Knox County Regional Forensic Center
Drug Related Death Report
2016
for
Knox and Anderson Counties

July 2017

Dr. Darinka Mileusnic-Polchan, Ph.D.
Chief Medical Examiner
Knox and Anderson Counties

Mr. John Lott, M.S., R.N.
Senior Director
Knox County Regional Forensic Center

Table of Contents

Letter from the Chief Medical Examiner……

Quo Vadis: Where Are You Heading, Tennessee?

My letter last year was entitled “Changing Landscapes and Dangerous Trends in Drug Overdose Deaths.” It is distressing to report that these trends continue to dominate the drug abuse landscape. First the bad news: As I stated in my letter last year, the data continue to show that substance abuse deaths are trending up and the trend does not look promising for our community. To add to the bad news, the variety and accessibility of cheaper and much more powerful drugs has expanded. A bit of the good news is that the recently passed and amended statues, rules and guidelines that deal with opioid overprescribing are starting to bear fruit. Our community has already made small inroads in curbing overprescribing. We all know, however, we will not be able to eradicate drug abuse problems altogether. As a society, we will not able to completely eliminate drug cartels, either foreign or domestic. We cannot control human behavior and propensity to “enjoy” or abuse different types of drugs. Nevertheless, we should strive to completely eradicate one thing that has contributed to drug-related deaths, which can be controlled. I am referring to the healthcare workers’ contribution to drug abuse problem, specifically, the overprescribing of drugs with abuse potential. There are several approaches to this problem. If applied judiciously, effectively and consistently, these methods and tactics will have a positive impact in drug abuse prevention.

How do we accomplish this? Initially, we must investigate and identify the substances that are poisoning our citizens. That is one of the roles of the county medical examiner. In these instances, the role of medico-legal death investigation, in conjunction with law enforcement agencies, is to triage and identify deaths that fall under our jurisdiction. Once jurisdiction is accepted, we further apply our skills, knowledge and experience to elucidate the cause and manner of death. As you will see in this report, about one quarter of the investigated sudden, unexpected and unexplained deaths within our community that come to the forensic center are caused by drugs. Last year, for the first time in Tennessee, the number of drug-related deaths surpassed the number of deaths from motor vehicle accidents. Knox and Anderson Counties are currently experiencing the same trend. The information generated by this office is shared with the local and state law enforcement agencies in order to help them identify, deal with and then eradicate the source of the problem. The information is disseminated to the public to educate the citizens on how to prevent and resist drug distribution and drug use in their communities. Unless one knows and identifies the enemy that is taking the lives of our citizens, one cannot develop meaningful strategies to combat it.

How do we combat and prevent the spread and expansion of drug abuse and related deaths? First and foremost, continuous education of health care workers and citizens about the dangers of these drugs, either prescribed or illegal, remains a top priority. We have learned the hard way that opiates and opioids are very dangerous drugs that should be prescribed judiciously, carefully and very selectively only by highly qualified individuals in proper health care settings. Second, the state legislation and regulation of opioid prescription practices needs to be tightened. This includes pain management clinic licensing and regulations that deal with the ownership, medical directorship, operation certificate, patient record keeping, reporting on identified prescription drug abuse, adherence to the pain management guidelines, and

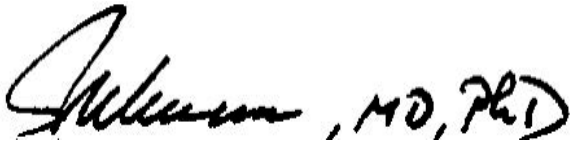
doctor shopping (please refer to pain management clinic sections TCA §63-1-301 to TCA §63-1-320). TCA §63-1-401 and 402 deal with recommended treatment guidelines for prescribing opioids. Directly related to Tennessee Prescription Safety Act of 2016 is the Prescription Monitoring Program (TCA §53-10-301 through TCA §53-10-312). Other related and relatively recent statutes of interest concern naloxone administration (TCA §63-1-152), doctor shopping and mandatory reporting (TCA §53-11-402) and needle exchange program (TCA 39-17-425). Third, through the interagency collaboration and the local drug task force efforts, timely exchange of information could eventually lead to the implementation of quick measures and legal actions against the individuals who perpetuate the drug abuse problem. This includes drug dealers, pain clinic owners and health care workers who consistently overprescribe these powerful medications, leading to patient deaths. In the report for 2016, we have incorporated our naloxone data. One of our future goals is to compare our naloxone data to law enforcement and emergency management service records in order to assess the effectiveness of the program with respect to the number of doses administered and the frequency of relapse following naloxone intervention.

What I find to be the most striking finding in 2016 is a dramatic increase in the sheer number of deaths related to fentanyl, fentanyl analogues and other designer drugs. Moreover, the increased number of these deaths does not come from middle-aged individuals previously addicted to prescription opioids, as originally expected. The largest increase in these numbers comes from younger individuals in their twenties and early thirties, who were not previous patients of now defunct pain clinics. Furthermore, oxycodone has dropped to the number three spot of the deadliest drugs, either prescribed or diverted. Oxymorphone (Opana®) remains strong second in the repertoire of drug-induced deaths. Finally, methamphetamine poisoning has become one of the top five leading causes of drug related deaths, most frequently in combination with other drugs. In fact, if I were to single out one of the most important persistent factors in the majority of the drug related deaths in East Tennessee, it would be polypharmacy and the resultant combined drug intoxications.

It is disturbing to see how much of the United States is awash in opioid products, both pharmaceutical and illegal. As we move forward, one of our projects will examine drug use in other types of deaths such as homicides, suicides, cases with undetermined manner of death, non-drug related accidents (in particular, motor vehicle accidents) and apparent natural deaths. Another interesting study would include the use of drugs and alcohol in accidental deaths from work related injuries. As we continue to track fetal and infant deaths in babies who were born with neonatal abstinence syndrome, we are already encountering older children in which delayed sequelae of the syndrome should be considered, whether directly or indirectly, in determining the cause and manner of death. Finally, you will see in the report that the gender gap in drug-induced fatalities continues to widen. Due to this, other questions emerge such as the influence of urban versus rural environment, race, ethnic and other social factors. Our hope is that by identifying the crucial factors that led to the rise of the drug overdose epidemic, we will be able to implement corrective actions to substantially decrease drug mortality.

Data sharing on the regional and state level is of paramount importance going forward. With that said, I would like to thank Dr. Thomas Boduch for sharing Roane County drug related mortality data with us. Education on all levels continues to be of the utmost importance and might include just a casual dinner conversation with our children in our homes. Recognizing and acknowledging the societal drug problem will hopefully lead us to unlocking the gates of success that, at this stage, remain firmly shut and largely elusive.

Your Medical Examiner



Darinka Mileusnic-Polchan, MD, PhD

2016 Trends and Concerns

The Knox County Regional Forensic Center's Drug Related Death Report for 2016 provides one piece of the picture for Knox and Anderson Counties' drug problem. This report indicates an overall upward trend of drug related death cases and the number/types of drugs associated with drug related deaths. The majority of the Drug Related Deaths involve pharmaceutical drugs. However, the use of illicit drugs is increasing.

This report highlights that Drug Related Deaths in Knox and Anderson counties are predominantly related to prescription drugs and in the 45 – 54 year old age range. However, we have identified a significant increase in the 25 to 34 year old age range especially in Drug Deaths involving Fentanyl and its analogues. In addition, Drug Related Deaths among blacks more than doubled in 2016.

Report Highlights for Knox and Anderson Counties

- The number of Drug Related Deaths continues to increase in Knox and Anderson counties. From 2010 to 2016, there has been a 153% increase in Drug Related Deaths. In 2016, there were 256 Drug Related Death Cases in Knox (224) and Anderson (32) counties.
- Drug Related Deaths occur more frequently in the 45 – 54 year old age category than any other age category. However, the number of deaths for the 25 – 34 year age group has increased 138% in 2016.
- Fentanyl and its analogues are the most frequently found drug in Drug Related Deaths for 2016.
- The number of Drug Related Deaths in Blacks increased by 109% in 2016.
- Polypharmacy (or multiple drugs) were involved in 66% of the Drug Related Death cases in 2016.
- Tentative 2017 figures indicate a continued increase in the number of Drug Related Death cases.
    - Prescription drugs continue to be the most frequently found drugs in a Drug Related Death. However, there is an increased presence of non-prescription (or illicit) drugs in Drug Related Deaths.
    - The number of Drug Related Deaths for blacks in 2017 has already reached the number of Drug Related Deaths for blacks in 2016.
    - The 25-34 year age group has the highest number of Drug Related Deaths in 2017.

Drug Trends

FENTANYL

The combination of fentanyl (and fentanyl analogues) was the most frequent drug noted in cause of death for 2016 drug related deaths. In 2016, five fentanyl analogues appeared in Knox/Anderson County cases (acetyl fentanyl, acryl fentanyl, carfentanil, furanyl fentanyl, despropionylfentanyl/4ANPP). In 2015, only one fentanyl analogue (acryl fentanyl) was noted. Fentanyl may either be pharmaceutical fentanyl or produced in clandestine labs. The potency of fentanyl analogues vary, but are generally of higher potency than that of fentanyl. Identifying these analogues adds approximately $200 - $500 in testing costs to the autopsy whether positively identified or not.

INCREASES IN OPIOIDS AND METHAMPHETAMINE

Instances of cocaine use in Drug Related Deaths have remained consistent from 2015 to 2016, while opioids, benzodiazepines, and methamphetamine/amphetamine have all increased. Methamphetamine and amphetamine were noted 14 times in 2015 Drug Related Deaths and 49 times in 2016 drug related deaths.

BENZODIAZEPINES

Alprazolam, lorazepam, and non-specified benzodiazepines all increased in 2016 drug related deaths. Additionally, etizolam, oxazepam, and temazepam were noted in 2016 drug related deaths. Occurrences of alprazolam in Drug Related Deaths increased by 45.7% from 2015 to 2016.

BUPRENORPHINE AND METHADONE

Buprenorphine has been steadily increasing in Drug Related Deaths since 2011. In 2015, buprenorphine was noted in 10 cases and in 2016 it was noted in 16 cases (a 60% increase). Methadone occurrences in 2015 and 2016 were comparable (15 in 2016).

DESIGNER/EMERGING DRUGS

The discovery of Designer or Emerging drugs is occurring at an exponential level that makes it difficult for the Regional Forensic Center, law enforcement, district attorneys, laboratories and others to keep pace. The tools and budgets necessary to identify and combat the emerging drugs lag behind by at least a budget cycle. As examples, laboratory tests can take 6 - 12 months before having the capability to accurately identify an emerging drug. In addition, tests for designer or emerging drugs can add significant costs. Testing for emerging, designer drugs adds an additional $30,000 -$70,000 in testing costs that may or may not provide an answer to whether the emerging drug was present.

Concerns

In 2016, prescription drugs were found in 68.36% of the Drug Related Deaths. This reflects a continuous downward shift where the rate was 85.12% in 2010 and 70% in 2015. This also represents a continuing rise in the rate of illicit drugs being found in Drug Related Deaths.

The chart below depicts changes in Frequently Listed Drugs for 2015 and 2016.

Drug	2015	2016	Change
Fentanyl and analogues	25	62	UP
Oxymorphone	46	55	UP
Oxycodone	57	53	DOWN
Alprazolam	35	51	UP
Methamphetamine	13	43	UP
Cocaine	35	34	DOWN
Hydrocodone	21	27	UP
Morphine	25	25	NO CHANGE
Alcohol/Ethanol	18	24	UP
Heroin	25	22	DOWN
Methadone	15	15	NO CHANGE
Buprenorphine	10	16	UP

The chart below depicts the Top 10 Most Frequently Listed Drugs for 2016.

Top 10 Most Frequently Listed Drugs in COD	Occurrences	% of Total Cases
Fentanyl and analogues*	62	24.2
Oxymorphone	55	21.6
Oxycodone	53	20.8
Alprazolam	51	20
Methamphetamine	43	16.9
Cocaine	34	13.4
Hydrocodone	27	10.6
Morphine	25	9.8
Alcohol/Ethanol	24	9.4
Heroin	22	8.7
*includes fentanyl (38), acetyl fentanyl (7), acryl fentanyl (1), carfentanil (3), despropionyl fentanyl (3), furanyl fentanyl (10)		

Concerns

The Regional Forensic Center is concerned that the 7 year trend of increasing Drug Related Deaths will continue. We believe there will be an increase in non-pharmaceutical (or illicit) and emerging, designer Drug Related Deaths due to legislative and practice changes to address prescribing and practice standards. Even though there are many actions to reduce over-prescribing practices, we believe there will be a continued high incidence of prescription drug deaths.

Based on the 2016 data, we expect to see a shift downward in the age group most effected by drug deaths. The reason for this downward age shift will be due to an increase in very potent, illicit drugs. The 45-54 year age group will continue to have a significant presence mainly due to pharmaceutical drugs.

There is a growing community focus on the drug death epidemic. However, resources are limited and need to be focused appropriately. Plans/ideas need to be vetted and have a proven, cost-effective approach before implementation. After implementation, the programs need to be monitored to assure goals are being met and the money allocated is being used efficiently and effectively.

While there are activities and efforts being done in the community to reduce Drug Related Deaths, there needs to be increased attention focused on these:

1. Increased funding for detection of emerging, designer drugs.
2. Education and training focused on prevention.
3. Treatment for those addicted who want to stop the addiction.

Our concern is that unless there is a focused effort with proven, effective, and measurable outcomes; we will continue to see dramatic increases in Drug Related Deaths especially with emerging, designer drugs.

KNOX COUNTY
Drug Overdose Task Force

In 2016, the Knox County Regional Forensic Center (Knox County Medical Examiner's Office) joined the Knox County Drug Overdose Task Force. The task force is designed to efficiently collect and share data among the member agencies to ensure intelligent prosecutions and actions to reduce drug related activities. The members of the Task Force are:

Knox County Regional Forensic Center
Knox County Office of the District Attorney – 6th Judicial District
Knoxville Police Department
Knox County Sheriff's Office
Drug Enforcement Administration
Appalachia High-Intensity Drug Trafficking Area

The Task Force works together to accomplish the following goals:

1. Identify and prosecute street level sources of illegal opiates
2. Lower drug related deaths, overdoses, and arrests
3. Develop best practices and a uniform data collection tool for regional use
4. Develop a drug related death data reference resource for medical and social service professionals
5. Create a confidential and secure system (behind the DRDTF firewall) to collect law enforcement and medically sensitive information. Quantify and analyze the data to provide de-identified reports and data collaborative community partner agencies

The Regional Forensic Center provides possible drug related death cases[1] to the District Attorney's Office, Knoxville Police Department and Knox County Sheriff's Office on a daily basis in order to facilitate possible drug related case investigation. The RFC's medico-legal death investigators work with other task force investigators to collect and share case data. The RFC Forensic Pathologists work with task force investigators and prosecutors to assist with medical determinations and other medical related questions.

(Note 1: The cases reported exhibit characteristics of a drug related case but have not been determined to be a drug death. This alert provides the District Attorney and law enforcement a quicker reaction time to save evidence and take appropriate actions.)

6th Judicial District

Background on the Knox County Regional Forensic Center

Function

The Knox County Regional Forensic Center serves the living, by investigating deaths that are unnatural and/or unexpected. Such deaths have implications to the greater community. This task begins with careful investigation at the scene of death, supplemented when appropriate, by autopsy examination, toxicology and other testing. The RFC Staff helps the community by determining the cause and manner of death, recognizing and collecting evidence needed for adjudication, defining public health and product safety risks and providing compassionate services to families.

Background

The Knox County Medical Examiner's Office has been in existence since the early 1950's when it operated out of a small, one-room morgue. In 1998, the Regional Forensic Center began operating out of the University of Tennessee Medical Center. In 2014, the Knox County government, with financial support from the State of Tennessee, built an 18,000 sq. ft. state of the art facility located at 2761 Sullins Street in Knoxville, Tennessee.

The Knox County Regional Forensic Center (RFC) serves as the Chief Medical Examiner for Knox and Anderson counties. The RFC provides autopsy and consultative service for 25 counties in East and Middle Tennessee.

The Knox County RFC operates 24/7/365. We have at least one autopsy technician at the facility and a medicolegal death investigator available to respond to death scene investigations at all times. In addition, there is a Medical Examiner/Forensic Pathologist on duty or on-call 24/7/365.

The RFC is a department of the Knox County government reporting to the Knox County Mayor. Mayor Burchett was instrumental in securing funding and leading the development of the new RFC building as well as assuring appropriate staffing and funding for RFC operations.

In June of 2016, the office received FULL accreditation from the National Association of Medical Examiners (NAME). The awarding letter indicated that "The Knox County Regional Forensic Center is an excellent model for any aspiring regional center, anywhere".

Organization

The RFC has 29 staff consisting of a Senior Director, Chief Medical Examiner, Deputy Chief Medical Examiner, two Assistant Medical Examiners/Forensic Pathologists, Forensic Quality Improvement Manager, Business Office Manager, 3 Forensic Clerks, Medicolegal Death Investigator Manager, 6 Medicolegal Death Investigators, Autopsy Technician Manager, 10 Autopsy Technicians, and Administrative Assistant. In addition, we have on contract a part-time Forensic Anthropologist.

All of our Medical Examiners are board certified by the American Board of Pathology in Anatomic and Clinical Pathology and the American Board of Pathology Certification in Forensic Pathology. In addition, they hold appointments as Assistant Professors with the University of Tennessee Graduate School of Medicine.

Our Forensic Anthropologist is board certified by the American Board of Forensic Anthropology (ABFA). In addition, he has a faculty appointment with the Department of General Dentistry's Forensic Odontology program in the Graduate School of Medicine at the University of Tennessee Medical Center.

Our Medicolegal Death Investigators are required to become certified by the American Board of Medicolegal Death Investigators (ABDMI). The RFC's Medico-legal

Death Investigator Manager is a Fellow with ABMDI. Four of our Medicolegal Death Investigators are Diplomats with ABMDI. And, two of our Medicolegal Death Investigators are in the process of being certified by ABMDI.

Services Provided and Region Covered

The Knox County Regional Forensic Center is responsible for the investigation and certification of cause and manner of death of all sudden, unexpected, violent, suspicious, or unnatural deaths that occur in Knox and Anderson Counties. The cause of death is a disease, injury, drug toxicity, or combination of factors that causes a physiologic derangement severe enough to result in death. The manner of death refers to the circumstances surrounding how the death came about and is divided into five categories: natural, accident, suicide, homicide, and undetermined.

The Knox County RFC also provides autopsy and consultative services for similar-type deaths occurring in 25 East and Middle Tennessee counties at the written request of the local authorities.

Reporting Deaths and Tennessee Medical Examiner Statutes

The Medical Examiner system in Tennessee is a County Based system. There are 5 Regional Forensic Centers, operating independently and are all nationally accredited by NAME, which provide autopsy and autopsy related services for the rural counties. The State Office of the Chief Medical Examiner exists to educate County Medical Examiners and assist County Medical Examiners as requested. Tennessee Statute § 38-7-Part 1 explains the Medical Examiner system in Tennessee and provides direction for its operation.

Tennessee Code Annotated (TCA) § ***38-7-108. Death under suspicious, unusual or unnatural circumstances.***

Any physician, undertaker, law enforcement officer, or other person:

- *Having knowledge of the death of any person from violence or trauma of any type,*
- *Suddenly when in apparent health*
- *Sudden unexpected death of infants and children*
- *Deaths of prisoners or persons in state custody*
- *Deaths on the job or related to employment*
- *Deaths believed to represent a threat to public health*
- *Deaths where neglect or abuse of extended care residents are suspected or confirmed*
- *Deaths where the identity of the person is unknown or unclear*
- *Deaths in any suspicious/unusual/unnatural manner*
- *Found dead*
- *Where the body is to be cremated*

Shall immediately notify the County Medical Examiner or the District Attorney General, the local police or the sheriff, who in turn shall notify the County Medical Examiner. The notification shall be directed to the County Medical Examiner in the county where the death occurred.

The Regional Forensic Center works to educate our partners on the law and the nuances of the law to assure proper death reporting.

Importance of On-Scene Investigation by Medicolegal Death Investigators

In Tennessee, potential Drug Related Deaths fall under medical examiner jurisdiction (TCA § 38-7-108). In Knox and Anderson Counties, when a potential drug related death is reported to the medical examiner, the death scene investigation is performed by medicolegal death investigators at the Knox County Regional Forensic Center (RFC). The medical death investigators (MDIs) follow the guidelines and policies of the RFC which include recommendations and investigation guidelines established by national organizations such as the National Association of Medical Examiners (NAME), the National Institute of Justice (NIJ), and the American Board of Medicolegal Death Investigation (AMBDI) and the Tennessee Code Annotated. Medical death investigators are considered the on-scene eyes and ears of the forensic pathologist or medical examiner at the scene. The focus of the MDI is the collection of evidence and information that will assist the forensic pathologist and/or medical examiner in determining cause and manner of death.

Accurate cause and manner of death determinations require integration of scene investigative findings, body examination findings, and toxicology. This is especially true in potential and suspected drug related deaths. The medical investigator will document many important findings, such as: the position and location of the decedent at the scene, any resuscitative measures (IVs, intubation, etc.), the presence or absence of evidence of drug use, including: opioid and other scheduled medications, drug paraphernalia (needles, spoons, cut straws, crushed tablets, pill crushers, etc.), packets of powder or crystals, overlapping prescriptions for the same medication from different prescribers, prescriptions in other people's names, mixed pills in pill bottles, the presence of naloxone, and altered transdermal patches. All of the decedent's prescription medication is collected, documented, and inventoried. A

complete medication inventory will include name and strength of the medication, administration regimen, number of pills prescribed, number of pills remaining, and the pharmacy and prescriber information.

The medicolegal death investigator and law enforcement officers serve cooperative and similar, yet distinct, purposes: the death investigator conducts an independent, objective medical investigation and is responsible for the body at a death scene, whereas law enforcement is responsible for the entire scene and often have different investigative goals and responsibilities. Medical death investigators also act as liaisons among medical examiners, law enforcement officials, and the decedent's family members. In addition, medicolegal death investigators often have easier and more direct access to a decedent's medical records, prescription histories, and prescription monitoring databases that are of prime importance in investigation of a potential drug related deaths.

Medicolegal Death Investigators, working for and under the direction of the county Medical Examiner, provide an essential function in death scene investigation. The MDIs at the Knox County Regional Forensic Center provide 24/7 coverage in Knox and Anderson counties. In addition, they are registered fellows or diplomats through the ABMDI and work under the direction of the Chief Medical Examiner and Senior Director.

Report Methodology

Data Sources

This Drug Related Death Report is derived from data in the Knox County Regional Forensic Center's (RFC) Medical Examiner database, MDILog database, Death Certificates certified by RFC Forensic Pathologists, and Medical Examiner case files for autopsies and examinations performed for Knox and Anderson counties at the Knox County Regional Forensic Center by its Forensic Pathologists from January 1, 2016 – December 31, 2016.

Reasoning for the Selection of Knox and Anderson Counties

Dr. Mileusnic-Polchan is the Chief Medical Examiner for Knox and Anderson counties. In addition, the Regional Forensic Center provides death scene investigation for Knox and Anderson counties. The Medicolegal Death Investigators work for the Regional Forensic Center and follow guidelines established by the Chief Medical Examiner and the Regional Forensic Center.

How Data was Derived

An initial data file was collated from the Medical Examiner database and MDILog database to identify possible drug related cases for January 1, 2016 – December 31, 2016 in the Accident-Non Motor Vehicle, Suicide, and Undetermined categories for cause and manner of death. Parameters were adjusted to include all cases where a toxicology report was requested and the data pull was rerun to determine a more specific dataset for possible drug related cases. The file with possible drug related cases was then utilized to pull related Death Certificates, Medical Examiner case files, and data from MDILog.

A file with specific data elements was created to perform data extraction from the Death Certificates, Medical Examiner case files, and data from MDILog in order to assure the record was complete for each case. Once data extraction was performed

from the Death Certificates, Medical Examiner case files (to include laboratory reports), and data from MDILog, data was reviewed to assure accuracy and the data properly reflected case outcomes. It was a requirement that a laboratory report specify the drug or drug class and the Forensic Pathologists determine the listed drug that caused or contributed to death in order for it to be counted as a drug related death. Additionally, cause of death or contributory causes of death including "overdose, toxicity, toxic effects of, polypharmacy, intoxication, mixed drugs" were included. This cohort specifically excludes chronic effects of drugs and alcohol where the manner of death was deemed to be "natural". Then, the Medical Examiner database and MDILog database was updated to reflect accurate information for each case.

A data file was then extracted from the Medical Examiner database and MDILog database to begin running statistics and produce drug related death reports.

Data Limitations/Caveats

The reports derived from this data have the following limitations:

1. This report only reflects data from autopsies and exams performed for Knox and Anderson counties between January 1, 2016 – December 31, 2016.
2. The data sources (Medical Examiner database, Death Certificates, Medical Examiner Case files, and MDILog database) are evolving over time. The reports reflect data available and Regional Forensic Center processes/policies at the time of the Autopsy Report and Death Certificate signing. It does not annotate changes in laboratory testing or an increased focus on drug related death cases.
3. The Medical Examiner database is not adequate to accurately reflect drug related death information by itself. The Medical Examiner database must be cross referenced with Death Certificate data and Medical Examiner Case file data. Changes are being made to the Medical Examiner database to assist in identifying and tracking drug related death cases.

4. This report does not account for decedents dying in hospitals, medical facilities or other facilities/locations where the Medical Examiner was not informed of the death. By statute, the Medical Examiner's Office is required to be informed of certain deaths. However, hospitals, medical facilities or other facilities/locations do not always notify the Medical Examiner which means that this report cannot account for Drug Related Deaths not reported to the Knox and Anderson counties' Medical Examiner's Office. Therefore, we believe this report is an undercount of the total number of overdose deaths.

5. This report will not accurately reflect drugs associated with death when a patient enters the hospital and the hospital does not perform a drug screen or only does a urine drug screen and the patient subsequently dies after being in the hospital for a week or more and is then reported to the Medical Examiner. Therefore, when there was not enough blood or material from the hospital to accurately test for drugs, the case will not be able to be classified as a drug related case.

6. Tennessee does have some regulations, rules, and laws in place to address drug related deaths.

    a. By statute (*Tennessee Code Annotated (TCA) § 38-7-108)*, the Medical Examiner's Office is required to be informed of certain deaths.

        - Hospitals, medical facilities or other organizations do not always report deaths appropriately or they do not report the death at all.
        - When physicians certify cause of death on Death Certificates, they often do not accurately annotate the Cause and Manner of Death which results in cases not being reported to the Medical Examiner's Office and Drug Related Deaths not being properly reported.

b. An unfunded Tennessee Rule was put in place by the Tennessee Department of Health's Office of the Chief Medical Examiner in November 2013 to address opiate, illegal, or drug overdose deaths. However, no coordination of effort was made with County Medical Examiners in its development, little to no education was provided on the change, and no funding was provided to carry out the Rule.

c. County Medical Examiners are required to approve each Cremation Request in their own county. The Knox County Regional Forensic Center does catch deaths, for Knox and Anderson counties, which were unreported by Hospitals, medical facilities or other organizations when the Medical Examiner reviews the Cremation Request. When the Medical Examiner determines that the death should have been reported, the body is usually ordered to be brought to the Regional Forensic Center for exam and/or autopsy. During the exam and/or autopsy, we do find some Drug Related Deaths that were not properly reported to the Medical Examiner's Office.

7. This report will not provide data or information on the appropriate use of prescription drugs or diversion. It simply reports the presence of the drug in the body at death and reports its impact on the cause and manner of death.

8. This report does provide a more detailed view into Drug Related Deaths in Knox and Anderson counties than Death Certificate data from Knox and Anderson counties since, as indicated from Centers of Disease Control and Prevention (CDC) reports:

   A. 1 in 5 drug overdose deaths have no specific drug listed on the Death Certificate

   B. Many Death Certificates indicate multiple drugs present because most deaths are caused by more than one drug

   C. Often it is difficult to identify which drug is the cause of death when multiple drugs are present

   D. CDC Death Certificate data is coded and grouped into drug class

Recommendations

1. Funding at the local County Medical Examiner and Regional Forensic Center level should be made available to facilitate examination/autopsy and toxicology testing for drug related cases. As the number of Drug Related Deaths and the cost of testing increases, there needs to be a corresponding increase in funding to assure the most accurate data.

2. Continued funding for multi-agency collaborative efforts such as the Knox County Drug Overdose Task Force and Metro Drug Coalition.

3. Funding and training for agencies involved in addressing education, prevention, and drug reduction activities.

4. The creation and utilization of a statewide electronic Death Certificate process utilized by all physicians would facilitate drug related death reporting and create the ability to have real time tracking of all drug related death data and information. Since Medical Examiners only certify a relatively small percentage of all deaths and do not have all cases appropriately referred to them, the utilization of a statewide electronic Death Certificate would provide data when examining Drug Related Deaths.

5. A training program is needed for physicians, hospitals, medical facilities and other organizations to assure their understanding of reporting requirements for death cases to their County Medical Examiner. Then, a methodology to hold these groups accountable for reporting to the County Medical Examiner needs to be established and implemented.

Acknowledgements

The Knox County Regional Forensic Center thanks the following individuals and organizations for their invaluable contribution to this report.

Ms. Genoa Clark – Ms. Clark is a Public Health Analyst for the Appalachia HIDTA working with the Regional Forensic Center to assist in gathering the data and creating the report.

Dr. Amy Hawes – For assistance in data gathering and report preparation.

Ms. Alison McNabb – Ms. McNabb works for the University of Tennessee Graduate School of Medicine. She assisted in pulling 2016 data from the Medical Examiner database.

KGIS and Mr. Will Fontanez – Mr. Fontanez works for KGIS and created the zip code maps.

Dr. Mark Prather – Dr. Prather is an Epidemiologist for the Knox County Health Department and assisted in reviewing age adjusted and age specific rates for this report.

Metro Drug Coalition – Ms. Pershing and the Metro Drug Coalition assisted with a discussion of data needs for the community and with spreading the word of our data release.

Mr. Jody Persino (Regional Forensic Center) for his review of the report.

Mayor Tim Burchett for his continued supporting in strengthening the Medical Examiner system in Knox County and the East Tennessee Region.


REGIONAL FORENSIC CENTER
KNOX COUNTY
U-47700
SEALED
026240
DRUG STORES
Rx#
GIVE 0.5ML TO 1ML BY MOUTH OR UNDER THE TONGUE EVERY 2 HOURS AS NEEDED FOR PAIN OR SHORTNESS OF BREATH
Morphine Conc (100 mg/5 mL) Sol Roxane
20 mg/mL
NDC# 00054-0404-44
Qty 30
0 Refills by 07/12/2015
Exp:07/12/15
OXYCODONE HCL 10
TABLET
Common Brand(s): Roxicodone
TAKE ONE TABLET BY M
FOUR TIMES DAILY AS
Qty:120
Refills require
Store Phone: (865) 21
Rx # N
Prescriber:
8 mg/2 mg
Suboxone
(buprenorphine and naloxone) sublingual film
8 mg/2 mg
Rx only
Do not cut, chew or swallow sublingual film
1ml

2016 DRUG RELATED DEATH DATA for KNOX and ANDERSON COUNTIES

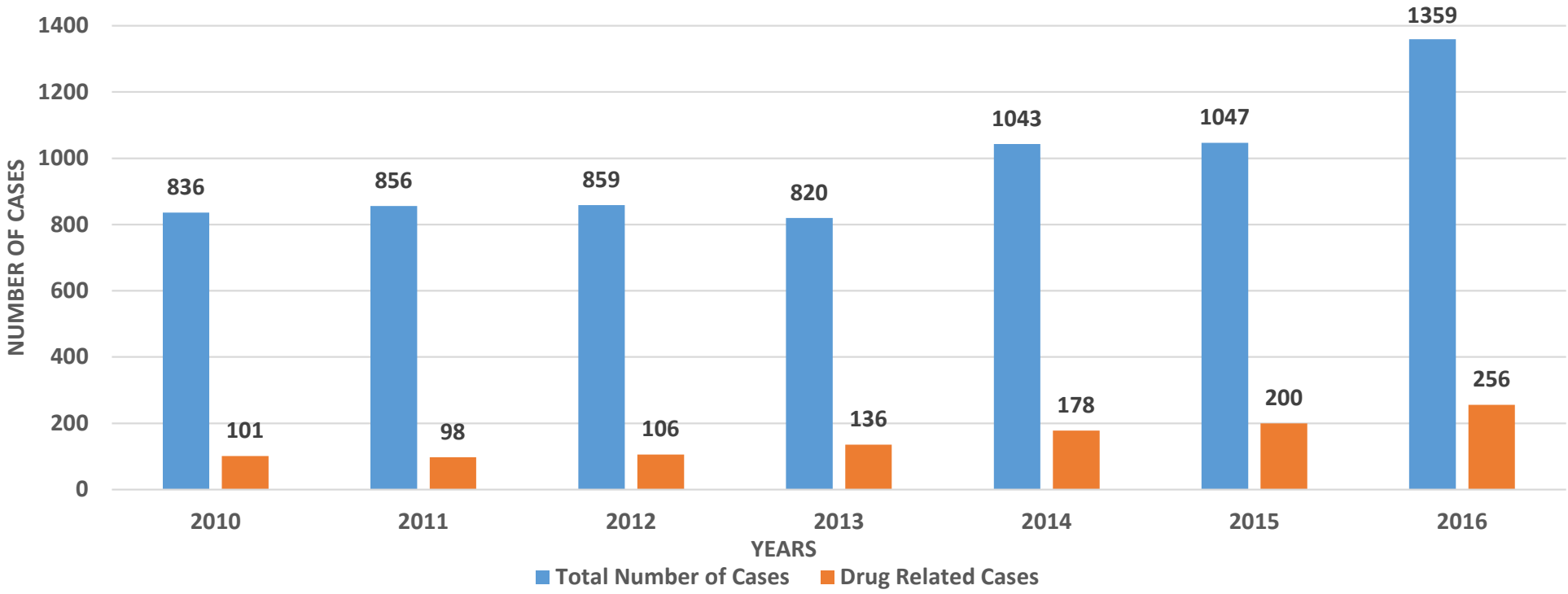
The following graphs represent Knox County Regional Forensic Center (KCRFC) data from Autopsies and External Examinations performed for Knox and Anderson Counties in 2016.

The data was taken from the MDILog Database, KCRFC Medical Examiner Database, Medical Examiner Case Files, and Death Certificates signed by the KCRFC Forensic Pathologists.

Data will be displayed for Knox and Anderson combined, Knox only, and Anderson only in order to provide actionable data for both counties.

The reader should remember the caveats and limitations to the data as expressed within this report and/or on the graphs/tables.

Knox and Anderson Counties
Total Number of Cases Vs Drug Related Death Cases
2010 - 2016

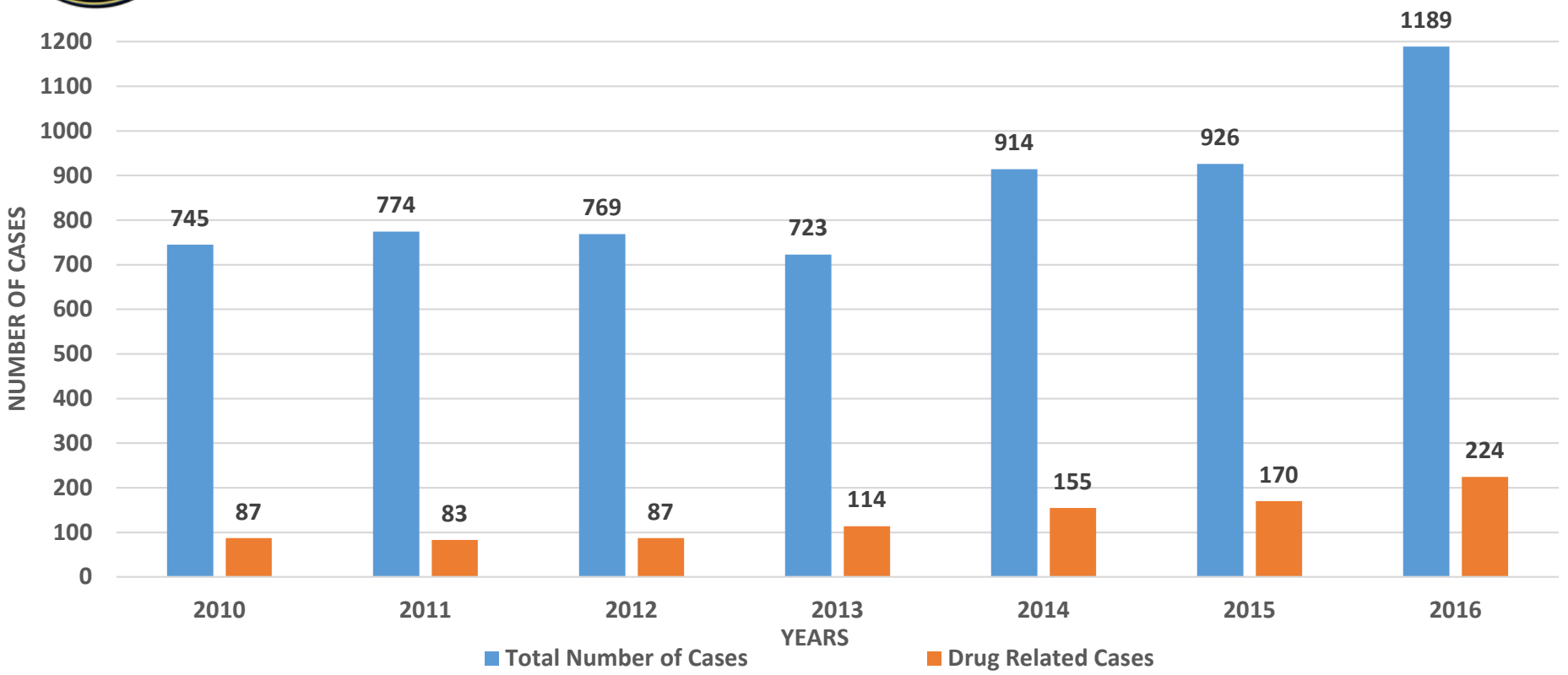


Data Source: Knox County RFC Medical Examiner Database, 2010 to 2016 and MDILog Database 2016. Knoxville, TN.

NOTES: 1. Total Number of Cases = Autopsies and Examinations conducted for Knox and Anderson counties

2. Drug Related Cases = Autopsies and Examinations in Knox and Anderson counties where the Manner of Death was Suicide or Non-Motor Vehicle Accident (Non-MVA) where a drug was listed as contributing to the Cause of Death.

Knox County
Total Number of Cases Vs Drug Related Death Cases
2010 - 2016

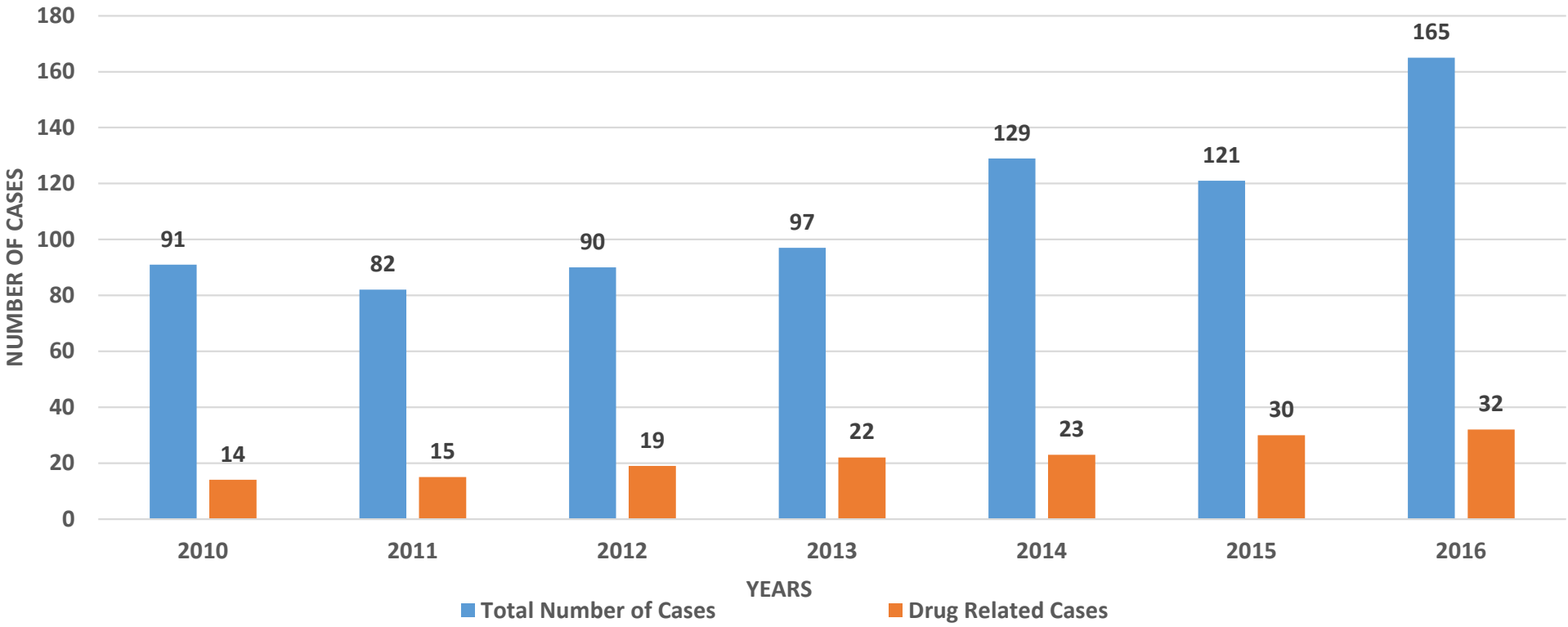


Data Source: Knox County RFC Medical Examiner Database, 2010 to 2016 and MDILog Database 2016. Knoxville, TN.

NOTES: 1. Total Number of Cases = Autopsies and Examinations conducted for Knox and Anderson counties

2. Drug Related Cases = Autopsies and Examinations in Knox and Anderson counties where the Manner of Death was Suicide or Non-Motor Vehicle Accident (Non-MVA) where a drug was listed as contributing to the Cause of Death.

Anderson County
Total Number of Cases Vs Drug Related Death Cases
2010 - 2016

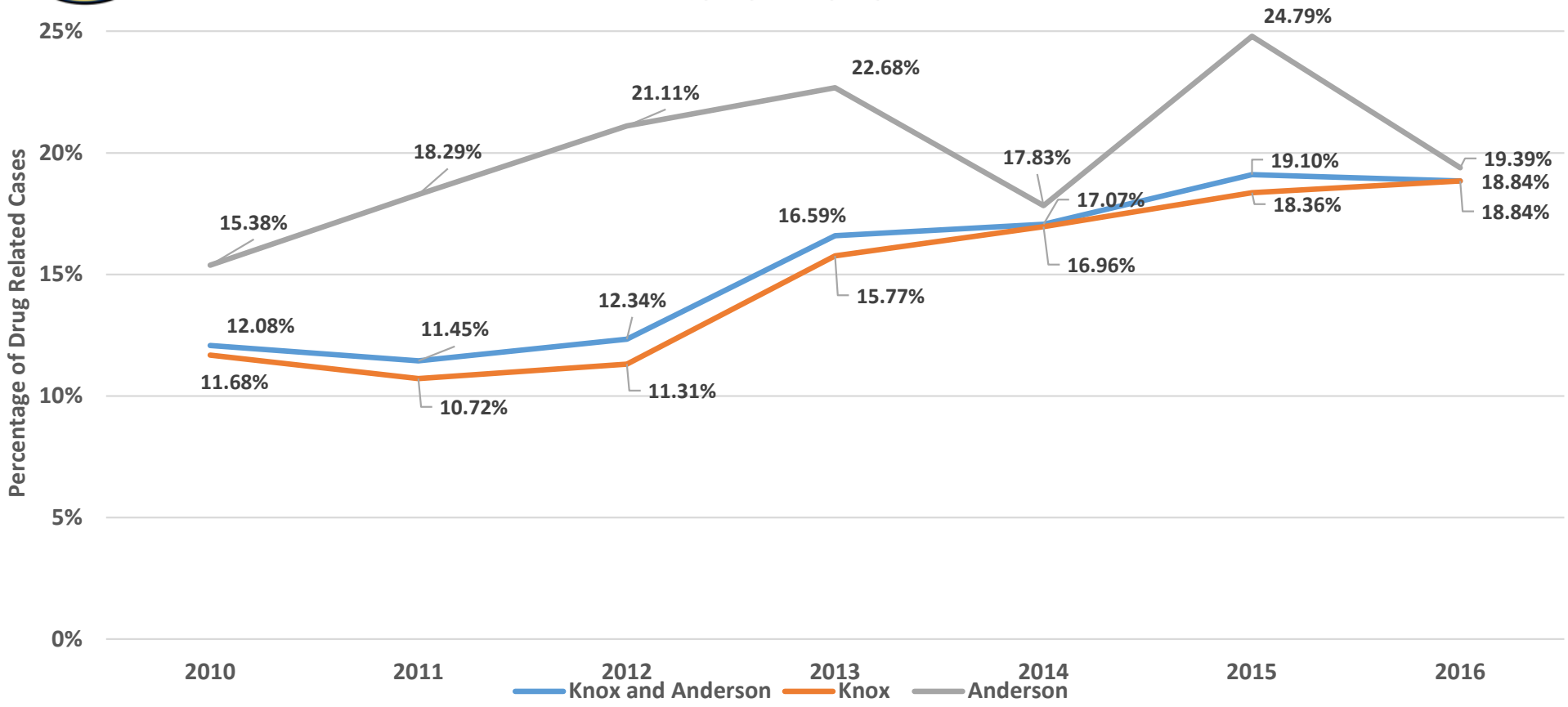


Data Source: Knox County RFC Medical Examiner Database, 2010 to 2016 and MDILog Database 2016. Knoxville, TN.

NOTES: 1. Total Number of Cases = Autopsies and Examinations conducted for Knox and Anderson counties

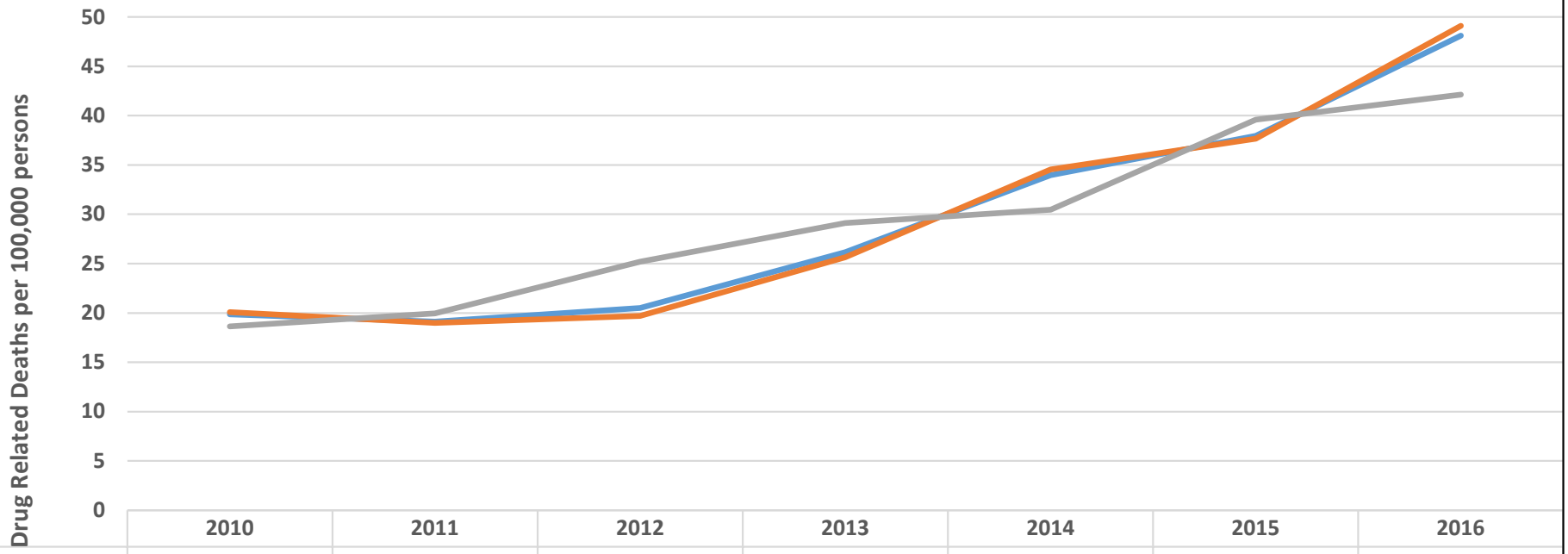
2. Drug Related Cases = Autopsies and Examinations in Knox and Anderson counties where the Manner of Death was Suicide or Non-Motor Vehicle Accident (Non-MVA) where a drug was listed as contributing to the Cause of Death.

Knox and Anderson Counties
Percentage of Drug Related Death Cases
2010 - 2016



Data Source: Knox County RFC Medical Examiner Database, 2010 to 2016 and MDILog Database 2016. Knoxville, TN.

Knox and Anderson Counties
Drug Related Death Cases per 100,000 population
2010 - 2016

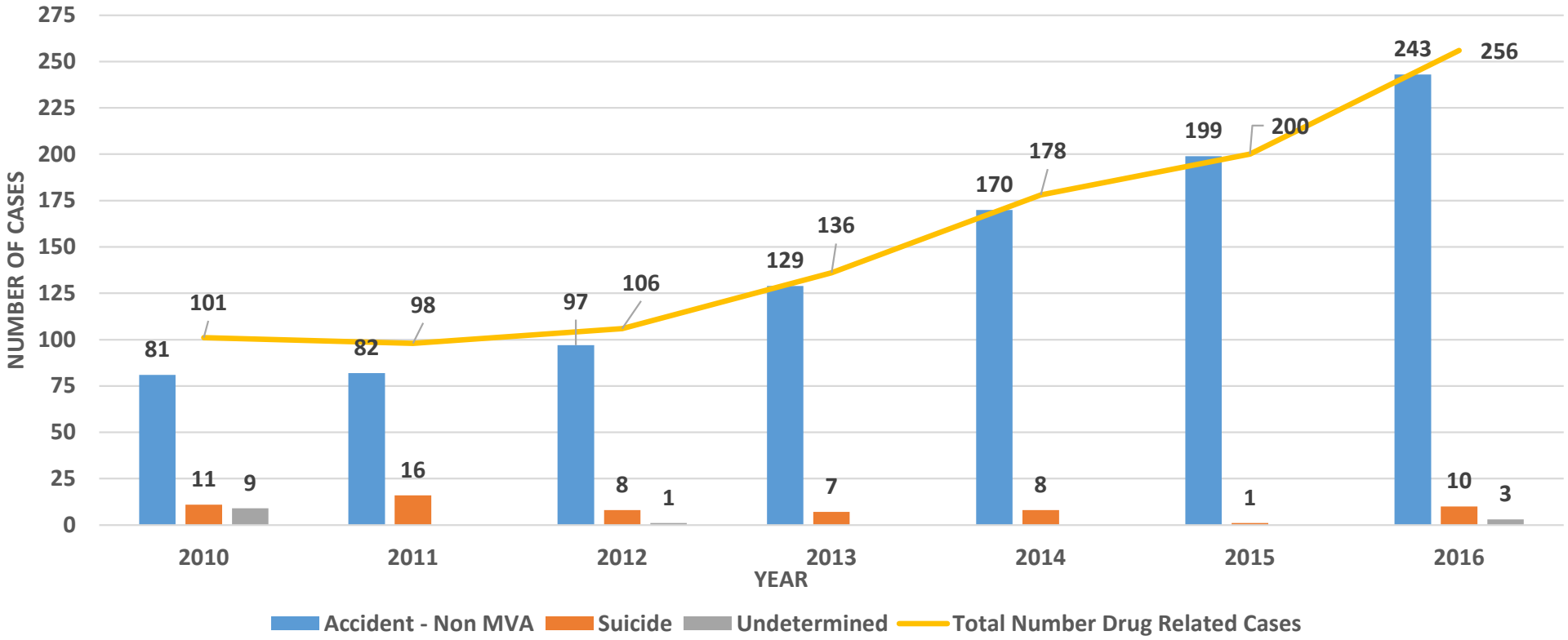


	2010	2011	2012	2013	2014	2015	2016
Total	19.9	19.1	20.5	26.2	34.0	38.0	48.1
Knox County	20.1	19.0	19.7	25.6	34.6	37.7	49.1
Anderson County	18.6	19.9	25.2	29.1	30.5	39.6	42.1

Data Source: Knox County RFC Medical Examiner Database, 2010 to 2016 and MDILog Database 2016. Knoxville, TN.
Census population from US Census Bureau "American Fact Finder" - http://factfinder.census.gov/faces/nav/jsf/pages/community_facts.xhtml.

The crude rate of Drug Related Deaths per 100,000 population has more than doubled over the last 7 years for Knox and Anderson counties. This rate only represents cases conducted at the Regional Forensic Center. It does not represent all Drug Related Deaths in Knox and Anderson county since not all deaths are properly reported either by institutions such as hospitals or through physicians filling out death certificates.

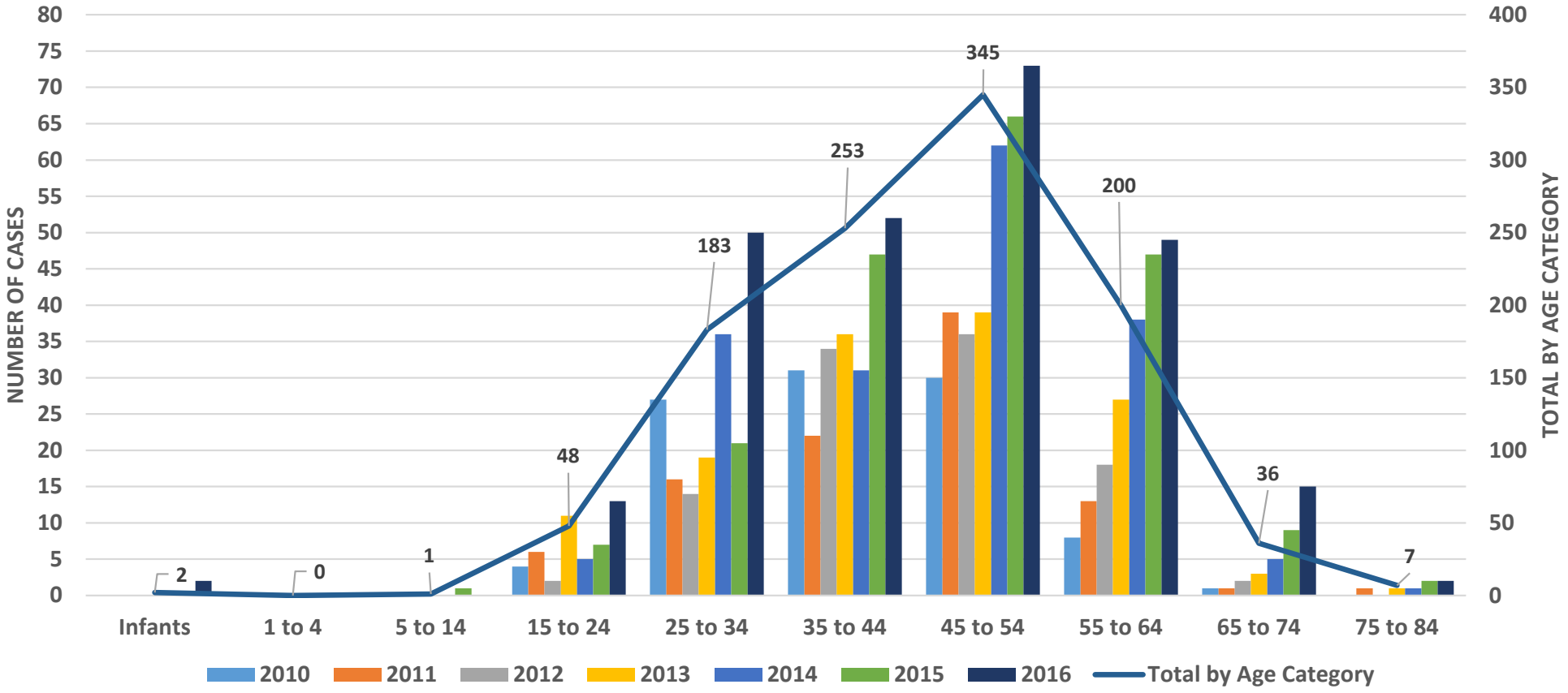
Knox and Anderson Counties
Manner of Death for Drug Related Cases
2010 - 2016



Data Source: Knox County RFC Medical Examiner Database, 2010 to 2016 and MDILog Database 2016. Knoxville, TN.

Drug Related Death cases have a Manner of Death classification of either Accident-Non Motor Vehicle, Suicide, or Undetermined. Often, determining if a case is classified as a Suicide can be difficult based on the available forensic evidence. Sometimes, there is not enough forensic evidence to properly determine the Manner of Death and it will be classified as Undetermined. In 2014, the CDC classified drug related deaths at the national level as 82% unintentional (accident), 12% suicides, and 6% undetermined.

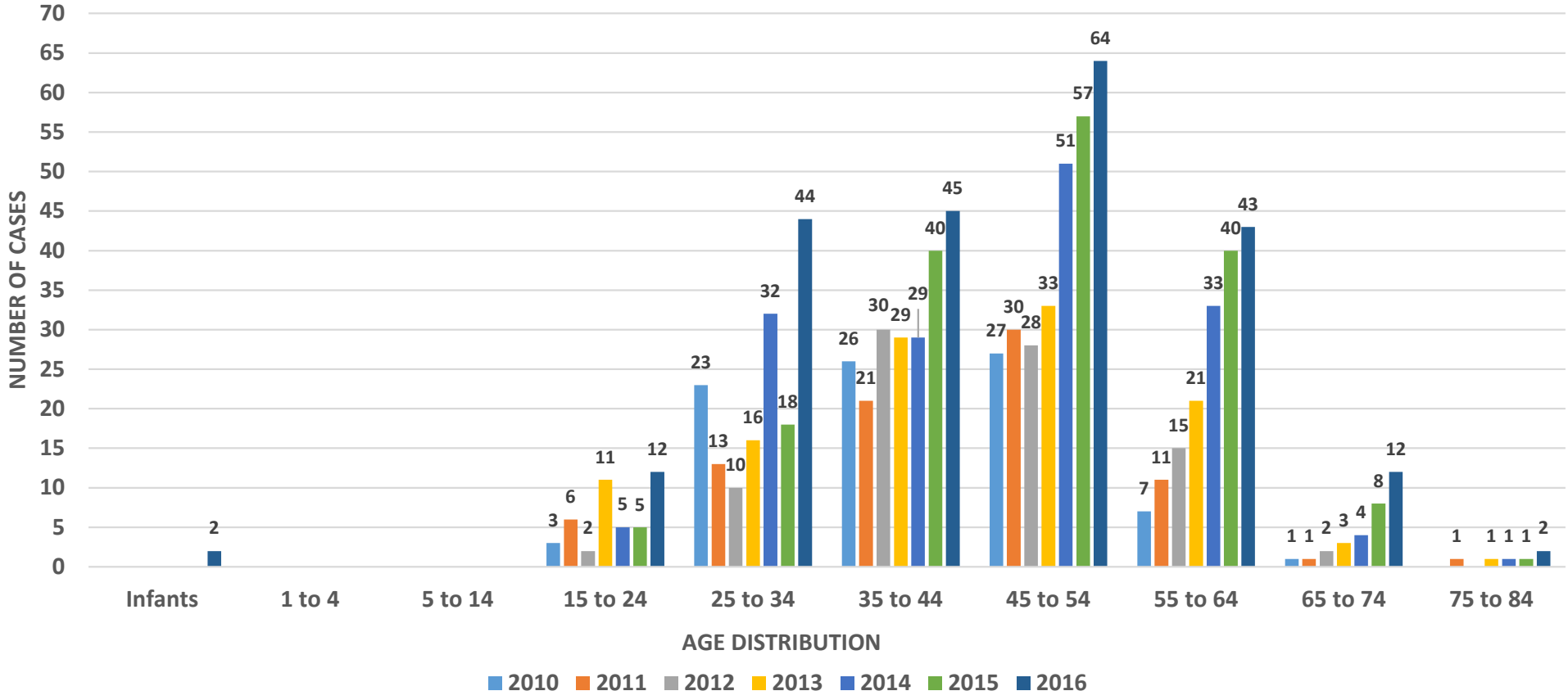
Knox and Anderson Counties
Age Distribution for Drug Related Cases
2010 - 2016



Data Source: Knox County RFC Medical Examiner Database, 2010 to 2016 and MDILog Database 2016. Knoxville, TN.

Most Drug Related Deaths occur in the 45 – 54 year old age group. The 25-34 year old age group showed a significant increase in 2016. The 35 – 44 and 55 – 64 year age groups have shown steady increases. These numbers represent actual case numbers. According to CDC statistics, the 45 to 54 year old age group is the predominant group at the national level dying of drug related issues.

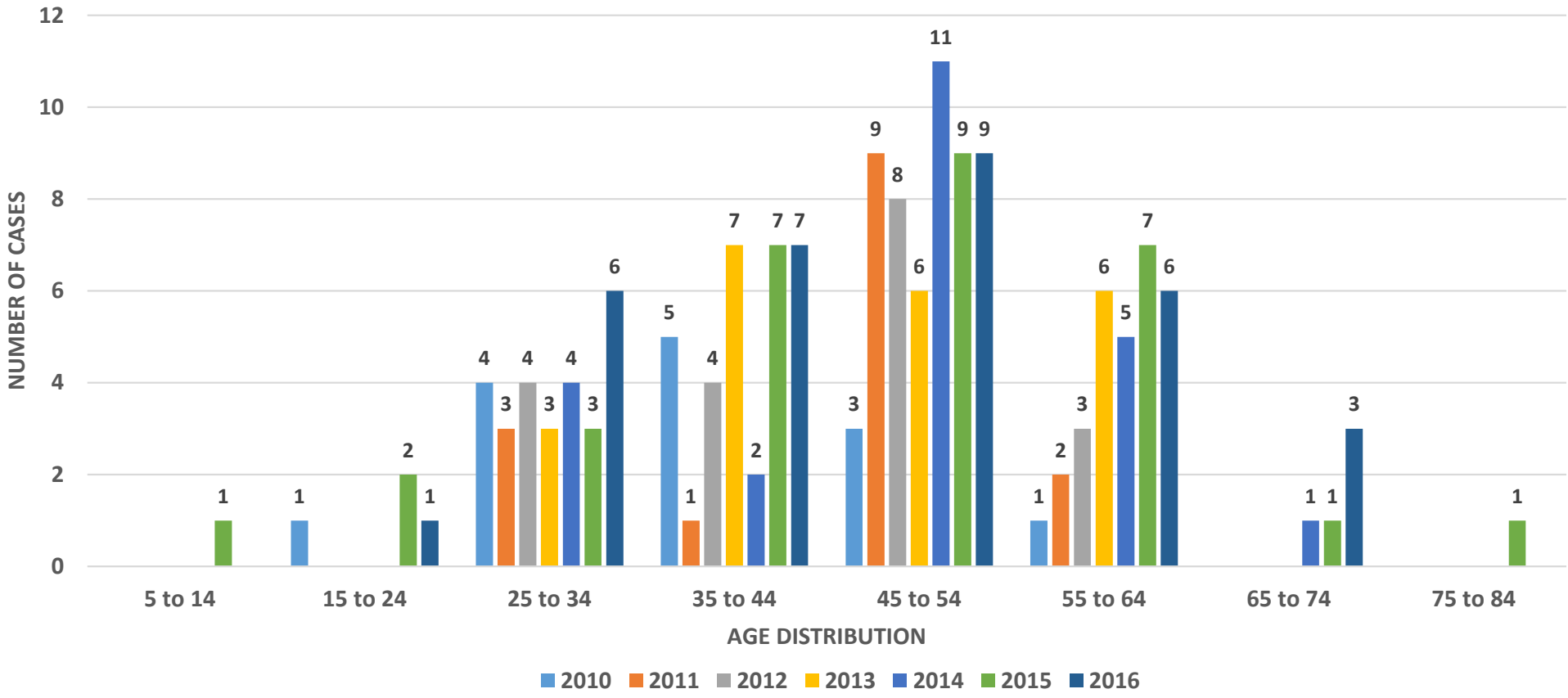
Knox County
Age Distribution for Drug Related Cases
2010 - 2016



Data Source: Knox County RFC Medical Examiner Database, 2010 to 2016 and MDILog Database 2016. Knoxville, TN.

In Knox County, the predominant age group for Drug Related Deaths is 45 – 54 years of age. The 25 – 34 year age group showed nearly a two and one-half times increase from 2015 to 2016. The 35 – 44 and 55 – 64 are the next age groups with the most Drug Related Deaths.

Anderson County
Age Distribution for Drug Related Cases
2010 - 2016



Data Source: Knox County RFC Medical Examiner Database, 2010 to 2016 and MDILog Database 2016. Knoxville, TN.

In Anderson County, the predominant age group for Drug Related Deaths is 45 – 54 years of age. The number of Drug Related Deaths in the 25 – 34 year age group double from 2015 to 2016. The 35 – 44 and 55 – 64 are the next age groups with the most Drug Related Deaths.

25-34 Year Age Group Special Look for 2016 Drug Related Deaths

Since the 25-34 year age group percentage rose by 138% from 2015 to 2016, we have included a focused look at this group. Of note, this age group died from a higher percentage of illicit vs prescription drugs than other age groups.

MOD in 2016	Knox	Anderson
Accident-NMVA	42	5
Suicide	1	1
Undetermined	1	0

RACE in 2016	Knox	Anderson
White	42	6
Black	1	0
Other	1	0

GENDER in 2016	Knox	Anderson
Male	27	4
Female	17	2

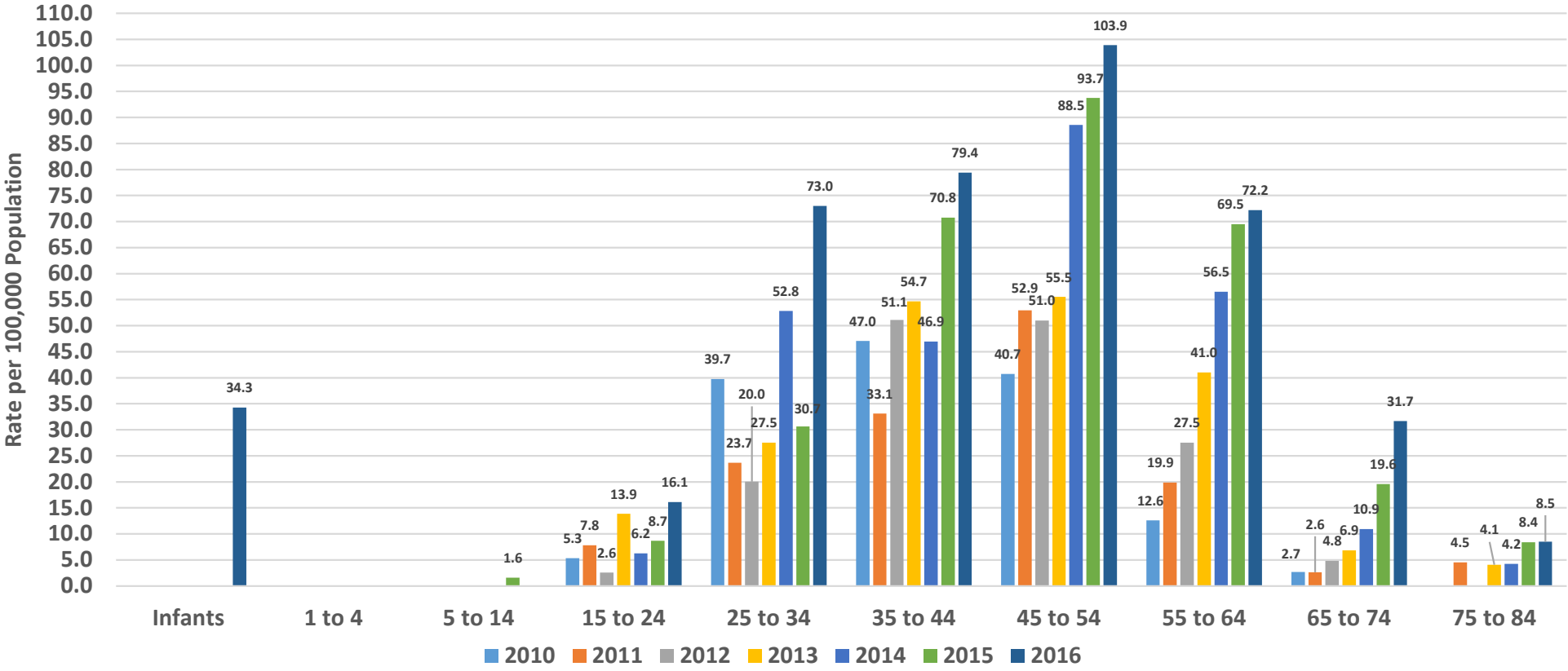
Predominant Home Zip Codes

Home Zip	Count
37917	5
37920	5
37921	5
37918	4
37923	4
37912	3
37919	3
37830	2
37849	2
37871	2

Drug in 2016 DRD Cases	Count
Fentanyl and Fentanyl Analogues	20
Fentanyl	*13*
Furanyl Fentanyl	*5*
4-ANPP	*1*
Acetyl Fentanyl	*1*
Oxymorphone	15
Methamphetamine	11
Alprazolam	7
Buprenorphine	7
Cocaine	6
Ethanol	5
Heroin	5
Oxycodone	5
Morphine	3
1,1-Difluoroethane	2
Diazepam	2
Diphenhydramine	2
Hydrocodone	2
Amitriptyline	1
Amphetamine	1
Butalbital	1
Citalopram / Escitalopram	1
Clonazepam	1
Doxepin	1
Etizolam	1
Hydromorphone	1
Hydroxyzine	1
Lorazepam	1
Methadone	1
Nortriptyline	1
Olanzapine	1
Sertraline	1
Tramadol	1
Trazodone	1

Naloxone	14

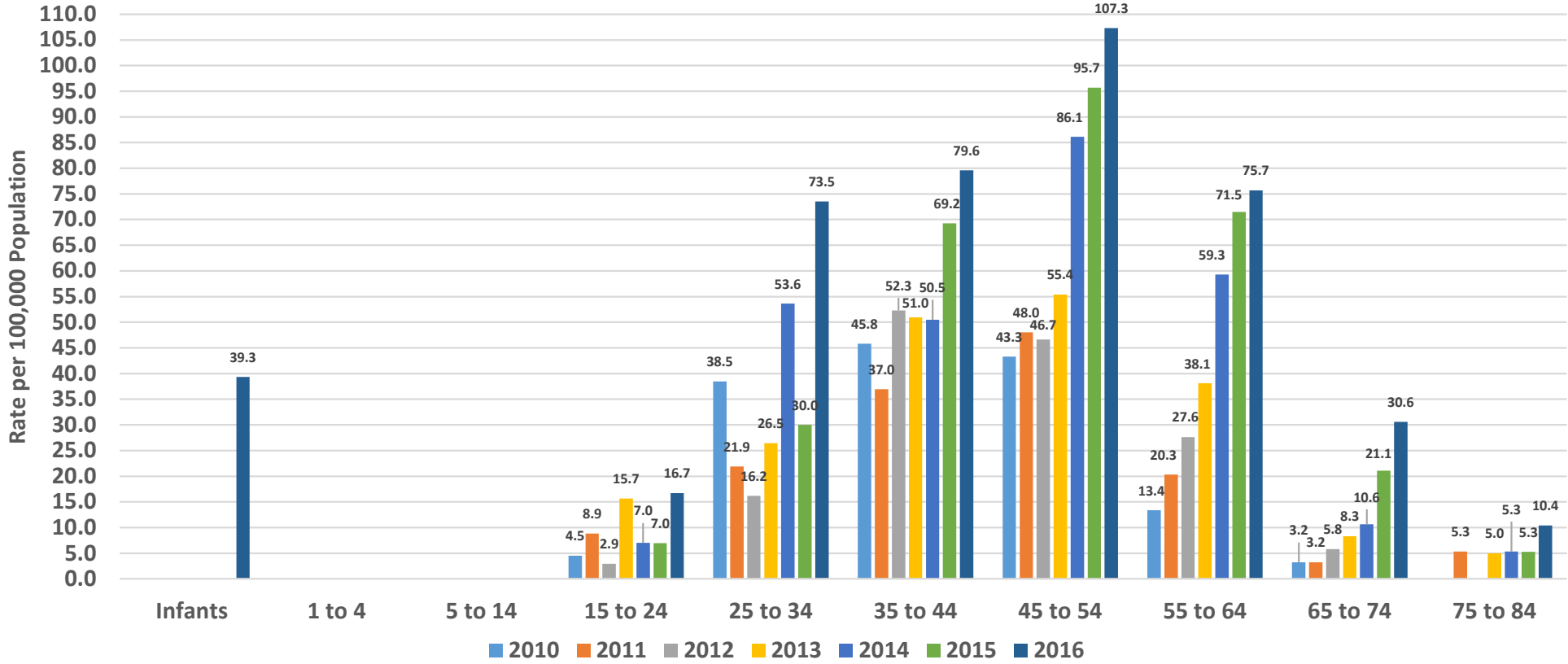
Knox and Anderson Counties
Age Adjusted Rate per 100,000 for Drug Related Cases
2010 - 2016



Data Source: Knox County RFC Medical Examiner Database, 2010 to 2016 and MDILog Database 2016. Knoxville, TN.
Population Data Source: American Fact Finder, U.S. Census and 2015 population data from Health Information Tennessee (https://hit.health.tn.gov/population.shtml) since age specific 2016 data unavailable.

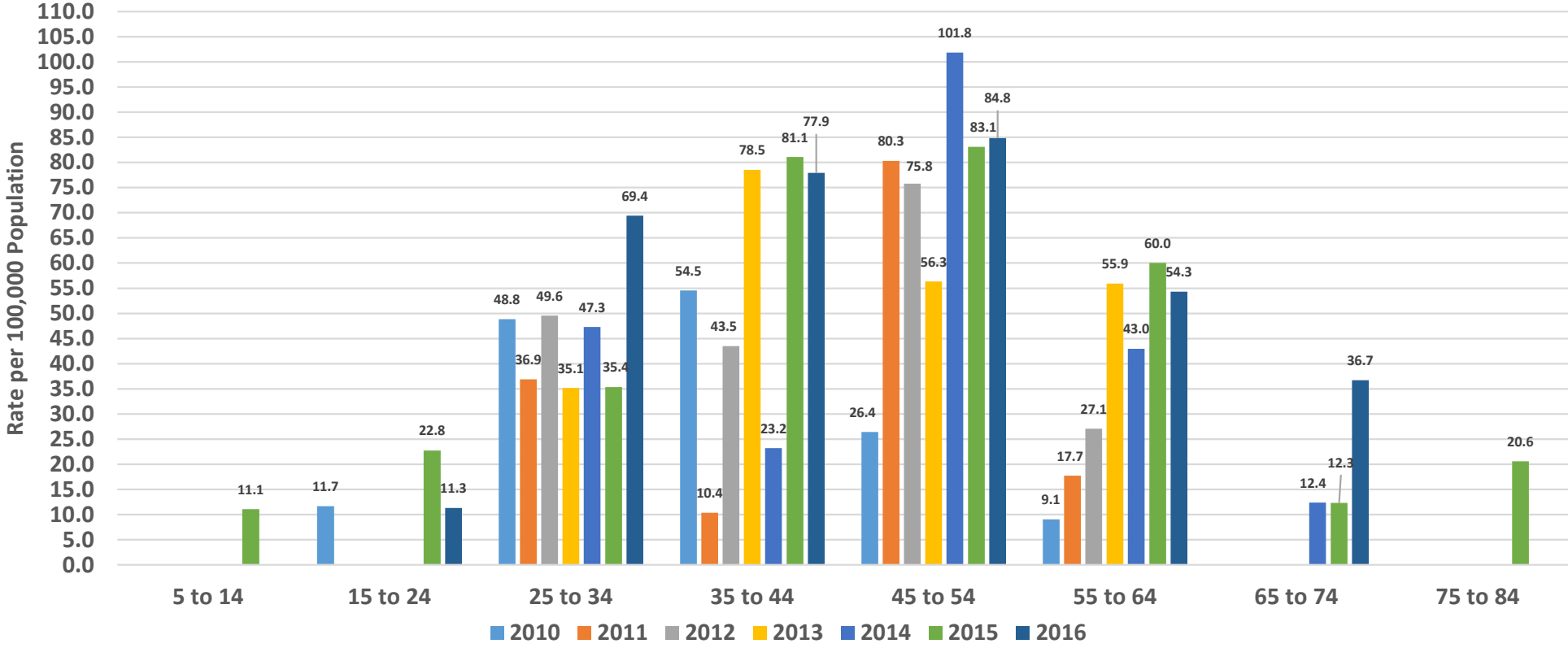
The 45 – 54 year age group continues to have the highest age specific rate. In addition in 2016, the 25 – 34 age group saw a significant increase in their age specific Drug Related Death rates. There were 2 infant Drug Related Deaths in 2016. However, due to a low census of that age group, it provides a significant age adjusted rate in infants.

Knox County
Age Adjusted Rate per 100,000 for Drug Related Cases
2010 - 2016



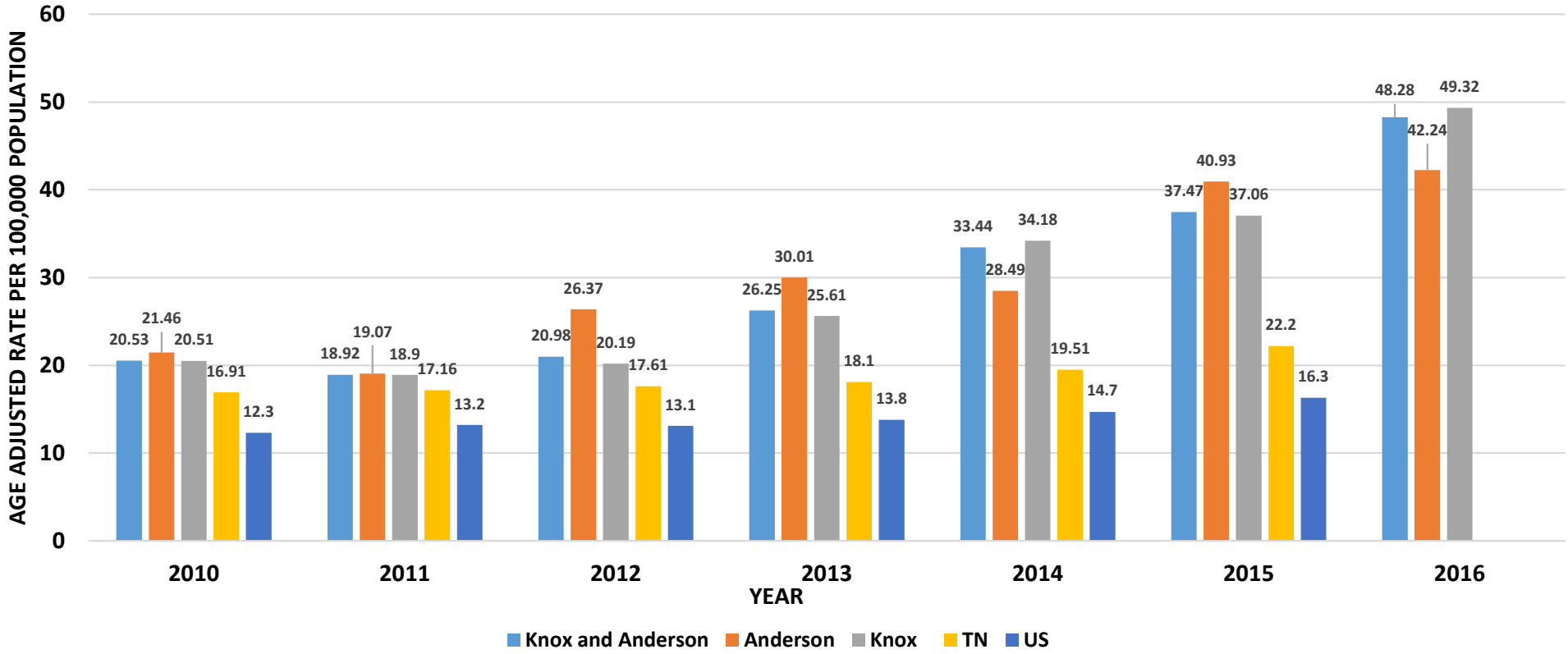
In Knox County, the 45 – 54 year age group continues to have the highest age specific rate. In addition in 2016, the 25 – 34 age group saw a significant increase in their age specific Drug Related Death rates. There were 2 infant Drug Related Deaths in 2016. However, due to a low census of that age group, it provides a significant age adjusted rate in infants.

Anderson County
Age Adjusted Rate per 100,000 for Drug Related Cases
2010 - 2016



In Anderson County, the 45 – 54 and 35 – 44 year age groups have the highest age specific rates. In 2016, the 25 – 34 year age group doubled its rate.

Age Adjusted Rate per 100,000 for Drug Related Death Cases
Knox vs Anderson vs TN vs US
2010 - 2016

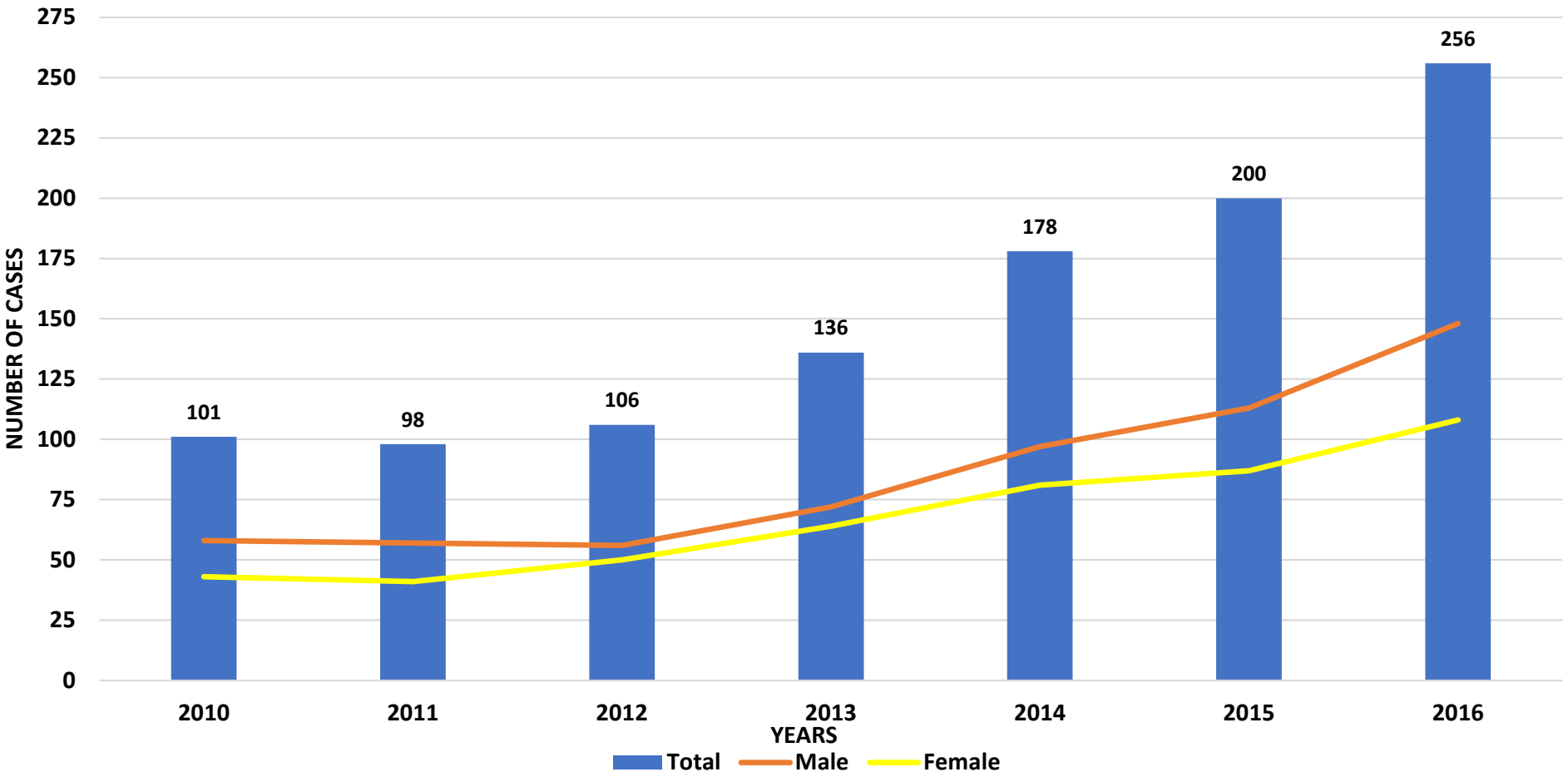


Data Source: Knox County RFC Medical Examiner Database, 2010 to 2016 and MDILog Database 2016. Knoxville, TN.
Population Data Source: American Fact Finder, U.S. Census and 2015 population data from Health Information Tennessee (https://hit.health.tn.gov/population.shtml) since age specific 2016 data unavailable.

The chart above depicts the Age Adjusted Rate per 100,000 population for Drug Related Death Cases for Knox, Anderson, Tennessee, and the United States. 2016 data for TN and the US is unavailable.

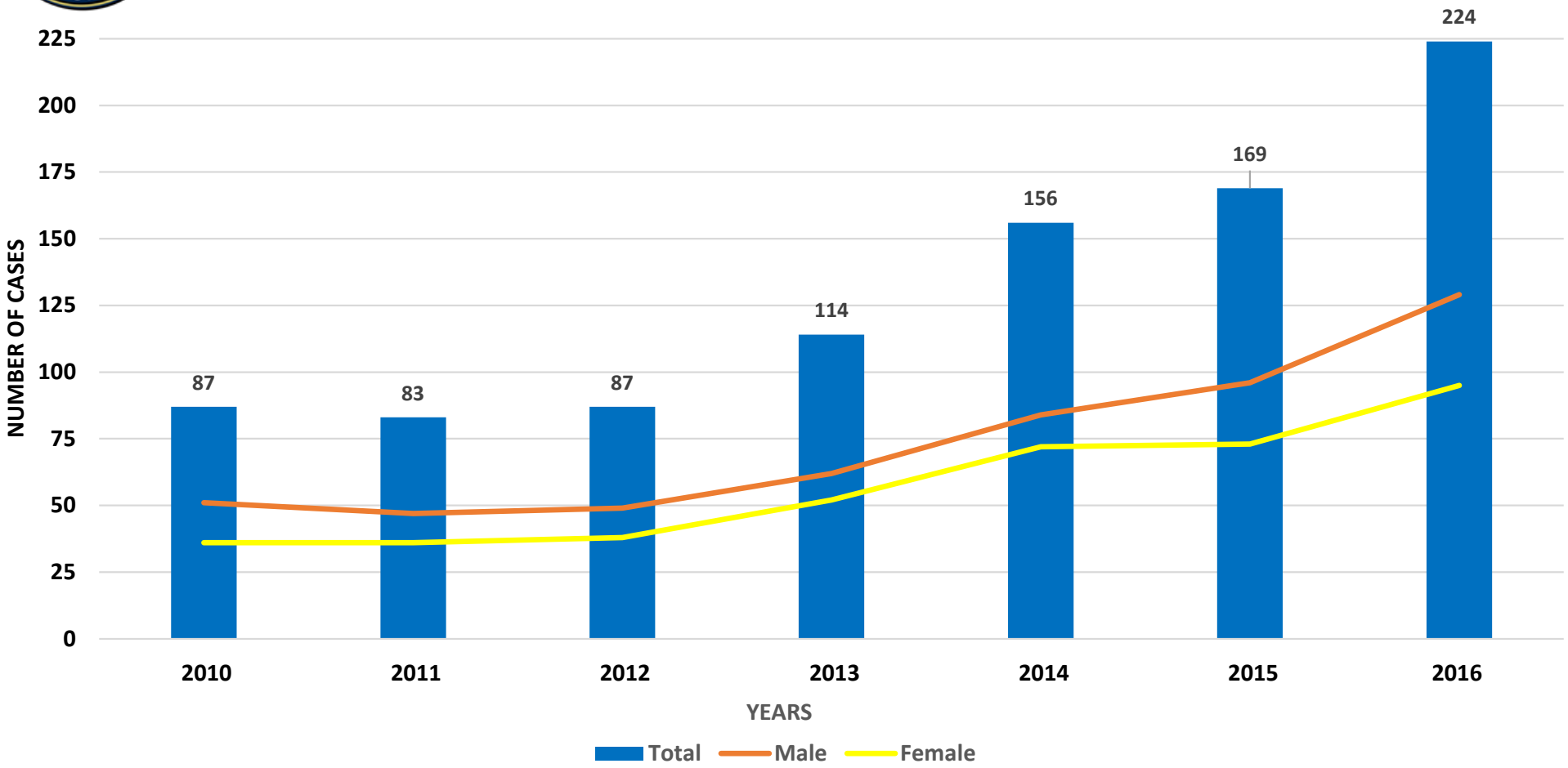
As a comparison to a local, rural county, Dr. Boduch, the Roane County Medical Examiner, provided Roane County drug overdose data for Medical Examiner cases for 2015 (36 per 100,000) and 2016 (58.6 per 100,000).

Knox and Anderson Counties
Gender Distribution for Drug Related Cases
2010 - 2016



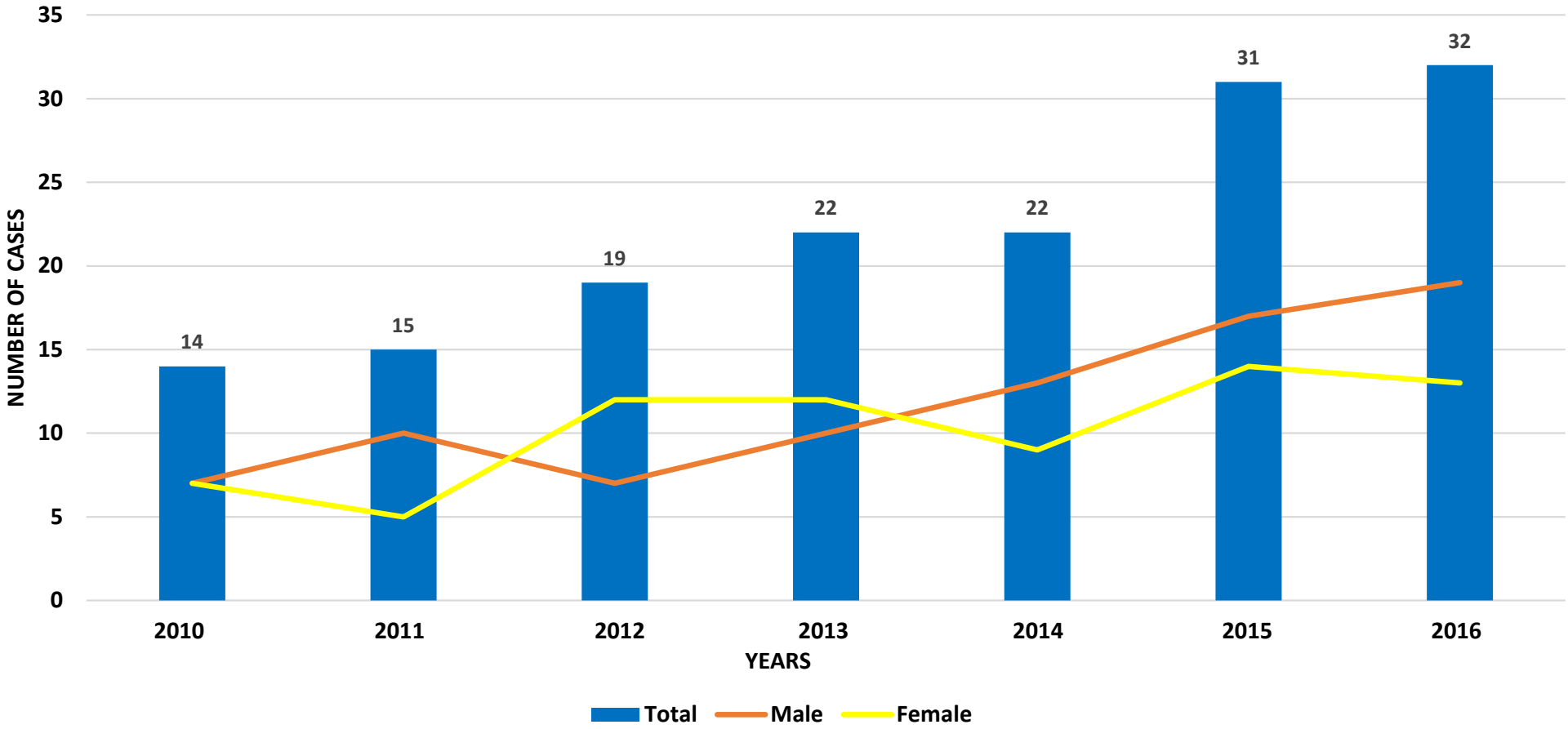
Data Source: Knox County RFC Medical Examiner Database, 2010 to 2016 and MDILog Database 2016. Knoxville, TN.

Knox County
Gender Distribution for Drug Related Cases
2010 - 2016



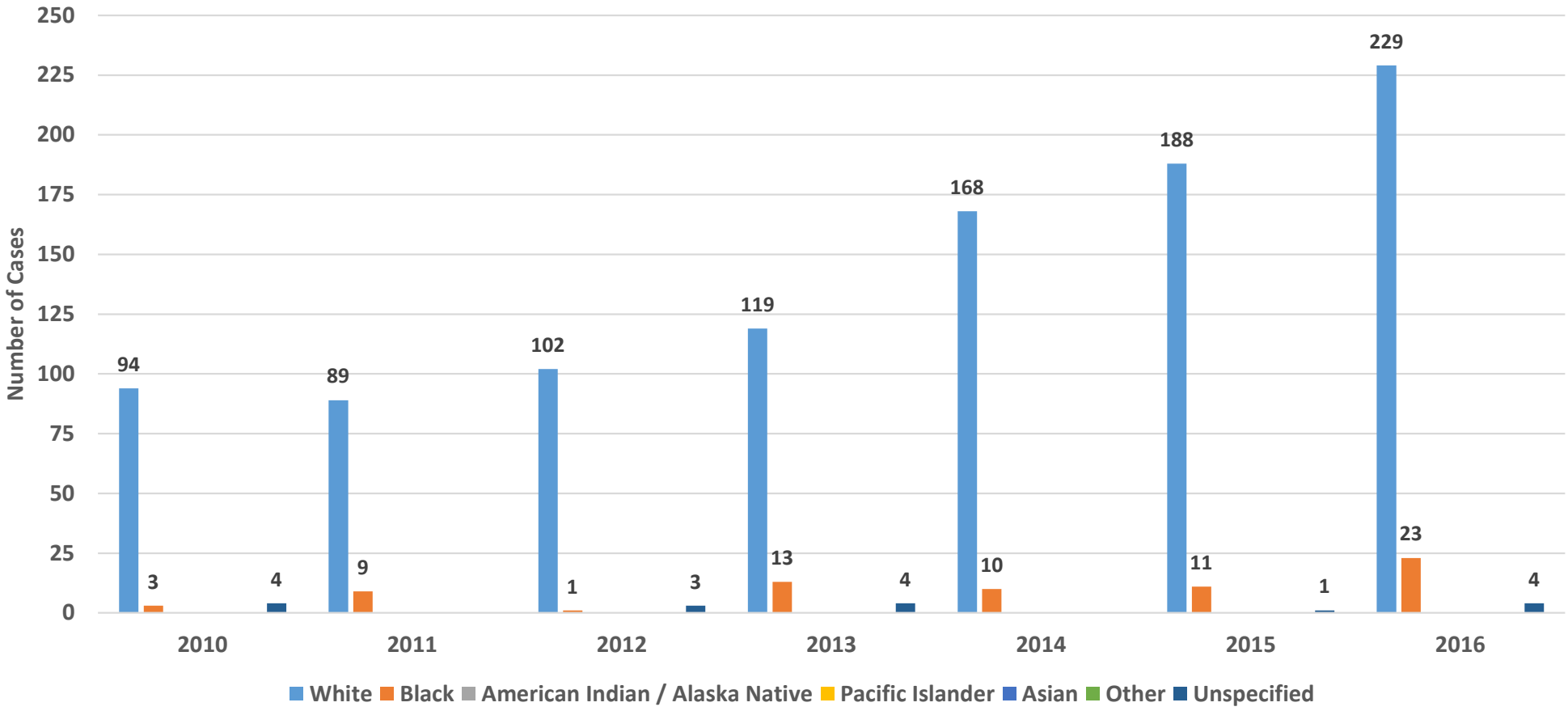
Data Source: Knox County RFC Medical Examiner Database, 2010 to 2016 and MDILog Database 2016. Knoxville, TN.

Anderson County
Gender Distribution for Drug Related Cases
2010 - 2016



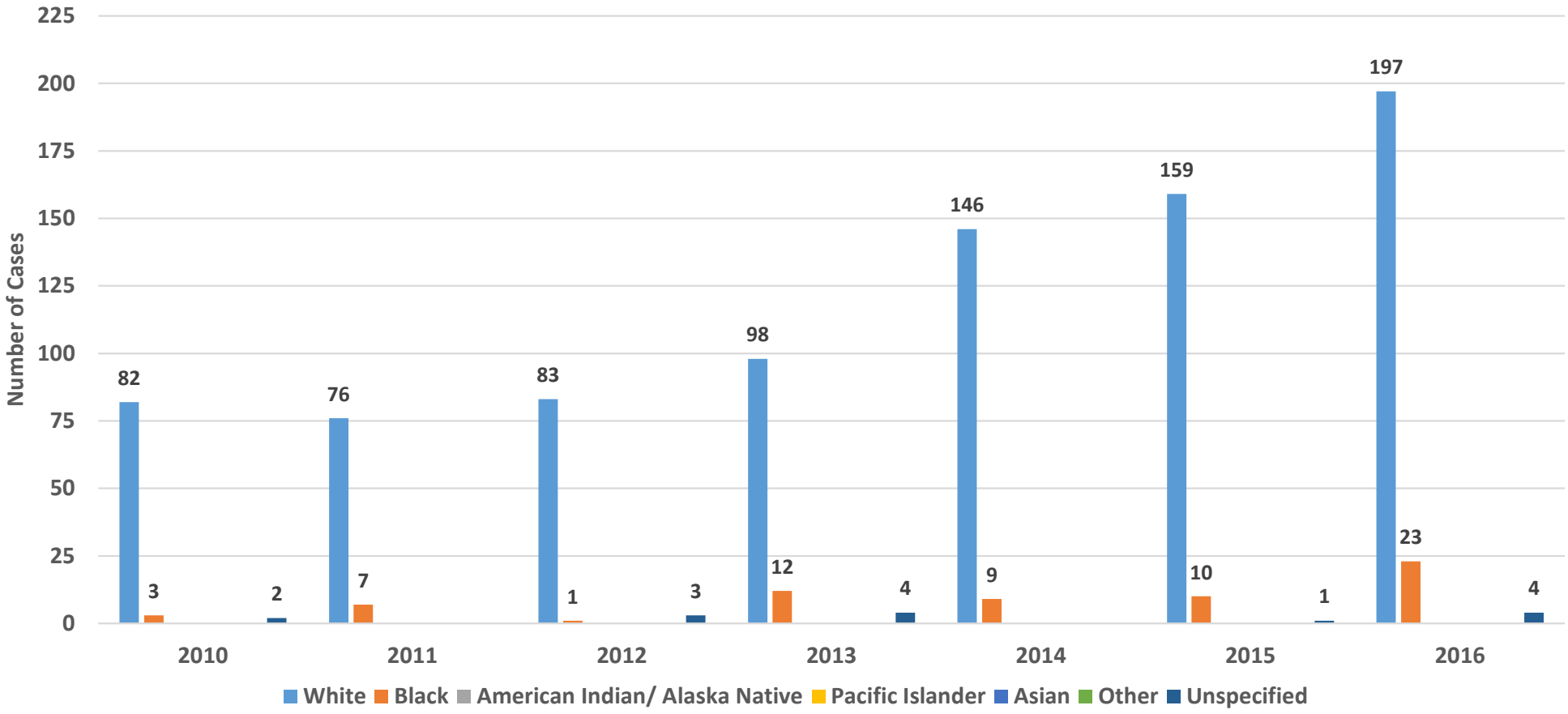
Data Source: Knox County RFC Medical Examiner Database, 2010 to 2016 and MDILog Database 2016. Knoxville, TN.

Knox and Anderson Counties
Race Distribution for Drug Related Cases
2010 - 2016



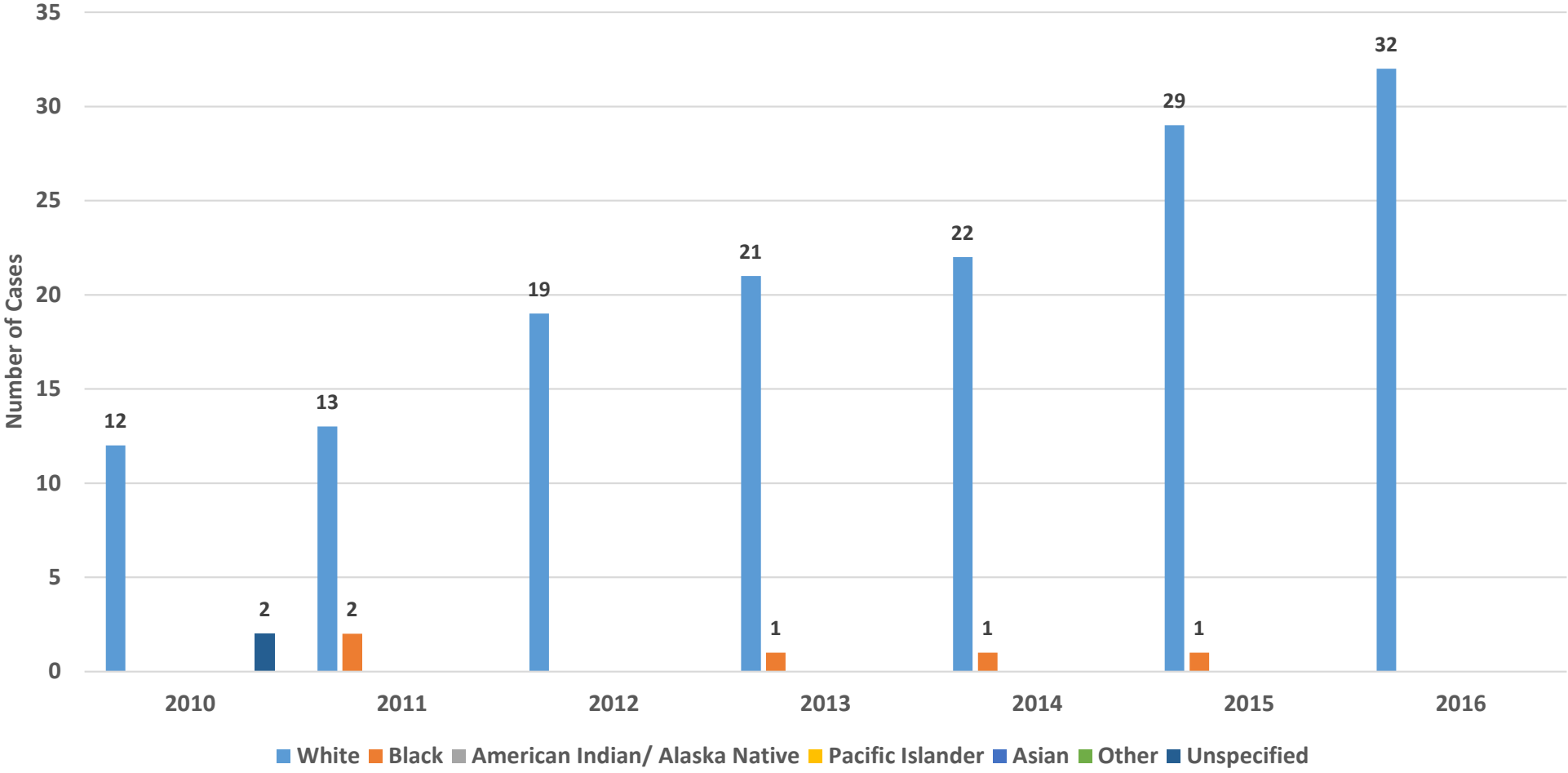
Data Source: Knox County RFC Medical Examiner Database, 2010 to 2016 and MDILog Database 2016. Knoxville, TN.

Knox County
Race Distribution for Drug Related Cases
2010 - 2016



Data Source: Knox County RFC Medical Examiner Database, 2010 to 2016 and MDILog Database 2016. Knoxville, TN.

Anderson County
Race Distribution for Drug Related Cases
2010 - 2016



Data Source: Knox County RFC Medical Examiner Database, 2010 to 2016 and MDILog Database 2016. Knoxville, TN.

Zip Code Distribution and Choropleth Maps by Year and County

The following Zip Code Data represents Home Addresses and Location of Injury for Drug Related Deaths which had an autopsy or examination in 2016 for Knox and Anderson Counties at the Knox County Regional Forensic Center. The Data Source and Notes are listed here for the Zip Code related pages.

KGIS assisted by creating the choropleth maps. The choropleth maps represent either the Home Address or the Location of Injury for the decedent. The percentage in the block group was derived by dividing the number of decedents in that block group by the population within that block group.

Additionally, we have provided a map of the Pain Clinic and school locations within Knox and Anderson counties.

Data Source: MDILog Database and Knox County RFC Medical Examiner Database, 2016. Knoxville, TN.

Notes:

1. Pain Clinics are located along easy access routes.
2. The Home Address Location maps represent where the people who died of a drug related death lived.
3. The Location of Injury Address maps represent where drug related death or injury occurred.
4. School locations were added to the maps at the request of the Knox County School system.

10 Most Prominent Home Residence Zip Codes by Year

	2010	2011	2012	2013	2014	2015	2016
#1	37918	37918	37917	37920	37921	37918	37920
#2	37921	37920	37920	37917	37912	37920	37917
#3	37919	37917	37918	37914	37920	37917	37921
#4	37912	37912	37716	37912	37917	37912	37918
#5	37830	37914	37830	37849	37918	37716	37919
#6	37849	37830	37849	37921	37914	37914	37849
#7	37914	37849	37912	37931	37922	37849	37912
#8	37917	37924	37919	37918	37938	37938	37830
#9	37909	37769	37921	37919	37923	37721	37716
#10	37920	37840	37931	37923	37849	37830	37915

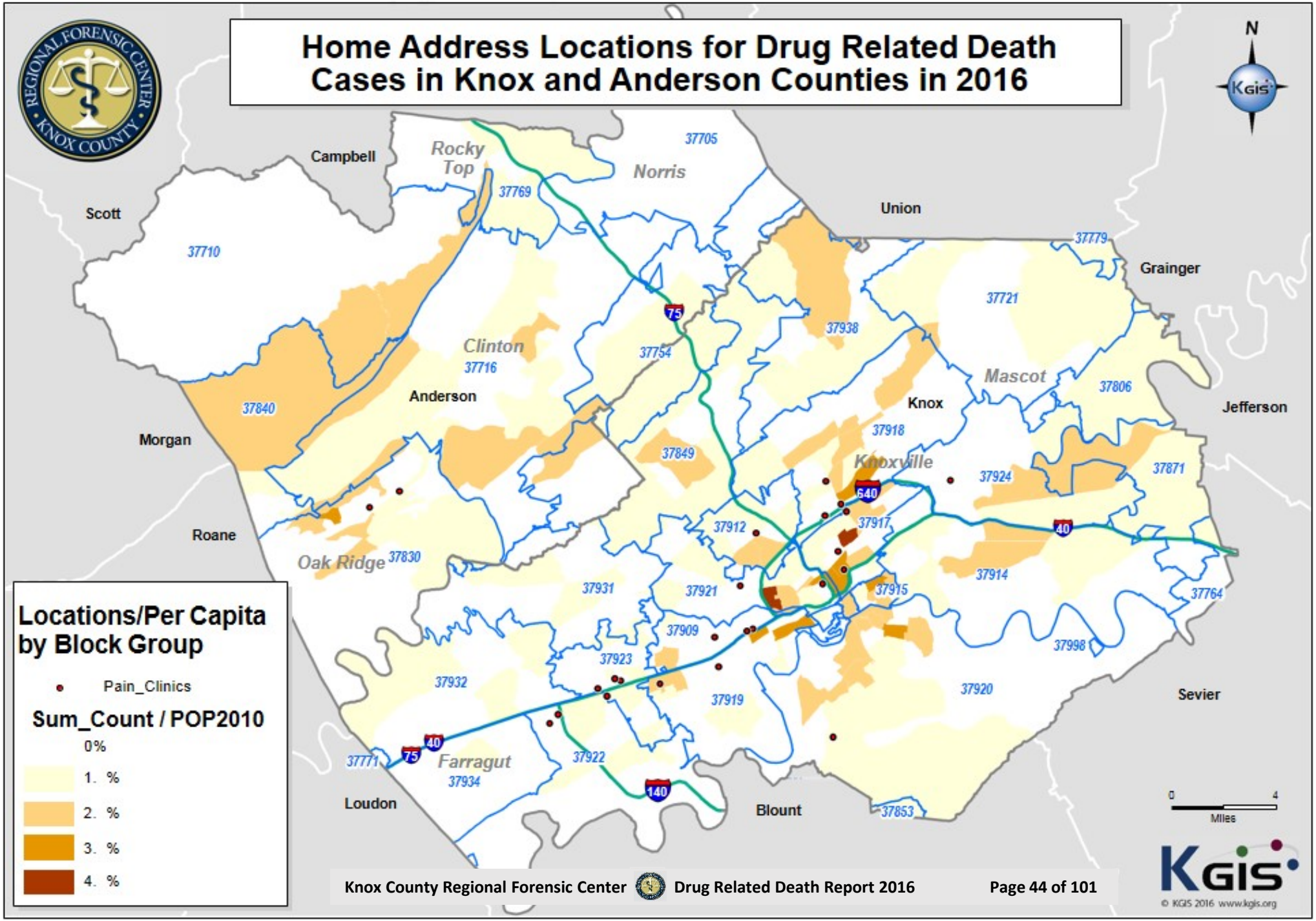
NOTE: Color coded Zip Codes represent Zip Codes that made the top 10 list all 7 years.

There are 5 zip codes (color coded) that appear each year within the Top 10 Most Prominent Home Residence Zip Codes for Drug Related Deaths for Knox and Anderson Counties.

The zip codes in GRAY boxes have appeared in the Top 10 Most Prominent Home Residence Zip Code list at least 4 of the 7 years. Those zip codes are 37921, 37930, 37919, and 37914.

The following pages are choropleth maps showing the highest number of deaths per Zip Code by Location of Injury and Home Residence. In addition, there is a map indicating the location of Pain Clinics in Knox and Anderson Counties.

Home Address Locations for Drug Related Death Cases in Knox and Anderson Counties in 2016



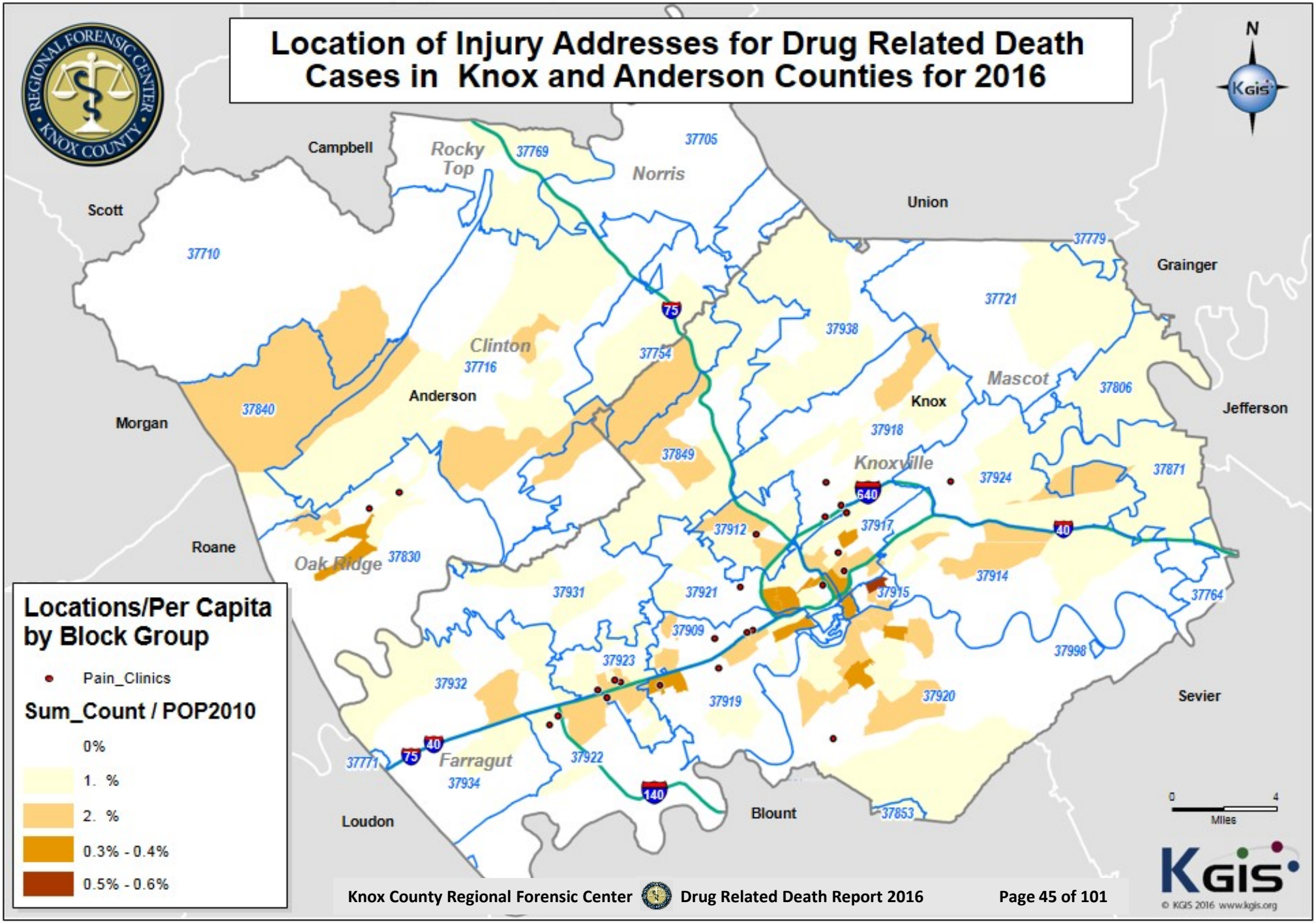
Locations/Per Capita by Block Group

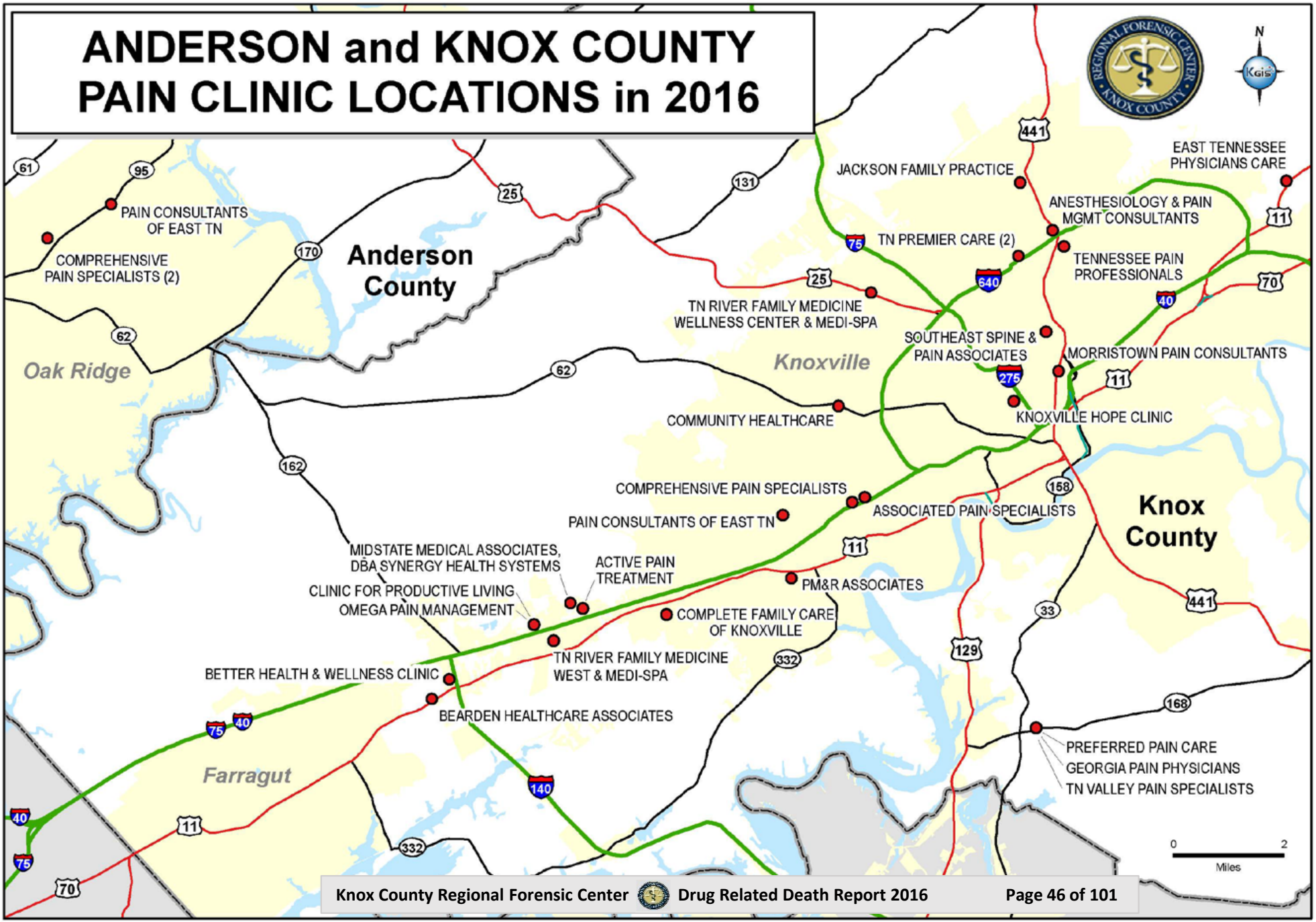
- Pain_Clinics

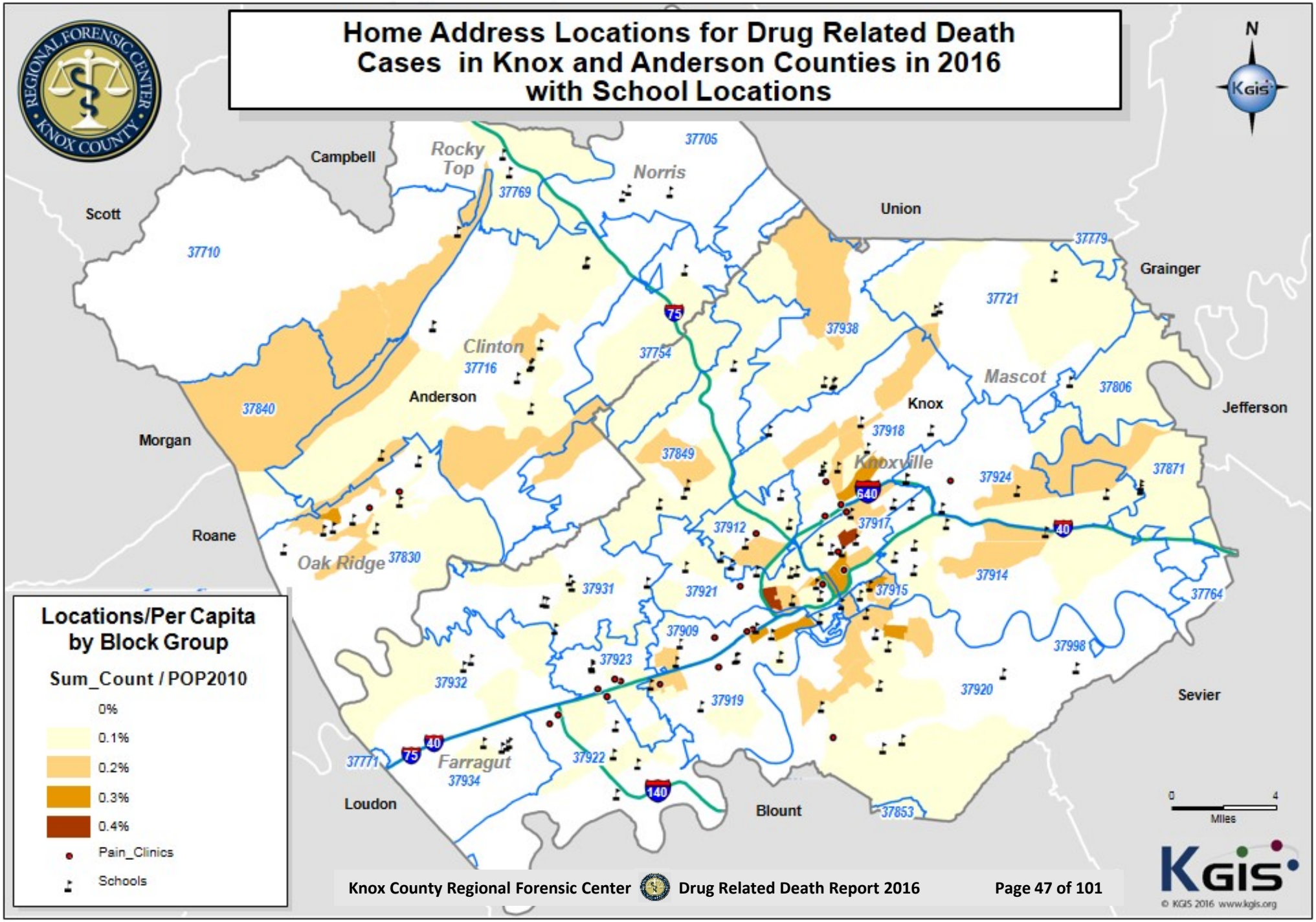
Sum_Count / POP2010

- 0%
- 1. %
- 2. %
- 3. %
- 4. %

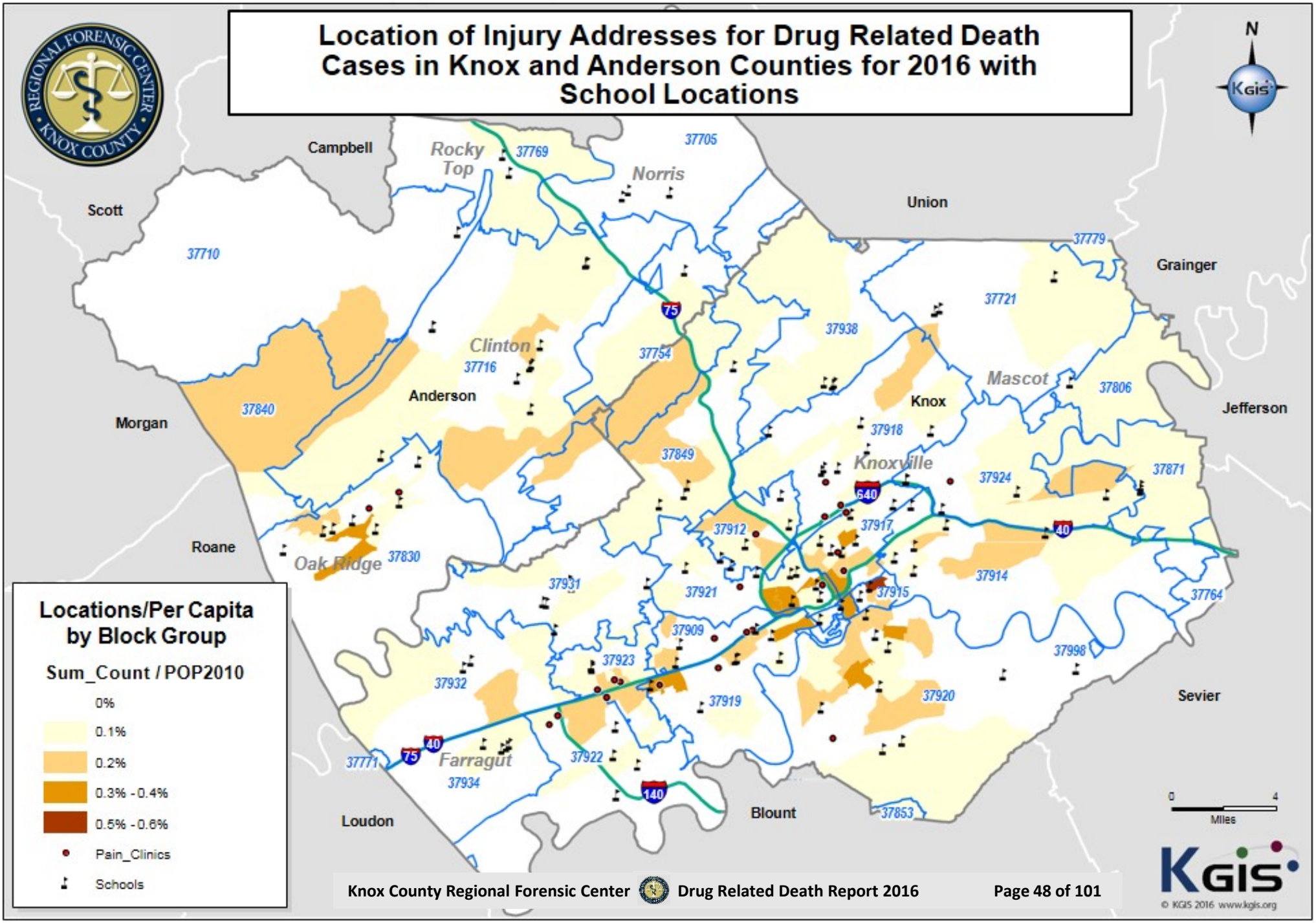
Location of Injury Addresses for Drug Related Death Cases in Knox and Anderson Counties for 2016



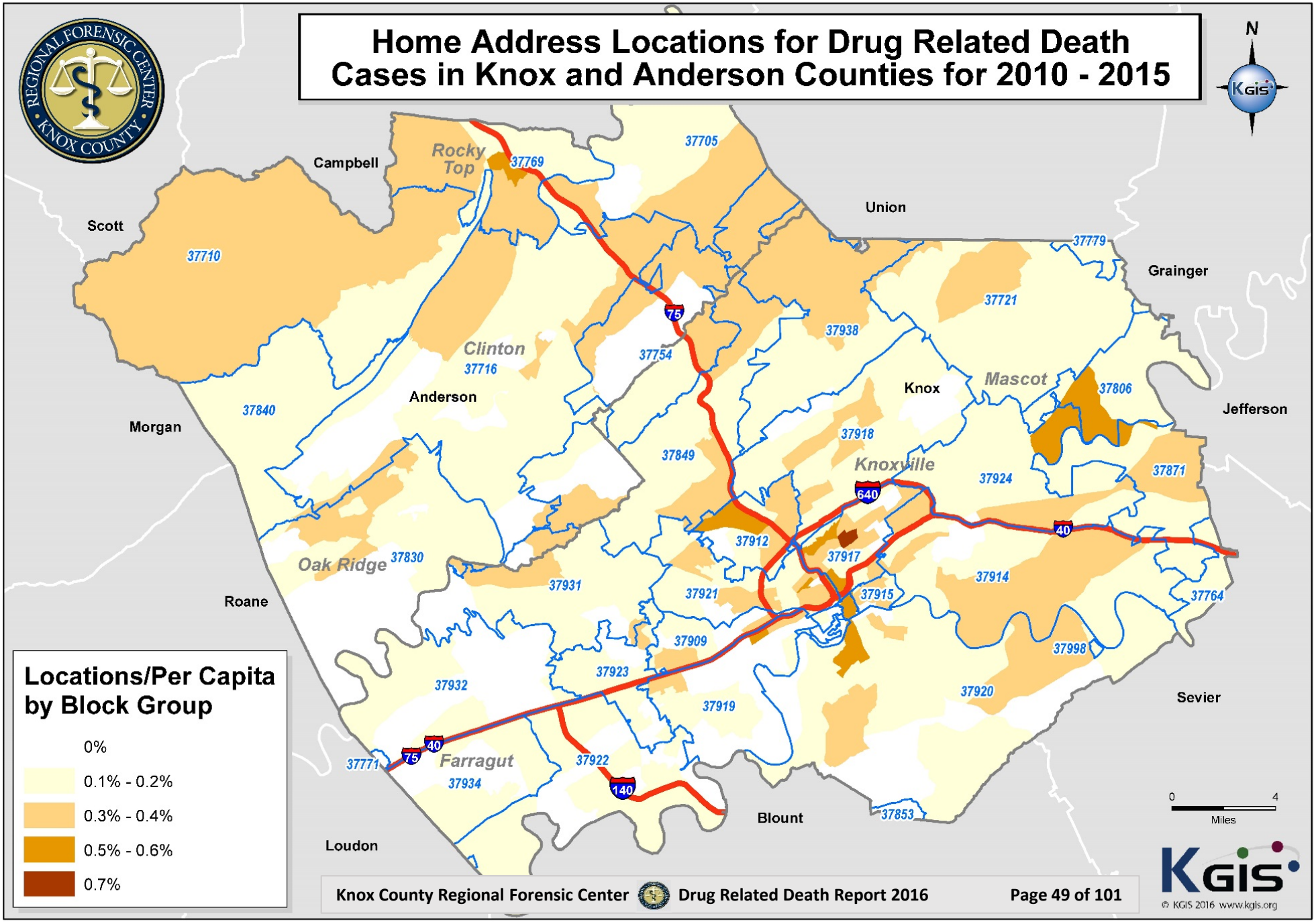

ANDERSON and KNOX COUNTY
PAIN CLINIC LOCATIONS in 2016
N
Kgis
REGIONAL FORENSIC CENTER
KNOX COUNTY
Anderson County
Knox County
Oak Ridge
Knoxville
Farragut
PAIN CONSULTANTS OF EAST TN
COMPREHENSIVE PAIN SPECIALISTS (2)
JACKSON FAMILY PRACTICE
EAST TENNESSEE PHYSICIANS CARE
ANESTHESIOLOGY & PAIN MGMT CONSULTANTS
TN PREMIER CARE (2)
TENNESSEE PAIN PROFESSIONALS
TN RIVER FAMILY MEDICINE WELLNESS CENTER & MEDI-SPA
SOUTHEAST SPINE & PAIN ASSOCIATES
MORRISTOWN PAIN CONSULTANTS
KNOXVILLE HOPE CLINIC
COMMUNITY HEALTHCARE
COMPREHENSIVE PAIN SPECIALISTS
ASSOCIATED PAIN SPECIALISTS
PAIN CONSULTANTS OF EAST TN
MIDSTATE MEDICAL ASSOCIATES, DBA SYNERGY HEALTH SYSTEMS
ACTIVE PAIN TREATMENT
CLINIC FOR PRODUCTIVE LIVING
OMEGA PAIN MANAGEMENT
PM&R ASSOCIATES
COMPLETE FAMILY CARE OF KNOXVILLE
TN RIVER FAMILY MEDICINE WEST & MEDI-SPA
BETTER HEALTH & WELLNESS CLINIC
BEARDEN HEALTHCARE ASSOCIATES
PREFERRED PAIN CARE
GEORGIA PAIN PHYSICIANS
TN VALLEY PAIN SPECIALISTS
0
2
Miles


Home Address Locations for Drug Related Death Cases in Knox and Anderson Counties in 2016 with School Locations
N
Kgis
Campbell
Scott
Union
Grainger
Jefferson
Morgan
Roane
Anderson
Knox
Loudon
Blount
Sevier
Rocky Top
Norris
Clinton
Mascot
Knoxville
Oak Ridge
Farragut
37705
37769
37710
37779
37721
37938
37754
37716
37840
37806
37918
37849
37924
37871
37912
37917
37830
37931
37921
37915
37914
37764
37909
37998
37923
37932
37919
37920
37771
37922
37934
37853
75
40
640
140
0
4
Miles
Locations/Per Capita by Block Group
Sum_Count / POP2010
0%
0.1%
0.2%
0.3%
0.4%
Pain_Clinics
Schools
© KGIS 2016 www.kgis.org

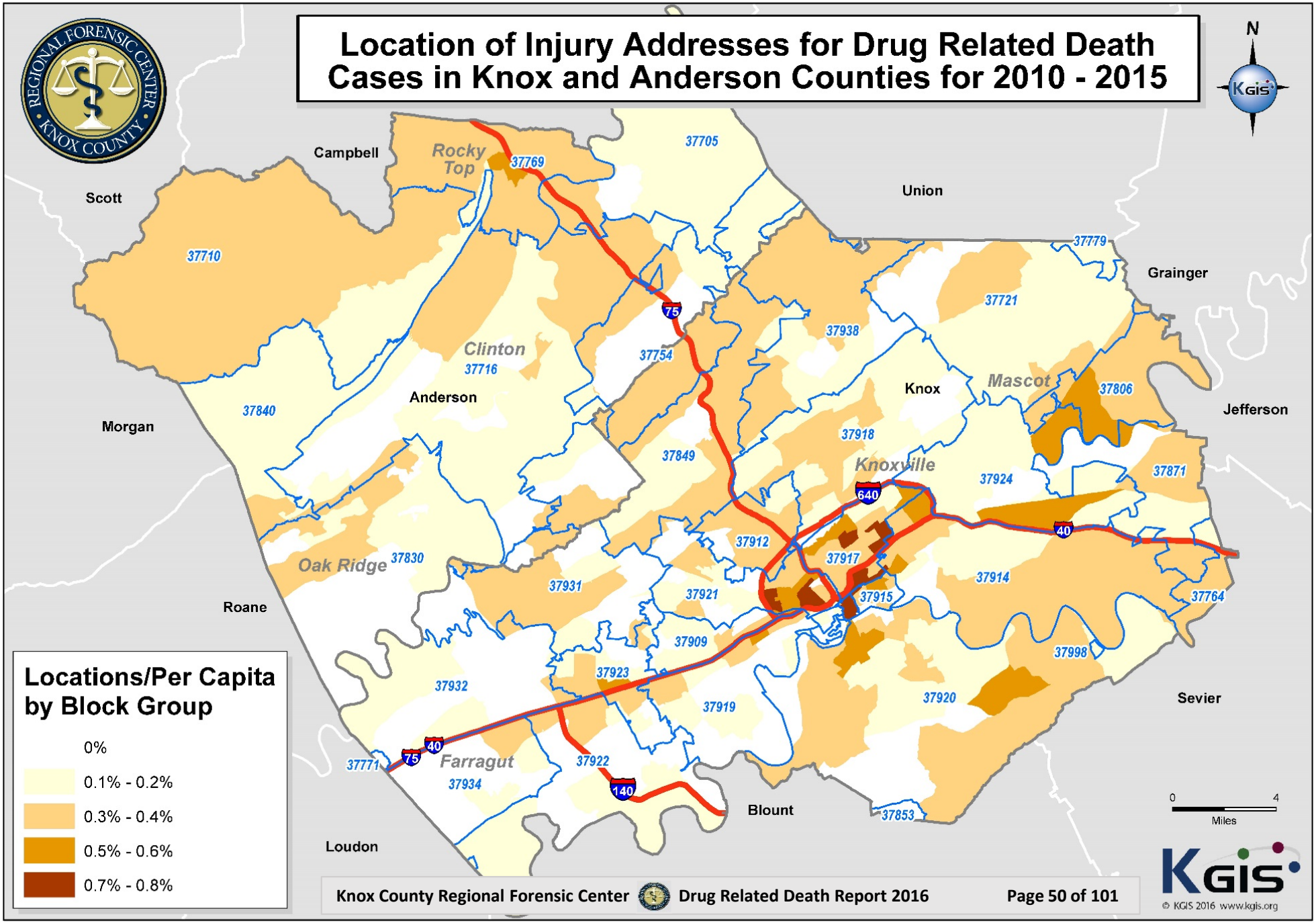
Location of Injury Addresses for Drug Related Death Cases in Knox and Anderson Counties for 2016 with School Locations



Home Address Locations for Drug Related Death Cases in Knox and Anderson Counties for 2010 - 2015



Location of Injury Addresses for Drug Related Death Cases in Knox and Anderson Counties for 2010 - 2015



Drugs Found in Drug Related Deaths

The following 31 pages will list the specific drugs found in drug related deaths. The data will be displayed in various forms in order to provide different views into the problem. You will see:

1. Top 10 Drugs Found by Year
2. Drug List by Year and County
3. Pharmaceutical vs Non-Pharmaceutical
4. Deaths Involving Opioids
5. Deaths Involving Benzodiazepines
6. Deaths Involving Cocaine and Heroin
7. Deaths Involving Fentanyl
8. Deaths Involving Naloxone

Drug List by Year and County

The following tables list drugs found during an autopsy or examination for Drug Related Deaths for 2016 for Knox and Anderson Counties at the Knox County Regional Forensic Center. The Data Source and Notes are listed here for the next 31 pages in order to provide more space for listing the drugs.

Data Source: MDILog Database and Knox County RFC Medical Examiner Database, 2016. Knoxville, TN.

Notes:

1. Some drugs can be classified as Pharmaceutical and Non-Pharmaceutical which accounts for the difference in numbers between some graphs and the "Drug List" graph count.
2. This report only notes the presence of the drug contributing to death but does not indicate the appropriate or legal use of a drug.
3. Drug poisoning deaths may involve more than one specific substance.
4. Some drugs are listed as Not Otherwise Specified (NOS) because information was obtained from sources that did not define the drug type.

TOP 10 DRUGS FOUND IN DRUG RELATED DEATHS BY YEAR FOR KNOX AND ANDERSON COUNTIES

	2010	2011	2012	2013	2014	2015	2016
#1	Oxycodone	Oxycodone	Oxycodone	Oxycodone	Oxycodone	Oxycodone	Fentanyl & Analogues*
#2	Alprazolam	Oxymorphone	Morphine	Morphine	Oxymorphone	Oxymorphone	Oxymorphone
#3	Morphine	Cocaine	Cocaine	Alprazolam	Alprazolam	Alprazolam	Oxycodone
#4	Methadone	Alprazolam	Oxymorphone	Cocaine	Morphine	Cocaine	Alprazolam
#5	Oxymorphone	Morphine	Alprazolam	Oxymorphone	Cocaine	Heroin	Methamphetamine
#6	Cocaine	Methadone	Methadone	Methadone	Methadone	Morphine	Cocaine
#7	Alcohol/Ethanol	Alcohol/Ethanol	Fentanyl	Hydrocodone	Fentanyl	Fentanyl	Hydrocodone
#8	Hydrocodone	Hydrocodone	Hydrocodone	Ethanol	Hydrocodone	Hydrocodone	Morphine
#9	Diazepam	Benzodiazepine (NOS)	Alcohol/Ethanol	Opiate (NOS)	Alcohol/Ethanol	Alcohol/Ethanol	Alcohol/Ethanol
#10	Carisoprodol	Diazepam	Diazepam	Methamphetamine	Diazepam	Methadone	Heroin
#10			Amitriptyline		Buprenorphine		
#10			Methamphetamine				

*includes fentanyl (38), acetyl fentanyl (7), acryl fentanyl (1), carfentanil (3), despropionyl fentanyl (3), furanyl fentanyl (10)

Data Source: Knox County RFC Medical Examiner Database, 2010 to 2016 and MDILog Database 2016. Knoxville, TN.

Note:
1. Some drugs can be classified as Pharmaceutical and Non-Pharmaceutical which accounts for the difference in numbers between this graph and the "Drug List" graph count.
2. This report only notes the presence of the drug contributing to death but does not indicate the appropriate or legal use of a drug.
3. Drug poisoning deaths may involve more than one specific substance.
4. Some drugs are listed as Not Otherwise Specified (NOS) because information was obtained from sources that did not define drug type.

Above are the Top 10 Drugs found in Drug Related Deaths by year for Knox and Anderson Counties. The following pages will take several different views of the Drugs found in the Drug Related Deaths reported by the Regional Forensic Center. Please be sure to look at the notes with each slide and remember the caveats stated earlier in this document.

Fentanyl and its analogues have emerged as the most prominent drug found in Drug Related Deaths.

Knox County Regional Forensic Center Drugs Found in Drug Related Deaths in 2010			
	Total Cases (N=101)		
Drug	Knox (N=87)	Anderson (N=14)	Total
Oxycodone	46	8	54
Alprazolam	21	2	23
Morphine	17	2	19
Methadone	14	2	16
Oxymorphone	14	2	16
Cocaine	10	2	12
Alcohol/Ethanol	7	2	9
Hydrocodone	8	1	9
Diazepam	4	2	6
Carisoprodol	5		5
Benzodiazepine (NOS)	4		4
Fentanyl	4		4
Fluoxetine	2	1	3
Amitriptyline	2		2
Amphetamine	2		2
Citalopram	1	1	2
Diphenhydramine	1	1	2
Promethazine	2		2
Propoxyphene	2		2
Quetiapine	2		2
1,1 DFE	1		1
Bupropion	1		1
Clonazepam	1		1
Dextro Methorphan		1	1
Doxepin		1	1
Insulin	1		1
Lamotrigine	1		1
Levetiracetam		1	1
Meprobamate	1		1
Methamphetamine		1	1
Opiates (NOS)	1		1
Paroxetine	1		1
Sertraline	1		1
Topiramate		1	1
Zolpidem		1	1
	177	**32**	**209**

Knox County Regional Forensic Center Drugs Found in Drug Related Deaths in 2011			
	Total Cases (N=98)		
Drug	Knox (N=83)	Anderson (N=15)	Total
Oxycodone	42	8	50
Oxymorphone	21	3	24
Cocaine	17	2	19
Alprazolam	14	2	16
Morphine	11	3	14
Methadone	9	1	10
Alcohol/Ethanol	6	1	7
Hydrocodone	5	1	6
Benzodiazepine (NOS)	5		5
Diazepam	3	1	4
Citalopram	3		3
Sertraline	3		3
Amitriptyline	1	1	2
Carisoprodol	2		2
Diphenhydramine	2		2
Fentanyl	2		2
Fluoxetine	1	1	2
Hydroxyzine	1	1	2
Opiates (NOS)	2		2
Quetiapine	2		2
Salicylate	1	1	2
Tramadol	2		2
Zolpidem	1	1	2
Acetaminophen	1		1
Clonazepam		1	1
Cyclobenzaprine	1		1
Dextro Methorphan	1		1
Diltiazem	1		1
Doxepin	1		1
Duloxetine	1		1
Ethanol		1	1
Isopropanol	1		1
Metformin	1		1
Metoprolol		1	1
Mirtazapine	1		1
Norbuprenorphine	1		1
Norfluoxetine	1		1
Olanzapine	1		1
Promethazine	1		1
	169	**30**	**199**

Knox County Regional Forensic Center Drugs Found in Drug Related Deaths in 2012			
	Total Cases (N=106)		
Drug	Knox (N=87)	Anderson (N=19)	Total
Oxycodone	32	8	40
Morphine	18	3	21
Cocaine	15	3	18
Oxymorphone	15	2	17
Alprazolam	8	4	12
Methadone	11	1	12
Fentanyl	6	3	9
Hydrocodone	8	1	9
Alcohol/Ethanol	7	1	8
Amitriptyline	3	1	4
Diazepam	4		4
Methamphetamine	2	2	4
Fluoxetine	3		3
Sertraline	3		3
Amphetamine	1	1	2
Benzodiazepine (NOS)	1	1	2
Buprenorphine	1	1	2
Opiates (NOS)	2	1	3
Paroxetine	2		2
Tramadol		2	2
1,1 DFE	1		1
Benztropine	1		1
Bupropion		1	1
Cyclobenzaprine		1	1
Doxepin	1		1
Duloxetine	1		1
Nortriptyline		1	1
Quetiapine	1		1
Salicylate	1		1
Venlafaxine	1		1
	149	**38**	**187**

Knox County Regional Forensic Center
Drugs Found in Drug Related Deaths in 2013

Drug	Total Cases (N=136)		
	Knox (N=114)	Anderson (N=22)	Total
Oxycodone	33	7	40
Morphine	20	5	25
Alprazolam	17	6	23
Cocaine	20	2	22
Oxymorphone	19	1	20
Methadone	10	5	15
Hydrocodone	9	5	14
Ethanol	11		11
Opiates (NOS)	11		11
Methamphetamine	7	2	9
Benzodiazepine (NOS)	4	2	6
Fentanyl	4	1	5
Cyclobenzaprine	4		4
Tramadol	4		4
Buprenorphine	3		3
Citalopram	2	1	3
Bupropion		2	2
Diazepam	2		2
Mirtazapine	2		2
Quetiapine	1	1	2
Acetaminophen	1		1
Acetone	1		1
Amitriptyline	1		1
Butane	1		1
Donepezil		1	1
Doxepin	1		1
Doxylamine		1	1
Fluoxetine		1	1
Isopropanol	1		1
Isoprpyl Alcohol	1		1
Methotrexate		1	1
Methylone	1		1
Metoprolol	1		1
Paroxetine	1		1
Promethazine	1		1
Propane	1		1
Propofol	1		1
Salicylate	1		1
Sertraline		1	1
Sevoflurane	1		1
Toluene	1		1
Venlafaxine	1		1
Verapamil	1		1
Zolpidem	1		1
	202	**45**	**247**

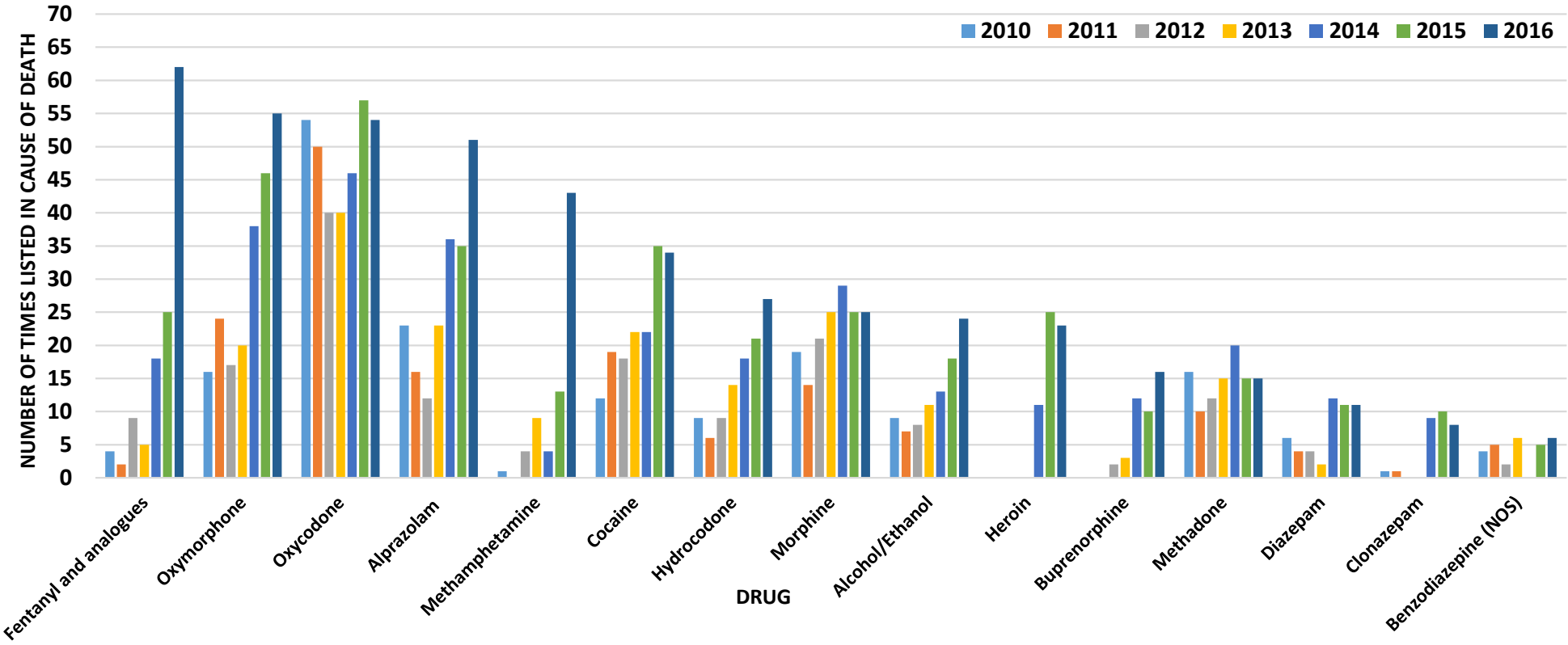
Knox County Regional Forensic Center Drugs Found in Drug Related Deaths in 2014			
	Total Cases (N=178)		
Drug	Knox (N=155)	Anderson (N=23)	Total
Oxycodone	36	10	46
Oxymorphone	35	3	38
Alprazolam	31	5	36
Morphine	27	2	29
Cocaine	17	5	22
Methadone	18	2	20
Fentanyl	16	2	18
Hydrocodone	16	2	18
Alcohol/Ethanol	10	3	13
Buprenorphine	10	2	12
Diazepam	12		12
Heroin	11		11
Clonazepam	5	4	9
1,1 DFE	4		4
Diphenhydramine	3	1	4
Methamphetamine	3	1	4
Cyclobenzaprine	3		3
Ethanol		3	3
Norbuprenorphine	2	1	3
Acetaminophen		2	2
Amitriptyline	2		2
Amphetamine	2		2
Butalbital	1	1	2
Citalopram	2		2
Codeine	2		2
Fluoxetine	1	1	2
Nortriptyline	2		2
Tramadol	2		2
Venlafaxine	1	1	2
Bupropion	1		1
Doxepin		1	1
Duloxetine	1		1
Gabapentin	1		1
Hydroxyzine	1		1
Methyl ethanol	1		1
Mirtazapine	1		1
Paroxetine	1		1
Sertraline	1		1
Verapamil	1		1
Zolpidem	1		1
	284	**52**	**336**

Knox County Regional Forensic Center Drugs Found in Drug Related Deaths in 2015			
	Total Cases (N=200)		
Drug	Knox (N=170)	Anderson (N=30)	Total
Oxycodone	47	10	57
Oxymorphone	38	8	46
Alprazolam	32	3	35
Cocaine	35		35
Heroin	24	1	25
Morphine	21	4	25
Fentanyl	17	7	24
Hydrocodone	20	1	21
Alcohol/Ethanol	17	1	18
Methadone	13	2	15
Methamphetamine	9	4	13
Diazepam	8	3	11
Buprenorphine	8	2	10
Clonazepam	8	2	10
Cyclobenzaprine	8		8
Benzodiazepine (NOS)	5		5
Opiates (NOS)	5		5
Diphenhydramine	4		4
Duloxetine	2	1	3
Promethazine	1	2	3
Zolpidem	3		3
Bupropion	1	1	2
Fluoxetine	2		2
Lorazepam	2		2
Tramadol	2		2
Venlafaxine	2		2
1,1 DFE	1		1
Acetaminophen	1		1
Acetyl fentanyl	1		1
Amitriptyline	1		1
Amphetamine	1		1
Chlorpheniramine	1		1
Citalopram		1	1
Codeine	1		1
Donepezil		1	1
Hydroxyzine		1	1
Isopropanol		1	1
Methylphenidate		1	1
Mirtazapine		1	1
Olanzapine	1		1
Paroxetine	1		1
Phentermine	1		1
Quetiapine	1		1
Risperidone	1		1
Salicylate	1		1
Sertraline	1		1
Topiramate	1		1
	349	**58**	**407**

Knox County Regional Forensic Center			
Drugs Found in Drug Related Deaths in 2016			
	2016 (N=256)		
Drug	**Knox (N=224)**	**Anderson (N=32)**	**Total**
Fentanyl and Analogues	56	6	62
Fentanyl	*34*	*4*	*38*
Furanyl Fentanyl	*8*	*2*	*10*
Acetyl Fentanyl	*7*	*0*	*7*
Carfentanil	*3*	*0*	*3*
Despropionyl Fentanyl/4ANPP	*3*	*0*	*3*
Acryl Fentanyl	*1*	*0*	*1*
Oxymorphone	47	8	55
Oxycodone	43	11	54
Alprazolam	45	6	51
Methamphetamine	36	7	43
Cocaine	32	2	34
Hydrocodone	21	6	27
Morphine	20	5	25
Alcohol/Ethanol	20	4	24
Heroin	21	2	23
Buprenorphine	13	3	16
Methadone	14	1	15
Diphenhydramine	9	2	11
Diazepam	11	0	11
Clonazepam	4	4	8
Cyclobenzaprine	5	3	8
Amphetamine	2	4	6
Benzodiazepine NOS	5	1	6
Citalopram	4	2	6
Hydroxyzine	4	2	6
Sertraline	6	0	6
Bupropion	4	1	5
Opiates/Opioids NOS	4	0	4
Doxepin	3	0	3
Fluoxetine	3	0	3
Lamotrigine	3	0	3
Lorazepam	2	1	3
Promethazine	2	1	3
Salicylate	2	1	3
Tramadol	3	0	3
U-47700	2	1	3
Amitriptyline	3	0	3

Knox County Regional Forensic Center Drugs Found in Drug Related Deaths in 2016 (CONTINUED)			
Drug	**Knox (N=224)**	**Anderson (N=32)**	**Total**
Acetaminophen	2	0	2
Amlodipine	2	0	2
Chlorpheniramine	2	0	2
Etizolam	1	1	2
Hydromorphone	1	1	2
Quetiapine	2	0	2
Zolpidem	1	1	2
1,1 DFE	2	0	2
Oxazepam	2	0	2
Temazepam	2	0	2
Olanzapine	2	0	2
Ace Inhibitor	1	0	1
Aripiprazole	1	0	1
Atenolol	1	0	1
Butalbital	1	0	1
Carisoprodol	1	0	1
Codeine	1	0	1
Dextro/Levo Methorphan	1	0	1
Dextromethorphan	0	1	1
Doxylamine	0	1	1
Hydrochlorothiazide	1	0	1
Levamisole	1	0	1
Lisinopril	1	0	1
Lithium (based on PMH)	1	0	1
Loperamide	1	0	1
Loxapine	0	1	1
Meprobamate	1	0	1
Metformin	1	0	1
Mirtazapine	1	0	1
Mitragynine	1	0	1
Paroxetine	1	0	1
Phentermine	1	0	1
Phenylpropanolamine	0	1	1
Pseudoephedrine	1	0	1
Seroquel	1	0	1
Topiramate	1	0	1
Trazodone	1	0	1
Venlafaxine	1	0	1
	491	**91**	**582**

Knox and Anderson Counties
Drug Count for Top 10 Drugs by Year for Drug Related Cases
2010 - 2016

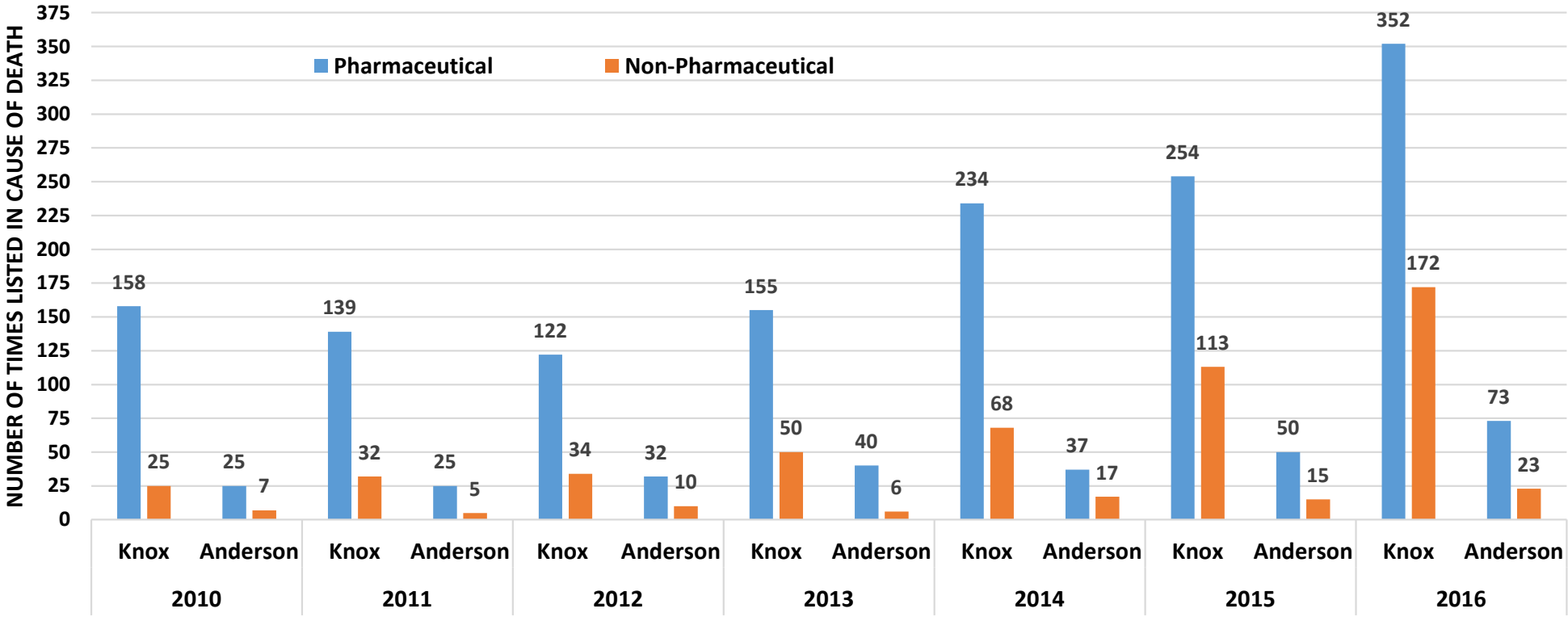


Data Source: Knox County RFC Medical Examiner Database, 2010 to 2016 and MDILog Database 2016. Knoxville, TN.

Note: 1. Some drugs can be classified as Pharmaceutical and Non-Pharmaceutical which accounts for the difference in numbers between this graph and the "Drug List" graph count.
2. This report only notes the presence of the drug contributing to death but does not indicate the appropriate or legal use of a drug.
3. Drug poisoning deaths may involve more than one specific substance.
4. Some drugs are listed as Not Otherwise Specified (NOS) because information was obtained from sources that did not define drug type.

Fentanyl and its analogues have become the most prevalent drug found in Drug Related Deaths. Oxymorphone, Oxycodone, and Alprazolam continue to be very prevalent prescription drugs found in Drug Related Deaths. Note the rise of Methamphetamine in 2016. The rise in illicit drugs is probably due to increased regulation of prescription drug prescribing practices.

Knox and Anderson Counties
Pharmaceutical vs Non-Pharmaceutical Drug Related Deaths
2010 - 2016

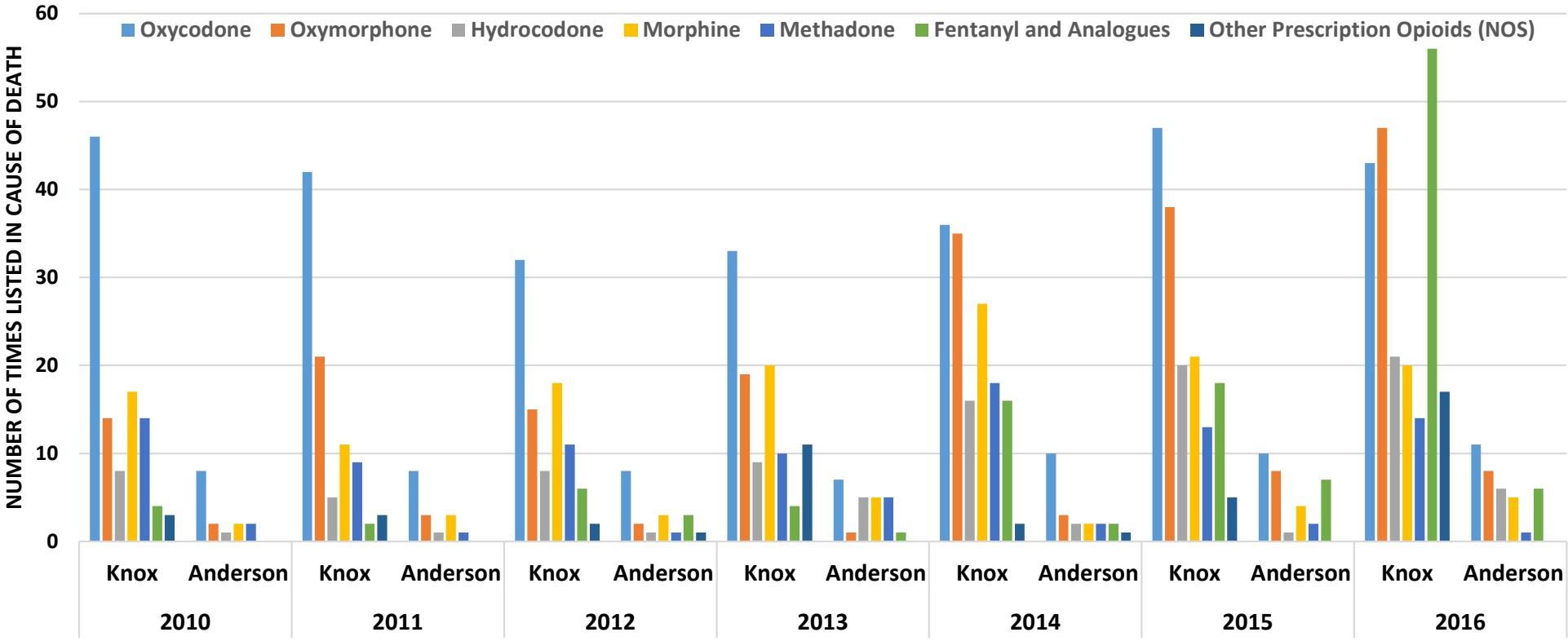


Data Source: Knox County RFC Medical Examiner Database, 2010 to 2016 and MDILog Database 2016. Knoxville, TN.

Note: 1. Some drugs can be classified as Pharmaceutical and Non-Pharmaceutical which accounts for the difference in numbers between this graph and the "Drug List" graph count.
2. This report only notes the presence of the drug contributing to death but does not indicate the appropriate or legal use of a drug.
3. Drug poisoning deaths may involve more than one specific substance.
4. Some drugs are listed as Not Otherwise Specified (NOS) because information was obtained from sources that did not define drug type.

In Knox and Anderson counties, pharmaceutical (or prescription) drugs are the predominant cause of death in Drug Related Death cases. The RFC staff does utilize Tennessee's Controlled Substance Monitoring Database (CSMD) to check each decedent's dispensed medications but we cannot verify if the medications were used appropriately.

Knox and Anderson Counties
Drug Deaths Involving Opioids
2010 - 2016

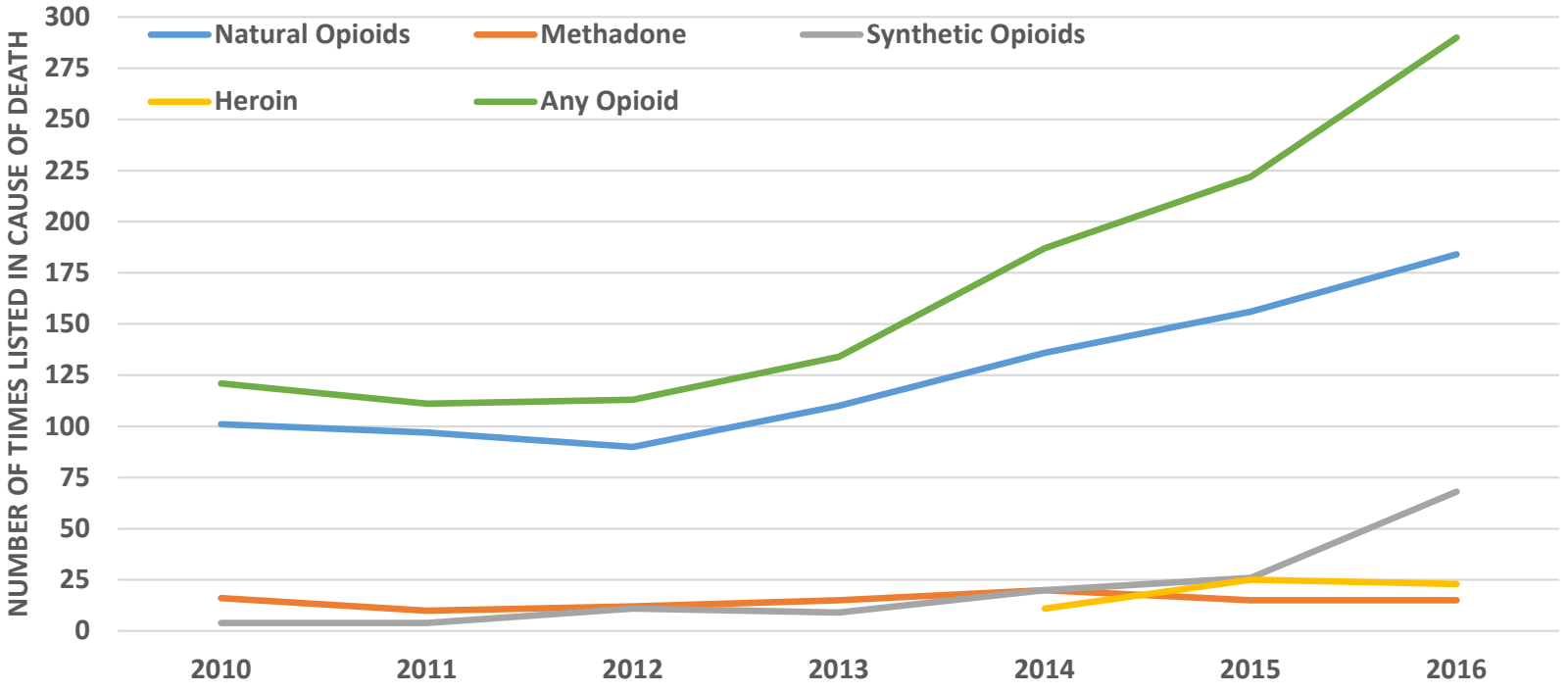


Data Source: Knox County RFC Medical Examiner Database, 2010 to 2016 and MDILog Database 2016. Knoxville, TN.

Note: 1. Prescription Opioid deaths drive the increase in drug overdose deaths in Knox and Anderson counties and in the US according to CDC data (http://www.cdc.gov/drugoverdose/data/index.html).
2. This report only notes the presence of the drug contributing to death but does not indicate the appropriate or legal use of a drug.
3. Drug poisoning deaths may involve more than one specific substance.
4. Some drugs are listed as Not Otherwise Specified (NOS) because information was obtained from sources that did not define drug type.

Within the Opioid classification, Fentanyl and its analogues are the drug found most often in Drug Related Death cases in 2016. This is a shift from the prescribed drug Oxycodone being the most prominent drug found in Drug Related Deaths.

Knox and Anderson Counties
Drug Deaths Involving Opioids
2010 - 2016

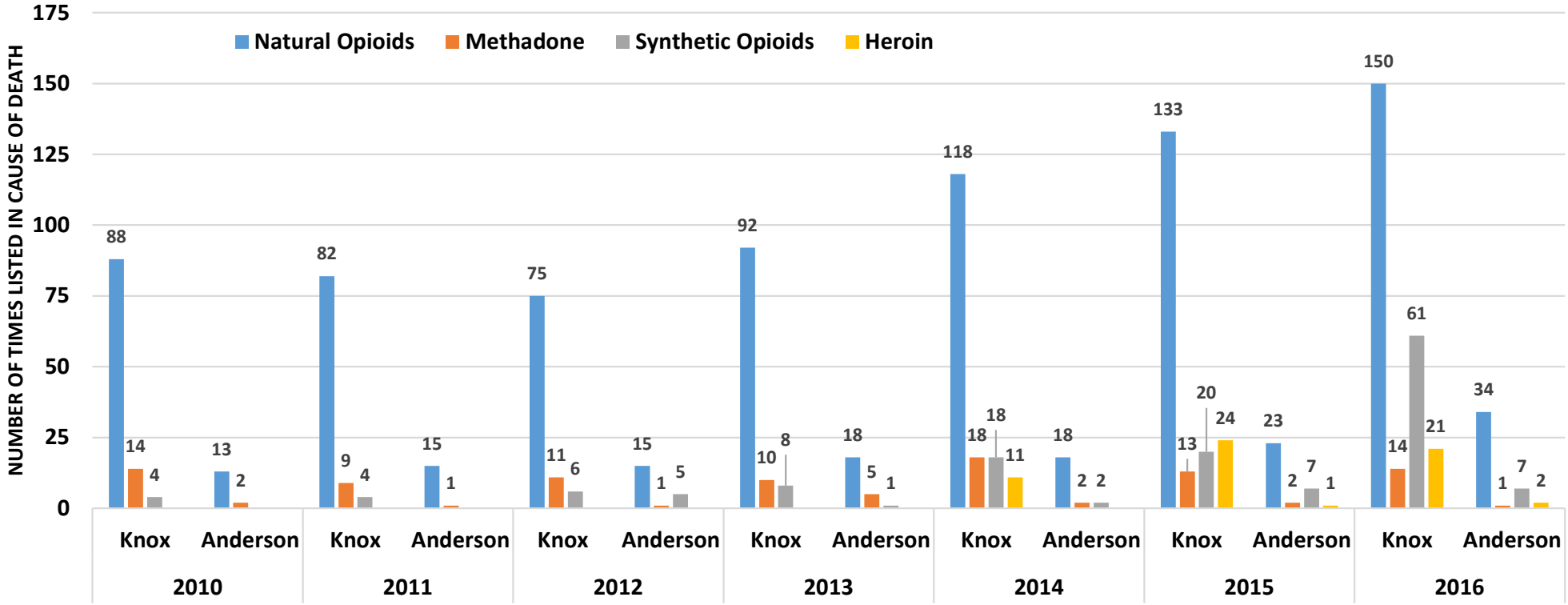


The CDC looks at four categories of opioids:
1) Natural opioid analgesics, including morphine and codeine, and **semi-synthetic opioid analgesics,** including drugs such as oxycodone, hydrocodone, hydromorphone, and oxymorphone;
2) Methadone, a synthetic opioid;
3) Synthetic opioid analgesics other than methadone, including drugs such as tramadol and fentanyl; and
4) Heroin, an illicit (illegally-made) opioid synthesized from morphine that can be a white or brown powder, or a black sticky substance.

Data Source: Knox County RFC Medical Examiner Database, 2010 to 2016 and MDILog Database 2016. Knoxville, TN.
Note: 1. Some drugs can be classified as Pharmaceutical and Non-Pharmaceutical which accounts for the difference in numbers between this graph and the "Drug List" graph count.
2. This report only notes the presence of the drug contributing to death but does not indicate the appropriate or legal use of a drug.
3. Drug poisoning deaths may involve more than one specific substance.
4. Some drugs are listed as Not Otherwise Specified (NOS) because information was obtained from sources that did not define drug type.

In looking at the chart above, Knox and Anderson counties show the same type of data results as those being seen across the nation for Drug Related Deaths. However, Knox and Anderson counties have a much greater prescription Drug Related Death issue. CDC data from 2000-2015 indicated that Opioid overdoses were driving the increase in drug overdoses overall. In addition, CDC data indicated that prescription Opioids lead the Opioid category.

Knox and Anderson Counties
Drug Deaths Involving Opioids by County
2010 - 2016

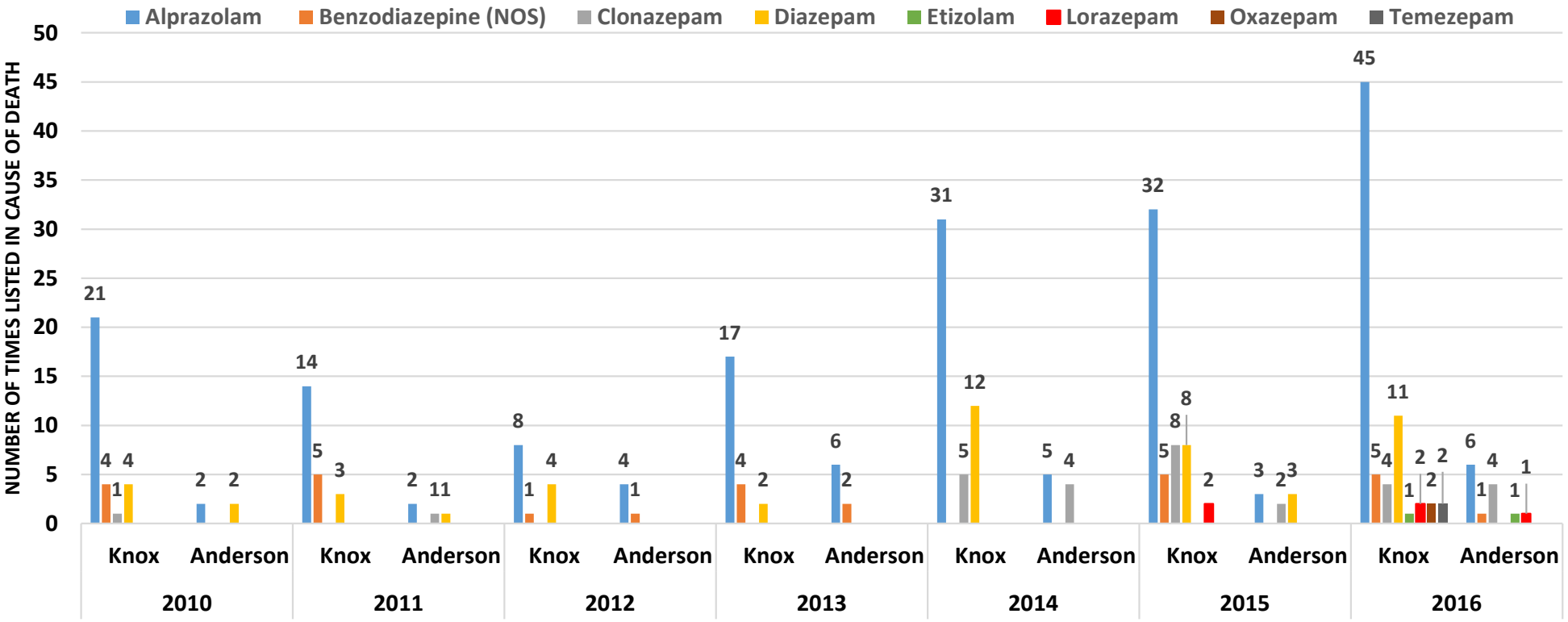


Data Source: Knox County RFC Medical Examiner Database, 2010 to 2016. Knox County MDILog Database 2016. Knoxville, TN.

Note: 1. Some drugs can be classified as Pharmaceutical and Non-Pharmaceutical which accounts for the difference in numbers between this graph and the "Drug List" graph count.
2. This report only notes the presence of the drug contributing to death but does not indicate the appropriate or legal use of a drug.
3. Drug poisoning deaths may involve more than one specific substance.
4. Some drugs are listed as Not Otherwise Specified (NOS) because information was obtained from sources that did not define drug type.

The above graph keeps the CDC classification for Opioids and provides a breakdown for Knox and Anderson counties.

Knox and Anderson Counties
Drug Deaths Involving Benzodiazepine
2010 - 2016

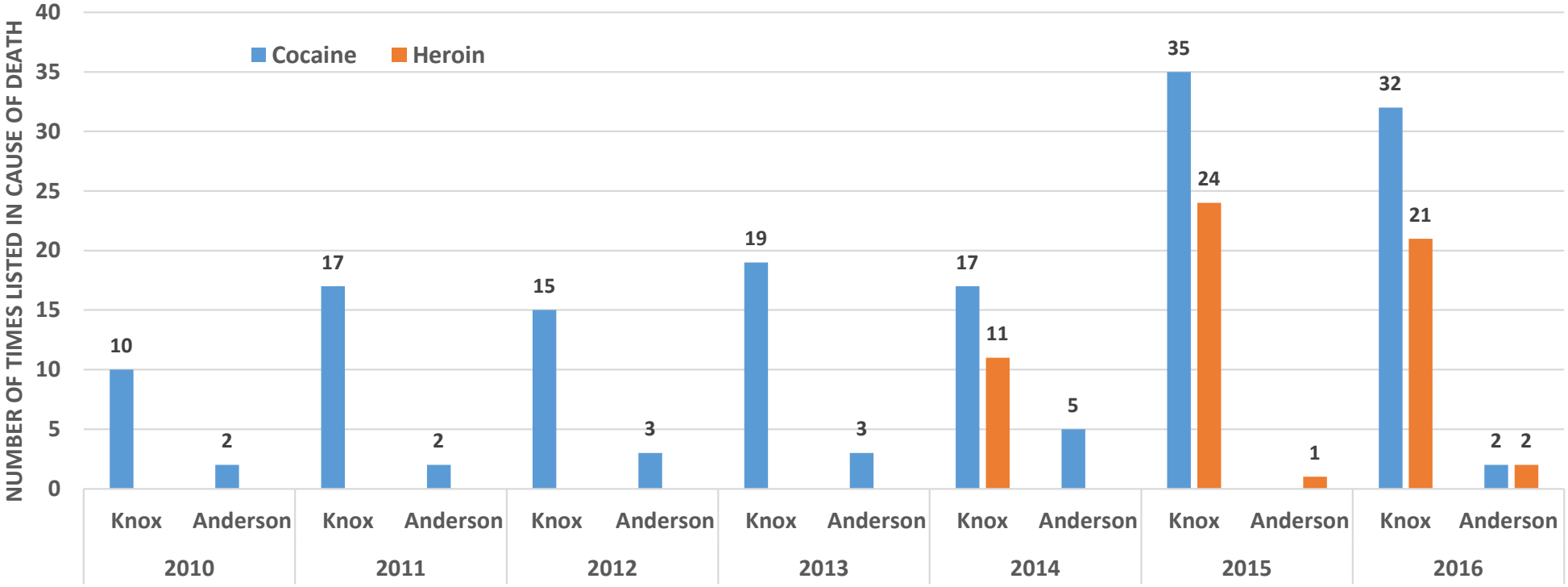


Data Source: Knox County RFC Medical Examiner Database, 2010 to 2016 and MDILog Database 2016. Knoxville, TN.

Note: 1. Some drugs can be classified as Pharmaceutical and Non-Pharmaceutical which accounts for the difference in numbers between this graph and the "Drug List" graph count.
2. This report only notes the presence of the drug contributing to death but does not indicate the appropriate or legal use of a drug.
3. Drug poisoning deaths may involve more than one specific substance.
4. Some drugs are listed as Not Otherwise Specified (NOS) because information was obtained from sources that did not define drug type.

Benzodiazepines are another class of drugs involved in Drug Related Deaths. Their presence has increased over the past 7 year period. Alprazolam is the most prevalent drug in this class.

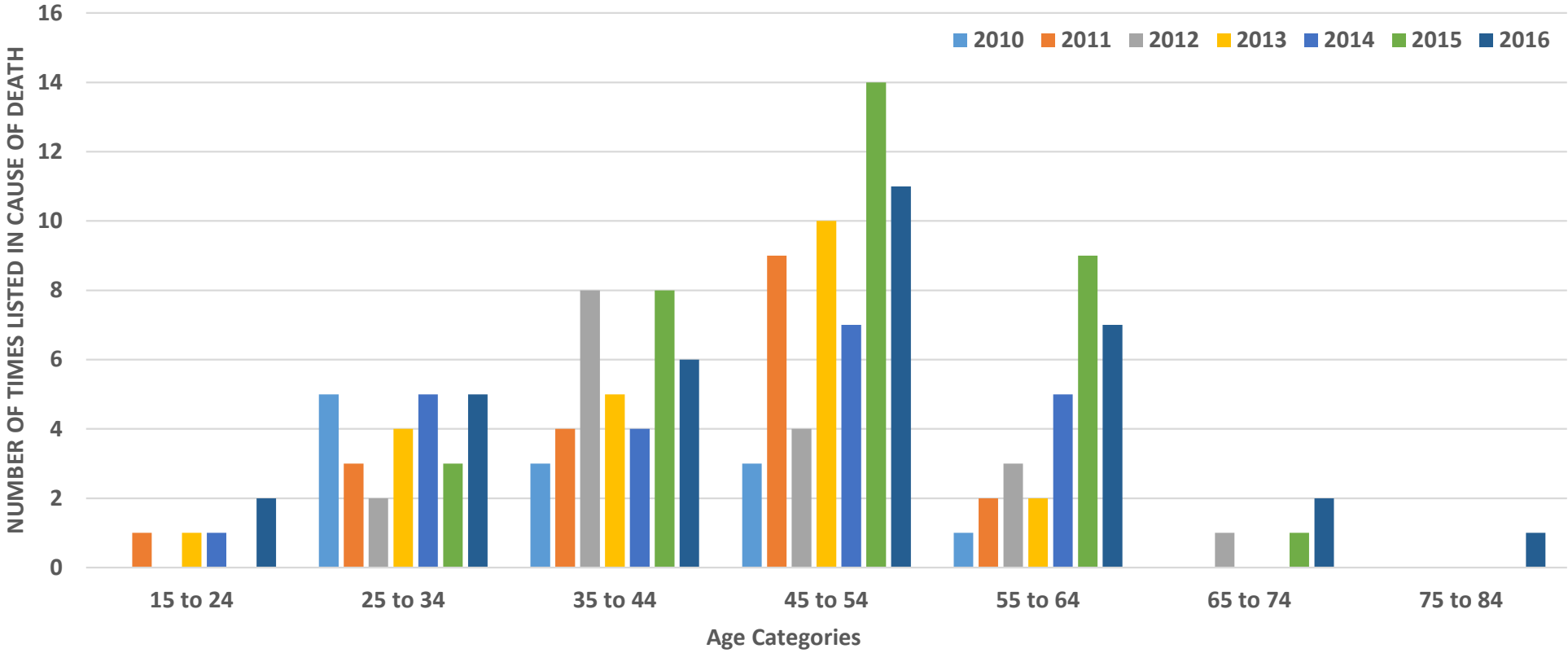
Knox and Anderson Counties
Drug Deaths Involving Cocaine and Heroin
2010 - 2016



Data Source: Knox County RFC Medical Examiner Database, 2010 to 2016 and MDILog Database 2016. Knoxville, TN.
Note: 1. This report only notes the presence of the drug contributing to death.
2. Drug poisoning deaths may involve more than one specific substance.

In 2014, RFC Medical Examiners detected the presence of Heroin in Drug Related Death cases. It does not mean that Heroin was not present in Drug Related Deaths prior to this time. Due to the rapid metabolism of heroin, blood analysis will not always yield supporting evidence of heroin use. Urine and vitreous humor often must be tested for the heroin metabolite 6-monoacetylmorphine (6-MAM), since 6-MAM persists longer in these specimens.

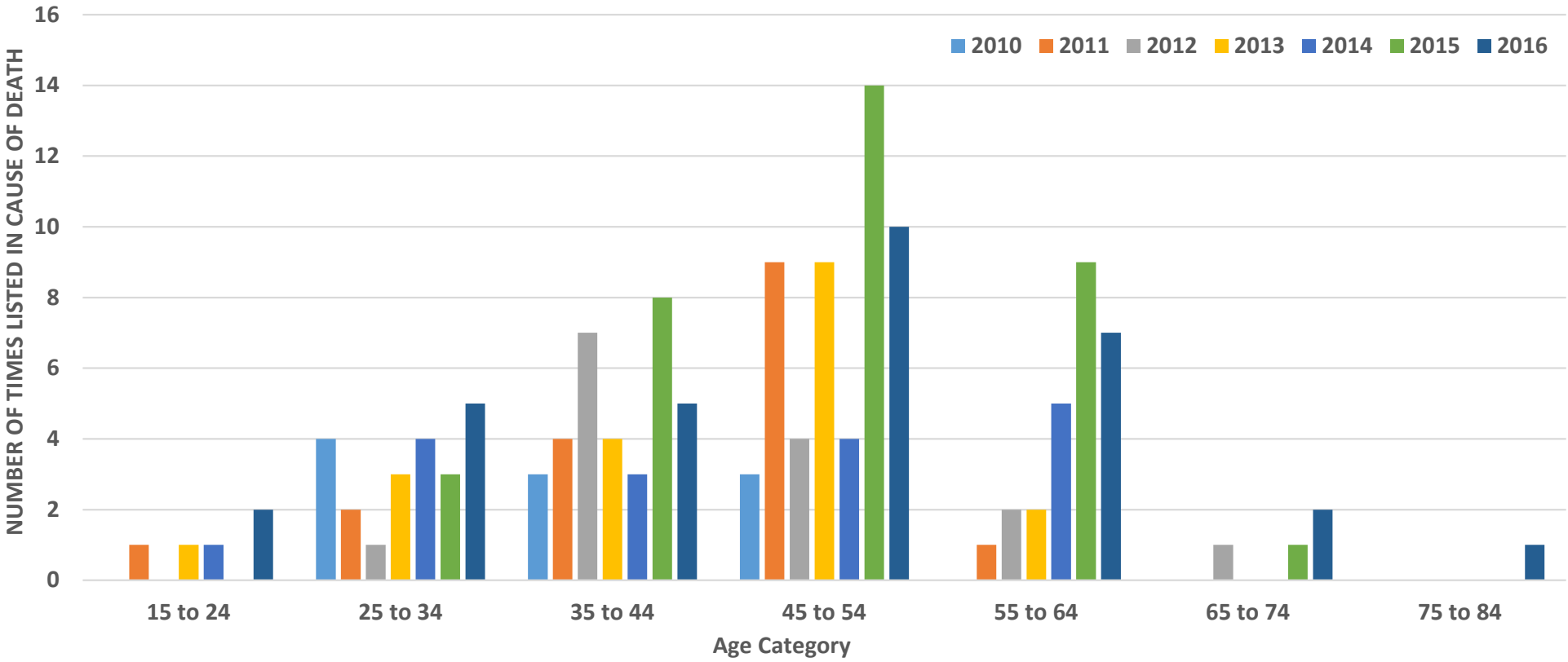
Knox and Anderson Counties
Drug Deaths Involving Cocaine by Age Group
2010 - 2016



Data Source: Knox County RFC Medical Examiner Database, 2010 to 2016 and MDILog Database 2016. Knoxville, TN.

Note: 1. This report only notes the presence of the drug contributing to death.
2. Drug poisoning deaths may involve more than one specific substance.

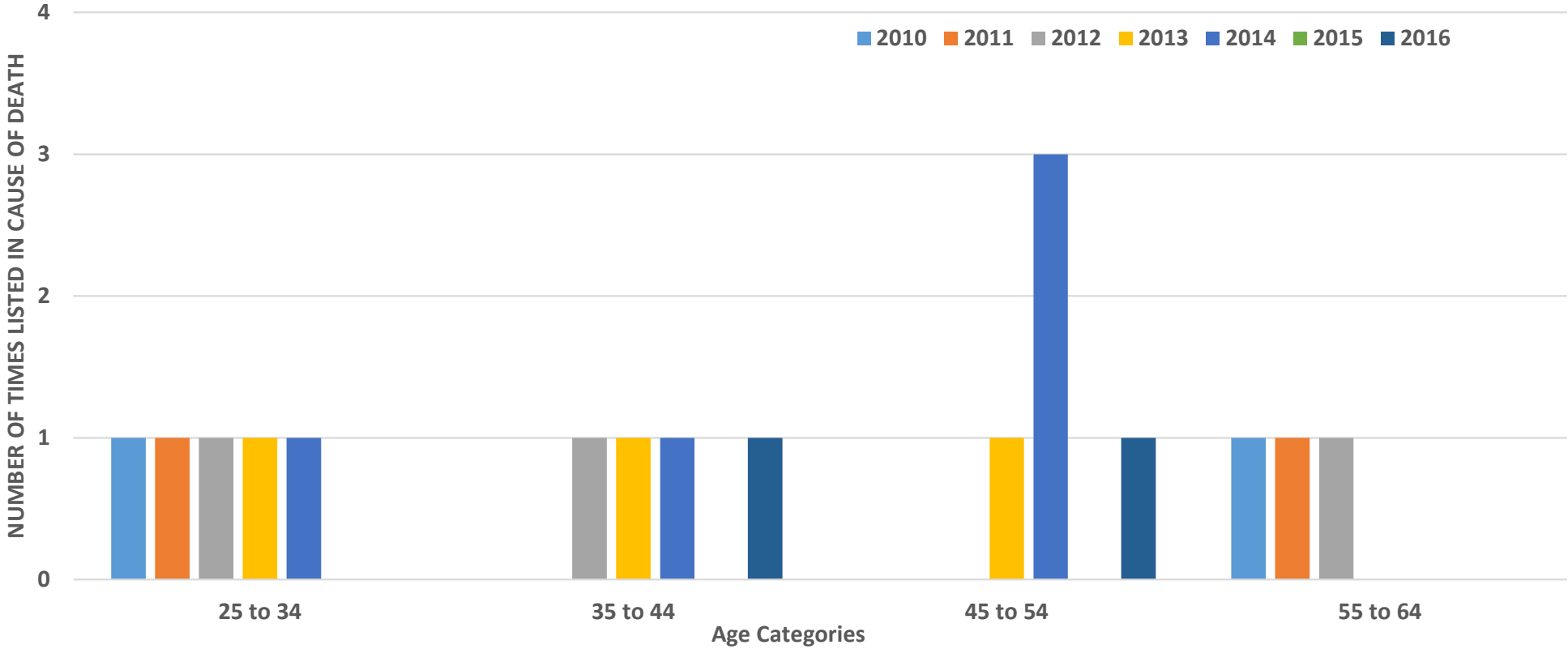
Knox County
Drug Deaths Involving Cocaine by Age Group
2010 - 2016



Data Source: Knox County RFC Medical Examiner Database, 2010 to 2016 and MDILog Database 2016. Knoxville, TN.

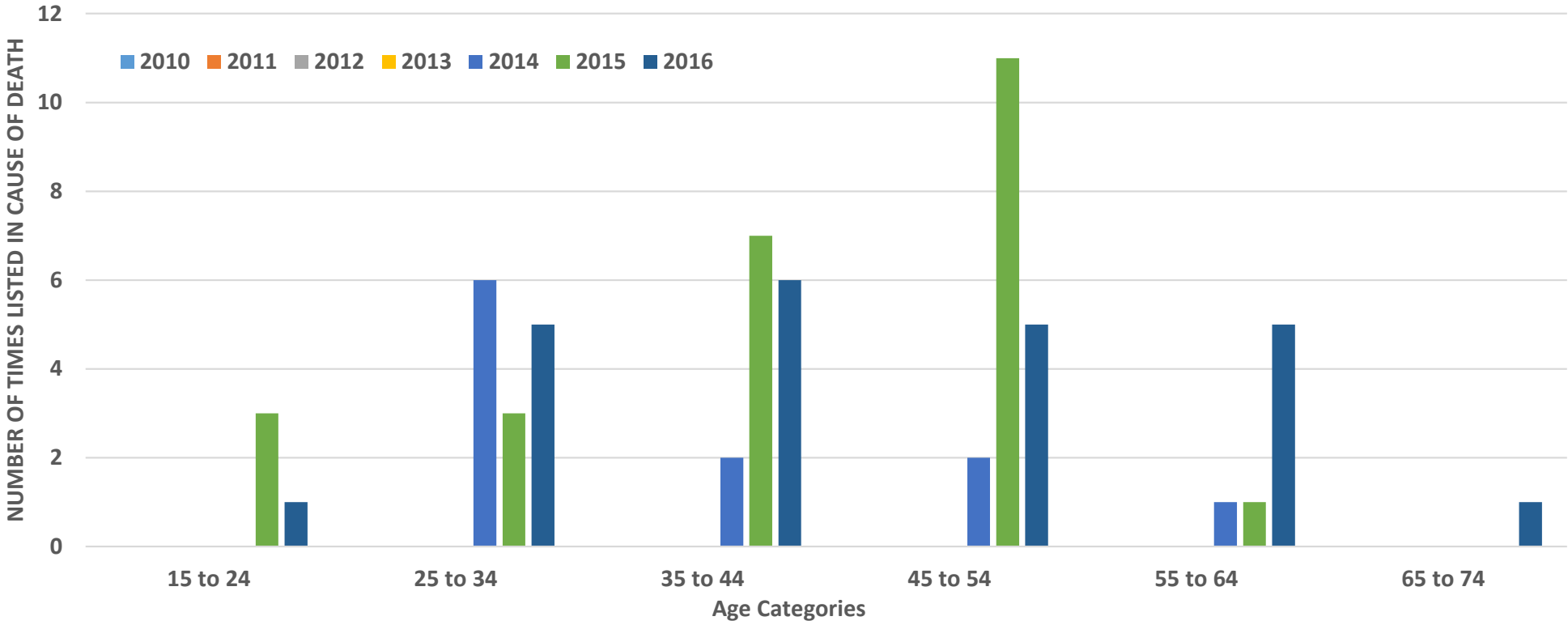
Note: 1. This report only notes the presence of the drug contributing to death.
2. Drug poisoning deaths may involve more than one specific substance.

Anderson County
Drug Deaths Involving Cocaine by Age Group
2010 - 2016



Data Source: Knox County RFC Medical Examiner Database, 2010 to 2016 and MDILog Database 2016. Knoxville, TN.
Note: 1. This report only notes the presence of the drug contributing to death.
2. Drug poisoning deaths may involve more than one specific substance.

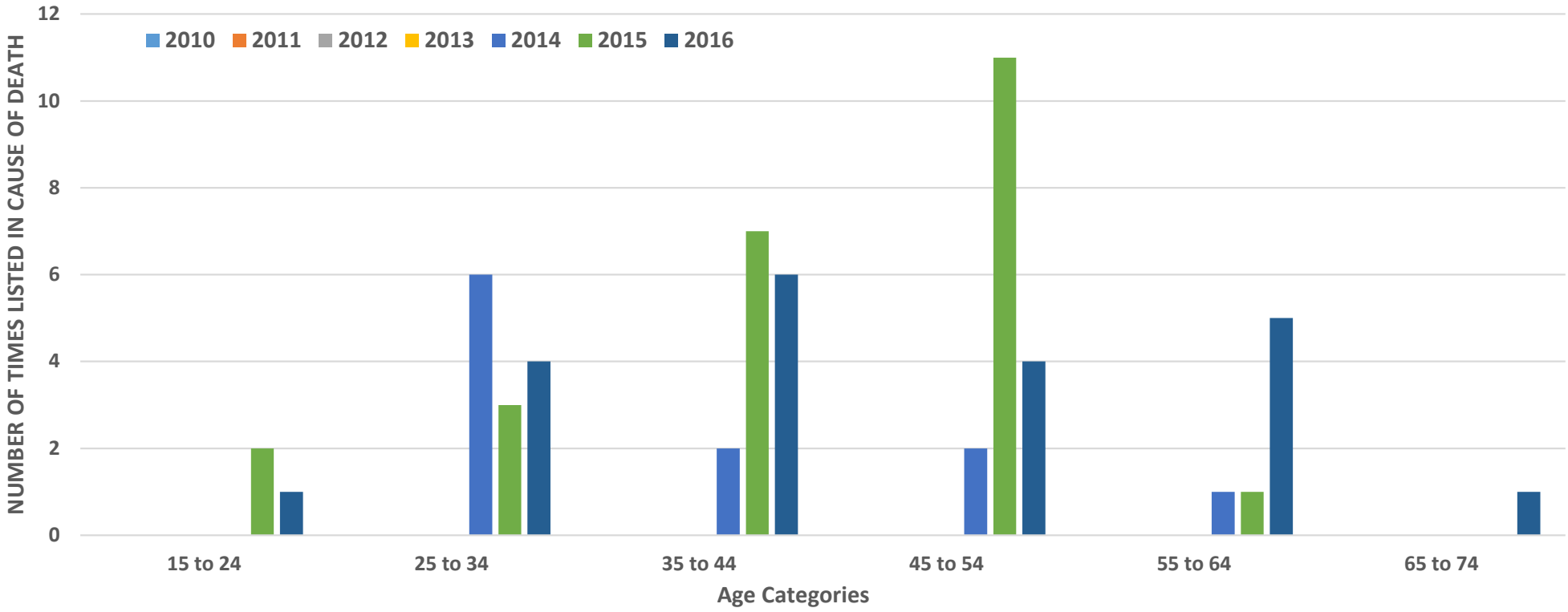
Knox and Anderson Counties
Drug Deaths Involving Heroin by Age
2010 - 2016



Data Source: Knox County RFC Medical Examiner Database, 2010 to 2016 and MDILog Database 2016. Knoxville, TN.
Note: 1. This report only notes the presence of the drug contributing to death.
2. Drug poisoning deaths may involve more than one specific substance.

In 2014, we detected the presence of Heroin in Drug Related Death cases. It does not mean that Heroin was not present in Drug Related Deaths prior to this time. Due to the rapid metabolism of heroin, blood analysis will not always yield supporting evidence of heroin use. Urine and vitreous humor often must be tested for the heroin metabolite 6-monoacetylmorphine (6-MAM), since 6-MAM persists longer in these specimens.

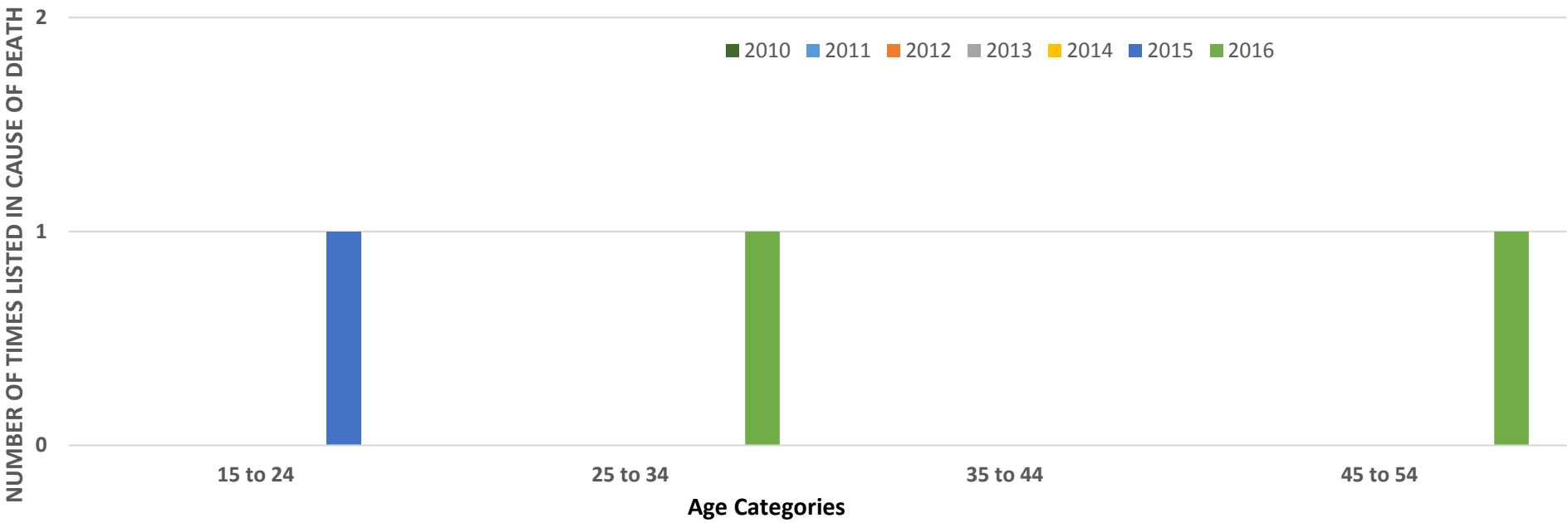
Knox County
Drug Deaths Involving Heroin by Age
2010 - 2016



Data Source: Knox County RFC Medical Examiner Database, 2010 to 2016 and MDILog Database 2016. Knoxville, TN.
Note: 1. This report only notes the presence of the drug contributing to death.
2. Drug poisoning deaths may involve more than one specific substance.

In 2014, we detected the presence of Heroin in Drug Related Death cases. It does not mean that Heroin was not present in Drug Related Deaths prior to this time. Due to the rapid metabolism of heroin, blood analysis will not always yield supporting evidence of heroin use. Urine and vitreous humor often must be tested for the heroin metabolite 6-monoacetylmorphine (6-MAM), since 6-MAM persists longer in these specimens.

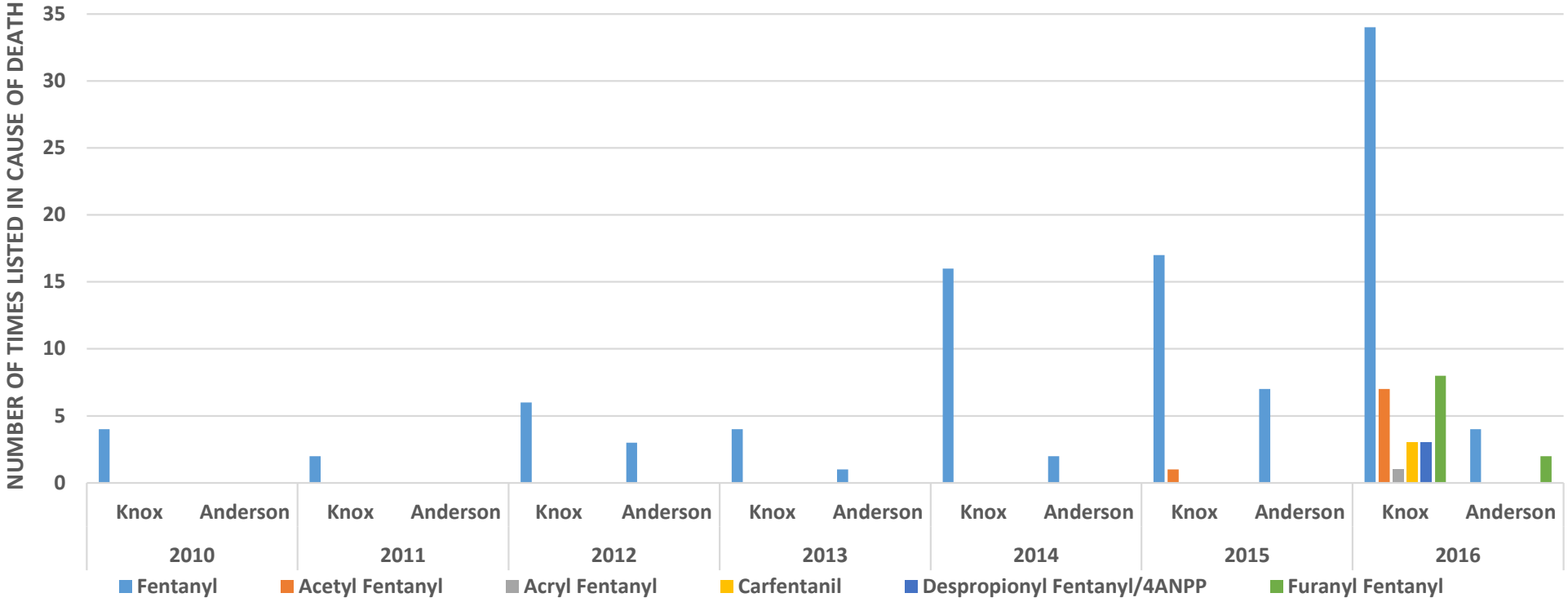
Anderson County
Drug Deaths Involving Heroin by Age
2010 - 2016



Data Source: Knox County RFC Medical Examiner Database, 2010 to 2016 and MDILog Database 2016. Knoxville, TN.
Note: 1. This report only notes the presence of the drug contributing to death.
2. Drug poisoning deaths may involve more than one specific substance.

In 2015, we detected the presence of Heroin in Drug Related Death cases in Anderson County. It does not mean that Heroin was not present in Drug Related Deaths prior to this time. Due to the rapid metabolism of heroin, blood analysis will not always yield supporting evidence of heroin use. Urine and vitreous humor often must be tested for the heroin metabolite 6-monoacetylmorphine (6-MAM), since 6-MAM persists longer in these specimens.

Knox and Anderson Counties
Drug Deaths Involving Fentanyl and Analogues
2010 - 2016



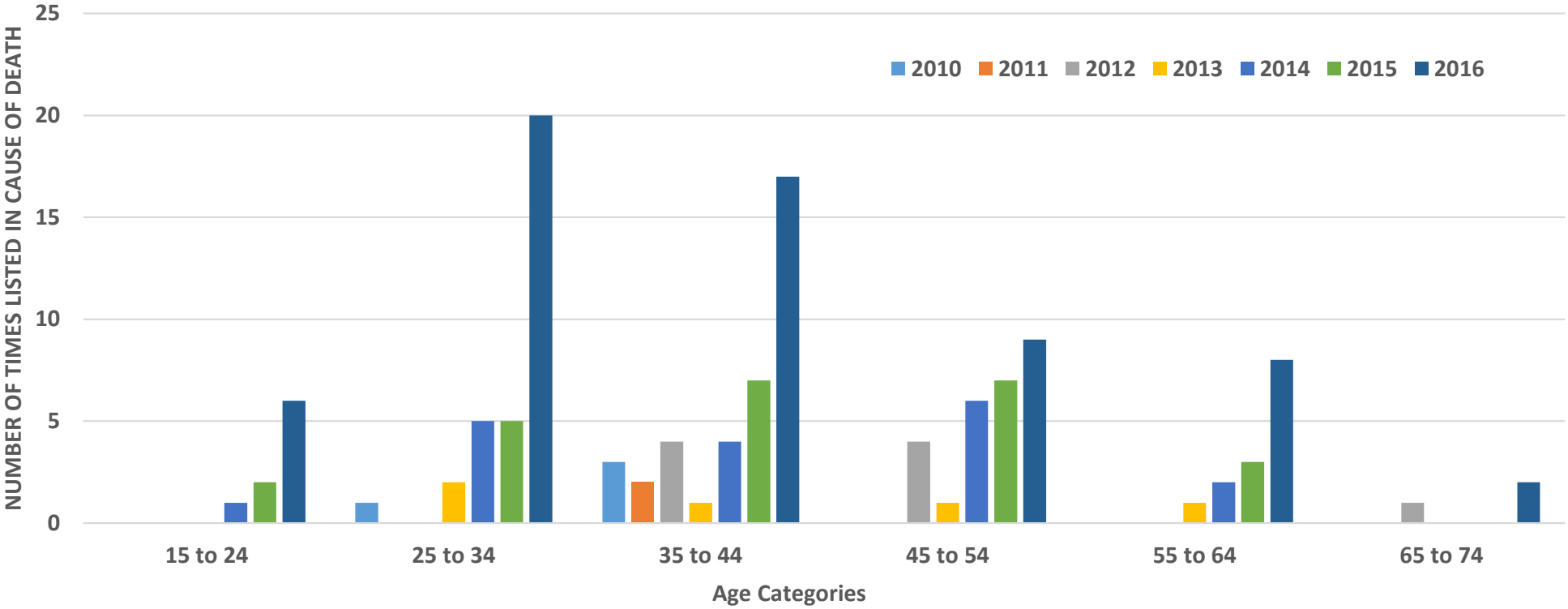
Data Source: Knox County RFC Medical Examiner Database, 2010 to 2016 and MDILog Database 2016. Knoxville, TN.

Note: 1. Some drugs can be classified as Pharmaceutical and Non-Pharmaceutical. This report only notes the presence of the drug contributing to death but does not indicate the origins of the drug. In addition, the report does not ascertain whether the drug was diverted or not.

2. Drug poisoning deaths may involve more than one specific substance.

In 2016, Fentanyl and its analogues became the most predominant drug found in Drug Related Deaths in Knox and Anderson counties. Fentanyl may either be pharmaceutical fentanyl or produced in clandestine labs. Analysis for fentanyl analogues has commenced recently in reference laboratories. The potency of fentanyl analogues vary, but are generally of higher potency than that of fentanyl. Identifying these analogues adds approximately $200 - $500 in testing costs to the autopsy whether positively identified or not.

Knox and Anderson Counties
Drug Deaths Involving Fentanyl by Age
2010 - 2016



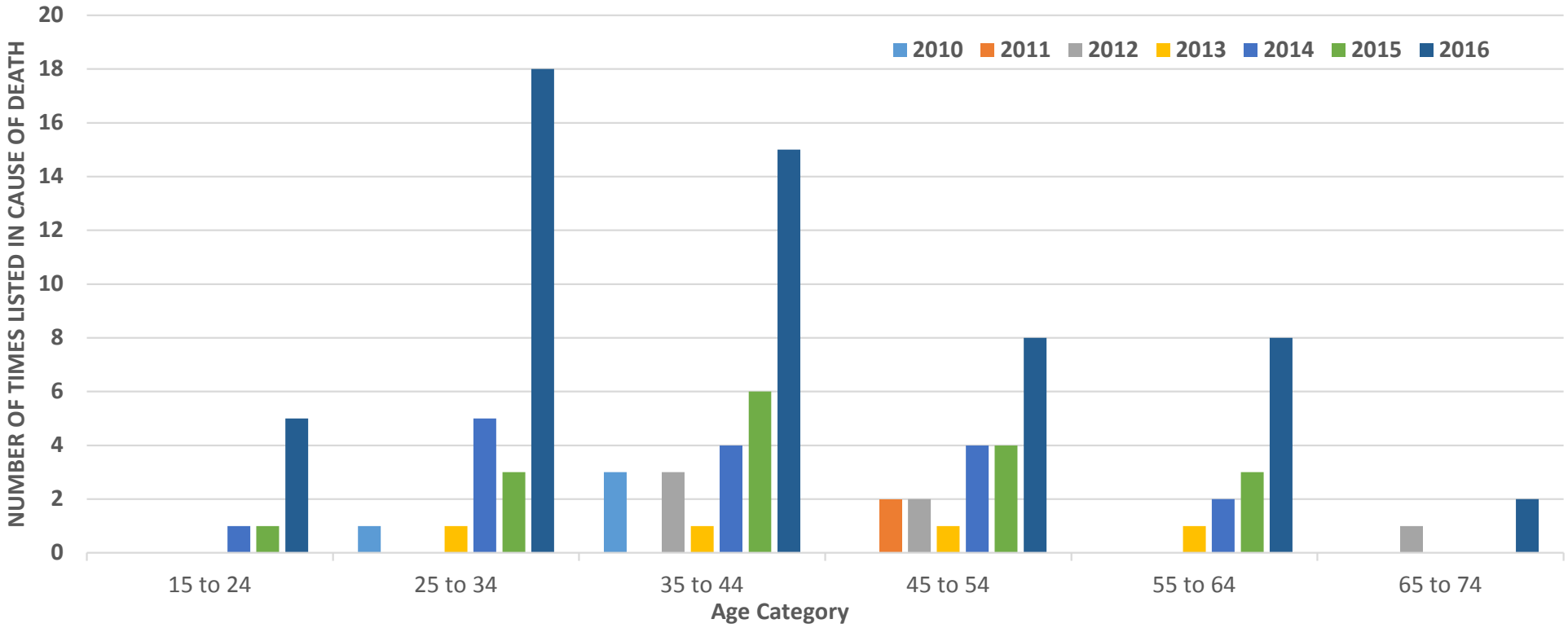
Data Source: Knox County RFC Medical Examiner Database, 2010 to 2016 and MDILog Database 2016. Knoxville, TN.

Note: 1. Some drugs can be classified as Pharmaceutical and Non-Pharmaceutical. This report only notes the presence of the drug contributing to death but does not indicate the origins of the drug. In addition, the report does not ascertain whether the drug was diverted or not.

2. Drug poisoning deaths may involve more than one specific substance.

In 2016, the number of times Fentanyl and its analogues were found in Drug Related Deaths had a 300% increase in the 25 to 34 year age group and more than doubled in the 35 to 44 and 55 to 64 year age groups. Fentanyl may either be pharmaceutical fentanyl or produced in clandestine labs. The potency of fentanyl analogues vary, but are generally of higher potency than that of fentanyl. Identifying these analogues adds approximately $200 - $500 in testing costs to the autopsy whether positively identified or not.

Knox County
Drug Deaths Involving Fentanyl by Age
2010 - 2016



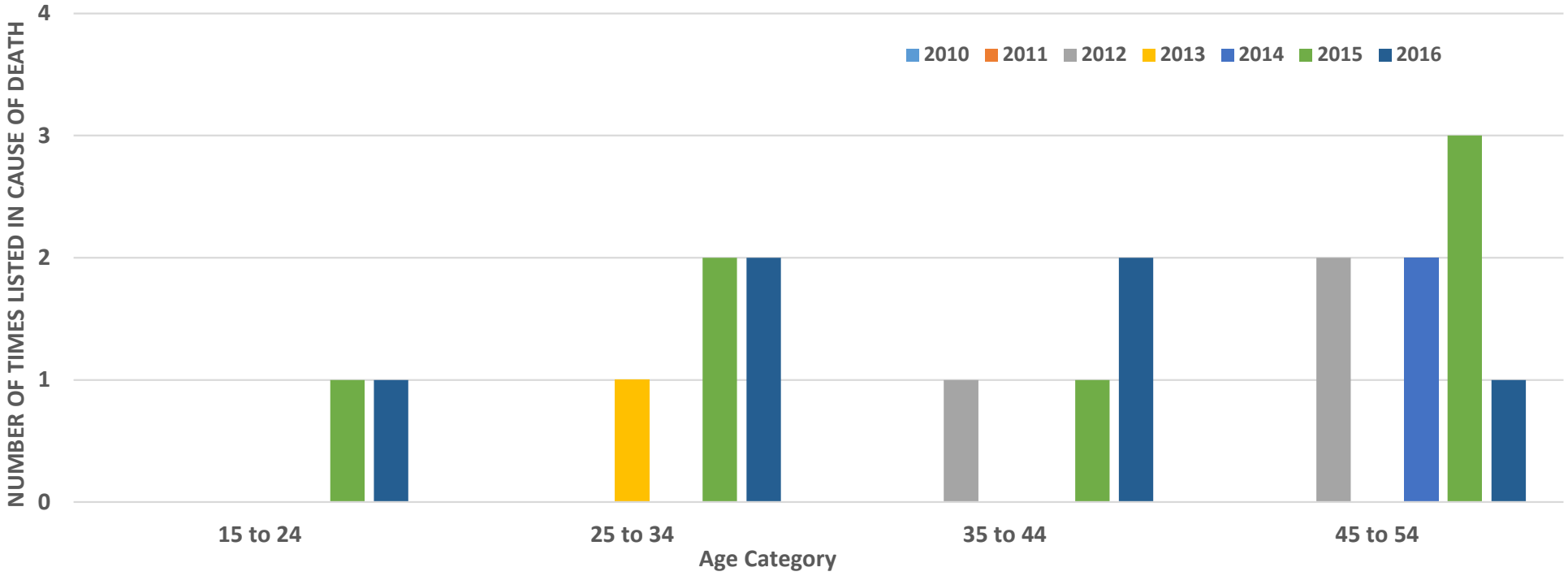
Data Source: Knox County RFC Medical Examiner Database, 2010 to 2016 and MDILog Database 2016. Knoxville, TN.

Note: 1. Some drugs can be classified as Pharmaceutical and Non-Pharmaceutical. This report only notes the presence of the drug contributing to death but does not indicate the origins of the drug. In addition, the report does not ascertain whether the drug was diverted or not.

2. Drug poisoning deaths may involve more than one specific substance.

In 2016, the number of times Fentanyl and its analogues were found in Drug Related Deaths had a 500% increase in the 25 to 34 year age group and more than doubled in the 15 to 24, 35 to 44, and 55 to 64 year age groups. Fentanyl may either be pharmaceutical fentanyl or produced in clandestine labs. The potency of fentanyl analogues vary, but are generally of higher potency than that of fentanyl. Identifying these analogues adds approximately $200 - $500 in testing costs to the autopsy whether positively identified or not.

Anderson County
Drug Deaths Involving Fentanyl by Age
2010 - 2016



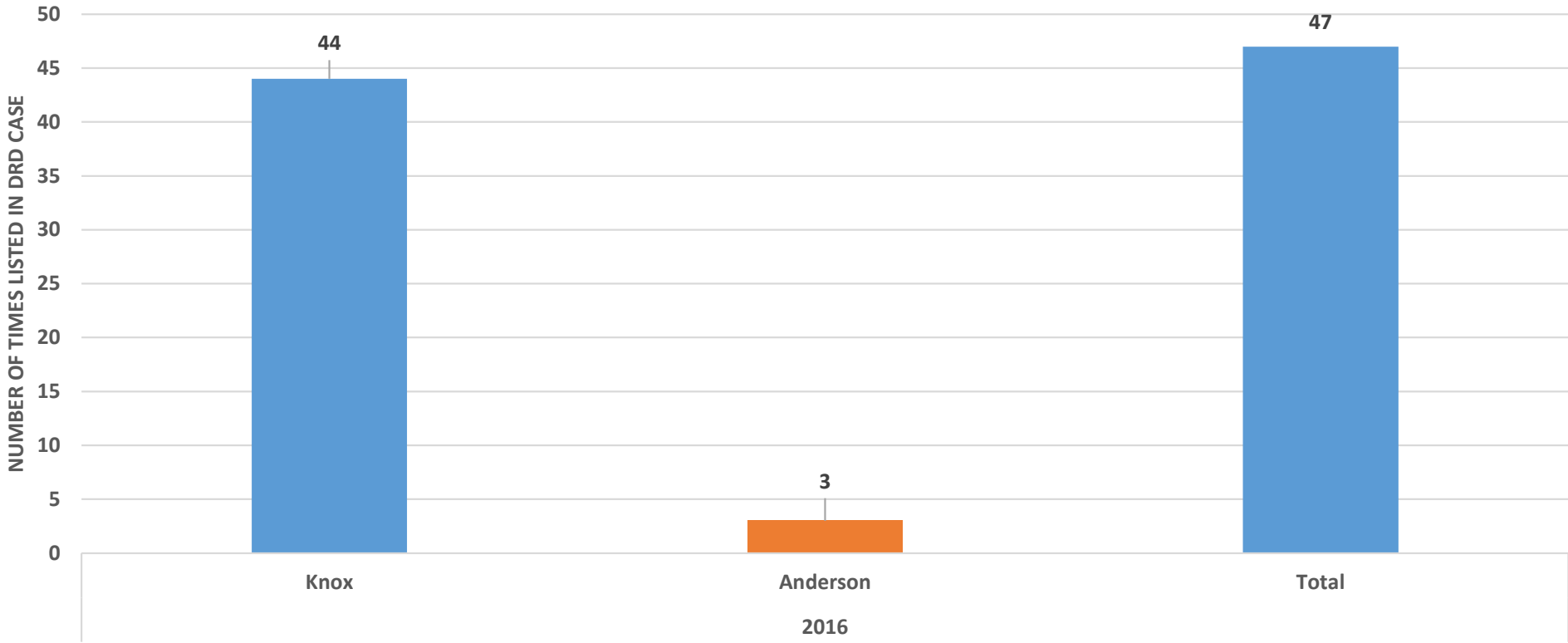
Data Source: Knox County RFC Medical Examiner Database, 2010 to 2016 and MDILog Database 2016. Knoxville, TN.

Note: 1. Some drugs can be classified as Pharmaceutical and Non-Pharmaceutical. This report only notes the presence of the drug contributing to death but does not indicate the origins of the drug. In addition, the report does not ascertain whether the drug was diverted or not.

2. Drug poisoning deaths may involve more than one specific substance.

In 2016, the number of times Fentanyl and its analogues were found in Drug Related Deaths decreased in the 45 to 54 year age group. Fentanyl may either be pharmaceutical fentanyl or produced in clandestine labs. The potency of fentanyl analogues vary, but are generally of higher potency than that of fentanyl. Identifying these analogues adds approximately $200 - $500 in testing costs to the autopsy whether positively identified or not.

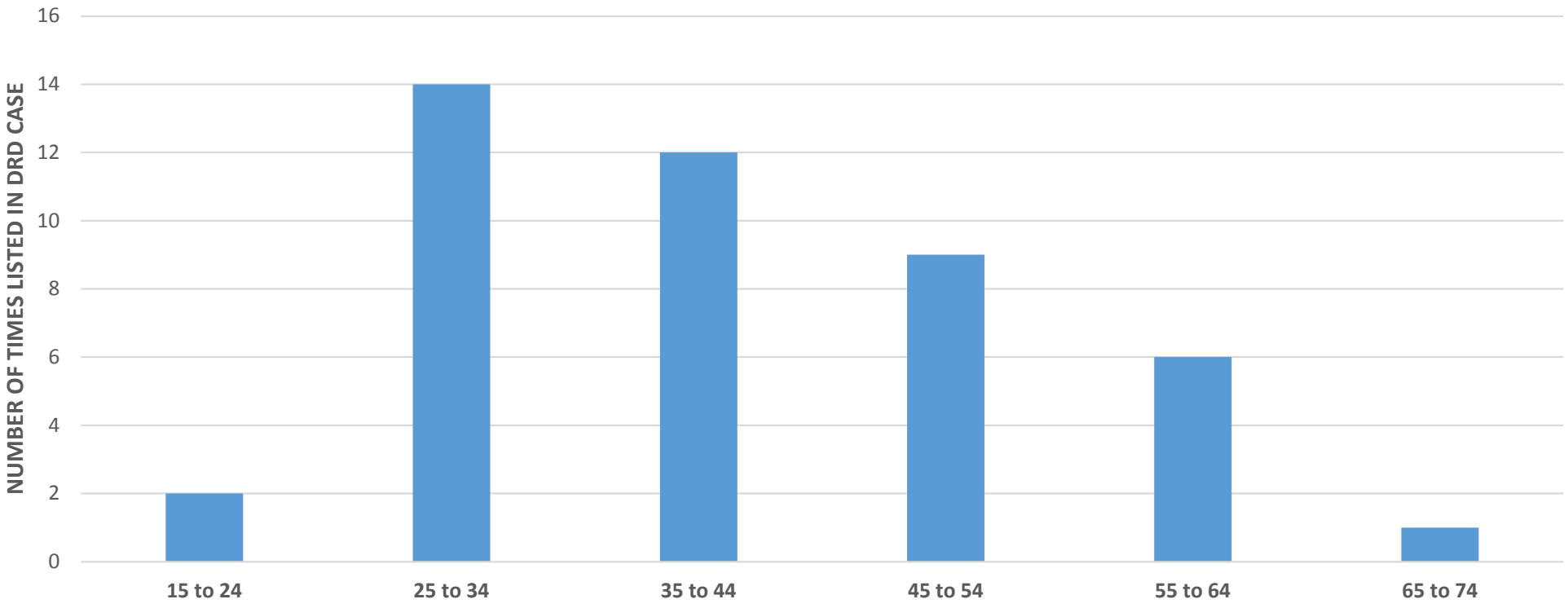
Knox and Anderson Counties
Drug Deaths Involving Naloxone
2016



Data Source: MDILog Database 2016. Knoxville, TN.
Note: 1. The presence of Naloxone was detected in the Drug Related Death case. There is no indication of how many doses of Naloxone were given.

In 2016, several groups in Knox and Anderson counties began administering Naloxone on scene by first responders (law enforcement, fire, ambulance authorities, etc.). This graph represents Naloxone being present in the decedent's system when the death was classified as a Drug Related Death.

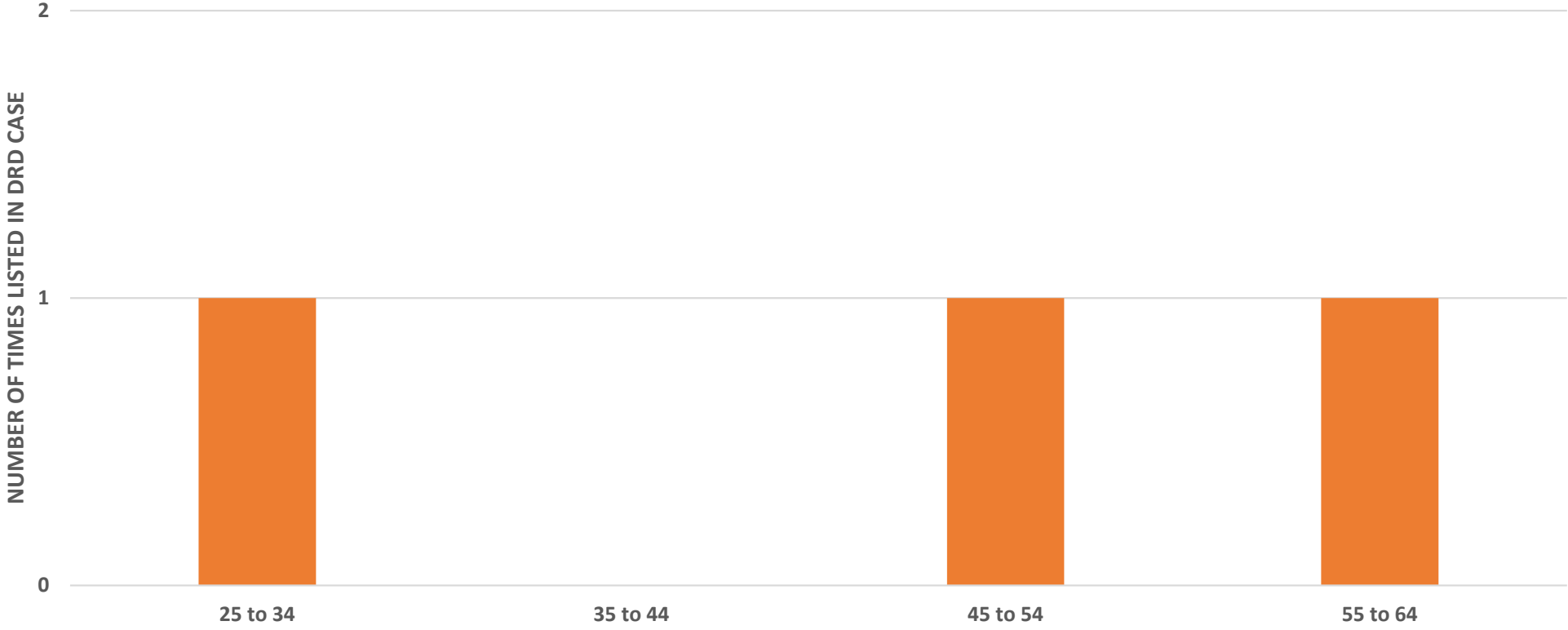
Knox County
Drug Deaths Involving Naloxone by Age
2016



Data Source: MDILog Database 2016. Knoxville, TN.
Note: 1. The presence of Naloxone was detected in the Drug Related Death case. There is no indication of how many doses of Naloxone were given.

This graph represents Naloxone being present in the decedent's system by age categories when the death was classified as a Drug Related Death. In 2016, several groups in Knox County began administering Naloxone on scene by first responders (law enforcement, fire, ambulance authorities, etc.). In Knox County, the 25-34 year age group had more Naloxone use and was the age group that had the highest increase of illicit drugs in 2016.

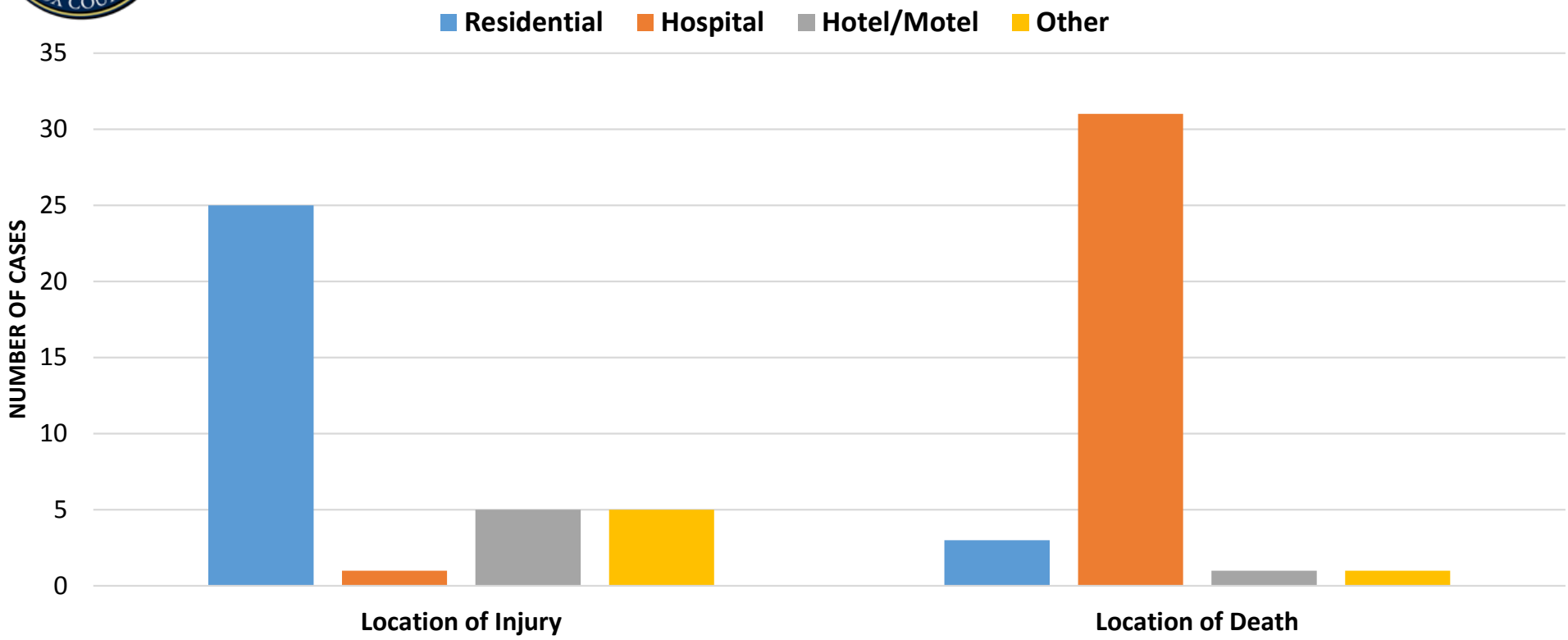
Anderson County
Drug Deaths Involving Naloxone by Age
2016



Data Source: MDILog Database 2016. Knoxville, TN.
Note: 1. The presence of Naloxone was detected in the Drug Related Death case. There is no indication of how many doses of Naloxone were given.

This graph represents Naloxone being present in the decedent's system by age categories when the death was classified as a Drug Related Death. In 2016, Anderson county began administering Naloxone on scene by first responders.

2016 Data Where Naloxone Was Present in Toxicology
Location of Injury vs Location of Death



Data Source: MDILog Database 2016. Knoxville, TN.
Note: 1. The presence of Naloxone was detected in the Drug Related Death case. There is no indication of how many doses of Naloxone were given.

Naloxone in Drug Related Deaths in 2016

In 2016, several groups in Knox and Anderson counties began administering Naloxone on scene by first responders (law enforcement, fire, ambulance authorities, etc.).

Of the 256 Drug Related Deaths in Knox and Anderson counties, 46 cases (or 18%) had Naloxone present. However, if Buprenorphine cases are removed, there are 38 cases (or 15%) had Naloxone present. Buprenorphine cases were excluded due to inability to differentiate between Naloxone in Buprenorphine/Naloxone in addition to Buprenorphine.

Types of Drugs and Frequency Found with Naloxone Present

DRUG	FREQUENCY
Fentanyl & Analogues	18
Benzodiazepines (including alprazolam)	15
Oxycodone	9
Oxymorphone	9
Alprazolam	9
Methamphetamine	7
Alcohol	4
Hydrocodone	3
Morphine	3
Heroin	3
Hydroxyzine	3
Diazepam	3
Furanyl Fentanyl	3
Methadone	2
Cocaine	2
Citalopram	2
Acetyl Fentanyl	2
Amphetamine	1
Amitriptyline	1
Carisoprodol	1
Fluoxetine	1
Lamotrigine	1
Meprobamate	1
Nortriptyline	1
Paroxetine	1
Phentermine	1
Pseudoephedrine	1
Quetiapine	1
Zolpidem	1
Lorazepam	1
Oxazepam	1
Temazepam	1
Acryl Fentanyl	1
Despropionyl-fentanyl	1

TENTATIVE
DRUG RELATED DEATH DATA January 1 – May 31, 2017 for KNOX and ANDERSON COUNTIES

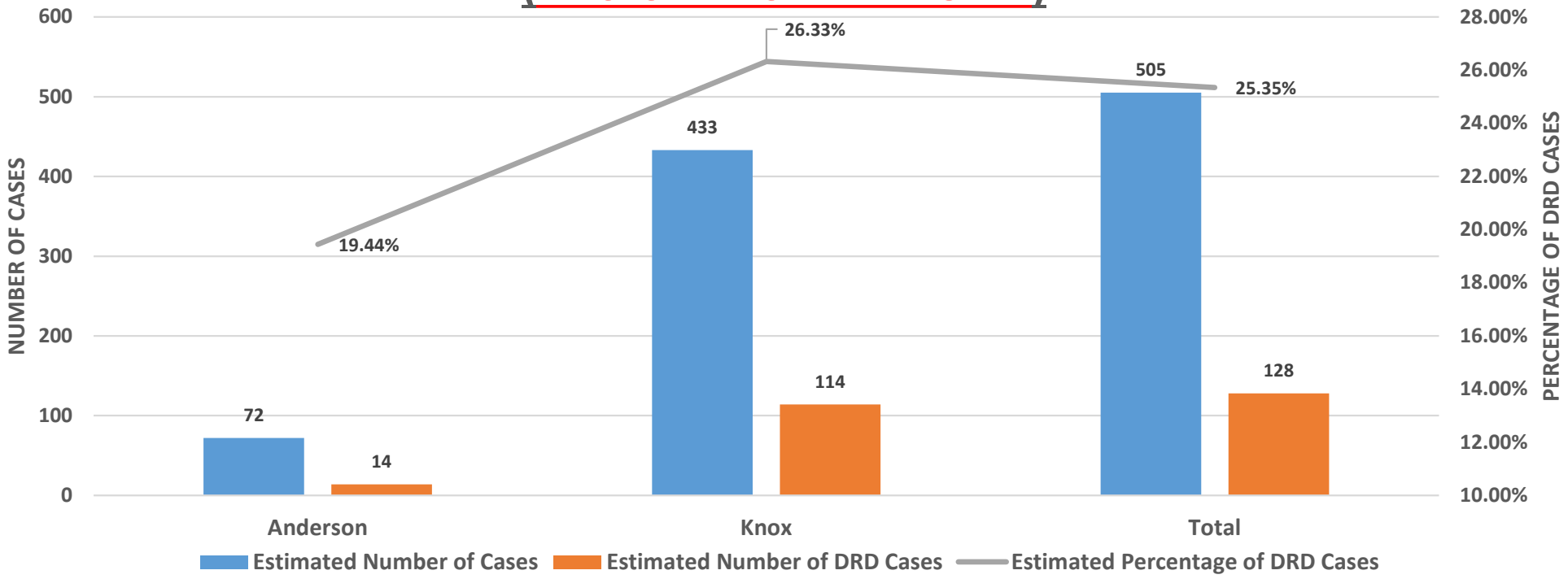
The following graphs represent Knox County Regional Forensic Center data from Autopsies and External Examinations performed for Knox and Anderson Counties between January 1 – May 31, 2017.

The data was taken from the KCRFC MDILog Database and should be considered tentative since there are still open cases which have not had the final determination for Manner and Cause of Death or involvement of drugs. The final report numbers will change. This is meant to provide our partners with a view of how the year's case data related to Drug Related Deaths is progressing.

*As a new feature and only for 2017 data, this report provides tentative **TOXICOLOGY** results for DRUGS found in the system of both Drug Related Deaths and Drugs Found in Non-Drug Related Death Cases. This is meant to provide the community and our partners with an idea of the types of drugs found during autopsy. It does not mean that the drugs caused the deaths.*

The reader should remember the caveats and limitations to the data as expressed within this report and/or on the graphs/tables.

Knox and Anderson Counties
Total Number of Cases Vs Drug Related Death Cases
January 1 - May 31, 2017
(THIS IS AN ESTIMATE ONLY)



Data Source: Knox County MDILog Database, 2017. Knoxville, TN.

NOTES: **1. This is only an estimate and is not to be considered the end results.**

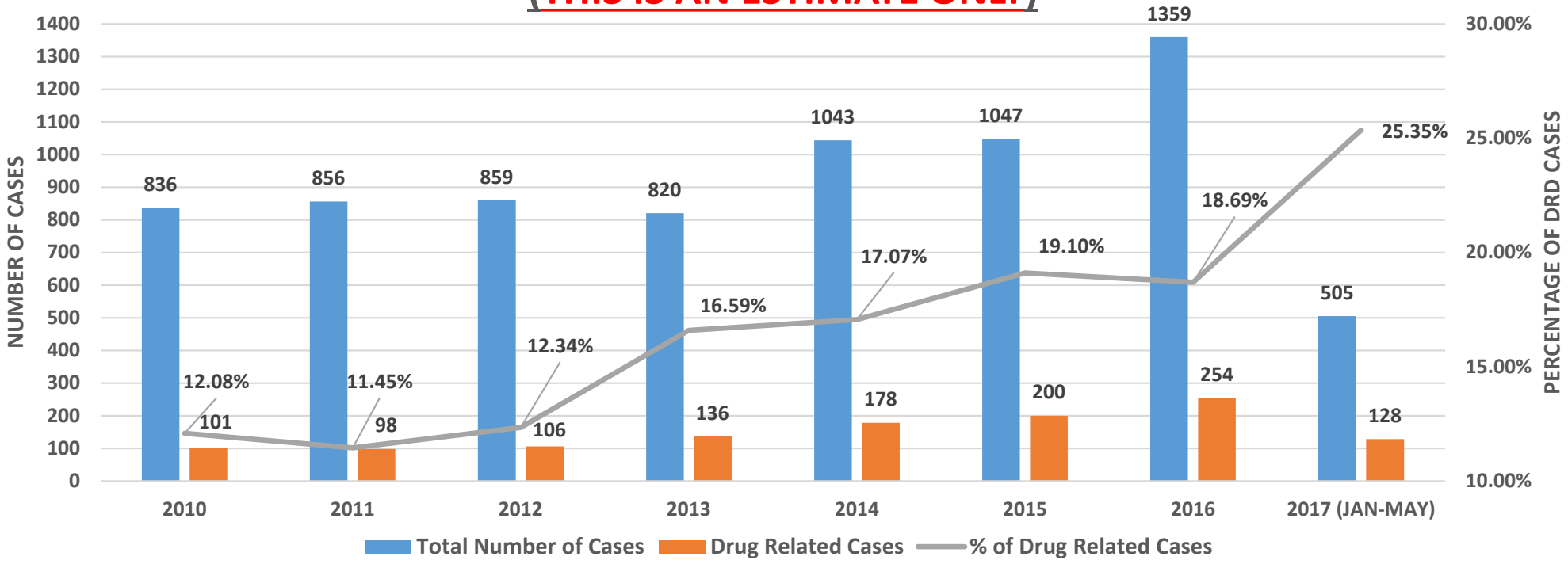
2. While we have a case count, not all of the cases have been finalized. This means that there are up to 100 cases which do not have all of their results documented.

3. Total Number of Cases = Autopsies and Examinations conducted for Knox and Anderson counties

4. Drug Related Cases = Autopsies and Examinations in Knox and Anderson counties where the Manner of Death was Suicide or Non-Motor Vehicle Accident (Non-MVA) where a drug was listed as contributing to the Cause of Death.

THIS IS ONLY AN ESTIMATE. While we have a case count, not all of the cases have been finalized. This means that there are approximately 100 cases which do not have all of their results documented.
However, the current estimate does put us on a path to have more Drug Related Deaths this year than in 2016.

Knox and Anderson Counties
Total Number of Cases Vs Drug Related Death Cases
and Percentage of Drug Related Death Cases
JANUARY 1, 2010 - May 31, 2017
(THIS IS AN ESTIMATE ONLY)



Data Source: Knox County MDILog Database, 2017. Knoxville, TN.

NOTES: **1. This is only an estimate and is not to be considered the end results.**

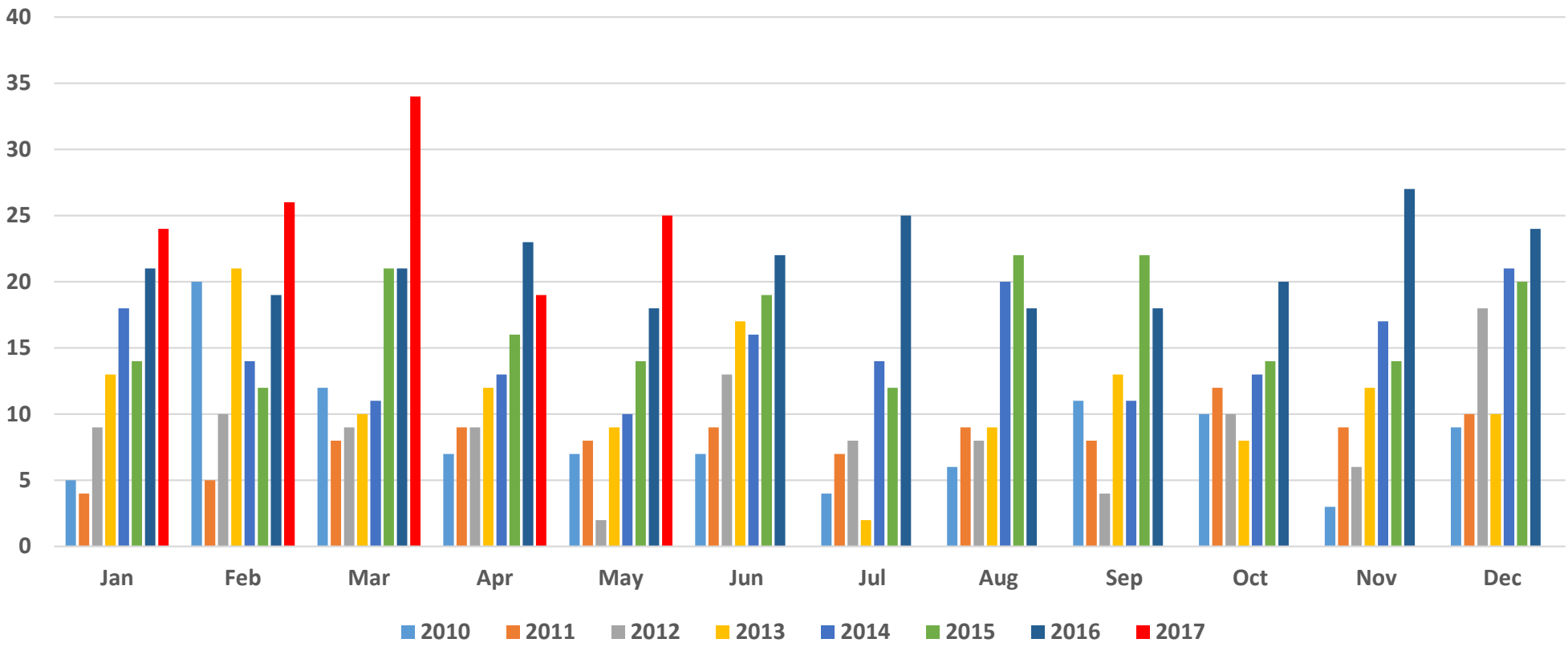
2. While we have a case count, not all of the cases have been finalized. This means that there are up to 100 cases which do not have all of their results documented.

3. Total Number of Cases = Autopsies and Examinations conducted for Knox and Anderson counties

4. Drug Related Cases = Autopsies and Examinations in Knox and Anderson counties where the Manner of Death was Suicide or Non-Motor Vehicle Accident (Non-MVA) where a drug was listed as contributing to the Cause of Death.

THIS IS ONLY AN ESTIMATE. While we have a case count, not all of the cases have been finalized. This means that there are approximately 100 cases which do not have all of their results documented.
However, the current estimate does put us on a path to have more Drug Related Deaths this year than in 2016.

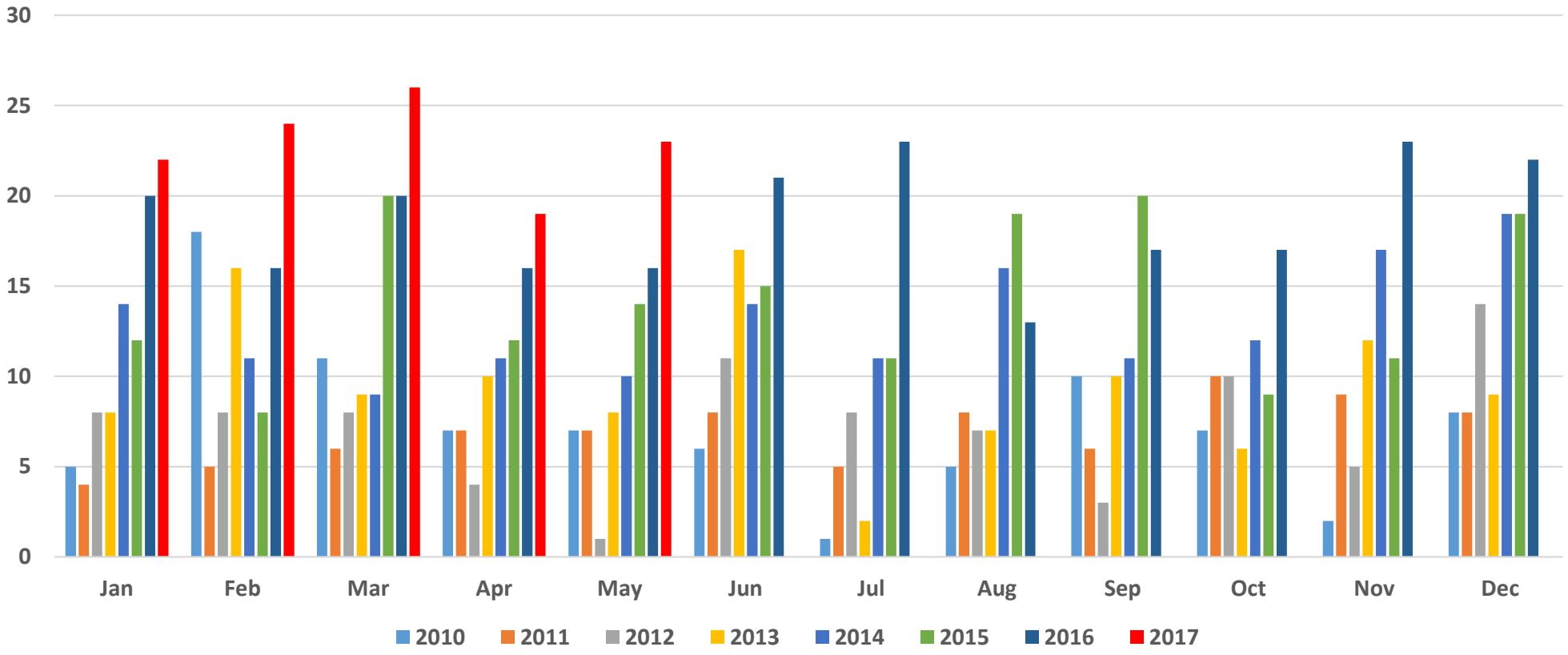
Knox and Anderson Counties
Distribution of Drug Related Cases
by Month and Year



Data Source: Knox County RFC Medical Examiner Database, 2010 to 2016 and MDILog Database 2016 to 2017. Knoxville, TN.
NOTE: 2017 data is **TENTATIVE** data only.

This chart depicts the number of Drug Related Death cases occurring in Knox and Anderson counties each month by year from January 2010 – May 2017. As a reminder, 2017 data is TENTATIVE and may change.

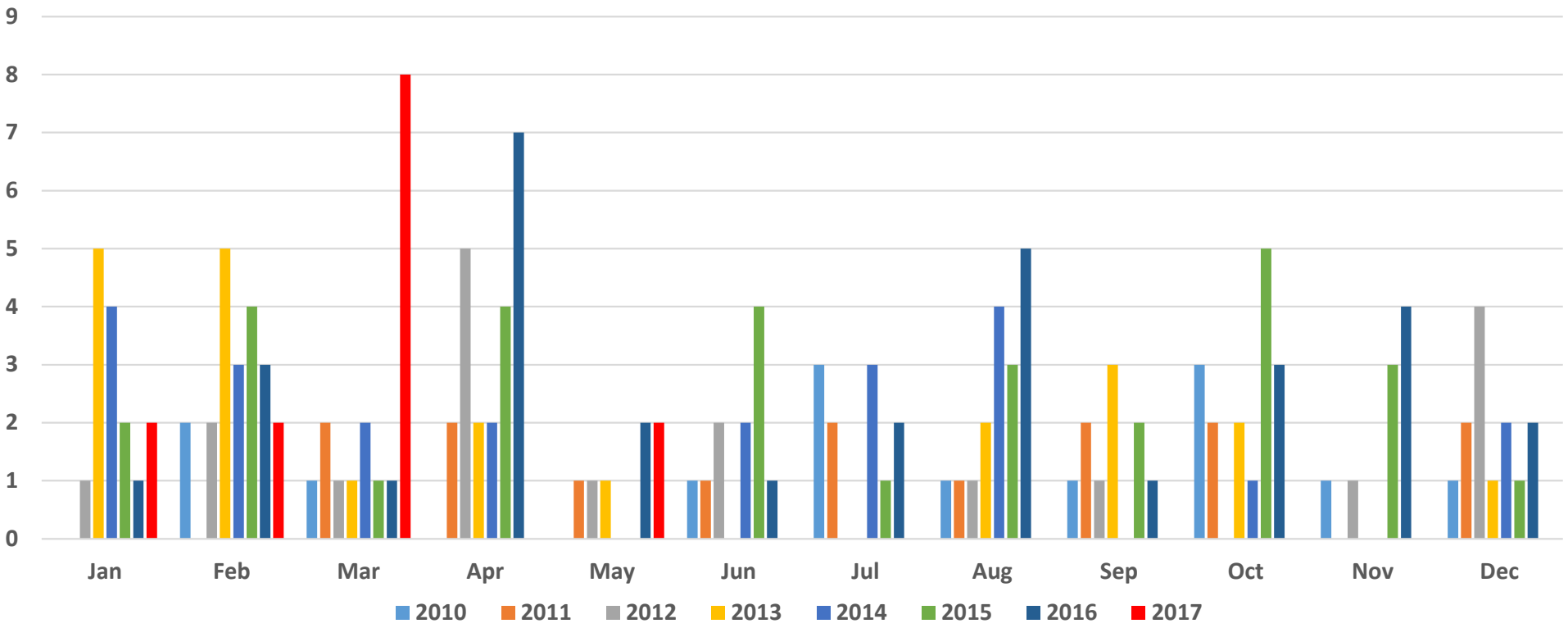
Knox County
Distribution of Drug Related Cases
by Month and Year



Data Source: Knox County RFC Medical Examiner Database, 2010 to 2016 and MDILog Database 2016 to 2017. Knoxville, TN.
NOTE: 2017 data is **TENTATIVE** data only.

This chart depicts the number of Drug Related Death cases occurring in Knox County each month by year from January 2010 –May 2017. As a reminder, 2017 data is TENTATIVE and may change.

Anderson County
Distribution of Drug Related Cases
by Month and Year



Data Source: Knox County RFC Medical Examiner Database, 2010 to 2016 and MDILog Database 2016 to 2017. Knoxville, TN.
NOTE: 2017 data is **TENTATIVE** data only.

This chart depicts the number of Drug Related Death cases occurring in Anderson County each month by year from January 2010 –May 2017. As a reminder, 2017 data is TENTATIVE and may change.

Knox and Anderson Counties
Manner of Death for All Cases
(Estimated 2017)
January 1 - May 31, 2017

MANNER OF DEATH	Knox	Anderson
Natural	173	37
Accident - Motor Vehicle Accident	33	6
Accident – Non Motor Vehicle Accident	157	21
Suicide	41	3
Homicide	17	1
Pending	13	3
TOTAL	434	71

As of May 31, 2017, there were 505 Knox and Anderson County cases where an autopsy or examination was performed. Of those, 128 were Drug Related Death Cases with 114 from Knox and 14 from Anderson. This is only an ESTIMATE since not all cases during that time frame have been completed/entered.

Cases can be assigned a Manner of Death pending toxicology or other study results. After the case is finalized, the Manner of Death and Cause of Death is placed on the Death Certificate. This makes the Death Certificate a valuable research tool for Death Statistics. The following definitions provide a general explanation of the Manner of Death categories:

Natural – death caused solely by disease or natural process

Accident MVA – unnatural death resulting from an inadvertent chance happening where the death was from the unintentional death of a driver, passenger, or pedestrian involving a motor vehicle

Accident NMVA – unnatural death resulting from an inadvertent chance happening the person died from a drug death, fall, blunt force trauma, industrial accident, or other accidental means.

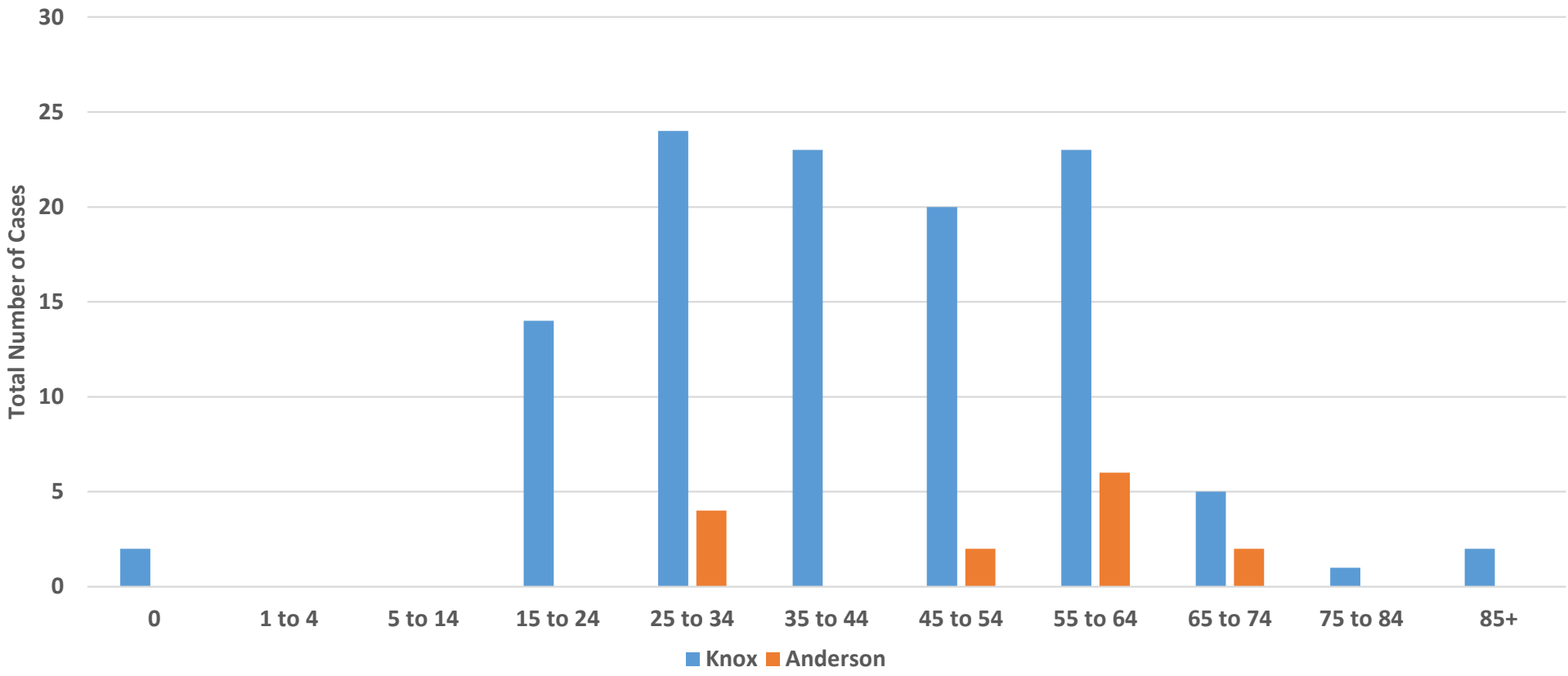
Suicide – death from self-inflicted injury with evidence of intent to die

Homicide – death resulting from the action of one person directly causing the death of another

Undetermined - for cases that have very little available information about the circumstances surrounding death (e.g., partial skeletal remains) or where known information equally supports, or conflicts with, more than one manner of death

Pending - may be listed temporarily on the death certificate for cause and/or manner when additional investigation, information and/or test results are required for certification

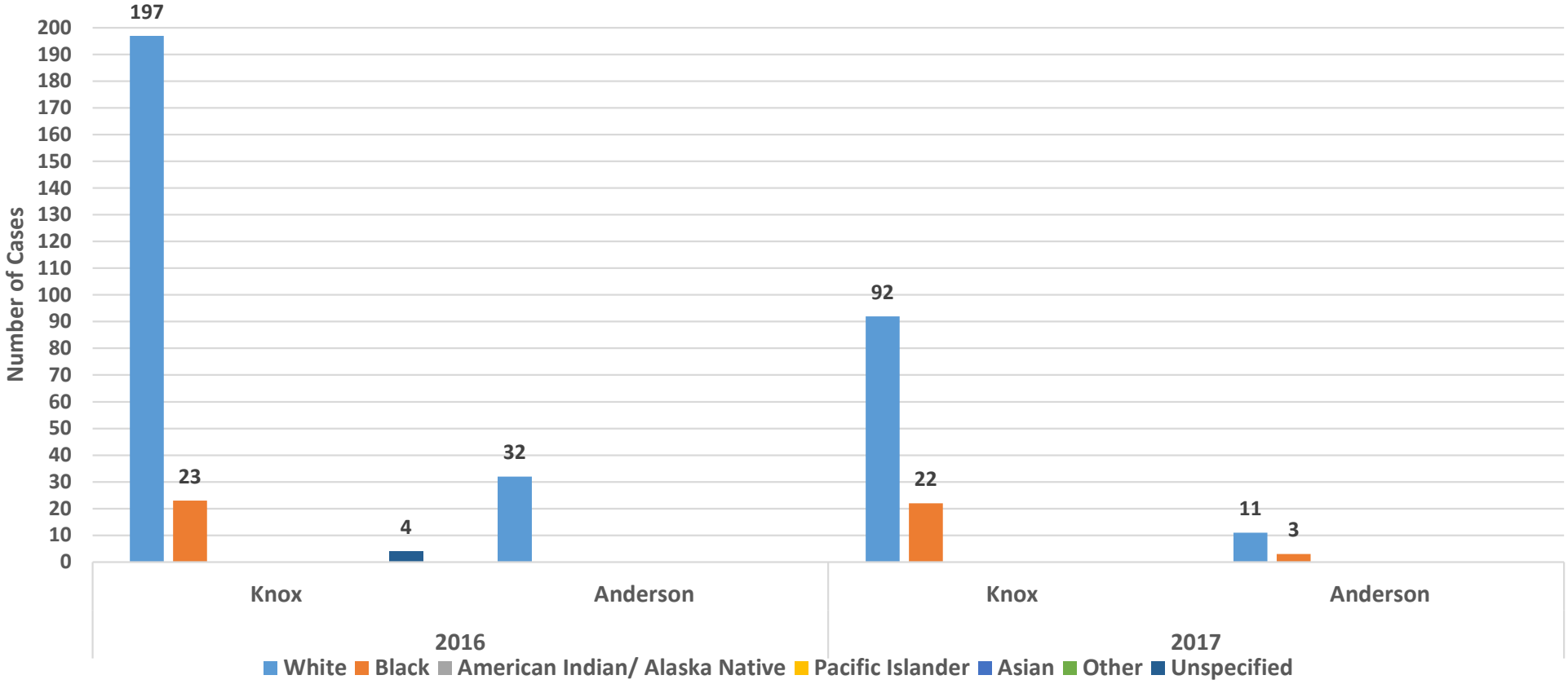
Knox and Anderson Counties
Age Distribution for Drug Related Cases
(Estimated January 1 - May 31, 2017)



Data Source: Knox County RFC Database 2017. Knoxville, TN.

As of May 31, 2017, there were 128 Drug Related Death Cases with 114 from Knox and 14 from Anderson. This is only an ESTIMATE since not all cases during that time frame have been completed.

Knox and Anderson Counties
Race Distribution for Drug Related Cases
2016 vs. 2017 (EST 1JAN-31MAY)



Data Source: Knox County RFC Medical Examiner Database, 2016 and MDILog Database 2016-2017. Knoxville, TN.

As of May 31, 2017, the amount of Drug Related Deaths among Blacks was 22 Knox and 3 from Anderson. While this is only an ESTIMATE, it elicits a concern due to the large increase in Drug Related Deaths in among Blacks.

Top 10 Home Residence Zip Codes for 2017 (Estimated)

10 Most Prominent Home Residence Zip Codes by Year								
	2010	2011	2012	2013	2014	2015	2016	2017
#1	37918	37918	37917	37920	37921	37918	37920	37918
#2	37921	37920	37920	37917	37912	37920	37917	37921
#3	37919	37917	37918	37914	37920	37917	37921	37917
#4	37912	37912	37716	37912	37917	37912	37918	37716
#5	37830	37914	37830	37849	37918	37716	37919	37830
#6	37849	37830	37849	37921	37914	37914	37849	37849
#7	37914	37849	37912	37931	37922	37849	37912	37923
#8	37917	37924	37919	37918	37938	37938	37830	37920
#9	37909	37769	37921	37919	37923	37721	37716	37914
#10	37920	37840	37931	37923	37849	37830	37915	37915

NOTE: Color coded Zip Codes represent Zip Codes that made the top 10 list all 7 years.
2017 is an estimate as of May 31, 2017

As of May 31, 2017, there were 128 Drug Related Death Cases with 114 from Knox and 14 from Anderson. This is only an ESTIMATE since not all cases during that time frame have been completed.

TOXICOLOGY FINDINGS
for 2017
AUTOPSIES AND EXAMS PERFORMED FOR KNOX AND ANDERSON COUNTIES

Please take note that the following pages are only the **TOXICOLOGY FINDINGS** in Knox and Anderson Counties where the RFC conducted an autopsy or exam. The report does not provide a listing of specific drugs which caused death in Drug Related Death cases for 2017.

This is meant for informational purposes only to provide you with an awareness of the types of drugs being seen in both Drug Related Death Cases and Non-Drug Related Death Cases.

It is important that the reader understands the difference between "Drugs Found in Drug Related Death Cases", "TOXICOLOGY FINDINGS in Drug Related Cases" and "TOXICOLOGY FINDINGS in Non-Drug Related Death Cases ".

Drugs Found in Drug Related Death Cases – These are drugs which contributed to the cause of death. This determination is made by the Forensic Pathologist after reviewing the medical death investigation, completing the autopsy/exam, and reviewing the laboratory or other results. The death occurred because of these drugs.

TOXICOLOGY FINDINGS in Drug Related Cases – This is a simple listing of toxicology results found in cases where the cause of death **IS** determined by the Forensic Pathologist to be a to drug overdose. It is a Drug Related Death case but specific drugs causing the death are not being identified as the cause.

TOXICOLOGY FINDINGS in Non-Drug Related Death Cases – This is a simple listing of toxicology results found in cases where the cause of death **IS NOT** determined by the Forensic Pathologist to be a to drug overdose.

ESTIMATE ONLY			
Knox County Regional Forensic Center			
TOXICOLOGY FINDINGS in Drug Related Deaths in Jan 1 - May 31, 2017			
	2017 (N=128)		
DRUG	**Knox (N=114)**	**Anderson (N=14)**	**Total**
Fentanyl and Analogues	69	5	74
Acryl Fentanyl	*21*	*2*	*23*
4-ANPP	*15*	*2*	*17*
Fentanyl	*15*		*15*
Norfentanyl	*12*		*12*
Furanyl Fentanyl	*3*	*1*	*4*
Acetyl Fentanyl	*2*		*2*
Carfentanil	*1*		*1*
Morphine	37	3	40
Oxymorphone	33	5	38
Alprazolam	31	2	33
Amphetamine	23	4	27
Oxycodone	24	2	26
Benzoylecgonine	23	2	25
Methamphetamine	19	5	24
6-Monoacetylmorphine	15	1	16
7-Amino Clonazepam	14	1	15
Ethanol	13	2	15
Cocaine	13	1	14
Promethazine	12	2	14
Diphenhydramine	11	1	12
Codeine	8	2	10
Hydrocodone	7	3	10
Citalopram / Escitalopram	8	1	9
Dihydrocodeine / Hydrocodol	5	3	8
Hydromorphone	6	2	8
6-MAM	7		7
Fluoxetine	7		7
Methadone	7		7
Norfluoxetine	7		7
Clonazepam	5	1	6
EDDP	6		6
Acetaminophen	3	2	5
Diazepam	4	1	5
Nordiazepam	4	1	5
Quetiapine	3	2	5
Buprenorphine	3	1	4
Bupropion	4		4
Cyclobenzaprine	4		4
Hydroxybupropion	4		4
Norbuprenorphine	3	1	4
Nortriptyline	4		4
Desmethyldoxepin	2	1	3
Desmethylsertraline	3		3
Doxepin	2	1	3
Doxylamine	2	1	3
Duloxetine	2	1	3
Meprobamate	2	1	3
Mirtazapine	2	1	3
Phenylpropanolamine	3		3
Temazepam	3		3
Trazodone	2	1	3
Zolpidem	2	1	3
Hydroxyzine	3		3
Levamisole	3		3

ESTIMATE ONLY - (CONTINUED)

Knox County Regional Forensic Center

TOXICOLOGY FINDINGS in Drug Related Deaths in Jan 1 - May 31, 2017

DRUG	2017 (N=128) Knox (N=114)	Anderson (N=14)	Total
10-Hydroxycarbazepine	2		2
Alpha-Hydroxyalprazolam	2		2
Amitriptyline	2		2
Carisoprodol	1	1	2
Cocaethylene	2		2
Flubromazolam	2		2
Lamotrigine	2		2
mCPP	2		2
Olanzapine	2		2
Paroxetine	2		2
Phentermine	2		2
Sertraline	2		2
U-47700	2		2
9-Hydroxyrisperidone	1		1
Acetone	1		1
Aripiprazole	1		1
Carboxyhemoglobin	1		1
Chlorpheniramine	1		1
Clonidine	1		1
Dextro / Levo Methorphan	1		1
Dihydrocodeine / Hydrocodol	1		1
Ephedrine	1		1
Eszopiclone / Zopiclone	1		1
Gabapentin	1		1
Glipizide	1		1
Isopropanol	0	1	1
Levetiracetam	1		1
Lidocaine	1		1
Lorazepam	1		1
Metformin	0	1	1
Methocarbamol	1		1
Midazolam	1		1
Mitragynine	1		1
Naltrexone	1		1
Nifedipine	1		1
Norpropoxyphene	1		1
O-Desmethyltramadol	1		1
O-Desmethylvenlafaxine	1		1
Oxazepam	1		1
Perphenazine	1		1
Phenobarbital	1		1
Prochlorperazine	1		1
Propoxyphene	1		1
Propylene Glycol	1		1
Pseudoephedrine	1		1
Risperidone and 9-Hydroxyrisperidone - Total	1		1
Salicylate	1		1
Theobromine	1		1
Topiramate	1		1
Tramadol	1		1
Venlafaxine	1		1
	469	62	531

Naloxone	25		25

TOXICOLOGY FINDINGS in NON-DRUG RELATED DEATH CASES for 2017

The next three pages contain information about **TOXICOLOGY FINDINGS** of NON-DRUG RELATED CASES in Knox and Anderson County cases which were autopsied or examined between January 1 – May 31, 2017. This is only TENTATIVE data but provides the community with an idea of drugs being found in the **TOXICOLOGY FINDINGS** of decedents who are a Medical Examiner case. It is meant for informational purposes only and no conclusions are drawn.

TOXICOLOGY FINDINGS in Non-Drug Related Death Cases – This is a simple listing of toxicology results found in cases where the cause of death **IS NOT** determined by the Forensic Pathologist to be a to drug overdose. For example, the types of cases may include:

- Motor Vehicle Accident – the person dies as a result of a vehicle accident and has drugs in their system.
- Suicide – the person dies by shooting, hanging, or other means of self-harm and has drugs in their system.
- Homicide – someone is killed by another person and the decedent has drugs in their system.

While in each of the examples above the decedent had drugs in their system, the primary means of death was by a means other than drugs.

Fentanyl and Fentanyl Analogues	
Name	**Count**
Fentanyl	37
Acryl Fentanyl	27
Norfentanyl	23
4-ANPP	20
Furanyl Fentanyl	4
Acetyl Fentanyl	3
Carfentanil	2
para-Fluorobutyryl Fentanyl/FIBF	1
	117

Marijuana	
Name	**Count**
Delta-9 THC	115
Delta-9 Carboxy THC	91
11-Hydroxy Delta-9 THC	40
	246

Heroin	
Name	**Count**
6-Monoacetylmorphine	21
6-MAM	10
	31

Cocaine	
Name	**Count**
Cocaine	23
Cocaethylene	6
	29

TENTATIVE DATA (Total Cases = 377)				
TOXICOLOGY FINDINGS in Non-Drug Related Death Cases				
Jan 1 - May 31, 2017				
Name	**Count**		**Name**	**Count**
Caffeine	236		Fluoxetine	15
Cotinine	145		Hydroxyzine	15
Delta-9 THC	115		Acetaminophen	13
Ethanol	99		Cyclobenzaprine	13
Delta-9 Carboxy THC	91		Methadone	13
Oxymorphone	85		EDDP	11
Oxycodone	83		Lorazepam	11
Alprazolam	68		Quetiapine	11
Morphine	68		6-MAM (Heroin)	10
Methamphetamine	66		Carboxyhemoglobin	9
Amphetamine	65		Nortriptyline	9
Hydrocodone	55		Tramadol	9
Naloxone	50		O-Desmethyltramadol	8
Benzoylecgonine	45		Paroxetine	8
11-Hydroxy Delta-9 THC	40		Phentermine	8
Fentanyl	37		Sertraline	8
Diphenhydramine	36		Trazodone	8
Dihydrocodeine / Hydrocodol	35		Bupropion	7
7-Amino Clonazepam	34		Chlorpheniramine	7
Nordiazepam	32		Hydroxybupropion	7
Promethazine	28		Lidocaine	7
Acryl Fentanyl	27		Mirtazapine	7
Diazepam	26		Temazepam	7
Cocaine	23		Amitriptyline	6
Norfentanyl	23		Cocaethylene (Cocaine)	6
6-Monoacetylmorphine (Heroin)	21		Levamisole	6
4-ANPP	20		O-Desmethylvenlafaxine	6
Hydromorphone	19		Duloxetine	5
Acetone	18		Gabapentin	5
Buprenorphine	18		Lamotrigine	5
Nicotine	18		mCPP	5
Citalopram / Escitalopram	17		Olanzapine	5
Clonazepam	17		Phenylpropanolamine	5
Norbuprenorphine	17		Pseudoephedrine	5
Norfluoxetine	17		Venlafaxine	5
Midazolam	16		Desmethyldoxepin	4
Codeine	15		Doxepin	4
Desmethylsertraline	15		Doxylamine	4

TENTATIVE DATA (Total Cases = 377) - CONTINUED				
TOXICOLOGY FINDINGS in Non-Drug Related Death Cases				
Jan 1 - May 31, 2017				
Name	**Count**		**Name**	**Count**
Etomidate	4		Desmethylloperamide	1
Furanyl Fentanyl	4		Dicyclomine	1
Isopropanol	4		Dihydrocodeine / Hydrocodol	1
Meprobamate	4		Eszopiclone / Zopiclone	1
Zolpidem	4		Fluphenazine	1
9-Hydroxyrisperidone	3		Guaifenesin	1
Acetyl Fentanyl	3		Hydromorphone - Total	1
Alpha-Hydroxyalprazolam	3		Hydroxyethylflurazepam	1
Aripiprazole	3		Imipramine	1
Beta-Phenethylamine	3		Ketamine	1
Carisoprodol	3		Loperamide	1
Clonidine	3		Meperidine	1
Dextro / Levo Methorphan	3		Metformin	1
Diltiazem	3		Methanol	1
Ephedrine	3		Methocarbamol	1
Levetiracetam	3		Methylphenidate	1
Norpseudoephedrine	3		Mitragynine	1
Oxazepam	3		Monoethylglycinexylidide (MEGX)	1
Phenobarbital	3		Morphine - Total	1
Risperidone and 9-Hydroxyrisperido	3		Naltrexone	1
1,1-Difluoroethane	2		Nifedipine	1
10-Hydroxycarbazepine	2		Norketamine	1
Carbamazepine	2		Normeperidine	1
Carbamazepine-10,11-Epoxide	2		Oxymorphone - Total	1
Carfentanil	2		para-Fluorobutyryl Fentanyl/FIBF	1
Clobazam	2		Perphenazine	1
Donepezil	2		Phenytoin	1
Flubromazolam	2		Propylene Glycol	1
Glipizide	2		Risperidone	1
Ibuprofen	2		Ritalinic Acid	1
Memantine	2		Selenium	1
Norpropoxyphene	2		Tadalafil	1
Prochlorperazine	2		Theobromine	1
Propoxyphene	2		Theophylline	1
Salicylate	2		Topiramate	1
U-47700	2		Verapamil	1
Butalbital	1		Ziprasidone	1
Chlordiazepoxide	1		Zonisamide	1
Desipramine	1			

Controlled Substances Act (CSA) Scheduled Drugs

Drugs, substances, and certain chemicals used to make drugs are classified into five (5) distinct categories or schedules depending upon the drug's acceptable medical use and the drug's abuse or dependency potential. These lists are intended as general references and are not comprehensive listings of all controlled substances. A controlled substance analogue is a substance which is intended for human consumption and is structurally or pharmacologically substantially similar to or is represented as being similar to a Schedule I or Schedule II substance and is not an approved medication in the United States.

Schedule I

Schedule I drugs, substances, or chemicals are defined as drugs with no currently accepted medical use and a high potential for abuse. Some examples of Schedule I drugs are:

heroin, lysergic acid diethylamide (LSD), marijuana (cannabis), 3,4-methylenedioxymethamphetamine (ecstasy), methaqualone, and peyote

Schedule II

Schedule II drugs, substances, or chemicals are defined as drugs with a high potential for abuse, with use potentially leading to severe psychological or physical dependence. These drugs are also considered dangerous. Some examples of Schedule II drugs are:

Combination products with less than 15 milligrams of hydrocodone per dosage unit (Vicodin), cocaine, methamphetamine, methadone, hydromorphone (Dilaudid), meperidine (Demerol), oxycodone (OxyContin), fentanyl and its analogues, Dexedrine, Adderall, and Ritalin

Schedule III

Schedule III drugs, substances, or chemicals are defined as drugs with a moderate to low potential for physical and psychological dependence. Schedule III drugs abuse potential is less than Schedule I and Schedule II drugs but more than Schedule IV. Some examples of Schedule III drugs are:

Products containing less than 90 milligrams of codeine per dosage unit (Tylenol with codeine), ketamine, anabolic steroids, testosterone

Schedule IV

Schedule IV drugs, substances, or chemicals are defined as drugs with a low potential for abuse and low risk of dependence. Some examples of Schedule IV drugs are:

Xanax, Soma, Darvon, Darvocet, Valium, Ativan, Talwin, Ambien, Tramadol

Schedule V

Schedule V drugs, substances, or chemicals are defined as drugs with lower potential for abuse than Schedule IV and consist of preparations containing limited quantities of certain narcotics. Schedule V drugs are generally used for antidiarrheal, antitussive, and analgesic purposes. Some examples of Schedule V drugs are:

cough preparations with less than 200 milligrams of codeine or per 100 milliliters (Robitussin AC), Lomotil, Motofen, Lyrica, Parepectolin

Alphabetical listing of Controlled Substances can be found at

https://www.deadiversion.usdoj.gov/schedules/orangebook/c_cs_alpha.pdf

Current 2017 Concerns

Based on the first 5 months of tentative data and monthly historical data, we estimate the 2017 number of Drug Related Deaths in Knox will be approximately 290 (~29% increase) and Anderson will be ~36 (~12% increase). Currently, the number of Drug Related Deaths account for 1 in 4 of our cases which is a change from approximately 1 in 5.5 of our cases in 2016.

We may see non-pharmaceutical (or illicit) and emerging, designer drugs involved in about 50% of the Drug Related Death cases in 2017. The cost for identifying and classifying emerging, designer drugs continues to rise along with the incidence of emerging, designer drugs in Drug Related Death cases. This presents budgetary concerns in balancing whether to test or not test for emerging, designer drugs when you have evidence necessary to classify the case as a Drug Related Death case without the additional testing due to polypharmacy.

The number of Drug Related Deaths in the 25 – 34 year age group is continuing to increase as it did in 2016. We expect this age group will continue to increase its utilization of illicit drugs in the form of fentanyl (and its analogues) and methamphetamine. This group may become the age group most often dying from Drug Related Deaths.

The number of Drug Related Deaths in blacks has matched the 2016 number in just 5 months in 2017. Based on these numbers, we expect the number of Drug Related Deaths in blacks to double for the third year in a row.

The Tennessee Department of Health – Vital Statistics electronic Death Certificate system is not fully functional. If this system were fully functional, it could provide real time data for all counties on the Cause and Manner of ALL deaths including Drug Related Deaths. This is important since not all drug related death cases are reported to the Medical Examiner and physicians complete Death Certificates for cases not completed by the Medical Examiner.

In closing, the Knox County Regional Forensic Center will continue to evaluate and report data to our partners and the community. Our desire is that community groups are able to utilize the data to take action to decrease Drug Related Deaths and improve the safety of our community through education and prevention.

To discuss this report, please contact Mr. John Lott, Senior Director, at the Knox County Regional Forensic Center. Mr. Lott is the preparer of the report.

This report is also available online at
http://www.knoxcounty.org/rfc/reports.php

Knox County Regional Forensic Center
2761 Sullins Street
Knoxville, TN 37919-4672
865-215-8000

2016 Drug Death Report