

# 2023 ANNUAL REPORT



HARRIS COUNTY  
**INSTITUTE**  
OF FORENSIC SCIENCES

SCIENCE.  
SERVICE.  
INTEGRITY.





The **MISSION** of the Harris County Institute of Forensic Sciences is to provide medical examiner and crime laboratory services of the highest quality in an unbiased manner with uncompromised integrity.

# Our Accreditations

- Accreditation Council for Graduate Medical Education
- American Board of Forensic Toxicology
- ANSI National Accreditation Board ISO/IEC 17025 Program (Crime Laboratory)
- ANSI National Accreditation Board ISO/IEC 17020 Program (Forensic Anthropology)
- Lloyd's Register Quality Assurance ISO 9001 Program (Quality Management System)
- National Association of Medical Examiners
- Texas Forensic Science Commission
- Texas Medical Association for Continuing Medical Education

# MEDICAL EXAMINER SERVICES

Has the statutory duty to determine cause and manner of death in accordance with Article 49.25 of the Texas Code of Criminal Procedure



# Texas Medical Examiner Jurisdiction

1. When a person dies within **twenty-four hours** after admission to a hospital
2. When any person is **killed**
3. When the body or a body part of a person is **found**
4. When the circumstances of the death are such as to lead to suspicion that the death was by **unlawful means**
5. When any person commits **suicide**
6. When a person dies **without** having been attended by a duly licensed and **practicing physician**
7. When the person is a child who is younger than **six years** of age
8. When a person dies who has been attended immediately preceding their death by a duly licensed and practicing physician, and such physician is not certain as to the cause of death and is **unable to certify** with certainty the cause of death

# Statistical Summary

- Harris County (HC) remains the **third most populous county** in the nation, exceeded only by Los Angeles and Cook counties
  - **4.83+ million** estimated HC population in 2023\*
  - **34,087** HC death certificates filed in 2023\*\*
  - **37%** (12,698) of HC deaths reported to HCIFS in 2023
- **6,565** deaths were certified in 2023, including:
  - **5,317** Harris County medicolegal (ML) cases - all brought to HCIFS for exam
  - **34** out-of-county cases examined
  - **1,214** certification only
- **6,133** inquest only cases reported\*\*\*

*\*Population estimate for 2023 obtained from the US Census Bureau*

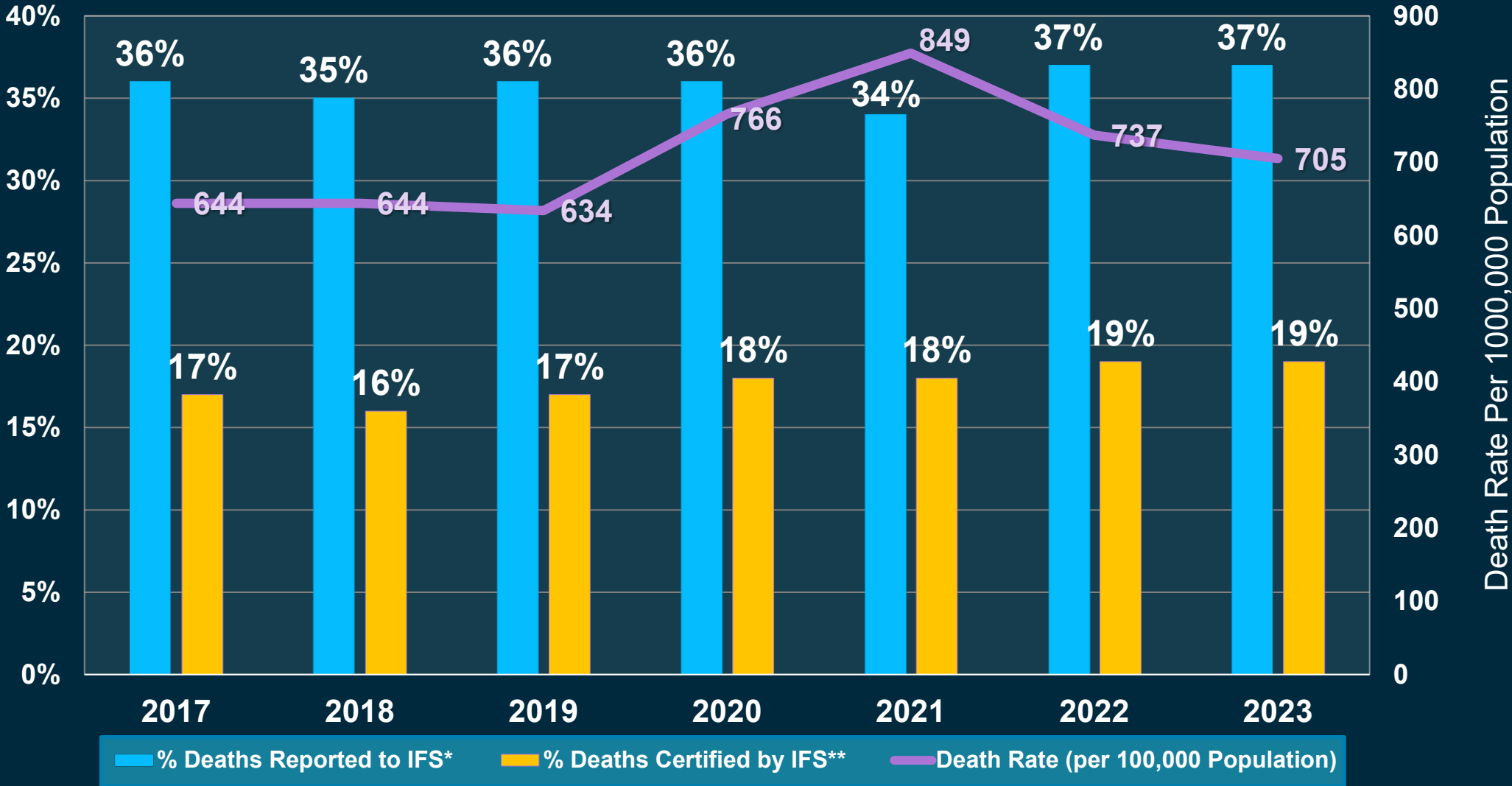
*\*\*Provisional death certificate data from the Texas Department of State Health Services*

*\*\*\*Inquest only cases are reported deaths that are released from medical examiner jurisdiction*

# Statistical Summary

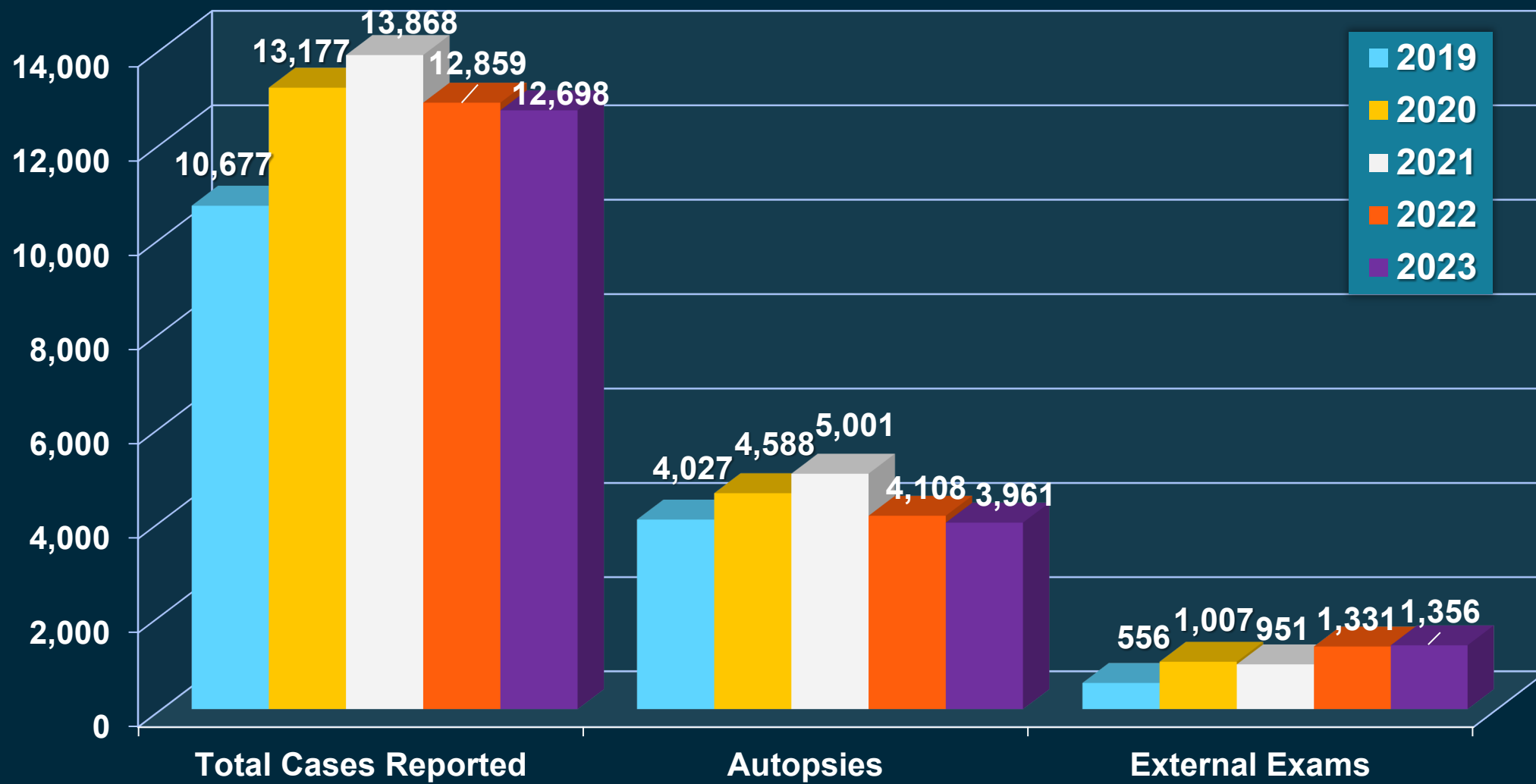
- **69%** of ML cases (**3,657**) received a full autopsy examination
  - **6%** of ML cases (**304**) received a partial autopsy exam
  - **25%** of ML cases (**1,356**) received an external examination
- **3,719** scenes attended by Forensic Investigators
- **439** referrals to Harris County Bereavement Services
- **13** decedents remain unidentified after six months or longer

# Harris County Population Statistics on Death



\* Deaths reported to IFS includes ML cases, certification only, and inquests  
 \*\* Deaths certified by IFS includes ML cases and certification only

# Total County Caseload (2019 - 2023)



# Monthly Medicolegal Caseload 2023



# Average Daily Medicolegal Caseload

## Months with **HIGHEST** Average Daily Caseload

- 2023 August : **18** cases
- 2022 January : **18** cases
- 2021 August : **19** cases

## Top 5 Days with **HIGHEST** Cases Received

2022	# of Cases	2023	# of Cases
January 23	<b>30</b>	January 1	<b>30</b>
February 18	<b>29</b>	February 3	<b>27</b>
January 3	<b>28</b>	November 2	<b>26</b>
January 17	<b>26</b>	July 27	<b>25</b>
January 22	<b>26</b>	August 24	<b>24</b>

**2023**

**14.6 cases**

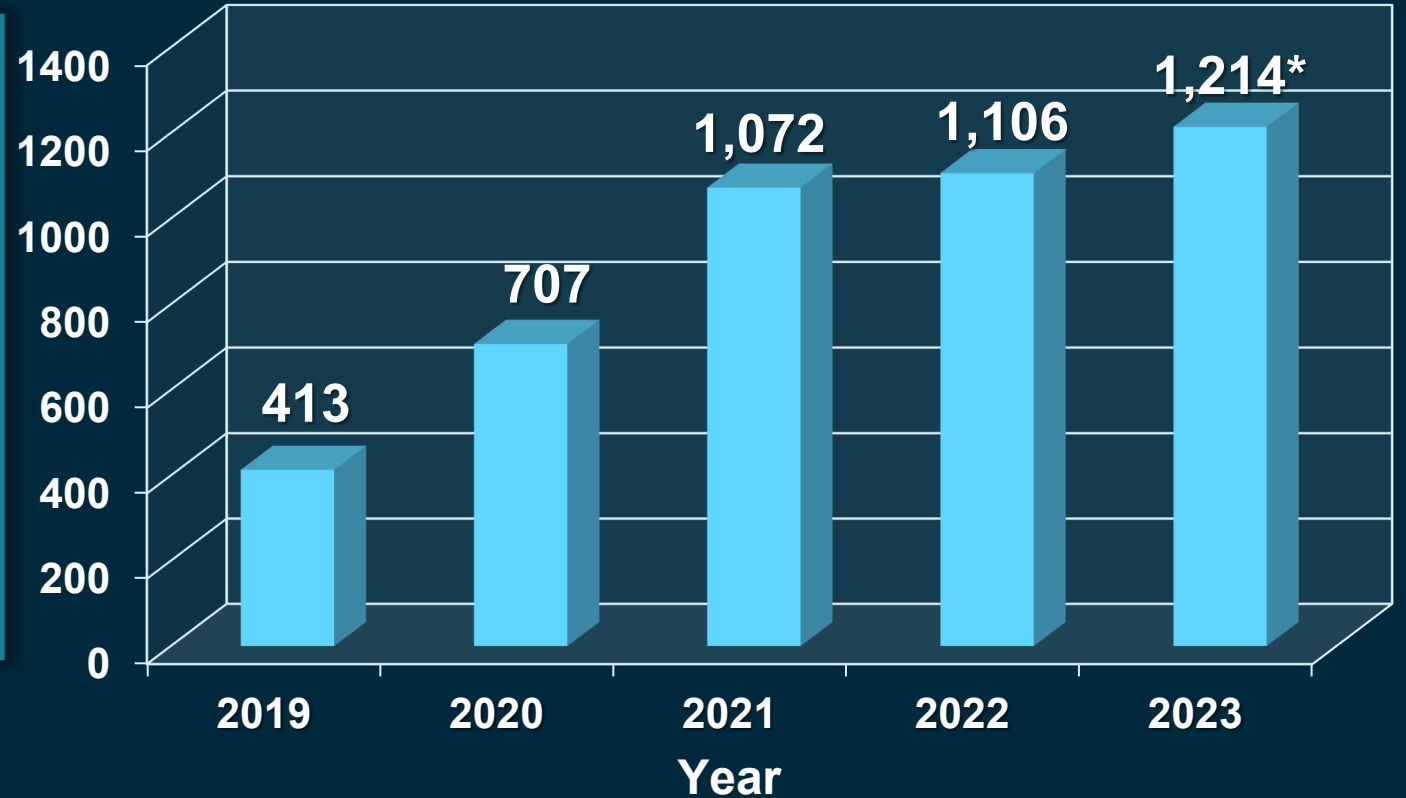
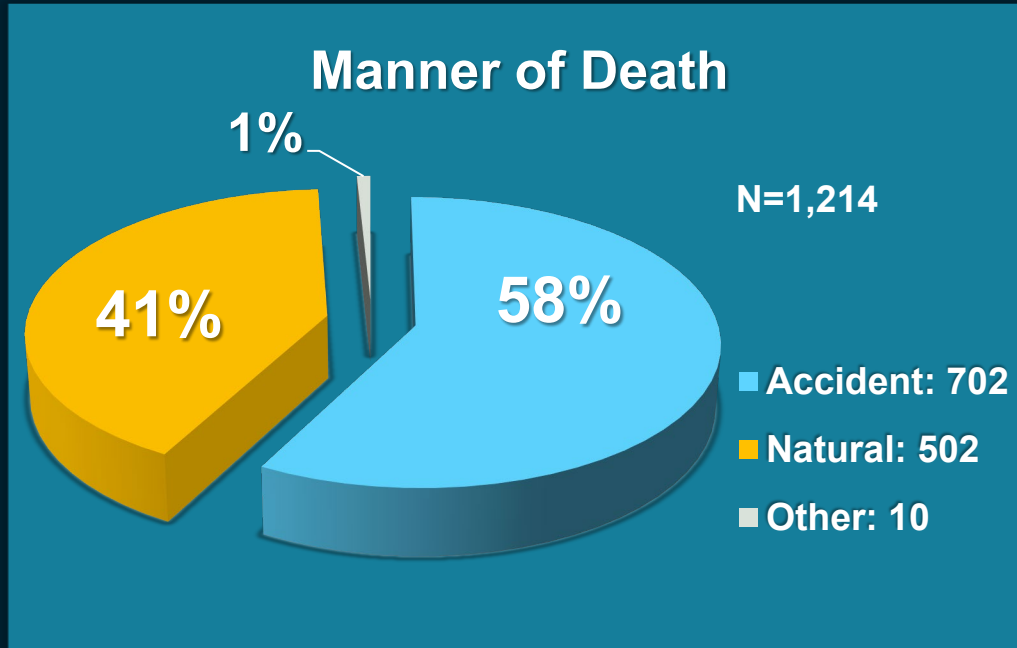
**2022**

**14.9 cases**

**2021**

**16.3 cases**

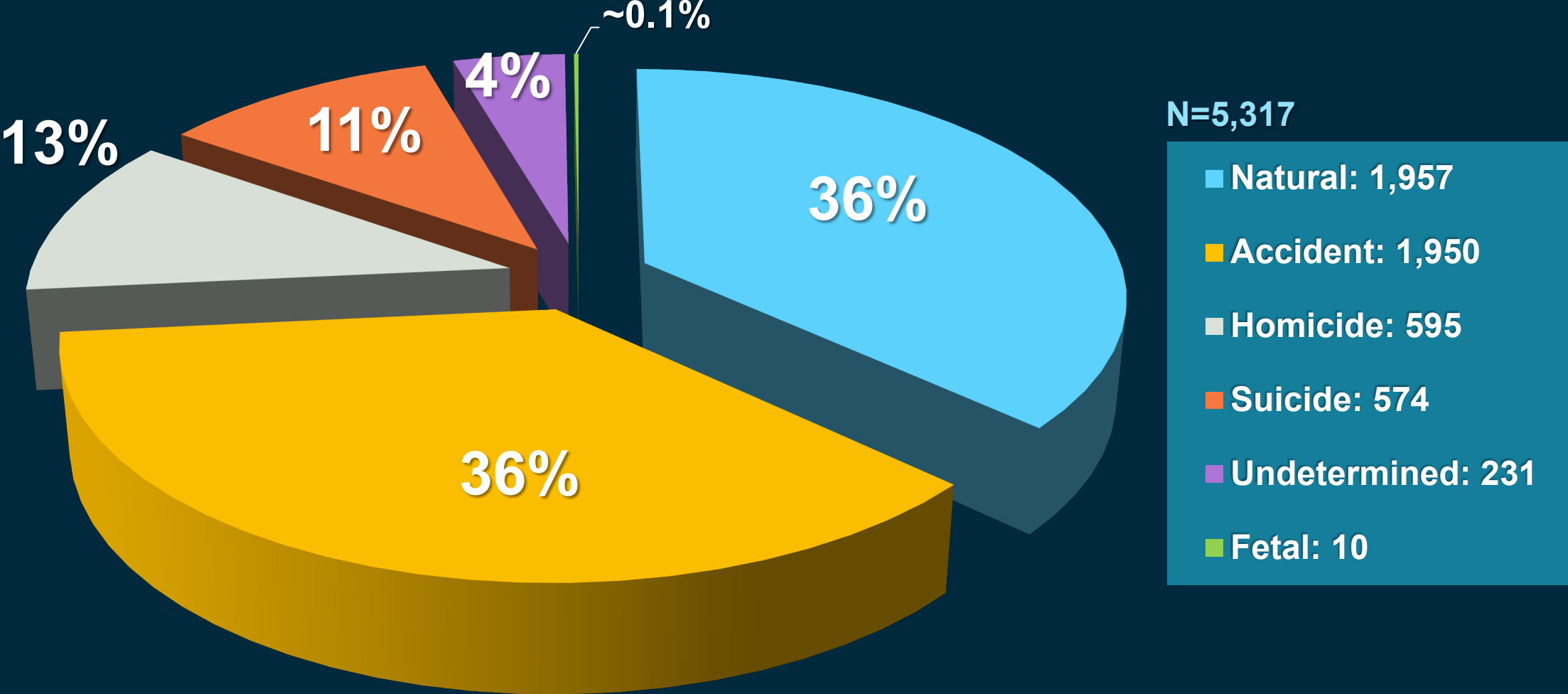
# Certification Only Cases



“Certification only” is a death investigation in which the medical examiner accepts jurisdiction and completes the death certificate, but the body of the deceased is not brought to HCIFS. There is sufficient medical/clinical information and investigative findings to properly classify the cause and manner of death. Hip fractures and head injuries after a fall are common examples.

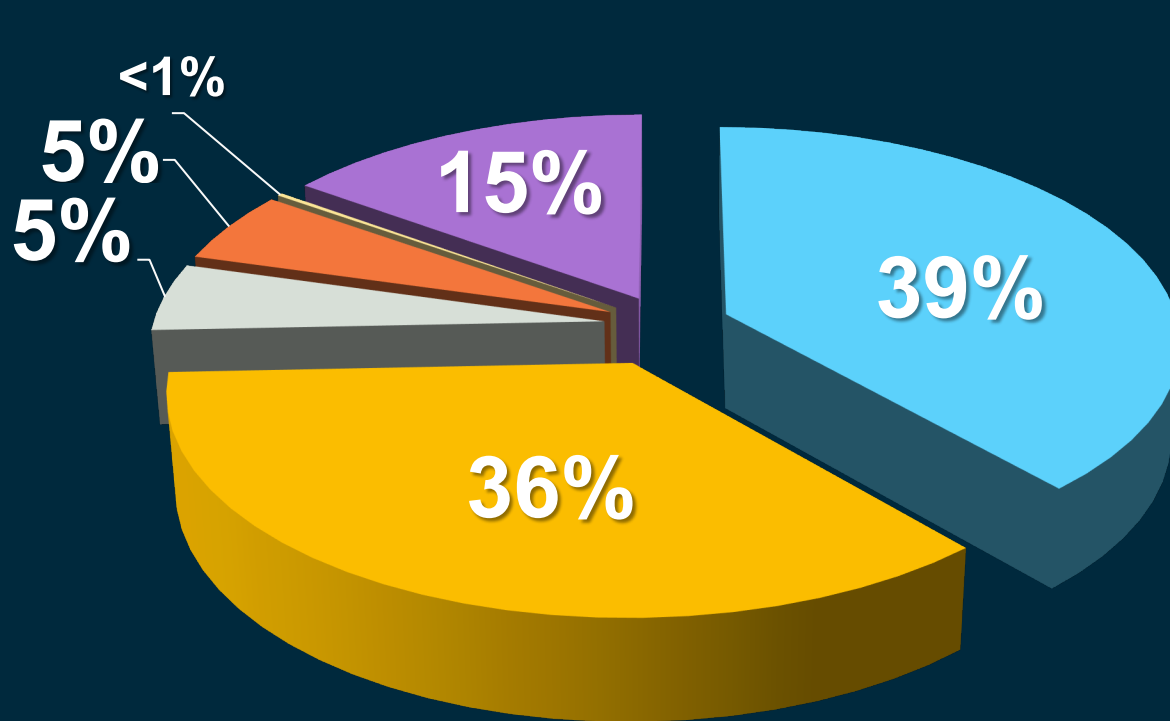
*\*2023 had a 10% increase from 2022; a record high for certification only cases.*

# Manner of Death - Autopsy and External Examinations Combined



# Manner of Death by Autopsy and External Examinations

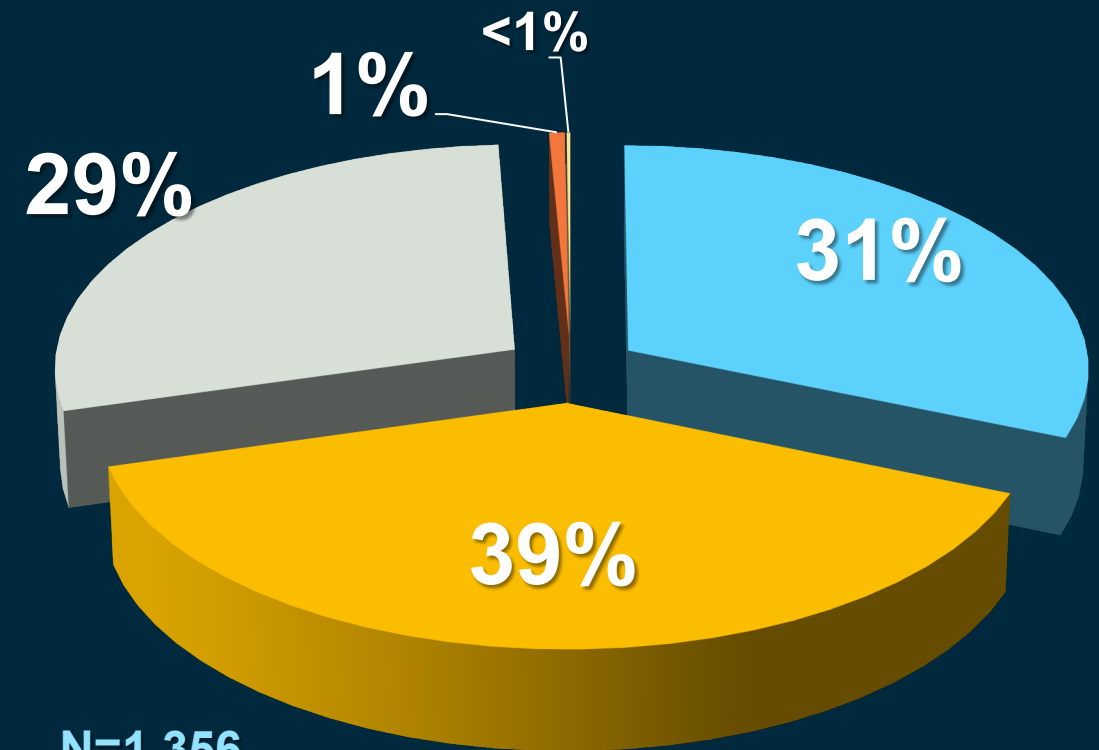
## Autopsy Examinations



N=3,961

- Natural: 1,526
- Accident: 1,419
- Suicide: 200
- Undetermined: 212
- Fetal: 9
- Homicide: 595

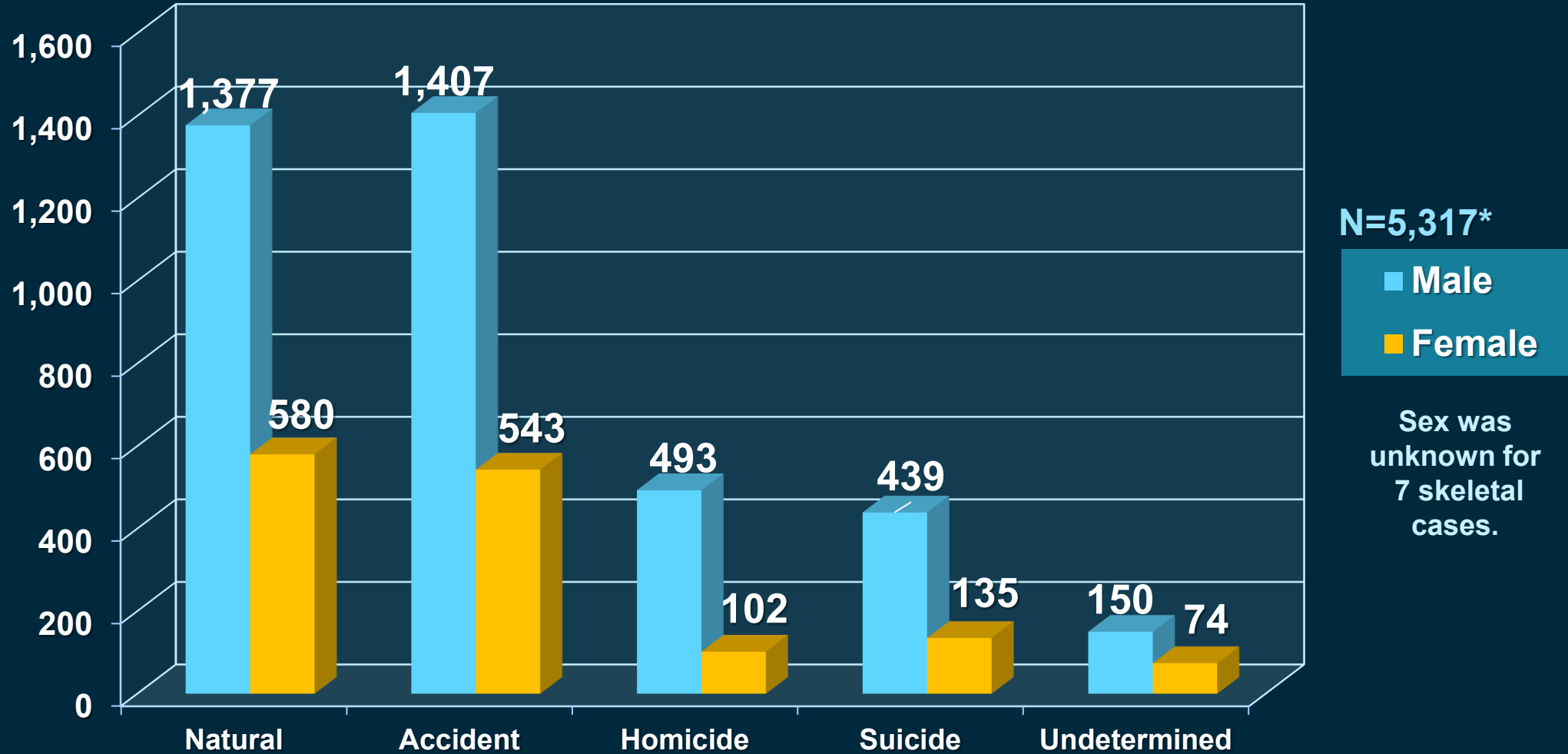
## External Examinations



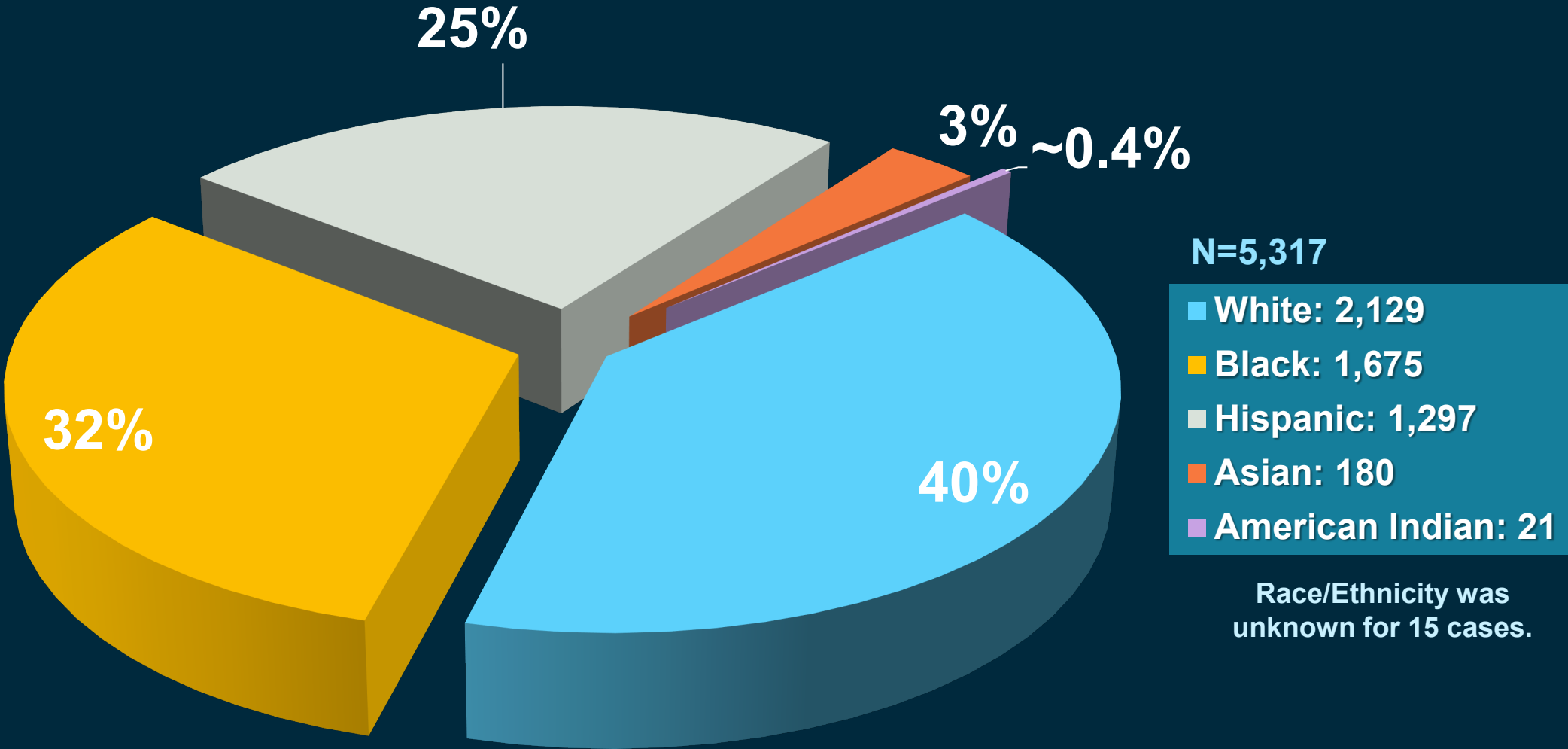
N=1,356

- Natural: 431
- Accident: 531
- Suicide: 374
- Undetermined: 19
- Fetal: 1

# Manner of Death by Sex

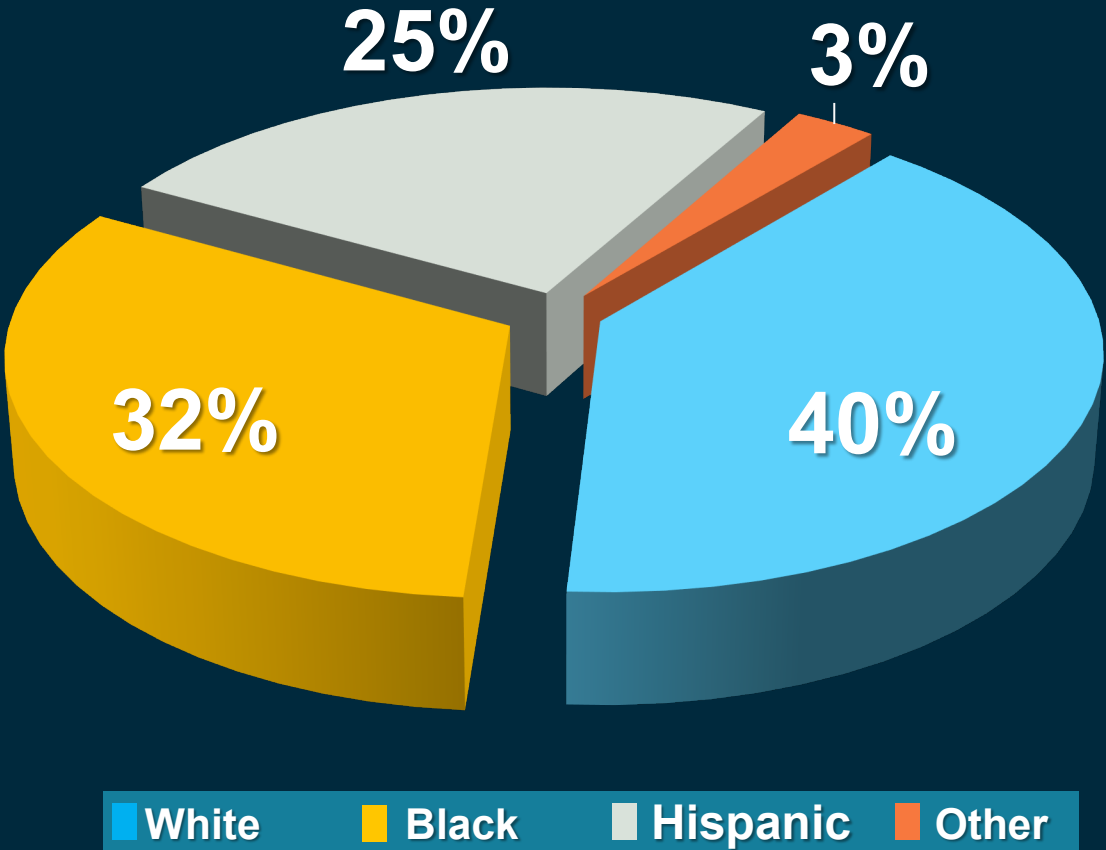


# Race/Ethnicity of Medicolegal Cases

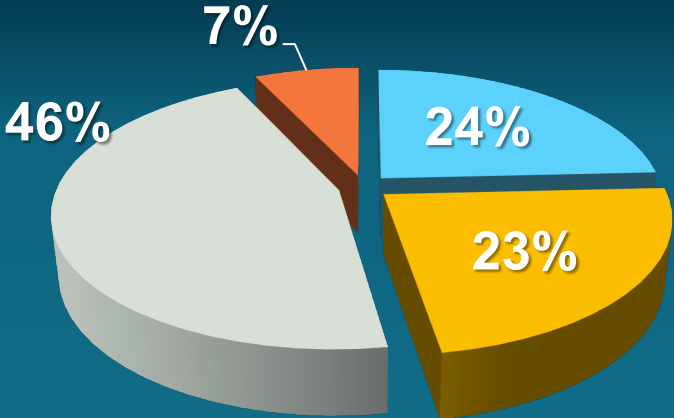


# Race/Ethnicity Demographics Compared to Population

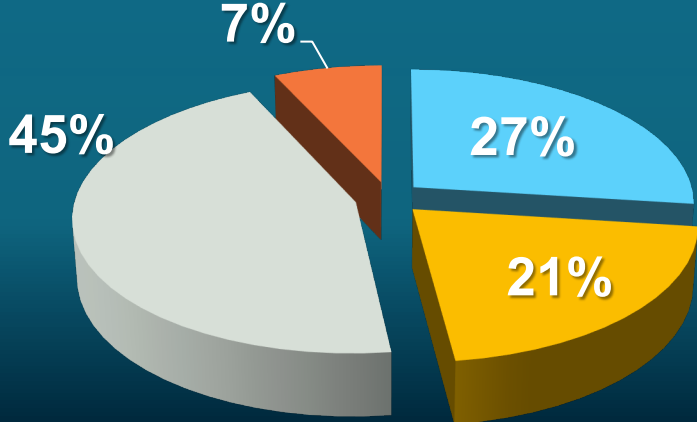
HCIFS Decedent Population\*



Houston City Population\*\*



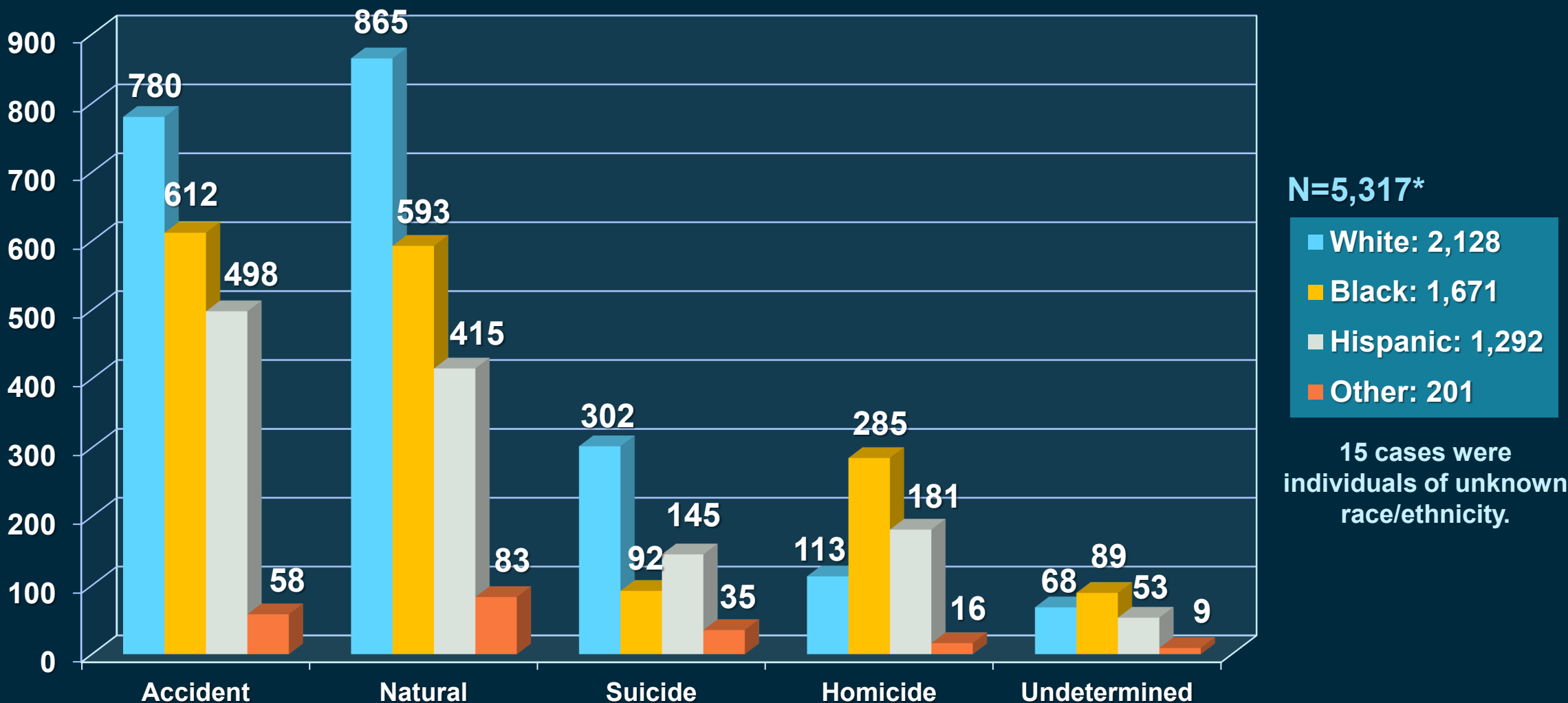
Harris County Population\*\*\*



■ White   
 ■ Black   
 ■ Hispanic   
 ■ Other

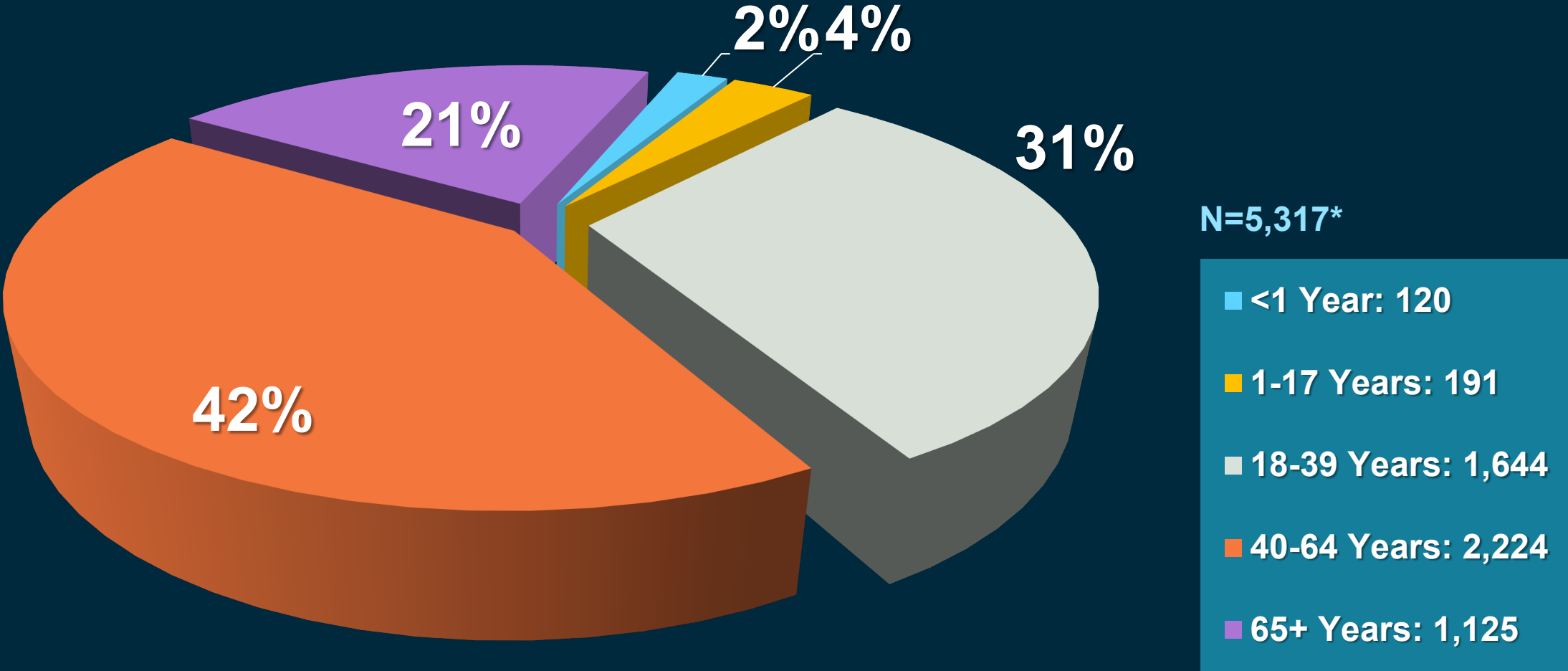
\* HCIFS decedent population for 2023, N=5,317, excludes unknown race/ethnicity  
 \*\* City of Houston population for 2023, N=2,323,285, estimated by U.S. Census Bureau  
 \*\*\* Harris County population for 2023, N=4,835,125, estimated by U.S. Census Bureau

# Medicolegal Cases by Manner and Race/Ethnicity



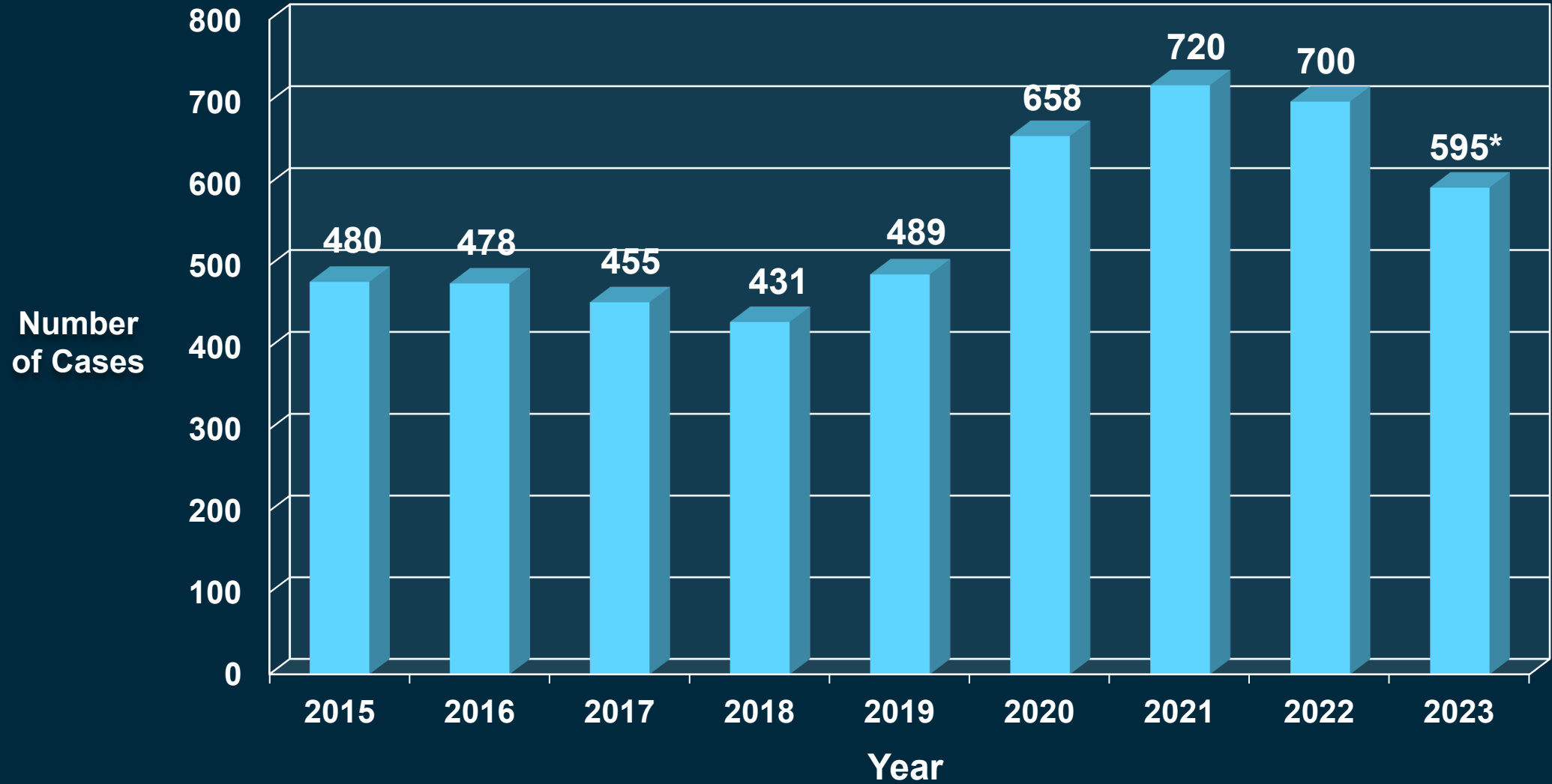
\*10 fetal cases were excluded from the total

# Medicolegal Cases by Age



\*13 cases with unknown age

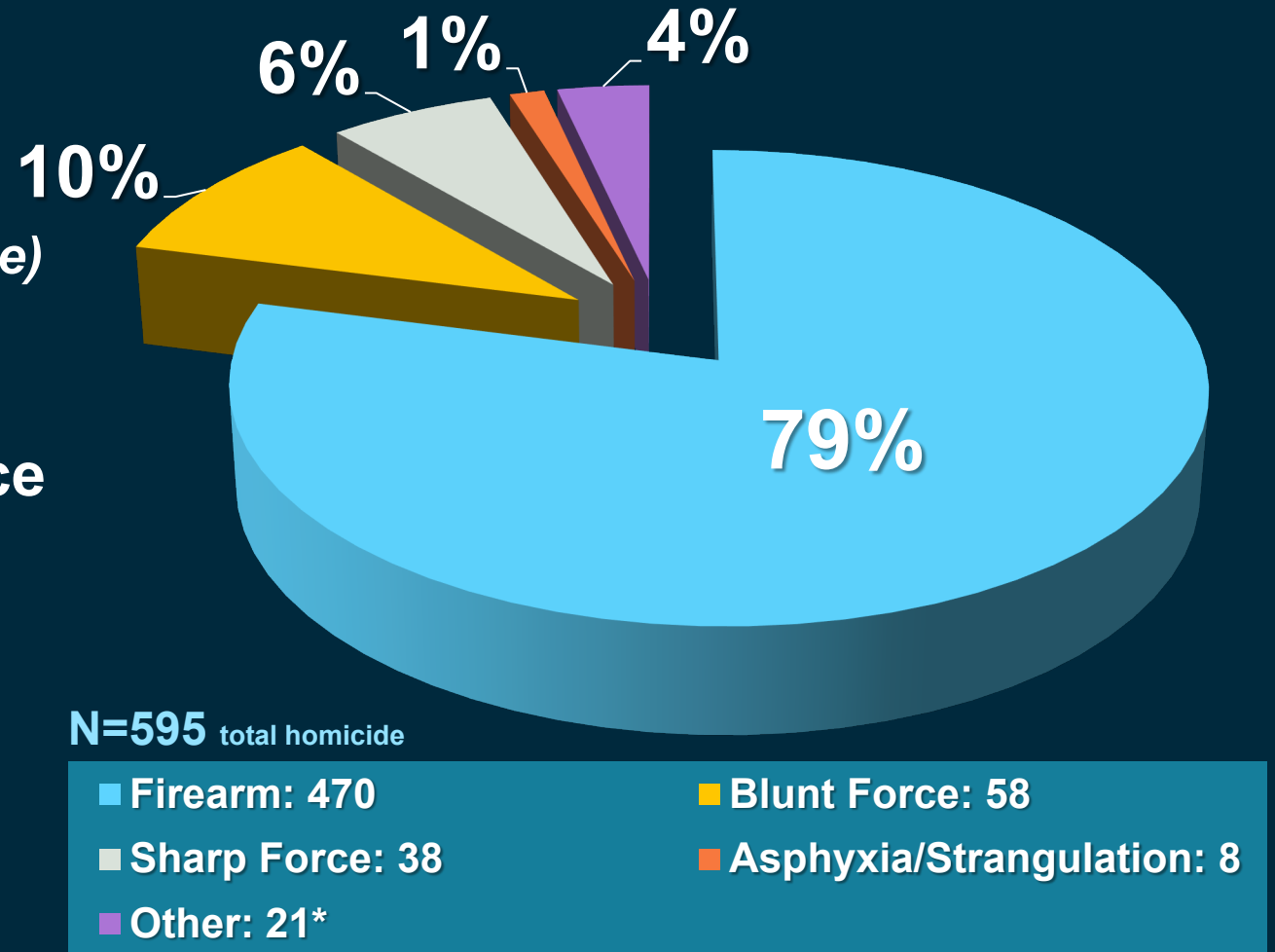
# Homicide Cases



*\*This is a 15% decrease from 2022 and an 22% increase from 2019 (year before COVID).*

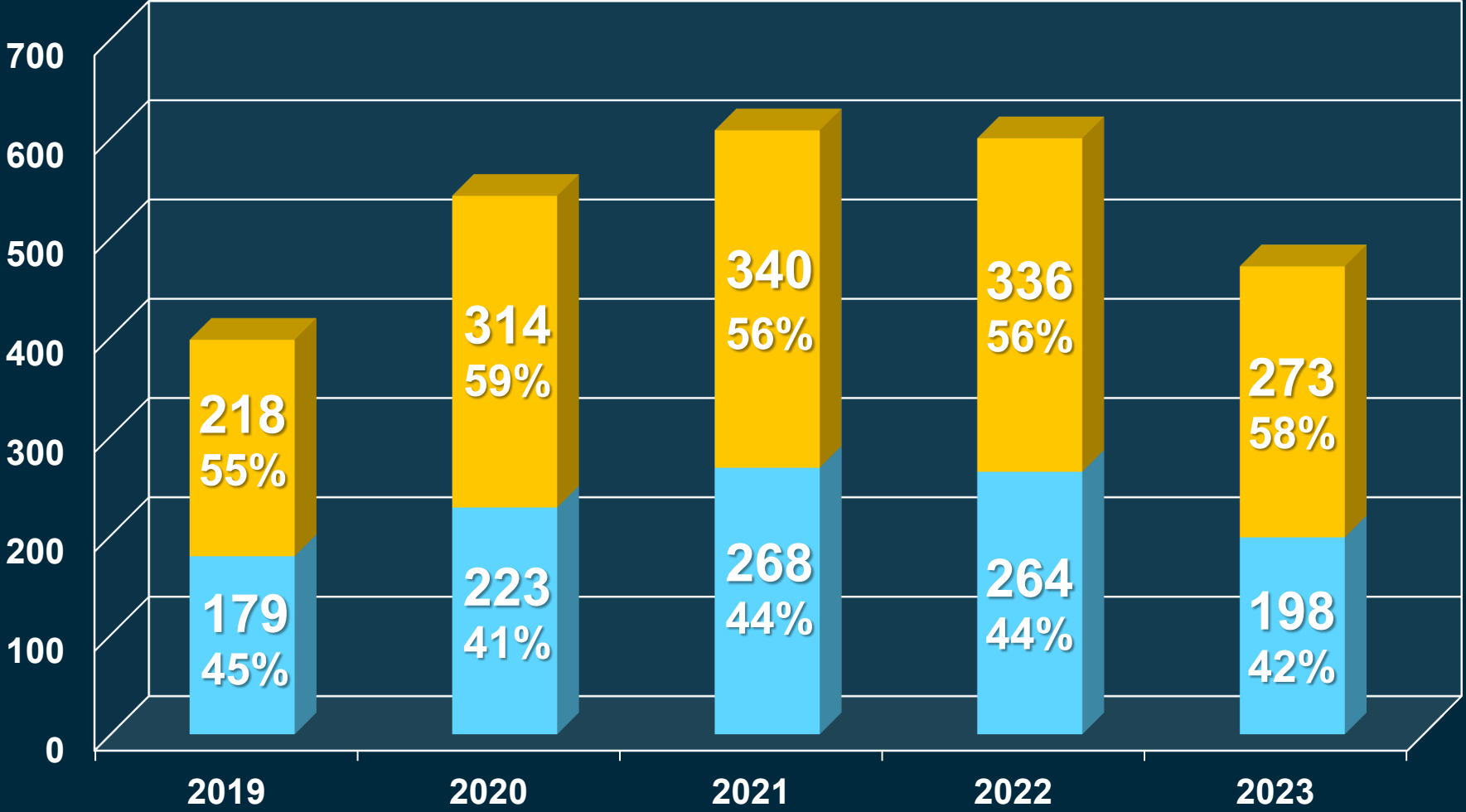
# Cause of Death in Homicide Cases

- **37** cases were linked to at least one other medicolegal case (e.g., double homicide, homicide-suicide)
- At least **45** homicide cases were associated with domestic violence
- **3** homicide deaths occurred “while at work”



\*Other causes include the combined use of firearm/sharp force/blunt force (7), drug toxicity (5), homicidal violence (1), neglect (5), thermal injury (1), and drowning (2).

# Homicide Deaths by Firearms\*

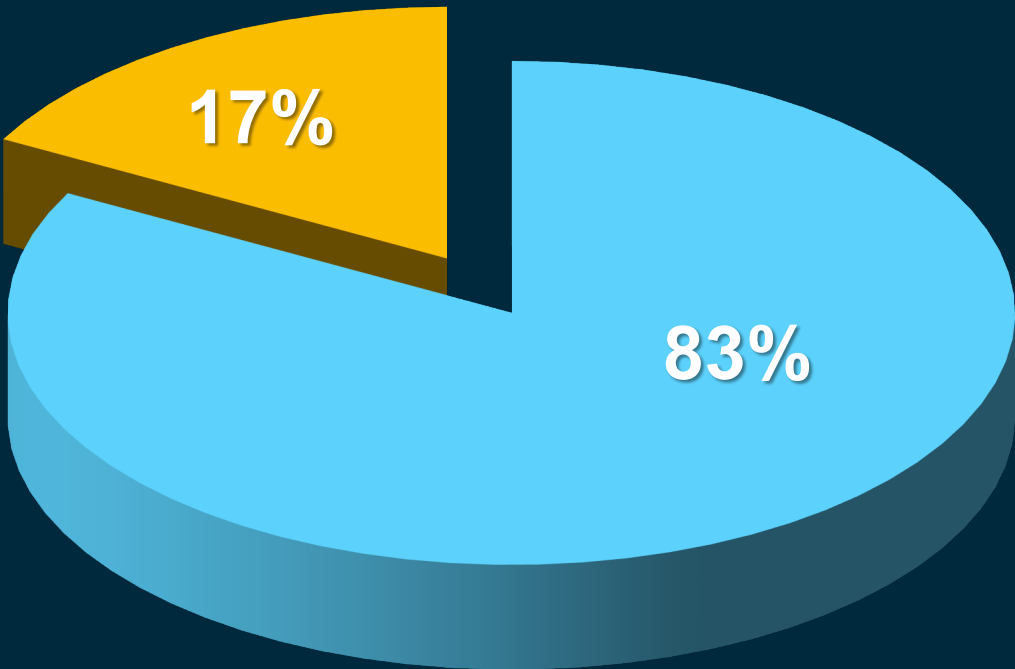


■ Single Wound ■ Multiple Wounds

\*Excludes shotgun cases

# Homicide Cases by Demographics

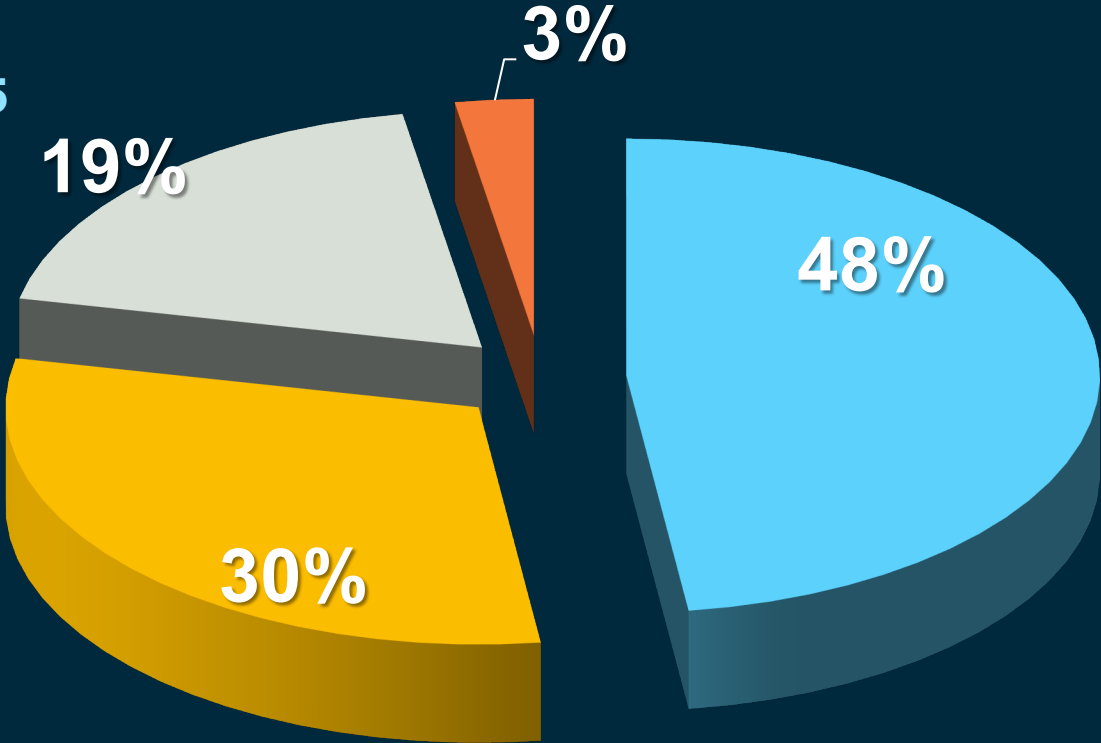
### Sex



■ Male: 493   ■ Female: 102

### Race/Ethnicity

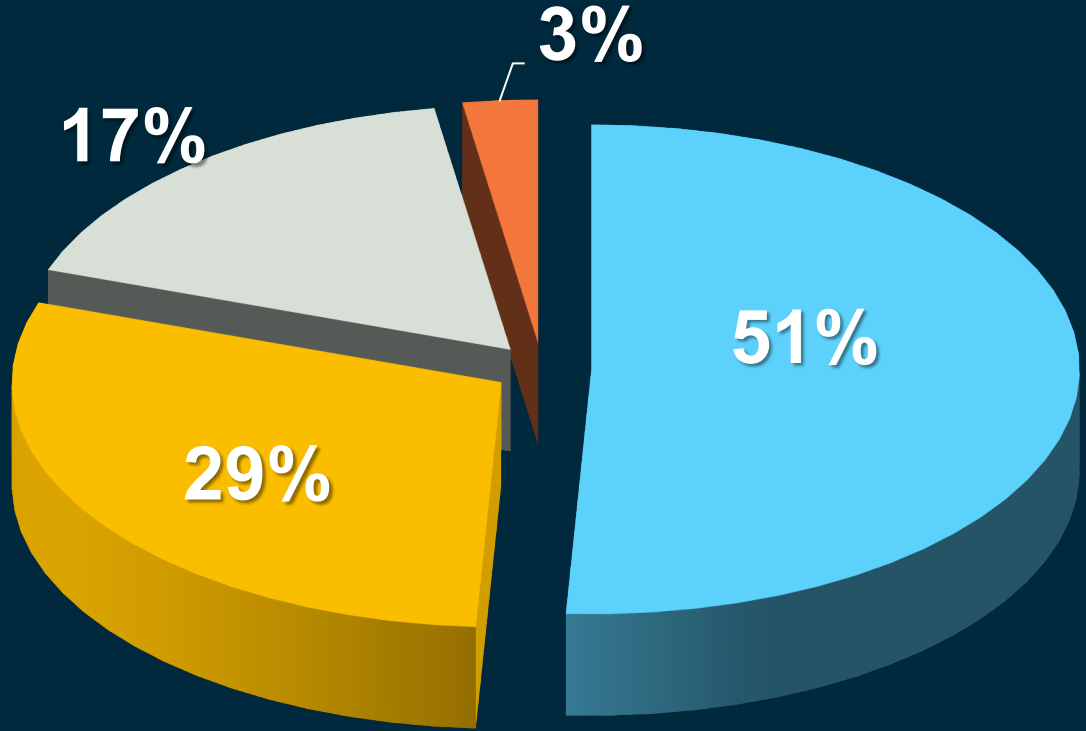
N=595



■ Black: 285   ■ Hispanic: 181  
■ White: 113   ■ Asian: 16

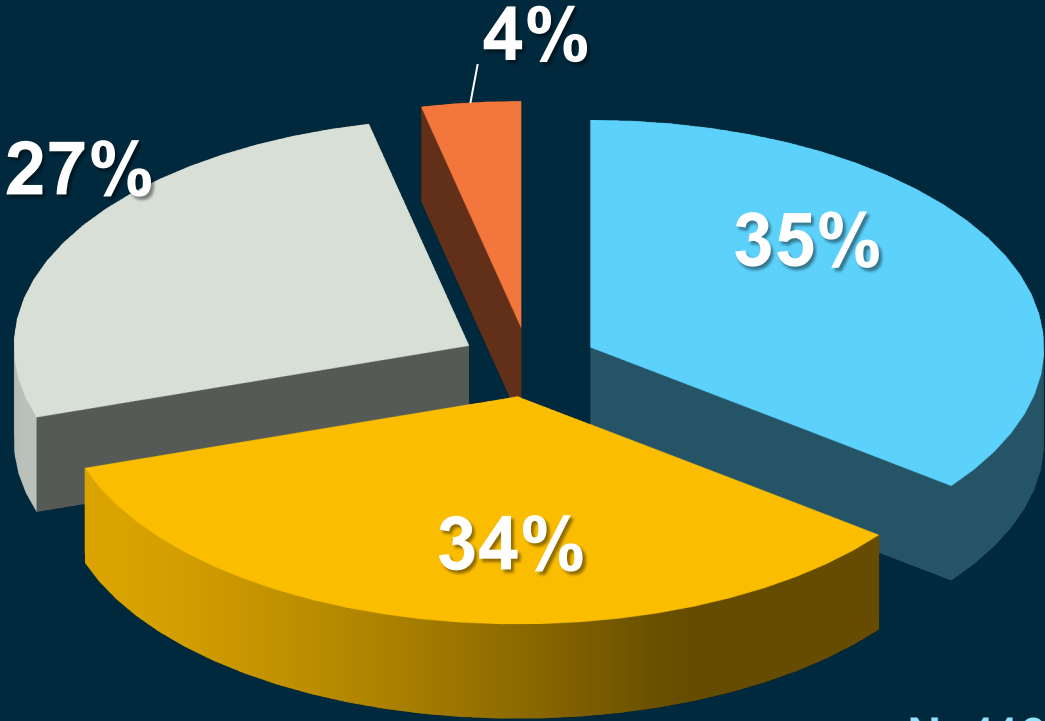
# Homicide Cases by Race/Ethnicity and Location

### City of Houston



N=482\*

### Harris County Excluding the City of Houston

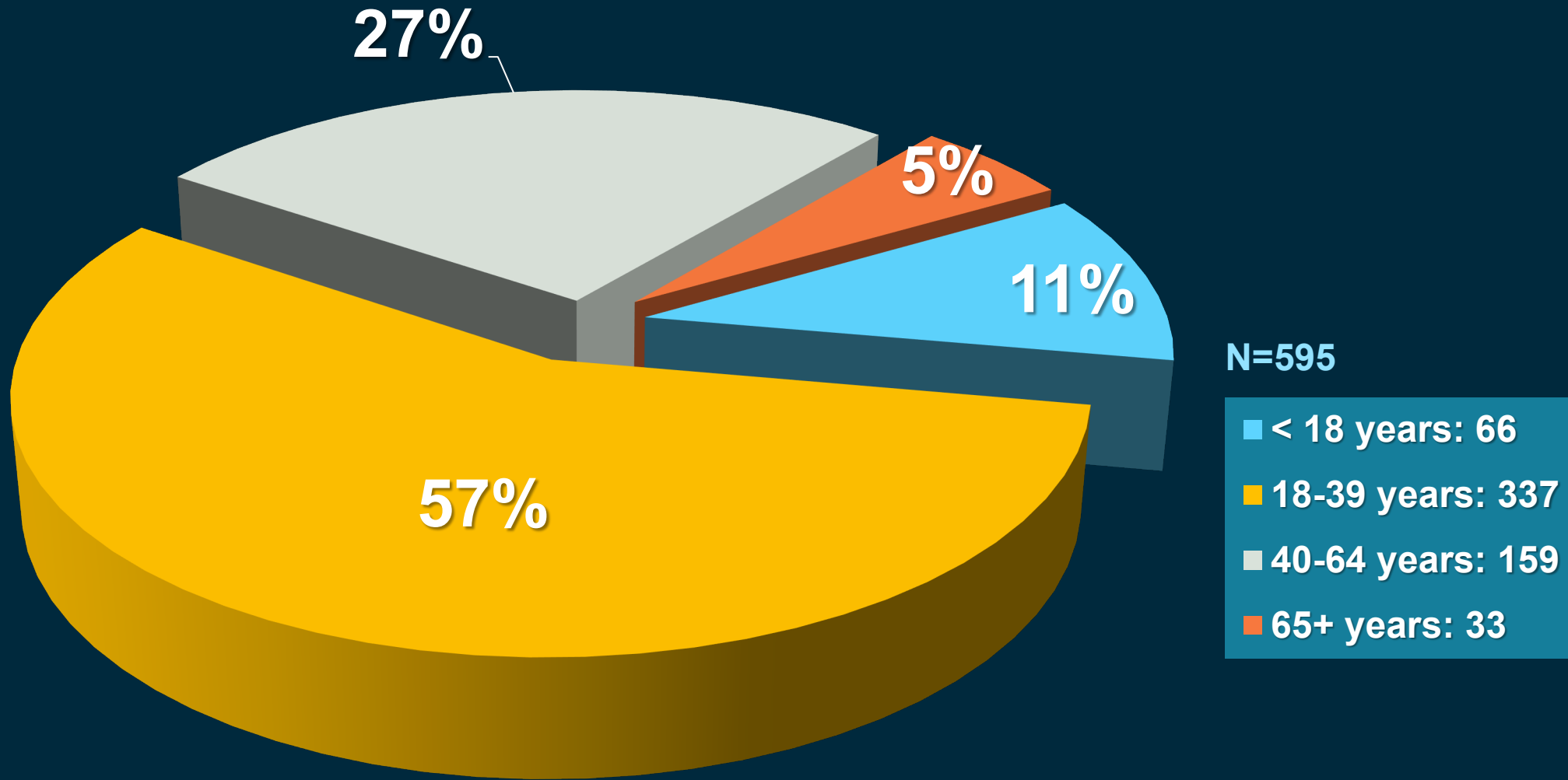


N=113

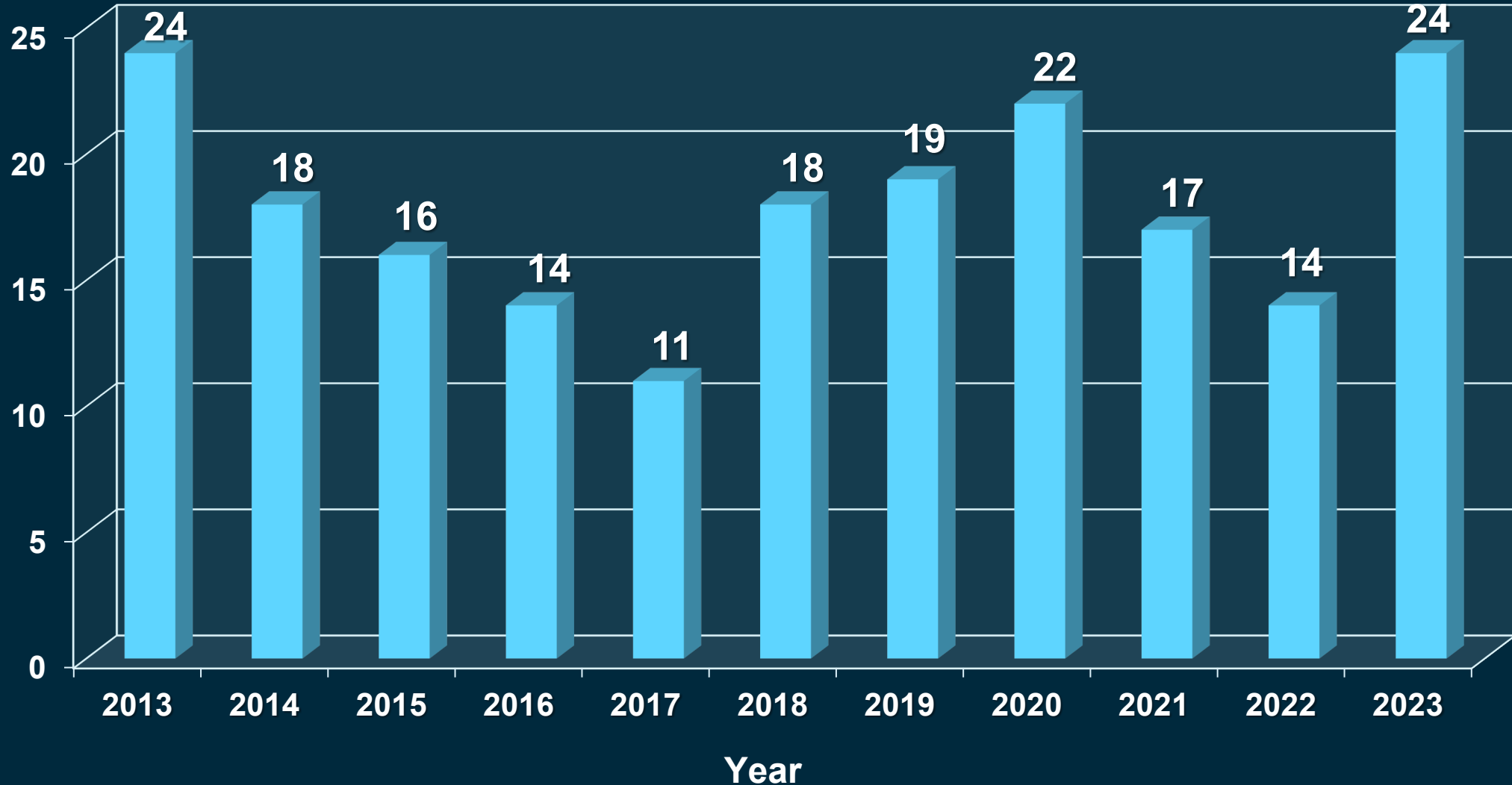
■ Black ■ Hispanic ■ White ■ Asian

*\*482 homicide cases were attributed to injury locations within the City of Houston based on the address of the place of injury and law enforcement jurisdiction.*

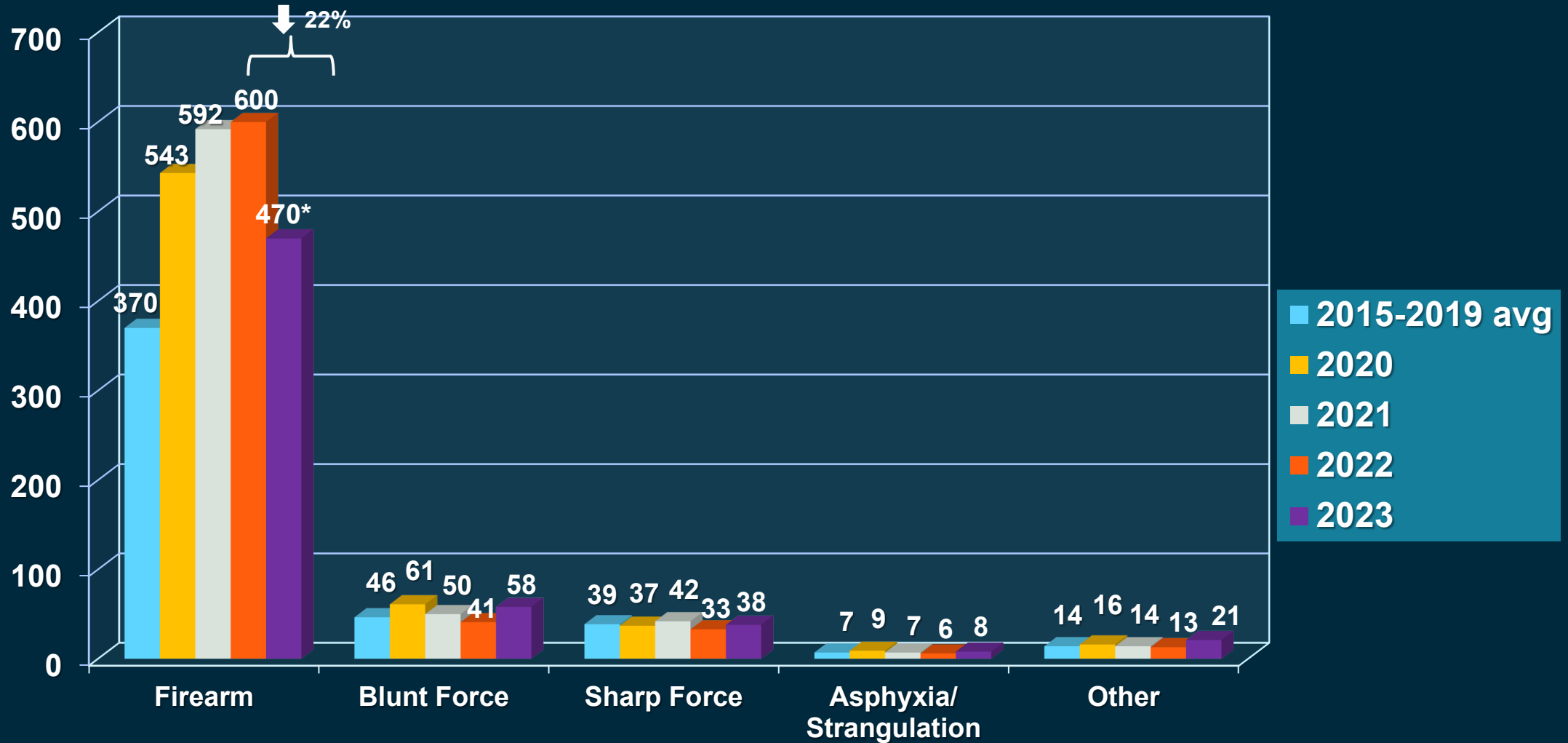
# Homicide Cases by Age



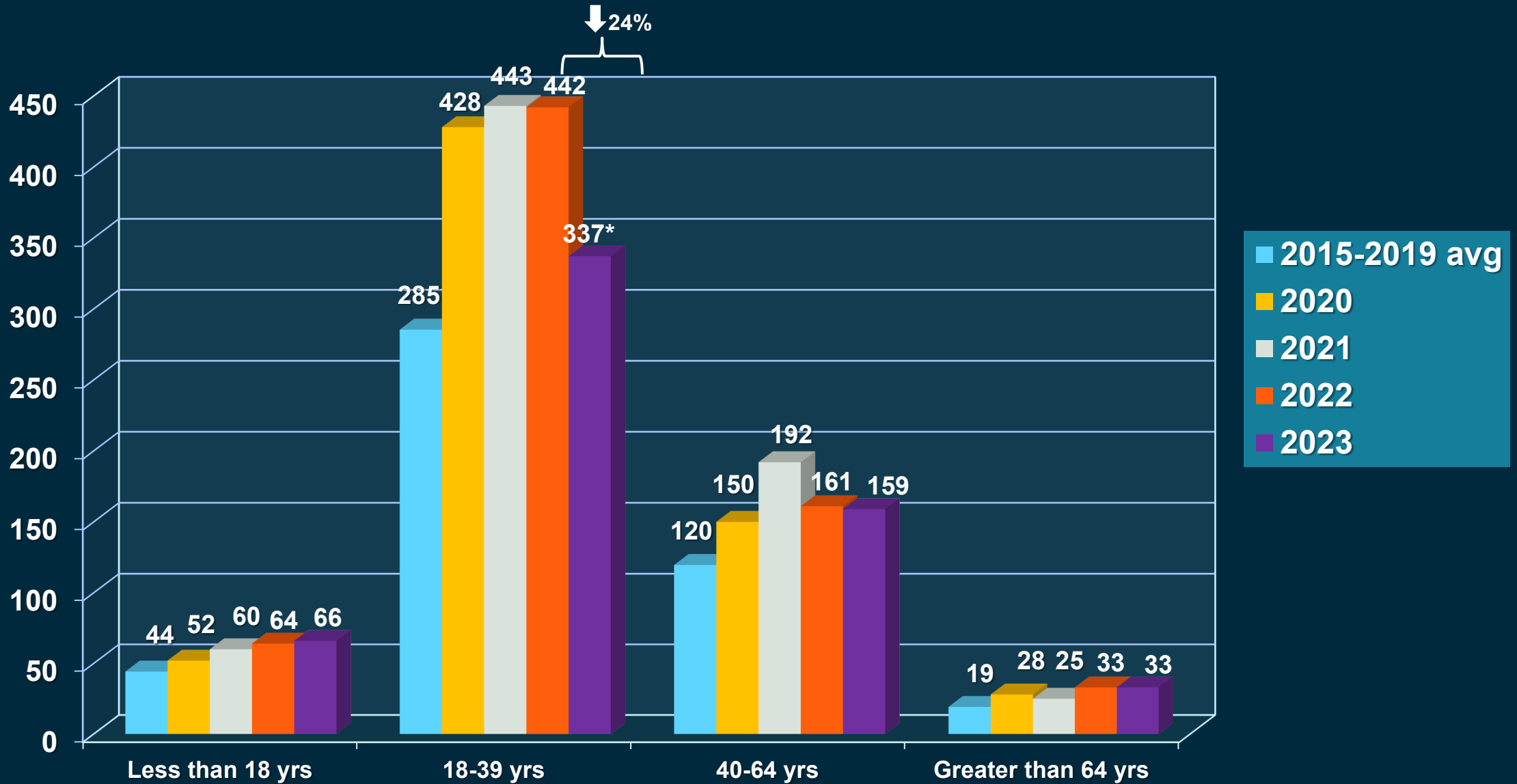
# Homicides of Infants and Toddlers (Age 0 - 4)



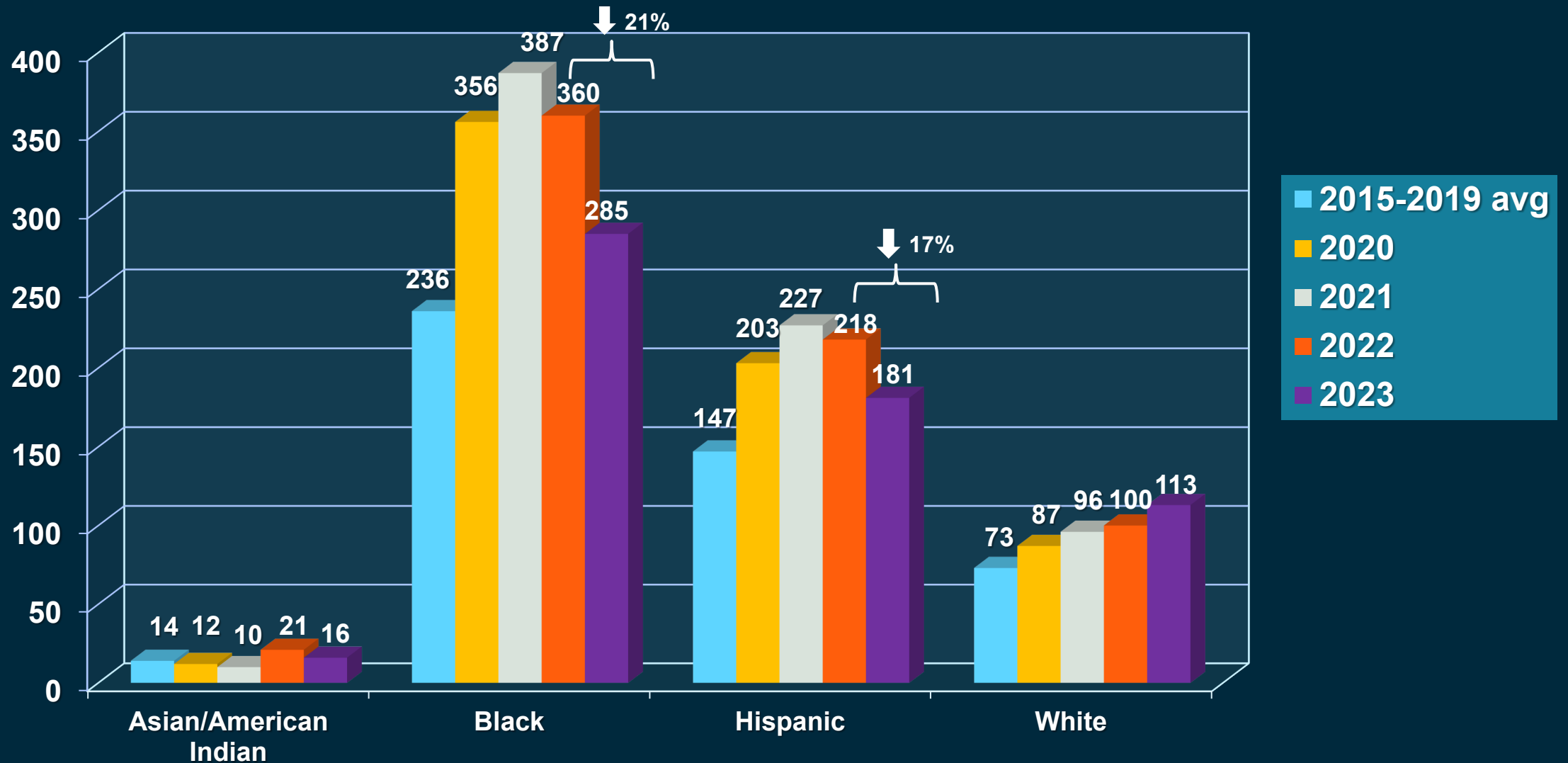
# Homicide Case Comparison Between Years by Cause



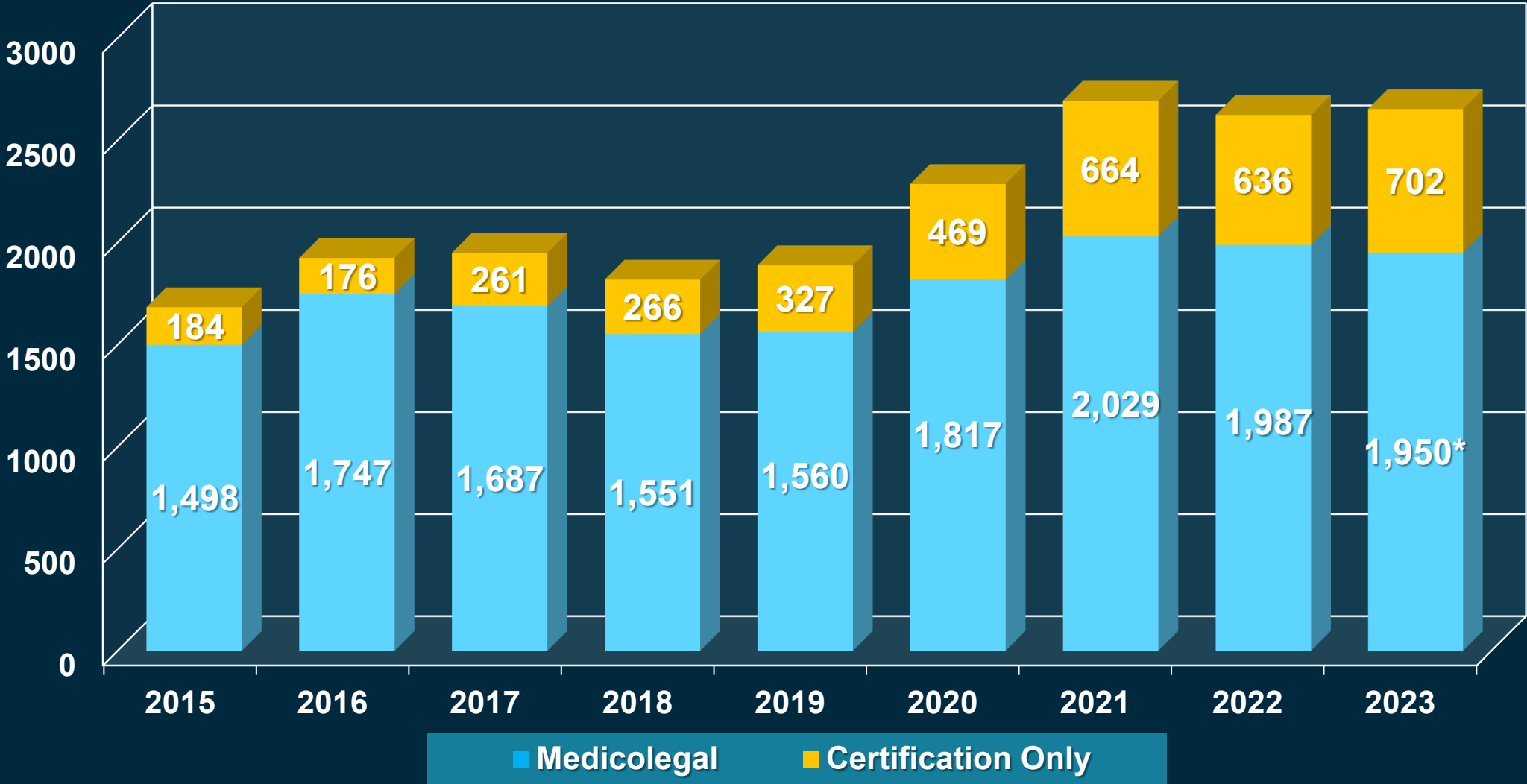
# Homicide Case Comparison Between Years by Age



# Homicide Case Comparison Between Years by Race

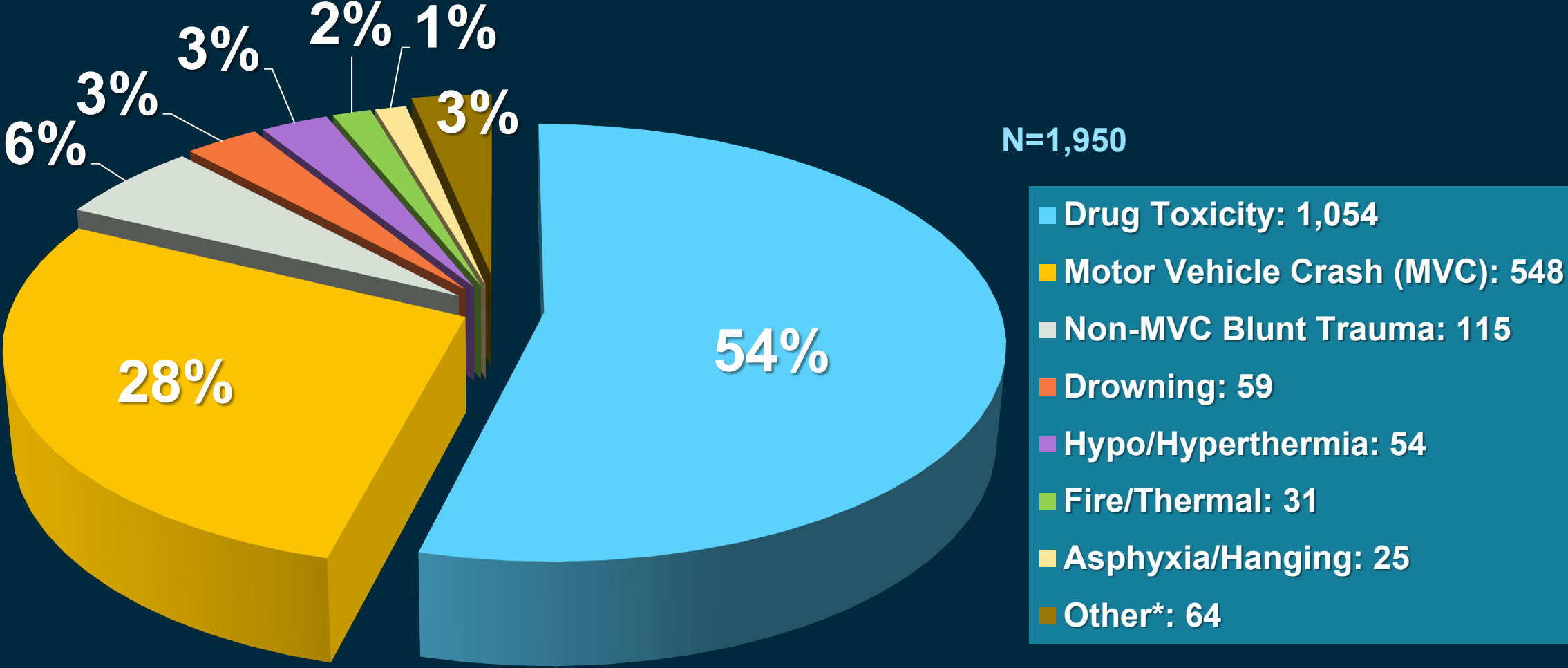


# Medicolegal Accidental Deaths



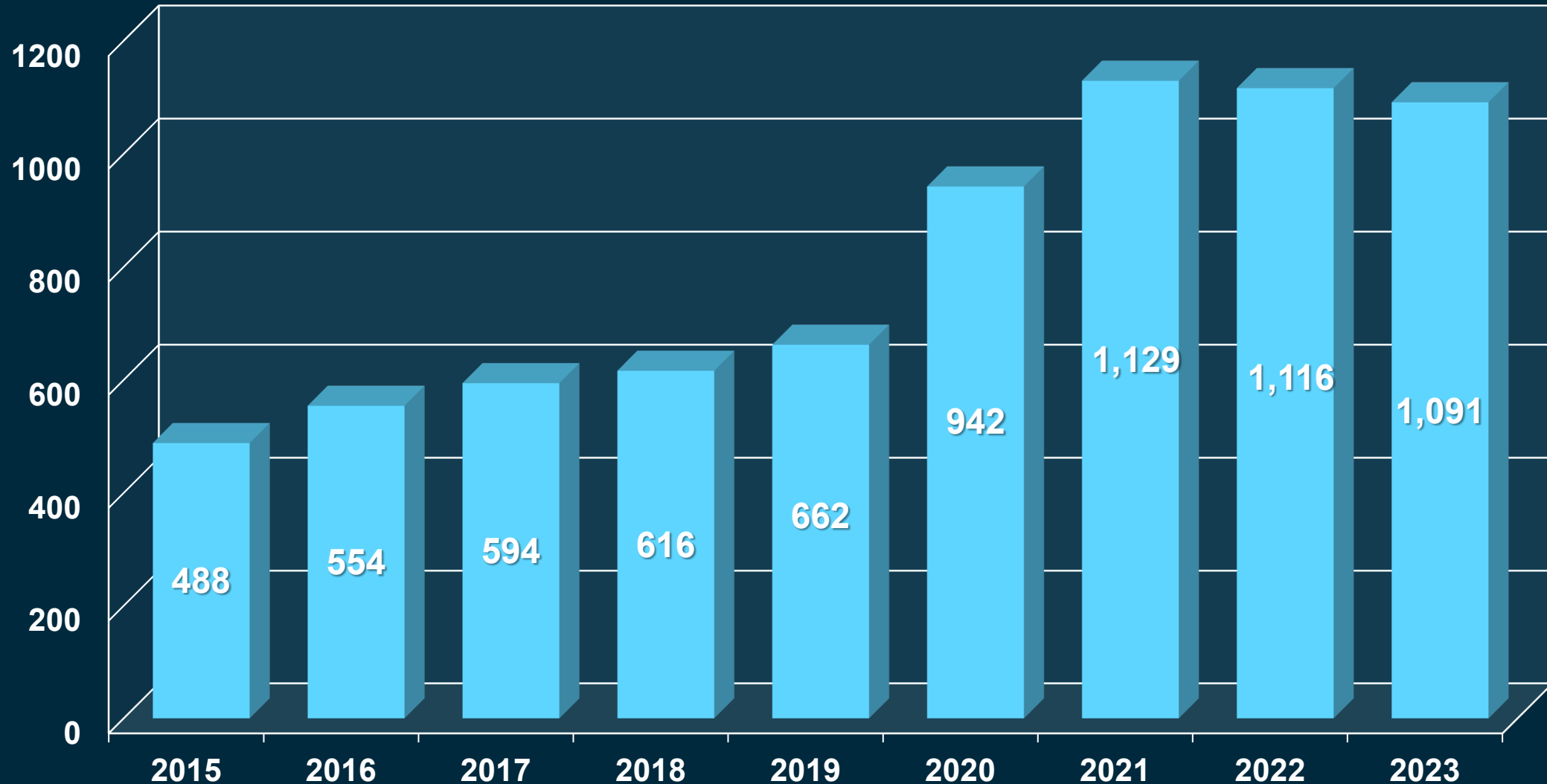
\*40% increase compared to 2019 (year before COVID)

# Primary Causes of Medicolegal Accidental Deaths

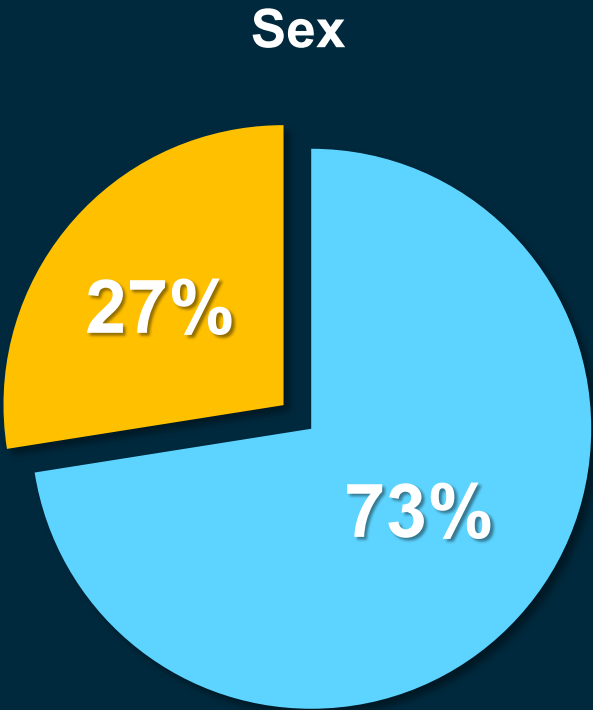


\*Other category includes firearm injuries, sharp force injuries, and therapeutic complications.

# Total Accidental Deaths Associated with Drug Toxicity (primary or secondary cause)

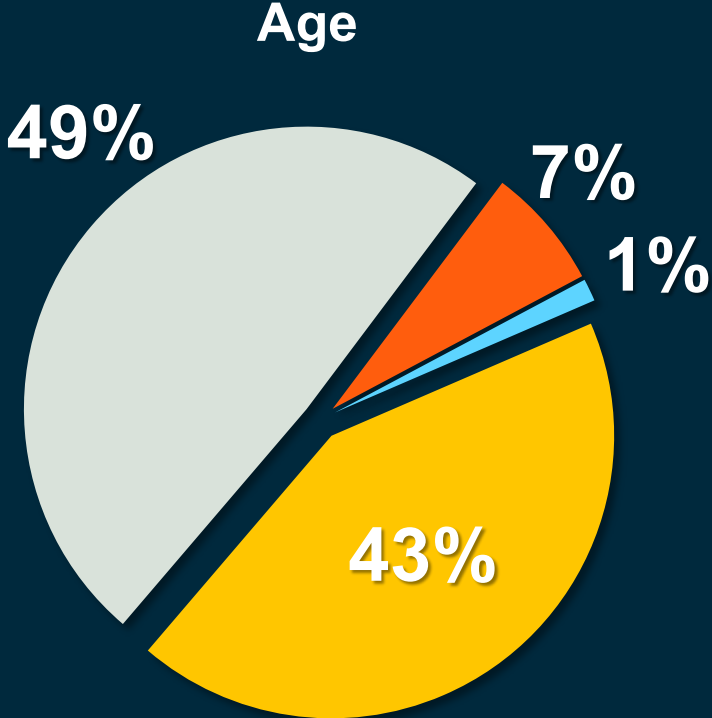


# Drug Toxicity Demographics in Accidental Deaths



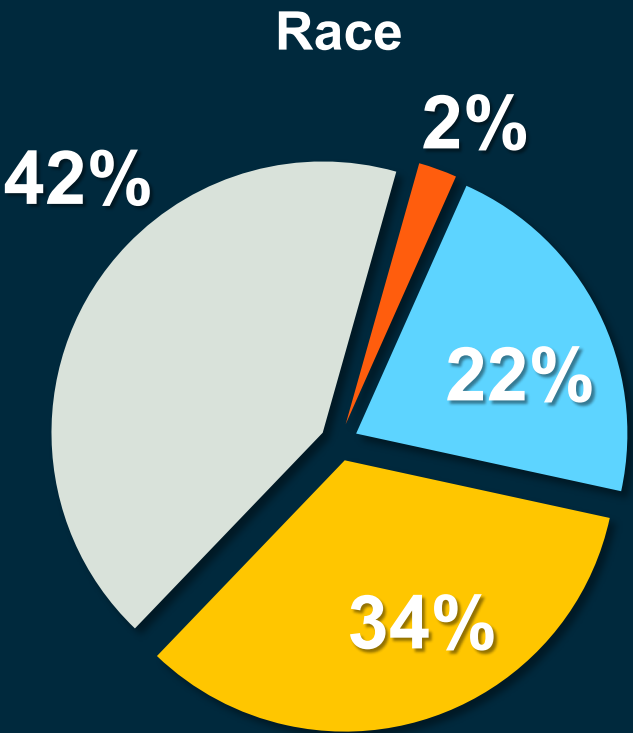
**N=1,091**

- Male: 791
- Female: 300



**N=1,090\***

- Under 18 years: 14
- 18 - 39 years: 466
- 40 - 64 years: 534
- 65+ years: 76



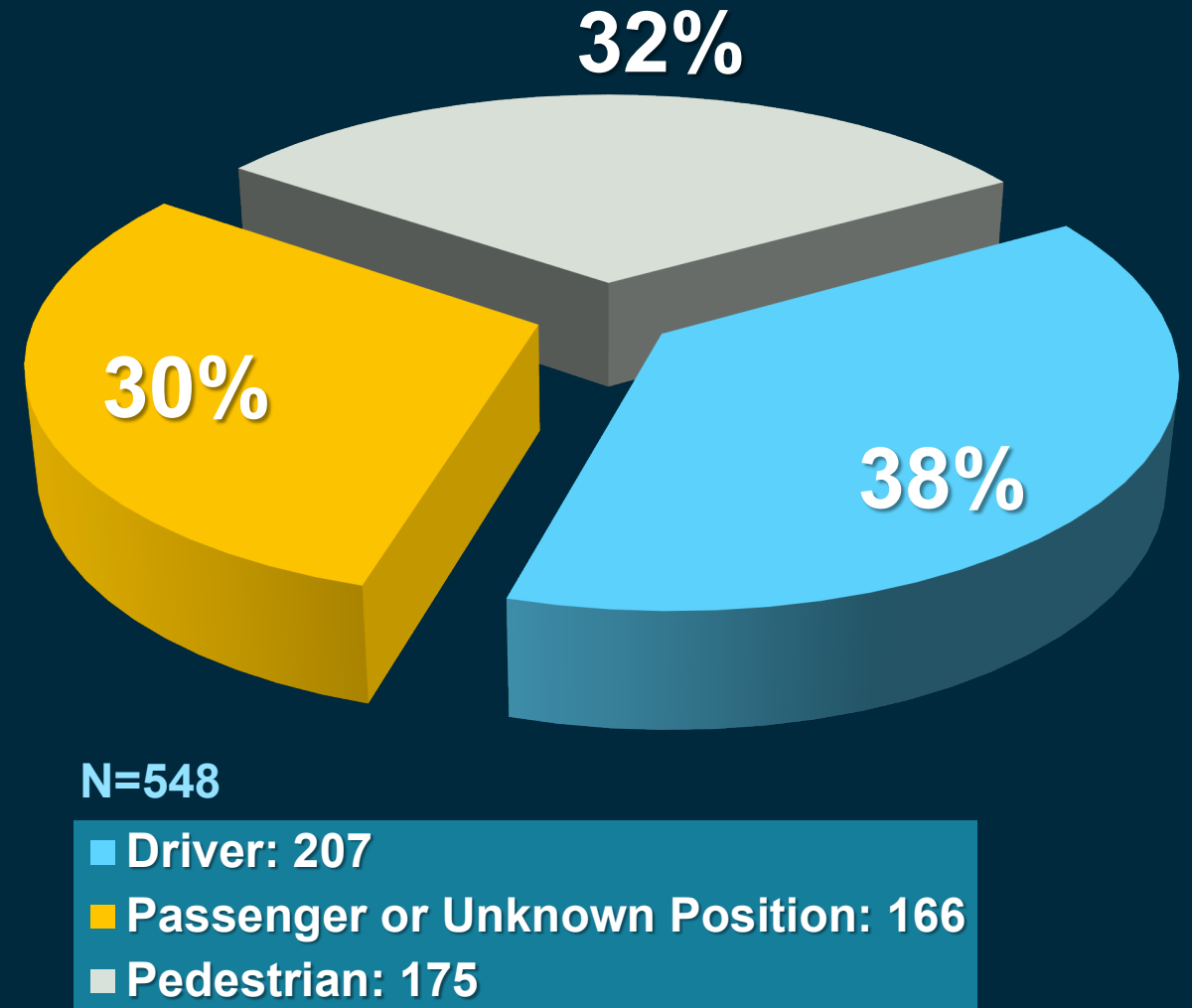
**N=1,090\***

- Hispanic: 237
- Black: 368
- White: 460
- Asian: 25

\*One case with unknown age and race.

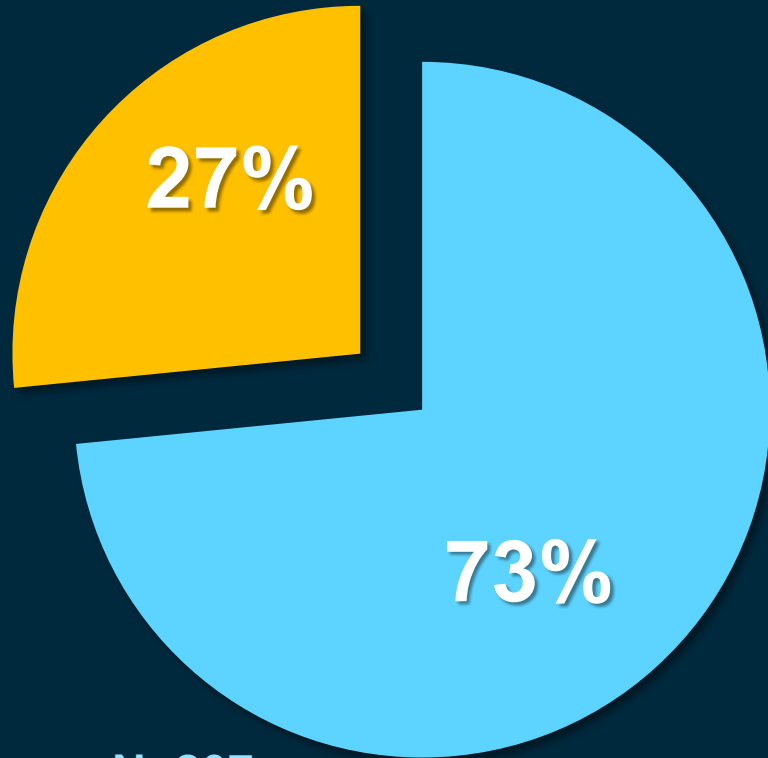
# Motor Vehicle Crash (MVC) Cases in Accidental Deaths

- MVC fatalities include **30** children, ages 2 months to 17 years old
- **12** children were hit as pedestrians
- **23%** of driver fatalities (**47**) were under 25 years old
- **25** stranded motorists were hit and killed



# MVC Driver Demographics in Accidental Deaths

## Driver's Sex

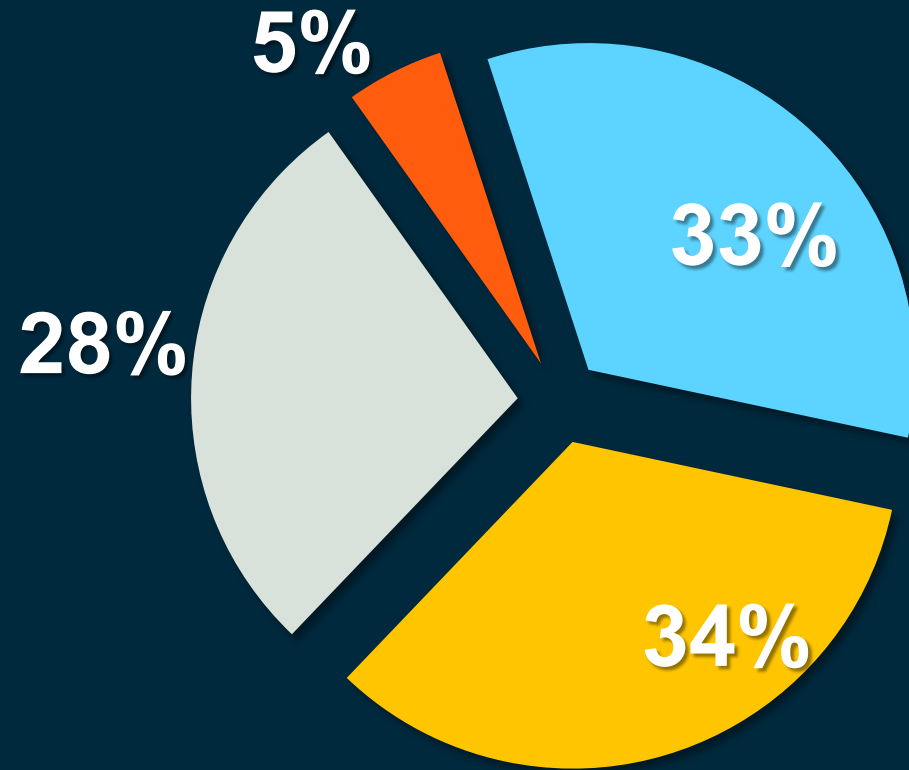


N=207

■ Male: 152

■ Female: 55

## Driver's Race



N=207

■ Hispanic: 69

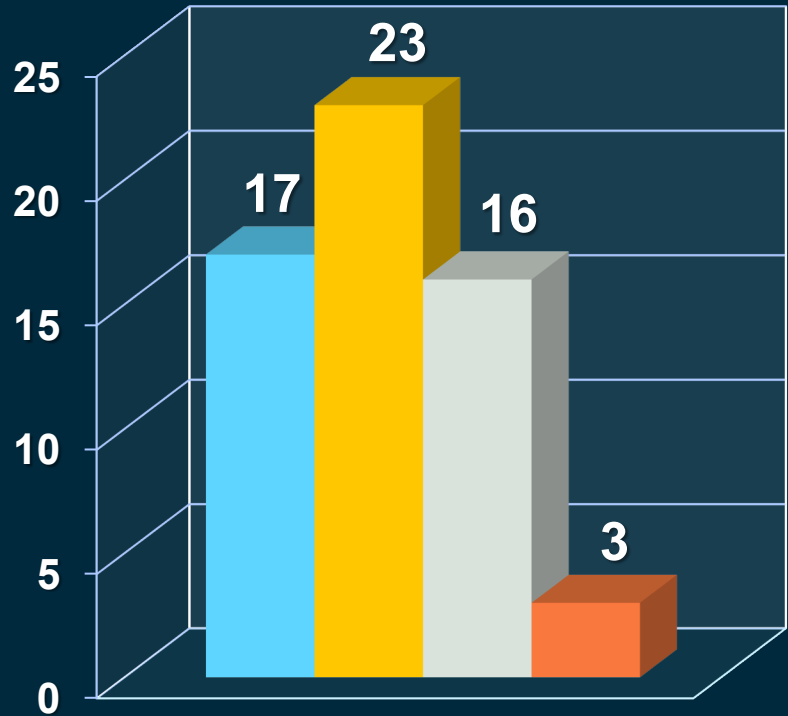
■ Black: 70

■ White: 58

■ Asian: 10

# Medicolegal Accidental Drownings

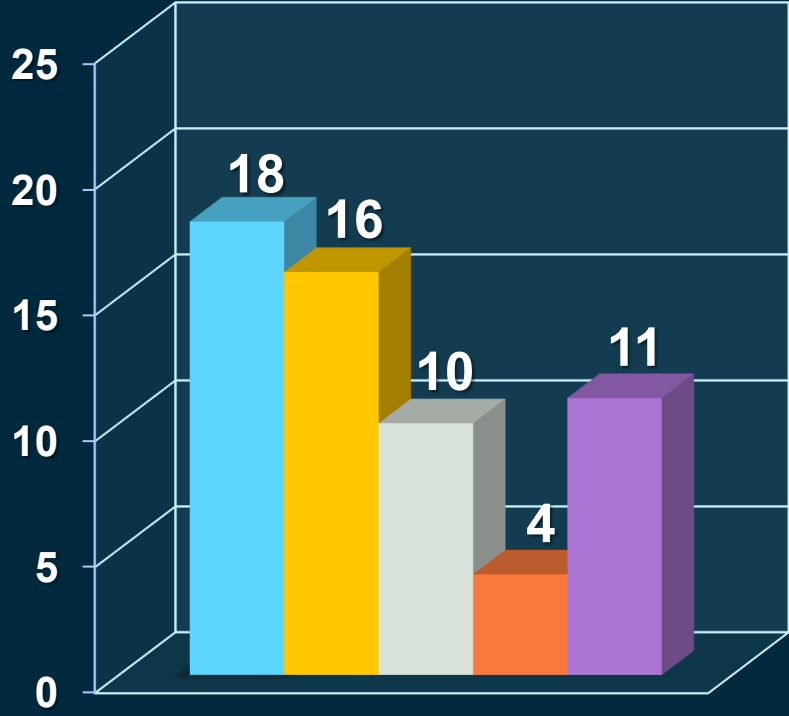
Race/Ethnicity



White Hispanic Black Asian

Type of Water

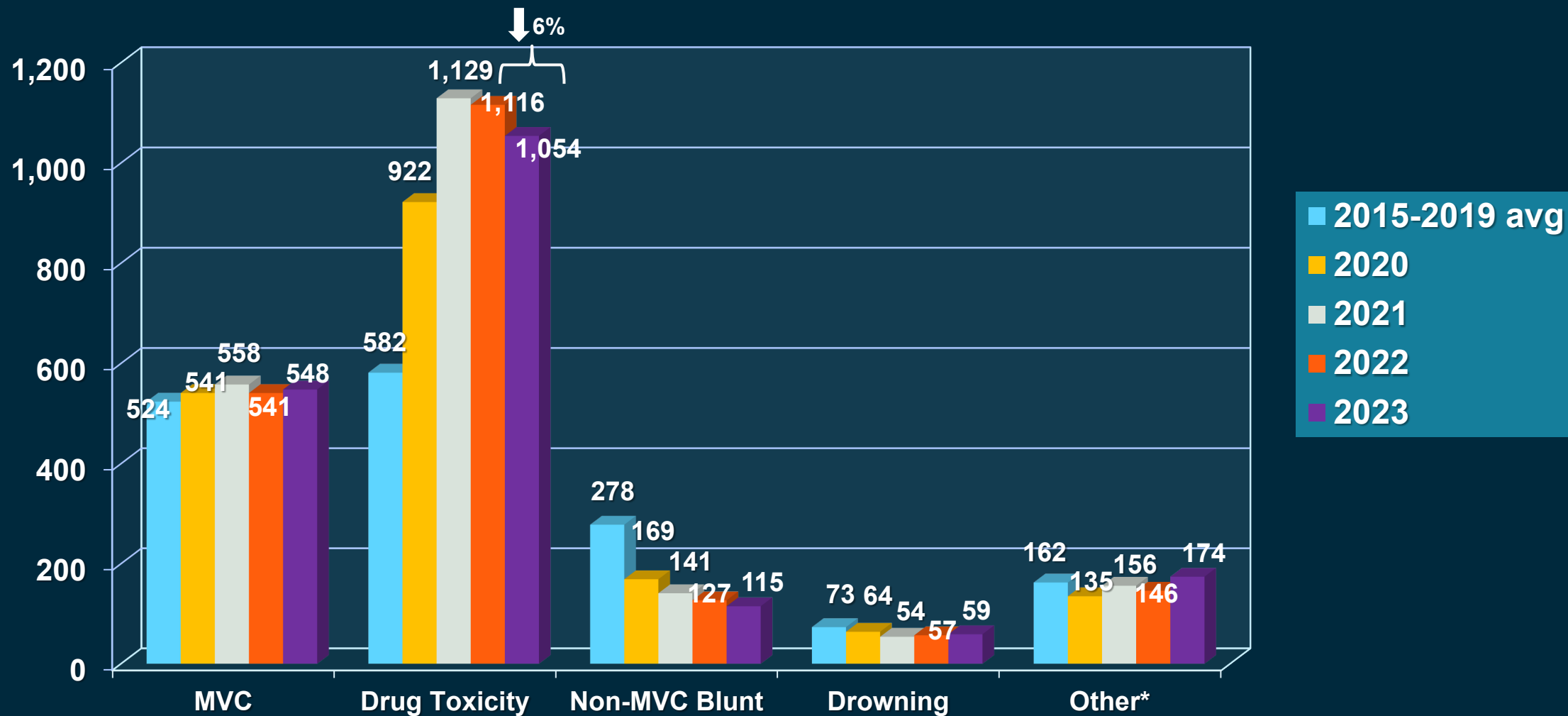
N=59\*



Bath Tub  
Community/Residential Pool  
Bayou/River  
Lake/Pond  
Other\*\*

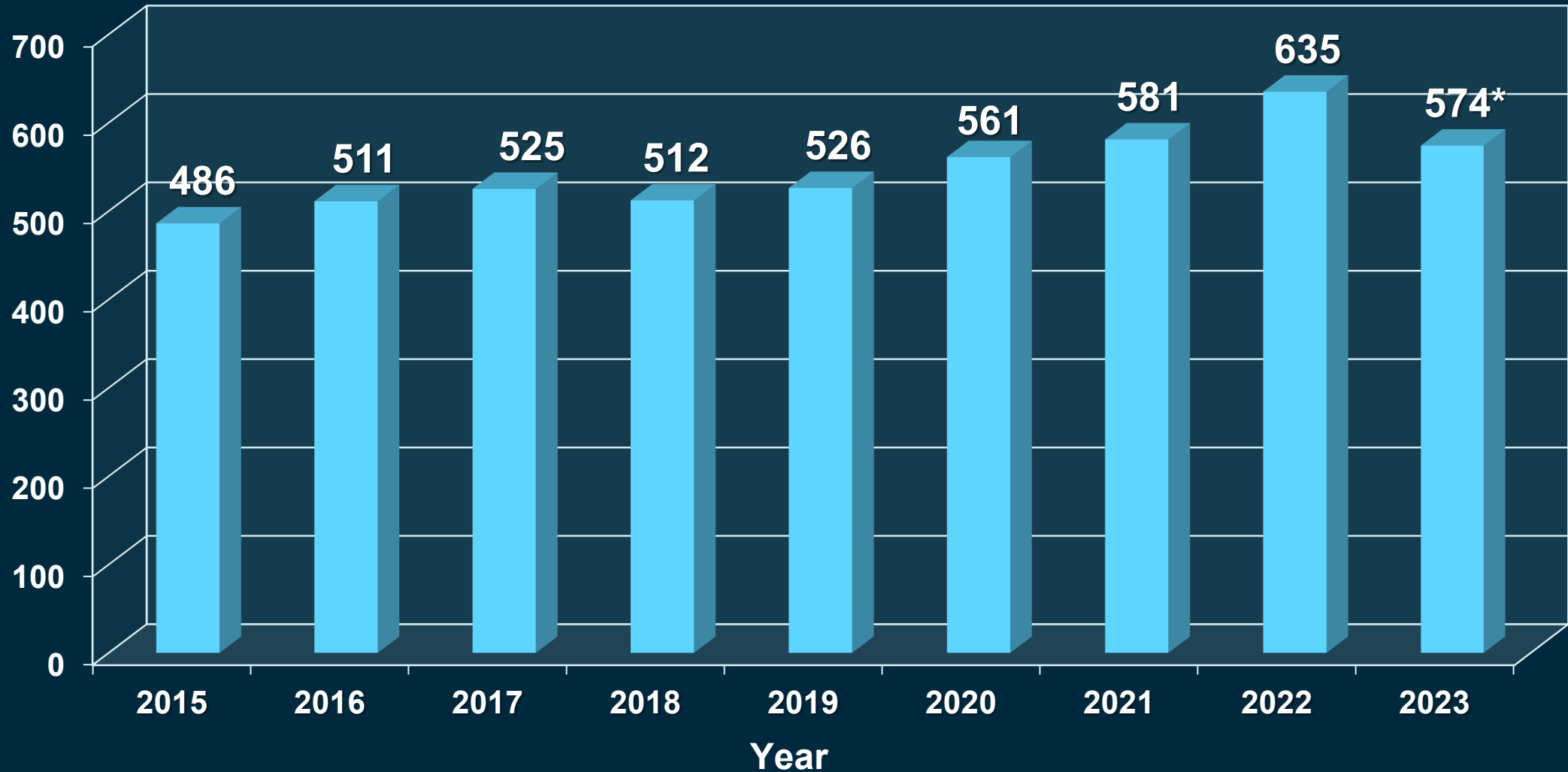
\*Includes 14 children, ages 1 to 6 years old; male to female ratio is 44:15.  
\*\*Other category includes near a roadway, parking lot, open areas, and ditches.

# Accidental Case Comparison Between Years by Cause



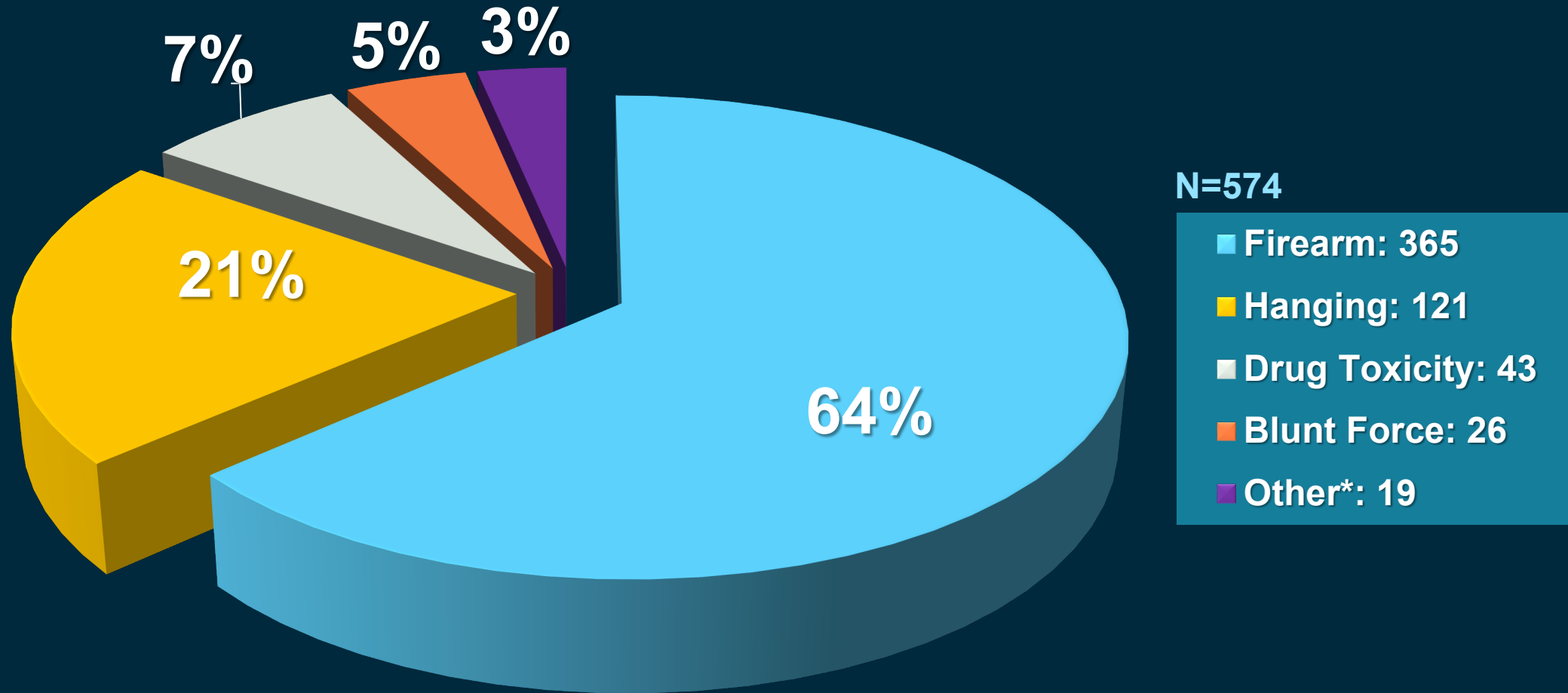
\*Other category includes asphyxia, thermal injuries, firearm injuries, sharp force injuries, hyperthermia, hypothermia, and therapeutic complications.

# Medicolegal Suicide Cases



*\*This is an 10% decrease from 2022 and a 9% increase from 2019 (year before COVID).*

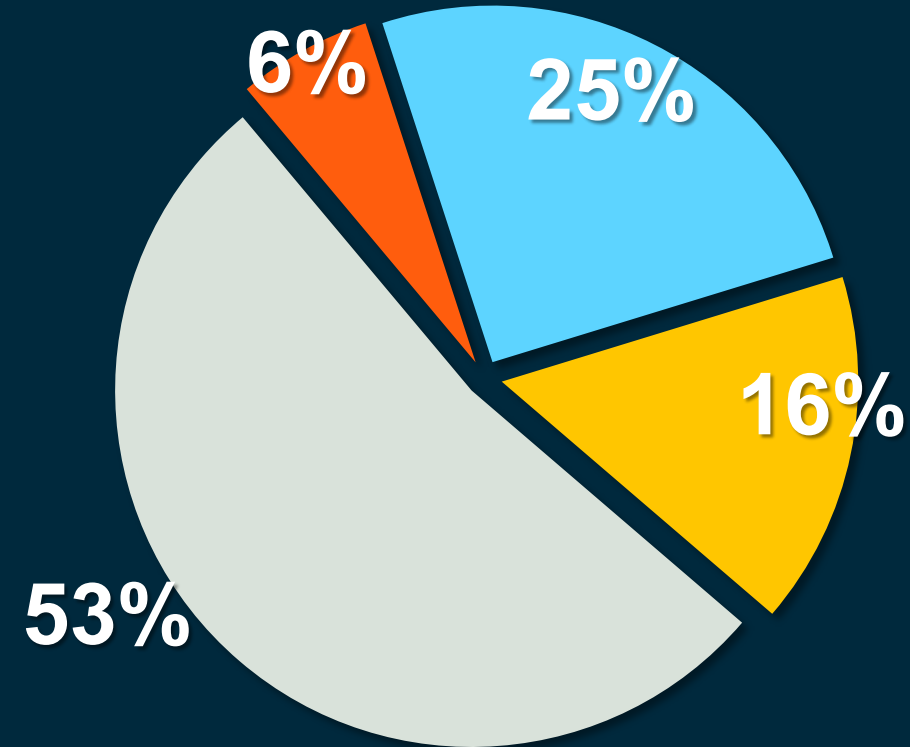
# Causes of Death in Suicide Cases



*\*Other category includes sharp force trauma (9), asphyxiation-not due to hanging (7), thermal (2), and drowning (1).*

# Medicolegal Suicide Demographics

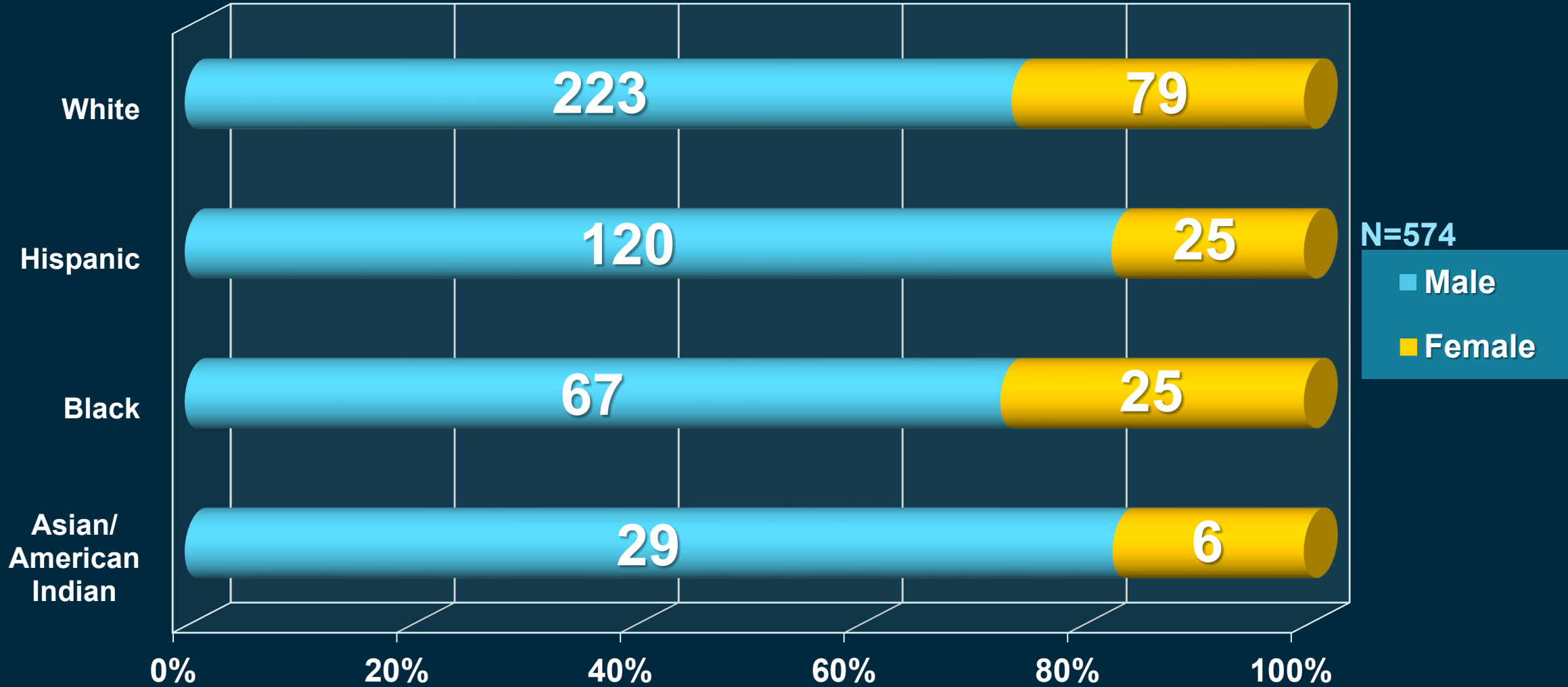
- Male to female ratio is **3 to 1**
- Age range is **10 to 96** years old
- Number of companion suicide/homicide cases:
  - 2019: 10
  - 2020: 13
  - 2021: 13
  - 2022: 17
  - **2023: 14**



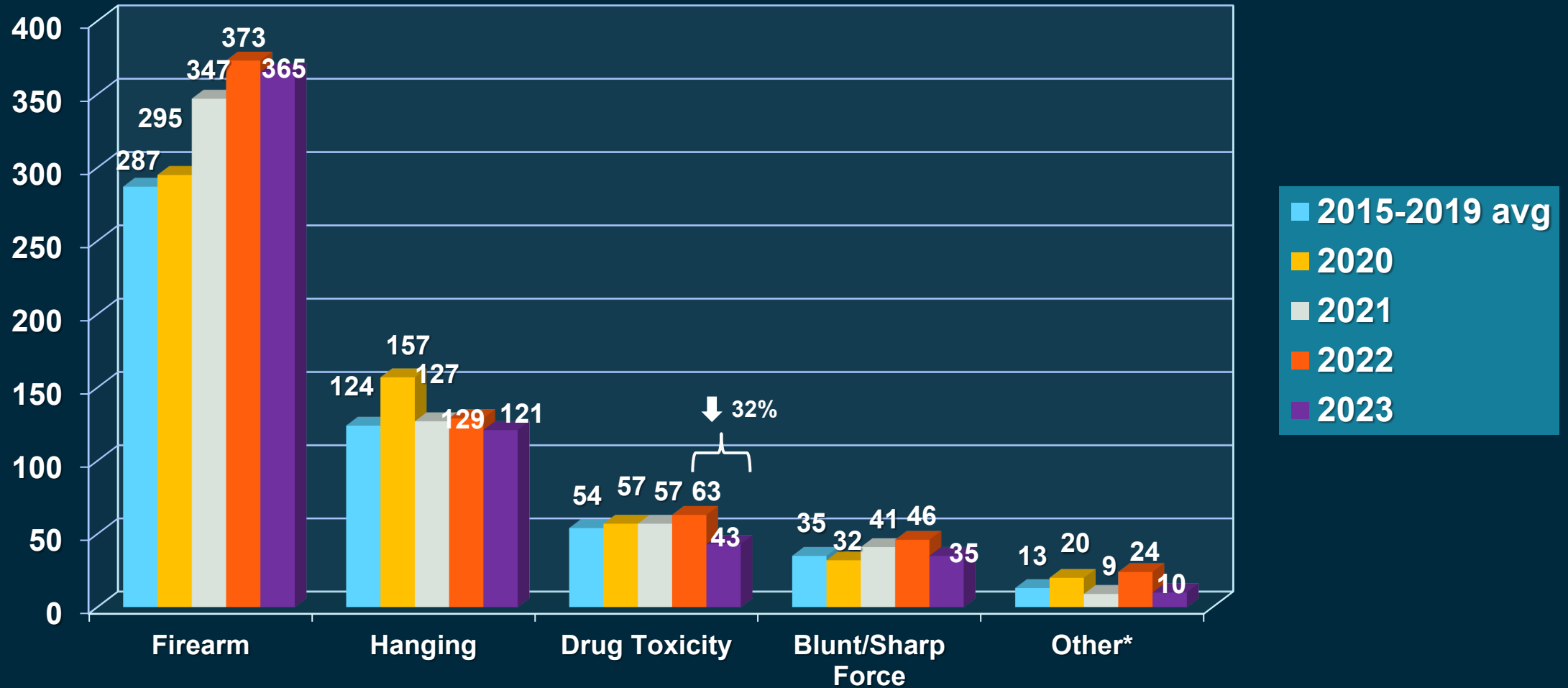
N=574

Hispanic	145
Black	92
White	302
Asian/American Indian	35

# Suicide Cases by Sex and Race/Ethnicity

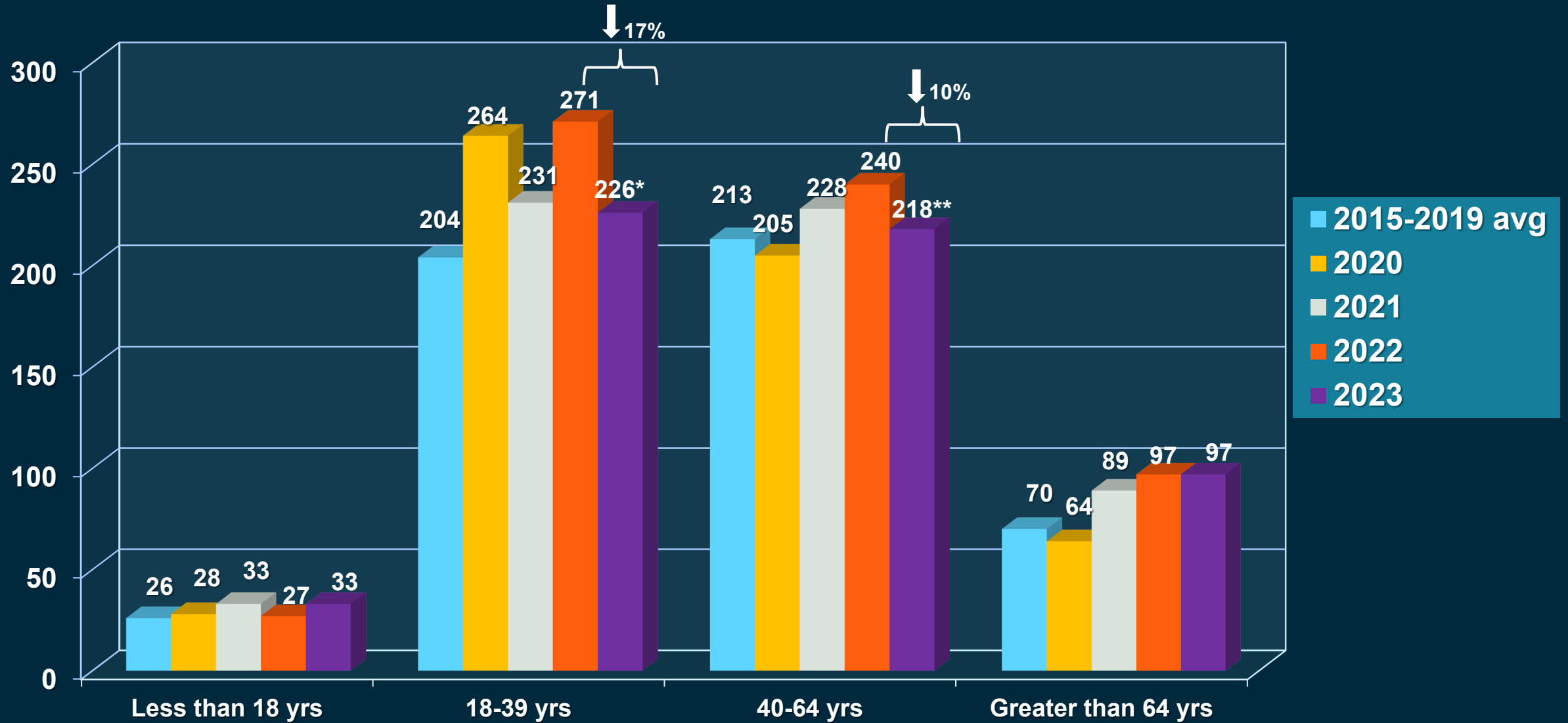


# Suicide Case Comparison Between Years by Cause

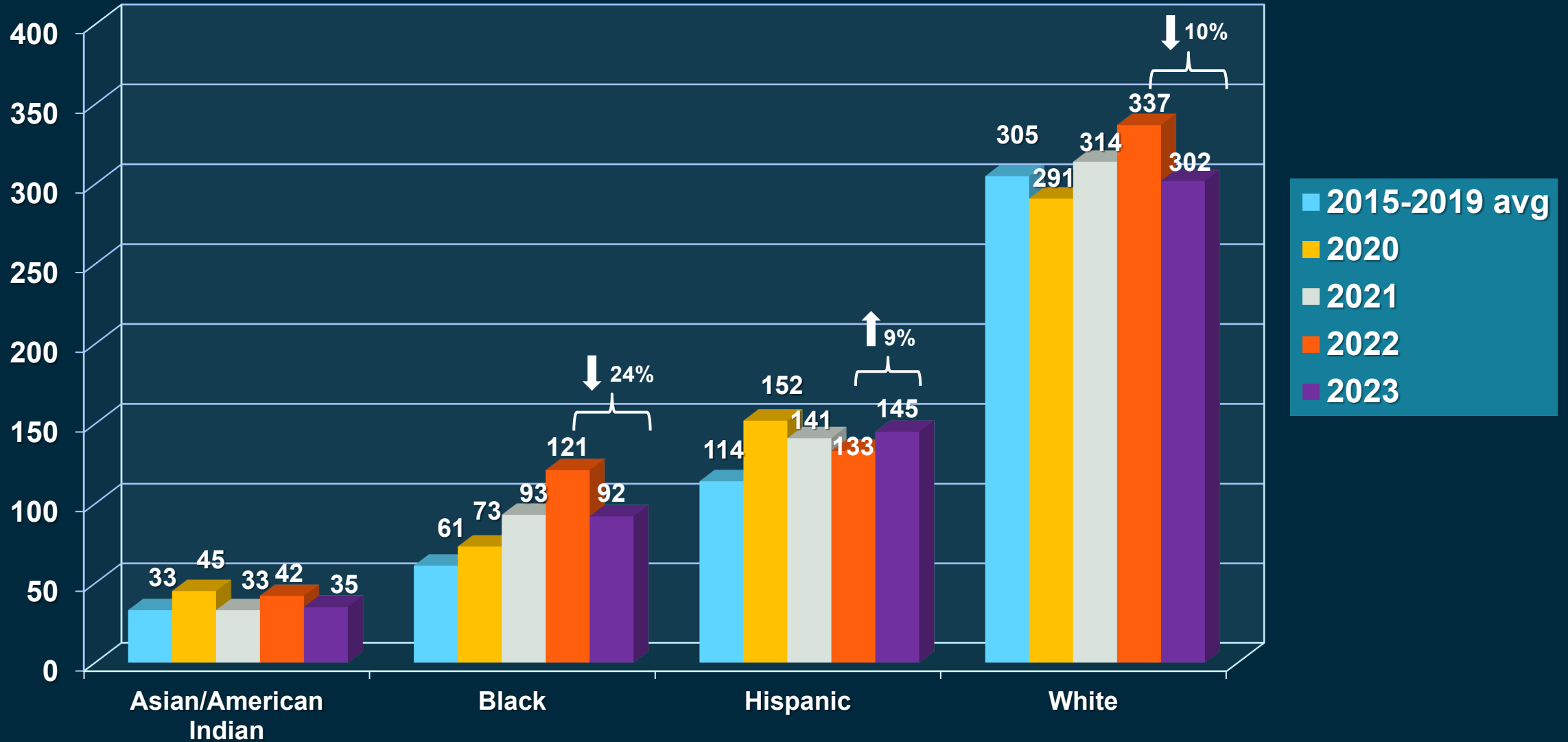


\*Other category includes asphyxia due to non-hanging, thermal injuries, and drowning.

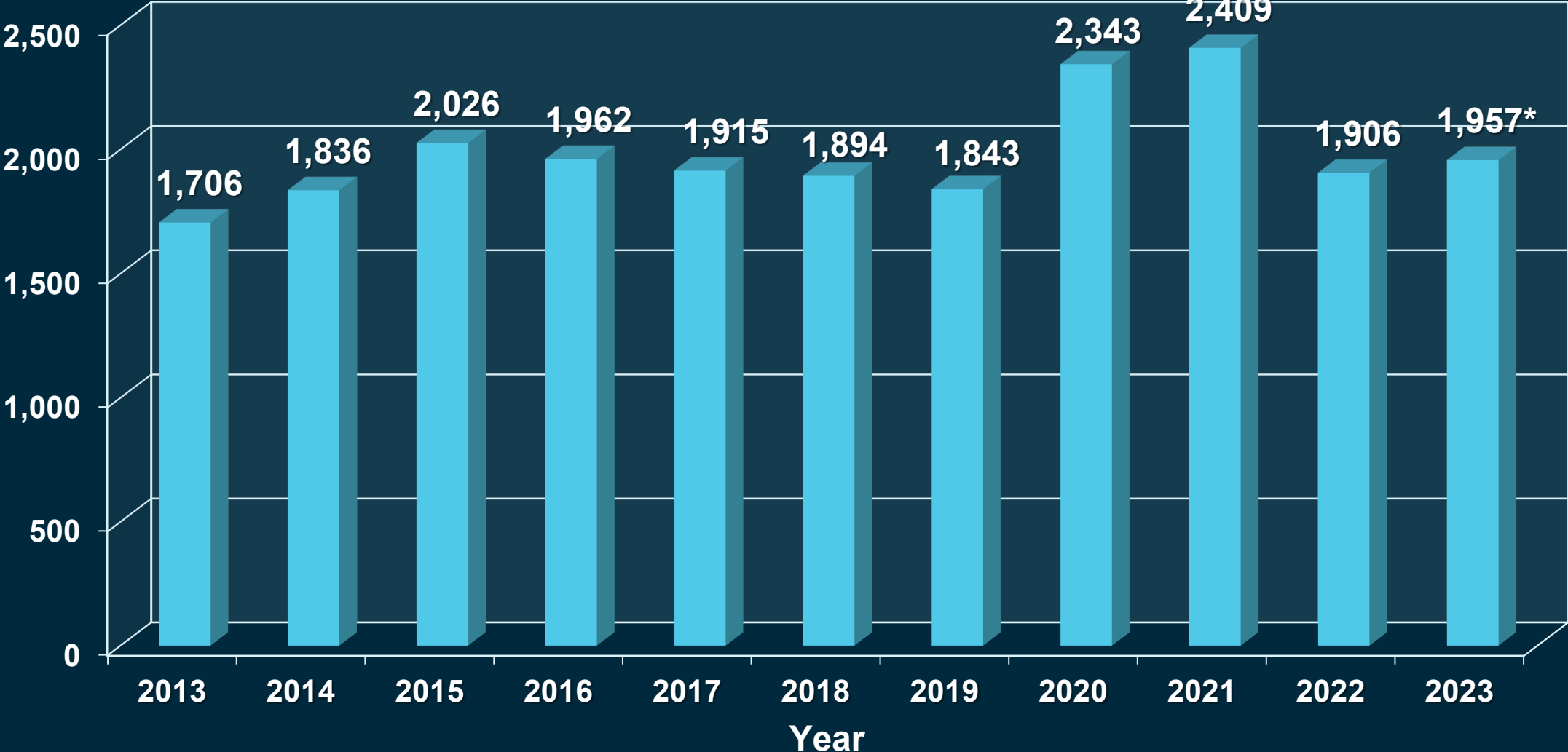
# Suicide Case Comparison Between Years by Age



# Suicide Case Comparison Between Years by Race

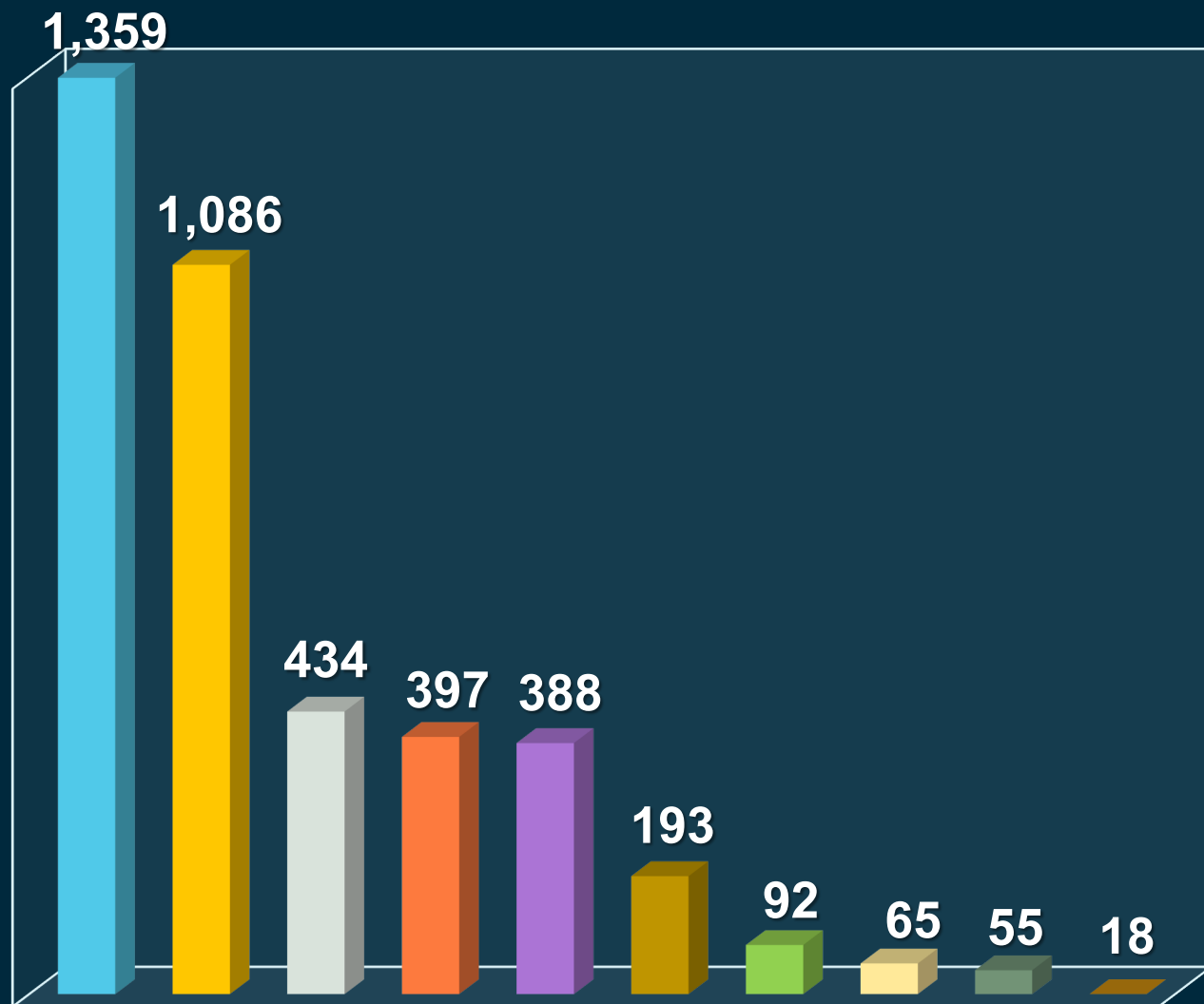


# Medicolegal Natural Cases



*\*This is a 3% increase from 2022 and a 6% increase from 2019 (year before COVID).*

# Most Frequent Causes of Medicolegal Natural Death

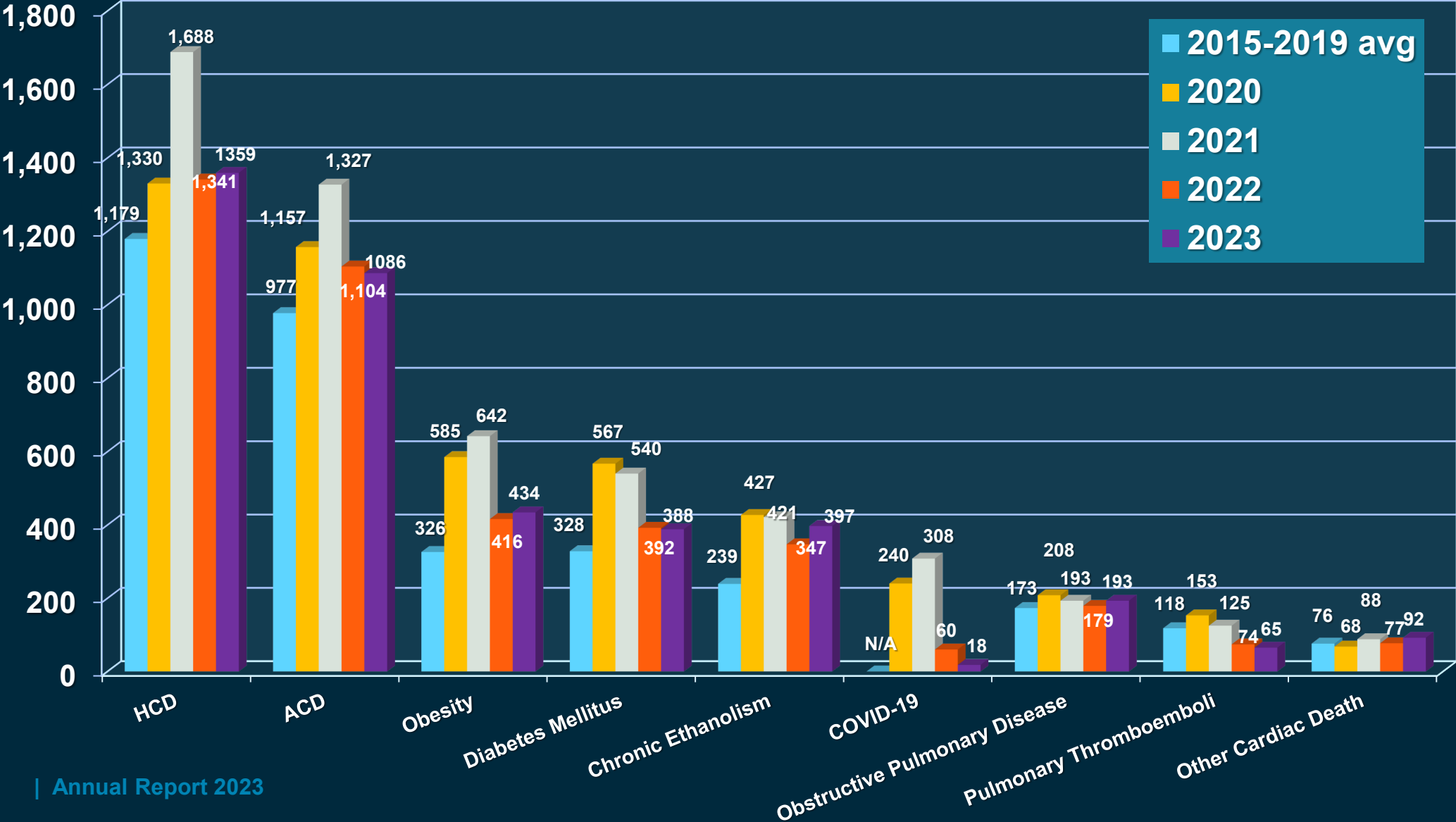


## 1,957 Natural Deaths in 2023

- Hypertensive Cardiovascular (HCD)
- Atherosclerotic Cardiovascular (ACD)
- Obesity
- Chronic Ethanolism
- Diabetes Mellitus
- Chronic Obstructive Pulmonary Disease
- Other forms of cardiac death
- Pulmonary Thromboemboli/Embolus
- Cancer/Neoplasm
- COVID-19

These data do not reflect discrete cases because multiple diseases may be present within a case.

# Natural Case Comparison Between Years by Cause

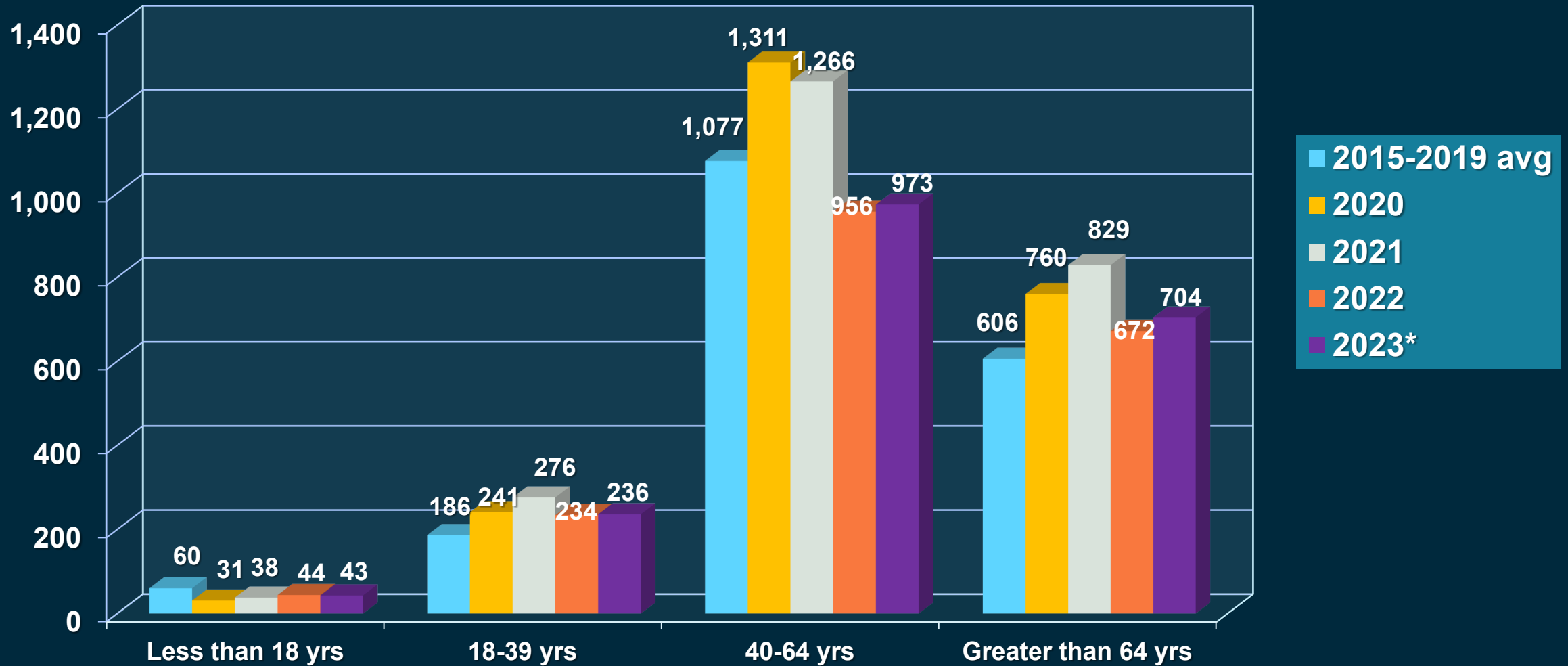


These data do not reflect discrete cases because multiple diseases may be present within a case.

# Diabetes and Obesity

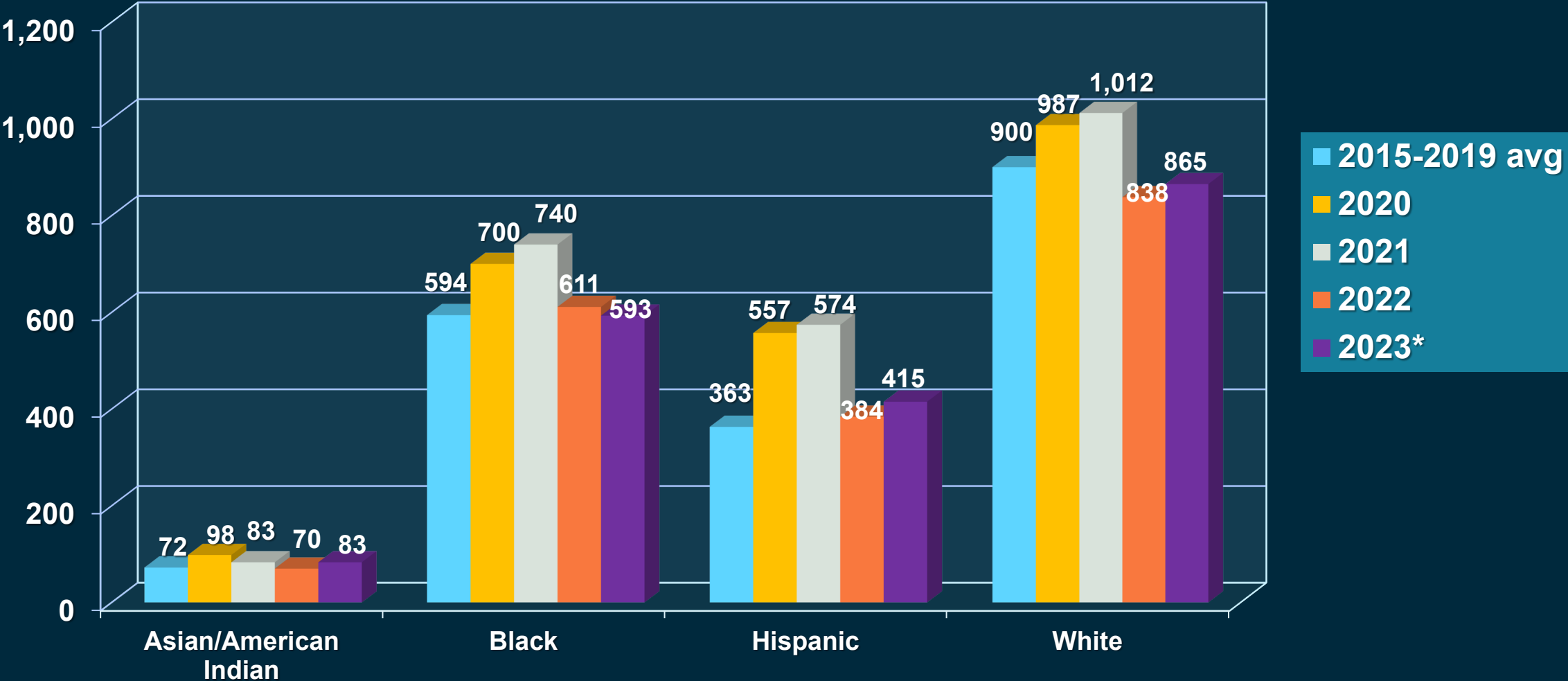
- For **388** decedents, diabetes mellitus was listed as the primary cause (**110**) or the contributing cause (**278**) of death
  - **70%** (**270**) were either overweight or obese (*Body Mass Index, BMI = 25+*)
- BMI was calculated for **5,070** decedents aged 13 years or older:
  - **1,728** (34%) were obese with a BMI of 30 or greater
  - **1,355** (27%) were overweight with a BMI between 25 and 29
  - **1,987** (39%) decedents were of normal weight or underweight
  - **24** decedents weighed more than 400 lbs

# Natural Case Comparison Between Years by Age



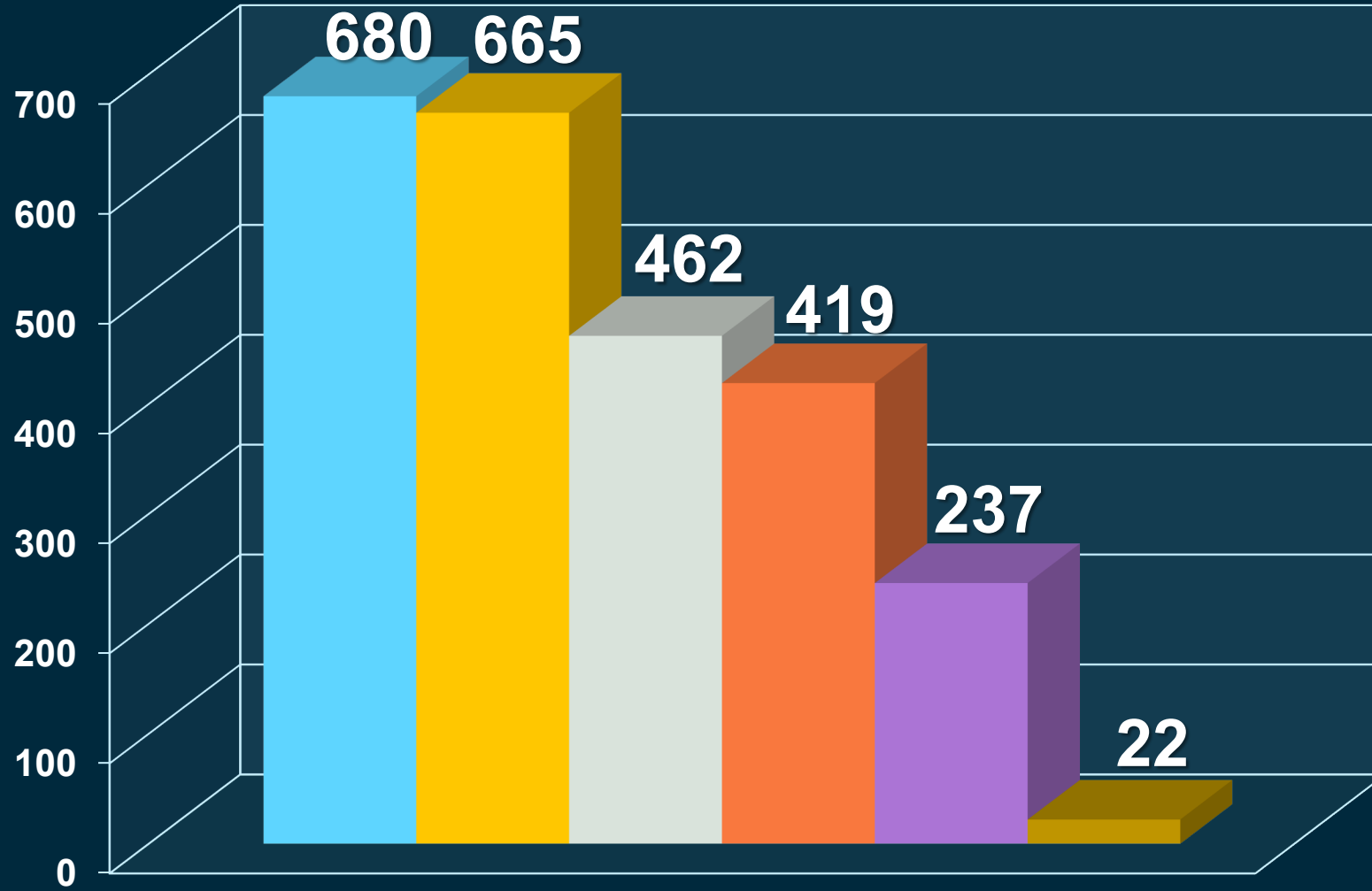
\*One case with unknown age

# Natural Case Comparison Between Years by Race



\*One case with unknown race/ethnicity

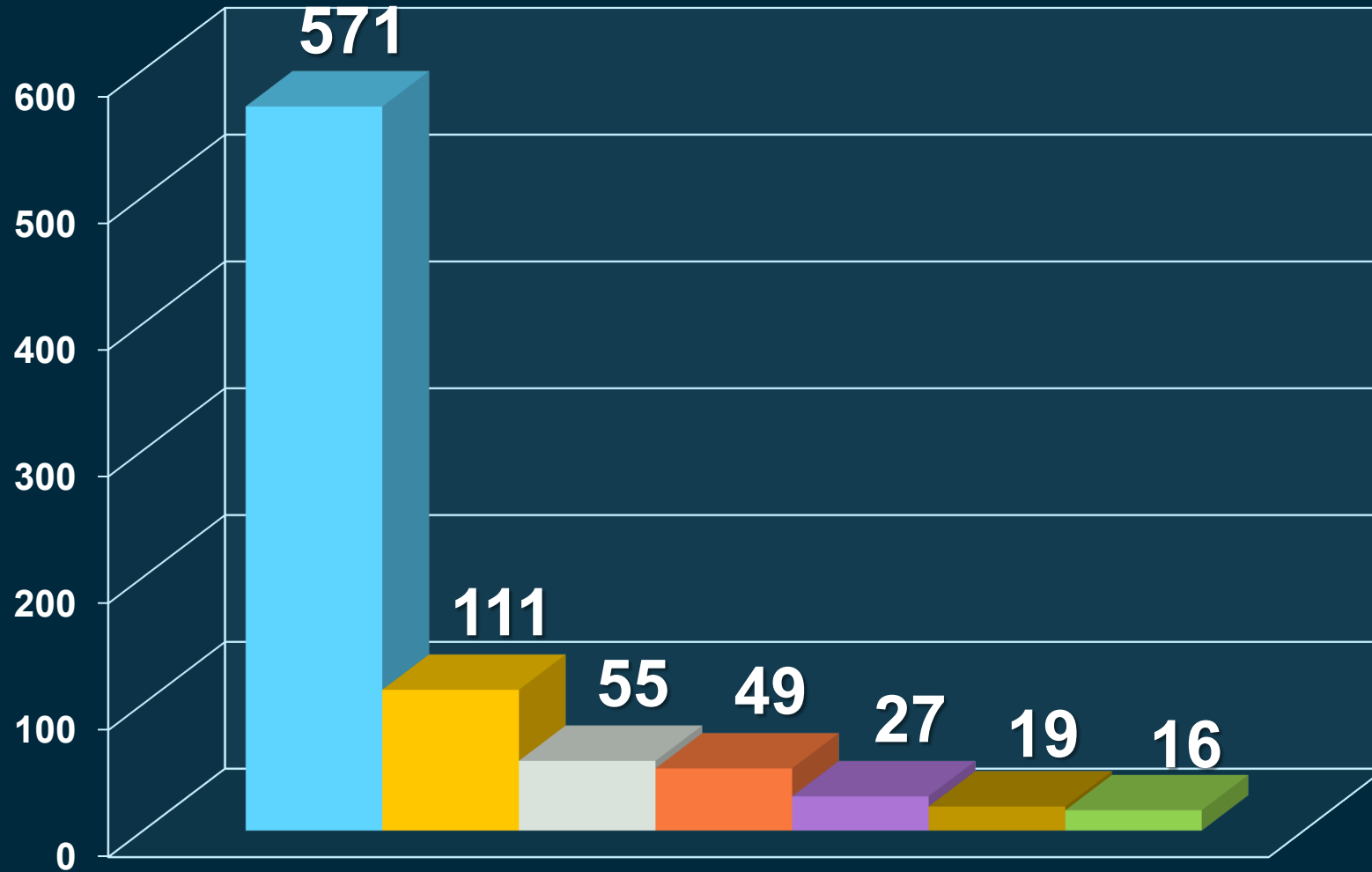
# Most Frequent Substances Listed in Cause of Death



- Opiates/Opioids
- Ethanol
- Cocaine
- Amphetamine/Meth
- Benzodiazepines
- Carisoprodol

These data do not reflect discrete cases because multiple drugs may be present within a case.

# Opiates/Opioids Listed in Cause of Death

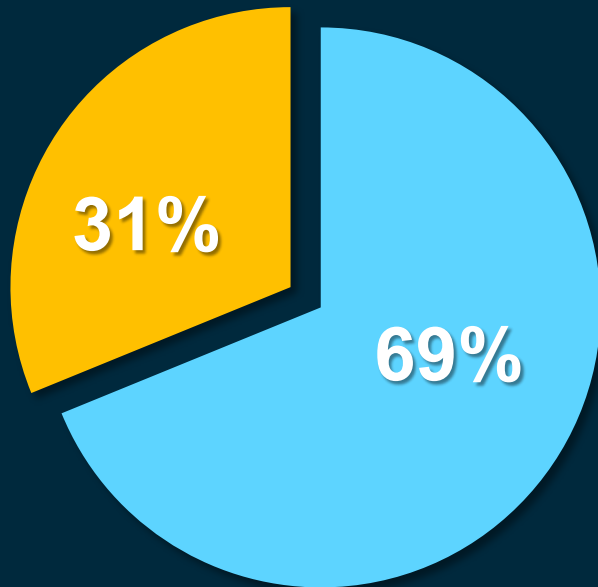


- Fentanyl and Analogs
- Heroin
- Hydrocodone
- Oxycodone
- Morphine
- Codeine
- Methadone

These data do not reflect discrete cases because multiple drugs may be present within a case.

# Fentanyl Toxicity Demographics

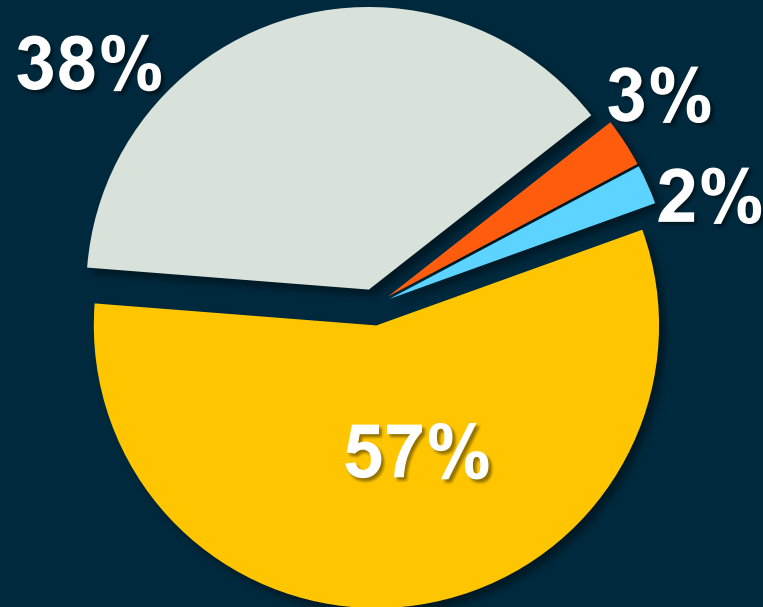
## Sex



N=571

- Male: 393
- Female: 178

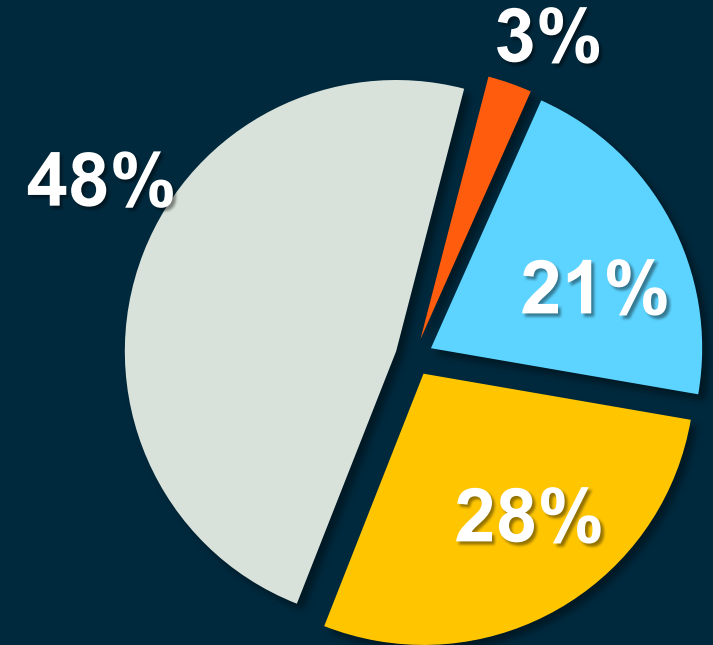
## Age



N=571

- Under 18 years: 13
- 18 - 39 years: 324
- 40 - 64 years: 218
- 65+ years: 16

## Race

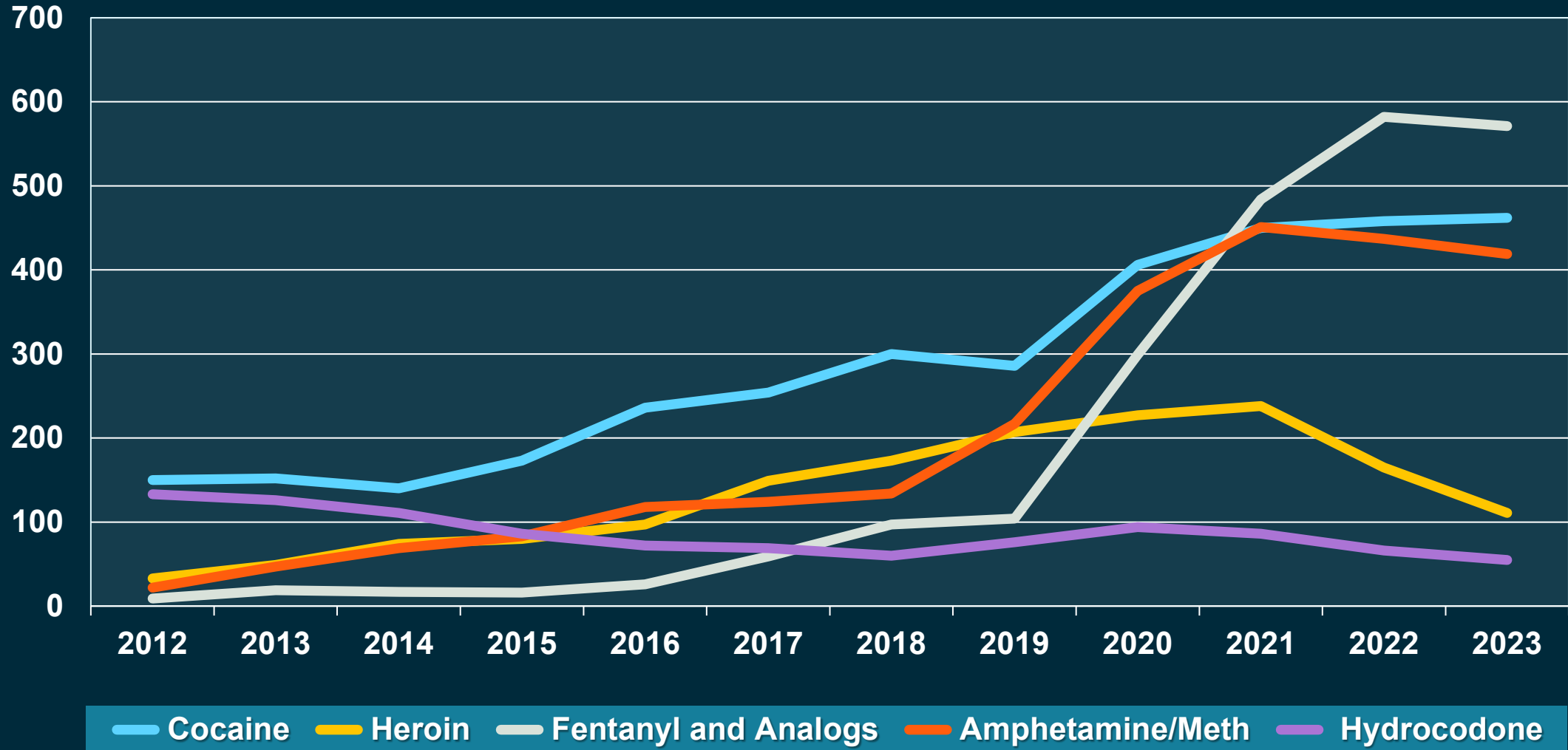


N=571\*

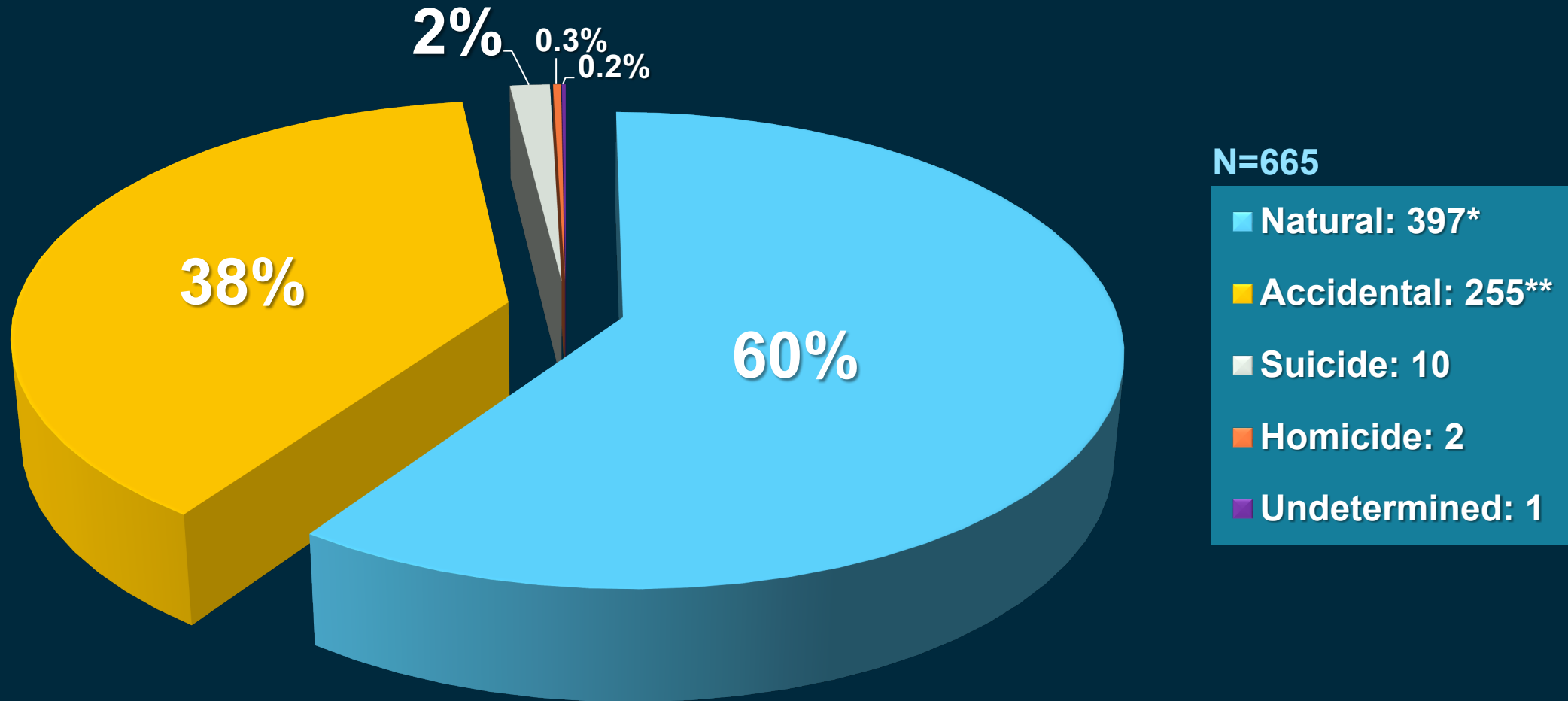
- Hispanic: 120
- Black: 161
- White: 274
- Asian/American Indian: 15

\*One case with unknown race/ethnicity

# Trends in Death from Selected Drugs



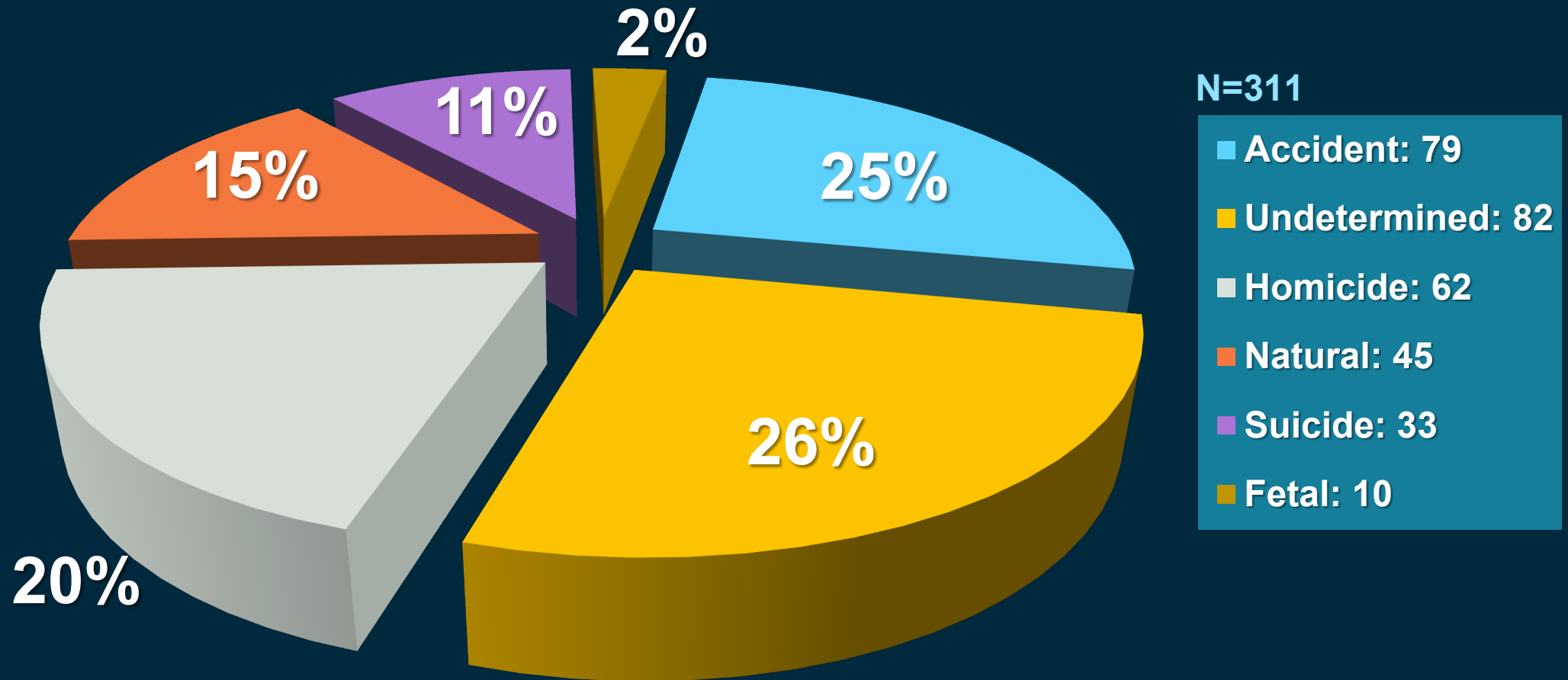
# Causes of Death Due to Ethanol



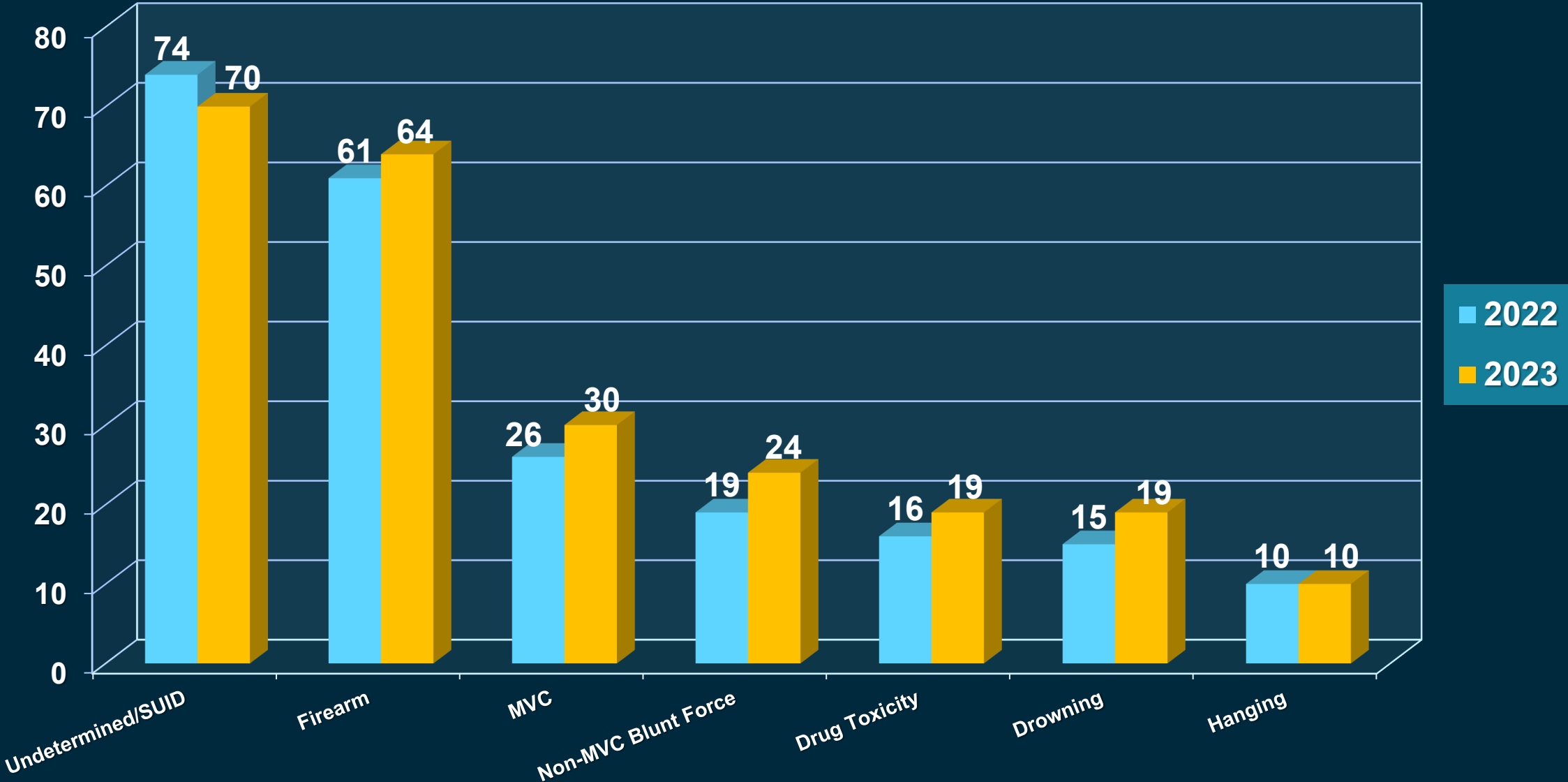
\*For 82 natural deaths, the primary cause of death was attributed solely to chronic alcoholism.

\*\*Ethanol was the sole intoxicant in 10 accidental cases.

# Pediatric Manners of Death (Age 0 – 17 Years)



# Most Frequent Cause of Pediatric Deaths (Age 0 – 17 Years)

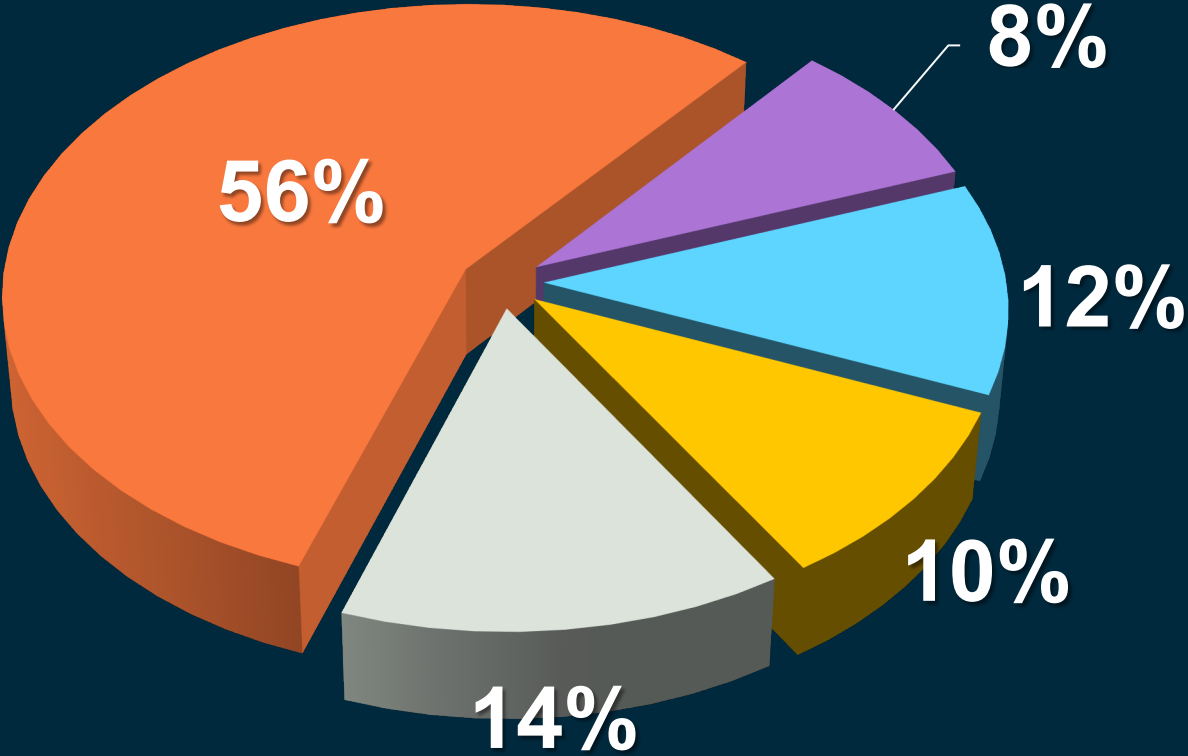


# Infant/Fetal Deaths

The birth count for Harris County was estimated to be 73,663 for 2023.

*(Data provided by Texas Department of State Health Services)*

- **120** infant/fetal death cases *(less than or equal to 1 year old)*
- **67** cases of Undetermined Manner
  - **60** cases of Unexplained Sudden Death



N=120

■ Accident: 14	■ Homicide: 12
■ Natural: 17	■ Undetermined: 67
■ Fetal: 10	

# Unexplained Sudden Death in Infants

The historical cause of the death designation Sudden Infant Death Syndrome, or SIDS, is an outdated term and was completely phased out in 2020. The accepted practice at this time is to acknowledge these deaths as unexplained, wherein no specific cause of death can be determined. The deaths are still acknowledged as “sudden” in that they are unexpected.

Although no mechanism of death can be identified for these infants, some risk factors may be identified. These associated findings may or may not contribute to the death, but their existence are acknowledged in the revised cause of death classification scheme. These associated findings may be intrinsic to the decedent (some natural disease) or extrinsic (such as an unsafe sleep environment). Some infant deaths are unexplained, but other factors relating to the investigation are found that do not really fit into the above categories. The term “undetermined (not further specified)” is used in these instances. Finally, when such a death occurs and investigative information is incomplete after all avenues to obtain that information have been exhausted, the classification “undetermined (insufficient data)” is used.

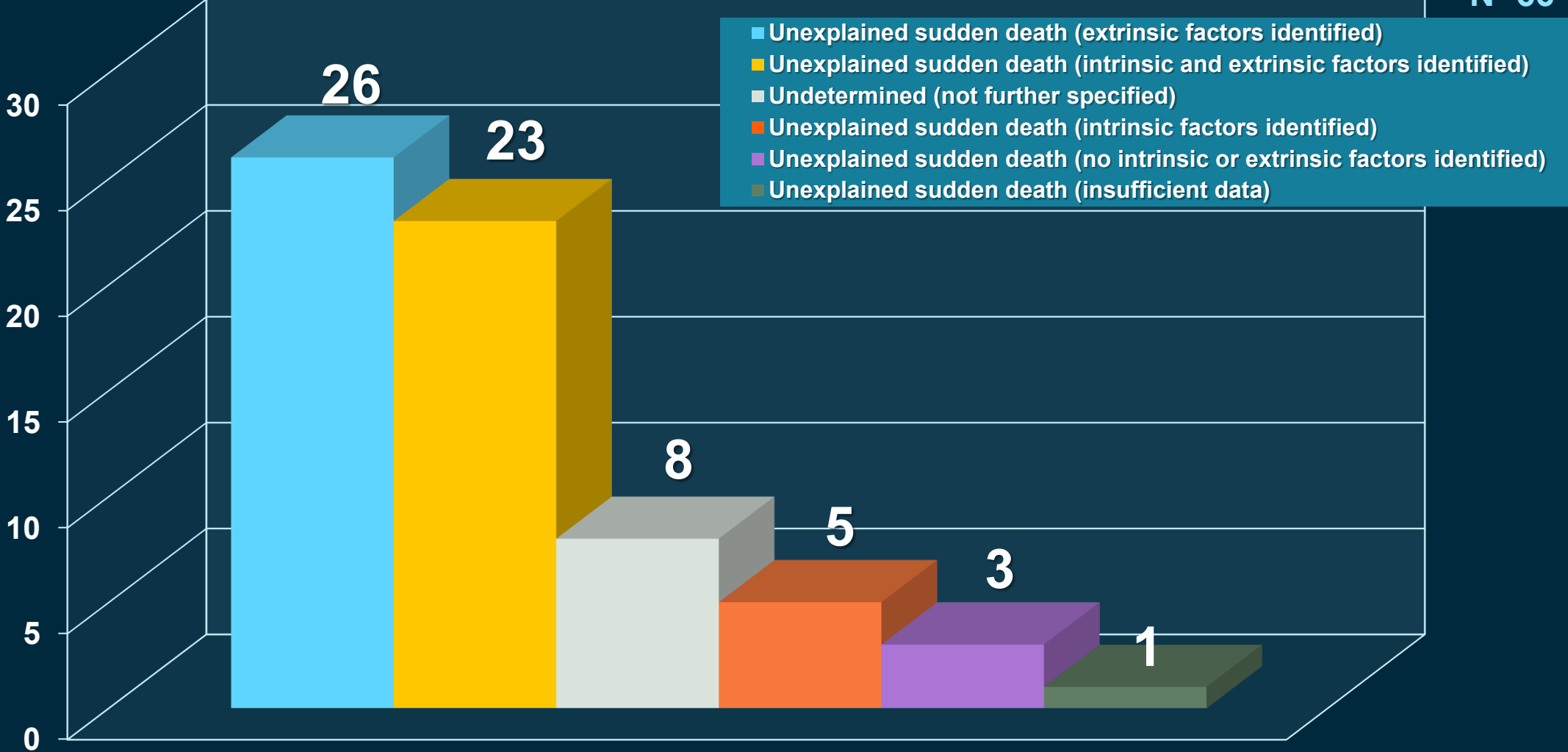
The revised classification scheme includes the following causes of death (The manner of death in each of these categories is undetermined):

1. Unexplained Sudden Death (No Identified Intrinsic or Extrinsic Factors)
2. Unexplained Sudden Death (Intrinsic Factors Identified)
3. Unexplained Sudden Death (Extrinsic Factors Identified)
4. Unexplained Sudden Death (Intrinsic and Extrinsic Factors Identified)
5. Undetermined (Not Further Specified)
6. Undetermined (Insufficient Data)

Reference: *Bundock E.A and Corey T.S., editors, Unexplained Pediatric Deaths: Investigation, Certification and Family Needs, 1<sup>st</sup> edition Academic Forensic Pathology International, San Diego, CA, 2019.*

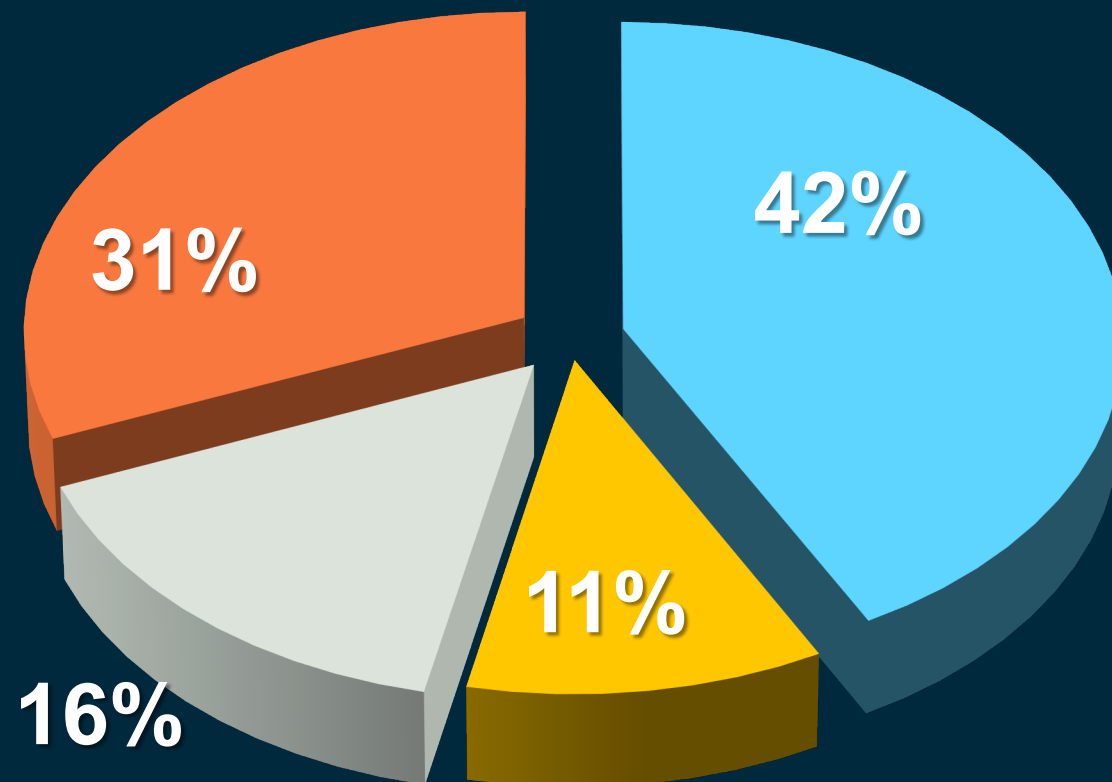
# Unexplained Sudden Death

N=66



# Toddler Deaths (Age 1 – 4 Years)

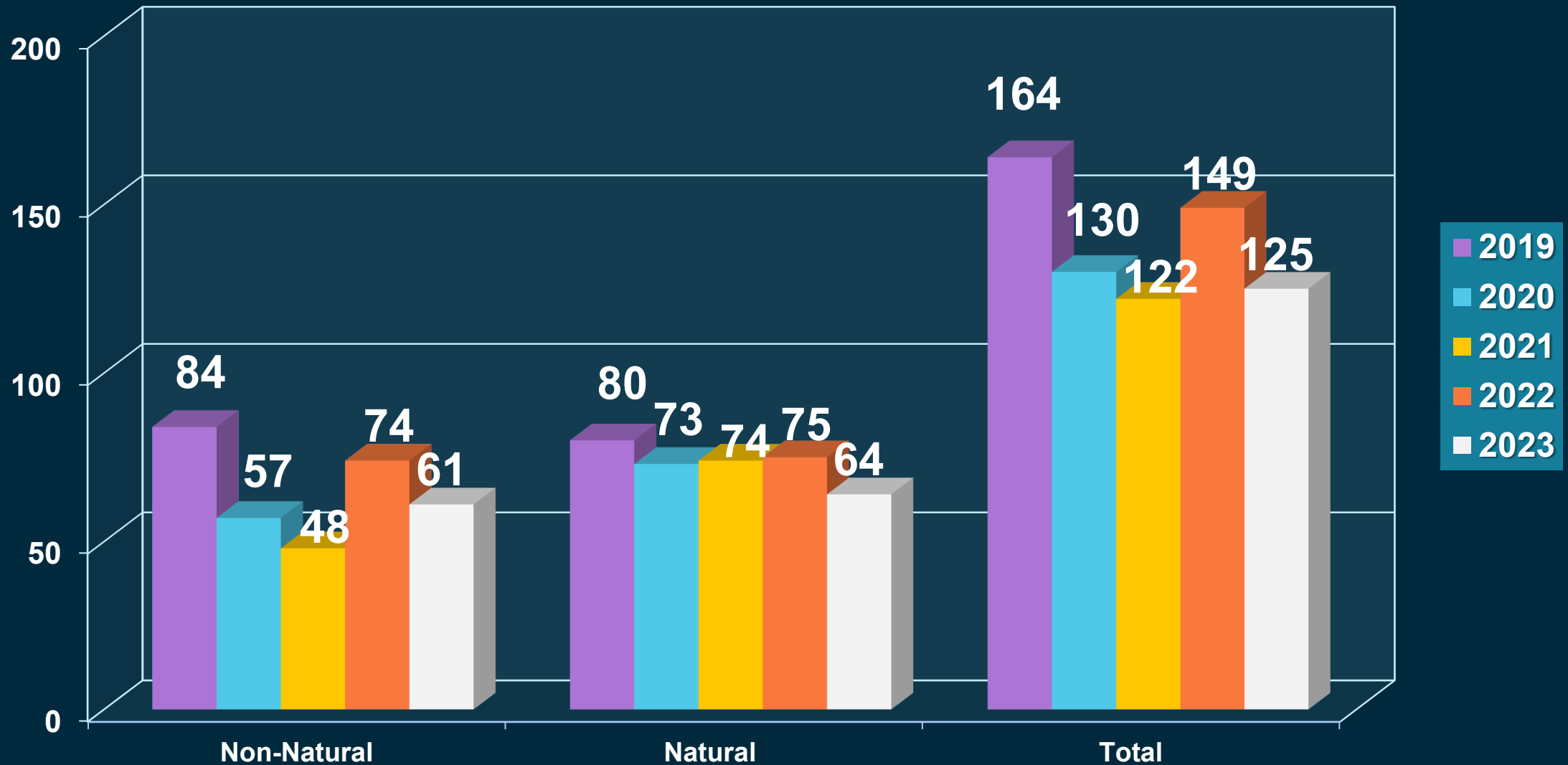
- Non-natural deaths include:
  - 7 toddlers died in motor vehicle crashes
  - 8 toddlers died by accidental drowning
  - 5 homicide cases
    - 1 male
    - 4 females



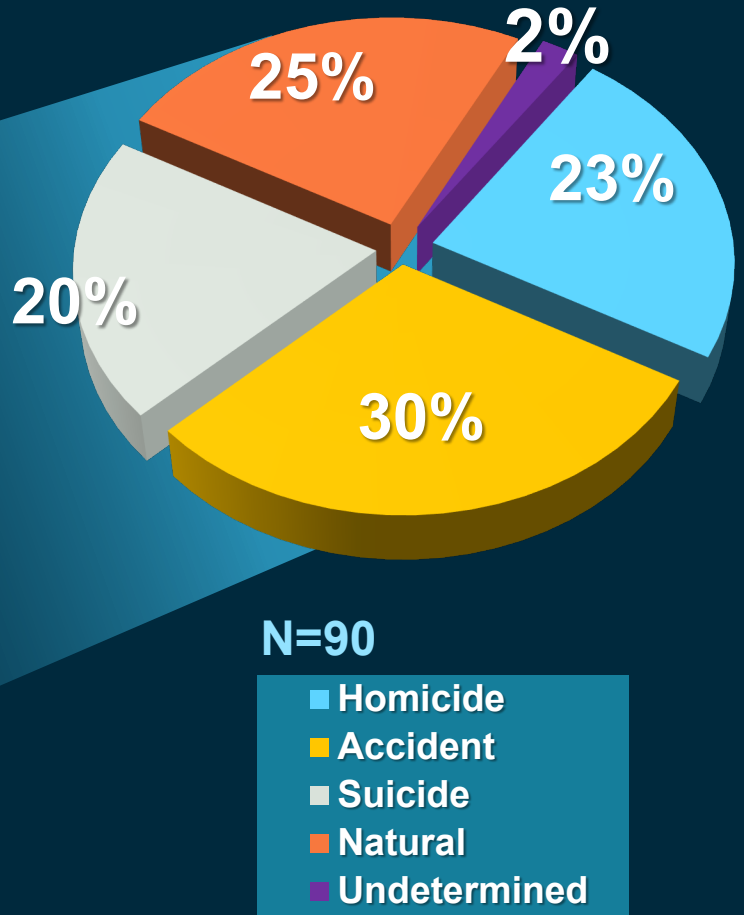
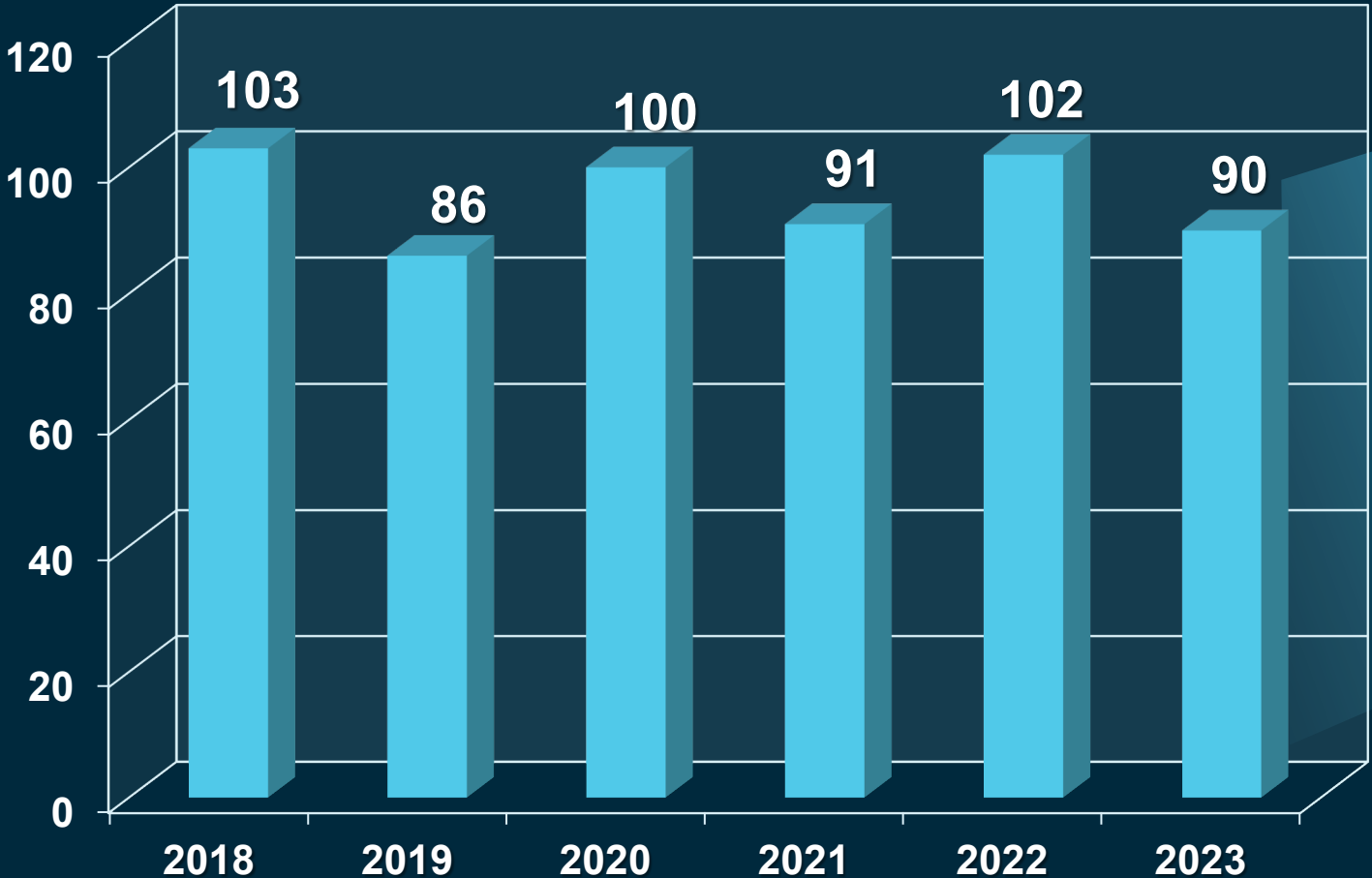
N=45

- Accident: 19
- Homicide: 5
- Natural: 7
- Undetermined: 14

# “While at Work” Deaths

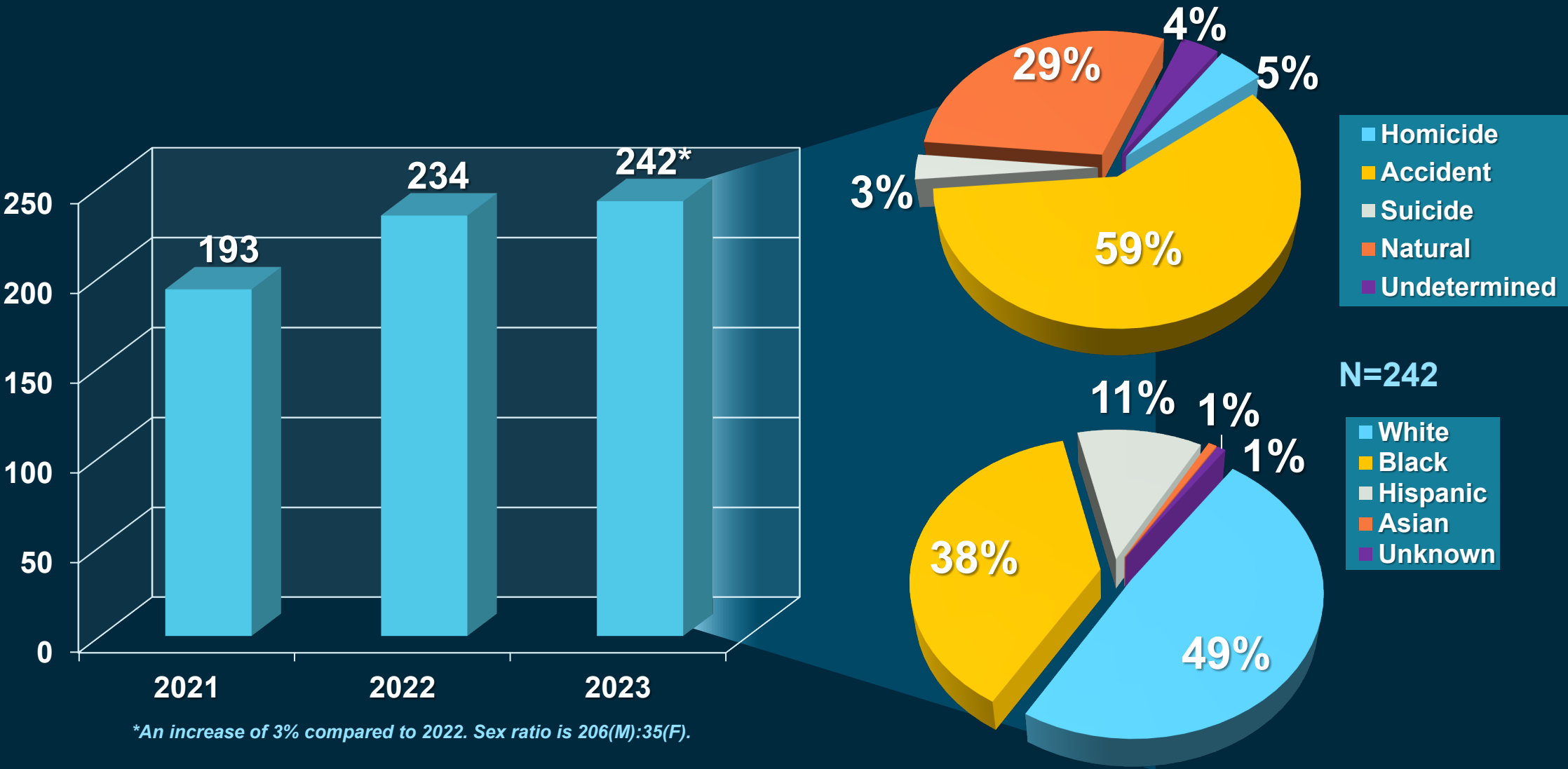


# Deaths During Police Intervention\*

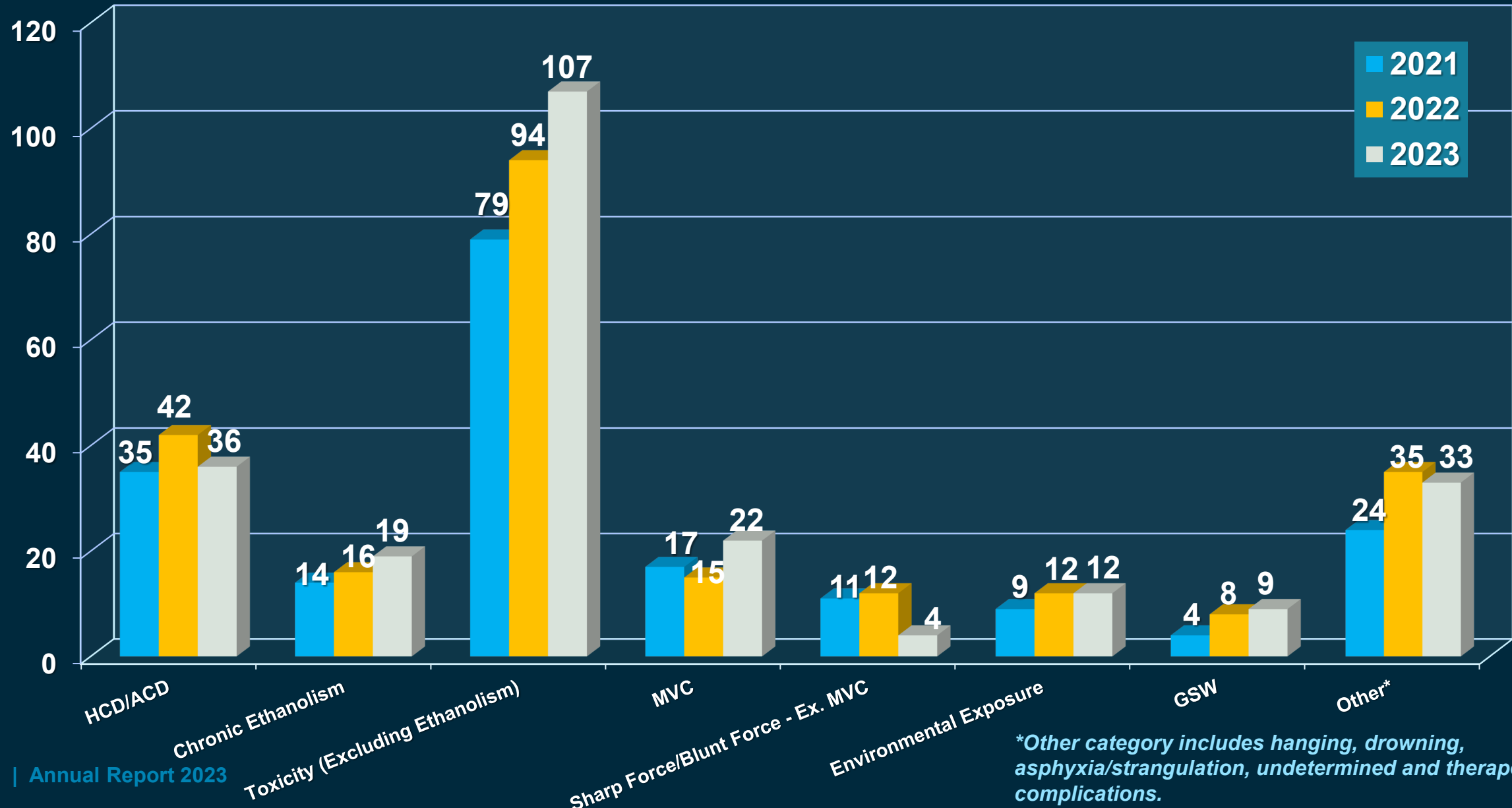


\*These include deaths in which the circumstances of the death place the decedent in either direct or indirect contact with law enforcement, such as incarceration, apprehension, and pursuit. This category of death is not limited to police shootings, arrest-related deaths, apprehension deaths, or in-custody deaths.

# Decedents Who Experienced Homelessness



# Classified Homeless Deaths – Primary Causes



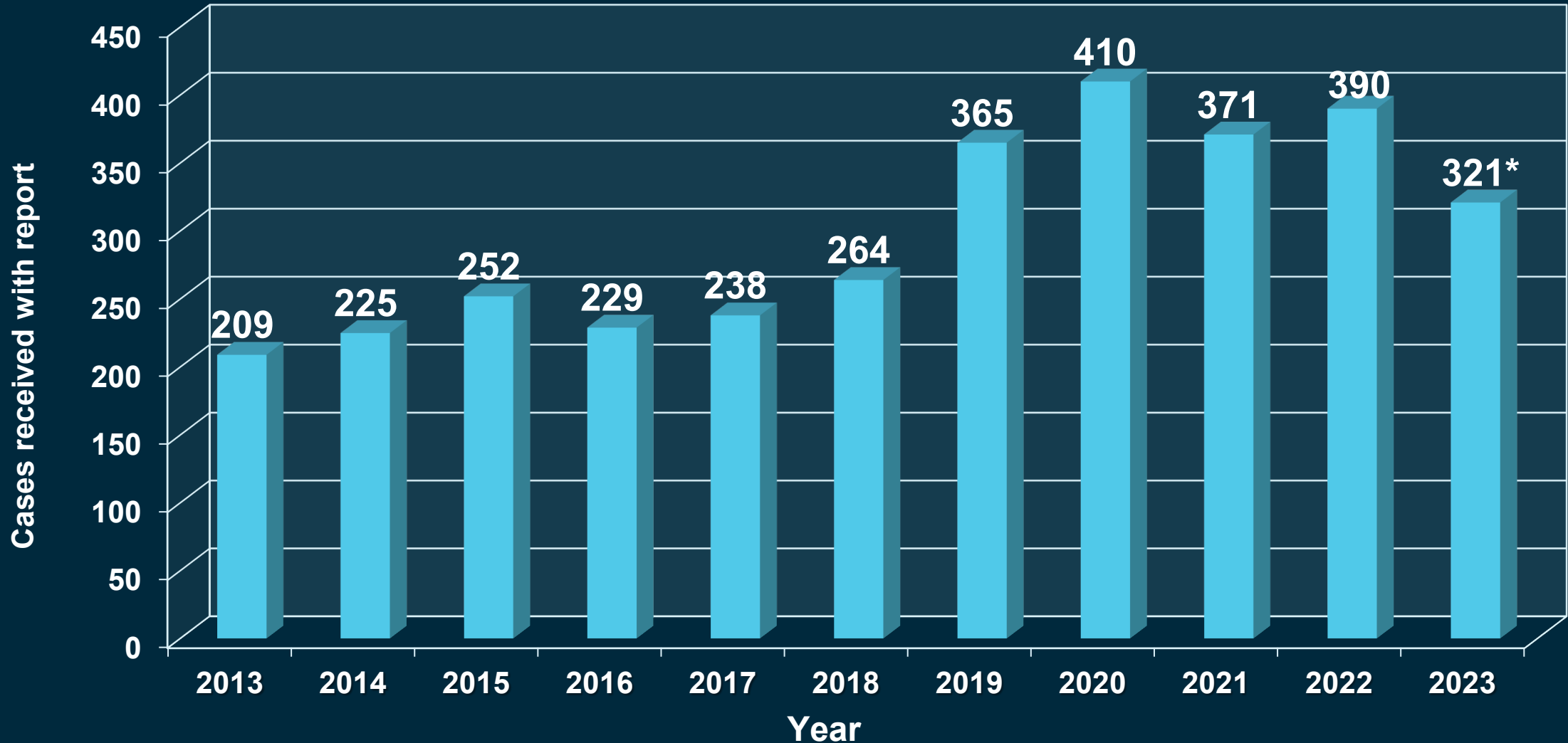
# Organ and Tissue Donation

- HCIFS maintains agreements with:
  - LifeGift
  - Lions Eye Bank of Texas at Baylor College of Medicine
  - Biograft Transplant Services
  
- **236** medicolegal cases were released in 2023 for organ and/or tissue donation

# Forensic Anthropology

- Staffed by **three** doctoral-level forensic anthropologists, all diplomates of the American Board of Forensic Anthropology
- **2023 casework highlights:**
  - **321** total cases received with written reports provided
  - **225** trauma cases analyzed
  - **20** death scenes with skeletal recovery (biological profile)
  - **38** cases of remains determined to be non-human

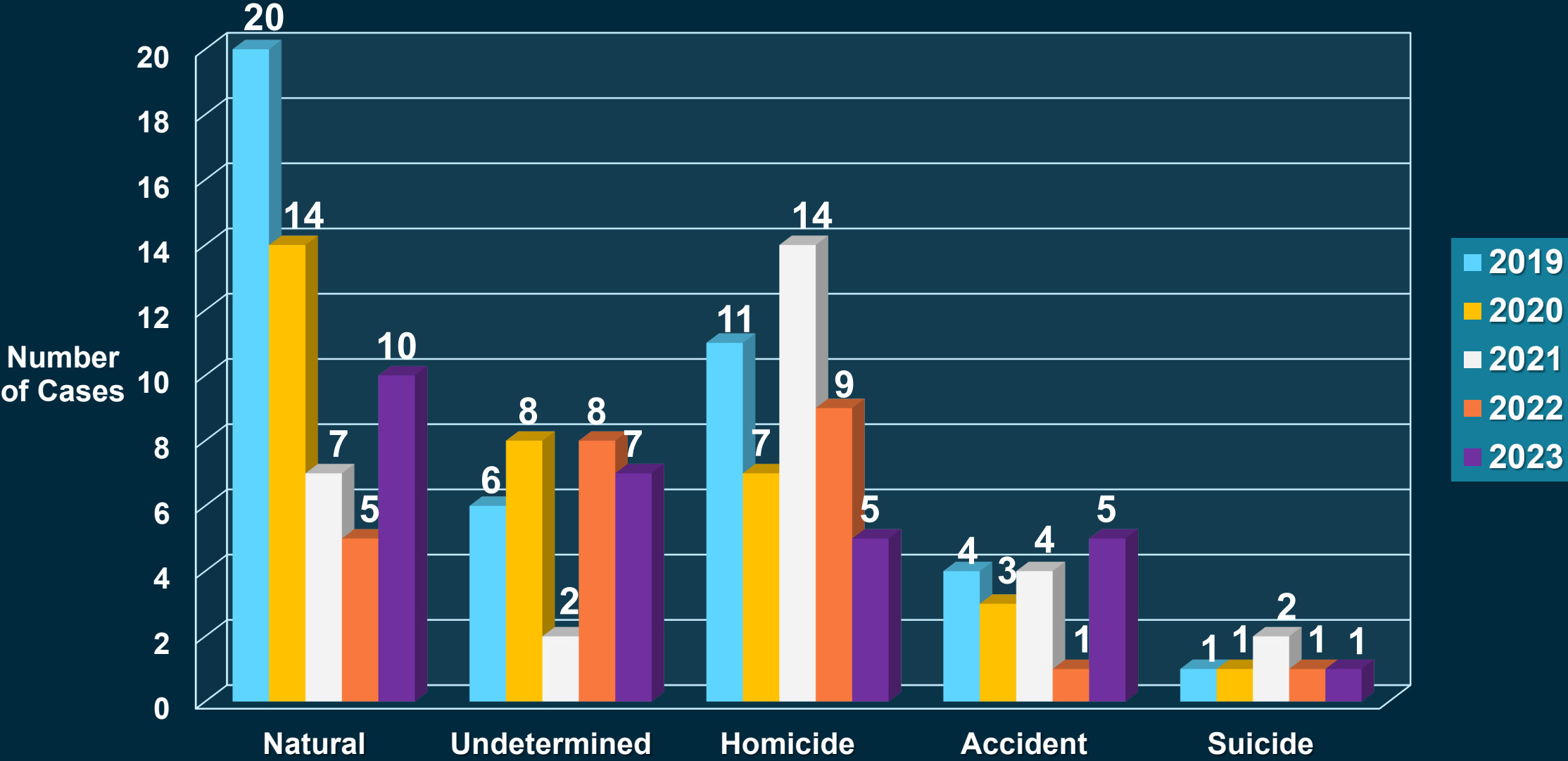
# Forensic Anthropology Caseload



# Forensic Entomology

- **Staffed by a board-certified, doctoral-level forensic entomologist**
  - Reports are peer-reviewed by external doctoral-level entomologists from three major academic institutions
- **2023 Casework:**
  - **28** total cases with
    - **7** scene collections
    - **21** autopsy collections

# Forensic Entomology Cases by Manner of Death



# QUALITY MANAGEMENT DIVISION

A SEPARATE DIVISION OF HCIFS

Ensures that services provided by  
the Institute are reliable  
and of high quality



# Quality Management (QM) Responsibilities

- Maintains a **documented quality management system** that meets all accreditation and county requirements
- Facilitates **quality improvements** within each division of HCIFS
- Monitors the **continued use of best practices** and ensures the reliability of records released for discovery

# 2023 QM Accomplishments

- **258** standard operating procedures reviewed
- **208** proficiency tests administered
- **858** court orders processed
- **12** internal audits conducted
- **84** internal training sessions provided

# CRIME LABORATORY SERVICES

Provides analytical testing  
on evidence submitted by  
local agencies in Harris and  
surrounding counties



# Statistical Summary

- Cases received: **21,704**
- Cases completed: **21,844**
- Total number of submitting agencies: **91**
- **66%** of laboratory personnel have a professional certification
  - American Board of Criminalistics: **50** analysts
  - American Board of Forensic Toxicology: **14** analysts
  - Association of Firearm and Tool Mark Examiners: **5** examiners

# CRIME LABORATORY SERVICES

## DRUG CHEMISTRY

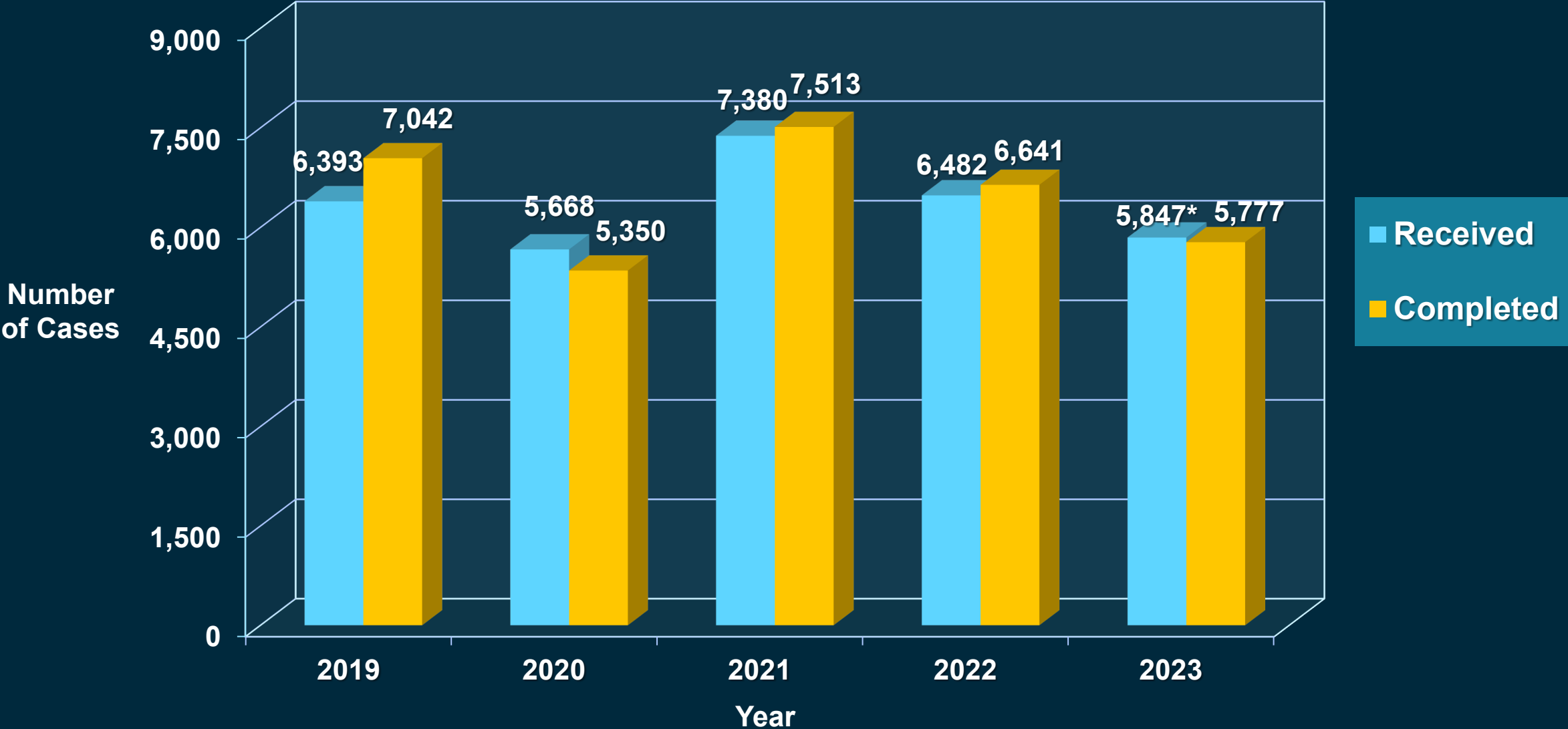
Analyzes suspected drug evidence seized by law enforcement agencies



# Drug Chemistry Laboratory

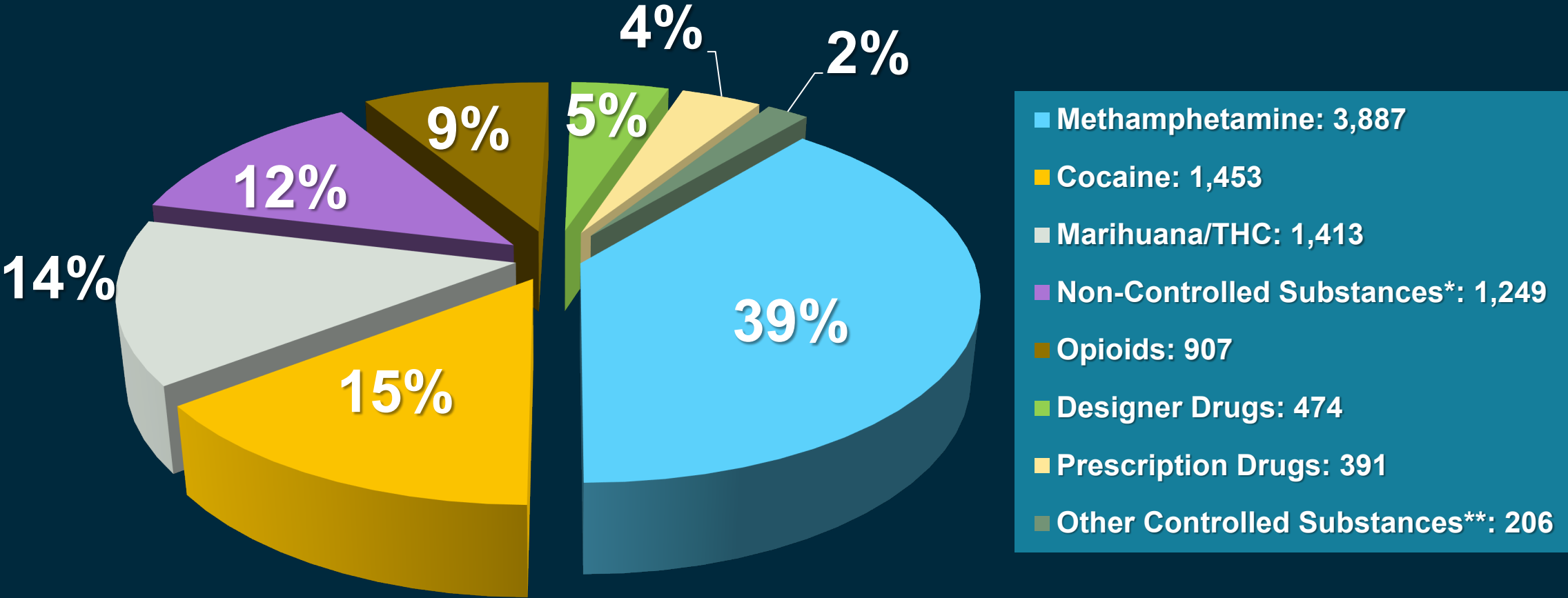
- In accordance with Texas state statutes, identifies **confiscated, illegal, and dangerous drugs**, including:
  - Plant material
  - Powders, tablets, liquids
  - Drug paraphernalia
- The laboratory also develops and implements methods to **identify new designer drugs** including:
  - Synthetic cannabinoids
  - Synthetic cathinones
  - Opioid derivatives

# Drug Cases Received and Completed



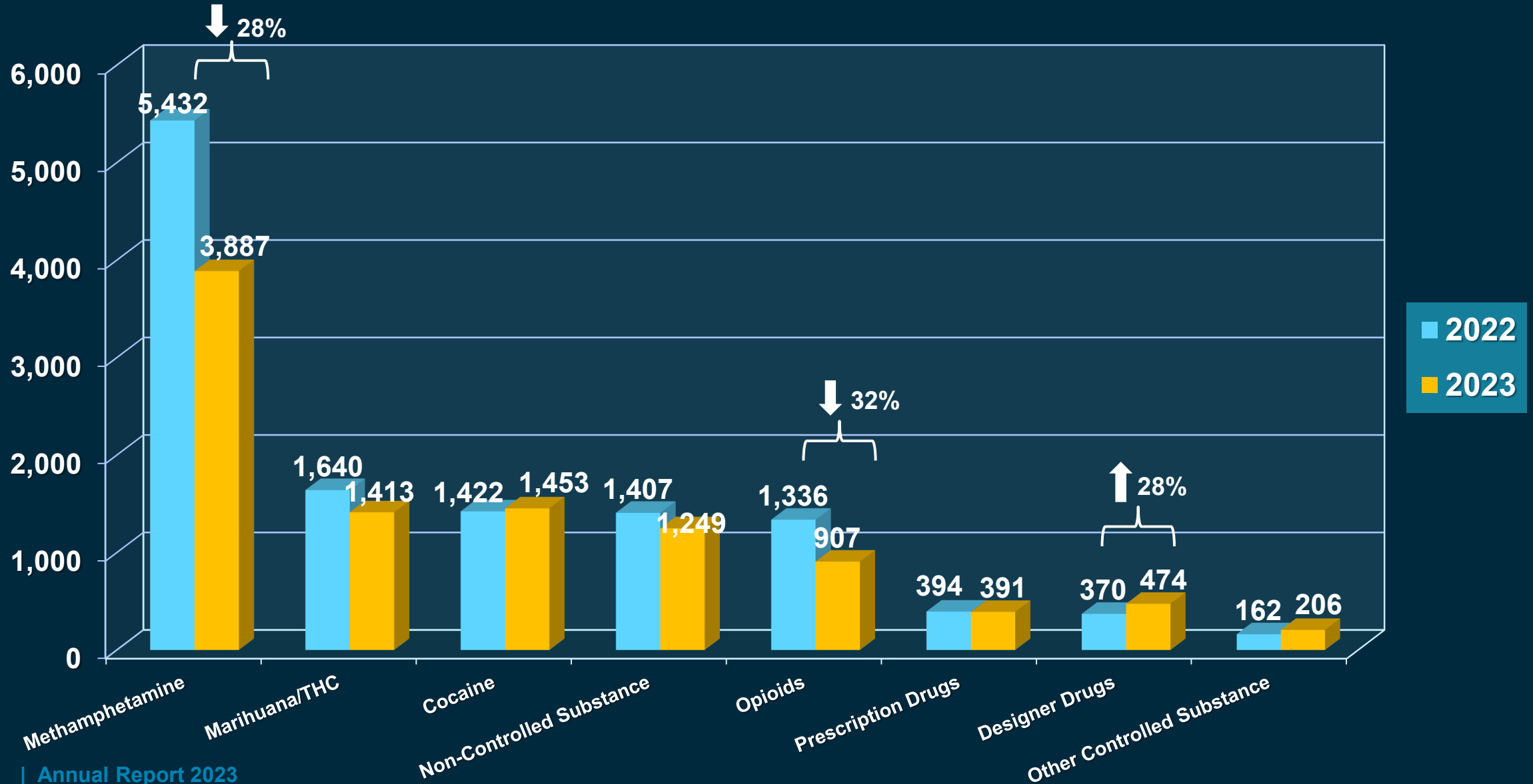
*\*This reflects a 10% decrease in cases received compared to 2022.*

# Positive Drug Test Results

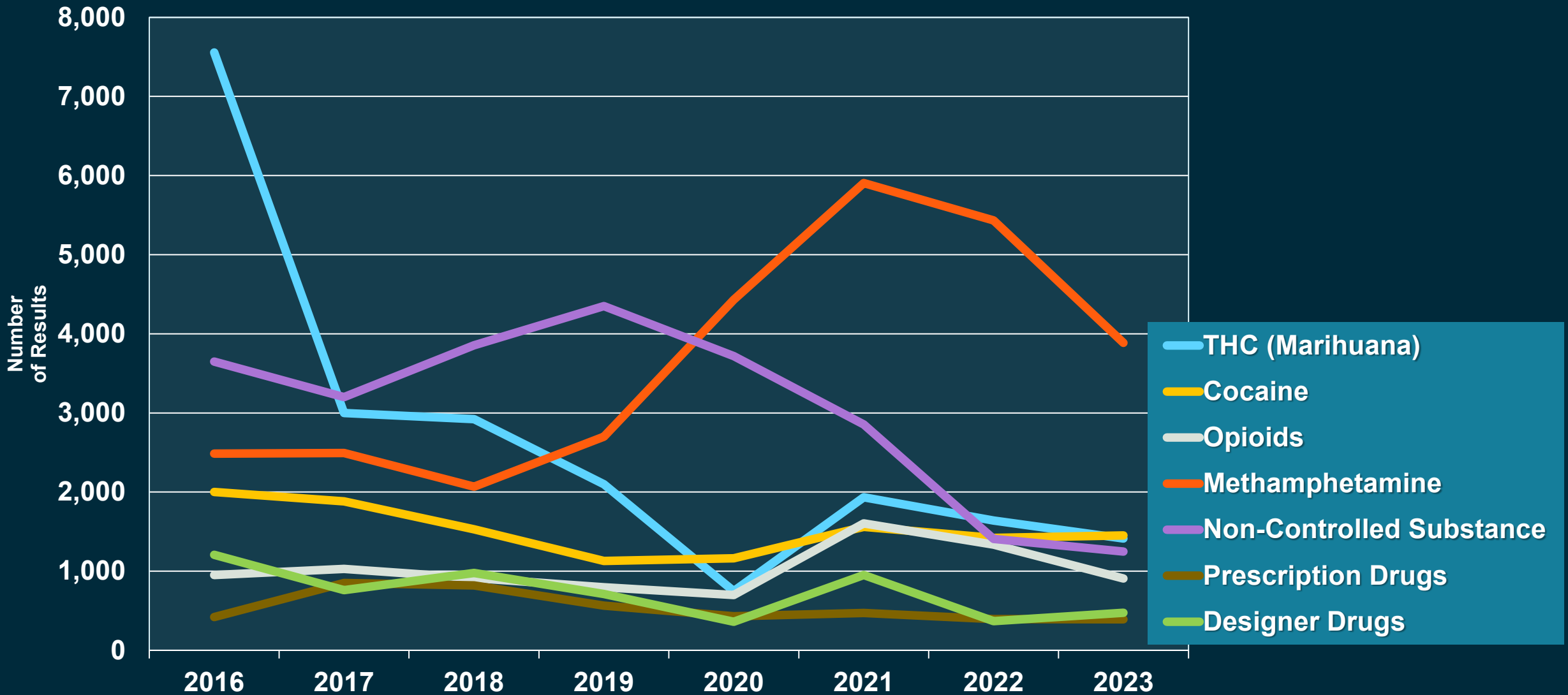


\*Non-controlled substances include acetaminophen, caffeine, lidocaine, tetramisole, xylazine.  
 \*\* Other controlled substances include GHB, LSD, PCP, psilocin.

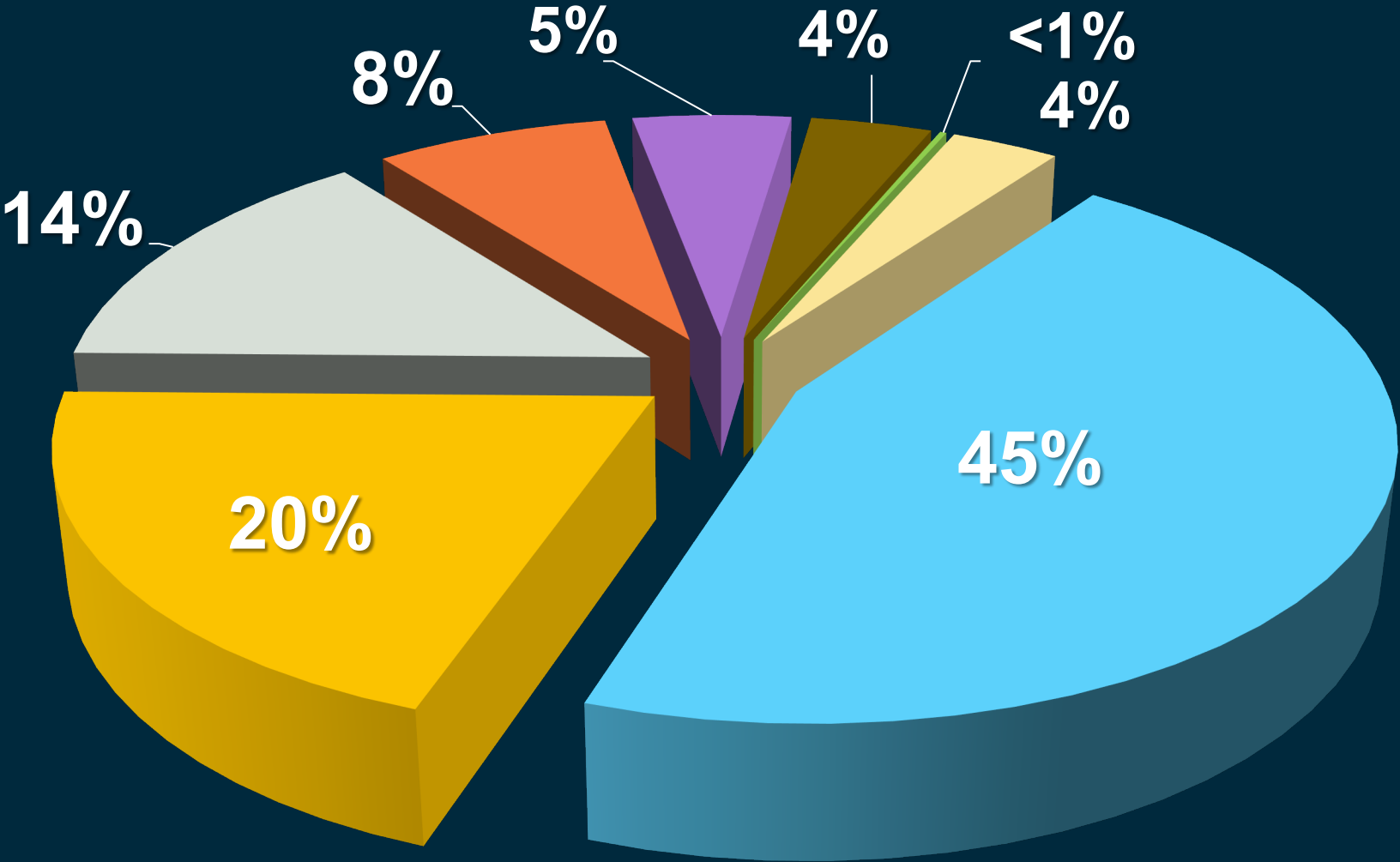
# Positive Drug Test Results Comparison 2023 vs 2022



# Trends in Seized Drugs



# Opioid Test Results

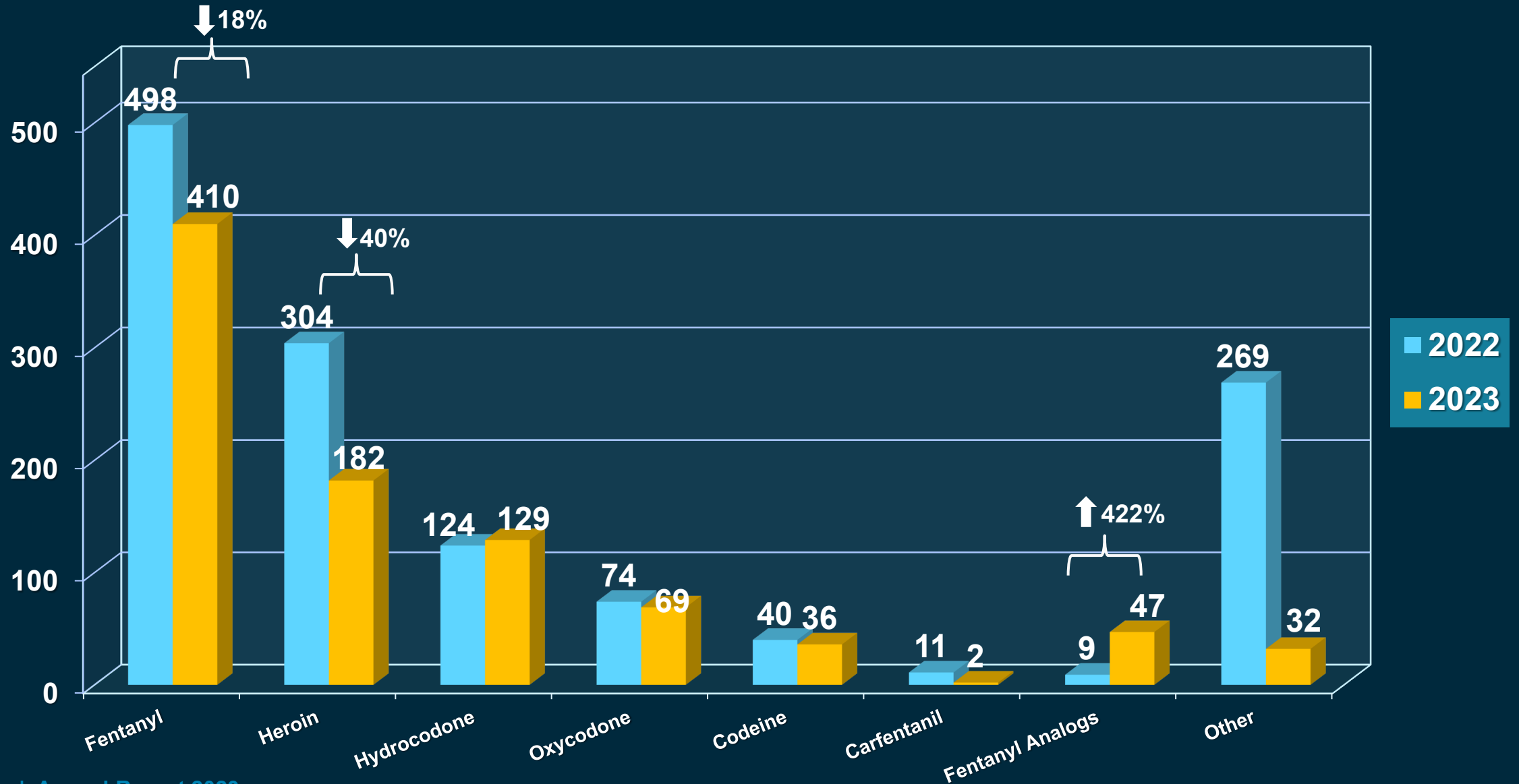


N= 907 total confirmed opioid results

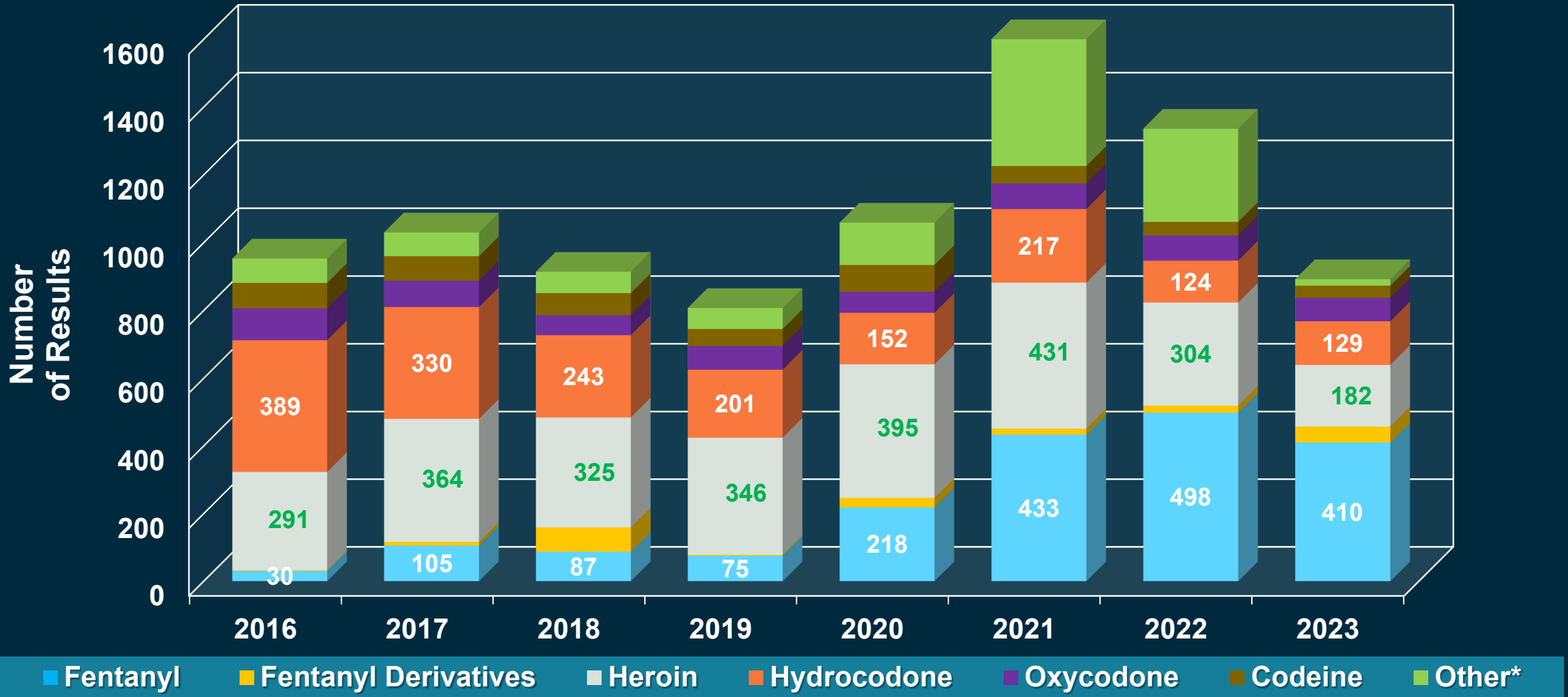
- Fentanyl: 410
- Heroin: 182
- Hydrocodone: 129
- Oxycodone: 69
- Fentanyl Analogs: 47
- Codeine: 36
- Carfentanil: 2
- Other\*: 32

\*Other category includes nitazenes, morphine, methadone, and hydromorphone.

# Opioid Test Results Comparison 2023 vs 2022

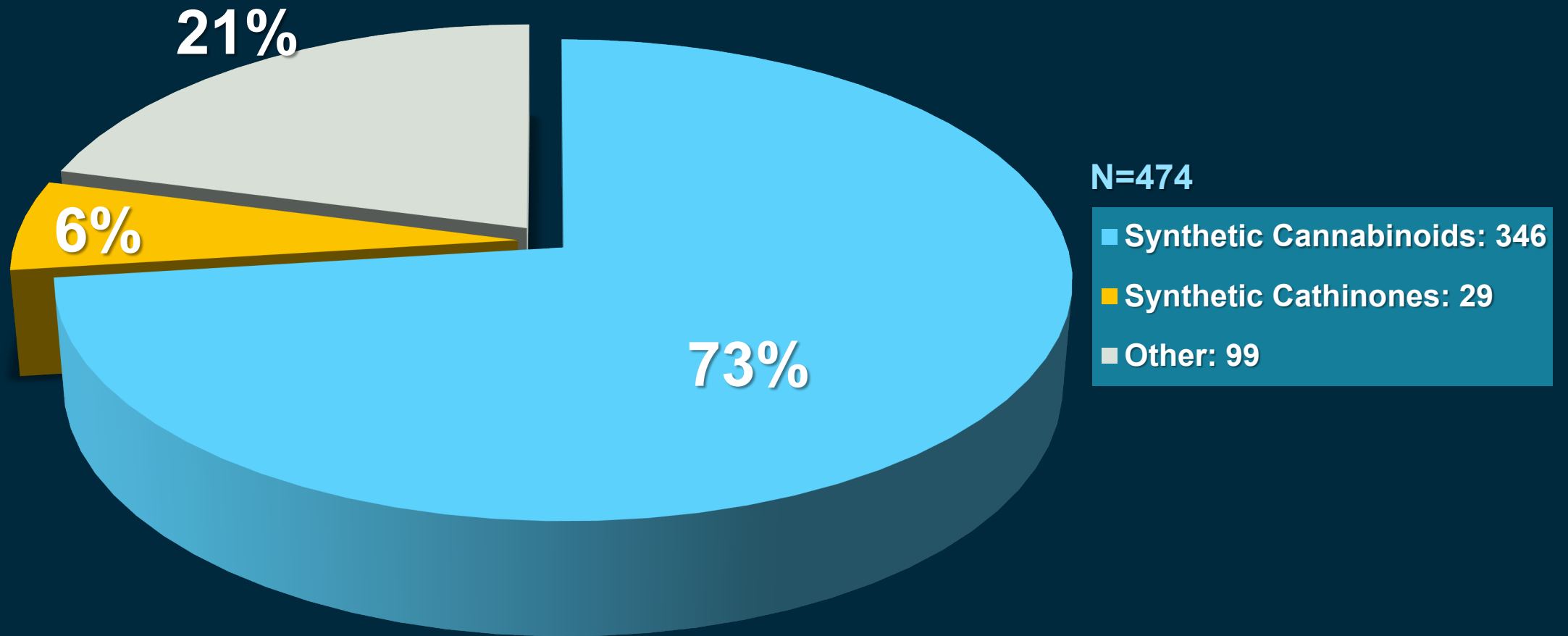


# Trends in Opioid Test Results



\*Other category includes methadone, morphine, hydromorphone, 4-ANPP, and other uncommon opioids.

# Designer Drug Test Results



*\*Other category includes cathinones, phenethylamines, and tryptamines.*

# CRIME LABORATORY SERVICES

## FORENSIC GENETICS

Analyzes biological fluids and tissues such as blood, semen, muscle, and bone for DNA



# Forensic Genetics Laboratory

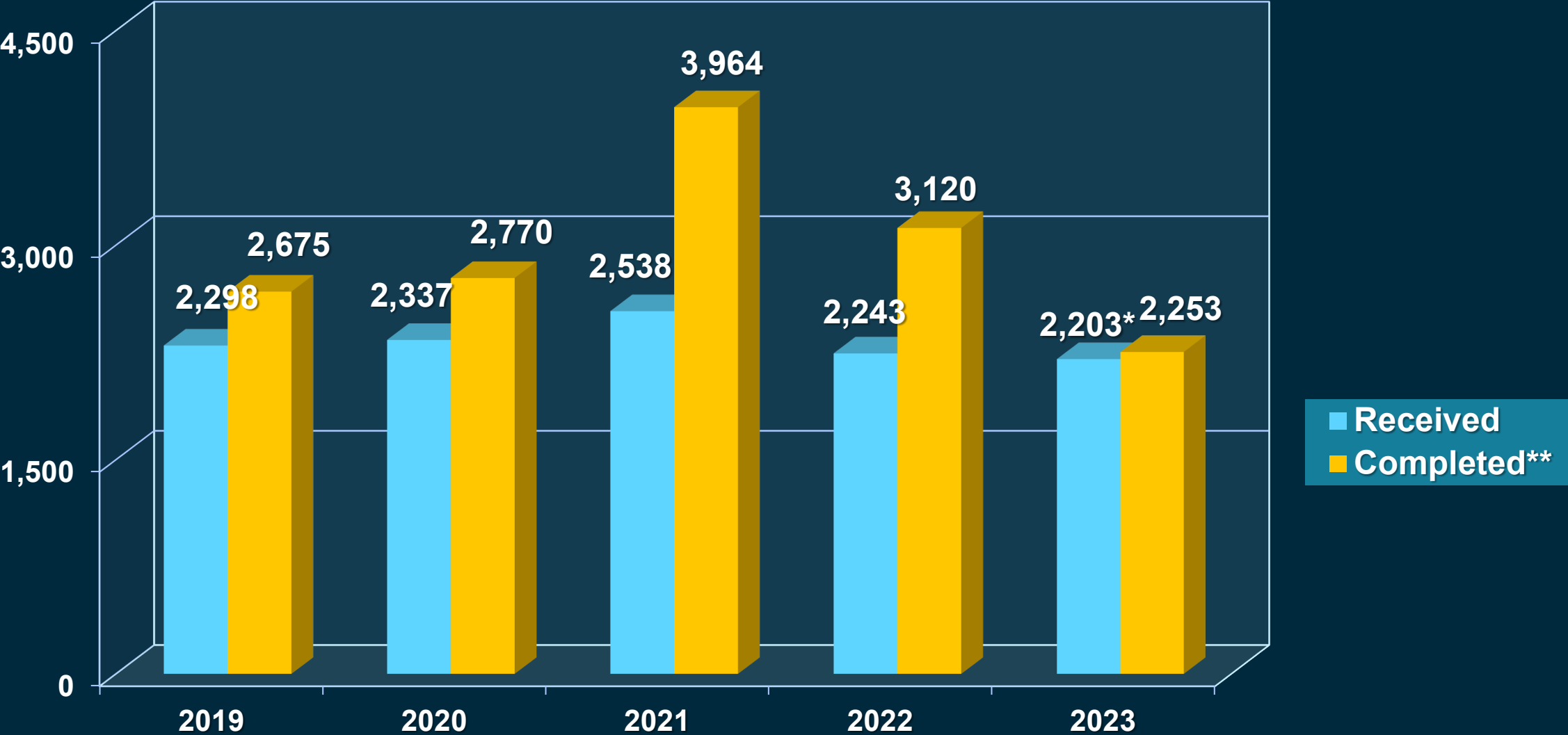
## *Conducts DNA testing primarily for:*

- Law enforcement agencies
- HCIFS medical examiners to assist in positively identifying decedents

Cases submitted for **DNA** testing include crimes against persons such as sexual assault, homicide, and robbery, as well as property crimes such as burglary and theft.

Crimes against persons are given **first priority** for testing.

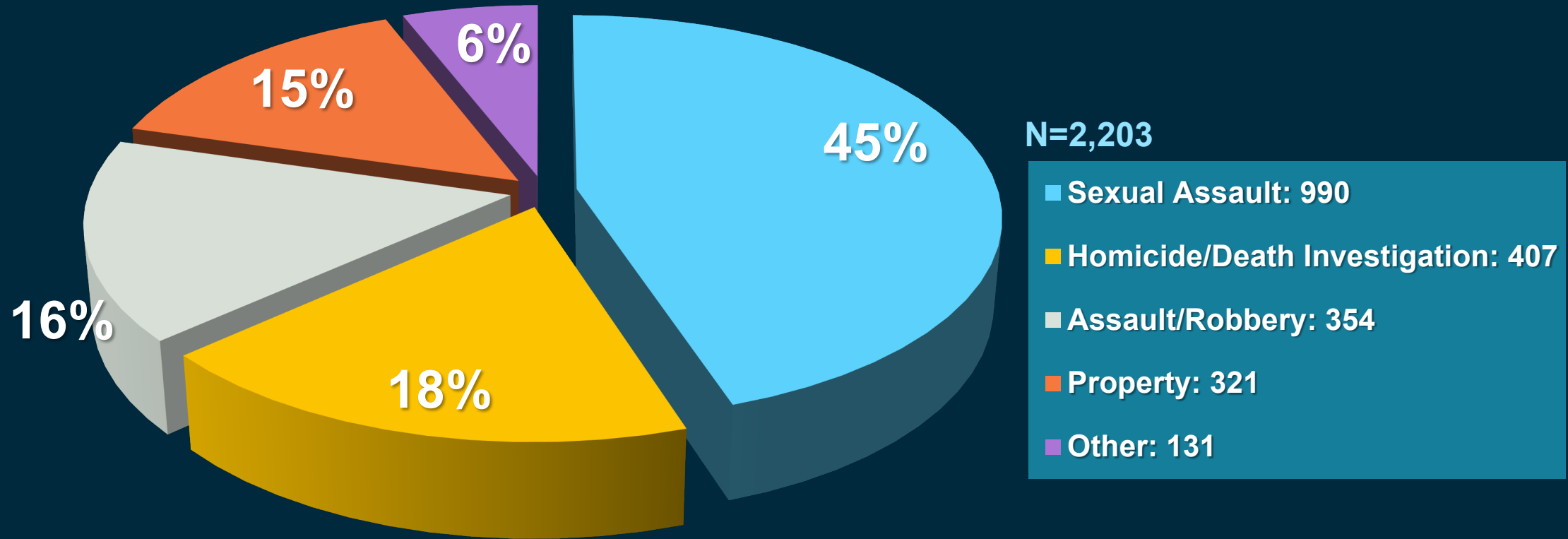
# DNA Cases Received and Completed



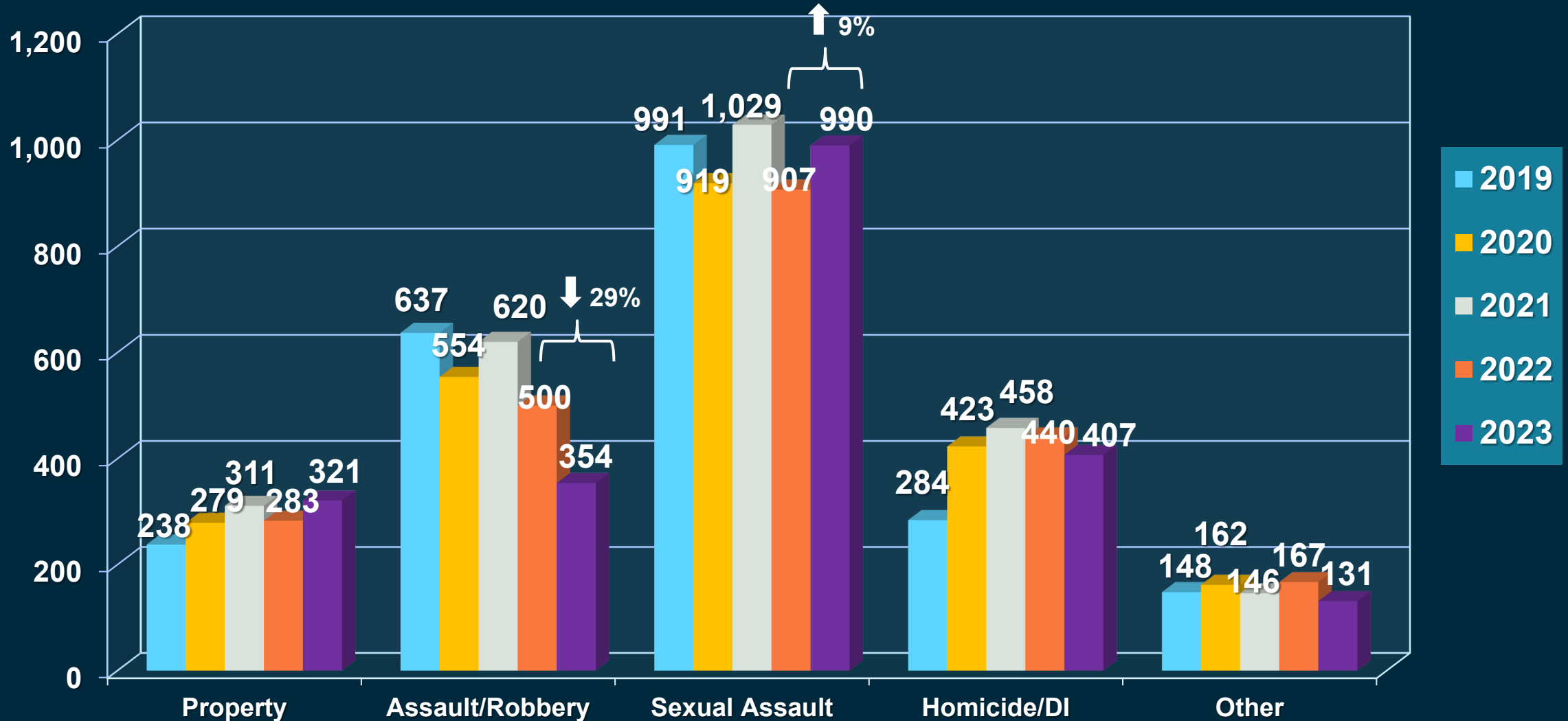
\*This reflects a 2% decrease from 2022 in cases received.

\*\*Cases completed have been revised to include administratively closed cases (mostly property crimes) for all previous years on this chart.

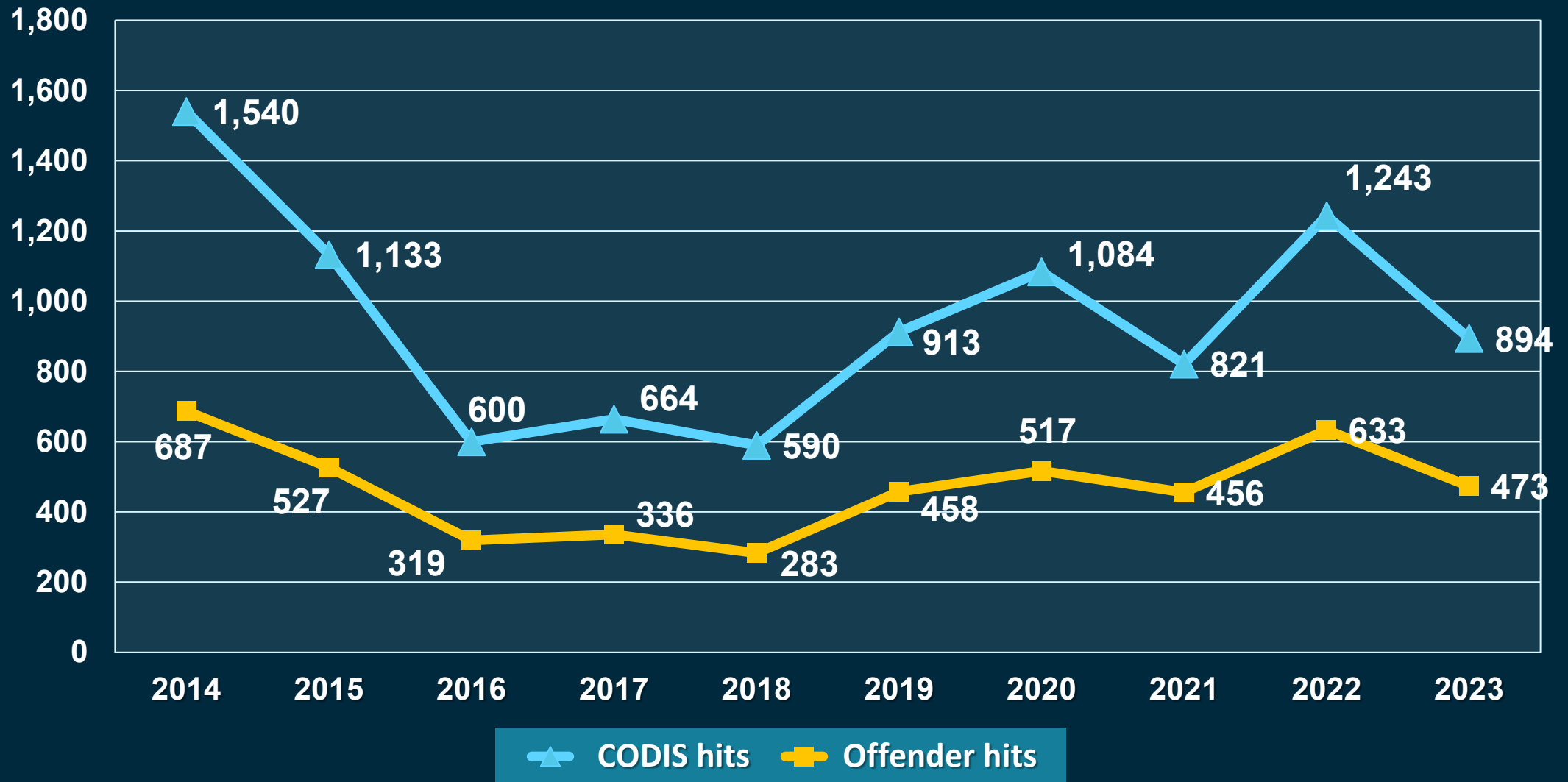
# DNA Case Submissions by Type



# Trend in DNA Case Submissions by Type



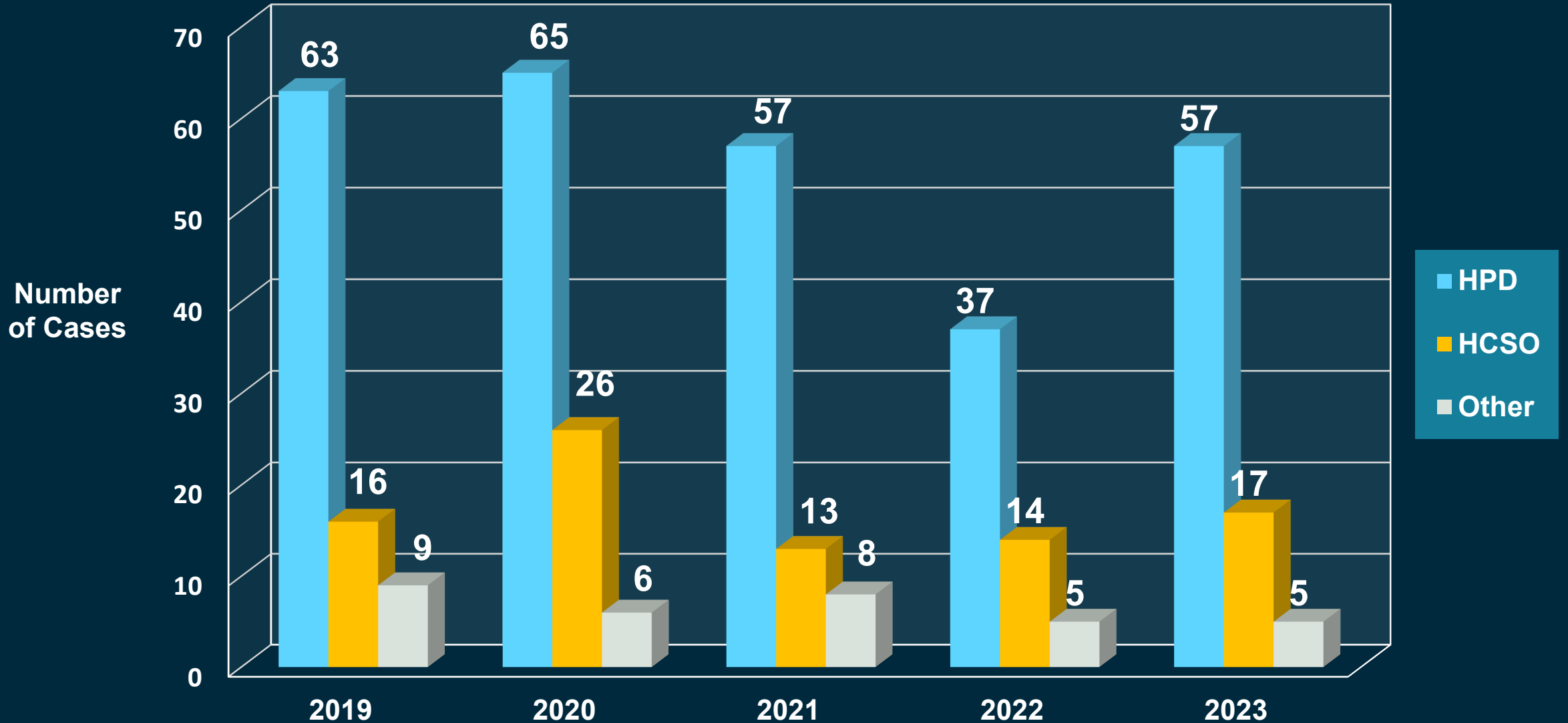
# CODIS Hits (Combined DNA Index System)



# Trace DNA Evidence Collection Team

- Specialized DNA analysts who attend select death scenes to **collect DNA and trace evidence** from bodies that have been:
  - Dumped
  - Bound
  - Thought to have been in close contact with an unknown perpetrator
- The team had a number of **successes obtaining DNA** different from that of the victim.
- This information assists investigators in **solving crimes.**

# Trace DNA Collection by Agency



# CRIME LABORATORY SERVICES

## FORENSIC TOXICOLOGY

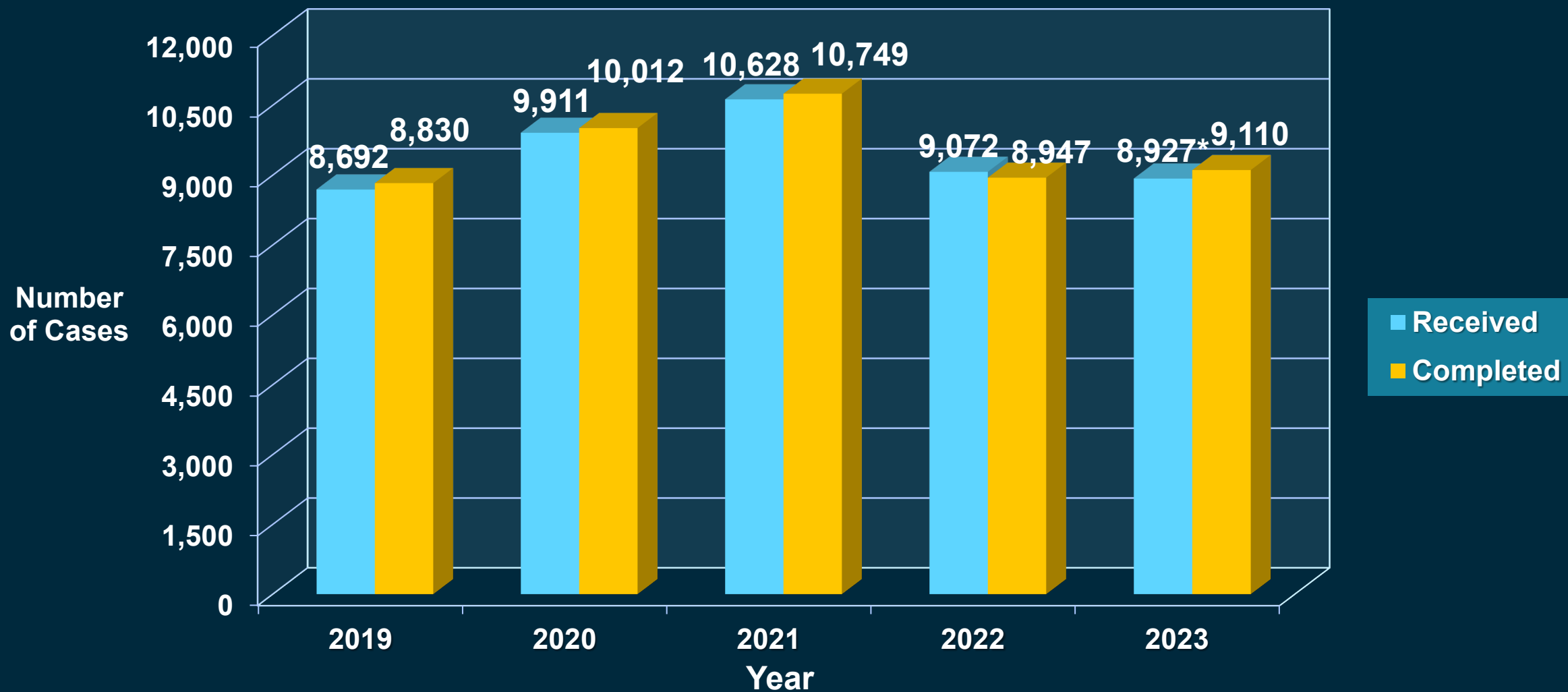
Provides analytical services in medicolegal death investigations, driving while intoxicated, and drug-facilitated sexual assault investigations



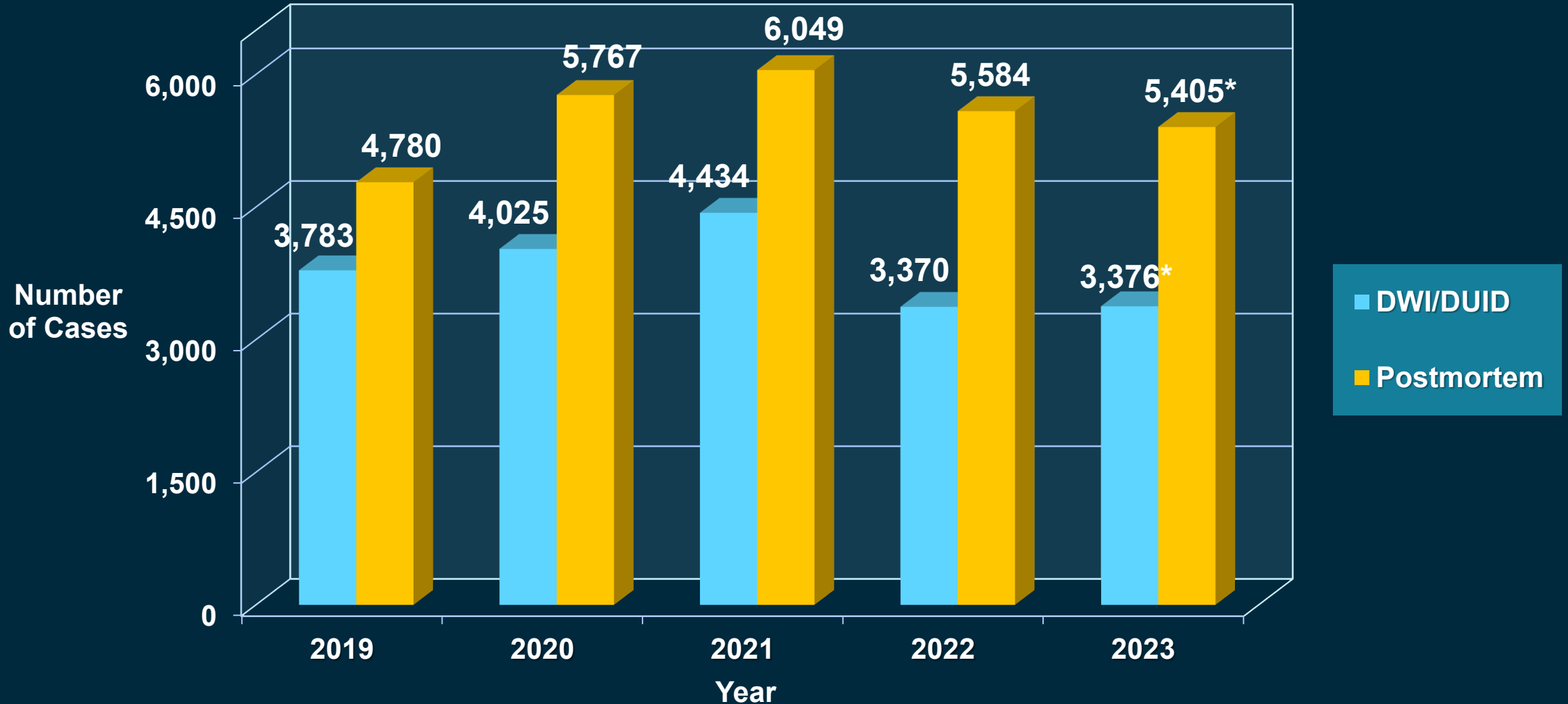
# Forensic Toxicology Laboratory

- Analyzes **biological evidence** submitted by the HCIFS Medical Examiner Service and law enforcement agencies in Harris County for:
  - Death investigations
  - Driving while intoxicated (DWI) and driving under the influence (DUI) cases
  - Drug-facilitated sexual assaults
- One of the two forensic toxicology laboratories in Texas **dually accredited** by the ANSI National Accreditation Board and the American Board of Forensic Toxicology

# Toxicology Cases Received and Completed

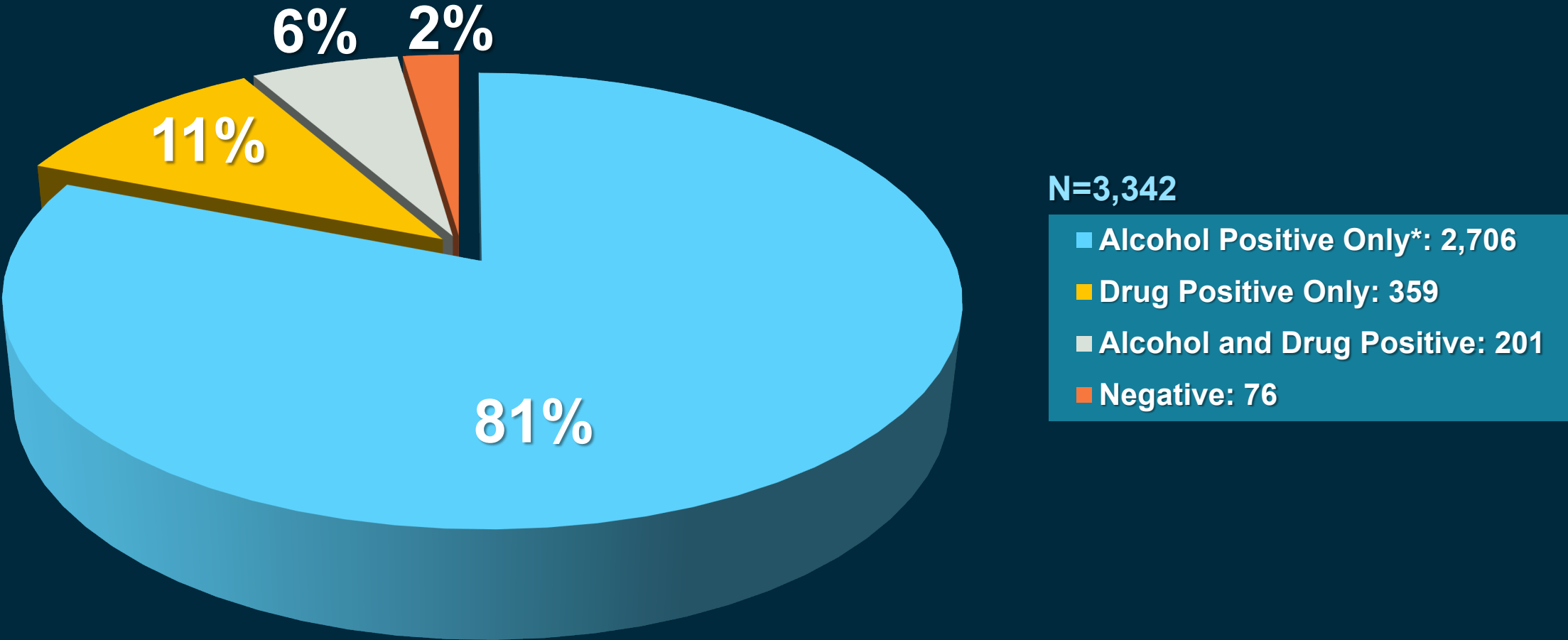


# Toxicology Cases Received by Type



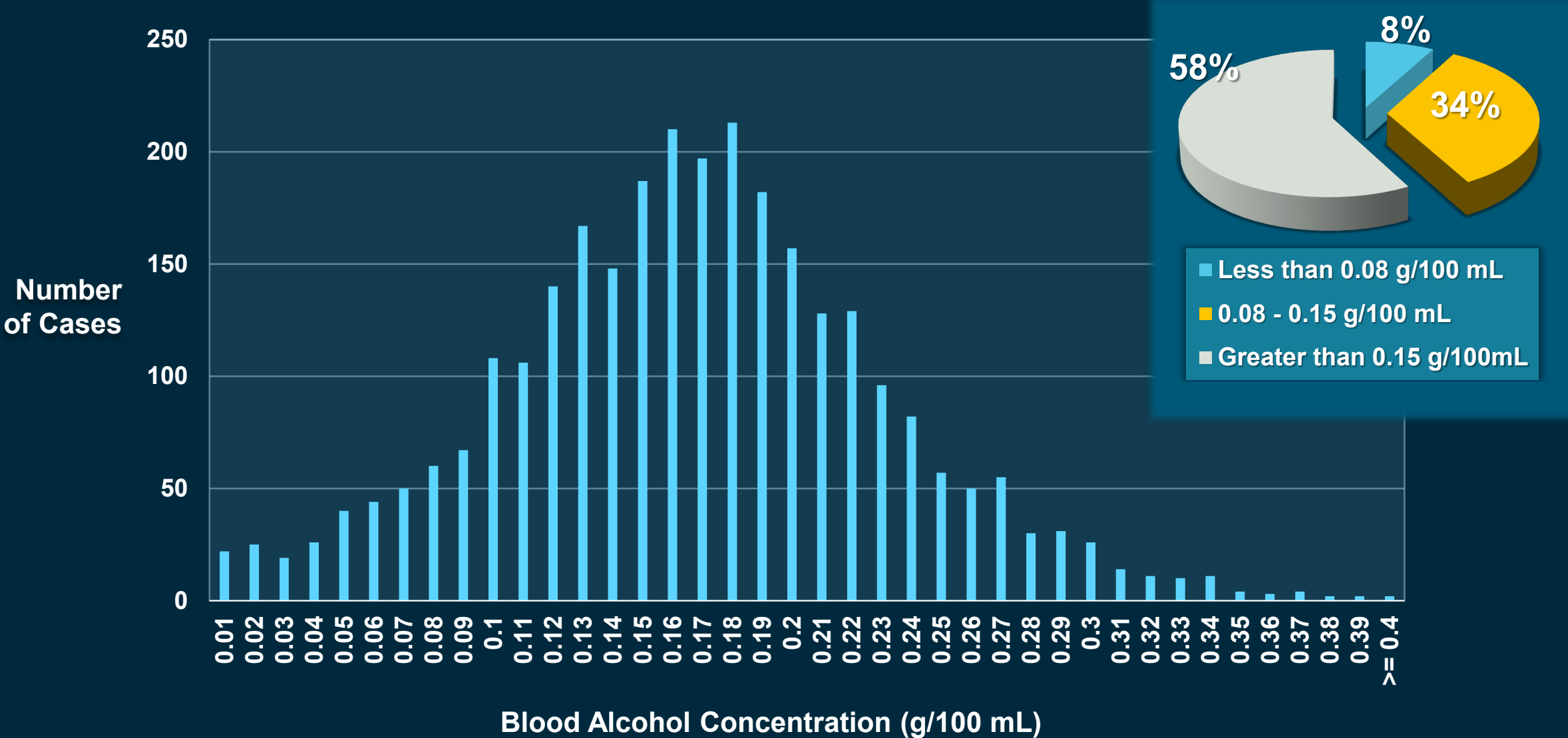
*\*Compared to 2022, this is about the same in cases received for DWI/DUID and a 3% decrease in cases received for postmortem cases.*

# DWI Case Results

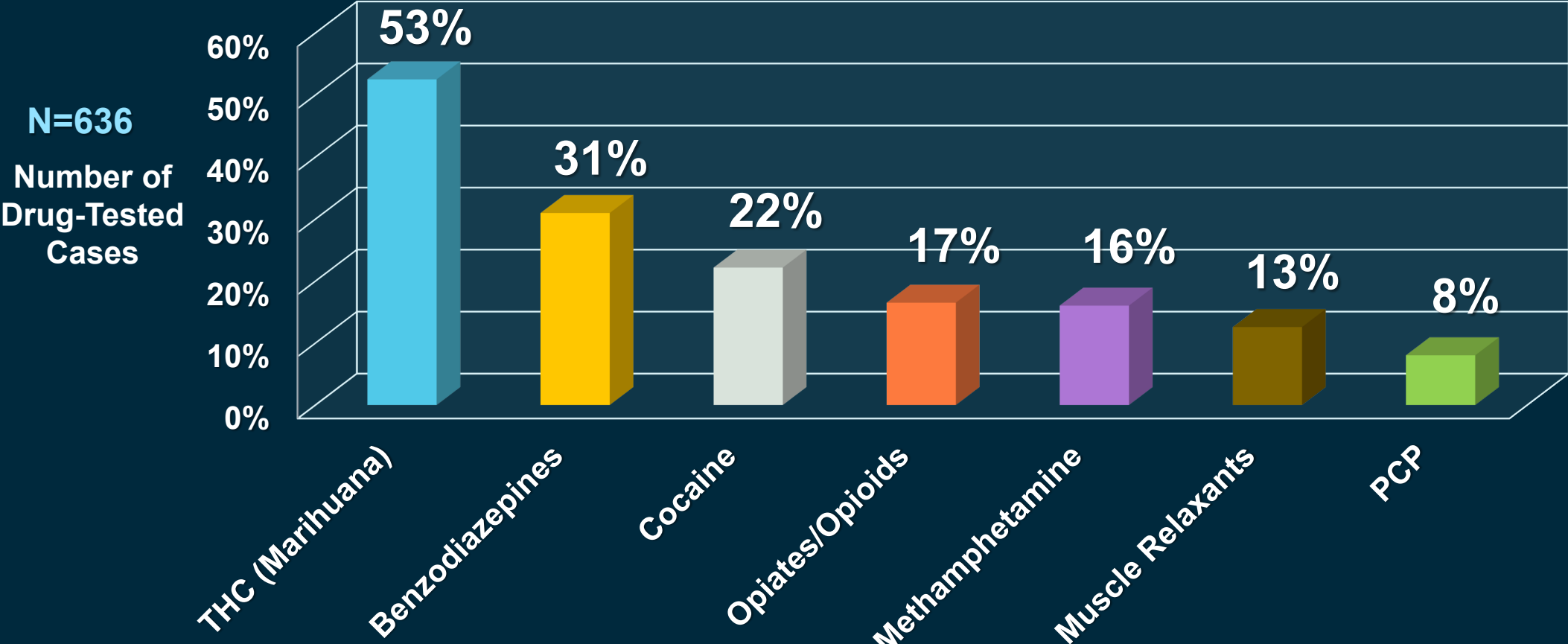


*\*Alcohol Positive Only is a case with the presence of ethanol but no drug analysis was performed. For cases that do not involve a fatality, drugs are tested only if the alcohol concentration is <0.10g/100mL.*

# DWI Blood Alcohol Concentrations

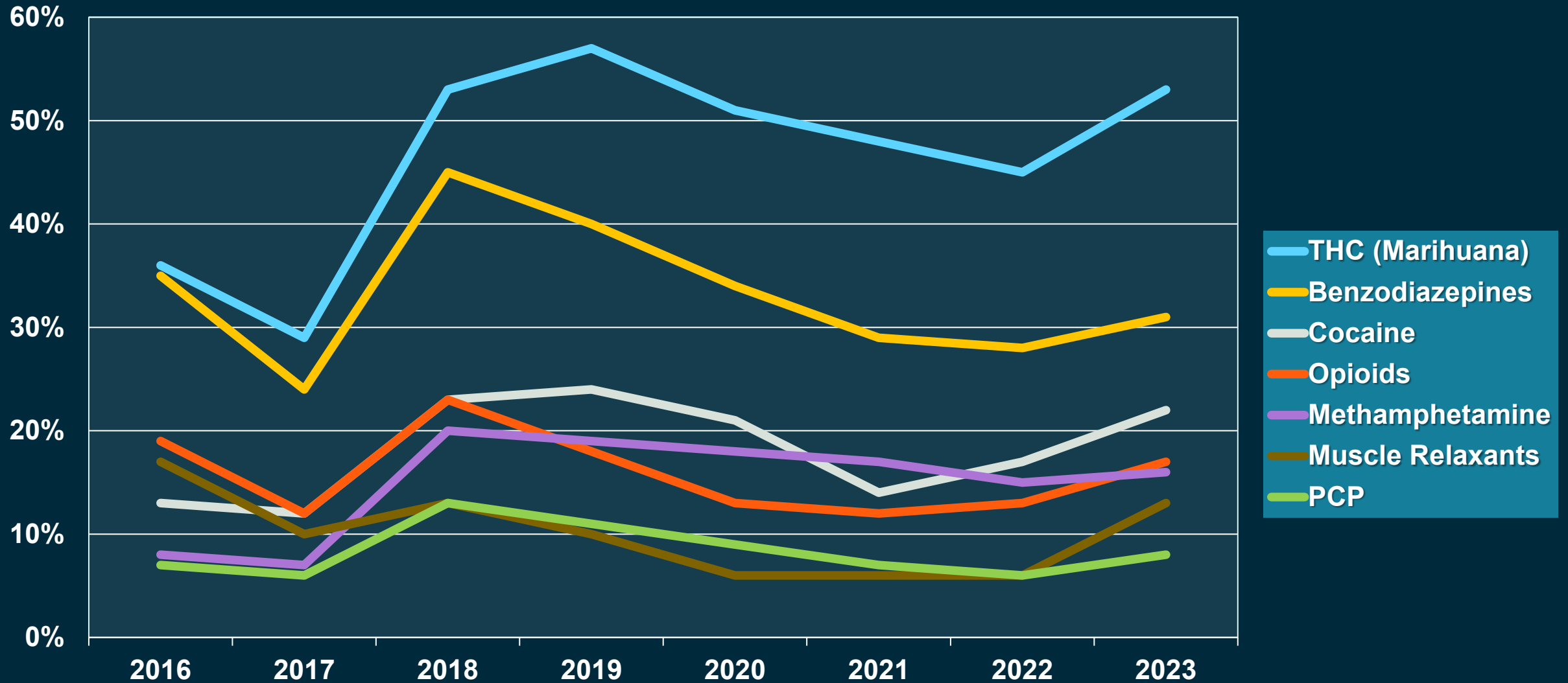


# Drug Prevalence in DWI Cases



True prevalence may be underrepresented as one case could have multiple drugs from a single drug class, e.g., opiates and benzodiazepines.

# Trends in Drug Prevalence for DWI Cases



# CRIME LABORATORY SERVICES

## FIREARMS IDENTIFICATION

Evaluates fired cartridge casings and bullets recovered from crime scenes and firearms involved in violent, gun-related incidents

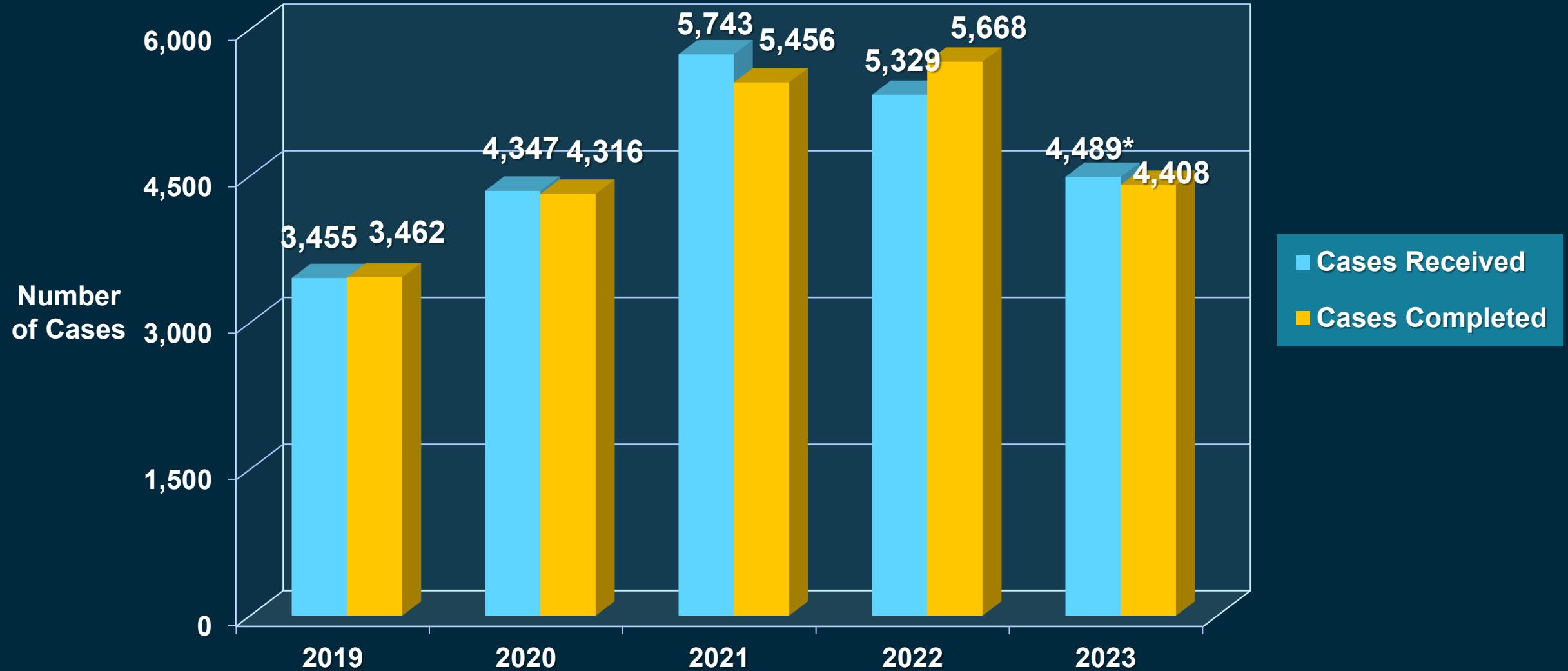


# Firearms Identification Laboratory

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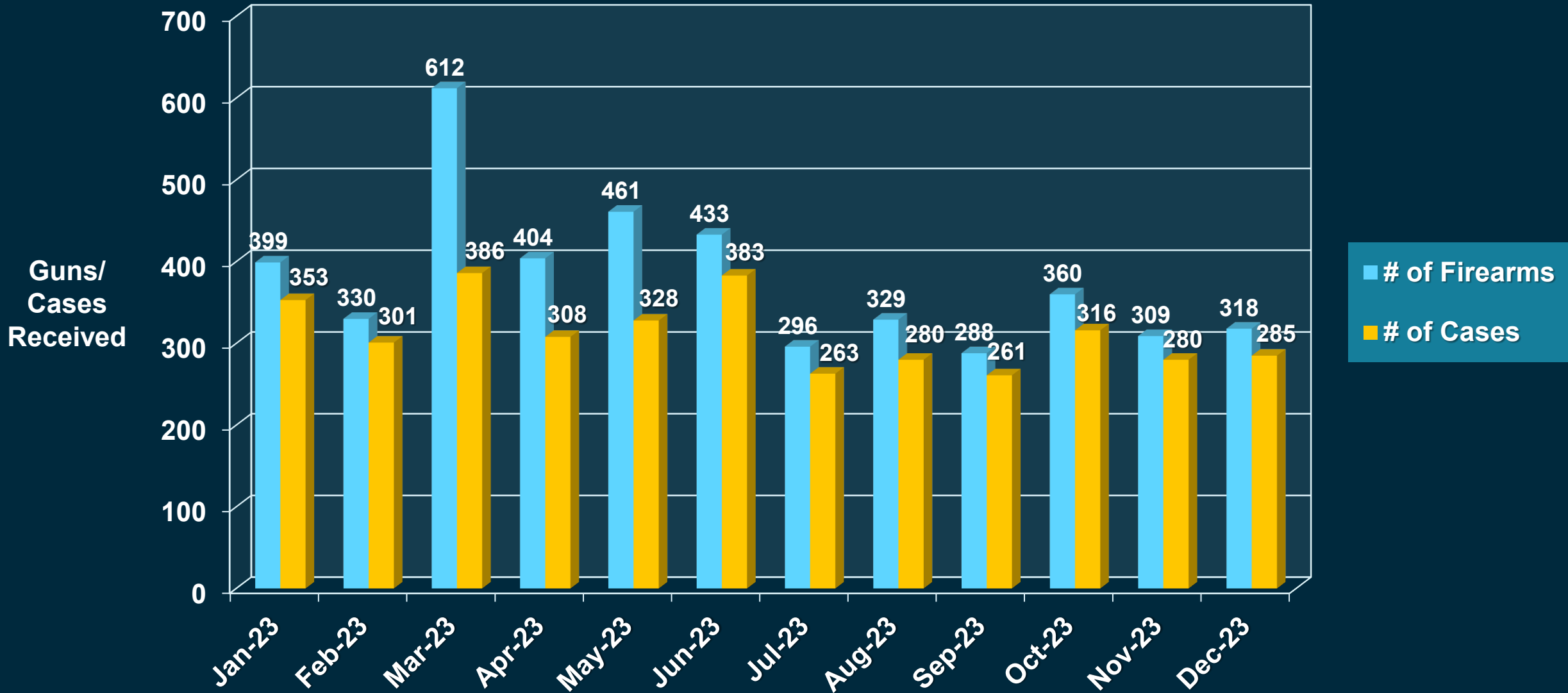
- Conducts examinations of evidence related to investigations of **firearm-related offenses**
- Cases received are comprised of **firearms, bullets, and cartridge casings**
- Participates in the National Integrated Ballistic Information Network (NIBIN) Program and performs serial number restorations

# Firearms Identification Casework

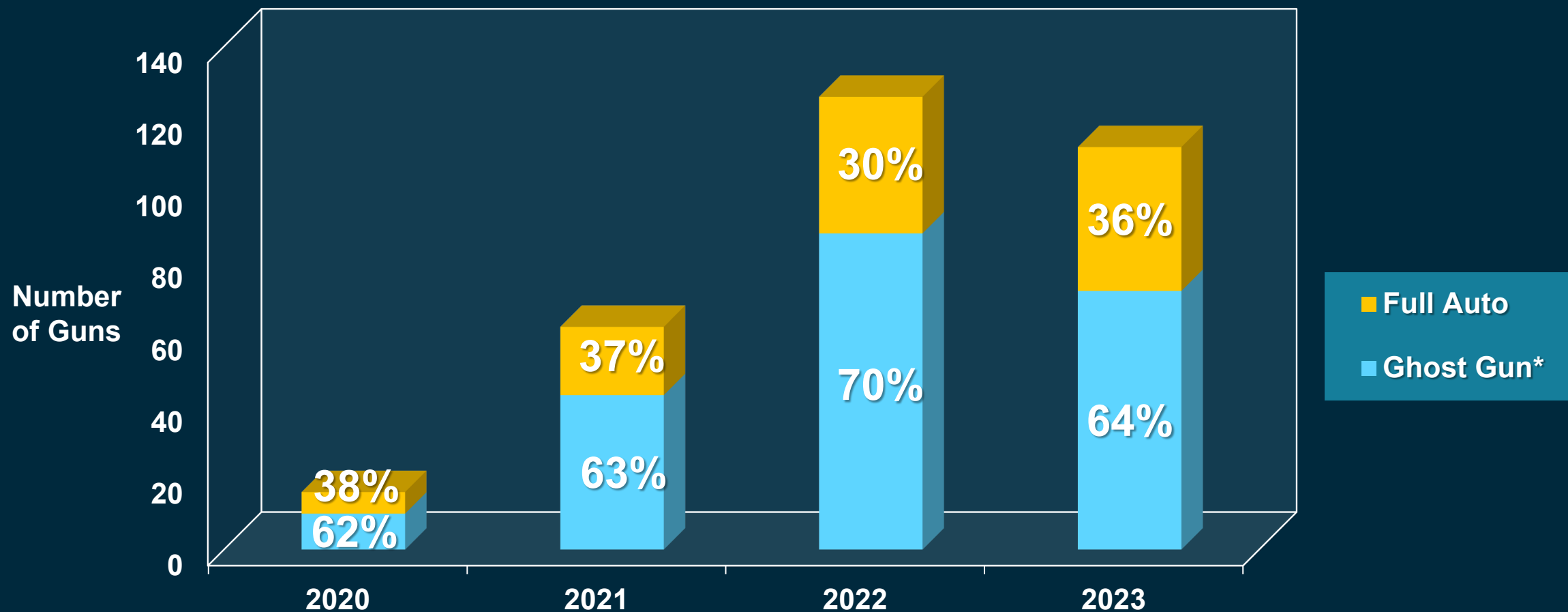


\*This reflects a 16% decrease in cases received compared to 2022.

# Firearms IBIS (Test-Fire Only) Case Submissions



# Submissions for Uncommon Firearms Types



*\*Ghost guns are unserialized, untraceable firearms that can be legally built from home. An 80% completed firearm receiver can be purchased online and comes with instructions on how to finish the assembly. All other firearm parts can be purchased legally online and assembled. The finished product will be a fully functioning firearm that has no serial number and cannot be traced by the ATF.*

# CRIME LABORATORY SERVICES

TRACE EVIDENCE

Provides gunshot residue analysis



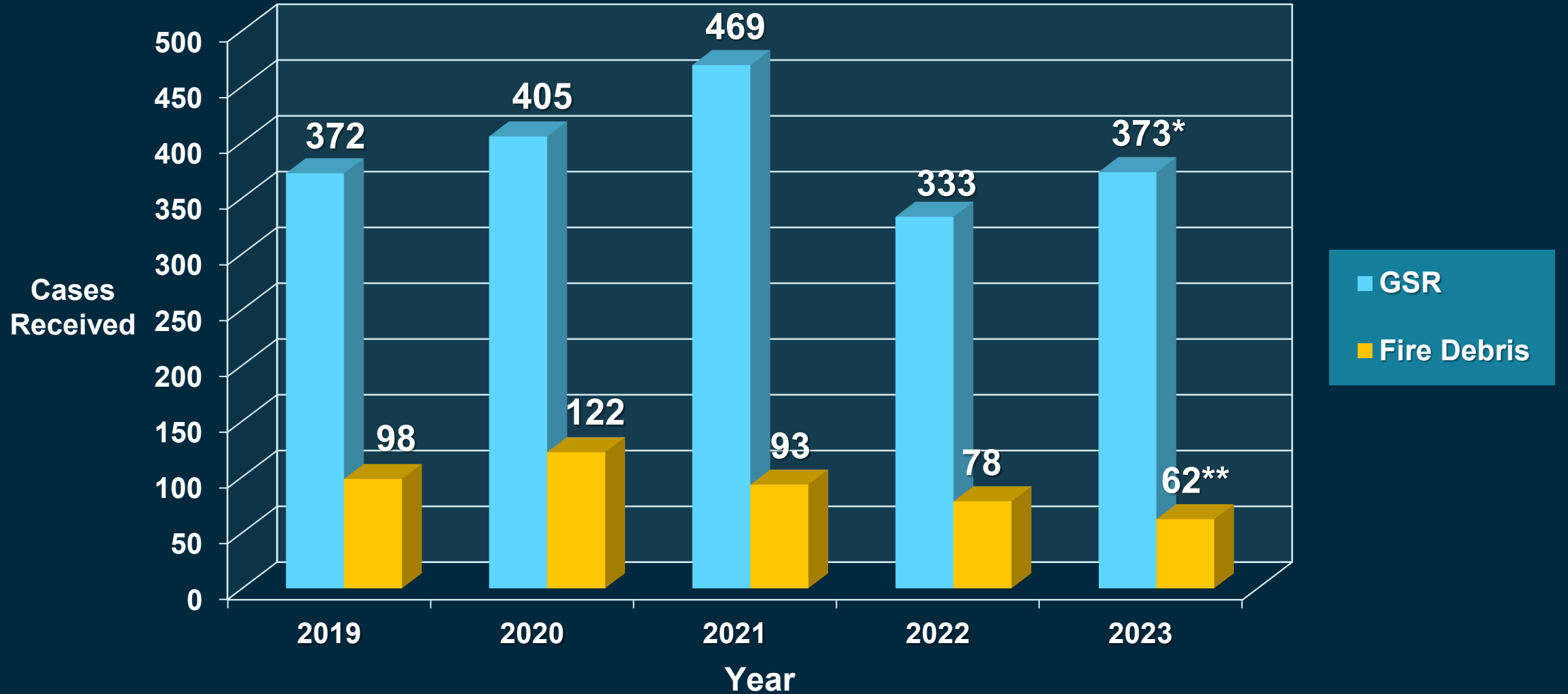
# Trace Evidence

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**Provides analytical support to the HCIFS Medical Examiner Services and law enforcement:**

- **Gunshot Residue (GSR) Analysis**
  - Assists in determining whether a person or object has an association with the discharge of a firearm

# Trace Evidence Casework



\*Compared to 2022, this is a 12% increase in GSR.

\*\*Fire debris analysis was paused at the end of 2023.

# PUBLISHED SCIENTIFIC WORK

Published articles in  
peer-reviewed journals



Identify the label. Think of synonyms you might use. Try to predict the answer. The label being described on the diagram is discussed on the page. Write its synonyms, and use them to answer in the space provided.

Instructions to see how many words you can use to complete each gap. Write your answers in the space provided. Describe it in your own words.

Model of human torso

Questions 1-6  
Label the diagram below.  
Write NO MORE THAN THREE WORDS for each answer.

Lungs: take oxygen from air and put it into the blood

Trachea (wind pipe): carries air from mouth and nose to lungs

Intestines: absorb nutrients and collect waste



8.6 Questions 3-4  
Choose TWO letters, A-E.  
Which TWO items should medical students NOT have in their bag?  
A a car  
B a thermometer  
C a stethoscope  
D a white coat  
E a mobile phone

# Publications by HCIFS Doctors and Scientists\*

	Title	Authors	Publication
1	Examination of acetone findings in suspected drug-facilitated sexual assaults: A case series	<u>Arndt C, Palmquist KB, Gray TR.</u>	<i>Journal of Analytical Toxicology</i> 2023;00:1-5. DOI: 10.1111/1556-4029.15308
2	Review of Analytical Methods for Screening & Quantification of Fentanyl Analogs and Novel Synthetic Opioids in Biological Specimens	<u>Palmquist KB</u> , Truver MT, Shoff EN, Krotulski AJ, Swortwood MJ	<i>Journal of Forensic Sciences</i> 2023; 00: 1-19; DOI: 10.1111/1556-4029.15282
3	Simplified COI barcoding of blow, flesh, and scuttle flies encountered in medicolegal investigations	<u>Kwiatkowski SC, Sanford,MR, Donley M, Welch K, Kahn R</u>	<i>Forensic Science, Medicine and Pathology</i> 10 May 2023; DOI: 10.1007/s12024-023-00653-y
4	A transdisciplinary analysis of domestic violence homicides in Harris County, Texas (2016-2020)	Lin HF, Spearman KJ, <u>Ross JL</u> , Blackburn E, Messing JT, Campbell JC, AbiNader MA, & Grimm KJ.	<i>Homicide Studies</i> 10887679231182331
5	The Evolving Role of Forensic Anthropologists in Medical Examiner Offices	<u>Fleischman J</u> , Vollner J, Adams B, <u>Crowder CM, Pinto D, Soto Martinez M</u> , Rainwater C, Vogelsberg C, <u>Wiersema J</u>	<i>Forensic Anthropology</i> DOI: <a href="https://doi.org/10.5744/fa.2023.0013">https://doi.org/10.5744/fa.2023.0013</a>

# Publications by HCIFS Doctors and Scientists\*

	Title	Authors	Publication
6	Neurovascular Complications of Iatrogenic <i>Fusarium solani</i> Meningitis	Strong N, Meeks G, Sheth SA, McCullough L, Villalba JA, Tan C, Barreto A, Wanger A, <b><u>McDonald M</u></b> , Kan P, Shaltoni H, Campo Maldonado J, Parada V, Hassan AE, Reagan-Steiner S, Chiller T, Gold JAW, Smith DJ, Ostrosky-Zeichner L	<i>N Engl J Med</i> 2024 Feb 8;390(6):522-529. DOI: 10.1056/NEJMoa2308192. PMID: 38324485
7	A 3-O-sulfated heparan sulfate dodecasaccharide (12-mer) suppresses thromboinflammation and attenuates early organ injury following trauma and hemorrhagic shock	Maria del Pilar Huby Vidaurre, Osborn B, Lowak K, <b><u>McDonald MM</u></b> , Wang YW, Pa V, Richter J, Xu Y, Arnold K, Liu J, and Cardenas J	<i>Front. Immunol. Sec. Molecular Innate Immunity</i> 2023 Volume 14. DOI: 10.3389/fimmu.2023.1158457
8	A 20-year Retrospective Autopsy Study of Fifty Patients with Hematological Malignancies from One Institution (abs#608)	Ahmed A, Gehris B, Wang W, <b><u>McDonald MM, Buja LM</u></b> , Chen L, Zhao B	<i>Modern Pathology</i> 2023; 3 (suppl 1): page S1-S2.
9	Comparison of Morphological Differences in COVID-19 and Non-COVID-19 From Explant Lungs (abs#2606)	Zhao B, <b><u>Buja LM, McDonald MM</u></b> , Savariya B	<i>Modern Pathology</i> 2023; 3 (suppl 1): page S1681.
10	Association of Genetic Variants with Outcomes in Patients with Nonischemic Dilated Cardiomyopathy (abs#2246)	Sadaf H, Park S, Nathan S, Mihalj M, Matejin S, <b><u>McDonald MM</u></b> , Zhao B, Radovancevic R, Kar B, <b><u>Buja LM</u></b>	<i>Modern Pathology</i> 2023; 3 (suppl 1): page S257

# INTERNSHIPS AND FELLOWSHIP PROGRAMS



# Internship Program

- **HCIFS prepares students for future careers in forensic science in many different scientific disciplines as well as in technical, professional, and administrative capacities.**
- **11 interns from the following disciplines were on site in 2023:**
  - Forensic Pathology
  - Forensic Anthropology
  - Forensic Entomology & Identification
  - Forensic Investigations
  - Forensic Genetics
  - Forensic Toxicology
  - Forensic Histology
  - Forensic Imaging
  - Drug Chemistry
  - Firearms Identification
  - Trace Evidence

# Medical Examiner Fellowship Program

## *Forensic Pathology Fellowship:*

A **1-year fellowship** that is a required training program for all new pathologists seeking Forensic Pathology Board certification

Fellows focus on the data acquisition and documentation processes from medical and non-medical sources with particular emphasis placed on the correlation of scene observations (forensic investigation) with autopsy and forensic toxicological findings.

# Crime Laboratory Fellowship Program

## *Forensic Toxicology:*

A **2-year fellowship** providing training for doctorate-level scientists seeking specialization in forensic toxicology

Upon completion of the program, fellows will be familiar with toxicology laboratory methods and interpretation. Methods include immunoassay screening, sample preparation, liquid and gas chromatography with mass spectrometry, and interpretation of toxicological findings in postmortem, DWI, and drug-facilitated sexual assault cases.

# Forensic Anthropology Fellowship Program

## *Forensic Anthropology:*

A **2-year fellowship** designed to expose an emerging physical anthropologist to the role of the forensic anthropologist in a medical examiner's office that serves a large urban population.

During the program, the fellow will participate in casework, attend and process death scenes, process unidentified decedents and conduct a research project. In addition, the fellow will be introduced to an extensive quality system required for forensic analysis.



HARRIS COUNTY

# INSTITUTE OF FORENSIC SCIENCES

SCIENCE.

SERVICE.

INTEGRITY.

