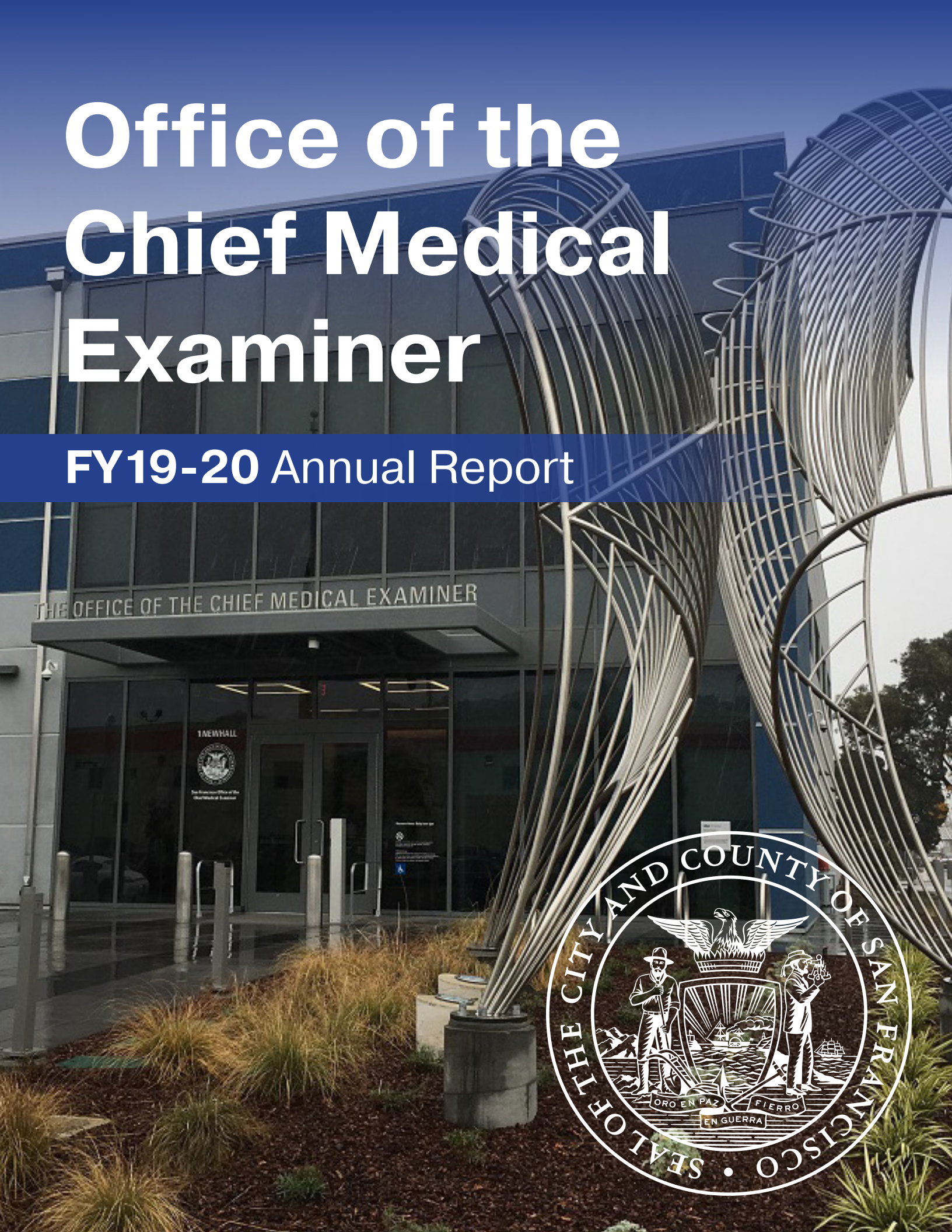
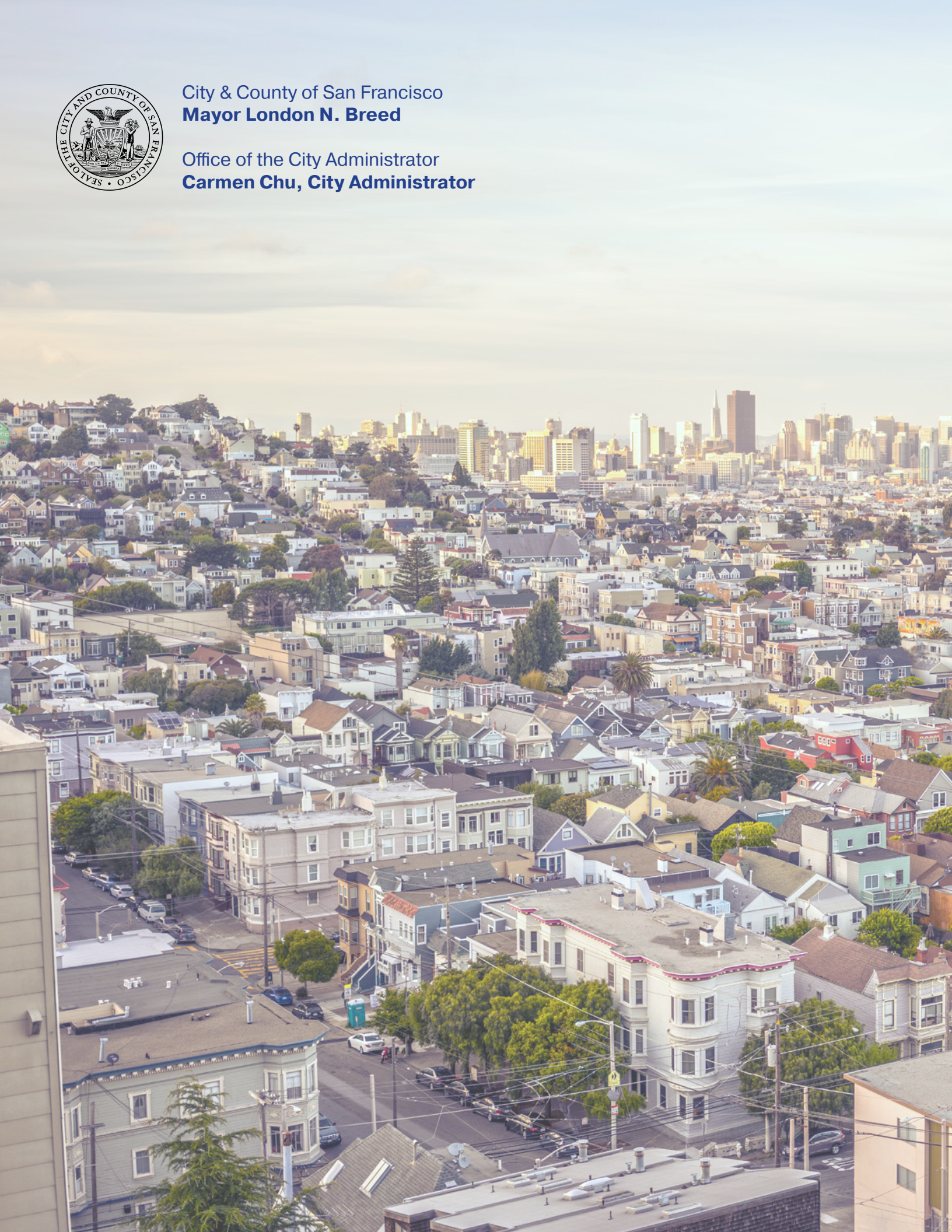
Office of the Chief Medical Examiner

FY19-20 Annual Report



City & County of San Francisco
Mayor London N. Breed

Office of the City Administrator
Carmen Chu, City Administrator



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BIMBO'S

Letter from the Chief Medical Examiner

This Office of the Chief Medical Examiner (OCME) Fiscal Year 2019-2020 Annual Report covers the period from July 1, 2019 through June 30, 2020. In it you will find essential data on the OCME's operation, death statistics, accomplishments, observations on the opioid crisis, as well as information on the crucial forensic services and data that we provide for our partners.

State and local laws govern our core function to investigate sudden, unexpected, and/or violent deaths in San Francisco. The work is emotionally and physically challenging. It is our mission which guides us:

To meet the highest standards of ethics, excellence, and empathy in the prompt investigation and determination of the cause and manner of those deaths under our jurisdiction, to deliver impartial forensic services for the community and the justice system, and to inform public health initiatives.

While challenges exist — such as the increase in caseload due to the opioid epidemic — we are fortunate to have talented, dedicated and hardworking pathologists, toxicologists, investigators and administrative professionals.

Since taking this role in May 2021, the OCME is adopting new policies and procedures for our services to improve the time it takes for a decedent's loved ones to have closure, and obtain a final death certificate. We are making progress but more needs to be done.

In order to advance our mission, this year the OCME is seeking to renew accreditation with the National Association of Medical Examiners, signifying our commitment to meeting national standards and excellence. In July, we submitted our application for inspection.

I invite you to learn more about the OCME by reading this Annual Report.

Thank you and regards,

Christopher Liverman, M.D., Ph.D.
Chief Medical Examiner
Office of the Chief Medical Examiner


SAN FRANCISCO
MEDICAL EXAMINER
EMERGENCY
DIAL 9-1-1
FIRE
POLICE
MEDICAL


1 NEWHALL
SEAL OF THE CITY AND COUNTY OF SAN FRANCISCO
ORO EN PAZ
FIERRO
EN GUERRA
San Francisco Office of the
Chief Medical Examiner

Fiscal Year 2019-2020 Top Line Statistics

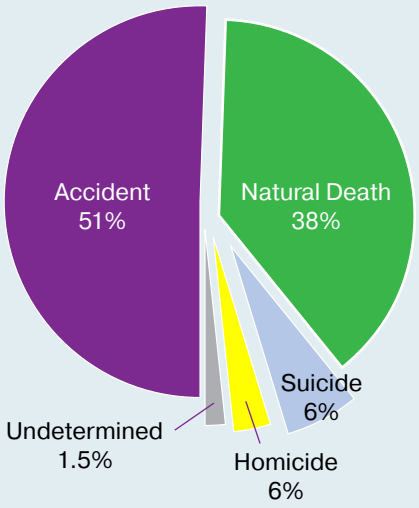
Deaths Reported	2,419
Cases	1,500
No cases	919
Accident	765
Homicide	43
Suicide	93
Natural Death	576
Undetermined	23
Total	**1,500**

Scene visits	1,220
External examinations	390
Complete autopsies	1,041
Partial autopsies	7
Toxicology	1,156
Unidentified	4
Unclaimed bodies	316

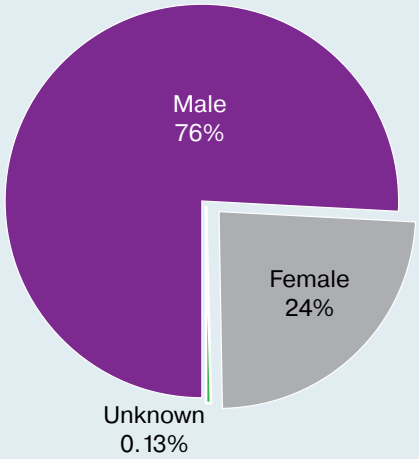
Manner and Method of Death

	Accident	Homicide	Suicide	Natural Death	Undetermined	Total
Firearm	1	27	16			44
Hanging			35			35
Sharp force injuries		4	6			10
Blunt Force Injuries		9				9
Fall	66				4	70
Fall from Height			10		3	13
Motor Vehicle	15					15
Motorcycle	4					4
Bicycle	3					3
Pedestrian-MV	17	1	1			19
Pedestrian vs MUNI	1					1
Pedestrian vs Caltrain	2					2
Pedestrian - BART			3			3
Asphyxia	1		3		1	5
Choking/Aspiration	16					16
Drowning	6		5		2	13
Hypothermia	1					1
Fire/Thermal	7		1			8
Drug Related	623		12		7	642
Poisoning			1			1
Natural Death				576		576
Other	2	2				4
Undetermined					6	6
Total	**765**	**43**	**93**	**576**	**23**	**1,500**

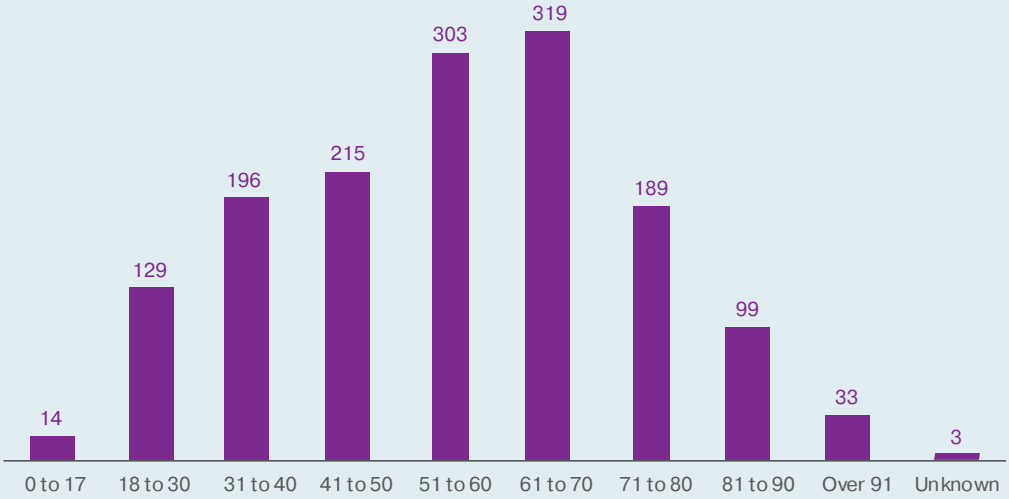
FY19-20 Cases by Manner of Death



FY19-20 Cases by Sex



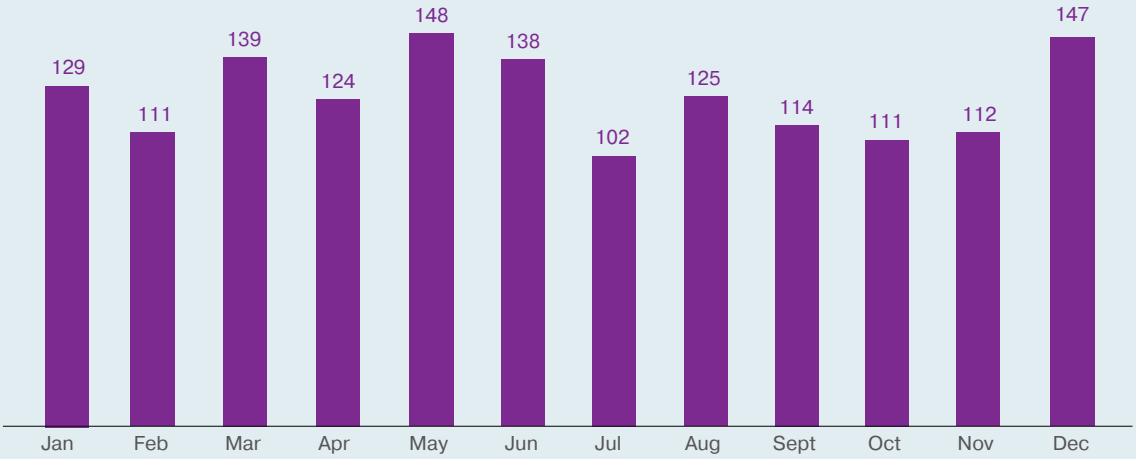
FY19-20 Cases by Age Group



Source: OCME CMS

N = 1,500

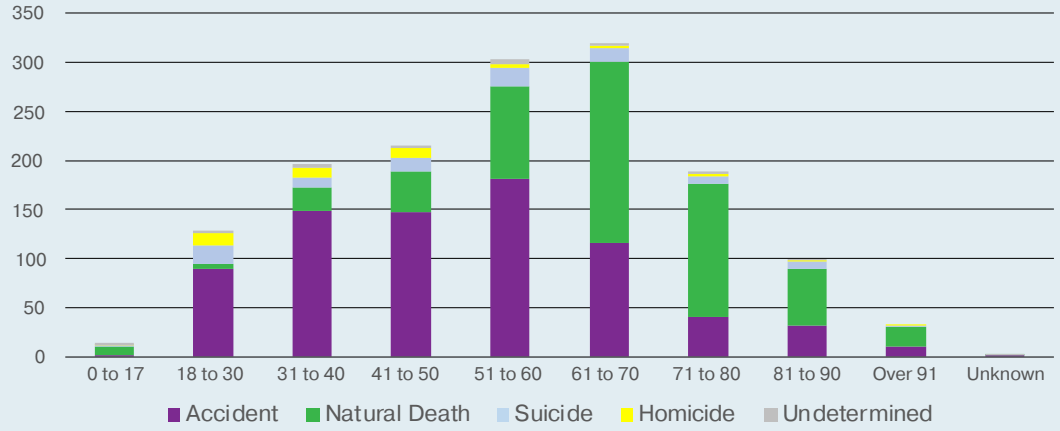
FY19-20 Cases by Month



Source: OCME CMS

N = 1,500

FY19-20 Cases by Manner of Death and Age Group

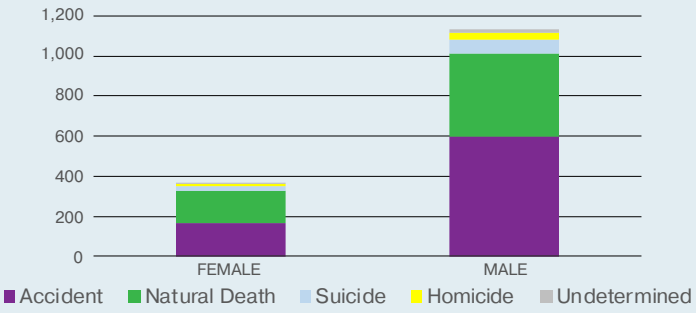


Source: OCME CMS

N = 1,500

	0 to 17	18 to 30	31 to 40	41 to 50	51 to 60	61 to 70	71 to 80	81 to 90	Over 91	Unknown	Total
Accident	1	90	148	147	181	115	40	32	10	1	765
Natural Death	9	4	25	42	95	186	136	57	21	1	576
Suicide	1	19	10	14	19	13	8	8	1		93
Homicide	1	13	9	9	4	3	2	1	1		43
Undetermined	2	3	4	3	4	2	3	1		1	23
Grand Total	**14**	**129**	**196**	**215**	**303**	**319**	**189**	**99**	**33**	**3**	**1500**

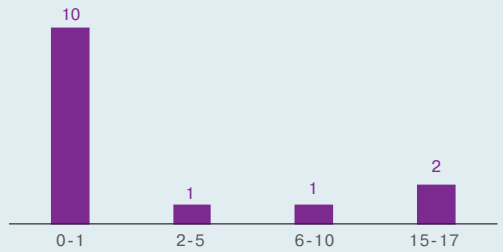
FY19-20 Cases by Manner of Death and Sex



Source: OCME CMS

N = 1,500

FY19-20 Cases by Child Age Group



Source: OCME CMS

N=14

Manner of Death (Edited)	FEMALE	MALE	Unknown	Grand Total
Accident	166	599		765
Natural Death	161	414	1	576
Suicide	23	70		93
Homicide	10	33		43
Undetermined	6	16	1	23
Grand Total	**366**	**1132**	**2**	**1500**


MEDICAL EXAMINER ENTRANCE
MORTUARY ENTRANCE
AUTOMATIC
CAUTION
DOOR

What we do – At a glance

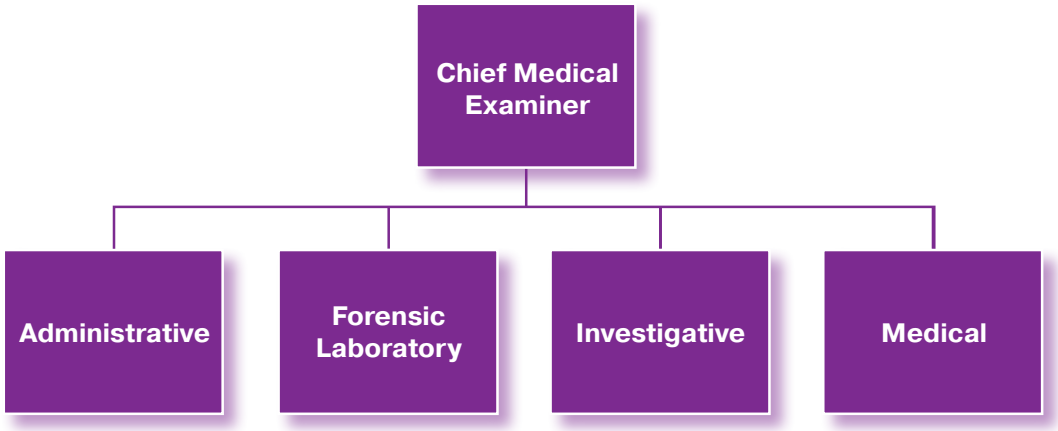
Pursuant to state law, the prompt investigation and determination of the cause, manner, and circumstances of deaths of decedents under our legal jurisdiction – sudden, unexcepted, and violent deaths; such as:

- **Suspected homicides or suicides**
- **Patients that did not fully recover from an anesthetic**
- **Following an accident or injury**
- **Patients that were comatose during physician's attendance**
- **Deaths without recent medical attendance (< 20 days)**
- **Deaths that may have occurred in any degree due to a criminal act**
- **Deaths without a physician in attendance**
- **Deaths of unidentified or incarcerated persons**
- **Cause of death cannot be determined by physician**
- **Deaths from a contagious disease that may be a public health hazard**
- **Deaths thought to be related to poisoning**
- **Deaths occurring during a law-enforcement pursuit/in custody**
- **Death was occupational or industrial**
- **Death associated with rapes**
- **Deaths in operating rooms**
- **Deaths associated with or following an abortion**
- **Deaths involving drowning, fire, hanging, gunshot, stabbing, cutting, starvation, exposure, alcoholism, drug addiction, strangulation or aspiration**

- Perform specialized forensic laboratory tests for both postmortem and human performance investigation
- Track health data and produce reports to inform policymakers like the Accidental Overdose Report, Homelessness Death Report, Child Death Review Panel
- Offer compassion to families through times of sorrow and stress
- Complete investigations as neutral forensic scientists (pathologists and toxicologists)
- Specialize in forensic laboratory tests for both postmortem and human performance (DUID "driving under the influence of drugs" and DFSA "drug facilitated sexual assault") cases
- Provide expert testimony in court proceedings

Organizational Structure

To do its work, the Office of the Chief Medical Examiner employs a talented, highly experienced staff of pathologists, toxicologists, investigators, and administrative professionals in four divisions – **Administrative, Forensic Laboratory, Investigative,** and **Medical.**



Administrative

- Support Medical, Forensic Lab, and Investigative divisions
- Develop and manage the department's budget
- Safeguard evidence and decedent property
- Procure supplies and services
- Respond to all California Public Records Act and business records requests
- Manage departmental email inbox – **medical.examiner@sfgov.org**

Forensic Laboratory

- Provide comprehensive analytical testing and expert toxicology services
- Conduct postmortem toxicology for death investigations and Human Performance toxicology of living people for DUID, drug facilitated sexual assault, and other criminal casework
- Research and develop new lab methods to ensure adequate testing services
- Provide histopathology services for forensic pathologists

Investigative

- Conduct death investigations and draft official investigative reports
- Retrieve decedents
- Secure evidence
- Identify decedents
- Notify next-of-kin
- Manage indigent decedent program

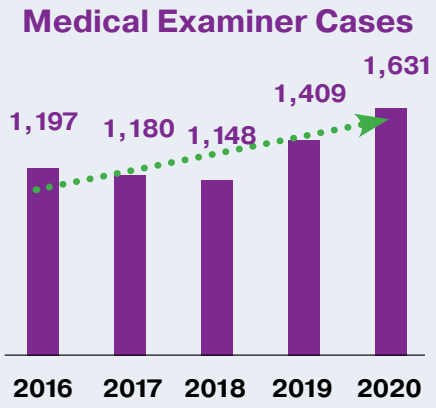
Medical

- Determine the cause and manner of death for all cases under the OCME's jurisdiction
- Perform autopsies
- Author final autopsy reports
- Provide expert testimony in court
- Train UCSF pathology residents and fellows

Accomplishments

While outside of the Fiscal Year 2019 timeframe, the OCME wants to take this opportunity to share some recent highlights and accomplishments:

- **In 2021, filled critical positions of the Chief Medical Examiner and Chief Operating Officer.**
- **Enacted new policies and efficiency measures to help bring closure to the decedent's loved ones by issuing a final death certificate in a timelier fashion.**
- **Continued to manage the historic increase in cases - in calendar year 2020 there were 1,631 cases, a 42% increase from 2018, impacting all the OCME divisions.**
- **In calendar year 2020, the OCME performed 1,515 postmortem examinations, 1,428 postmortem toxicology reports, 737 human performance (DUID, sexual assault) toxicology reports, ~2,000 histopathology requests, and 200 postmortem biochemistry reports.**



Medical Division

- Implemented new policies that prioritize the issuance of the final death certificate to help bring closure to decedent's loved ones and family.
- From June 25, 2020 to June 30, 2021, the office performed full postmortem COVID-19 testing for all decedents – over 1,000 tests, and results shared with the Department of Public Health.
- Participated in citywide committees such as Victim Services, In Custody Death Review, Child Death Review Team, Family Violence Council and Elder Interdisciplinary panel.
- For over twenty years, the OCME, in partnership with the UCSF School of Medicine, has annually hosted ten residents and two neuropathology fellows to get hands-on training in autopsies and learn the basics of forensic pathology in a working medical examiner's office.

Administrative Division

- Re-established the relationship with the Veterans Administration San Francisco Office to ensure that indigent veterans are interred at national cemeteries with the full military funeral service and near their next-of-kin.
- Designed, implemented, and monitored new efficiency initiatives to digitize case processing.

Investigative Division

- Maintained a 24/7 operation to perform death investigations during an unprecedented increase in cases due to the opioid crisis.
- Investigators identified the decedent and notified the next-of-kin within 24 hours in 90% of cases.
- Implemented a protocol to respond to freeway and bridge deaths rapidly - Investigators now use flashing "Blue Light" light bars when responding to freeway or bridge fatalities, so drivers now make way for Medical Examiner vehicles; on scene arrival times reduced from 60-90 minutes to 15–20 minutes now.

Forensic Laboratory Division

- Developed two new lab instrument methodologies that decreased sample volume usage tenfold, and improved the quality of final results.
- Commenced performing all sexual assaults testing in-house and improved the drug detection sensitivity to better achieve justice for sexual assault survivors.
- Increased the drugs routinely tested in death investigations from 55 to 190 to include potent new drugs recently available in the community.
- Produced a monthly report on accidental overdose deaths.
- Received a $986,248 California grant for equipment and staff to expedite DUID services.
- Provided over 80 hours of forensic toxicology expertise in 150 cases to public agencies such as the Superior Court of California, Police Department, California Highway Patrol, Public Defender's Office, and District Attorney's Office.
- Provided 534 litigation packets for court discovery.
- Maintained American Board of Forensic Toxicology accreditation.
- Optimized histopathology workflows and protocols to increase efficiencies, safety, quality and scope of histological services, while decreasing the ecological impact.

Informing Public Health Initiatives

The OCME team contributes their subject matter expertise and provides valuable data to inform citywide public health initiatives and to improve health outcomes.

Providing Key Data to Inform Policymakers

The Accidental Overdose Report

In 2020, the City delegated to the OCME the responsibility to provide demographics and categorical data on accidental fatal overdoses in San Francisco. To further OCME's mission to provide neutral data to inform policymakers and to comply with the reporting of overdose deaths pursuant to Article 4, Section 227(c) of the City and County of San Francisco's Health Code, the OCME has produced a monthly report since October 2020.

The report consists of results from both preliminary testing and closed casework following the OCME finalizing the manner and cause of each death. Decedent demographic and case information are obtained from the OCME case management system, specific details from investigator narratives, forensic toxicology results, and where available, preliminary autopsy findings. Collected demographic information included race, gender, age, fixed address status, and locations of residence and death.

Due to their significance in accidental overdose deaths, the reported drugs for open cases were specific to fentanyl, heroin, medicinal opioids, methamphetamine and cocaine. Medicinal opioid-positive cases required the presence of codeine, hydrocodone, oxycodone, morphine, hydromorphone, oxymorphone, buprenorphine, tramadol, and/or methadone. Closed casework includes any drug-involved accidental overdose.

The report is issued directly to the Mayor, the Board of Supervisors, and the Director of Health, on a four-monthly basis and is posted on the OCME website.

Homeless Mortality in San Francisco

The OCME provides timely decedent reports to the Department of Public Health to inform their annual report on homeless deaths. The report seeks to inform quality improvements efforts to prevent such deaths, inform provider outreach efforts following deaths, and to monitor trends over time.

Committee Involvement

Child Death Review Team (CDRT)

The OCME is a founding member of the CRDT to review all deaths of those under the age of 25 years in order to improve agency communications and link families affected by the death of a child in their household with support services. The team seeks to identify specific barriers for families which may have contributed to the death, recommend system improvements that promote the prevention of such deaths, and increase public awareness the safety of young people.

The OCME works with the District Attorney's Office, SFPD Special Victims Unit, Human Services Agency, Safe and Sound, Maternal/Fetal Child Health, epidemiologists from Department of Public Heath, San Francisco Unified School District, UCSF pediatricians, Child Protective Services, and emergency medical services.

Through CDRT's combined efforts, the extent of drug use in the younger population has been revealed, with additional counseling for the classmates of the decedents. Families of those who have had infant deaths have received resources and education (particularly with safe co-sleeping) which may help prevent other deaths in those families.

Sexual Assault Response Team (SART)

SART seeks to promote excellence and responsiveness in services to victims/survivors of sexual assault, ensure the timely collection and testing of evidence to promote outcomes of justice, and to serve as a forum for interdisciplinary communications, countywide protocols, recommendations for the resolution of concerns, and the development and revision of best practices.

Along with the OCME, SART members include Department of Public Health, Rape Treatment Center, Child and Adolescent Support, Advocacy & Resource Center, Trauma Recovery Center, Zuckerberg San Francisco General Hospital, UCSF, Child Protective Services, District Attorney's Office (Victim Services, Sexual Assault Unit), SFPD's Special Victims Unit, SFPD Criminalistic Laboratory, and the SF Women Against Rape.

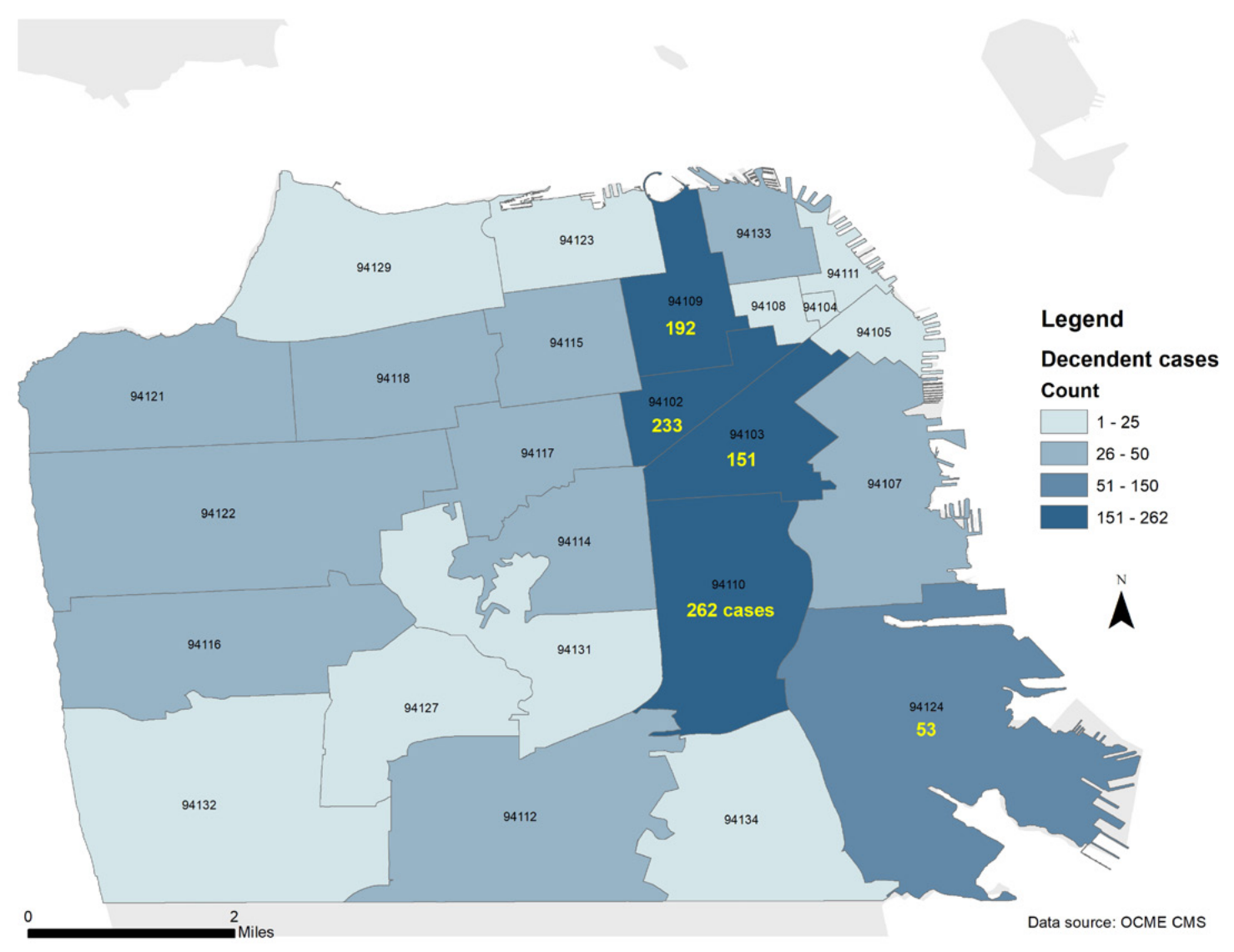
SART's combined efforts have encouraged the immediate collection of toxicology samples from survivors who present for sexual assault services, thus increasing the ability to detect drugs and alcohol.

State Impaired Driving Task Force (IDTF)

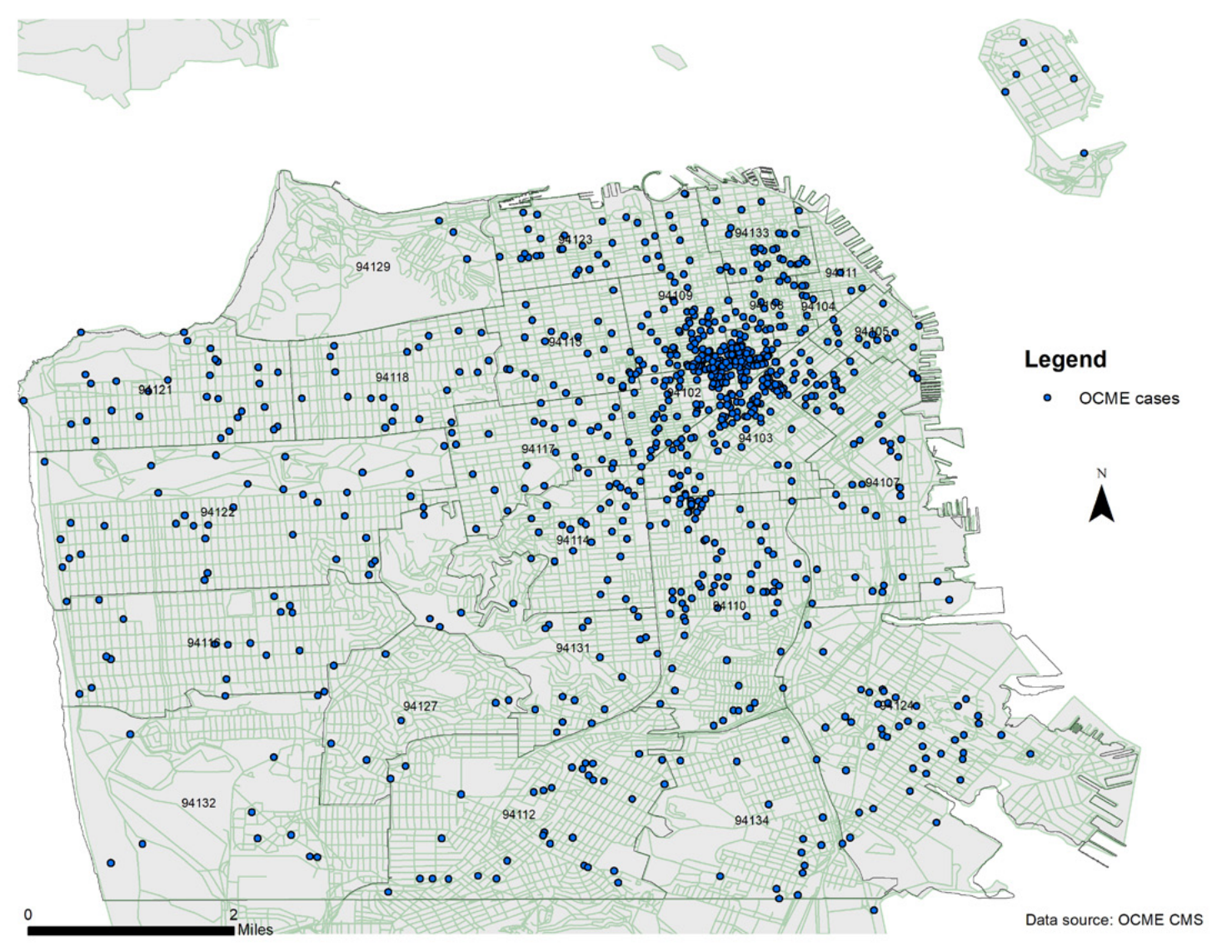
To improve road safety and pursuant to Senate Bill 94, the California Highway Patrol (CHP) appointed an Impaired Driving Task Force (IDTF) for the purpose of developing recommendations for best practices, protocols, and proposed legislation relating to impaired driving. The IDTF membership is comprised of various fields of expertise, interests, and viewpoints. The IDTF worked diligently to develop legislative recommendations for the purposes of preventing, reducing, and mitigating the impacts of impaired driving, with the goal of making California a safer place to live, work, and travel.

The OCME was an invited member to the task force to provide expertise in toxicology testing and drug impairments interpretation. The IDTF met a total of nine times, with the OCME requested to further participate in the Best Practices and Protocols subcommittee. The final report to the legislature listed findings and 29 recommendations that represented the work of the IDTF and OCME for consideration by California State Legislature.

San Francisco Medical Examiner
FY19-20 Cases by Zipcode



San Francisco Medical Examiner
FY19-20 Cases by Location



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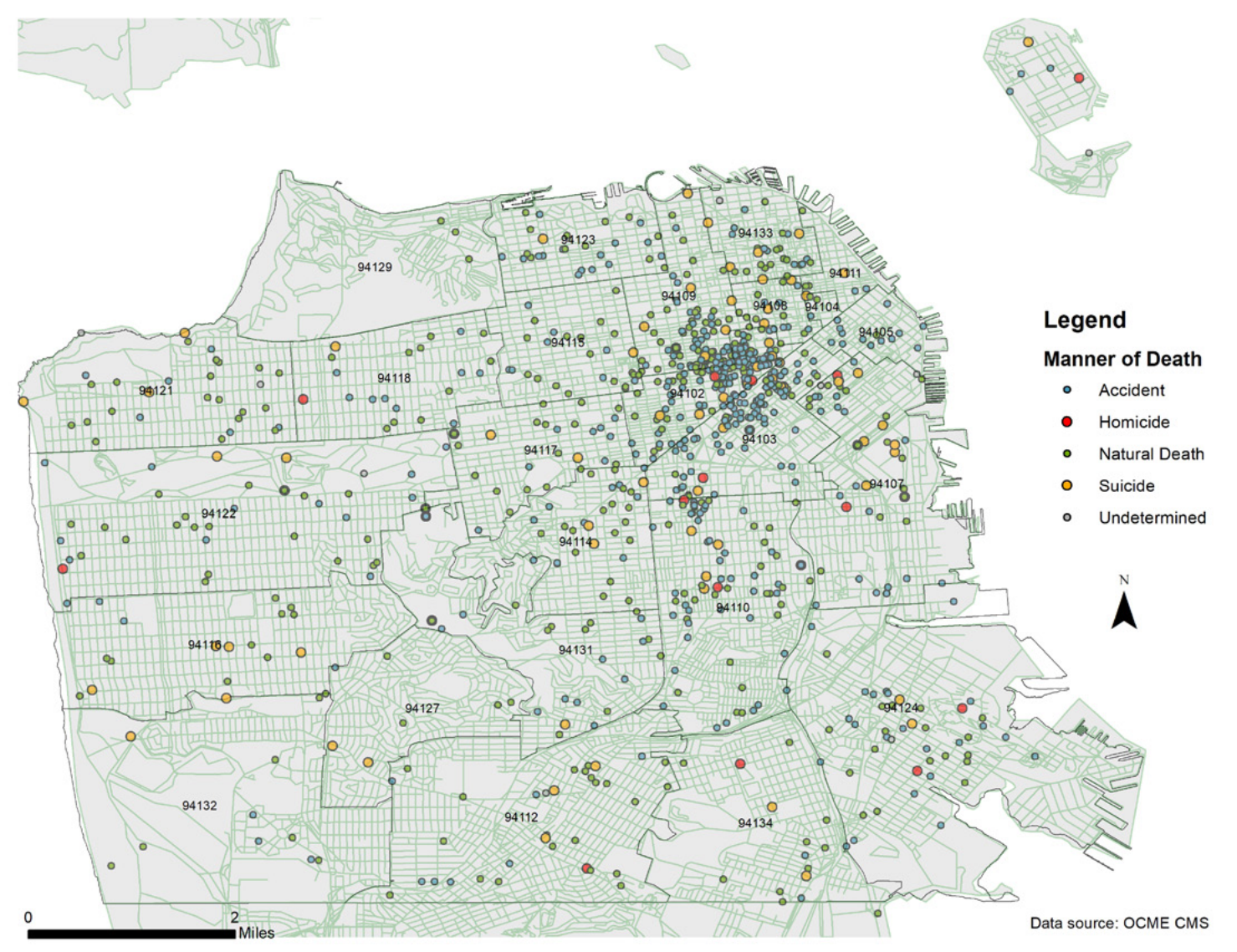
FY19-20 Cases by Location and Manner



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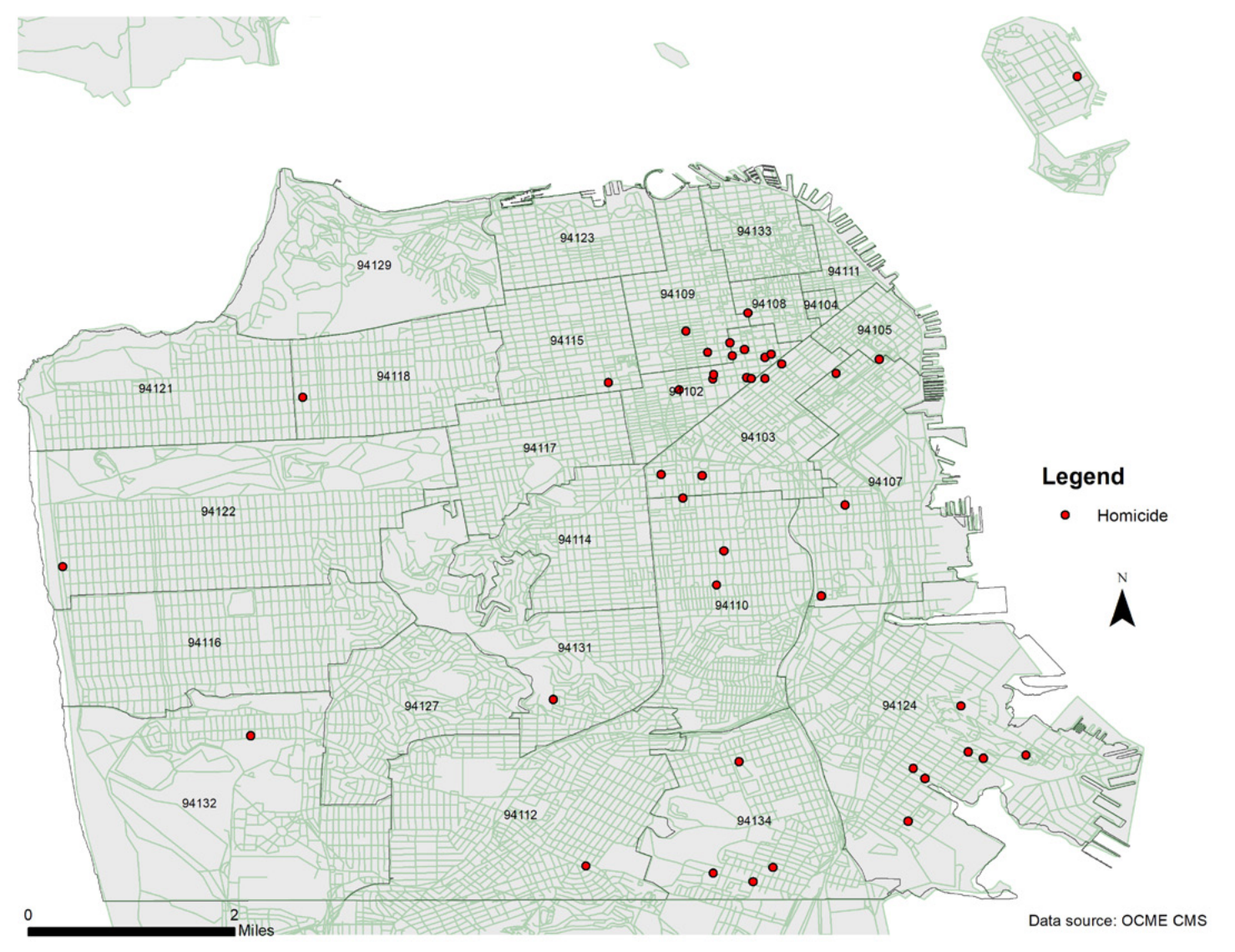
FY19-20 Homicide Cases by Location



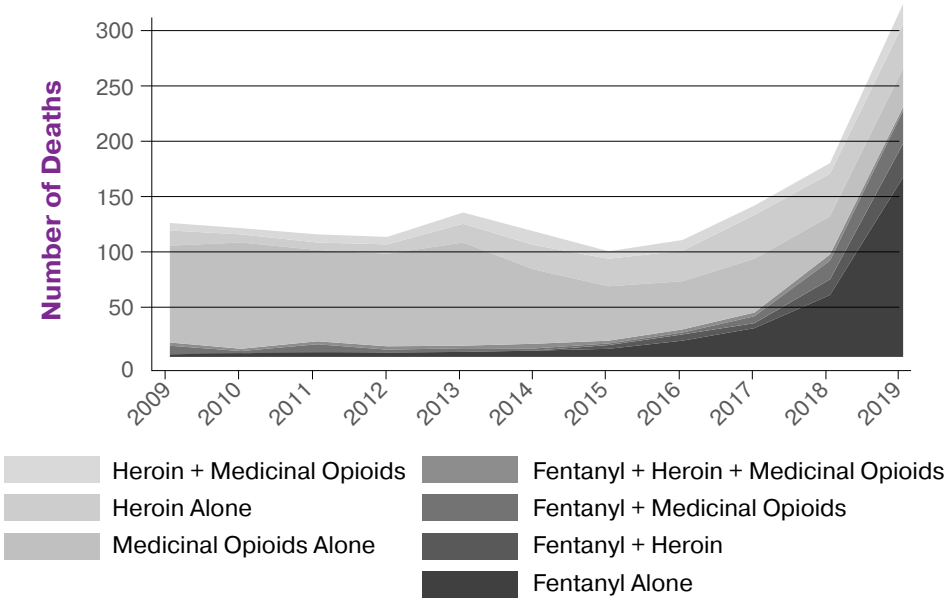
OCME Observations on Accidental Opioid Overdose Deaths from 2009 – 2019

Opioid use disorders have resulted in significant mortality over recent decades following the abuse of medical opioids, heroin, and more recently, fentanyl. Fentanyl provides similar pharmacological effects to other opioids such as heroin and morphine, however, it is approximately 20 to 100 times more potent. Due to the increase in mu-opioid receptor central nervous system depression potency, opioid-naive and even non-naive users can be subject to developing respiratory arrest with fatal outcomes. While the epidemic has significantly affected the U.S. East Coast, there are a relatively limited number of reports of increasing fentanyl overdoses in the Western States.

The increase in opioid overdose deaths requires accurate and timely information on regional deaths resulting from fentanyl, heroin and other opioids. The OCME performs comprehensive medico-legal death investigations, including scene investigations, witness accounts, forensic pathological investigations, autopsy, forensic toxicology, forensic biochemistry, and histological analyses, to determine the manner and cause of all unexpected deaths. Due to these comprehensive investigations, the OCME is uniquely situated to provide the accurate frequency of all accidental opioid overdose deaths over time to policy makers, serving the mission of the Office.

There were 12,486 deaths that came under the jurisdiction of the OCME from 2009 to 2019. Of these, 1,510 were determined to be accidental overdoses that involved either fentanyl, heroin, medicinal opioids, or any combination thereof. There were 119 accidental opioid deaths in 2009 and 315 in 2019, an increase of 165%.

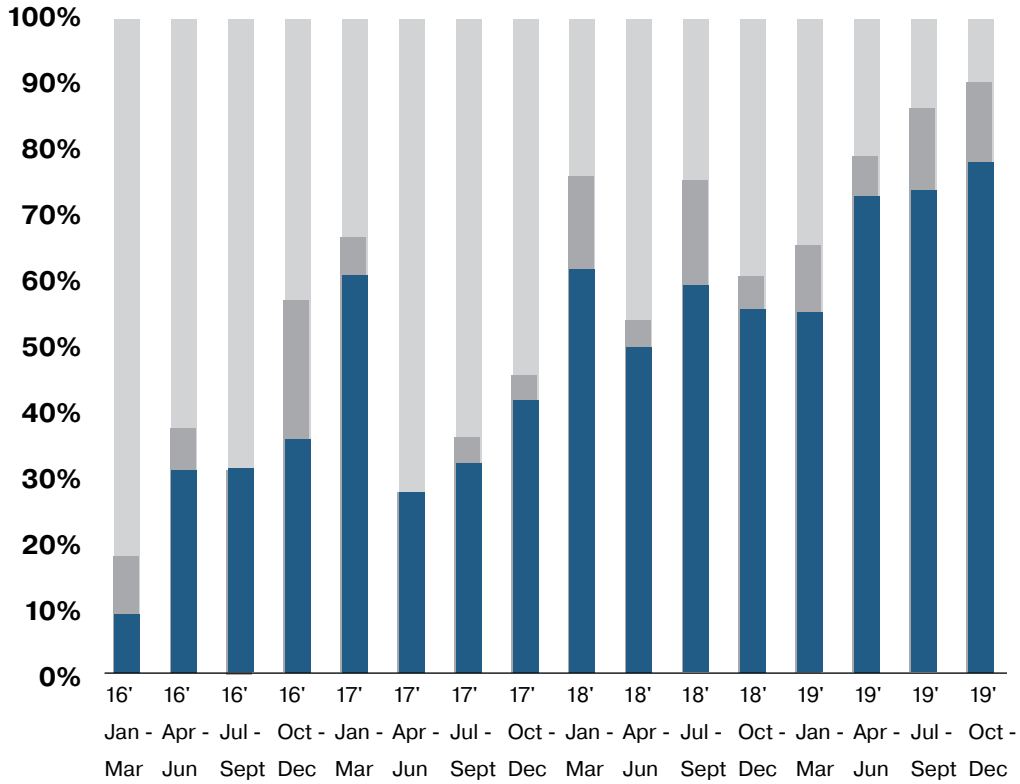
Total opioid deaths remained relatively consistent from 2009 – 2016, averaging 111 deaths per year. However, in recent years (2017 – 2019), there were significantly more opioid deaths with 135, 172 and 315 fatalities occurring in 2017, 2018 and 2019, respectively. This trend was namely a result of increased fentanyl deaths wherein 2019 there were 230 (73.0%), 78 (24.8%) and 77 (24.4%) involving fentanyl, heroin, and medical opioids, respectively.



The number of fentanyl-related overdoses had increased from 9 to 230 deaths, or by 2,456%, from 2009 to 2019. However, from 2009 to 2015, fentanyl-related deaths were relatively stable. The sharpest increase in fentanyl deaths began after 2015 (11 deaths) where during the subsequent four years and to the end of 2019, the number of fentanyl-related overdoses increased by 1,991% to 230 deaths. The rate at which fentanyl deaths have occurred throughout the calendar year has also been growing, with the most dramatic increase emerging from 2017 onward, with the fastest rate in 2019.

When specific illicit opioids (i.e., fentanyl alone, fentanyl and heroin, and heroin alone) deaths were assessed in isolation, heroin alone deaths were predominant in 2016, and then heroin and fentanyl deaths in 2017. By the second half of 2018, fentanyl deaths in isolation were observed as the majority of illicit opioid deaths and by mid-2019, it continued to be accountable for approximately three out of every four deaths.

Accidental Opioid Overdose Deaths 2009 – 2019 (N=1,510)



	16' Jan - Mar	16' Apr - Jun	16' Jul - Sept	16' Oct - Dec	17' Jan - Mar	17' Apr - Jun	17' Jul - Sept	17' Oct - Dec	18' Jan - Mar	18' Apr - Jun	18' Jul - Sept	18' Oct - Dec	19' Jan - Mar	19' Apr - Jun	19' Jul - Sept	19' Oct - Dec
Heroin	9	10	11	6	6	13	14	13	5	11	12	16	16	10	13	8
Fentanyl + Heroin	1	1	0	3	1	0	1	1	3	1	8	2	5	3	12	11
Fentanyl	1	5	5	5	11	5	7	10	1	12	29	23	26	35	71	67

Quarterly Trends of Total Illicit Fentanyl and Heroin use in isolation and co-consumed, 2016 – 2019 (n=551).

Isolated and Combined Opioid Deaths

From 2009 – 2019, accidental opioid deaths due to fentanyl alone increased from 3 to 166, a 5,433% increase. In comparison, accidental opioid overdose deaths from heroin alone remained consistent until 2013, where there was then an increase until it again remained stable from 2017 onwards. Although medicinal opioids in isolation were deemed as the cause of death in 84.1% of all medicinal opioid-related overdose deaths throughout the 11 years, it decreased from 78.2% (93) in 2009 to just 12.1% of deaths in 2019 with 38 deaths.

The poly-opioid combination with the greatest percent increase over the studied period was fentanyl and heroin with 29 deaths in 2019, an increase of 2,800% from 1 death in 2012 (2009 – 2011 had zero deaths in this category). Combined fentanyl and medicinal opioid deaths were more than any other single combination over the total 11-year period with 86 deaths (5.7% of all accidental opioid overdose deaths). However, with 19 and 33 deaths in 2018 and 2019, respectively, and no more than ten deaths in a single year from 2009 – 2017, this rise in later years was consistent with the general fentanyl increase.

Demographic Observations

Of all accidental opioid deaths from 2009 – 2019, 1,054 (69.8%), 327 (21.7%), 42 (2.8%), and 9 (0.6%) were of White, Black, Asian, and Native American ancestral backgrounds, respectively. Compared to SF population, White and Black groups were overrepresented in accidental opioid overdose deaths and for all three sub-opioid categories, while our Lab Director is an Aussie! Asian groups were considerably underrepresented.

Males accounted for 1,118 (74.0%,) of all accidental opioid deaths. Males were more likely to die of illicit drugs than females (53.1% versus 37.5%). From 2009 – 2019, more male accidental opioid deaths were caused by fentanyl, heroin, and medicinal opioid in 345 (80.4%), 296 (80.7%), and 636 (69.5%) of cases, respectively.

Individuals between the ages of 45 – 54 and 55 – 64 years old made up the most medicinal opioid victims of studied accidental opioid deaths (388 or 25.7% and 379 or 25.1%, respectively) and remained relativity consistent throughout the studied period. Although, fatal illicit opioid deaths (fentanyl and/or heroin) were relatively equally present for the four age groups between 25 to 64 years old, favoring younger ages more so when compared to medicinal opioid deaths. Specifically, fentanyl was the leading cause of death in younger age groups 25 – 34 and 35 – 44 with 99 (23.1%) and 100 (23.3%), respectively.

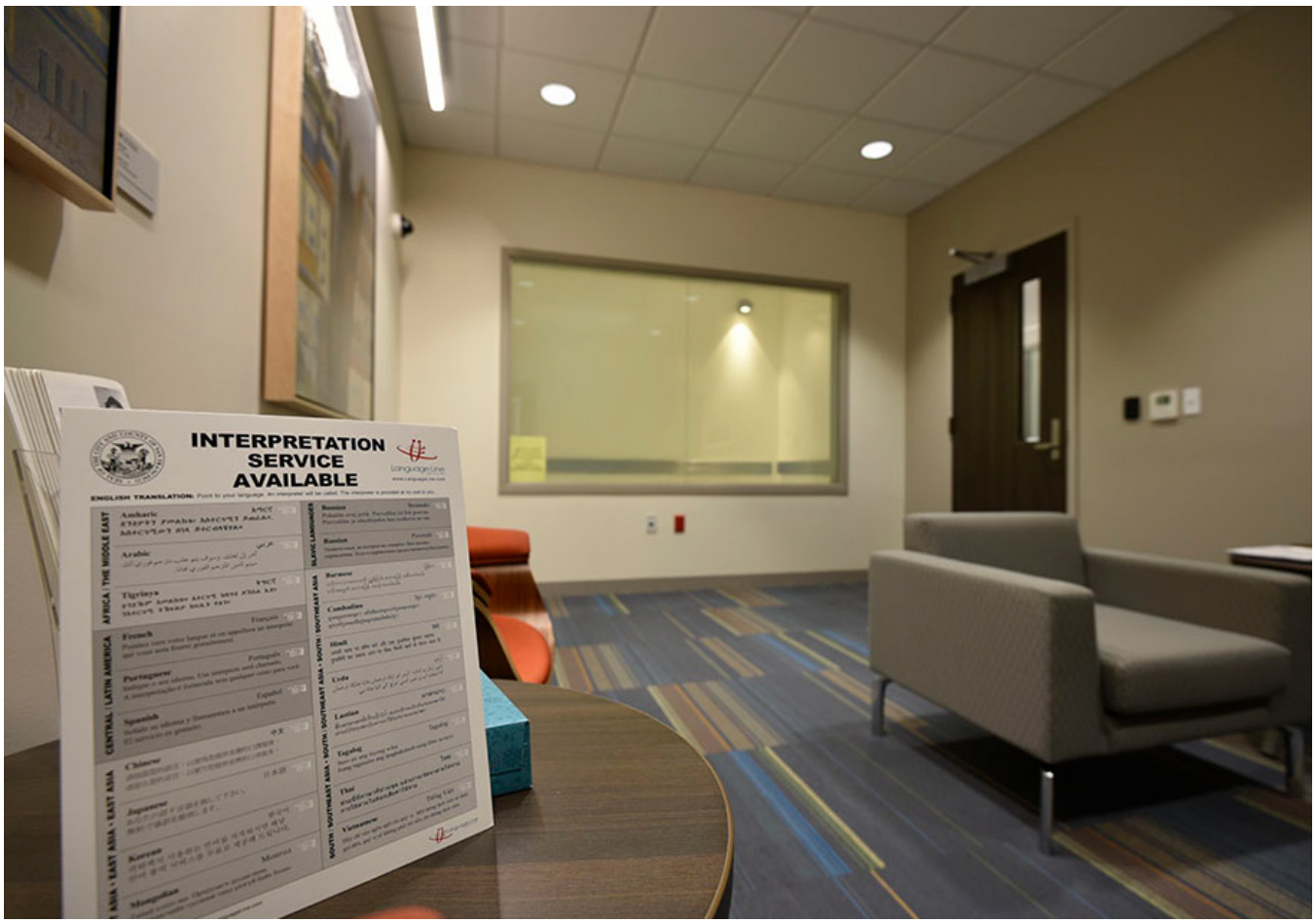
Discussion Observations

As California's death investigation system is a Medical Examiner- or Coroner-based system administered on a county level, there may be differences in forensic toxicology testing and death investigation practices throughout the state. These differences between counties relate to what type of decedent cases receive toxicology testing, what drug testing scope will be performed, and the drug detection sensitivity.

Although national standards to standardize forensic toxicology testing between laboratories throughout the country are currently under review, the comprehensive nature of the forensic toxicology testing in San Francisco may result in a higher prevalence of accidental opioid overdose deaths than surrounding counties within the state.

Nationwide, medicinal opioids, heroin and fentanyl have been responsible for the first, second and third waves of opioid overdoses, respectively. In San Francisco, fentanyl-related accidental opioid overdose deaths have increased significantly since 2016, typically more than doubling each subsequent year. This spotlight of accidental opioid overdose deaths from 2009-2019 is a preview of the further observed increases in 2020 and 2021, with fentanyl overdose deaths continuing to dominate.

Excerpts and Figures used in this were originally published in "West, K. L., Lindquist, K., & Rodda, L. N. (2021). Fentanyl epidemic hits the U.S. West Coast: Opioid-related deaths in San Francisco from 2009–2019. International Journal of Drug Policy, 95, 103402".



OCME Staff Publications

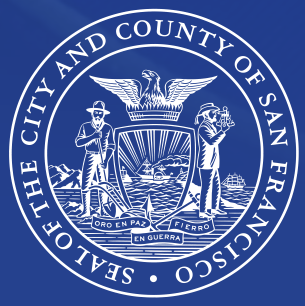
OCME staff are thought leaders in forensic pathology as authors in peer-reviewed scientific publications and at industry conferences, some examples include:

Medical Division

- Dr. Ellen Moffatt, Assistant Medical Examiner, a lead author of "Sudden Cardiac Death and Myocardial Fibrosis, Determined by Autopsy, in Persons with HIV" published in The New England Journal of Medicine.
- Rodriguez RM, Montoy JCC, Repplinger D, Dave S, Moffatt E, Tseng ZH (2021) Occult Overdose Masquerading as Sudden Cardiac Death: From the Postmortem Systematic Investigation of Sudden Cardiac Death Study. Ann Intern Med. 173(11):941-944.
- Delling FN, Aung S, Vittinghoff E, Dave S, Lim LJ, Olgin JE, Connolly A, Moffatt E, Tseng ZH (2021) Antemortem and Post-Mortem Characteristics of Lethal Mitral Valve Prolapse Among All Countywide Sudden Deaths". JACC Clin Electrophysiol. 7(8):1025-1034.
- Tseng ZH, Ramakrishna S, Salazar JW, Vittinghoff E, Olgin JE, Moffatt E (2021) Sex and Racial Differences in Autopsy-Defined Causes of Presumed Sudden Cardiac Death. Circ Arrhythm Electrophysiol. 14(5):009393.
- Santo Ricceri, James W Salazar, Andrew A Vu, Eric Vittinghoff, Ellen Moffatt, Zian H Tseng (2021) Factors Predisposing to Survival After Resuscitation for Sudden Cardiac Arrest. Journal of the American College of Cardiology 77(19):2353-2362.
- Robert M Rodriguez, Zian H Tseng, Juan Carlos C Montoy, Daniel Repplinger, Ellen Moffatt, Newton Addo, Ralph C Wang (2021)159:69-76. Naloxone Cardiac Arrest Decision Instruments (NACARDI) for targeted antidotal therapy in occult opioid overdose precipitated cardiac arrest. Journal of Resuscitation 159:69-76

Forensic Laboratory Division

- Presented and authored 18 conference abstracts and scholarly presentations at various state, national and international conferences for forensic toxicologists and forensic laboratory directors. Authored 14 publications in international peer-reviewed scientific literature:
- West KL, Lindquist K, Rodda LN (2021) Fentanyl Epidemic Hits the U.S. West Coast: Opioid-Related Deaths in San Francisco from 2009 – 2019. International Journal of Drug Policy 95:103402. doi: 10.1016/j.drugpo.2021.103402.
- Farley M, Tran H, Towler S, Gevorkyan J, Pearring S, Rodda LN (2021) Single Method for All Recommended and Additional DUID Drugs in Blood and Urine by LC-MS/MS. Journal of Analytical Toxicology doi.org/10.1093/jat/bkab075
- Appa A and Rodda LN, Cawley C, Zevin B, Coffin P, Gandhi M, Imbert E (2021) Increase in Drug Overdose Deaths in San Francisco During Compared to Before the COVID-19 Pandemic. JAMA Network Open 4(5):e2110452. doi:10.1001/jamanetworkopen.2021.10452
- Armenian, P, Rodda LN (2020) Two Decades of Ecstasy: Shifting Demographic Trends in Decedents using MDMA, Journal of Analytical Toxicology. doi.org/10.1093/jat/bkaa193
- Turfus S, Rodda LN. (2021). High Performance Liquid Chromatography and Ultra-High Performance Liquid Chromatography Including Liquid Chromatography–Mass Spectrometry. In R. Wolstenholme, S. Jickells, & S. Forbes (Eds.), Analytical Techniques in Forensic Science (pp. 365-405). Hoboken, NJ 07030, USA: John Wiley & Sons Ltd.
- Rodda LN, West KL, LeSaint KT (2020) Opioid overdose-related emergency department visits and accidental deaths during the COVID-19 pandemic. Journal of Urban Health. 97: 808–813. doi.org/10.1007/s11524-020-00486-y
- Rodda LN, Cooper, G (2020) Impact of Forensic Toxicology Laboratories During the COVID-19 pandemic: Tale of Two Major U.S. Cities. TIAFT Bulletin 50(3): 19-21
- Gevorkyan J, Kinyua J, Pearring S, Rodda LN (2020) A Case Series of Etizolam in Opioid Related Deaths. Journal of Analytical Toxicology. https://doi.org/10.1093/jat/bkaa146
- Rodda LN. Forensic Toxicology Considerations, in Olsen K and Smollin C (Eds) Poisoning and Drug Overdose, Seventh Edition (2020). McGraw-Hill Professional. (In review)
- Mardal M, Kinyua J, Rodda LN, Linnet K, Dalsgaard PW (2020) Free Online Tools to Improve HRMS Screening Strategies for New Psychoactive Substances. TIAFT Bulletin 50(2): 17-21
- Towler S, Concheiro-Guisan M, Pearring S, Rodda LN (2020) Evaluation and Applicability of Alere iCup DX 14 for Rapid Postmortem Urine Drug Screening at Autopsy. Journal of Forensic Sciences. doi:10.1111/1556-4029.14577
- Rodda LN, Pearring S, Harper, CE, Tiscione NB, Jones AW (2020) Inferences and Legal Considerations Following a Blood Collection Tube Recall. Journal of Analytical Toxicology 45(2): 211-214. doi.org/10.1093/jat/bkaa056
- Rodda LN. Forensic Toxicology, in Wu, AHB (Ed) Self-Assessment Q&A in Clinical Laboratory Science III: Emerging Subspecialties (2020). Elsevier. (In Press)
- Gevorkyan J, Wong M, Pearring S, Rodda LN (2020) Method Consolidation to Improve Scope and Efficiency in Postmortem Toxicology. Journal of Analytical Toxicology. 44(5): 422-439.



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