

# PIMA COUNTY FORENSIC SCIENCE CENTER OFFICE OF THE MEDICAL EXAMINER

## ANNUAL REPORT 2011



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## **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 2011 there were 8,383 deaths in Pima County; of these 2,133 (25%) 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 last year.

## **OVERVIEW**

Of particular note, 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 system. The FSC has the distinction of being the sole accredited office in Arizona and one of 60 offices across the United States, a distinction for which we are proud.

### Reportable Deaths

Arizona statute 11-593 delineates the 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 2,133 reports of deaths from Pima County and 495 reports from 10 additional Arizona counties in 2011. Jurisdiction was declined in 494 of these cases. A total of 1,918 decedents were transported to the FSC for examination or storage in 2011.

### Examinations

Pima County forensic pathologists and anthropologists performed 1,345 autopsies, 397 external examinations, 216 death certifications, and 171 anthropologic examinations and reviewed 5,789 cremations in 2011.

Education, Training and Activities

1) *Forensic Medical Investigators*

Calendar year 2011 saw a transition from 5 Forensic Medical Investigators (FMI) to 11 and the addition of scene based investigation for Pima County cases. A FMI supervisor was added in the late fall. The position of Field Agent was eliminated in 2011, with those duties now being performed by FMI's. Two FMI's and the FMI supervisor are currently certified by the American Board of Medicolegal Death Investigation. FSC Forensic Pathologists lecture to the FMIs on varying topics monthly.

2) *Community education, presentations and media interviews*

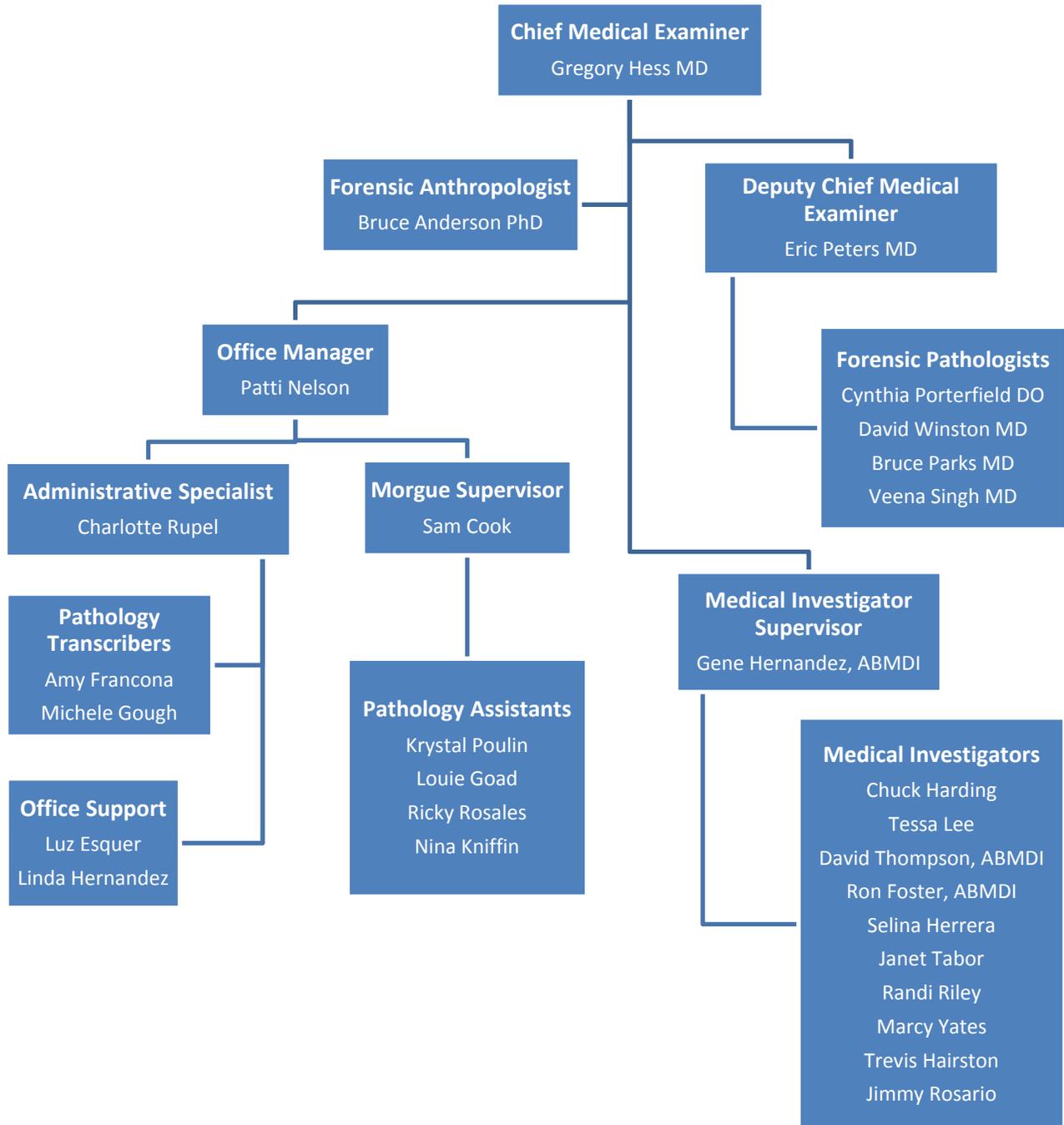
The FSC receives numerous requests from various groups, organizations, individuals and schools for presentations regarding a host of forensic issues annually. Not all requests can be honored due to time and personnel constraints, but examples of educational activities in 2011 include but are not limited to: presentations at high school career fairs; lectures at the Pima County Attorney's Office Community Prosecutors Academy and Victim Services Division training programs; presentations and tours for humanitarian organizations; lectures to classes at the University of Arizona Law School, Veterinary School and Public Health School; and the teaching of a 3-credit-hour death investigation class at Pima Community College. The Chief Medical Examiner participated in approximately 104 media interviews in 2011, many involving migrant issues. Pima County's Forensic Anthropologist gave 10 lectures and presented three papers to organizations and at meetings in Nevada, Illinois, Tennessee, Michigan, and Mexico City, Mexico in 2011.

3) *University of Arizona Medical School, Department of Pathology and School of Anthropology*

FSC Forensic Pathologists hold clinical appointments with the Department of Pathology at the University of Arizona School of Medicine, where they are involved with pathology resident teaching and medical student lectures. Four pathology residents, three medical students and two pathology post-sophomore fellows rotated through the FSC for month-long rotations in 2011. Our Forensic Anthropologist also holds an academic appointment at the University of Arizona and six anthropology interns trained at our facility in 2011.

Law Enforcement and Legal System

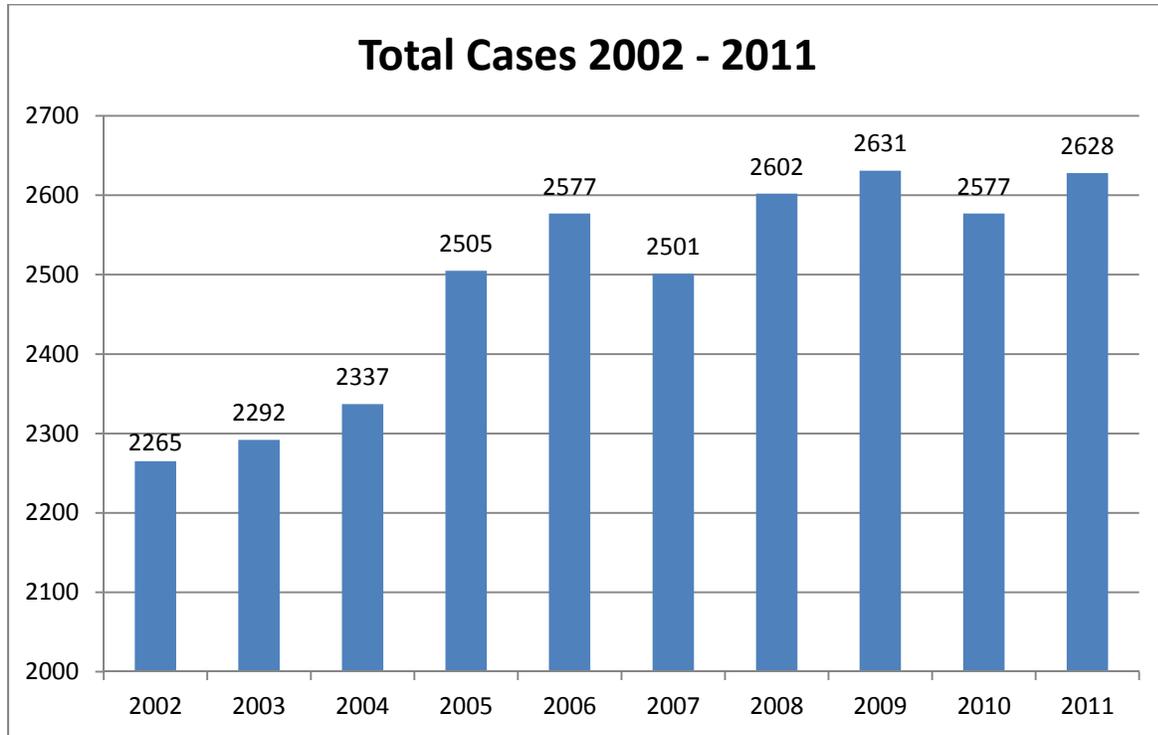
The availability of our pathologists to assist or advise law enforcement personnel in their investigations and the legal system in its proceedings is an important function of the FSC. Pima County law enforcement agencies requested the assistance of a pathologist in 47 scene investigations in 2011. Involvement of the FSC in the legal system generally consists of pretrial interviews, depositions and courtroom testimony. In 2011, the office's six forensic pathologists participated in approximately 46 pretrial interviews, 23 depositions and 52 jury trials.



**OFFICE OF THE MEDICAL EXAMINER  
ORGANIZATIONAL CHART AS OF DECEMBER 2011**

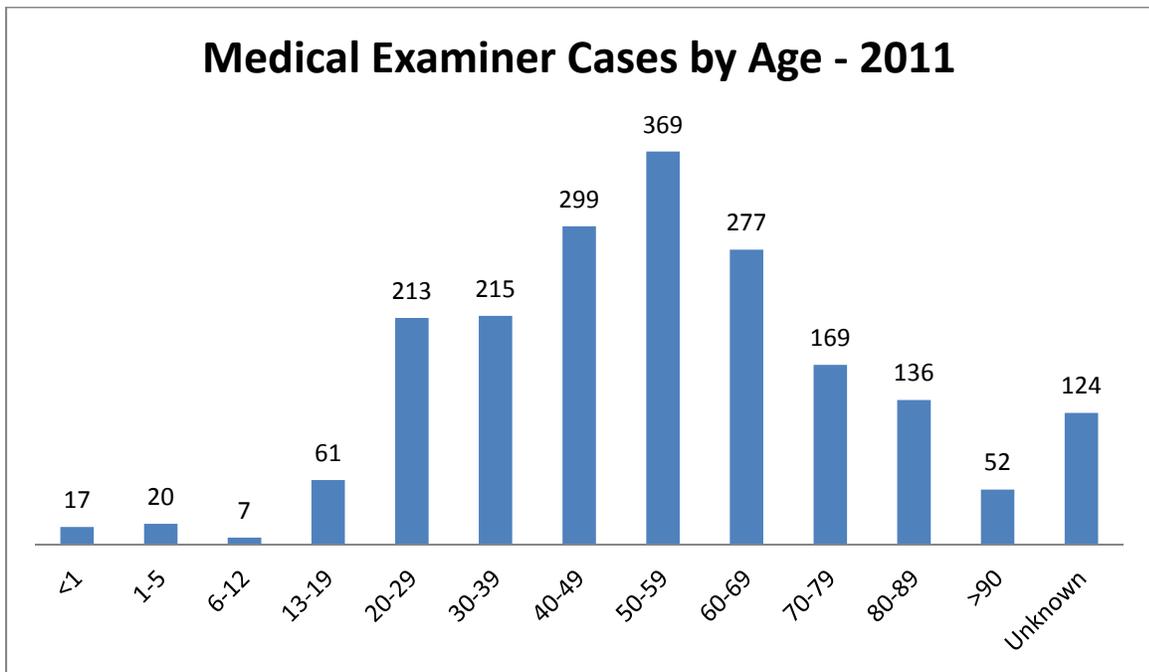
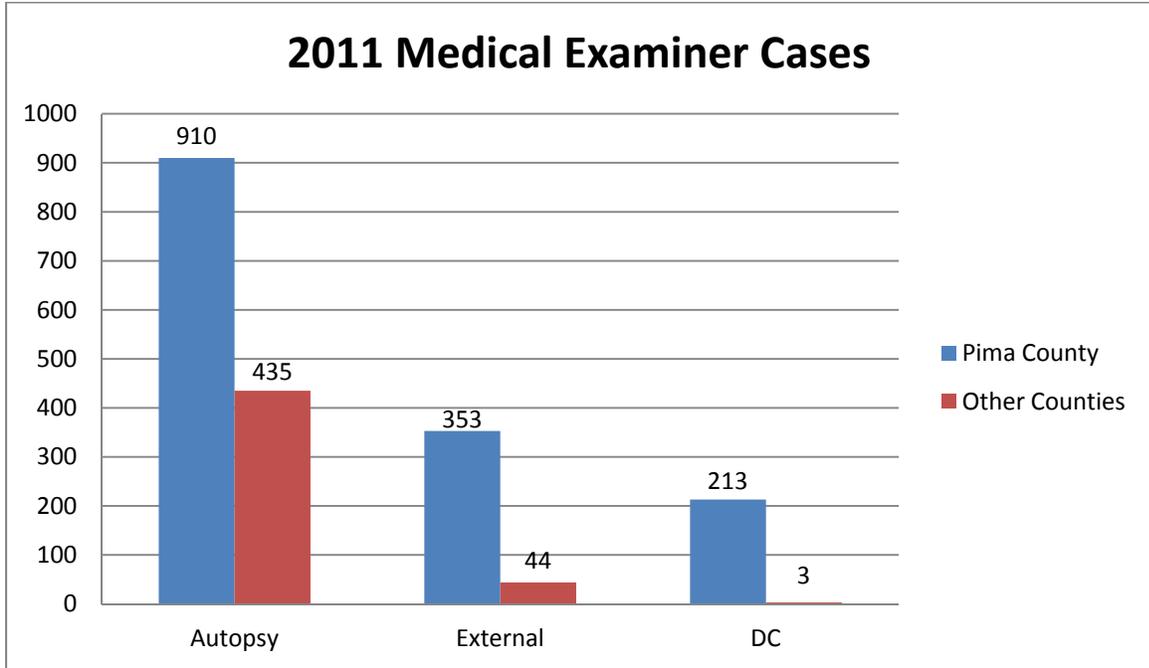
## TOTAL CASES

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). These data include cases examined at the FSC from Apache, Gila, Graham, Greenlee, La Paz, Maricopa, Navajo, Pima, Pinal, Santa Cruz and Yuma counties.

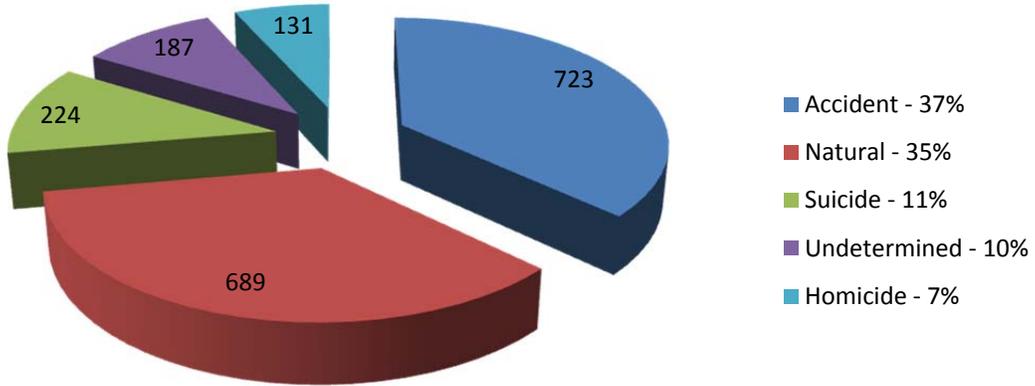


## MEDICAL EXAMINER CASES

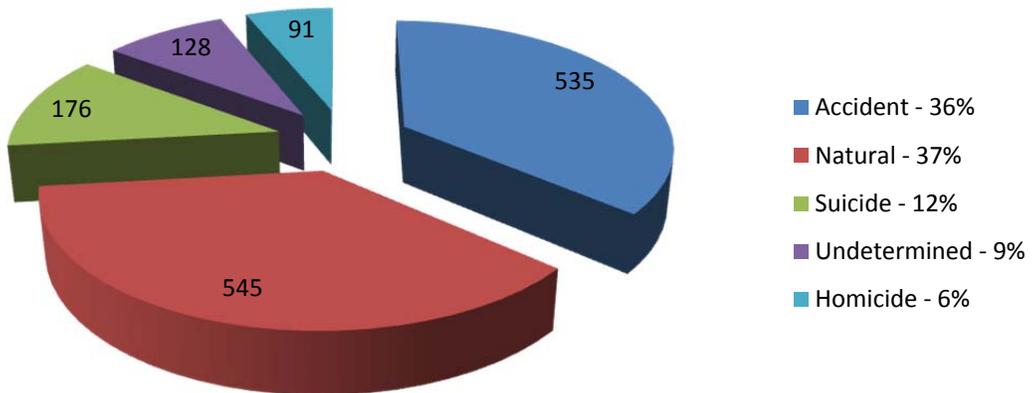
The Pima County FSC considers all cases in which the cause and manner of death are determined by this office as “medical examiner cases.” Those cases include autopsies, external examinations and death certificate (DC) cases. Autopsies are examinations where a decedent is examined both externally and 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 only 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 decedent. In 2011, for Pima and all other counties listed above, 1345 autopsies, 397 external examinations and 216 DC cases were performed at the FSC. Pima County alone accounted for 910 autopsies, 353 external examinations and 213 DC cases.



### ME Cases by Manner of Death - 2011



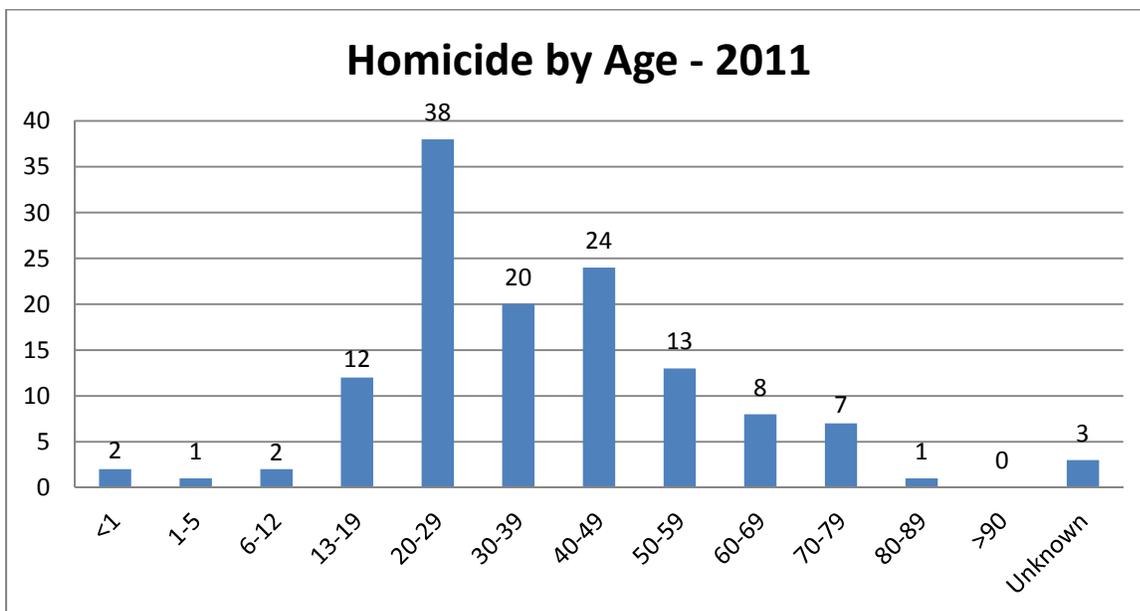
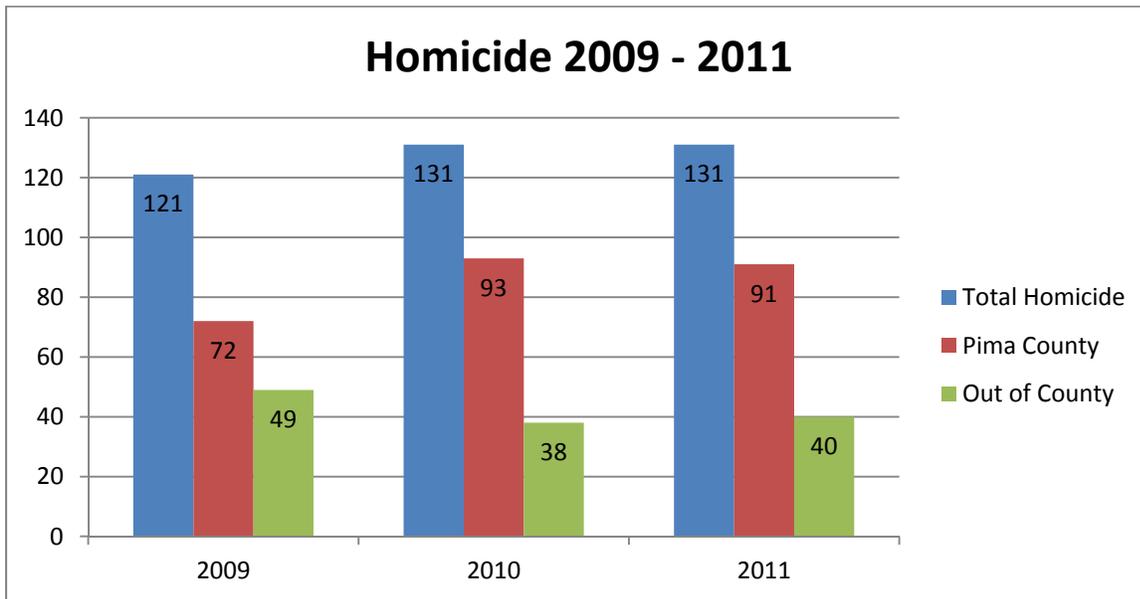
### Pima County ME Cases by Manner of Death - 2011



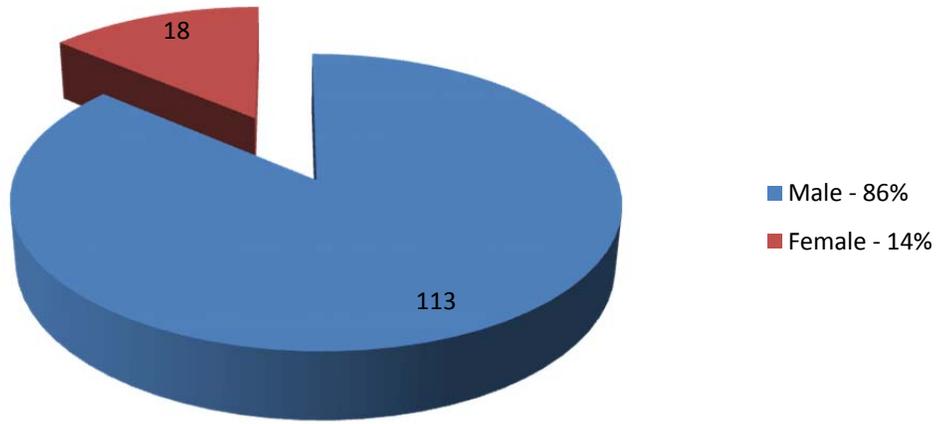
## HOMICIDE DEATHS

This office examined 131 homicides in 2011, 91 from Pima County and 40 from other counties. Homicide rates from 2009 – 2011 are compared below.

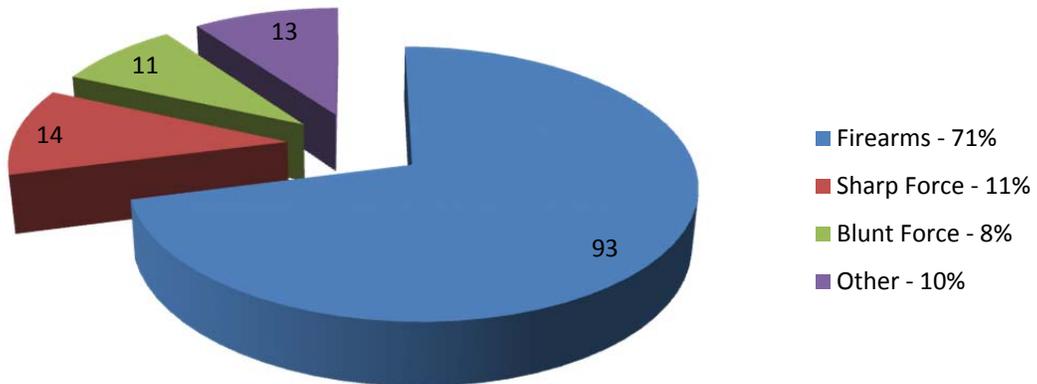
Homicide deaths from all counties increased by 8% from 2009 to 2011, although these deaths remained nearly unchanged when comparing 2010 to 2011. In 2011, homicide victims were most frequently male (86%), between 20-29 years of age (29%) and died as the result of firearms (71%).



### Homicide by Gender - 2011

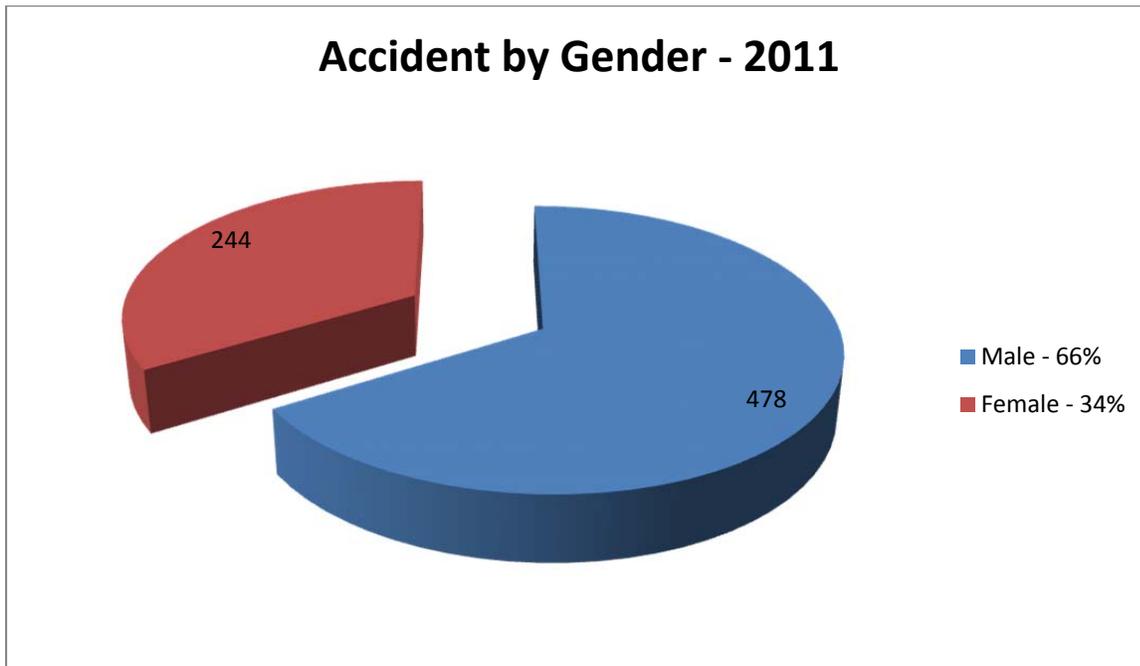
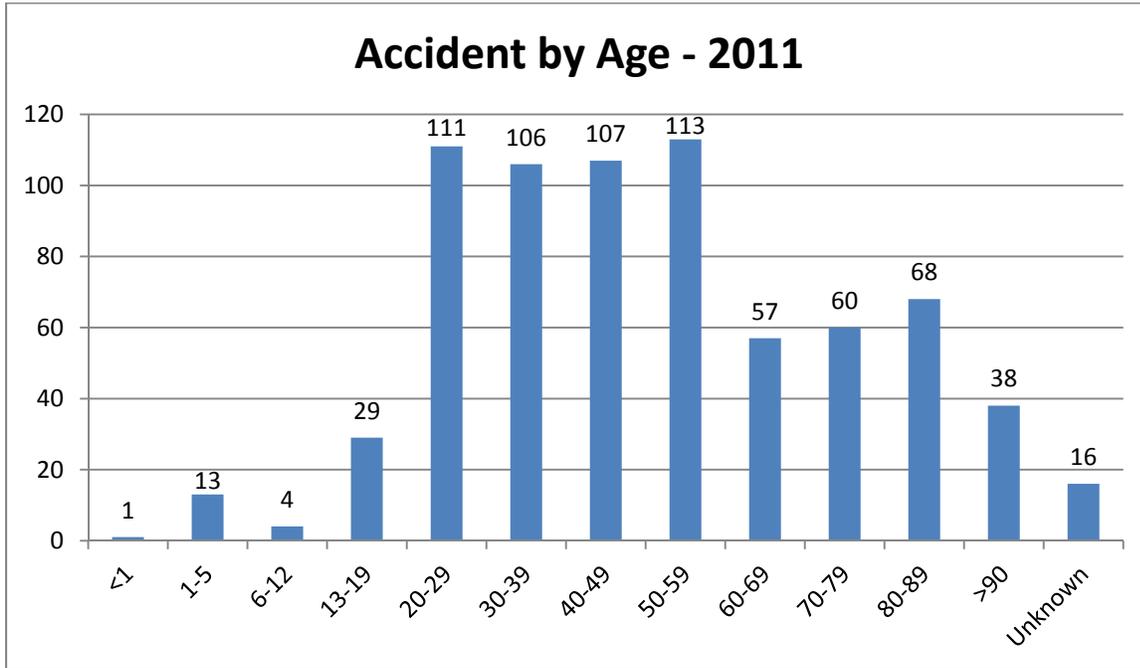


### Homicide by Cause - 2011

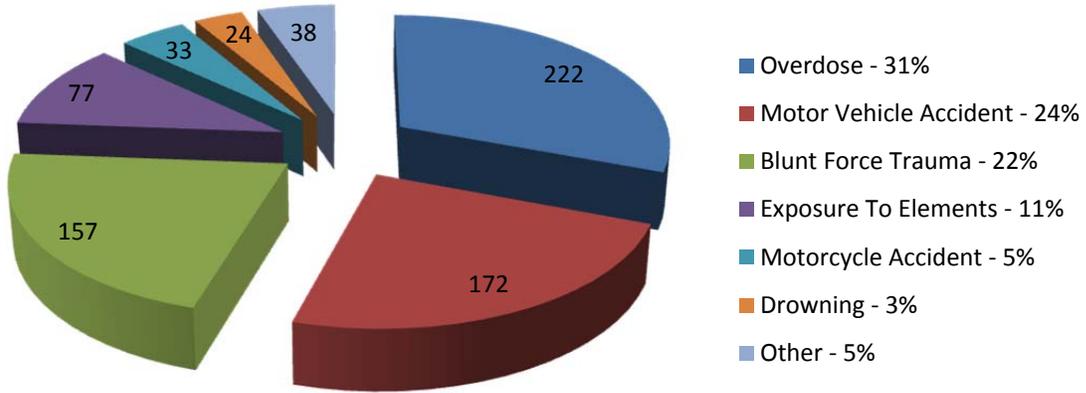


## ACCIDENT DEATHS

Deaths due to accidents accounted for 37% of the ME deaths investigated by the FSC in 2011. Accident victims were most frequently males (66%), between 50-59 years of age (16%) and died as the result of an overdose (31%).

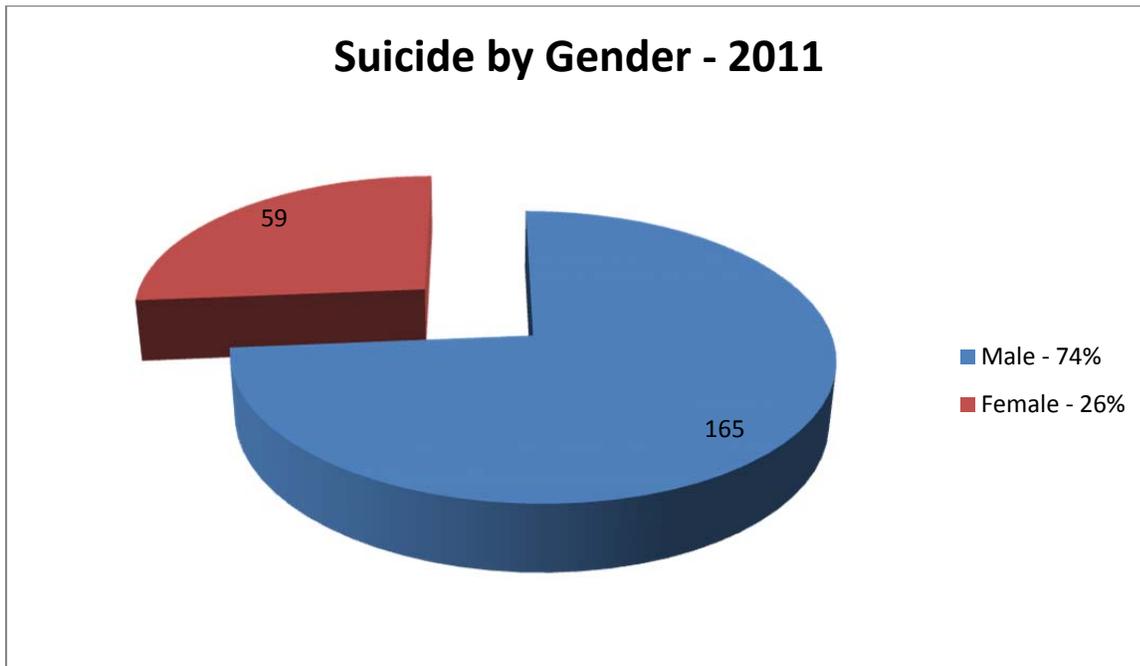
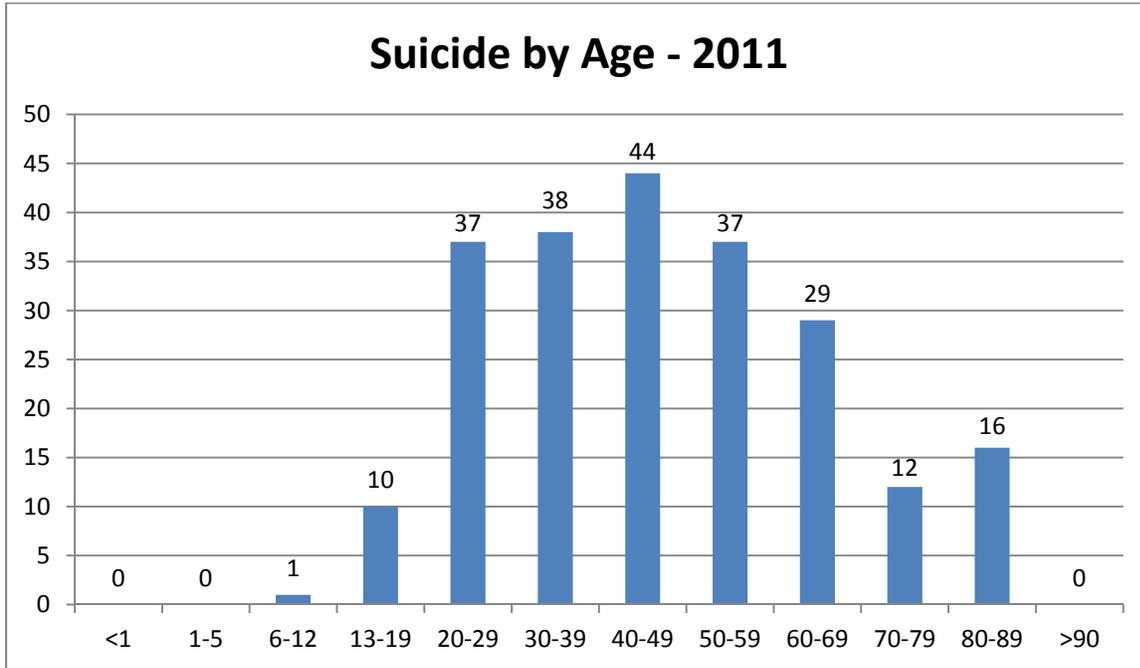


### Accident by Cause - 2011

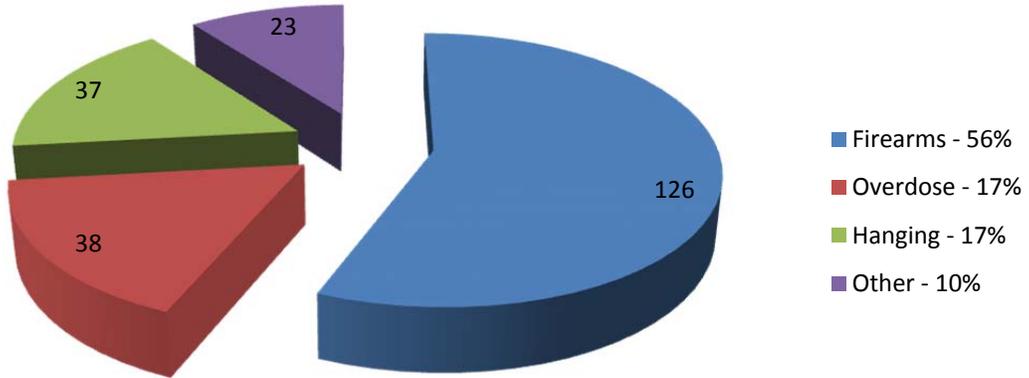


## SUICIDE DEATHS

Suicide deaths accounted for 11% of the ME deaths investigated by the FSC in 2011. Suicide victims were most frequently males (74%), between 40-49 years of age (20%) and died as the result of firearms (56%).

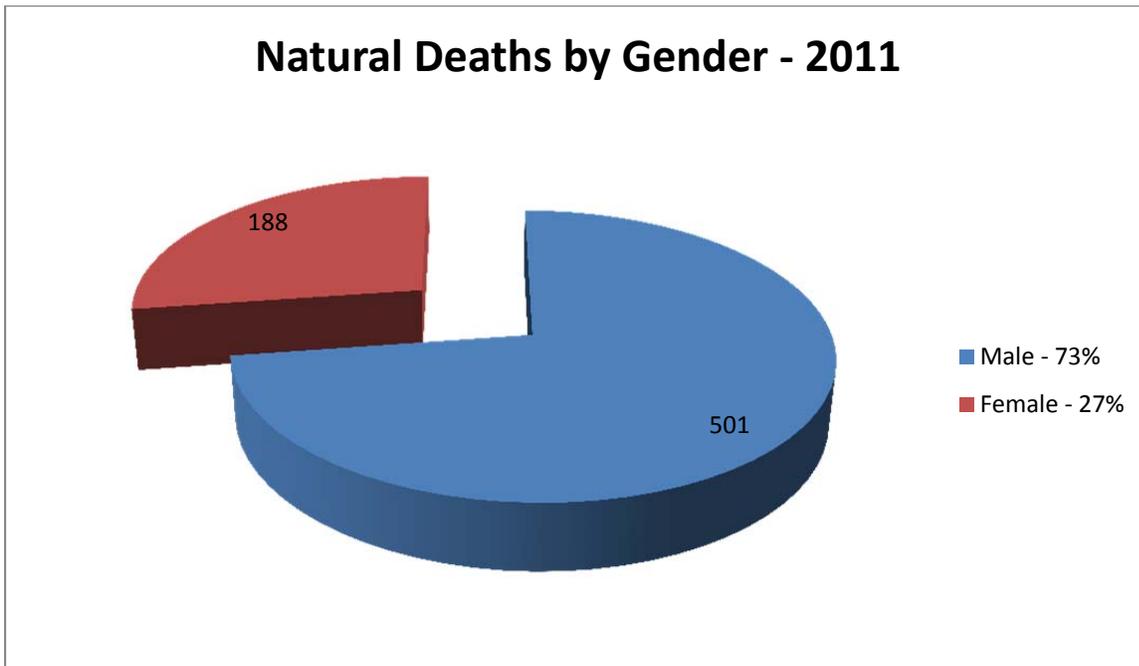
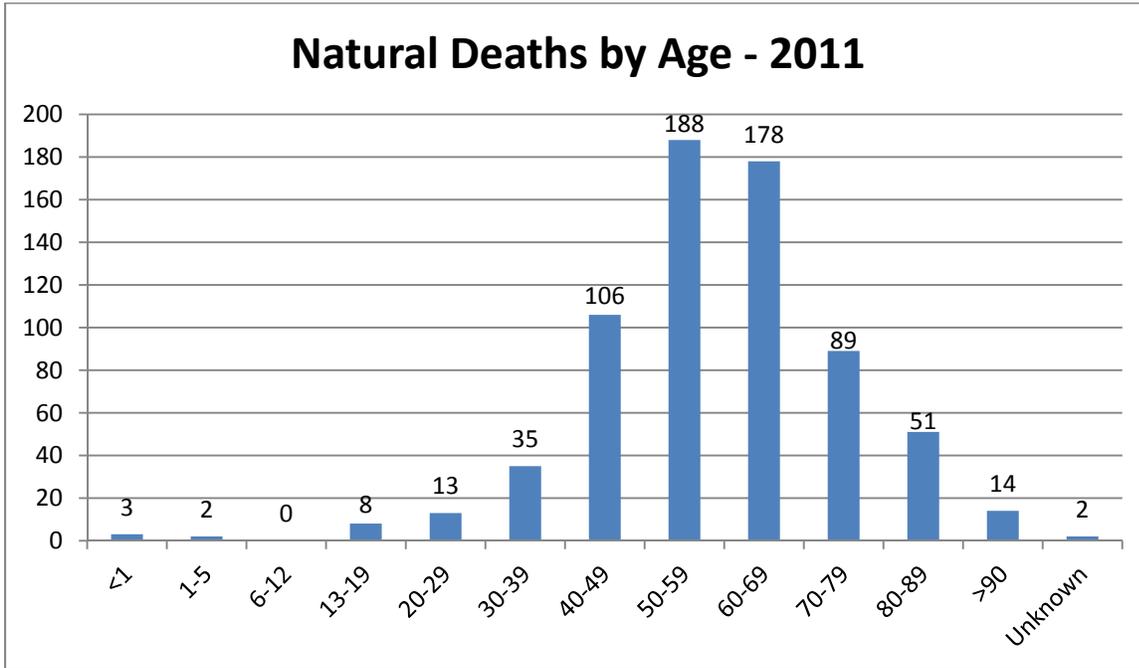


### Suicide by Cause - 2011

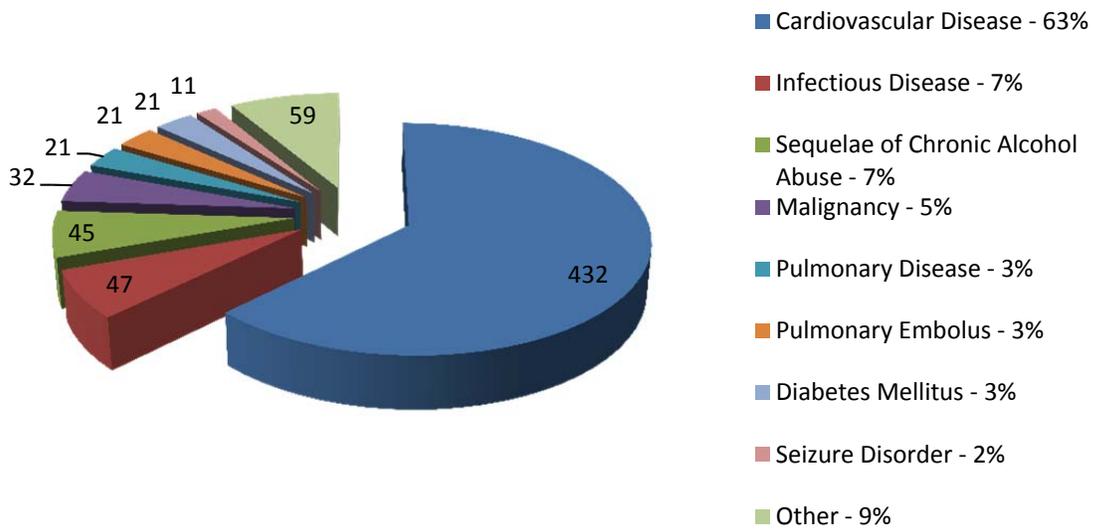


## NATURAL DEATHS

Natural deaths accounted for 35% of the ME deaths investigated by the FSC in 2011. Individuals who died from natural causes were most frequently males (73%), between 50-59 years of age (27%) and died as the result of cardiovascular disease (63%).

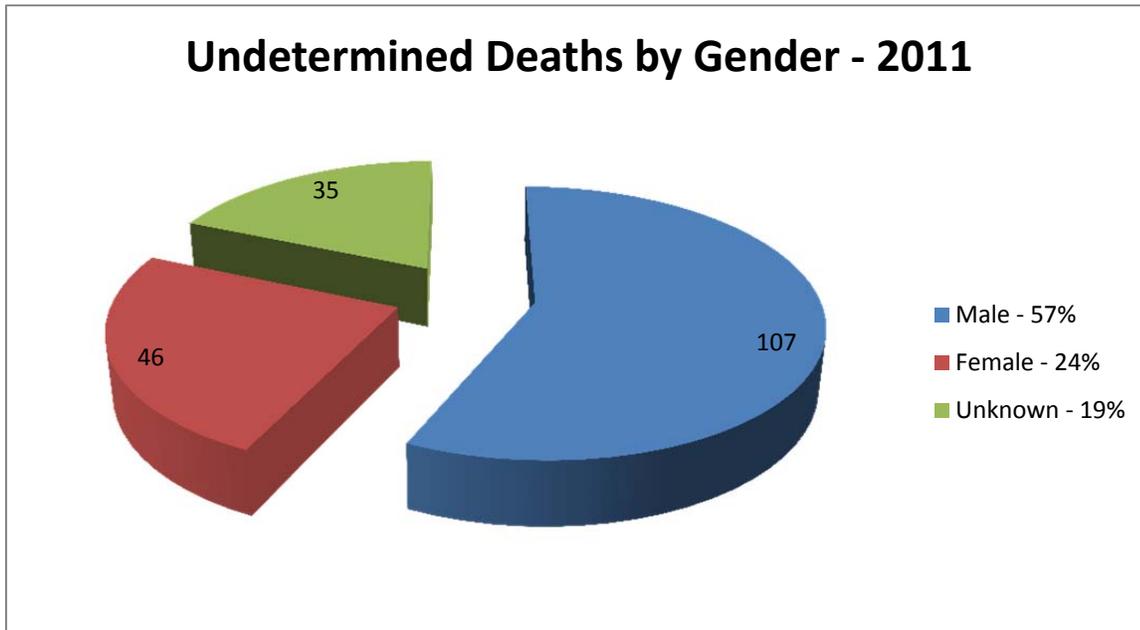
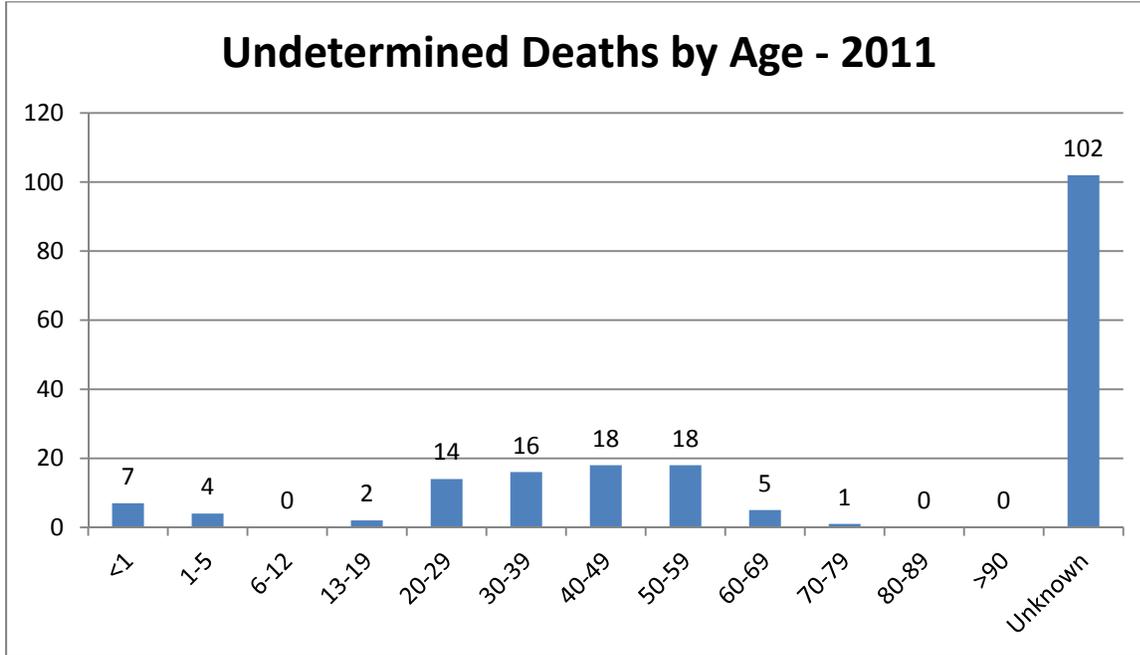


### Natural Deaths by Cause - 2011

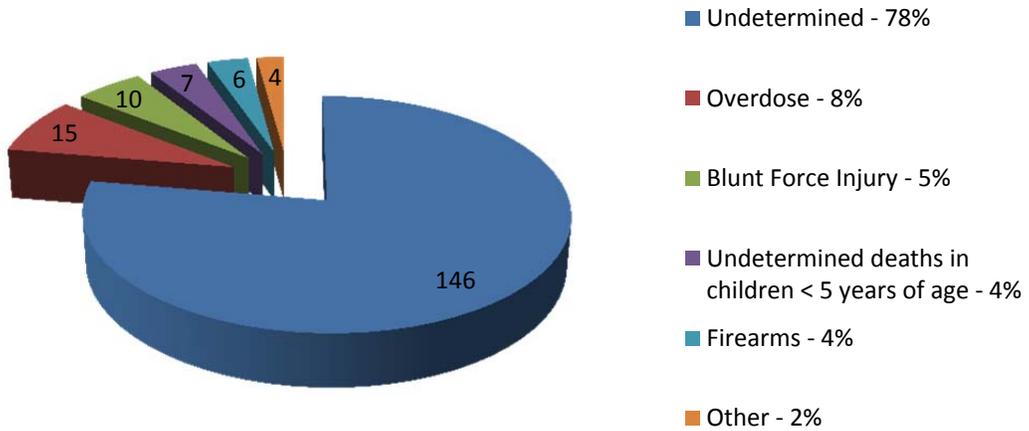


## UNDETERMINED DEATHS

Undetermined deaths accounted for 10% of the ME deaths investigated by the FSC in 2011. Individuals who died from undetermined causes were most frequently males (57%), of unknown age (54%) and died from undetermined causes (72%). Many of these deaths represent skeletal remains of presumed migrants who died in the desert of Western Pima County.



### Undetermined Deaths by Cause - 2011



## OVERDOSE DEATHS

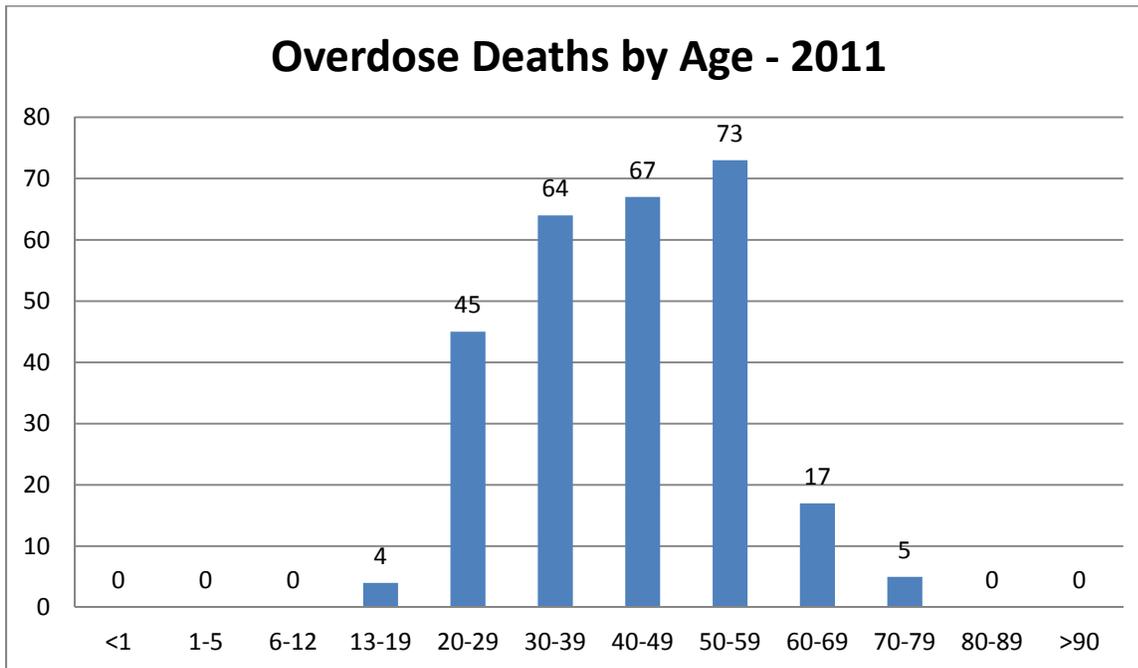
There were 277 deaths attributed to an overdose of either a single drug (142 deaths, 53%) or a combination of drugs (125 deaths, 47%) in 2011. Overdose deaths commonly involved males (58%) between the ages of 50-59 (26%). The majority of these deaths were classified as accidents (80%).

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.

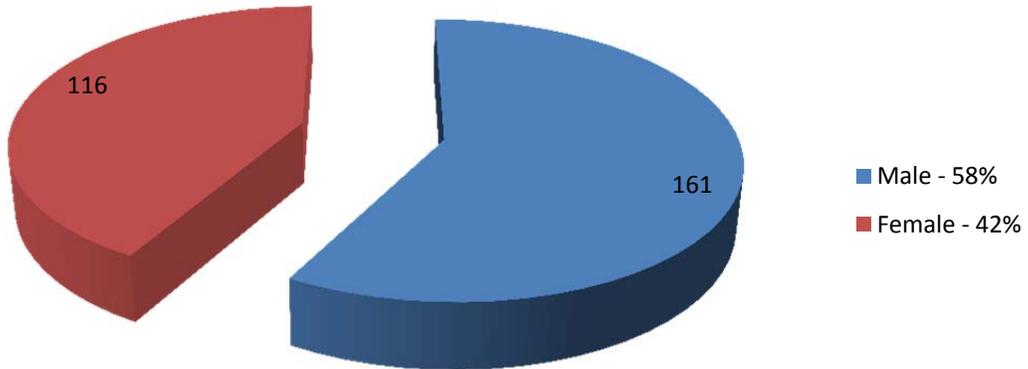
The number of heroin deaths is likely underreported as heroin is rapidly metabolized to morphine by the body and if the parent compound indicative for heroin (6-monoacetylmorphine) is not present on the toxicology report these deaths may be classified as either morphine intoxication or “opiate” intoxication.

Alcohol intoxication alone accounted for 15 (6%) deaths in 2011.

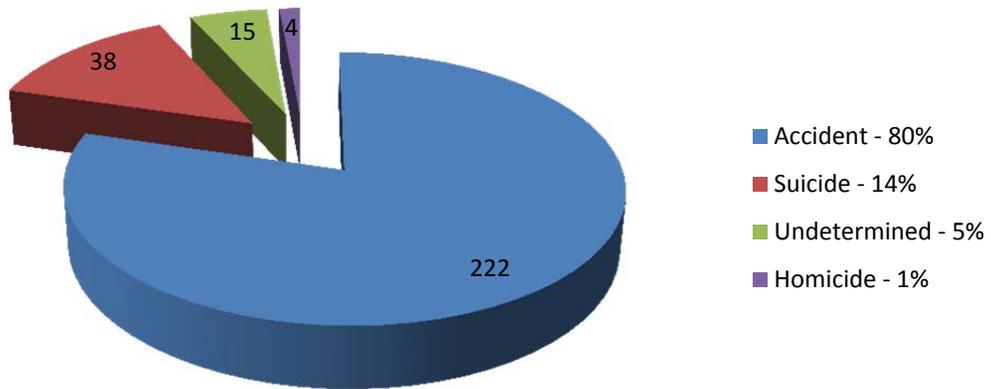
There were four judicial executions by injection of drugs autopsied at the FSC in 2011.



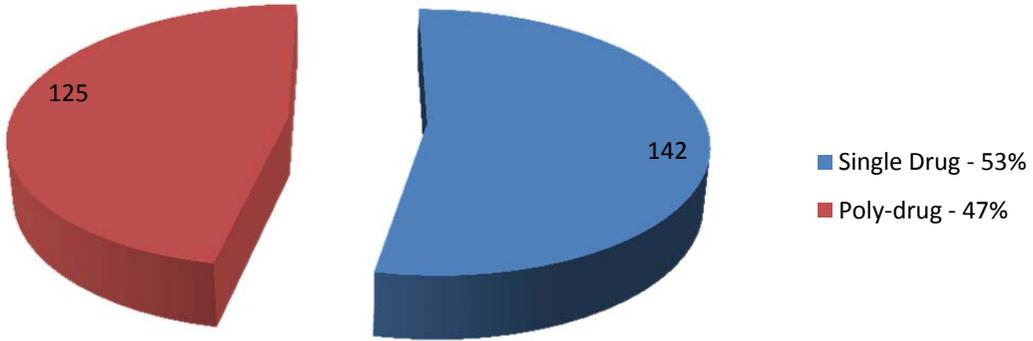
### Overdose Deaths by Gender - 2011



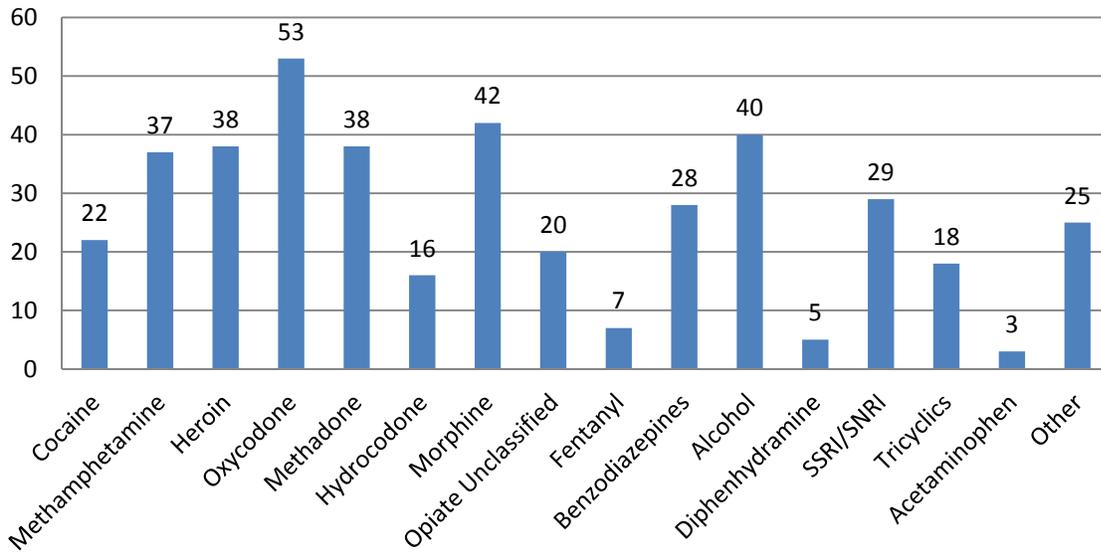
### Overdose Deaths by Manner - 2011



### Single vs Poly-drug Overdose - 2011

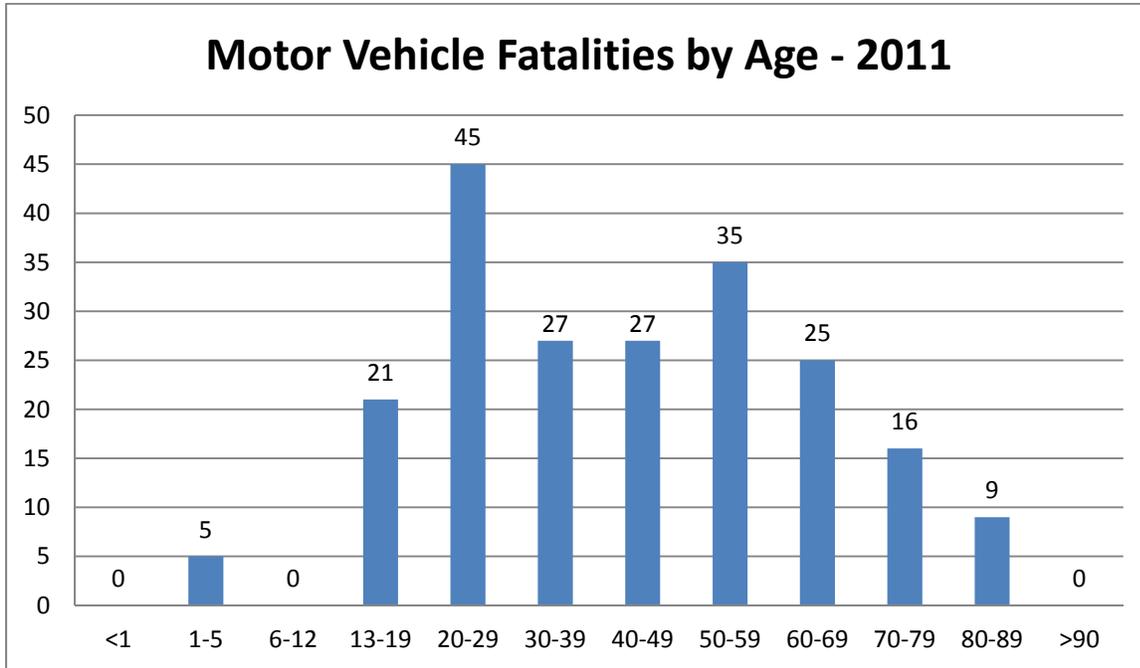


### Overdose Deaths by Drug - 2011

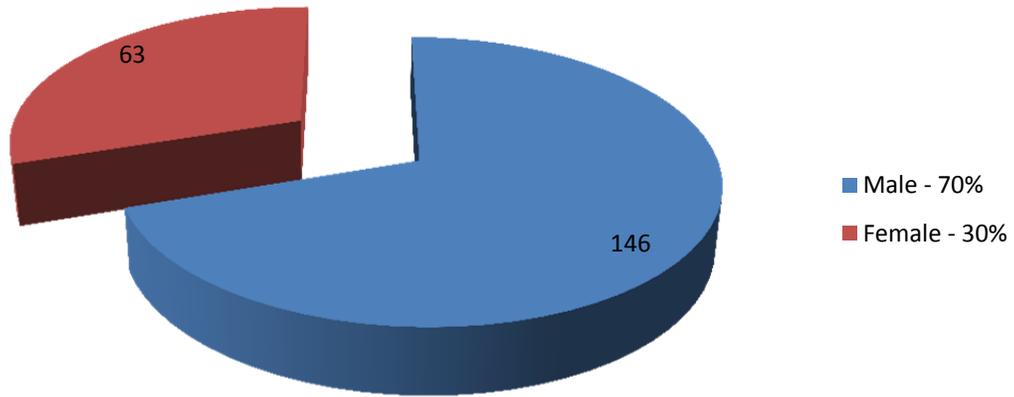


## MOTOR VEHICLE RELATED FATALITIES

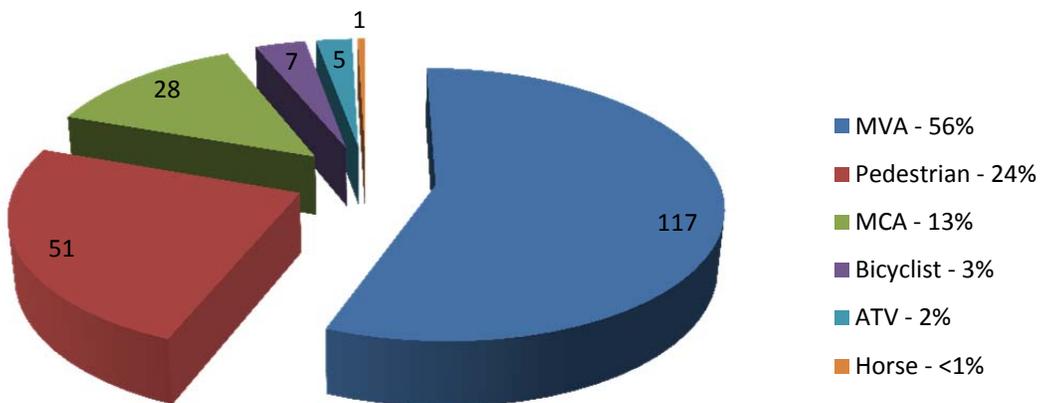
Motor vehicle related fatalities accounted for 209 total deaths in 2011. The majority, 117 deaths, were occupants of a motor vehicle involved in an accident (MVA). Of the remaining, 28 were motorcycle accidents (MCA), 5 were all-terrain vehicles (ATV), 58 were pedestrians or bicyclists struck by vehicles and one was a horseback rider struck by a vehicle. Individuals who died from motor vehicle related fatalities were most frequently males (70%) and between 20-29 years of age (22%).



### Motor Vehicle Fatalities by Gender - 2011



### Motor Vehicle Fatalities by Type - 2011





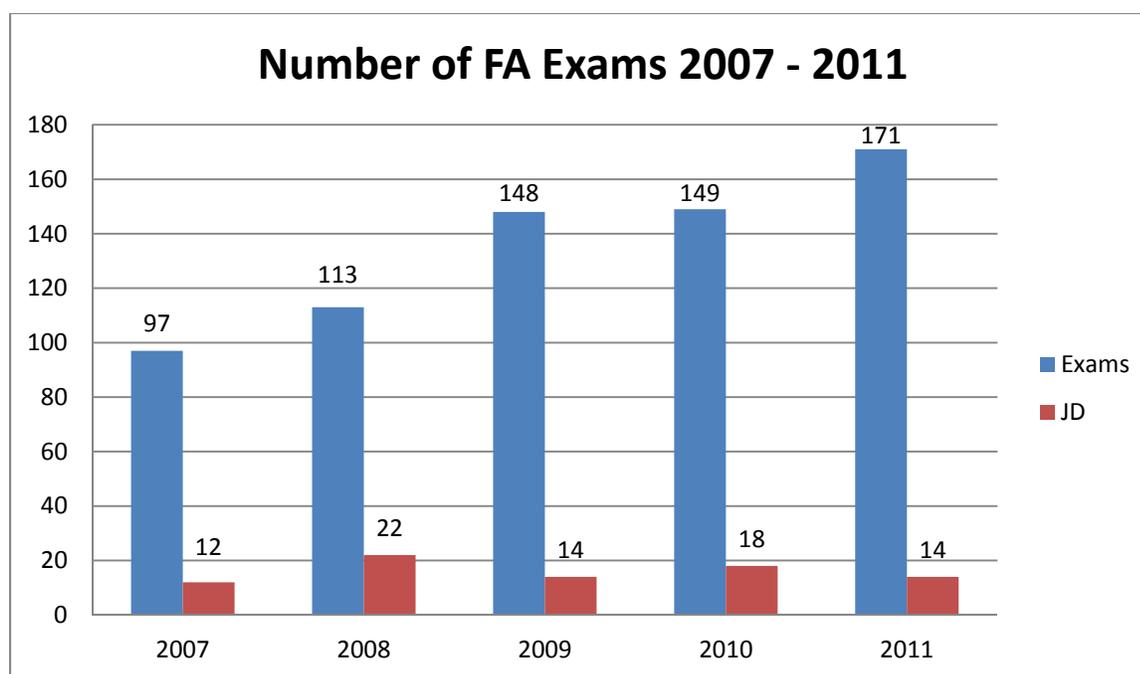
## W.H. BIRKBY FORENSIC ANTHROPOLOGY LABORATORY

Forensic Anthropologists at the W.H. Birkby Forensic Anthropology Laboratory within the FSC performed 171 examinations (biological profiles, trauma evaluations or dental examinations) in 2011 on human remains of forensic significance. An additional 14 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.

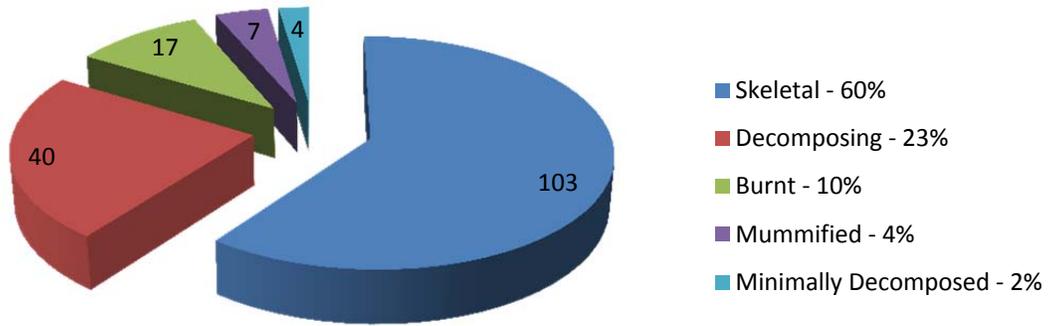
The extent of postmortem decomposition of a particular set of remains is also important when performing a Forensic Anthropology (FA) examination. Remains examined by Forensic Anthropologists were categorized as minimally decomposed, decomposing, mummified, skeletal or burnt. In 2011, skeletal remains comprised 60% of FA examinations.

Three main types of exams are performed; biologic profiles, dental and trauma examinations.

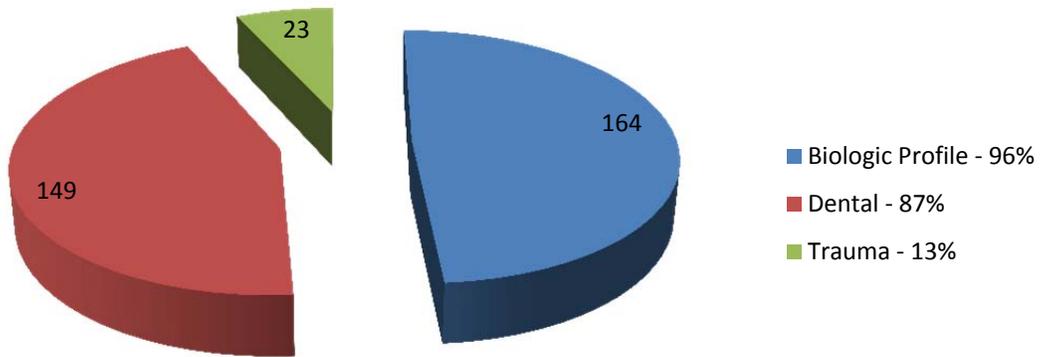
Biological profiles refer to charting, measurements, descriptions, radiographs and photographs taken to estimate sex, age, ancestry, stature and postmortem interval of a set of remains. Dental examinations entail charting, descriptions, radiographs and photographs in an effort to identify an unknown 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 (96%) FA exams include a biological profile with dental examination (87%) when applicable. Less common are trauma (13%) evaluations with or without biological profiles and dental examinations.



### FA Exam by Condition of Remains - 2011



### FA Examination by Type - 2011



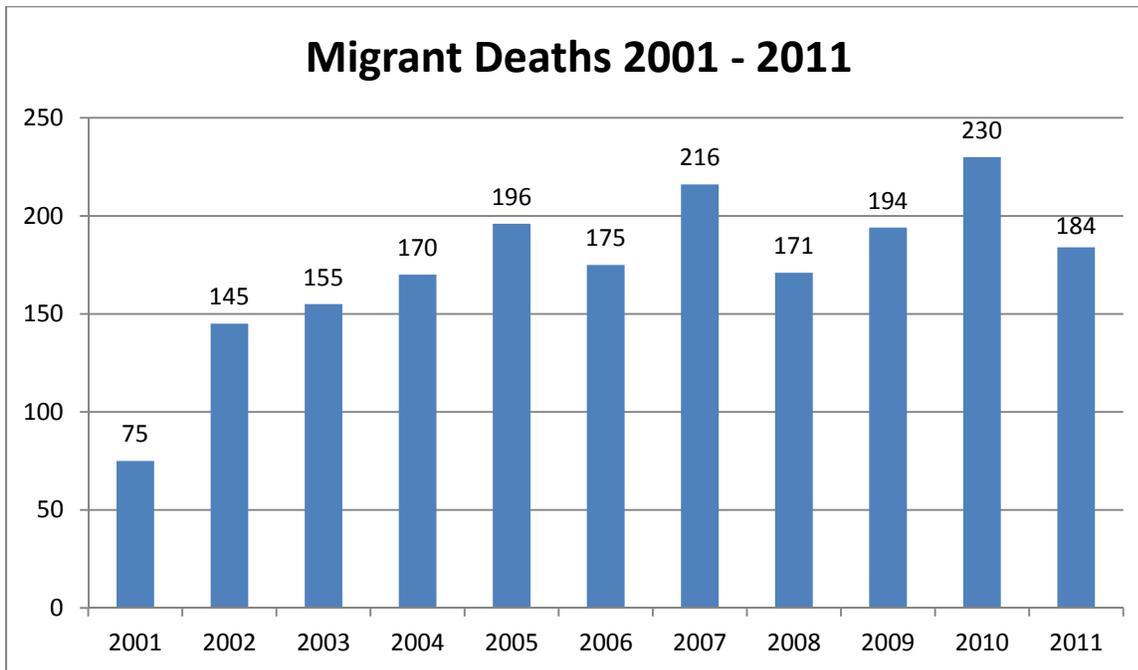
## MIGRANT DEATHS

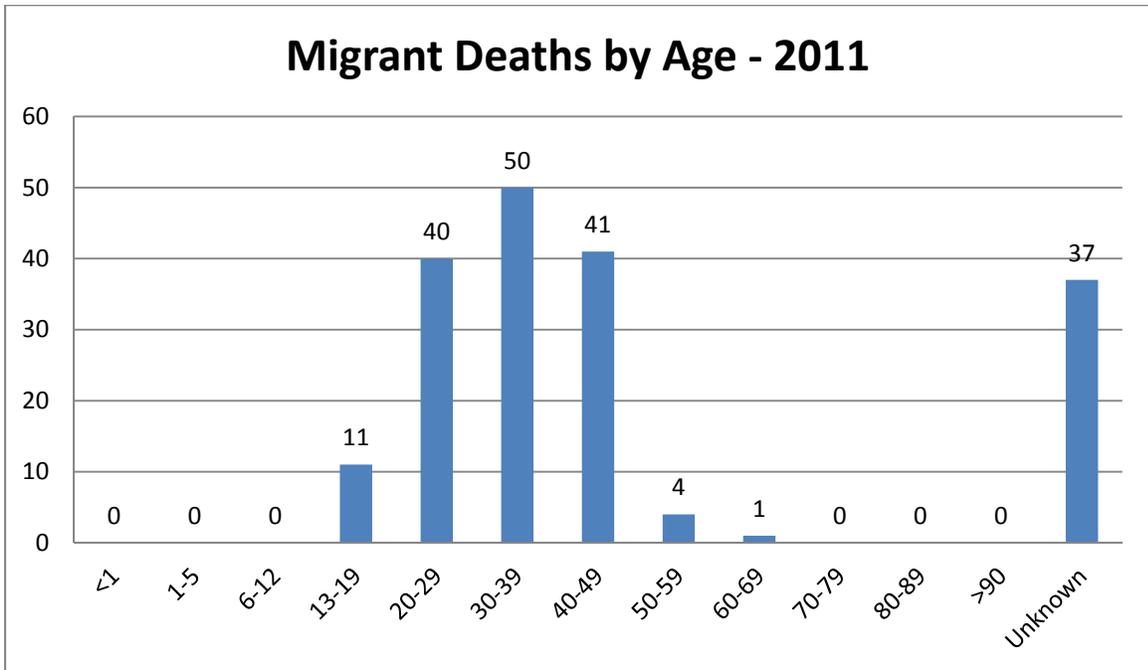
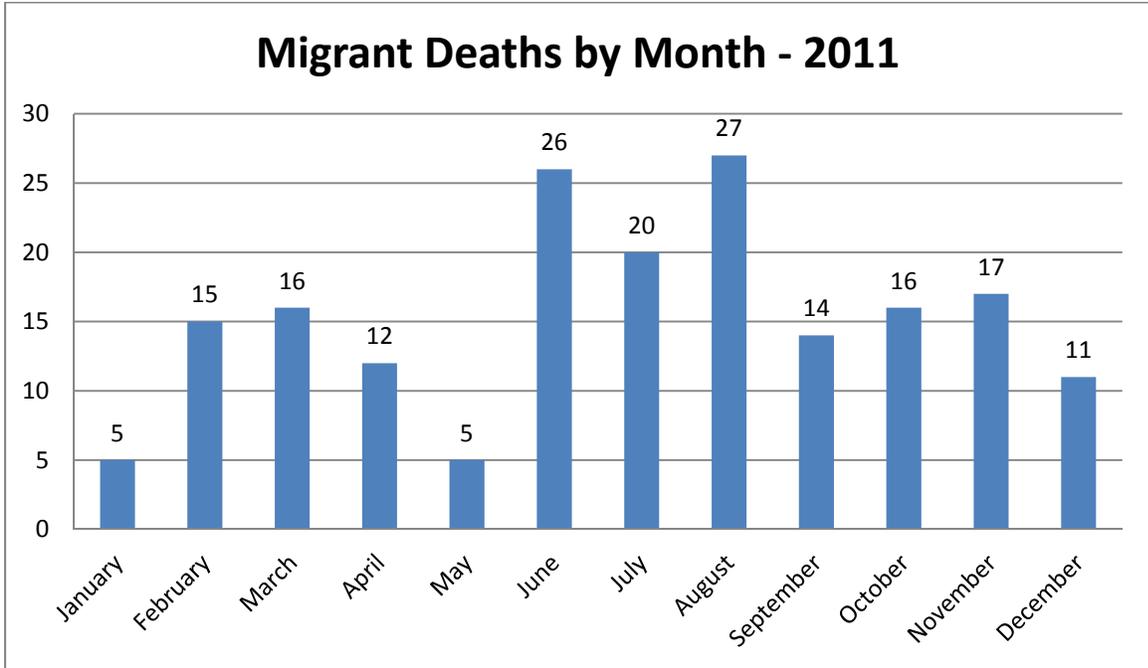
Migrant deaths are defined as deaths of foreign nationals who die attempting to cross the southern Arizona desert. Calendar year 2010 saw the highest number of migrant deaths (230) recorded at the FSC while 2011 saw a return to average (184). 184 deaths per year is the average number of deaths per year since 2002. The FSC has recorded 1,911 migrant deaths since 2001.

As is the historic norm, migrant deaths peaked during the summer months (June-August) with 73 deaths (40% of total for year). Many remains are not identifiable due to postmortem changes and efforts by migrants to obscure their identities. Of the decedents who were identified or in which age and sex estimation could be obtained from the skeletal remains, 71% (131 deaths) were between 20-49 years of age and 76% (139) were males. Skeletal remains accounted for 106 (58%) of the 184 migrant deaths in 2011, an increase from 45% in 2010.

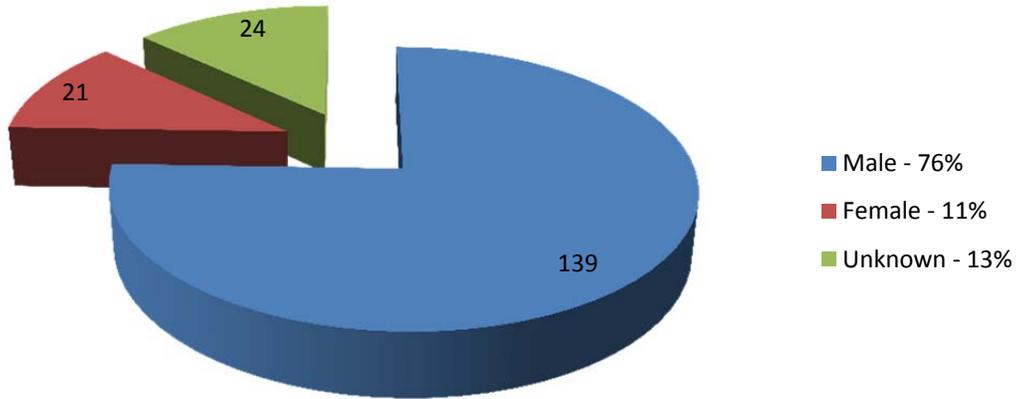
The cause of death was undetermined in 62% of cases, primarily due to limitations of examination of decomposed and skeletal remains. Of the remainder, environmental exposure to extremes in heat or cold combined with dehydration comprised 28% of deaths. Other, less frequent, causes of death included gunshot wound injuries (7 cases), blunt force injuries from falls or motor vehicle accidents (3), drowning (1), natural deaths (5), sharp force injuries (1) and an overdose (1).

In 2011, 87% (61) of identified migrants were of Mexican nationality, followed by Guatemalans (9%, 6) and Hondurans (3%, 2). Since 2001, identified migrants of Mexican nationality have been the most numerous (87%, 1,063), followed by Guatemalans (6%, 79) and Salvadorans (3%, 30). Of the 1,911 migrants since 2001, 64% (1,219) have been identified, 12% (150) by DNA comparison to a family reference sample. As of December 31, 2011, 692 decedents remain unidentified.

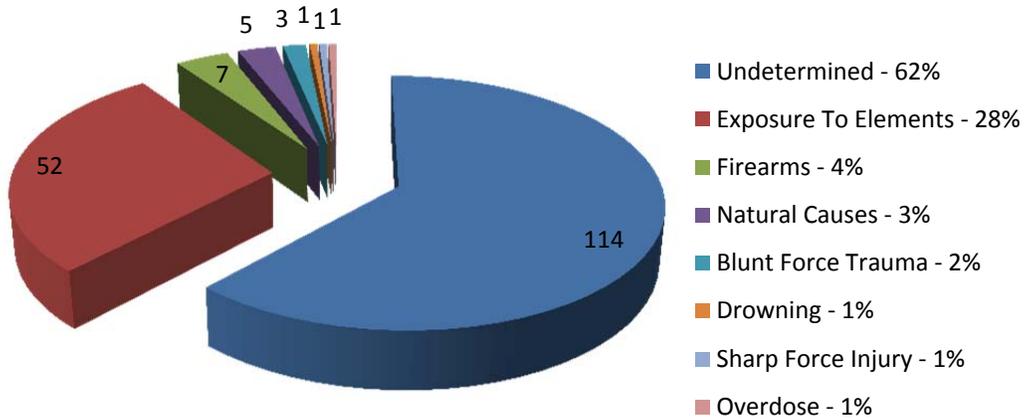




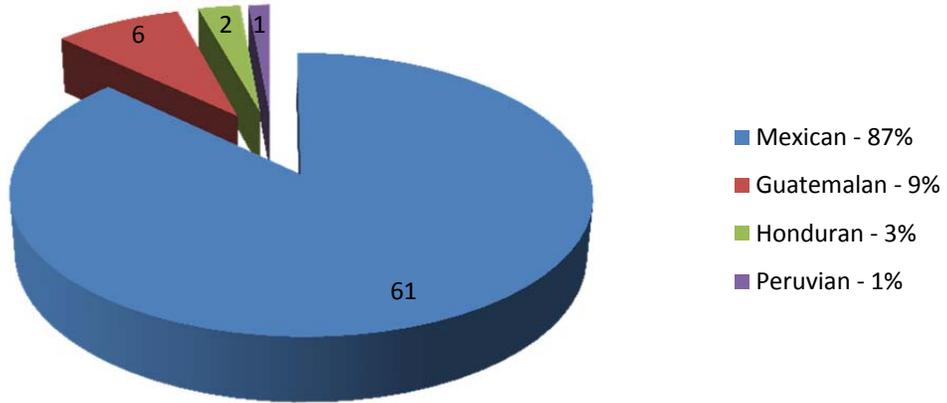
### Migrant Deaths by Gender - 2011



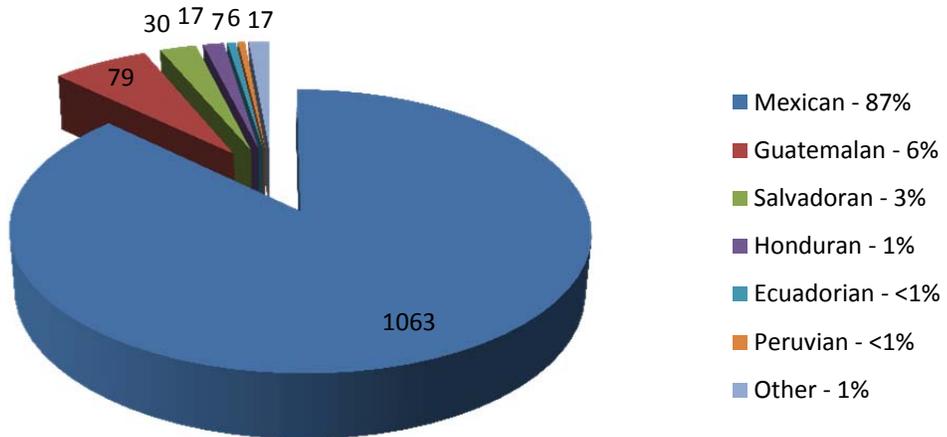
### Migrant Deaths by Cause - 2011

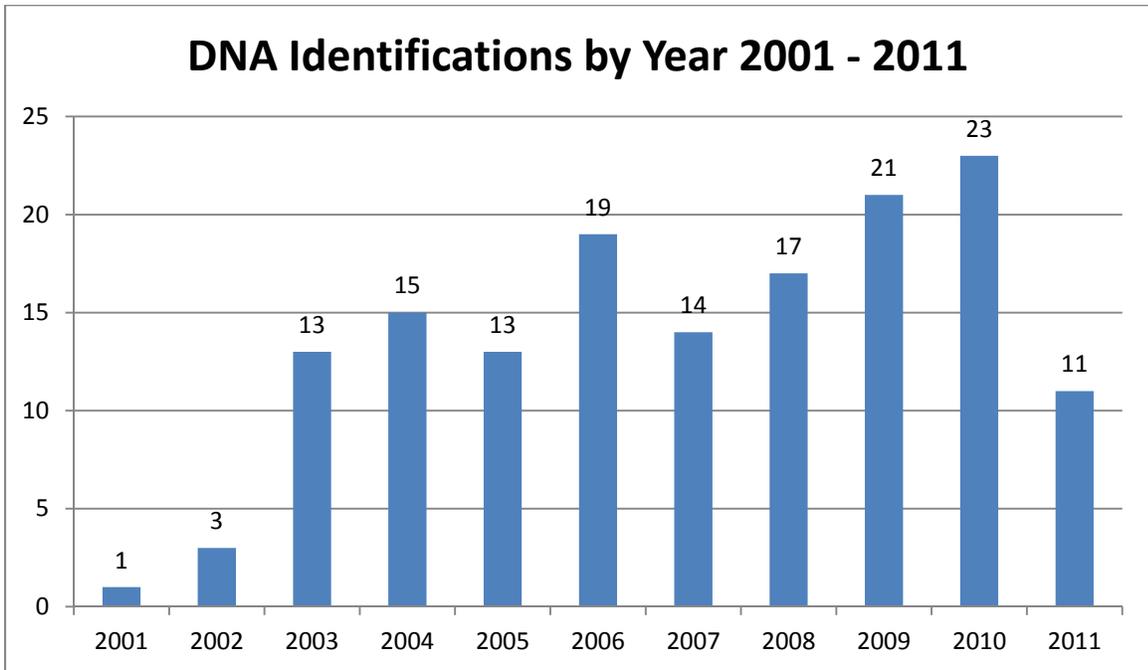
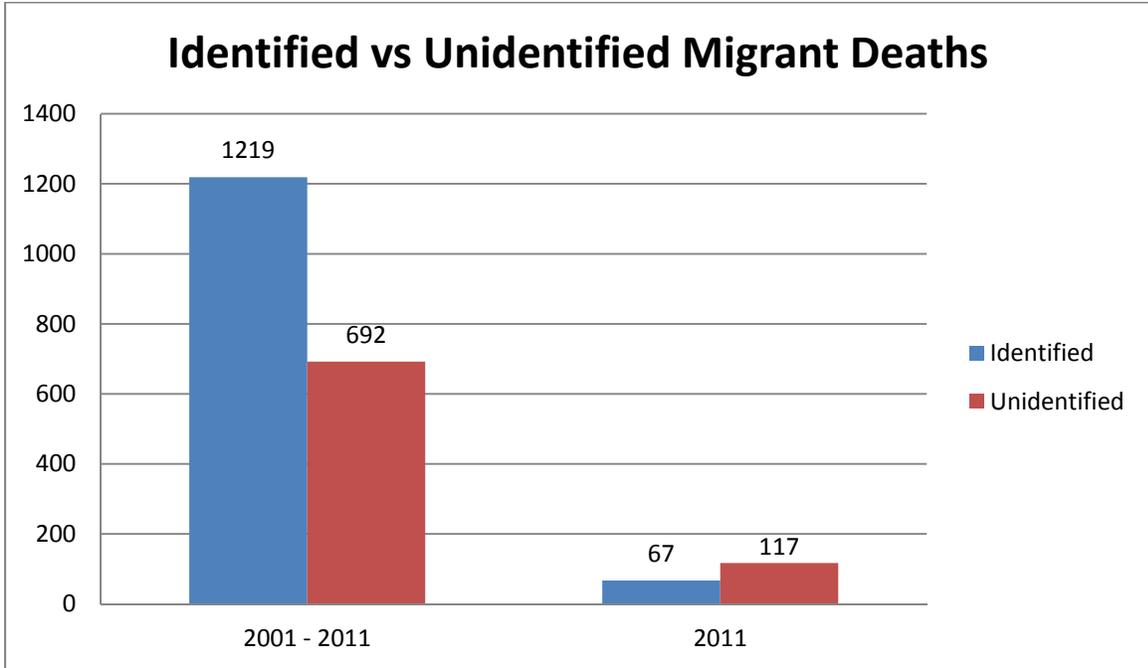


### Migrant Deaths by Nationality - 2011



### Migrant Deaths by Nationality 2001 - 2011





## UNCLAIMED DECEDENTS

A significant number of individuals who die in Pima County are unclaimed, indigent or unidentified and require referral to the Public Fiduciary (PF) Office for burial or cremation. In 2011, 291 decedents were referred to the PF and 369 decedents were released for burial or cremation. On December 31, 2011 the FSC had a storage census of 194 remains, a decrease of approximately 40% from the end of the previous year.

