



**Unexplained Death (UNEX) Investigations
Arizona Department of Health Services (ADHS)
Infectious Disease Epidemiology and Investigations Section
Annual Report 2011**

Unexplained deaths with a history of fever (UNEX) have been reportable in Arizona since 2004. Hospitals and medical examiners (ME) are required to report UNEX to their local health department within 24 hours of receipt of case report (A.A.C R9-6-377 & R9-6-202). The purpose of these UNEX investigations is to identify deaths of an infectious disease nature that might be an agent of public health significance such as infectious diseases transmitted person-to-person, require a public health intervention, represent a new/emerging infection or are an act of terrorism. These investigations involve close collaboration and coordination with outside health agencies, including healthcare facilities and the Office of the Medical Examiner (OME). The official determination of cause of death is determined by the ME and is a separate process from the public health led UNEX investigation.

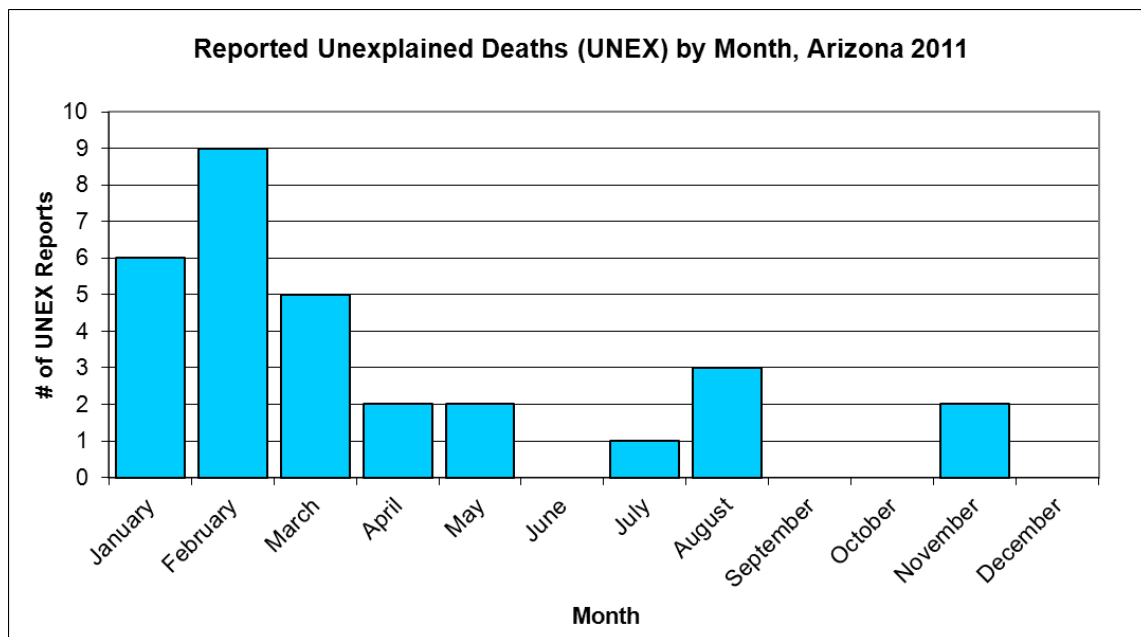
The case must meet at least one of the following criteria to be considered an UNEX investigation:

Hospital/facility or patient-reported death with no known cause **AND** with a history of fever (>38.0°C) **OR** a temperature of <36°C within 48 hours of death.

SUMMARY

For 2011, a total of 30 UNEX investigations were reported from 7 counties and one tribal area in Arizona. This is compared to 26 UNEX investigations reported in both 2009 and 2010. Public health investigations are initiated for all UNEX reports; however, after a complete investigation, only 29 (96.7%) of the reports met the above criteria to be considered an official UNEX investigation. The below summary details the statistics of all UNEX investigations reported to Arizona public health agencies.

Graph 1: UNEX Investigations by Month for Arizona using the local health department notification date.



The highest number of UNEX reports occurred in February with 9 (30.0%) reports (Graph 1). Twenty out of thirty of the reports (66.7%) occurred within the first three months of the year. The median number of UNEX investigation reports received was 2 per month with no investigations reported in the months of June, September, October, and December.

Graph 2. UNEX Investigations by County, Arizona 2011

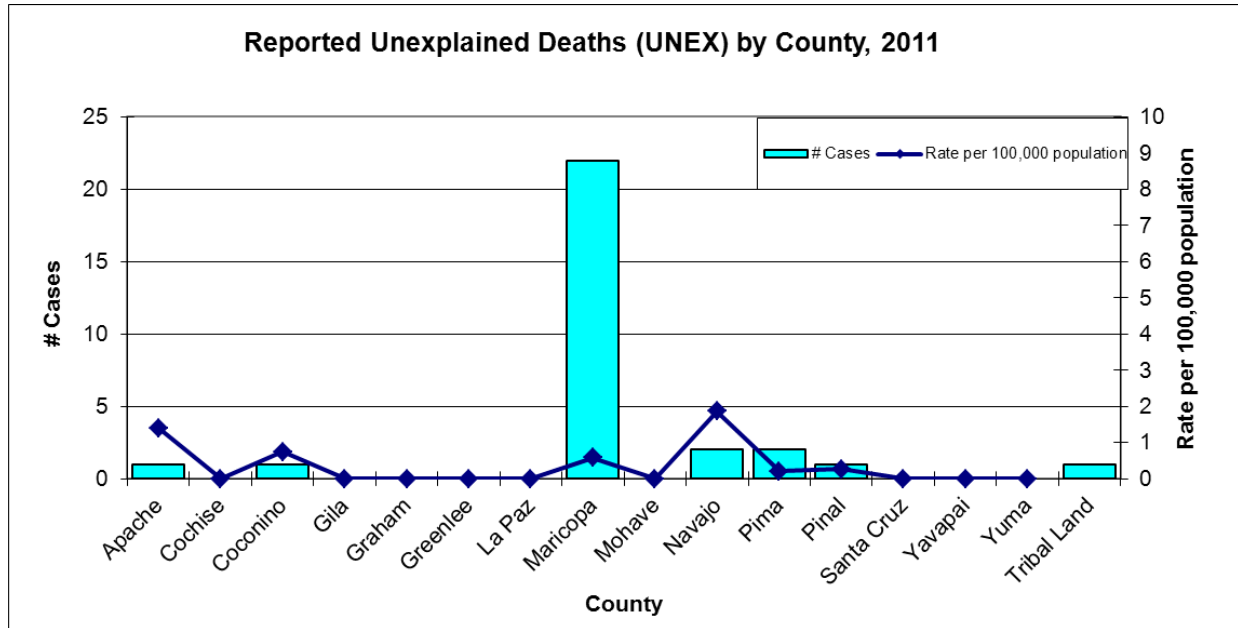
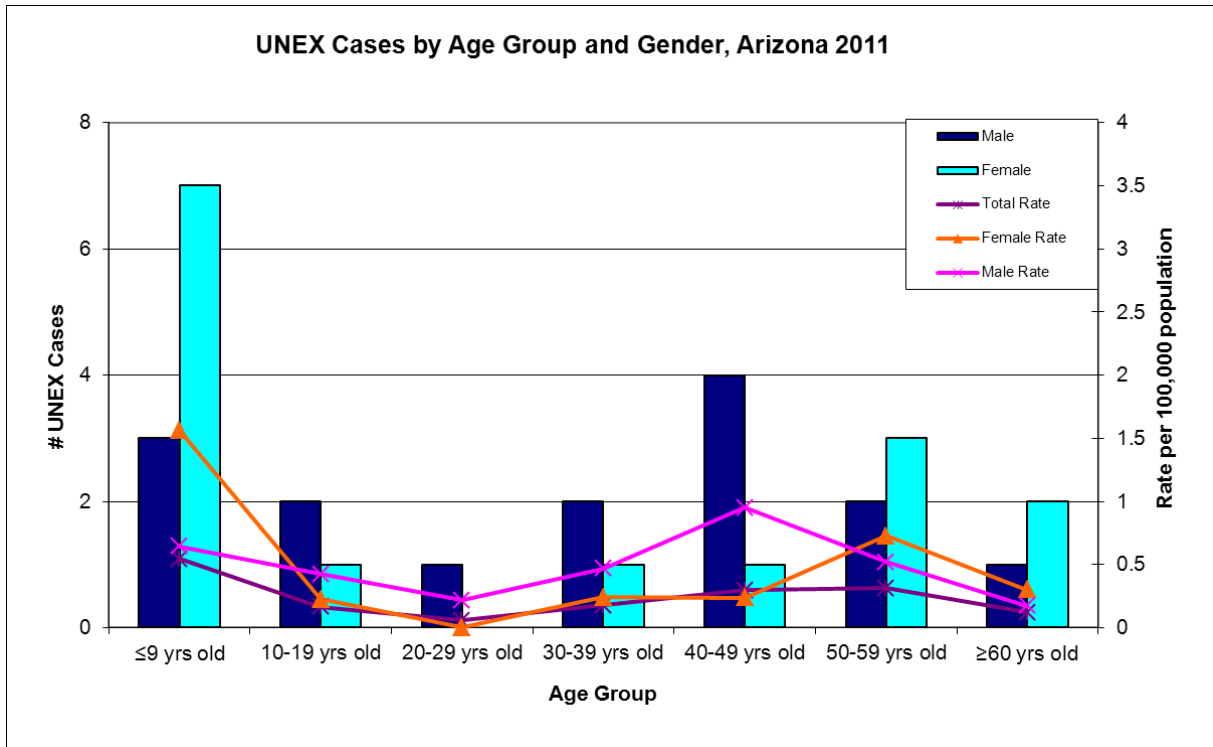


Table 1. UNEX Investigations by County & Month, Arizona 2011

	<u>Apache</u>	<u>Coconino</u>	<u>Maricopa</u>	<u>Navajo</u>	<u>Pima</u>	<u>Pinal</u>	<u>Tribal Land</u>	<u>TOTAL</u>
January	0	0	6	0	0	0	0	6
February	1	0	7	1	0	0	0	9
March	0	1	4	0	0	0	0	5
April	0	0	2	0	0	0	0	2
May	0	0	1	0	0	0	1	2
June	0	0	0	0	0	0	0	0
July	0	0	0	0	1	0	0	1
August	0	0	2	1	0	0	0	3
September	0	0	0	0	0	0	0	0
October	0	0	0	0	0	0	0	0
November	0	0	0	0	1	1	0	2
December	0	0	0	0	0	0	0	0
TOTAL	1	1	22	2	2	1	1	30

Unexplained deaths occurred predominately in Maricopa County (73.3%, 22/30), followed by Navajo (6.7%, 2/30) and Pima counties (6.7%, 2/30). This is likely due to the large population, but could also be the result of increased awareness of reporting requirements of UNEX investigations within the Maricopa County medical examiner office (MEO). Navajo and Apache County had the two highest rates of reported UNEX investigations at 1.9 and 1.4 per 100,000 populations, respectively (Graph 2).

Graph 3. UNEX Investigations by Age Group and Gender, Arizona 2011



Approximately 55% of the UNEX cases occurred in people less than 40 years old. The average age at time of death for all UNEX cases was 30 (total median=32; female median=17; male median=32). Females represented 50% of the cases (15/30).

The gender-specific rates differed by age group. The highest rate of reported UNEX investigations for females was in the ≤9 years old age group (1.56 per 100,000 population), whereas the highest rate for males was in the 40–49 years old age group (0.95 per 100,000 population). The age group with the highest overall rate of UNEX investigations was the ≤9 years old age group, with 1.09 reports per 100,000 population (Graph 3).

Table 2. Death Location of UNEX Cases

<u>UNEX Investigations: Death Location</u>	N (%)
Hospital	21 (70)
Residence	9 (30)

Table 3. UNEX Investigations: Specimen Collection

<u>Specimen Collection</u>	N (%)
No Specimen Collection*	5 (17)
Specimen Collection to ASPHL and/or CDC	25 (83)
Specimen Collection to ASPHL only	24 (96)
Specimen Collection to CDC only	1 (4)
Specimen Collection to ASPHL & CDC	0 (0)

*Specimens either not collected or pre-mortem specimens collected by the hospital for internal laboratory testing during relevant visit.

Table 4. Reporting Source for UNEX Cases

<u>UNEX Investigations: Reporting Source</u>	N (%)
Office of the Medical Examiner (OME)	24 (80)
Hospital	2 (7)
Other	4 (13)

An autopsy was conducted for 87% (26/30) of the reports. Hospital deaths accounted for 70% (21/30) of the case death locations (Table 2) and the primary reporting source was the Office of the Medical Examiner (OME) (Table 4).

Specimen collection and testing was conducted at the Arizona State Public Health Laboratory (ASPHL) and/or the Centers for Disease Control and Prevention (CDC) in 83% of the investigations to determine whether the cause was due to an agent of public health significance (Table 3). Laboratory testing assistance was not needed for 5 (17%) of these investigations, meaning either no laboratory testing was conducted or hospital laboratory testing was sufficient to rule out any potential agents of public health significance.

Arizona investigates all reports of unexplained deaths with a history of fever. Both the local and state health departments work with the OME and health care providers (HCP) to identify potential agents of public health significance. The public health investigation includes creating a differential diagnosis through consultation with OME, supporting selected laboratory testing to identify agents of public health significance, and, if applicable, implementing control measures. Some of the findings for these UNEX investigations are shown in Table 5. While the primary finding for infectious disease UNEX investigation presentations continues to be infections due to *Streptococcus* and *Staphylococcus* bacteria, Hantavirus, Varicella, and Rocky Mountain Spotted Fever were notable agents of public health significance identified in 2011. Five (17%) cases this year have remained unexplained after a public health investigation; however, laboratory testing ruled out agents of public health significance.

Table 5: Conditions and/or Agents Identified through UNEX Investigations, Arizona 2011

Public Health UNEX Investigation Findings*
Bacterial pneumonia, unspecified organism
Hantavirus
Influenza
Respiratory Syncytial Virus
Rocky Mountain Spotted Fever (RMSF)
<i>Staphylococcus</i> spp.
<i>Streptococcus</i> spp.
Varicella
Labs do not indicate an agent public health significance *This is not a complete list of all the public health investigation findings but a sample. These agents were not necessarily considered the official cause of death but results that indicated the cause of death to not be of public health significance and close the public health investigation.