

**PIMA COUNTY FORENSIC SCIENCE CENTER  
OFFICE OF THE MEDICAL EXAMINER**

**ANNUAL REPORT 2012**



**TABLE OF CONTENTS**

<b>INTRODUCTION</b>	<b>PAGE 4</b>
<b>OVERVIEW</b>	<b>PAGE 4</b>
<b>ORGANIZATIONAL CHART</b>	<b>PAGE 6</b>
<b>TOTAL CASES</b>	<b>PAGE 7</b>
<b>MEDICAL EXAMINER (ME) CASES</b>	<b>PAGE 7</b>
ME CASES	PAGE 8
ME CASES BY AGE	PAGE 8
ME CASES BY MANNER	PAGE 9
PIMA COUNTY ME CASES BY MANNER	PAGE 9
<b>HOMICIDE DEATHS</b>	<b>PAGE 10</b>
HOMICIDE 2009-2012	PAGE 10
HOMICIDE BY AGE	PAGE 10
HOMICIDE BY GENDER	PAGE 11
HOMICIDE BY CAUSE	PAGE 11
<b>ACCIDENT DEATHS</b>	<b>PAGE 12</b>
ACCIDENT BY AGE	PAGE 12
ACCIDENT BY GENDER	PAGE 12
ACCIDENT BY CAUSE	PAGE 13
ACCIDENT BY CAUSE 2011-2012	PAGE 13
<b>SUICIDE DEATHS</b>	<b>PAGE 14</b>
SUICIDE BY AGE	PAGE 14
SUICIDE BY GENDER	PAGE 14
SUICIDE BY CAUSE	PAGE 15
SUICIDE BY CAUSE 2011-2012	PAGE 15
<b>NATURAL DEATHS</b>	<b>PAGE 16</b>
NATURAL BY AGE	PAGE 16
NATURAL BY GENDER	PAGE 16
NATURAL BY CAUSE	PAGE 17
NATURAL BY CAUSE 2011-2012	PAGE 17
<b>UNDETERMINED MANNER OF DEATH</b>	<b>PAGE 18</b>
UNDETERMINED MANNER BY AGE	PAGE 18
UNDETERMINED MANNER BY GENDER	PAGE 18
UNDETERMINED MANNER BY CAUSE	PAGE 19

<b>OVERDOSE DEATHS</b>		<b>PAGE 20</b>
<b>OVERDOSE DEATHS 2010-2012</b>	<b>PAGE 20</b>	
<b>OVERDOSE DEATHS BY AGE</b>	<b>PAGE 21</b>	
<b>OVERDOSE DEATHS BY GENDER</b>	<b>PAGE 21</b>	
<b>OVERDOSE DEATHS BY MANNER</b>	<b>PAGE 22</b>	
<b>SINGLE V. POLY DRUG OVERDOSE</b>	<b>PAGE 22</b>	
<b>OVERDOSE DEATHS BY DRUG</b>	<b>PAGE 23</b>	
<b>MOST FREQUENT DRUG 2011-2012</b>	<b>PAGE 23</b>	
<b>MOTOR VEHICLE RELATED FATALITIES</b>		<b>PAGE 24</b>
<b>MOTOR VEHICLE FATALITIES 2011-2012</b>	<b>PAGE 24</b>	
<b>MOTOR VEHICLE FATALITIES BY AGE</b>	<b>PAGE 24</b>	
<b>MOTOR VEHICLE FATALITIES BY GENDER</b>	<b>PAGE 25</b>	
<b>MOTOR VEHICLE FATALITIES BY TYPE</b>	<b>PAGE 25</b>	
<b>W.H. BIRKBY FORENSIC ANTHROPOLOGY LABORATORY</b>		<b>PAGE 26</b>
<b>FA EXAMS BY NUMBER 2007-2012</b>	<b>PAGE 26</b>	
<b>FA EXAMS BY CONDITION OF REMAINS</b>	<b>PAGE 27</b>	
<b>FA EXAMS BY TYPE</b>	<b>PAGE 27</b>	
<b>MIGRANT DEATHS</b>		<b>PAGE 28</b>
<b>MIGRANT DEATHS 2001-2012</b>	<b>PAGE 28</b>	
<b>MIGRANT DEATHS BY MONTH</b>	<b>PAGE 29</b>	
<b>MIGRANT DEATHS BY AGE</b>	<b>PAGE 29</b>	
<b>MIGRANT DEATHS BY GENDER</b>	<b>PAGE 30</b>	
<b>MIGRANT DEATHS BY CAUSE</b>	<b>PAGE 30</b>	
<b>MIGRANT DEATHS BY NATIONALITY, 2012</b>	<b>PAGE 31</b>	
<b>MIGRANT DEATHS BY NATIONALITY, 2001-2012</b>	<b>PAGE 31</b>	
<b>IDENTIFIED V. UNIDENTIFIED MIGRANT DEATHS</b>	<b>PAGE 32</b>	
<b>DNA IDENTIFICATION OF MIGRANTS</b>	<b>PAGE 32</b>	

## **INTRODUCTION**

The Pima County Forensic Science Center (FSC) investigates any death in Pima County that is sudden, violent, unexpected, or in which the cause of death is unknown. In 2012 there were 9,742 deaths in Pima County; of these 2,523 (26%) were reported to the FSC for investigation. This annual report consists of two main sections. The first is an overview of the activities and notable events of the office over the course of the report year. The second is a statistical review of the types of cases processed by the office over the same time period.

## **OVERVIEW**

The FSC was fully accredited by the National Association of Medical Examiner's (NAME) following a two day inspection in October 2011. This accreditation is effective October 24, 2011 through October 24, 2016 and requires annual accreditation verification. NAME accredited offices represent the highest quality of death investigation systems. The FSC has the distinction of being the sole accredited office in Arizona and one of 69 offices across the United States, a distinction for which we are proud.

### Reportable Deaths

Arizona statute §11-593 delineates ten circumstances in which a death is reportable to the OME.

1. Death when not under the current care of a physician or nurse practitioner for a potentially fatal illness or when an attending physician or nurse practitioner is unavailable to sign the death certificate.
2. Death resulting from violence.
3. Death occurring suddenly when in apparent good health.
4. Death occurring in a prison.
5. Death of a prisoner.
6. Death occurring in a suspicious, unusual or unnatural manner.
7. Death from disease or accident believed to be related to the deceased's occupation or employment.
8. Death believed to present a public health hazard.
9. Death occurring during, in association with or as a result of anesthetic or surgical procedures.
10. Unidentifiable bodies.

### Investigations

Our 11 medical investigators processed 2,523 reports of deaths from Pima County and 680 reports from 10 additional Arizona counties in 2012. Jurisdiction was declined in 809 of these cases. A total of 2,098 decedents were transported to the FSC for examination or storage in 2012.

### Examinations

Pima County forensic pathologists and anthropologists performed 1,470 autopsies, 448 external examinations, 296 death certifications, 161 anthropologic examinations and reviewed 5,704 cremations in 2012.

Education, Training and Activities

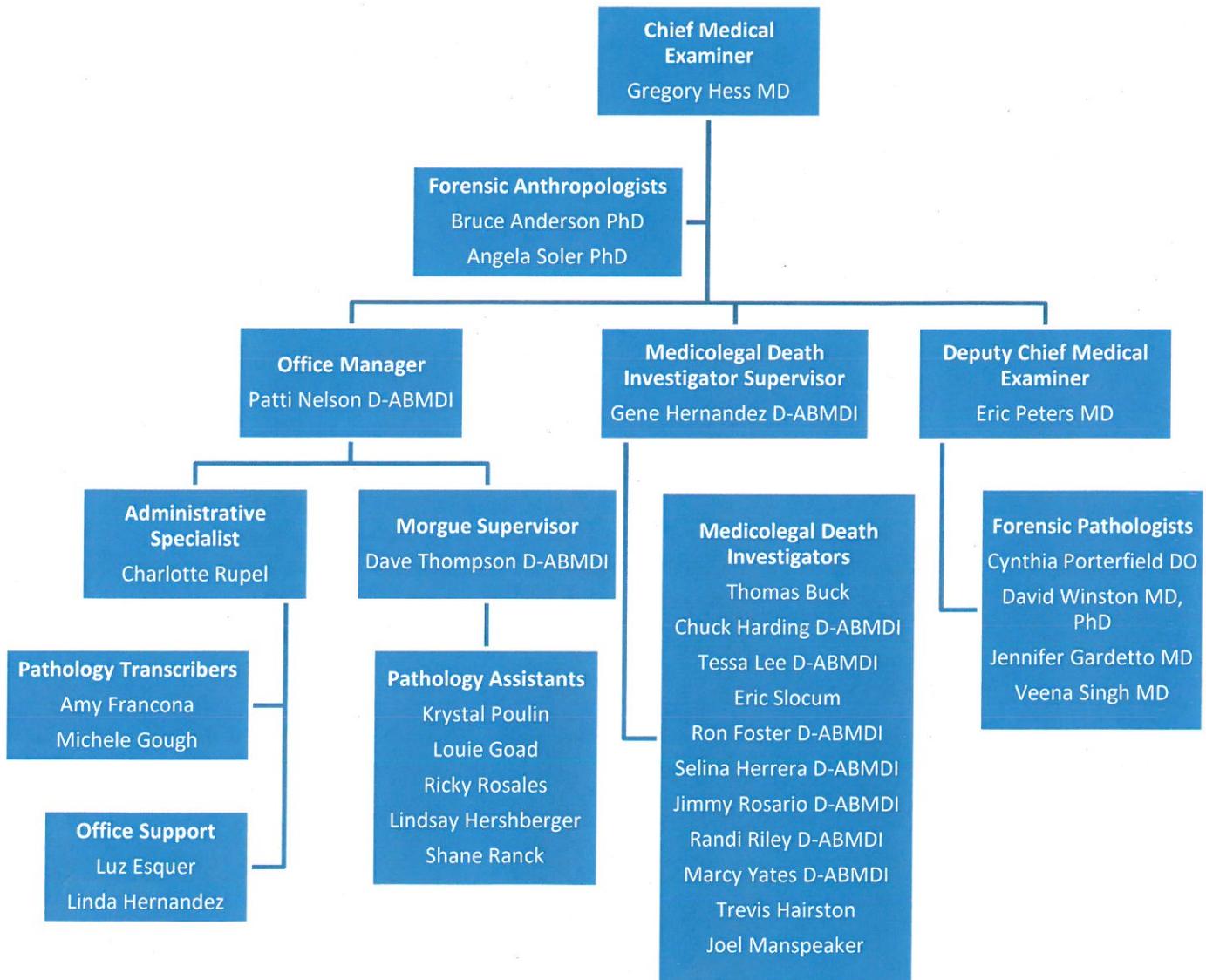
- 1) *Medicolegal Death Investigators*  
Calendar year 2012 saw a transition from the term Forensic Medical Investigator (FMI) to Medicolegal Death Investigator (MDI) for our 11 MDIs in keeping with national norms. Seven MDIs, our MDI Supervisor, Morgue Supervisor and Office Manager are certified by the American Board of Medicolegal Death Investigators to provide competent medicolegal death investigations. FSC Forensic Pathologists lecture to the MDIs on varying topics monthly, 10% of cases are pathologist reviewed monthly and 10% of cases are peer reviewed quarterly in accordance with our MDI quality assurance and performance improvement program.
- 2) *Community education, presentations and media interviews*  
The FSC receives numerous requests from various groups, organizations, individuals and schools for presentations regarding a host of forensic issues annually. Not all requests can be honored due to time and personnel constraints, but examples of educational activities include but are not limited to: presentations at local primary and secondary schools; lectures at various institutions and departments at the University of Arizona; presentations and tours for humanitarian organizations; and the teaching of a 3-credit-hour death investigation class at Pima Community College. The Chief Medical Examiner participated in 157 media interviews, emails and phone calls, many involving migrant issues. Pima County's Forensic Anthropologist and Postdoctoral Fellow gave numerous platform and poster presentations to various organizations and at national anthropologic and forensic conferences.
- 3) *University of Arizona College of Medicine, Department of Pathology and School of Anthropology*  
FSC Forensic Pathologists hold clinical appointments with the Department of Pathology at the University of Arizona, College of Medicine, where they are involved with pathology resident and medical student teaching. Four pathology residents, five medical students and three pathology post-sophomore fellows rotated through the FSC for month-long rotations in 2012. Our Forensic Anthropologist also holds an academic appointment at the University of Arizona and six anthropology interns trained at our facility in 2012.

Law Enforcement and Legal System

The availability of our pathologists to assist or advise law enforcement personnel in their investigations and the legal system in its proceedings is an important function of the FSC. Pima County law enforcement agencies requested the assistance of a pathologist in a number of scene investigations. Involvement of the FSC in the legal system generally consists of pretrial interviews, depositions and courtroom testimony. In 2012, the office's six forensic pathologists and two anthropologists participated in approximately 50 pretrial interviews, 30 depositions and 55 jury trials.

Organ and Tissue Donation

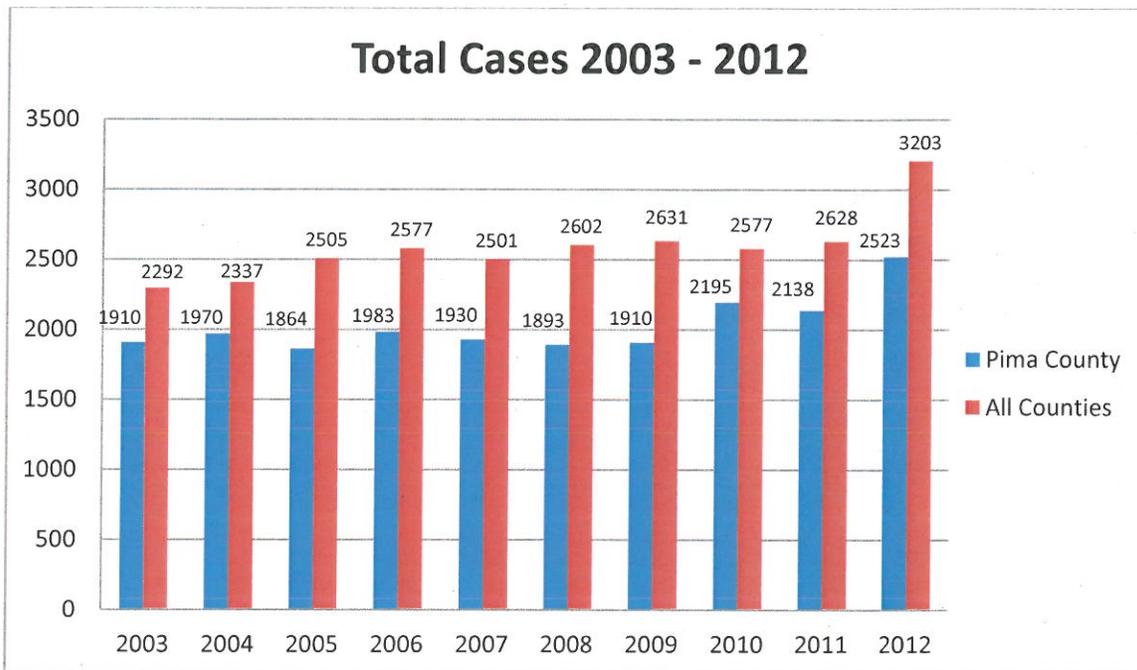
In January 2012, the FSC began referring all cases reported to the office to Donor Network of Arizona (DNA) and DNA began performing tissue recoveries at the FSC. As a result of these changes, the FSC was involved in 24 organ donations, 188 cornea transplantations, 16 heart valve transplantations, 29 vascular tissue transplantations and numerous bone and tissue grafts.



**OFFICE OF THE MEDICAL EXAMINER  
ORGANIZATIONAL CHART AS OF DECEMBER 2012**

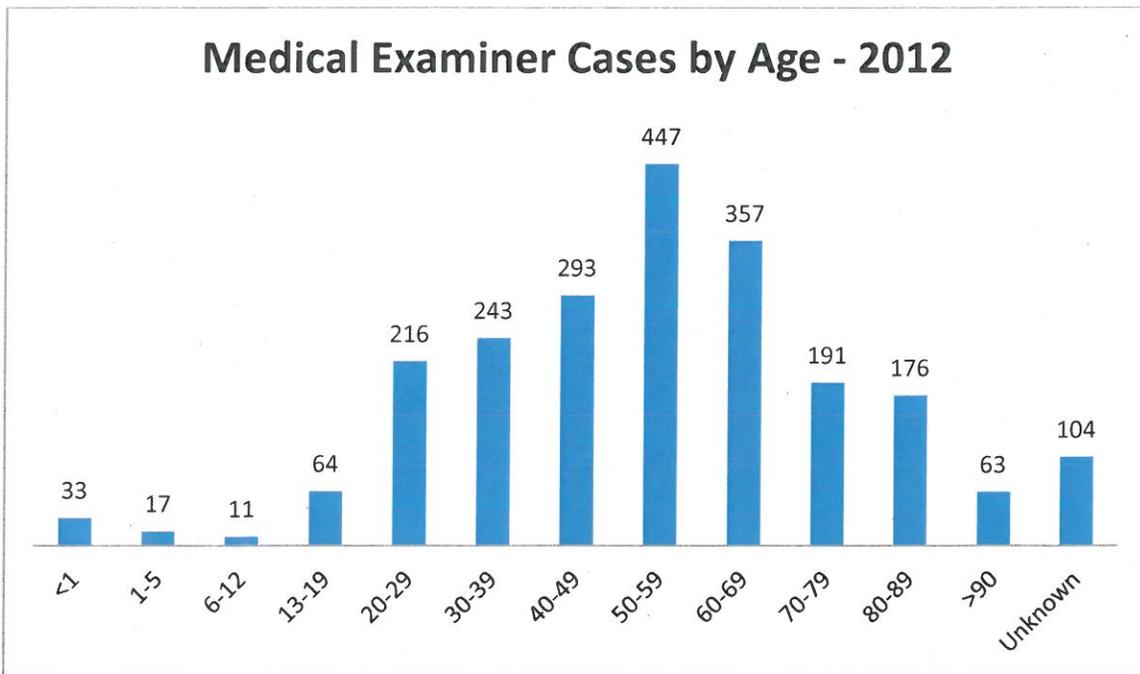
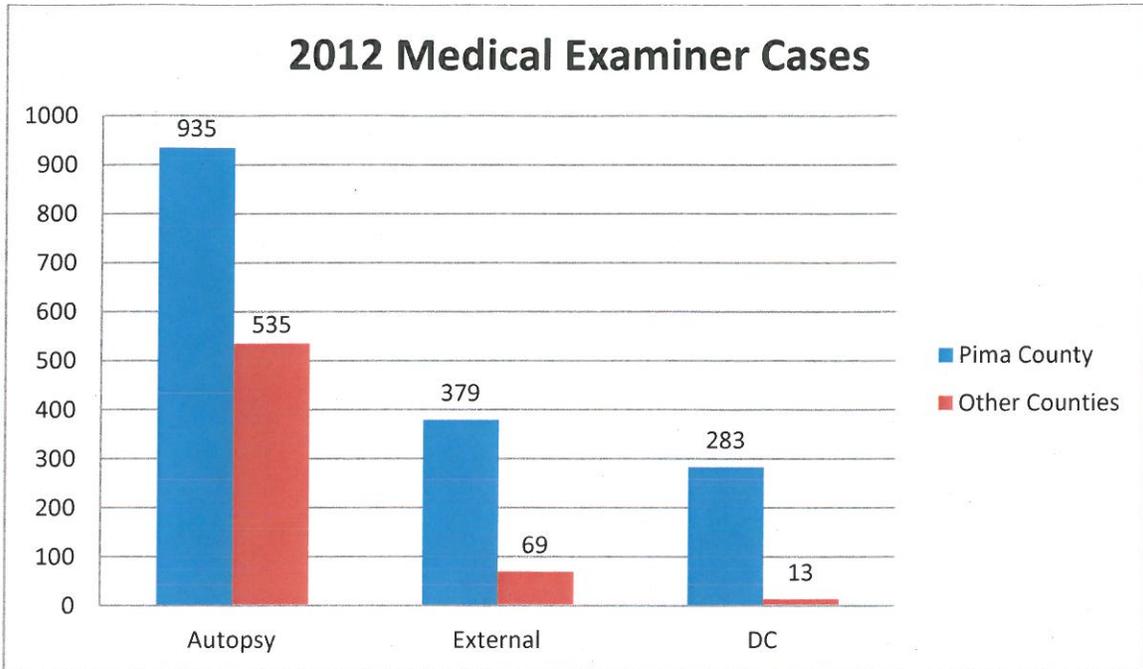
## TOTAL CASES

The total cases handled by the FSC in a given year are the sum of the medical examiner (ME) cases (autopsies, external examinations, and death certificate cases), cases in which jurisdiction was declined, and the number of cases stored at our facility during the calendar year (storage cases). ‘All Counties’ includes cases examined at the FSC from Apache, Cochise (effective 7/1/12), Gila, Graham, Greenlee, La Paz, Navajo, Pinal, Santa Cruz and Yuma counties in addition to Pima County.

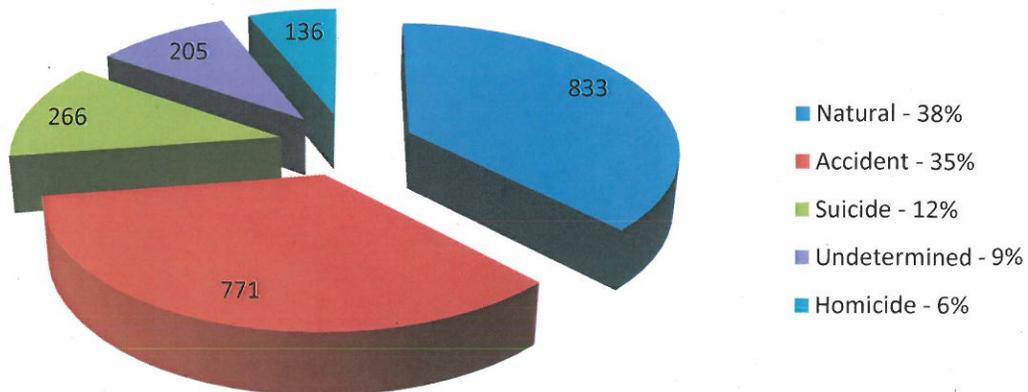


## MEDICAL EXAMINER CASES

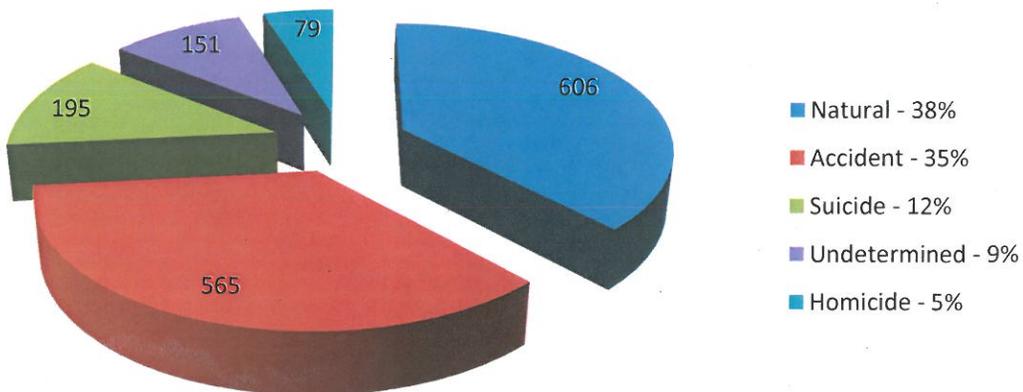
The Pima County FSC considers all cases in which the cause and manner of death are determined by this office as “medical examiner cases.” Those cases include autopsies, external examinations and death certificate (DC) cases. Autopsies are examinations where a decedent is examined both externally and internally for evidence of injury or natural disease which may have caused or contributed to the individual’s death. External examinations consist of an external examination of the body without the internal examination. A DC case involves review of the medical records, law enforcement reports and any other information that may be necessary to determine the cause and manner of death without physical examination of the decedent. In 2012, for Pima and all other counties listed above, 1470 autopsies, 448 external examinations and 296 DC cases were performed at the FSC. Pima County alone accounted for 935 autopsies, 379 external examinations and 283 DC cases.



### ME Cases by Manner of Death - 2012



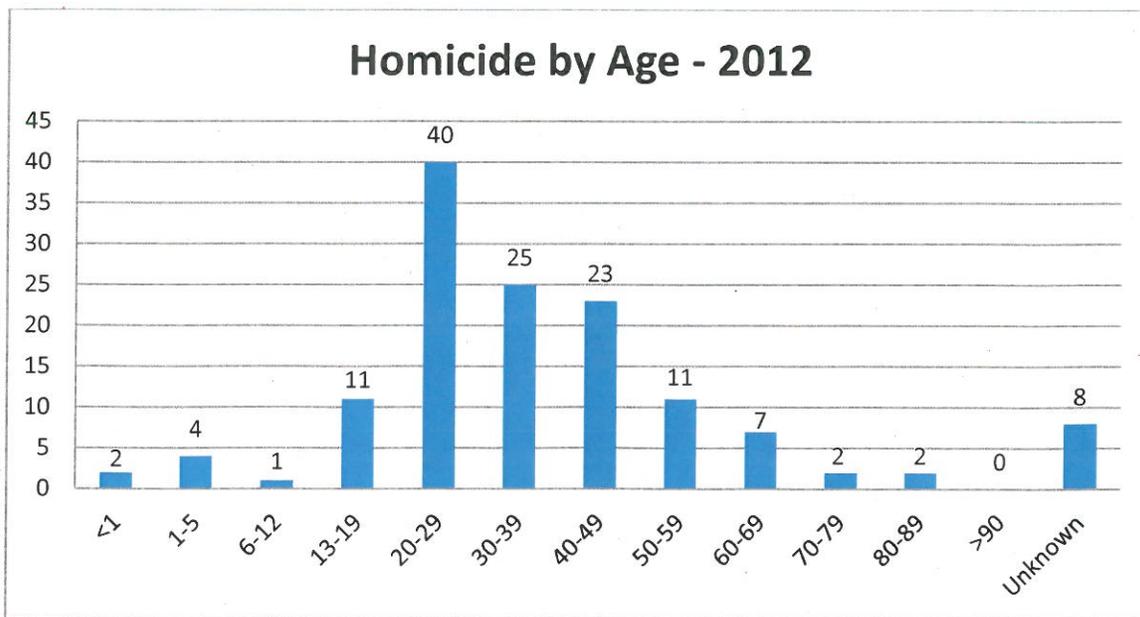
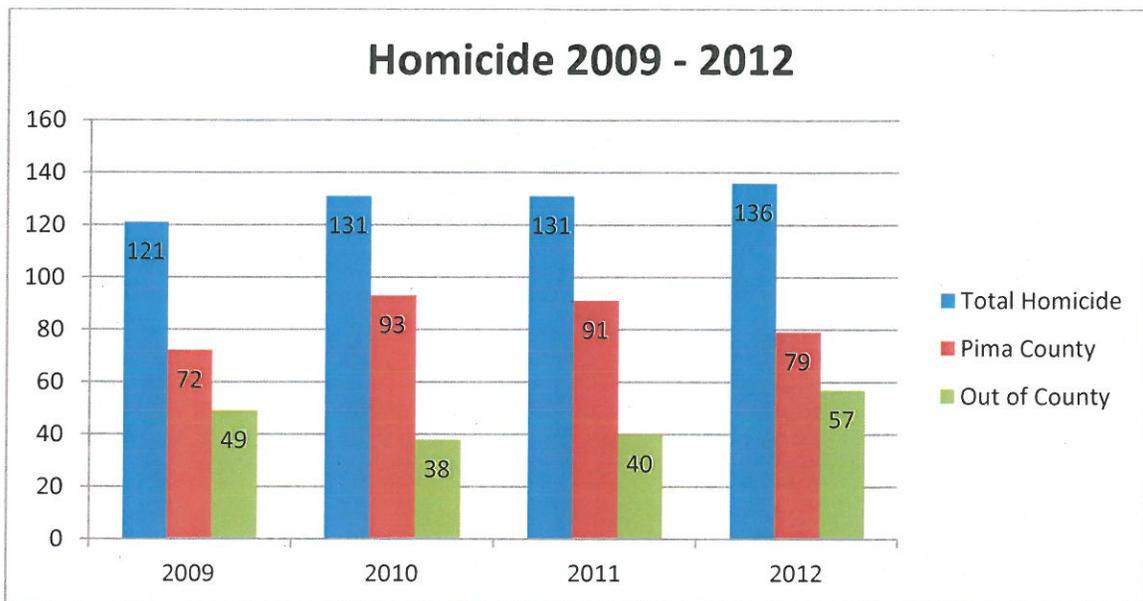
### Pima County ME Cases by Manner of Death - 2012



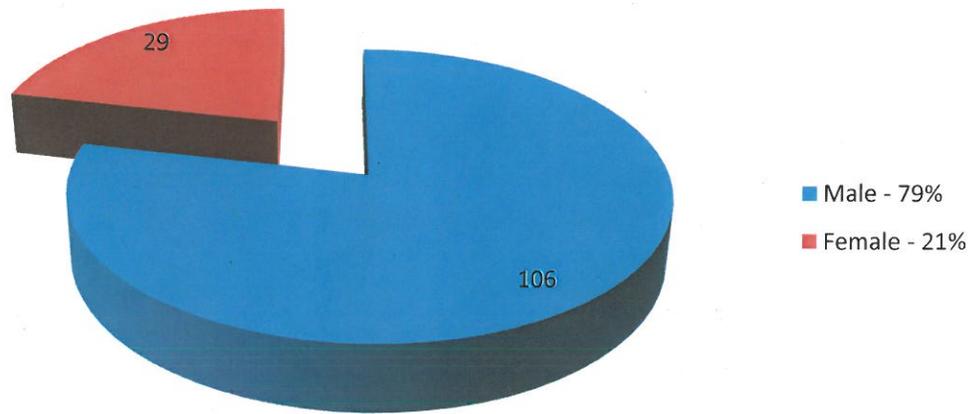
## HOMICIDE DEATHS

This office examined 136 homicides in 2012, 79 from Pima County and 57 from other counties. Homicide rates from 2009 – 2012 are compared below.

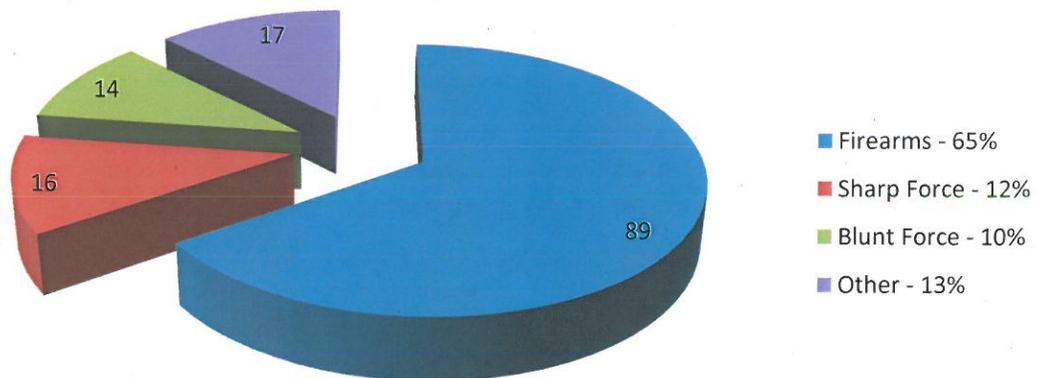
Homicide deaths from all counties increased by 11% from 2009 to 2012, although homicide deaths in Pima County alone have decreased by 13% from 2011 to 2012. Homicide victims were most frequently male (79%), between 20-29 years of age (29%) and died as the result of firearms (65%).



### Homicide by Gender - 2012

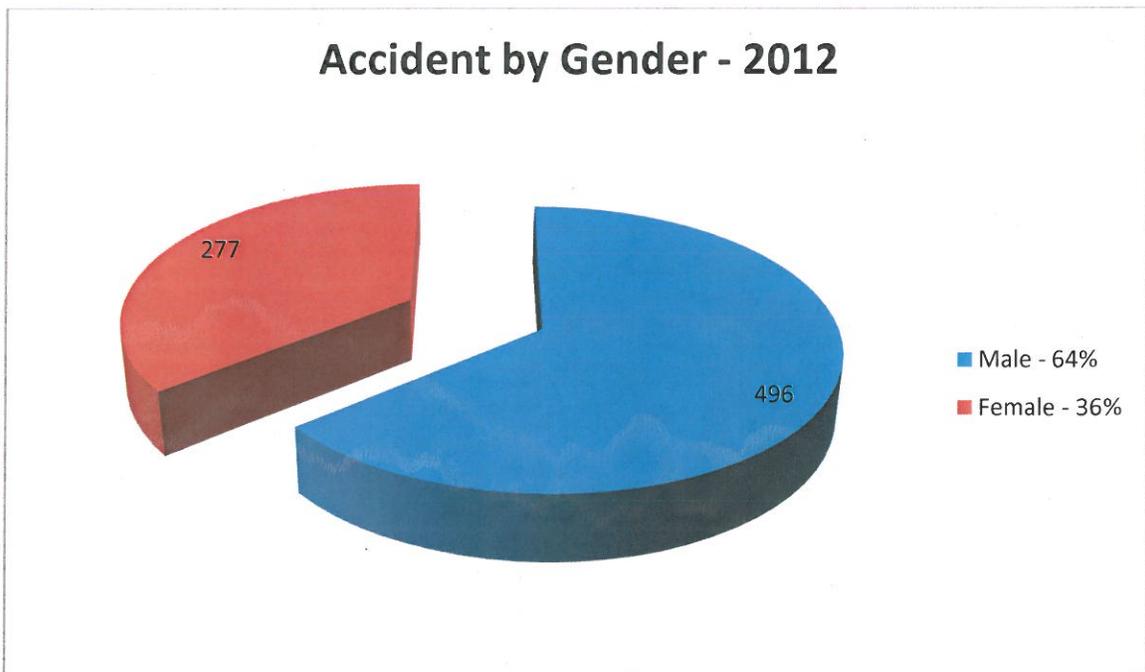
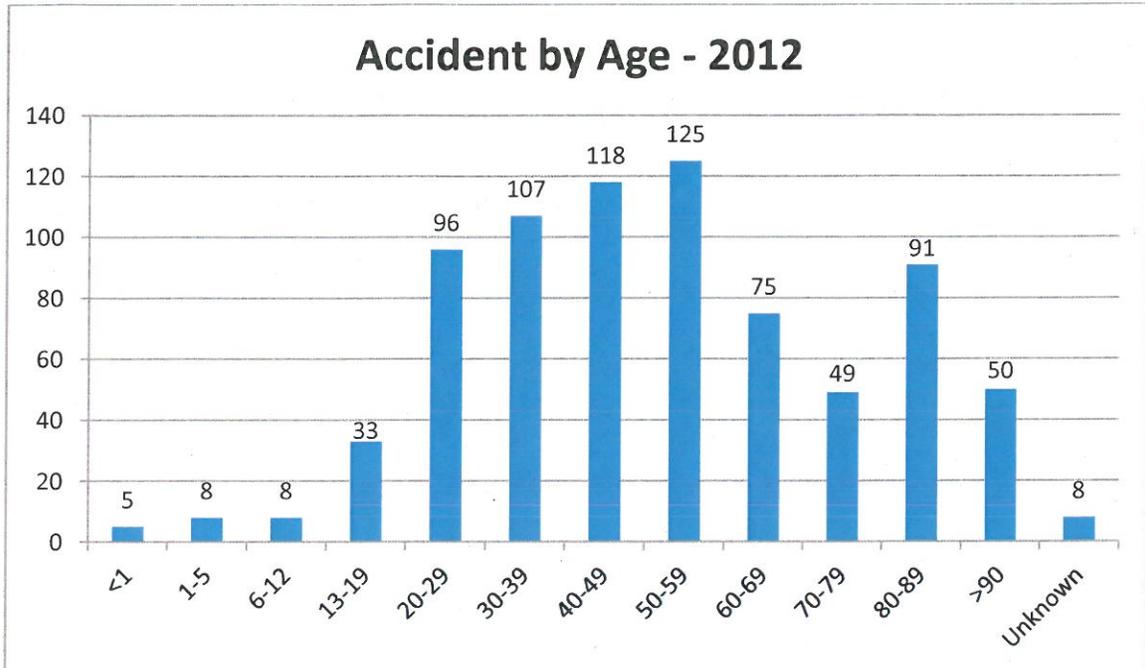


### Homicide by Cause - 2012

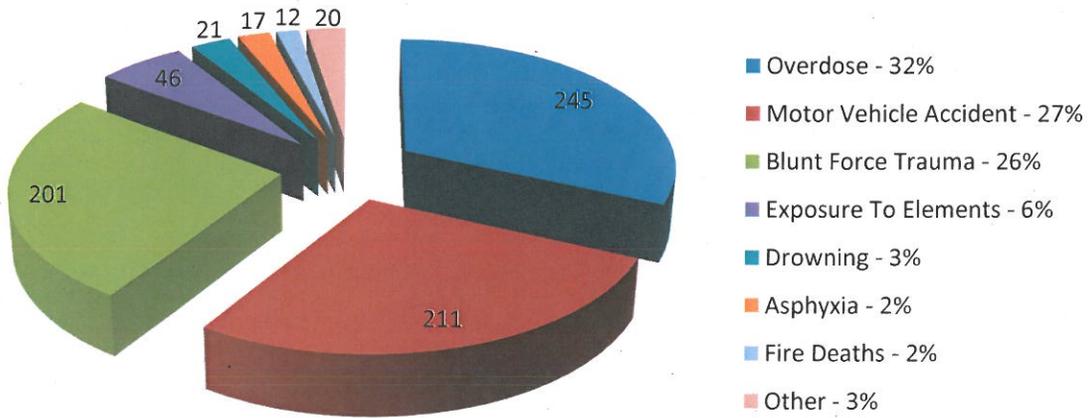


## ACCIDENTAL DEATHS

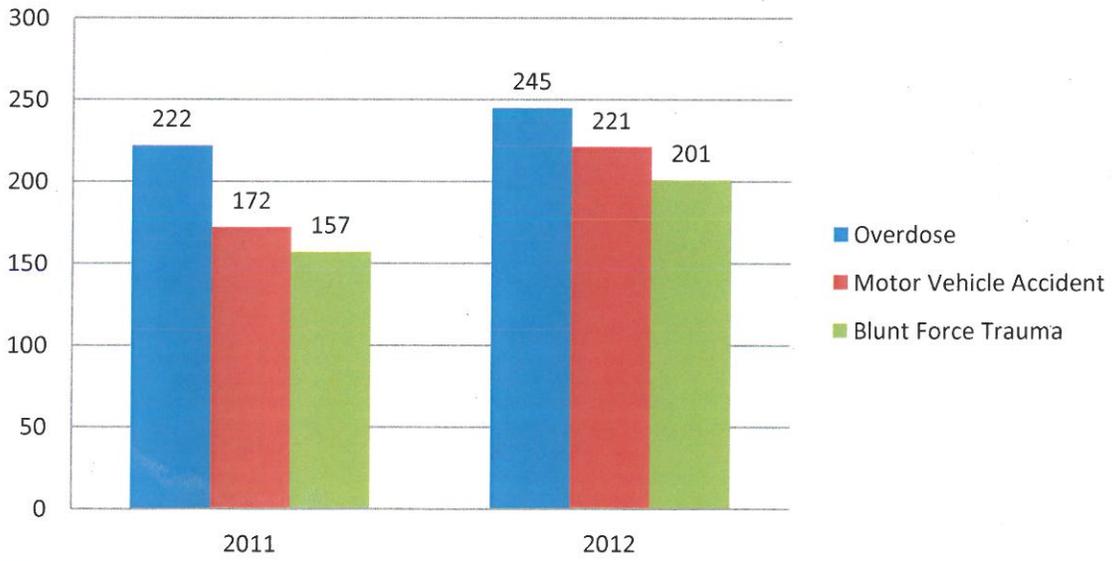
Deaths due to accidents accounted for 35% of the ME deaths investigated by the FSC in 2012. Accident victims were most frequently males (64%), between 50-59 years of age (16%) and died as the result of an overdose (32%).



### Accident by Cause - 2012

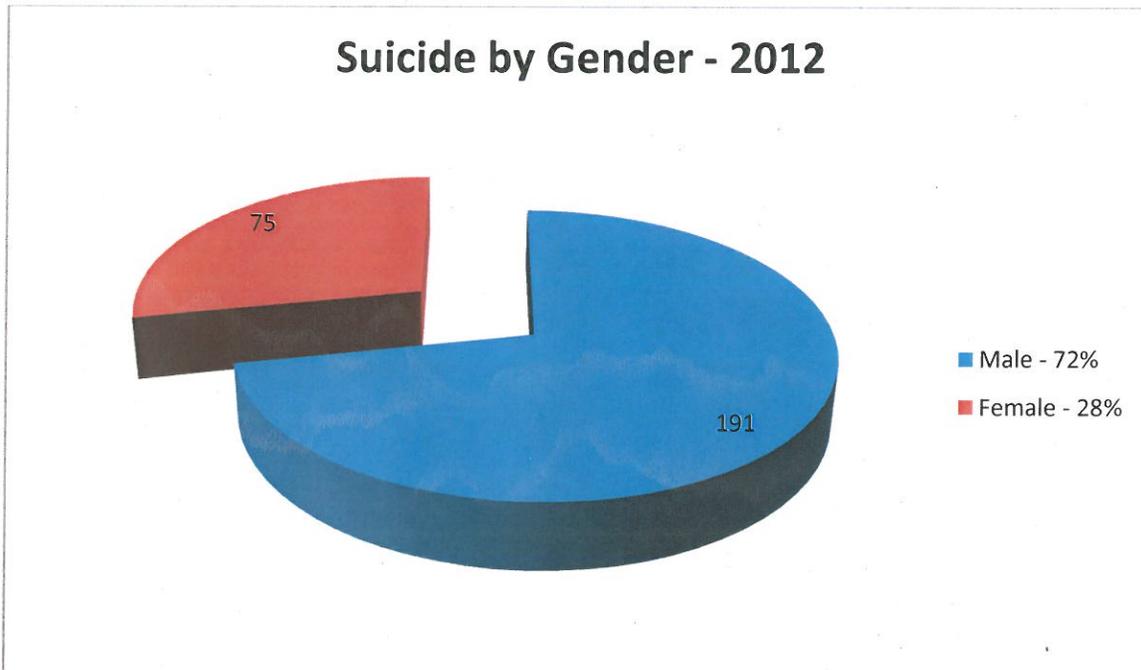
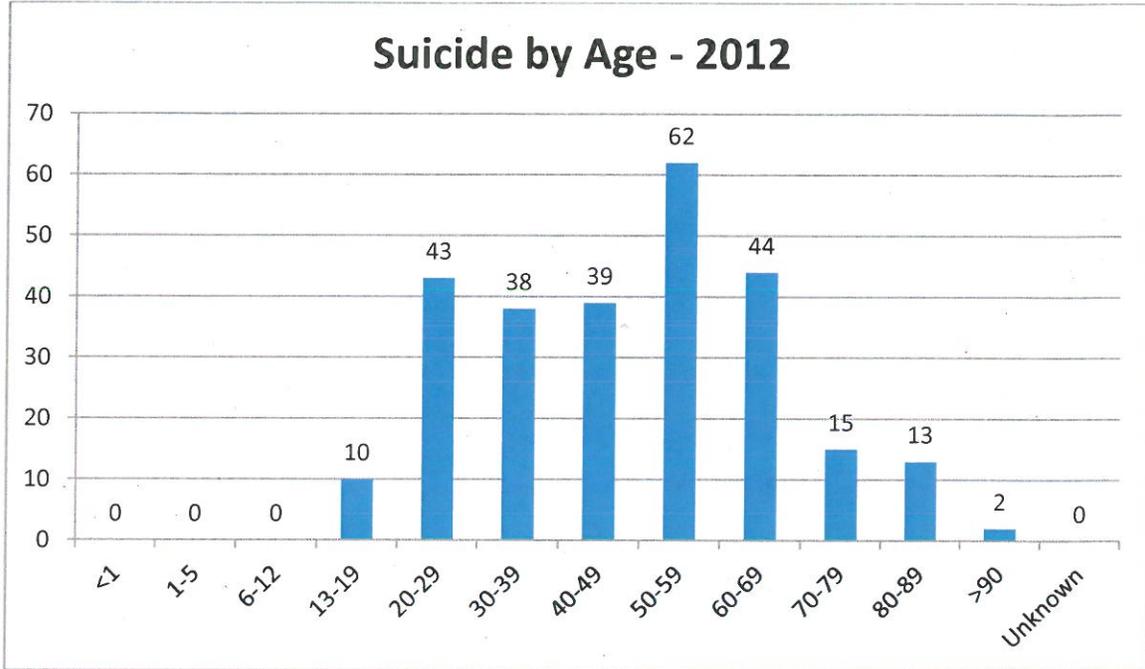


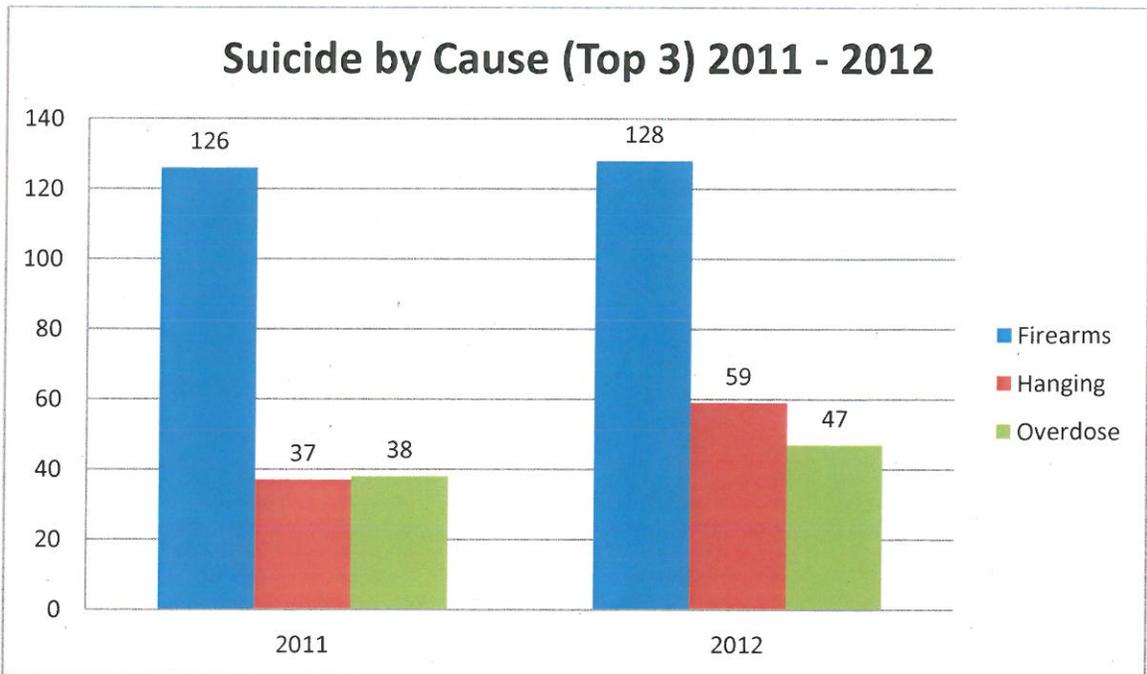
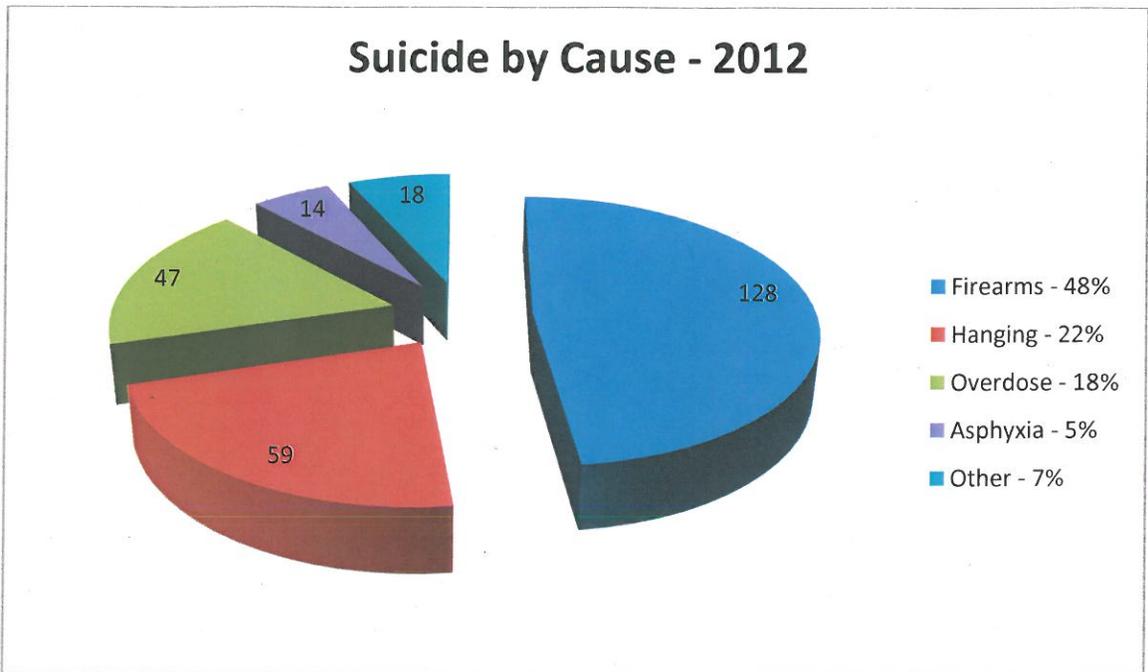
### Accident by Cause (Top 3) 2011 - 2012



## SUICIDE DEATHS

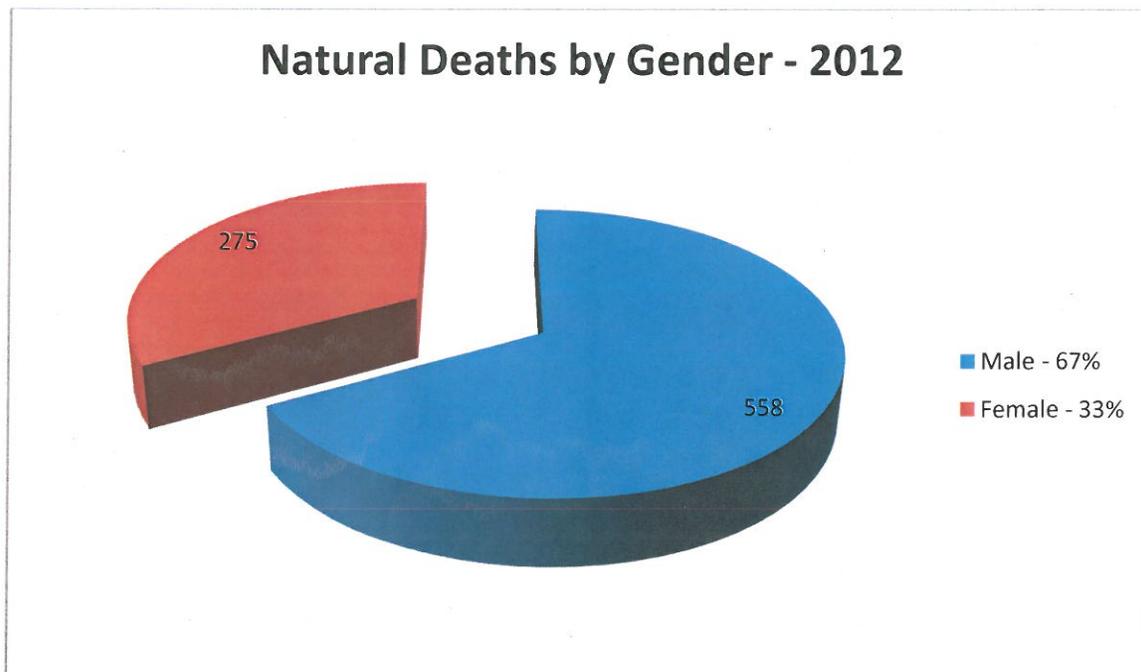
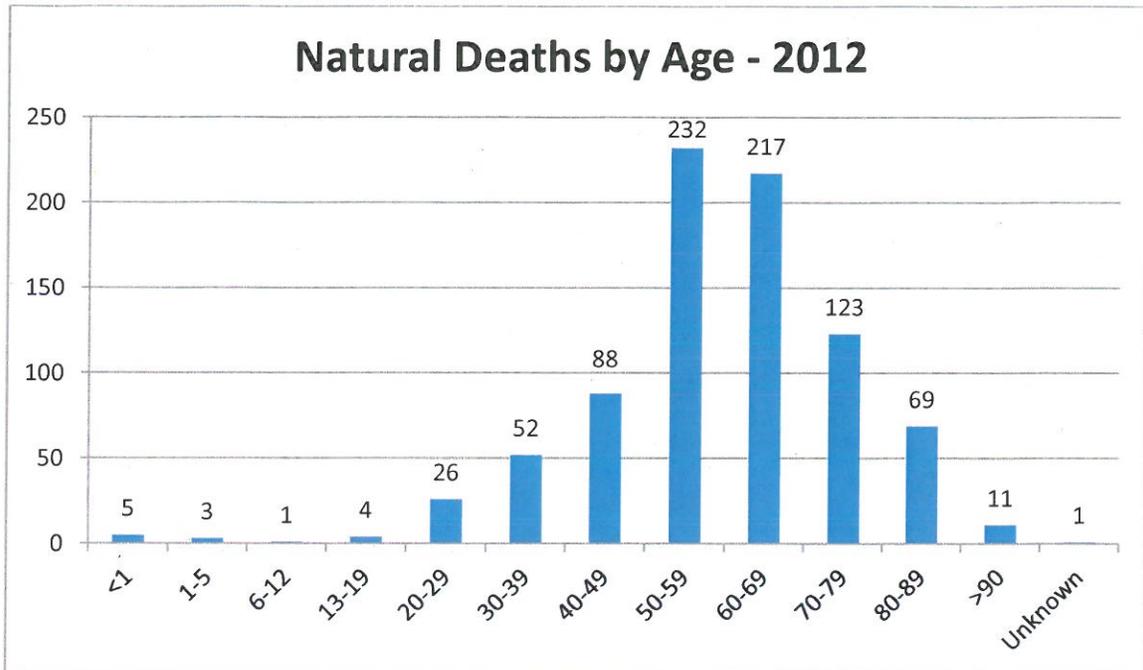
Suicide deaths accounted for 12% of the ME deaths investigated by the FSC in 2012. Suicide victims were most frequently males (72%), between 50-59 years of age (23%) and died as the result of firearms (48%).



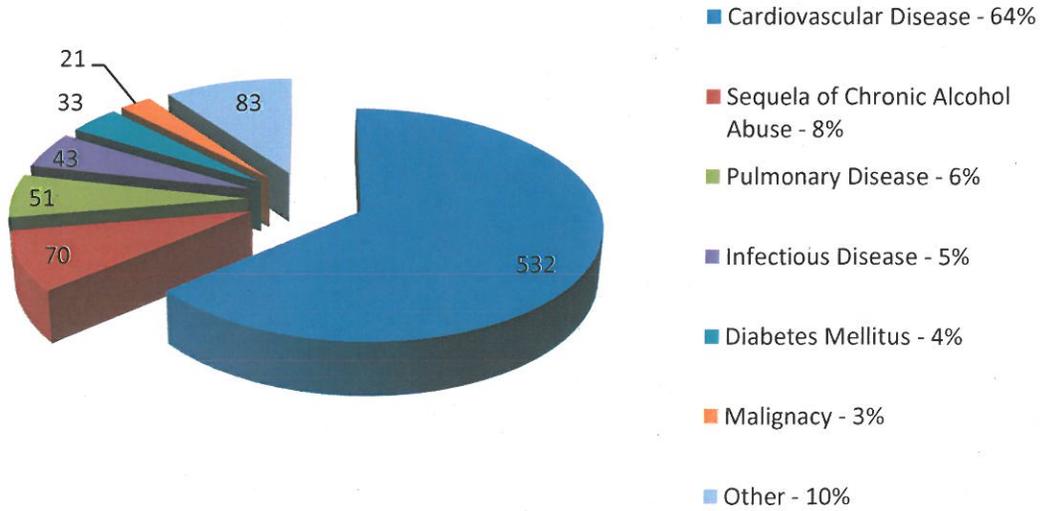


## NATURAL DEATHS

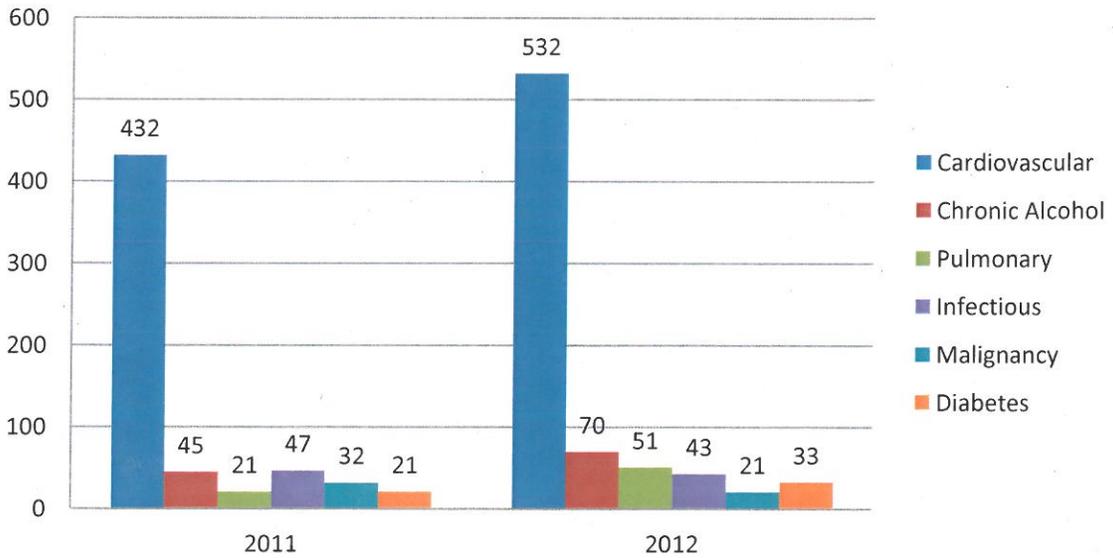
Natural deaths accounted for 38% of the ME deaths investigated by the FSC in 2012. Individuals who died from natural causes were most frequently males (67%), between 50-59 years of age (28%) and died as the result of cardiovascular disease (64%).



### Natural Deaths by Cause - 2012

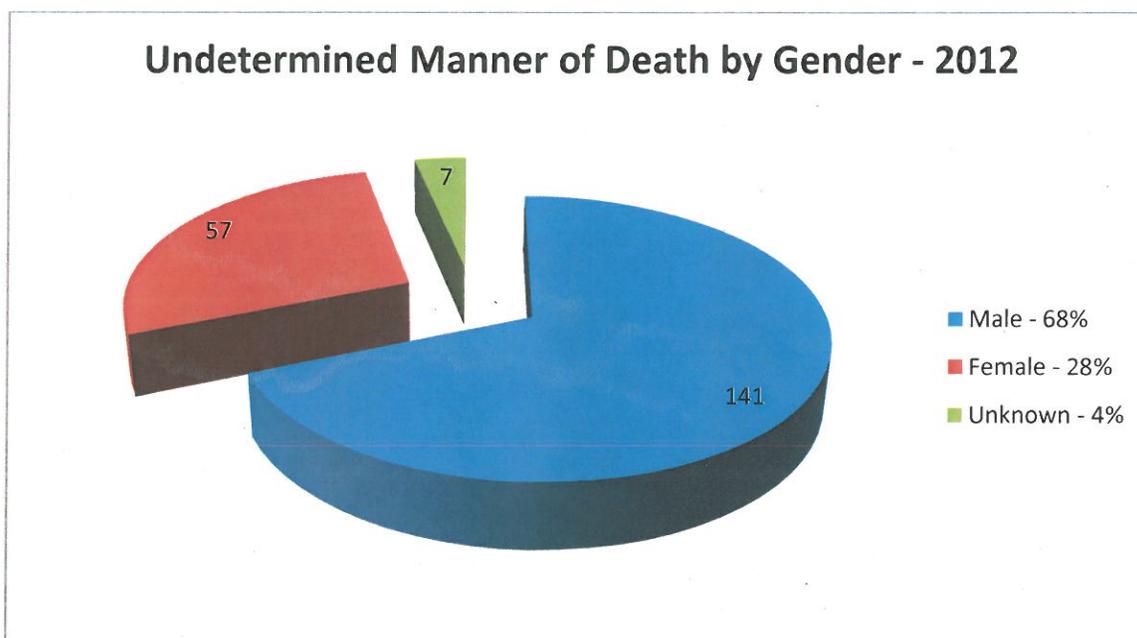
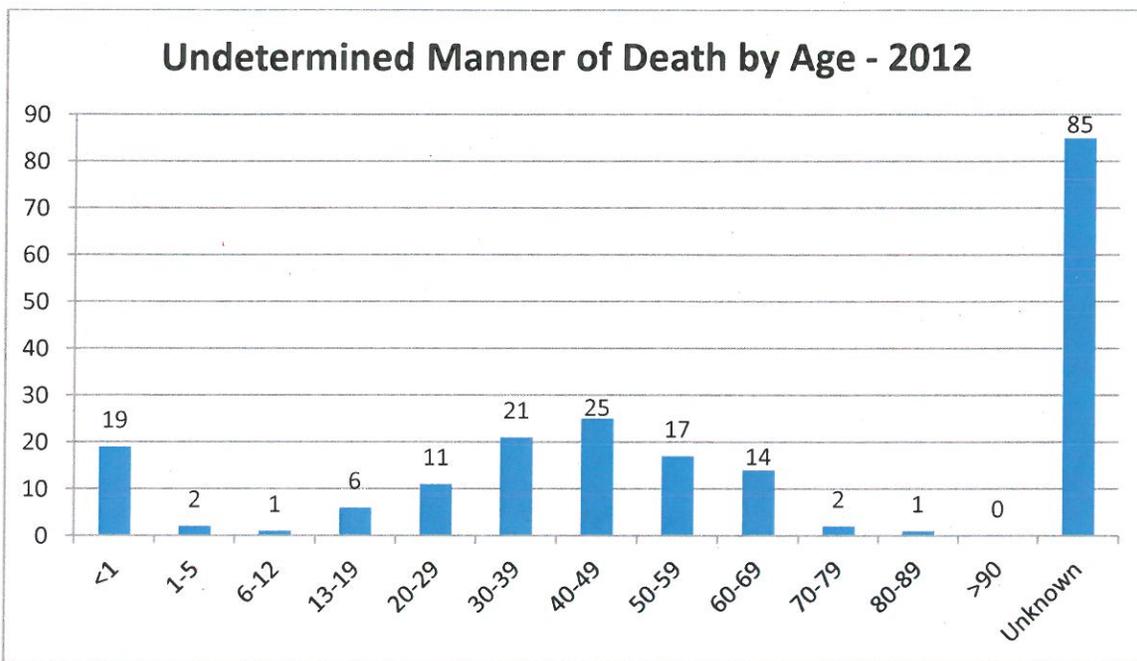


### Natural Death by Cause 2011 - 2012

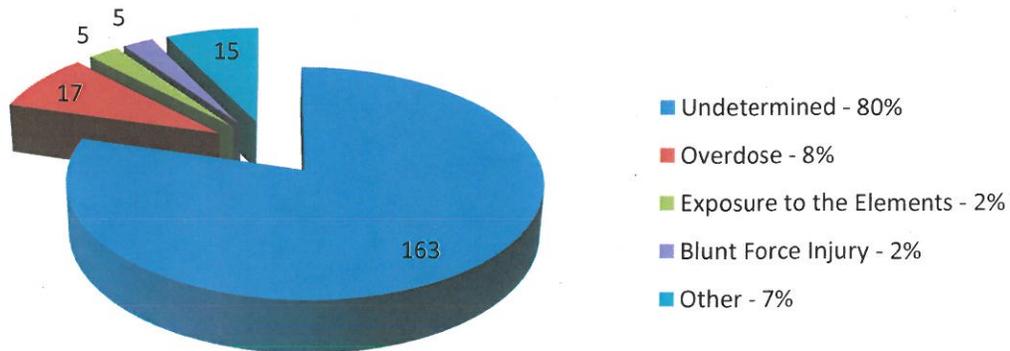


## UNDETERMINED MANNER OF DEATH

Deaths in which the manner of death was undetermined accounted for 9% of the ME deaths investigated by the FSC in 2012. Individuals who died with an undetermined manner were most frequently males (68%), of unknown age (42%) and died from undetermined causes (80%). Many of these deaths represent skeletal remains of presumed migrants who died in the deserts of southern Arizona.



### Undetermined Manner of Death by Cause - 2012



## OVERDOSE DEATHS

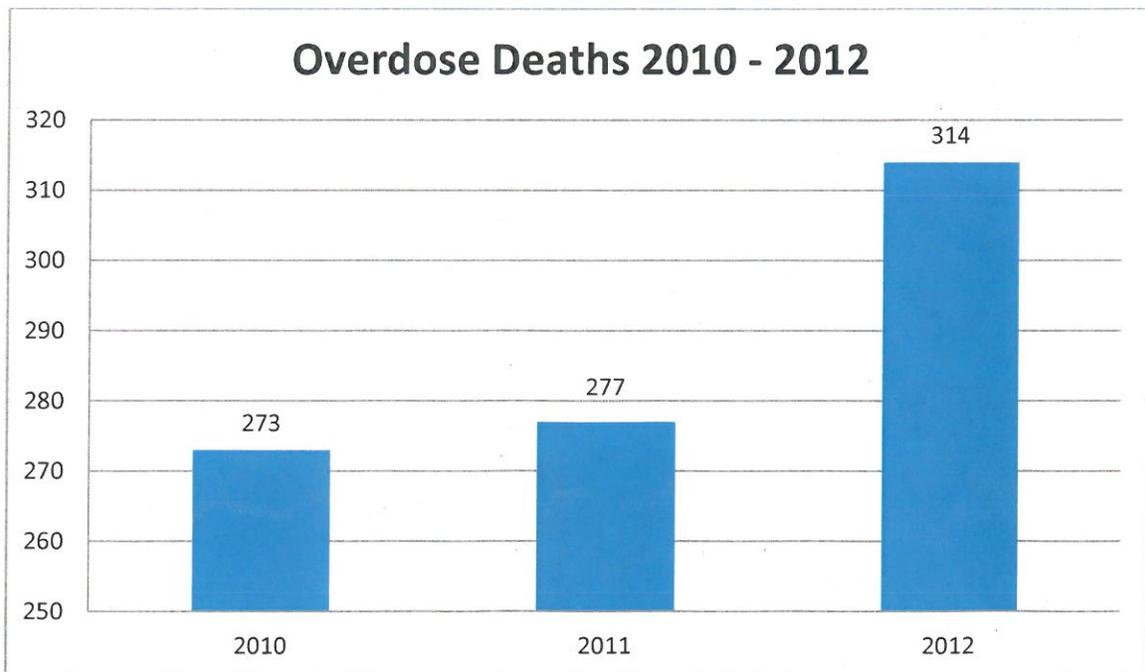
There were 314 deaths attributed to an overdose of either a single drug (160 deaths, 51%) or a combination of drugs (154 deaths, 49%) in 2012. Overdose deaths commonly involved males (57%) between the ages of 40-49 (28%). The majority of these deaths were classified as accidents (78%).

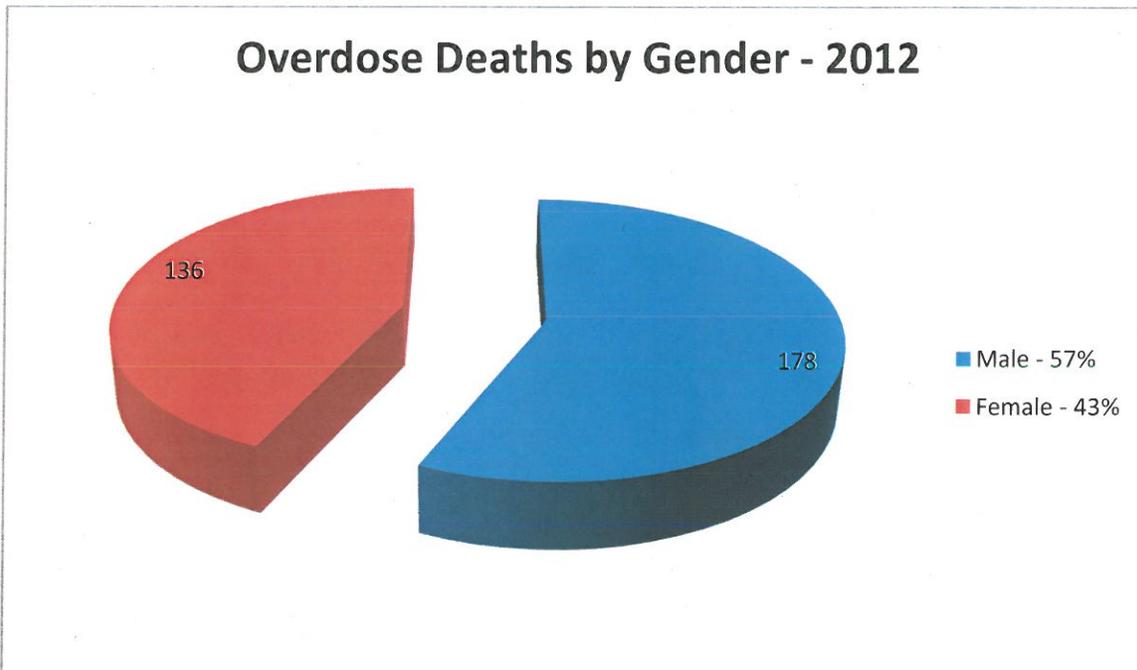
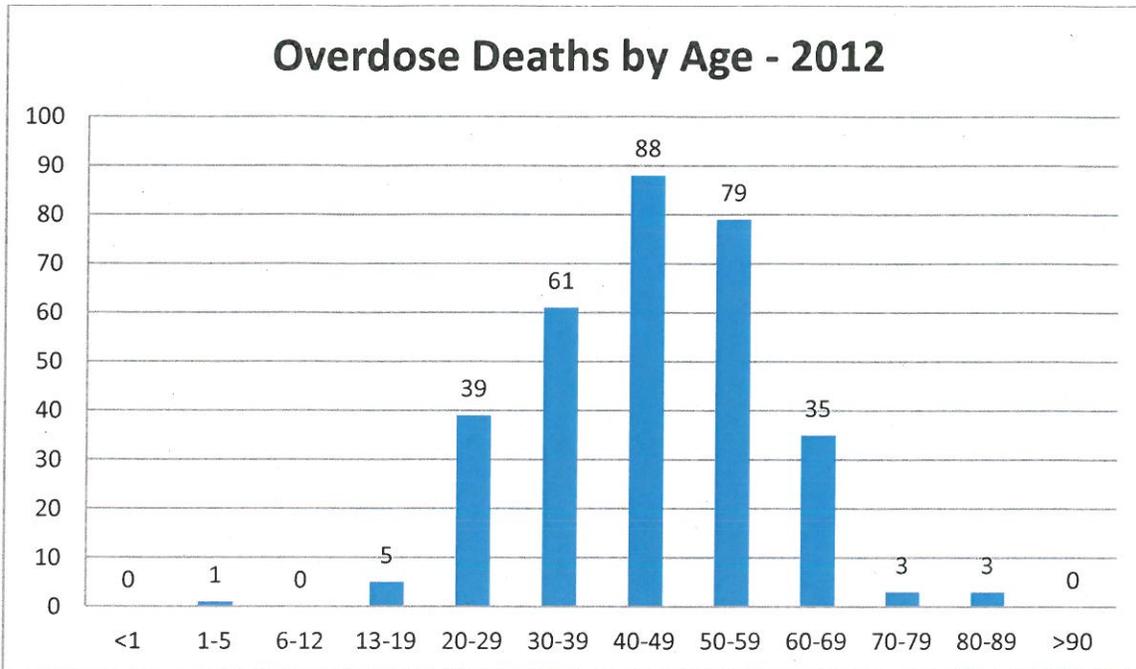
Opiate drugs (heroin, oxycodone, methadone, hydrocodone, morphine, opiate unspecified) and fentanyl (a synthetic opioid narcotic) accounted for the majority of overdose deaths, either as a single drug or a component of a poly-drug overdose. The most common drugs found as a component of poly-drug overdoses are oxycodone followed by morphine and alcohol.

The number of heroin deaths is likely underreported as heroin is rapidly metabolized to morphine by the body and if the parent compound indicative for heroin (6-monoacetylmorphine) is not present on the toxicology report these deaths may be classified as either morphine intoxication or “opiate” intoxication.

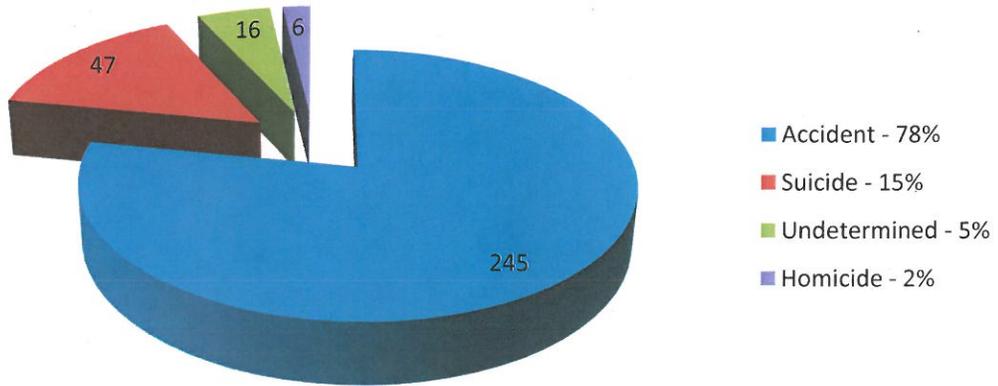
Alcohol intoxication alone accounted for 13 (4%) deaths in 2012.

There were six judicial executions by injection of pentobarbital examined at the FSC in 2012.

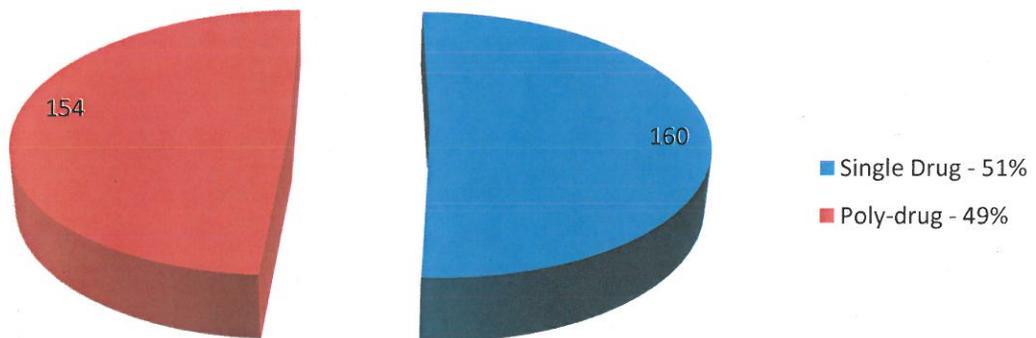


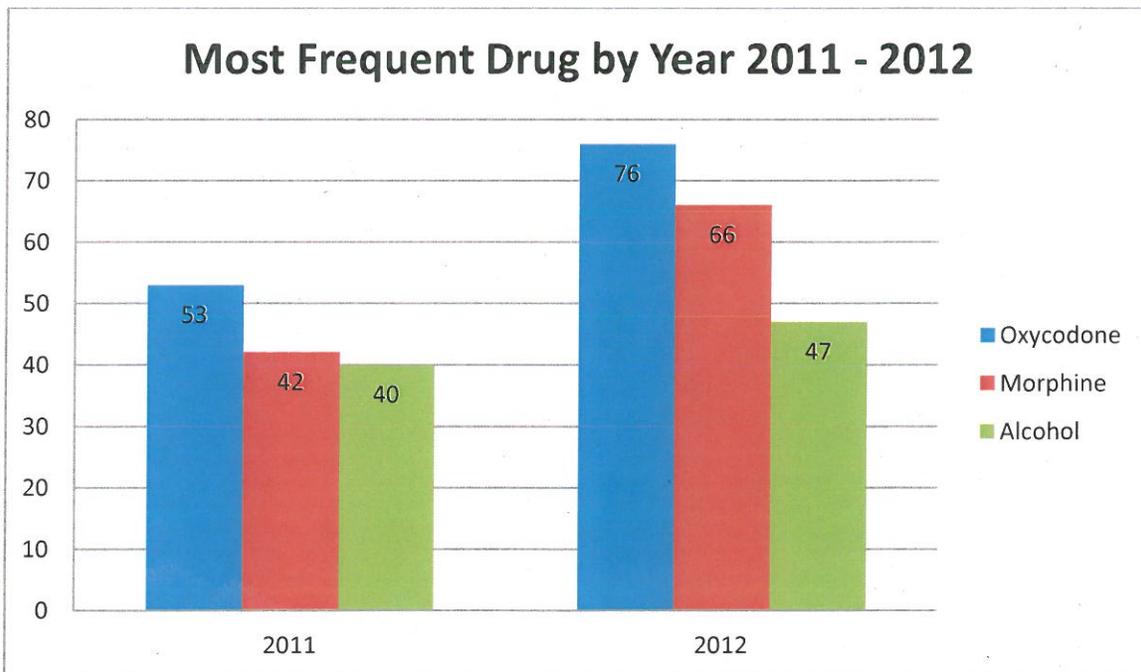
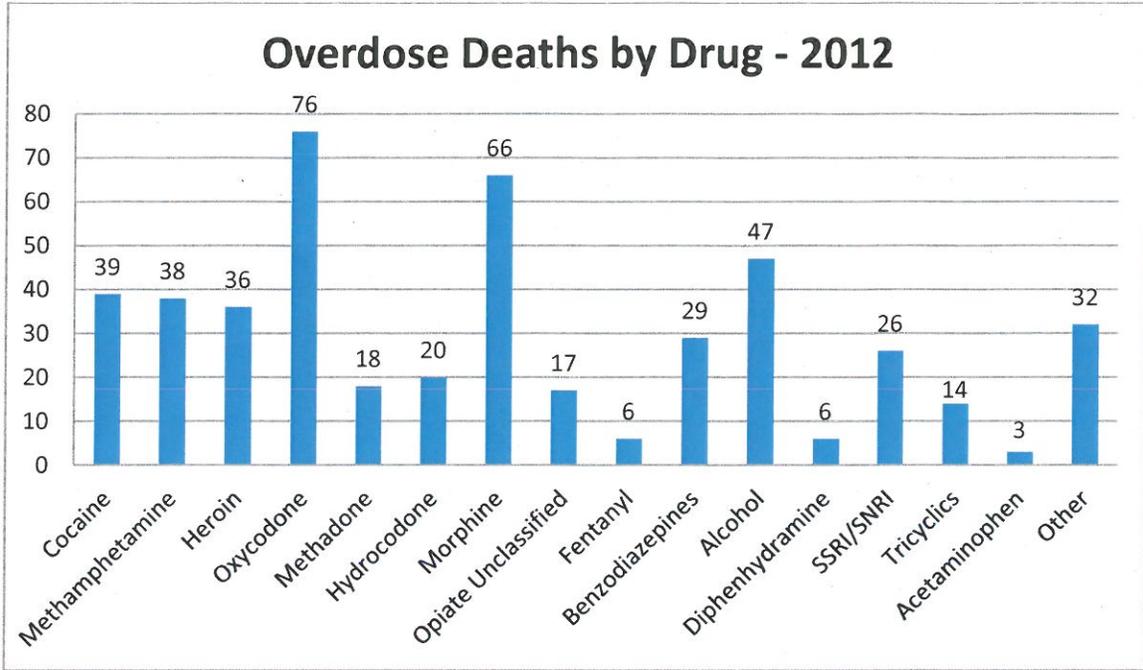


### Overdose Deaths by Manner - 2012



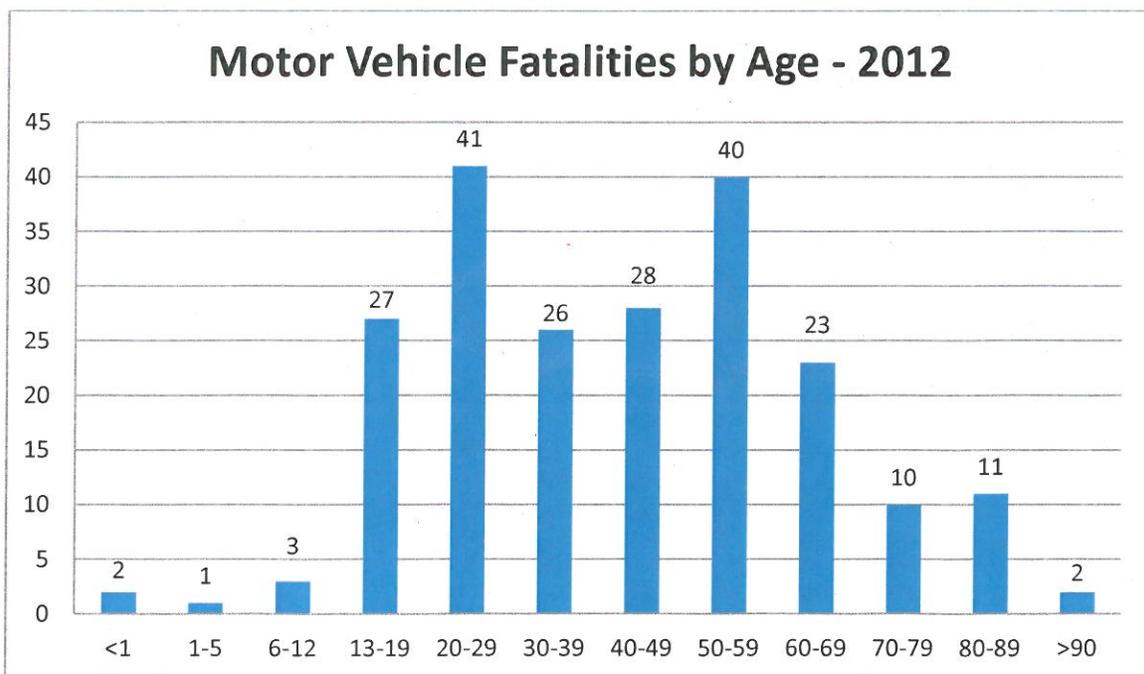
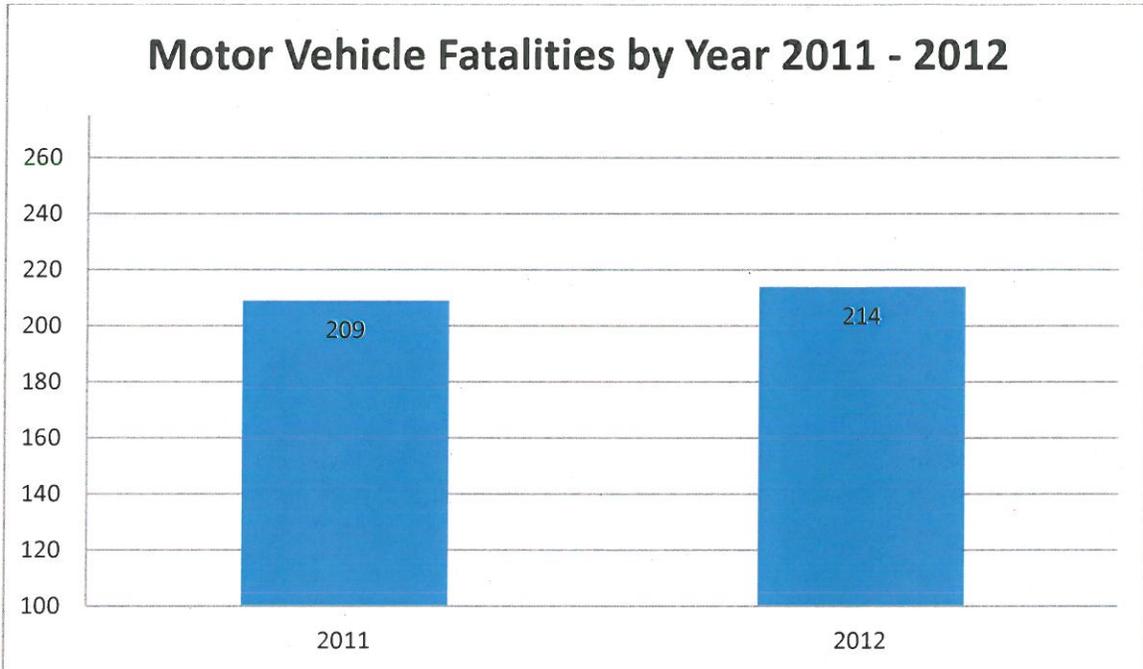
### Single vs Poly-drug Overdose - 2012



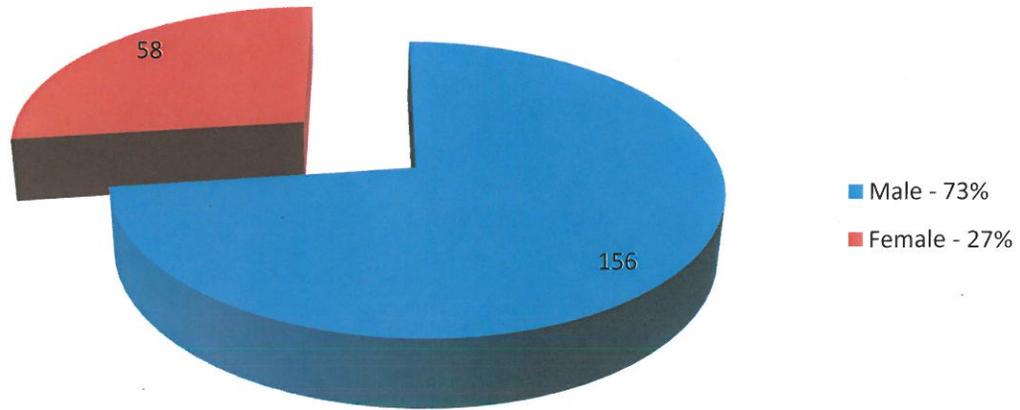


## MOTOR VEHICLE RELATED FATALITIES

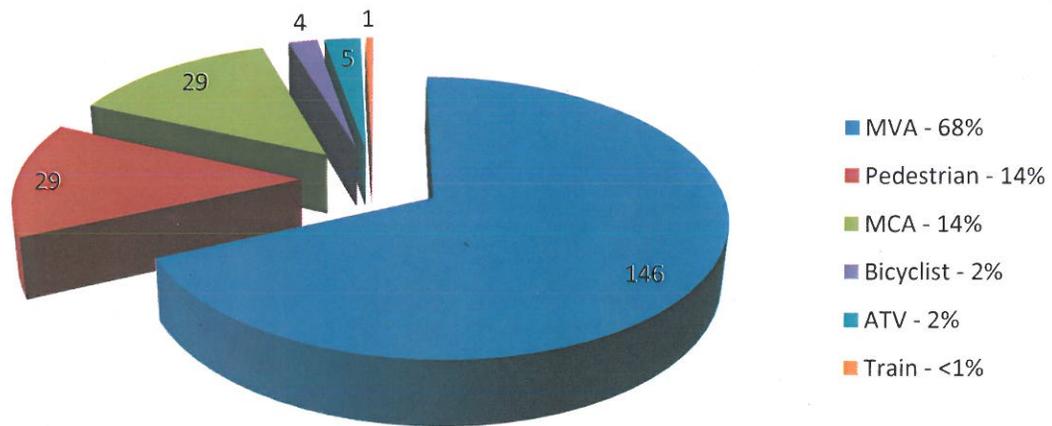
Motor vehicle related fatalities accounted for 214 total deaths in 2012. The majority, 146 deaths, were occupants of a motor vehicle involved in an accident (MVA). Of the remaining, 29 were motorcycle accidents (MCA), 5 were all-terrain vehicles (ATV), 33 were pedestrians or bicyclists struck by vehicles, and one was a vehicle struck by a train. Individuals who died from motor vehicle related fatalities were most frequently males (73%) and between 20-29 years of age (19%).



### Motor Vehicle Fatalities by Gender - 2012



### Motor Vehicle Fatalities by Type - 2012



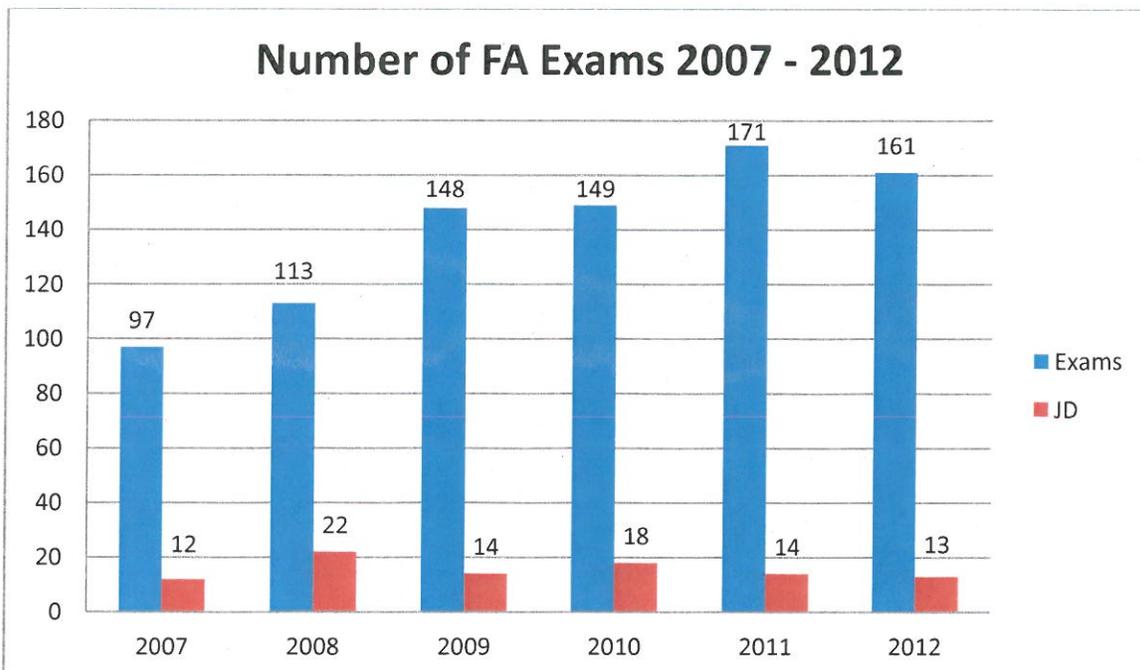


## W.H. BIRKBY FORENSIC ANTHROPOLOGY LABORATORY

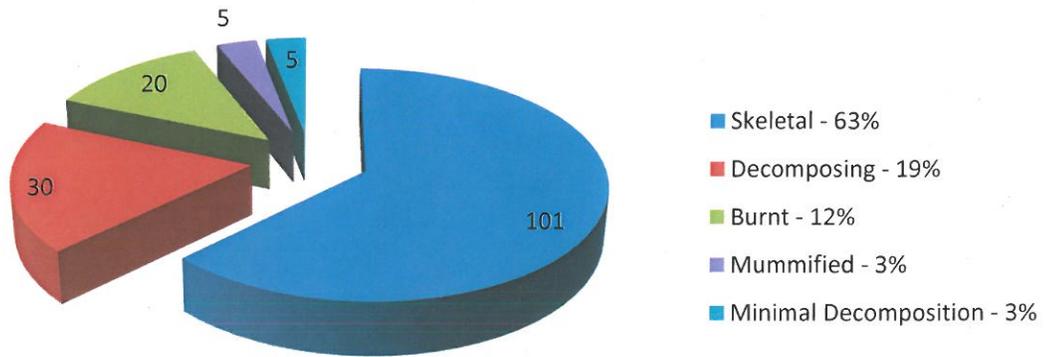
Forensic Anthropologists at the W.H. Birkby Forensic Anthropology Laboratory within the FSC performed 161 examinations (biological profiles, trauma evaluations, dental examinations and examinations for identification) in 2012 on human remains of forensic significance. An additional 13 examinations were performed on remains ultimately deemed non-human, prehistoric or otherwise not forensically significant and jurisdiction of the remains was declined (JD) in those cases.

The extent of postmortem decomposition of a particular set of remains is important when performing a Forensic Anthropology (FA) examination. Remains examined by Forensic Anthropologists were categorized as minimally decomposed, decomposing, mummified, skeletal or burnt. In 2012, skeletal remains comprised 63% of FA examinations. Four main types of exams are performed; biologic profiles, dental, trauma and identification examinations.

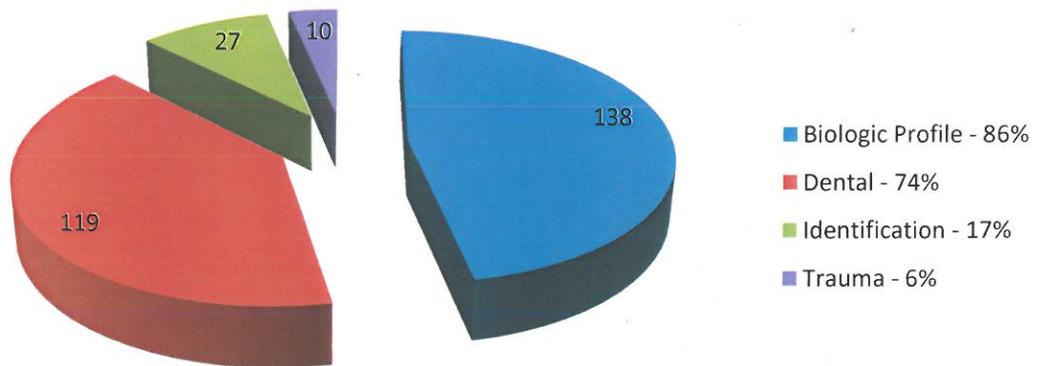
Biological profiles refer to charting, measurements, descriptions, radiographs and photographs taken to estimate sex, age, ancestry, stature and postmortem interval of a set of remains. Dental and identification examinations entail charting, descriptions, radiographs and photographs in an effort to identify an unknown individual or confirm a suspected identity. Trauma examinations entail charting, measurements, descriptions, radiographs and photographs to characterize the nature of an injury, implement used to cause injury to the bone, age of injury, etc. It is common for a particular set of remains to receive more than one type of examination. Most (86%) FA exams include a biological profile with dental examination (74%) when applicable. Less common are examinations for identification (17%) and trauma (13%) evaluations with or without biological profiles and dental examinations.



### FA Exam by Condition of Remains - 2012



### FA Examination by Type - 2012



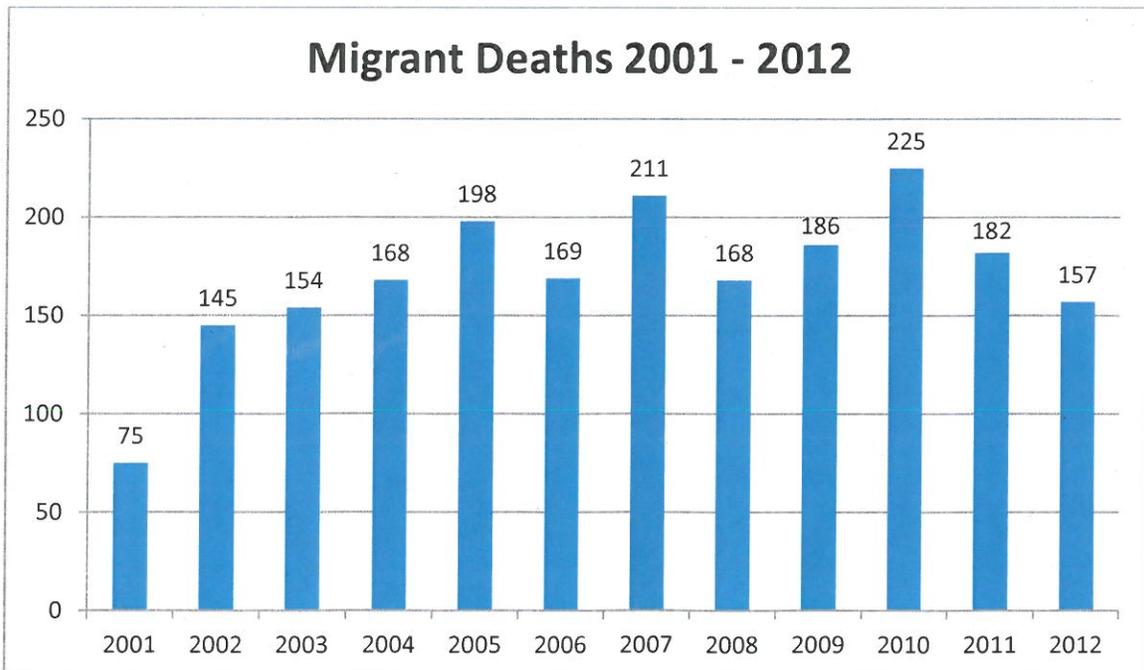
## MIGRANT DEATHS

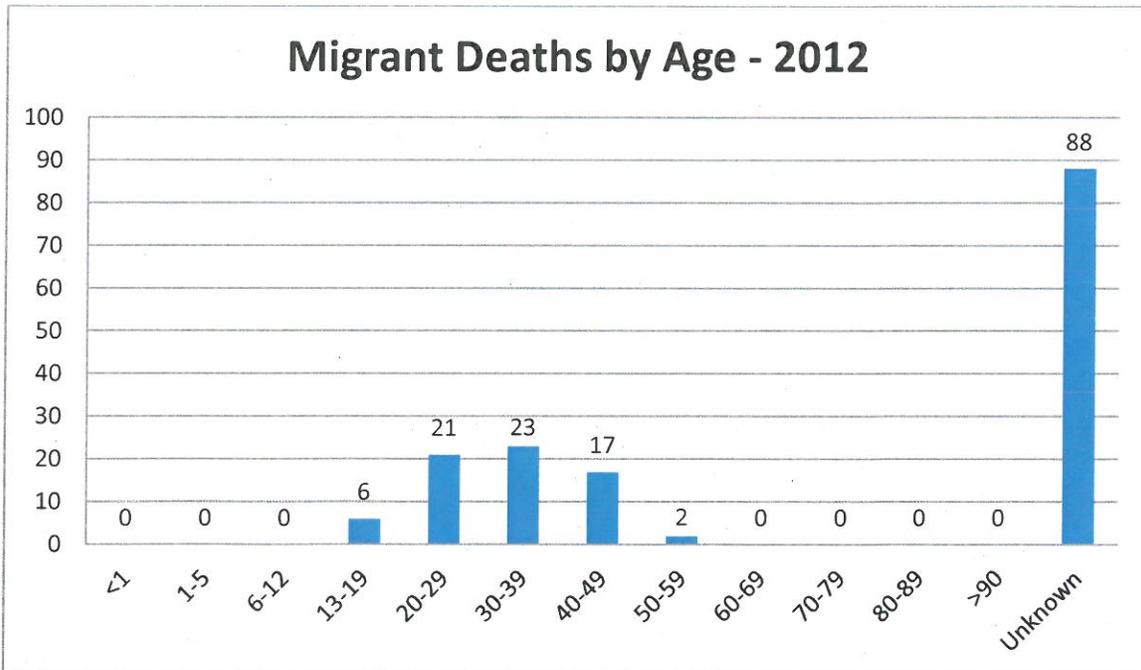
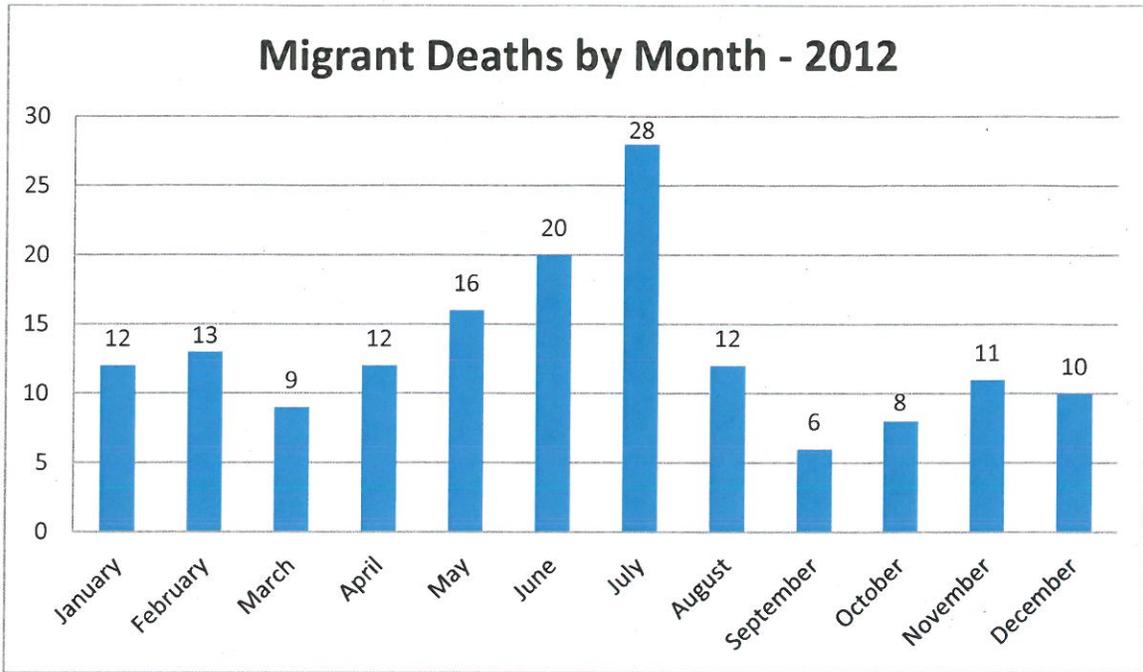
Migrant deaths are defined as deaths of foreign nationals who die attempting to cross the southern Arizona desert. Calendar year 2010 saw the highest number of migrant deaths (225) recorded at the FSC while 2012 (157 deaths) saw a drop below average (178 deaths on average from 2002 - 2012). The FSC has recorded 2,037 migrant deaths since 2001. The deaths per year are adjusted annually to account for identification of remains initially thought to be those of a migrant that are not, and association of remains found months or years apart later discovered to be that of the same individual.

As is the historic norm, migrant deaths peaked during the summer months (June-August) with 60 deaths (38% of total for year) in 2012. Many remains are not identifiable due to postmortem changes and efforts by migrants to obscure their identities. Of the decedents who were identified, 28% (44 deaths) were between 20-39 years of age and 85% (134) were males. Skeletal or significantly decomposed remains accounted for 107 (68%) of the 157 migrant deaths in 2012.

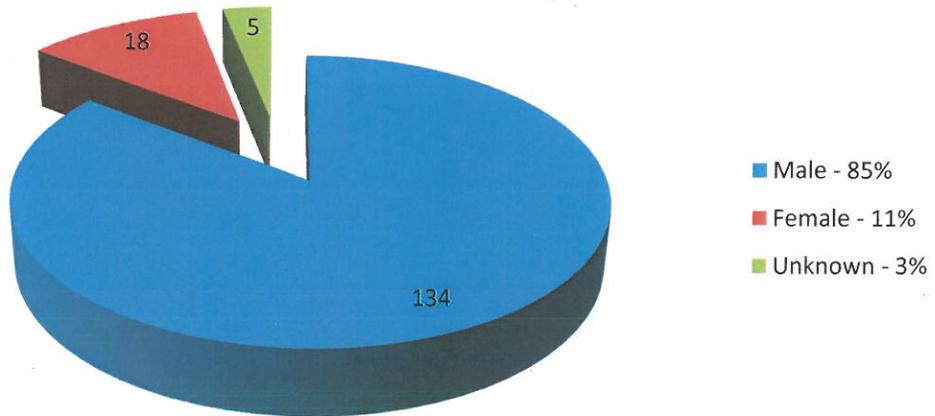
The cause of death was undetermined in 68% of cases, primarily due to limitations of examination of decomposed and skeletal remains. Of the remainder, environmental exposure to extremes in heat or cold combined with dehydration comprised 23% of deaths. Other, less frequent, causes of death included gunshot wound injuries (7 cases), blunt force injuries from falls or motor vehicle accidents (6), drowning (3) and a natural death (1).

In 2012, 76% (53) of identified migrants were of Mexican nationality, followed by Guatemalans (17%, 12) and Ecuadorians (4%, 3). Since 2001, identified migrants of Mexican nationality have been the most numerous (86%, 1,126), followed by Guatemalans (7%, 94) and Salvadorans (2%, 30). Of the 2,037 migrants since 2001, 64% (1,303) have been identified, 14% (176) by DNA comparison to a family or law enforcement reference sample. As of December 31, 2012, 734 decedents remain unidentified.

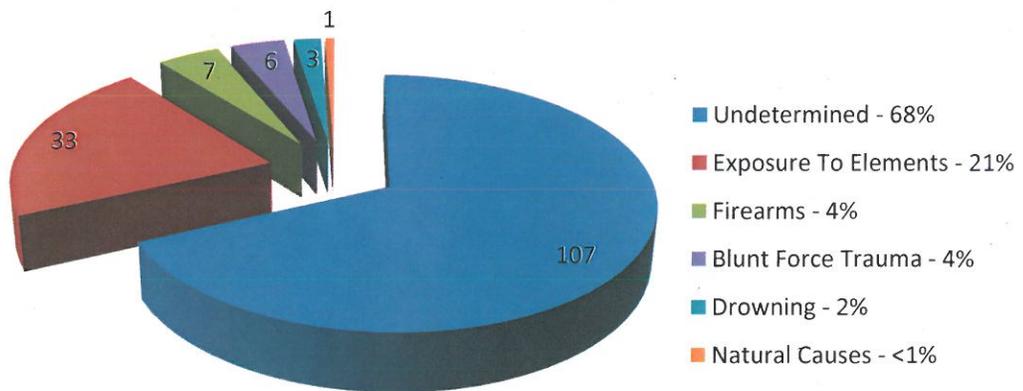




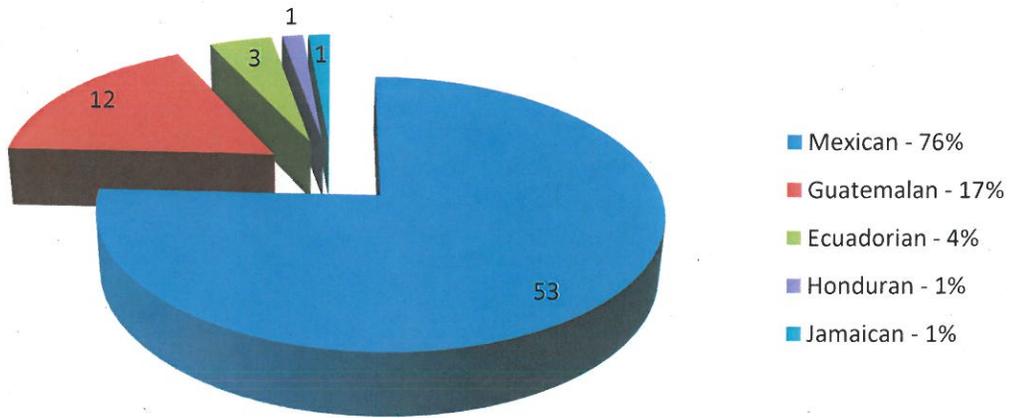
### Migrant Deaths by Gender - 2012



### Migrant Deaths by Cause - 2012



### Migrant Deaths by Nationality - 2012



### Migrant Deaths by Nationality 2001 - 2012

