midst of staff members on family leave.
2. New marijuana laws could affect the section, unsure at this time what the impact may be.

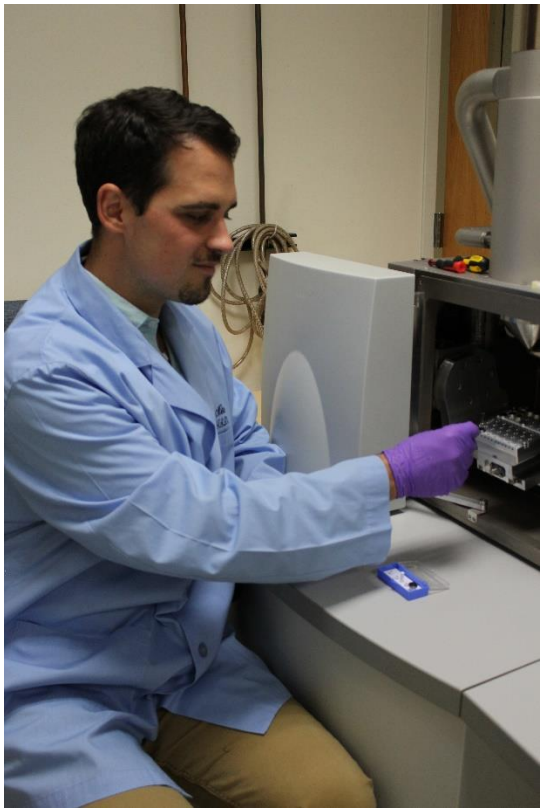
Casework Summary

Year	Number of Cases Submitted Missoula/Billings/Outsourced	Samples Analyzed	Beginning Year Backlog (Cases)	Turnaround Time for Year (Days)
2011	1375	1961	346	60
2012	1577	2149	320	104
2013	1348	1819	627	162
2014	1482	1854	1240	224
2015	2221	2772	1051	120
2016	2024/565	3392	560	67
2017	2047/911	3947	366	31
2018	1434/1323/2	3721	370	175
2019	1096/1239/264	3132	1528	195
2020	1114/754/826	3578	1747	141

Year	No Controlled Found	% No Controlled of Total	Meth	Heroin	Fentanyl	Hydrocodone	Oxycodone	Buprenorphine	Morphine	Cocaine	Synthetic Cannabinoids
2011	238	12.1%	480	23	6	84	117	19	49	104	11
2012	225	10.5%	651	60	4	103	87	19	45	50	30
2013	177	9.7%	858	49	5	75	72	14	27	37	3
2014	134	7.2%	1074	53	9	47	63	18	21	20	27
2015	169	6.1%	1758	133	4	37	65	21	26	49	16
2016	216	6.4%	2109	282	8	39	80	19	26	56	12
2017	249	6.3%	2479	307	20	52	56	44	22	68	14
2018	274	7.4%	2357	260	13	3	35	33	16	93	22
2019	202	6.4%	2032	319	10	5	23	26	17	45	9
2020	187	5.2%	2234	427	26	9	28	17	12	93	5







Forensic Chemist Travis Doria analyzes controlled substances in the Chemical Analysis Section.

Latent Print/Impression Evidence Section

The Latent Print/Impression Evidence Section analyzes evidence for the presence of latent fingerprints. Staff then compares them to known prints when possible. The Lab participates in Automated Fingerprint Identification System (AFIS), a fingerprint database.

Staff

Kaitlin Delphy Technical Lead Forensic Scientist IAI Board Certified
Stephanie Shappee Forensic Scientist IAI Board Certified

Successes

1. Work from home solution for section during 2020 helped keep section functioning smoothly
2. Ability to keep up with casework after the completion of the backlog project

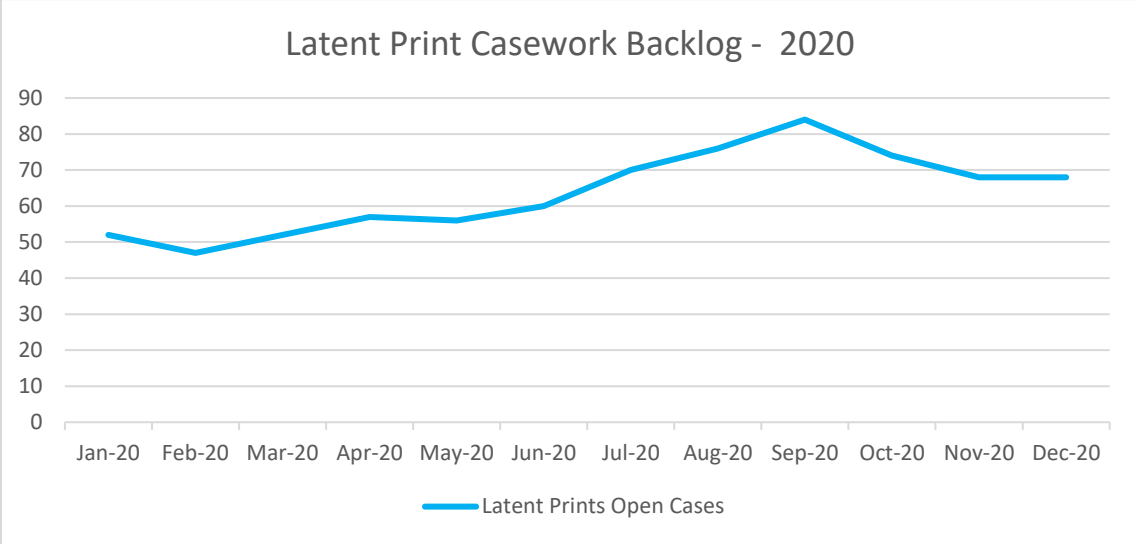
Challenges

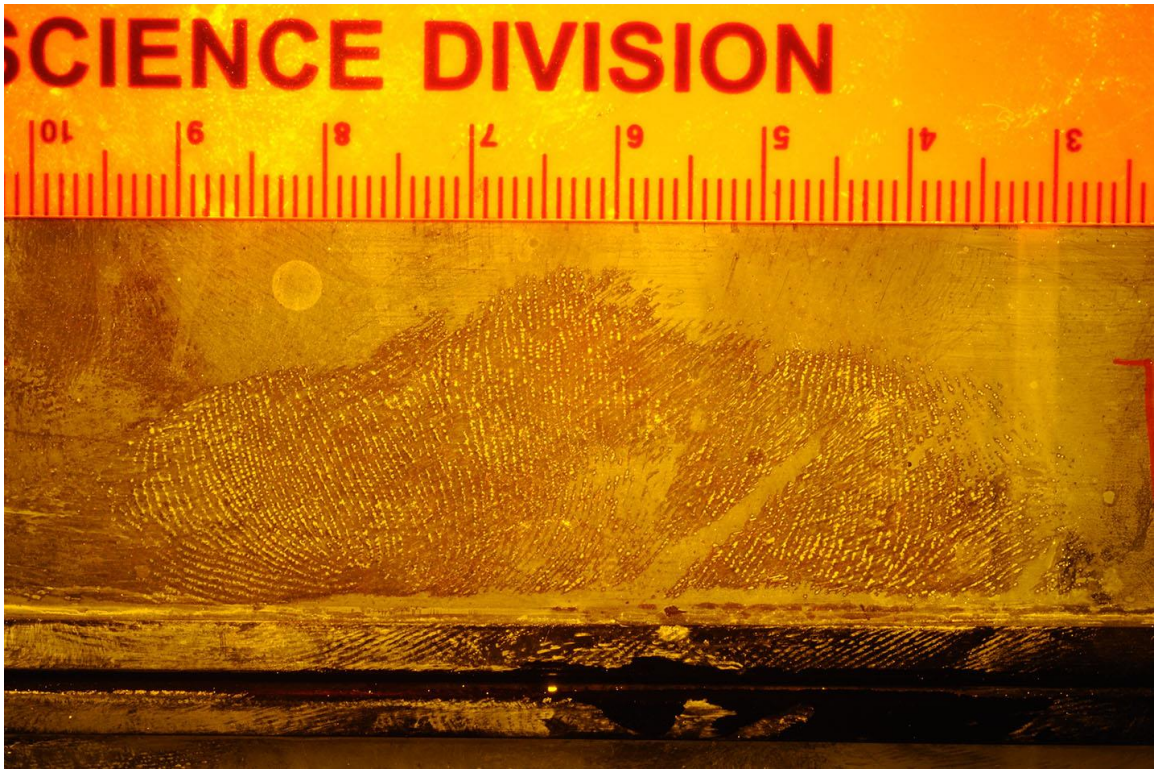
1. Delayed training on new equipment received in 2020 due to COVID.

Casework

Additional cases were outsourced during the last quarter of 2020 that has further helped the reduction of the backlog. The data is not reflected in the below table as these cases were not officially closed until 2021.

Year	2020	2019
Total cases submitted	240	164
Total cases completed	188 184 cases completed in-house 4 cases outsourced	323 152 cases completed in-house 171 cases outsourced
Median TAT (days)	68 (in house cases)	45 (in house cases)
95% of cases worked (days)	307 (Due to clearing out historic cases)	1,043 (Due to clearing out historic cases)


Latent Print Casework Backlog - 2020
90
80
70
60
50
40
30
20
10
0
Jan-20
Feb-20
Mar-20
Apr-20
May-20
Jun-20
Jul-20
Aug-20
Sep-20
Oct-20
Nov-20
Dec-20
Latent Prints Open Cases


SCIENCE DIVISION

Biology Section

The Biology Section provides quality, accurate, and timely analysis of evidence for the presence of biological fluids and further characterization of those samples using state of the art DNA technologies. Additionally, Section staff testify at trials regarding analysis conclusions.

Joe Pasternak, DNA Supervisor and Technical Leader
Megan Ashton, CODIS Administrator
Jamie Bray, DNA Analyst
Andrew Zeigler, DNA Analyst (in training)
Jen Revis-Siegfried, DNA Analyst* (part-time)
Lacey Van Grinsven, Serologist
Andrew Bishop, Serologist/CODIS Technician
Rachel Beddall, Serologist
Kate Kulgavyy, DNA Technician*
Phil Reiner, DNA Technician*
Nolan Cassell, DNA Technician
Kendra Henning, DNA Technician

**Position funded by federal grant*

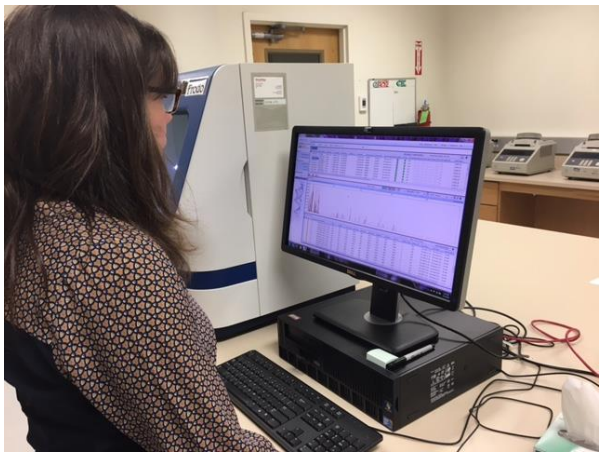
Successes

1. Validation of Y-STR analysis method for male specific DNA analysis. It will be implemented in the fall of 2021.
2. Male screening of sexual assault kits upon receipt.
3. Staff fully trained. Cross-training in progress for resiliency.

Challenges

1. Substantial increases in submitted cases for the third straight year that is outpacing increases in productivity.
2. Between new hires and cross-training, a total of 32 months (4 analysts) were spent in training and not performing casework.

Sexual Assault Kit Initiative (SAKI)



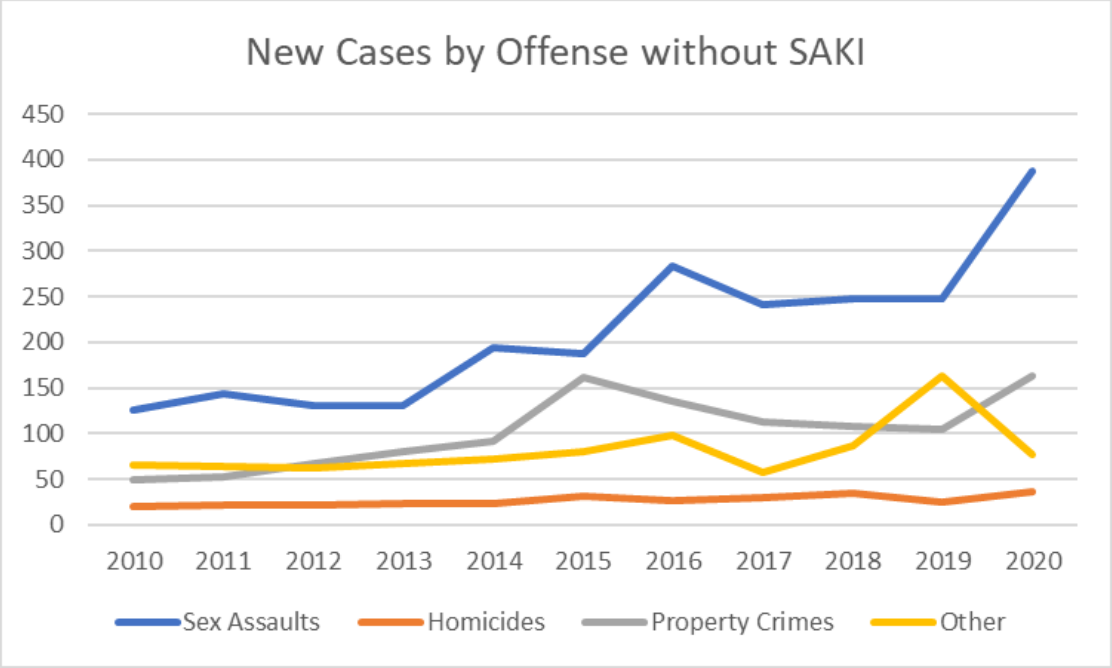
DNA Analyst Jamie Bray works on DNA profile data at the State Crime Lab.

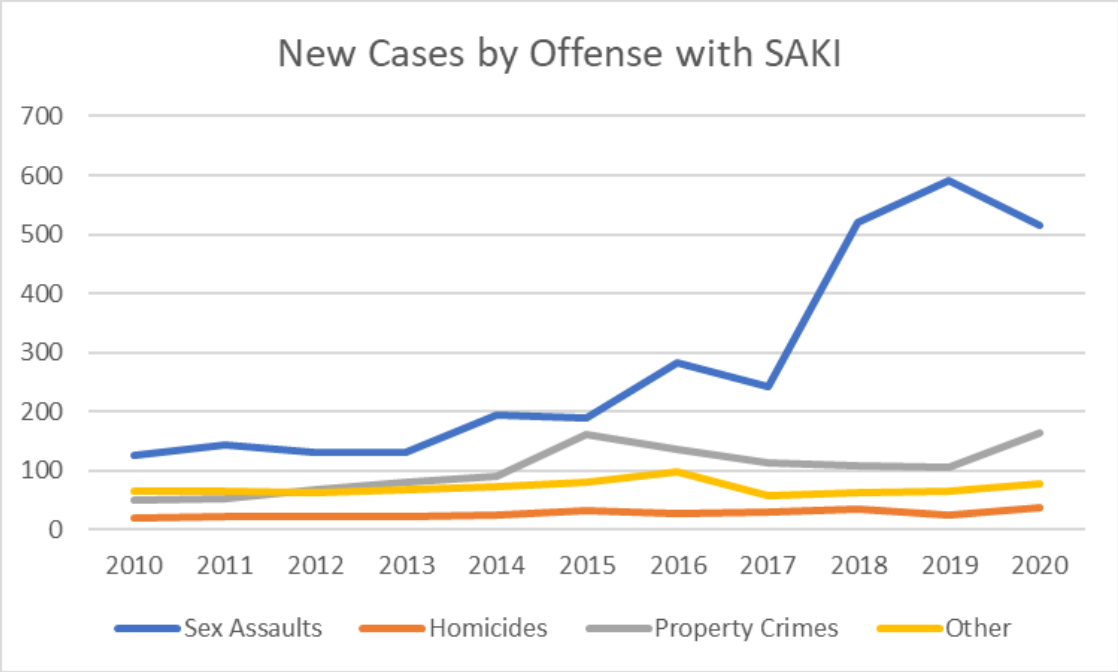
The statewide SAKI project has continued to move forward and produce many results. Statewide, 1,252 previously unsubmitted sexual assault kits were collected by DOJ's Division of Criminal Investigation and outsourced to a private lab for DNA analysis using grant funds. In addition, a statewide kit tracking system was developed; now, every kit can be tracked. The next phase includes the testing of 217 unsubmitted kits that originated between 2016-2018. A portion of these cases will be tested at FSD; however, the majority will be outsourced to a private lab through grant funding in 2021. The passage of SB52 required all sexual assault kits to be submitted to FSD, causing a large increase in the number of cases absorbed by this section.

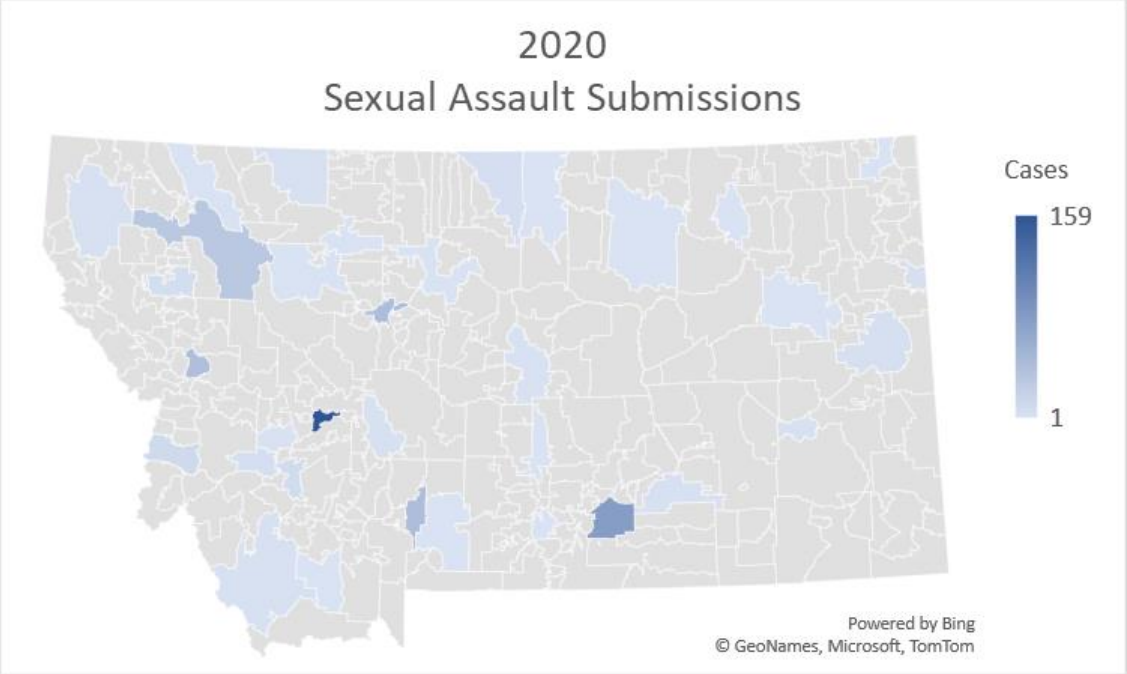
For SAKI cases, FSD is responsible for verifying CODIS eligibility of profiles, DNA profile entry into the CODIS database, reviewing and issuing reports regarding the CODIS entries, performing confirmation sample DNA analysis for CODIS hits, reviewing and issuing CODIS hit reports, and ultimately authoring and reviewing final DNA comparison reports for cases in which the perpetrator is identified. These SAKI processes are conducted by Section staff in addition to their other casework responsibilities.

Annual Case Submission

In 2019, casework submissions rose by 13%; this included a 26% increase in sexual assault cases. The following graph does not include 247 historical SAKI kits that were outsourced for analysis; however, follow up work was performed by our lab. These SAKI case results were submitted to us to verify CODIS eligibility of profiles, to enter DNA profiles into the CODIS database, and to review and issue reports regarding these entries. The Section also performed confirmation sample DNA analysis for CODIS hits, reviewed and issued CODIS hit reports, and ultimately wrote and reviewed final DNA comparison reports for those cases where the perpetrator is identified. FSD must acquire additional resources to keep pace with the Section's increased workload.

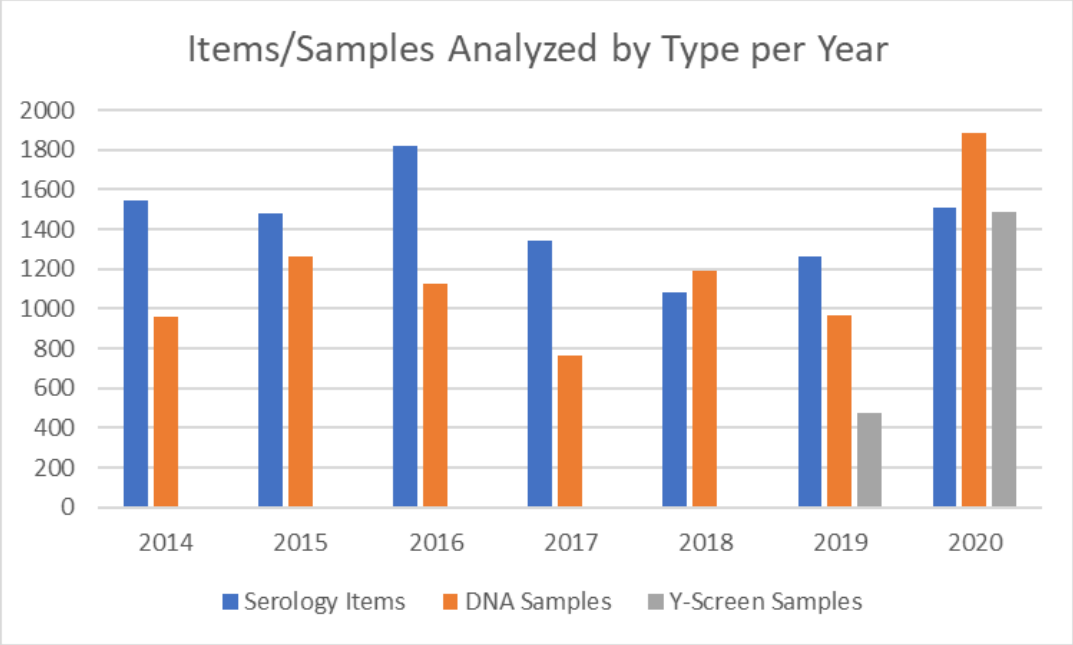

New Cases by Offense without SAKI
450
400
350
300
250
200
150
100
50
0
2010
2011
2012
2013
2014
2015
2016
2017
2018
2019
2020
Sex Assaults
Homicides
Property Crimes
Other


New Cases by Offense with SAKI
700
600
500
400
300
200
100
0
2010
2011
2012
2013
2014
2015
2016
2017
2018
2019
2020
Sex Assaults
Homicides
Property Crimes
Other



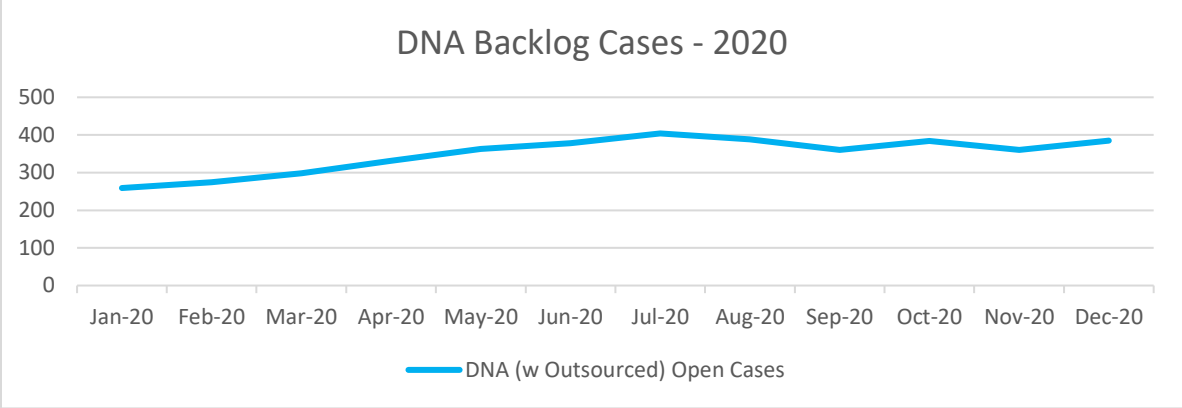
*Lewis & Clark County facilitates the SAKI program.

Most case submissions consist of multiple items or samples requiring analysis. This chart represents the volume of items and samples worked by type each year:



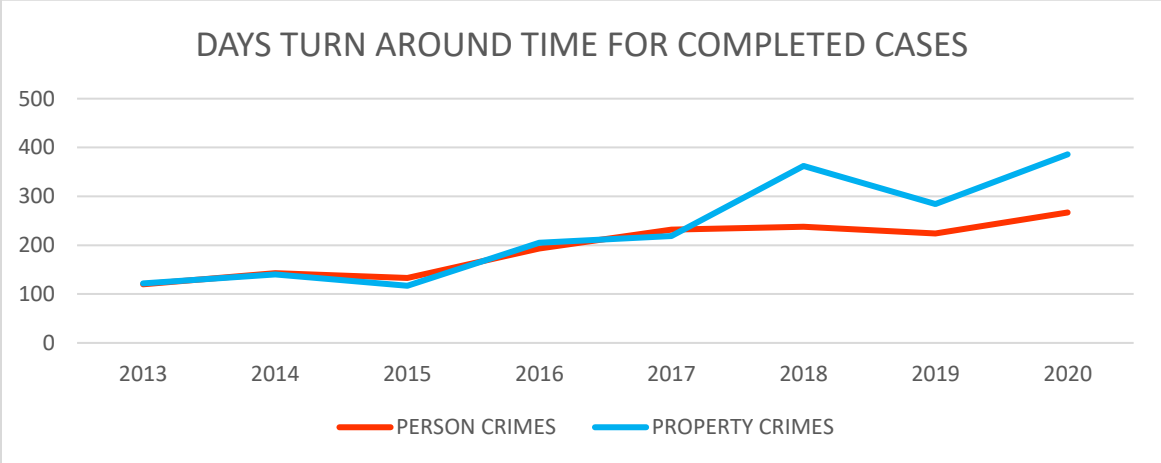
DNA Backlogged Cases

Due to an increase in case submissions and a 25% decrease in staffing, the DNA backlog rose in 2019. By mid-2020, the Section was completely trained, and this trend has started to decrease.



Turnaround Times

Increasing turnaround times are correlation increases in submitted cases; it takes time to ramp up production through new instrumentation and/or staff.



CODIS

The CODIS database allows forensic laboratories the ability to compare DNA profiles from one case to another and also to known offenders. The Sexual Assault Kit Initiative (SAKI) program has created a large increase in the number of profiles entered into the database and the resulting positive comparisons or hits. Theoretically, this will lead to more violent crimes being solved in the future. This increased work is very time consuming and comes at the expense of new casework and CODIS offender sample processing due to staffing limitations.

CODIS Totals – Casework and SAKI

	2020	**2019**	**2018**	**2017**
Casework Forensic Unknowns	189 (58 Outsourced, non-SAKI	71	124	105
SAKI Only Forensic Unknowns	15	237	129	N/A
Total Profiles Entered	**204**	**308**	**253**	**105**
CODIS HITS	**86 (6 SAKI)**	**140 (107 SAKI)**	**138 (41 SAKI)**	**31**

Firearms/Toolmarks Section

The Firearms/Toolmark Section examines firearms and ammunition from crime scene evidence. In addition, its staff examines toolmarks by request. They can determine whether a bullet was fired from a particular gun, and whether a particular tool was used at a crime scene. Within a certain range, they can estimate the distance between a gunshot victim and the gun.

Staff

Travis Spinder Section Supervisor AFTE Certified	**Lynette Lancon** Forensic Scientist AFTE Certified

Successes

1. Maintained cases with work from home option during pandemic.

Challenges

1. Working through increase in case submission in addition to a large increase in items of evidence worked (small number of cases accounting for item increase).

Casework

Year	2020	2019	2018	2017
Total cases worked	90 (2112 items of evidence worked)	65 (597 items of evidence worked)	89 (1,212 items of evidence worked)	87 (978 items of evidence worked)
Median TAT (Days in Firearms section)	46	25	21	21
95% of cases worked (Days in Firearms section)	95	73	77	156

Quality Assurance

The Quality Assurance Section maintains the Laboratory's international accreditation and continually improves its management system. The quality assurance manager is responsible for ensuring the management system related to quality is implemented and followed at all times. This includes ensuring compliance with ISO 17025, ANAB *International* Supplemental Requirements for Testing and Calibration Laboratories and Forensic Science Division policies.

Staff

Stacey Wilson Quality Assurance Manager

Successes

1. Implementation of Qualtrax which has assisted with prior challenges: maintaining policies (current revisions, revision history, archiving) and notifying staff of policies changes and tracking notifications.
2. Received provisional NAME accreditation status for Medical Examiner's Office with on-site inspection to occur in June 2021.

Challenges

1. Developing paperless tracking for nonconformities, proficiency monitoring, risks/opportunities to assist with laboratory accreditation objective evidence.
2. Determining best method and practice for completing annual internal audit that allows minimal impact on scientist/technician schedules.

Evidence Section

The Evidence Section ensures evidence is accurately and efficiently transferred to maintain the integrity of all evidence submitted and to protect it from loss and cross contamination.

Staff

Alysa Nichols Evidence Technician - Missoula
Marina Contreraz Evidence Technician - Billings

Casework

In 2020, the evidence technicians processed 8787 cases. Most of them have multiple pieces of evidence, some totaling over one hundred individual items. It is an essential and often overlooked role within the Division to document, log, and track the tens of thousands of unique pieces of evidence submitted each year.

Successes

1. Provided two evidence training presentations at MLEA.

Challenges

1. Passage of recreational marijuana should have an impact and a need for a second evidence technician in Missoula facility.