Drug-Related Deaths in Yolo County, 2007- 2015

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TABLE OF CONTENTS

EXECUTIVE SUMMARY

- The rate of all drug-related deaths in Yolo County has increased 71% from 2007 (7 per 100,000 persons) to 2015 (12 per 100,000 persons). This statistic mirrors the State of California's increasing trend in drug-related deaths during this time period.

- From 2007 to 2015, Yolo County had an overall lower rate (8 per 100,000 persons) for accidental poisoning than the State of California (9.1 per 100,000 persons).

- From 2007 to 2015, there were a total of 170 reported drug-related deaths in Yolo County where:

    - 17.7% (n=30) were listed under ICD-10 codes X41, X61, & Y11 as accidental poisoning (e.g., overdose), suicide, and undetermined intent by exposure to antiepileptics, barbiturates, sedative-hypnotic, antiparkinsonism, and psychotropic drugs.

    - 34.7% (n=59) were listed under ICD-10 codes X42 & X62 as accidental poisoning and suicide by exposure to narcotics, psychodysleptics, or opiates (including heroin and methadone).

    - 47.6% (n=81) were listed under ICD-10 codes X44, X64, & Y14 as accidental poisoning, suicide, and undetermined intent due to exposure to unspecified drugs, medicaments, biological substances and other (e.g., polypharmacy, multi-drug intoxication).

    - According to the death certificates, a total of 76 deaths were attributed to multiple drugs including:
        - 21 deaths listed as polypharmacy solely
        - 24 listed as multi-drug intoxication solely
        - 22 listed as multi-drug intoxication with at least one or more of the combined drugs listed as an opioid (7 also included alcohol)
        - 4 listed as multi-drug intoxication combined with alcohol
        - 5 listed as multi-drug (no alcohol or opioids included)

    - There was no increasing trend in the rate of drug-related deaths from any one-code group from 2007 to 2015.

- From 2007 to 2015, the age group 35 to 64 years of age accounted for 73% of all drug-related deaths in Yolo County.

- From 2007 to 2015, non-Hispanic blacks and non-Hispanic whites had the highest drug-related death rates (14.8 and 14.1 deaths per 100,000 persons, respectively), when compared to other race-ethnicities in Yolo County.

- An increase of 64% was observed in the drug-related death rate for non-Hispanic whites from 2007 (11 per 100,000 persons) to 2015 (18 per 100,000 persons). The rates for non-Hispanic whites also demonstrated a significant increasing trend. There was no such trend in the non-

Hispanic black drug-related death rates from 2007 to 2015.

- West Sacramento accounted for 46% of all drug-related deaths in Yolo County from 2007 to 2015. West Sacramento had the highest rate of the three major cities in Yolo County as well as being double the California rate from 2007 to 2015. There was no significant linear increase in the drug-related death rate for the city of West Sacramento during this time, although the rate almost tripled from 7 deaths per 100,000 persons in 2007 to 18 deaths per 100,000 persons in 2015.

PROBLEM DESCRIPTION

In Yolo County, the vast majority of drug-related deaths include a combination of different drugs, which are usually listed on the death certificate as “multiple-drug intoxication” or “polypharmacy.” These drug cocktails often include an opioid as one or more of the multiple drugs. Over the past decade, drug-related deaths and opioid-involved deaths have skyrocketed at the national, state, and local levels. According to the Centers for Disease Control and Prevention (CDC), approximately 33,000 overdoses in 2015 involved an opioid drug. Although California’s overall drug poisoning and opioid-related drug death rates are lower than the national average, California is one of many states struggling to reduce opioid overdoses. According to the California Department of Public Health (CDPH), more than 4,000 Californians died in 2013 from drug poisoning, most of them due to prescription drugs, the majority of which were opioids.

From 2006 to 2013, opioid overdoses in Sacramento, Placer, and El Dorado counties were higher than the statewide average and Yolo County had a slightly lower rate than the statewide average. The highest death rates in California can be found in small, rural counties in northern California such as Plumas County and Lake County, with opioid- and pharmaceutical-related death rates of 24.5 and 22.5 per 100,000 persons, respectively.

While the opioid epidemic started with prescription pills, it is now being largely driven by heroin and other types of synthetic opioids prescribed as pain relievers. Examples of synthetic opioids include methadone, tramadol, and fentanyl. Examples of natural and semisynthetic opioids include hydrocodone, oxycodone, and morphine. The drug hydrocodone is currently the most widely prescribed drug for pain management.

This report reviews the causes of drug-related mortality in Yolo County. This review can help a local health department evaluate the health of its residents and determine the specific causes of increasing or decreasing death rates over time. Mortality rates have been tabulated by race-ethnicity, age group, and by geographic area to illuminate health disparities, so that efforts to improve public health can be directed towards population groups or geographic areas with the greatest need.

METHODOLOGY

Death records for 2007 to 2015 were exported to Microsoft Excel from California's Vital Records Business Information System (VRBIS), an electronic database that contains death records updated on a continuous basis. These records are submitted to the National Center for Health Statistics (NCHS), where the preliminary cause of death is validated and a final cause of death is established according to NCHS criteria. Causes of death were grouped so that ICD-10 codes for the current year mapped to the same major diagnoses as ICD-9 codes that were in use until 2012. Records were reviewed by the epidemiologist to ensure they were for Yolo County residents by checking the city of residence, ZIP code and address.

Population data for the purpose of calculating rates (per 100,000 persons) was obtained from the California Department of Finance (DOF) population tables posted in 2013 at (http://www.dof.ca.gov/research/demographic/dru/index.php). In most cases, percentages were rounded to the nearest whole number for clarity and readability. Linear trends were evaluated using R-squared (ρ^2), the coefficient of determination, with values >0.70 suggesting a significant linear trend. Ninety-five percent confidence intervals (95% CIs) for rates were calculated according to Szklo and Nieto (2000). No age adjustment was made for Yolo County rates.

Geographic population data at the census designated place level for city was sourced from the latest US Census American Community Survey (ACS) five-year estimates (2011 to 2015), Table S0101, which was published in December 2016 at http://www.factfinder.census.gov. These rates were not adjusted for age.

OVERVIEW OF DRUG-RELATED DEATHS IN YOLO COUNTY FROM 2007-2015

The leading cause of drug-related deaths from 2007 to 2015 was from accidental poisoning (i.e., overdose), suicide, and undetermined intent to other (e.g., multi-drug intoxication or polypharmacy) or unspecified drugs and biologicals, accounting for close to half (47.6%, n=81) of all Yolo County drug-related deaths (Table 1). Accidental overdose and suicide due to opiates, narcotics, and psychodyseleptics (including heroin and methadone) represented the second most common cause of drug-related deaths with 34.7% (n=59) of all deaths. The rate of drug-related deaths in Yolo County due to opiates, narcotics, and psychodysleptics has not increased overtime since 2007. Accidental poisoning, suicide, and undetermined intent due to barbiturates, psychotropics, and antiepileptics (including methamphetamines) was the third leading cause of drug-related deaths at 17.7% (n=30) from 2007 to 2015.

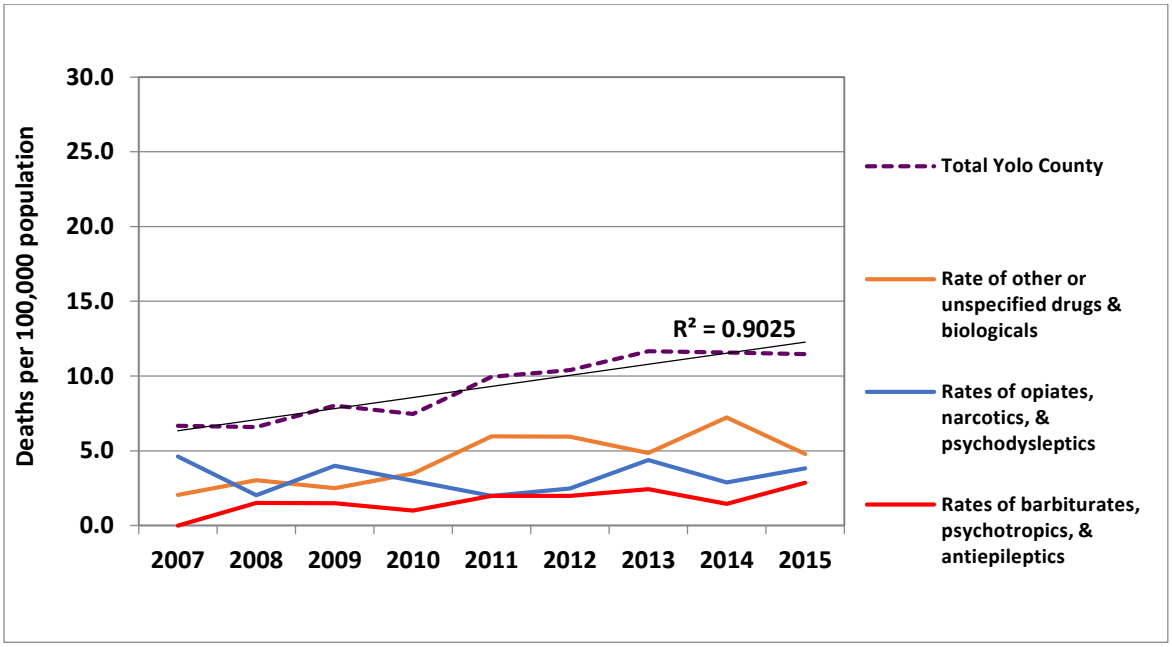
In Yolo County, drug-related deaths have increased 71% from a rate of 7 per 100,000 people in 2007 to a rate of 12 per 100,000 people in 2015. There was a significant linear upward trend in the rate of drug-related death from 2007 to 2015 (ρ^2=0.90) (Figure 1). The drug-related death rate for the most recent 3-year period 2013-15 has increased when compared to the previous 3-year periods 2007-09 and 2010-12. Refer to Table 1 for the confidence intervals for the lower confidence limit (LCL) and the upper confidence limits (UCL), as well as the average deaths per year for each 3-year period.

Table 1. Drug-Related Deaths from Accidental Poisoning, Suicide, Homicide & Undetermined Intent, Yolo County Residents, 2007-2015.

ICD-10 Cause Code	Description	2007 to 2009	2010 to 2012	2013 to 2015	Total 2007-15	% Total 07-15
X41, X61, Y11	AP*, suicide, & undetermined intent due to barbiturates, psychotropics & antiepileptic (including methamphetamines)	6	10	14	30	17.7%
X42, X62	AP accidental poisoning and suicide by exposure to opiates, narcotics, and psychodysleptics (including heroin and methadone)	21	15	23	59	34.7%
X44, X64, Y14	AP, suicide, and undetermined intent due to other (including multi-drug intoxication and polypharmacy) or unspecified drugs & biologicals	15	31	35	81	47.6%
	Total No. Deaths (all drugs)	**42**	**56**	**72**	**170**	
	Rate per 100,000 population	7.1	9.2	11.6	9.3	
	Confidence Interval (LCL – UCL)	5.1 – 9.6	6.8 – 12.2	9.1 – 14.7		
	Average deaths per year	14	19	24		

**AP - accidental poisoning, i.e., overdose*
Source for population estimates: CA DOF, 2013 projections
Drug-related deaths were coded using the International Classification of Diseases, tenth version (ICD-10)

Figure 1. Drug-Related Death Rates per 100,000, Yolo County 2007-2015



AGE MORTALITY DEMOGRAPHICS

The majority (73%) of drug-related deaths in Yolo County, measured at a rate of 15 deaths per 100,000 persons from 2007 to 2015, were among individuals aged 35 to 64 (Table 2 and Figure 2). State of California data from 2008 to 2015 indicate a slightly higher drug-related death rate than Yolo County's, at 21 per 100,000 persons in this age group. These rates are similar to national trends which show the majority of drug-related deaths occur in persons aged 35 to 64 years old.

The 65 and over age group in Yolo County had the second highest drug-related death rate at 8 deaths per 100,000 persons, which was higher than the statewide rate of 5 deaths per 100,000 persons. The 15-to 34-year-old age group had the third highest drug-related death rate at 5 deaths per 100,000 persons in Yolo County, which was lower than the statewide rate of 8 deaths per 100,000 persons. There were no drug-related deaths in Yolo County for children under age 15 during the 2007 to 2015 time frame.

Table 2. Drug-Related Deaths by Age Group

	Yolo County		California*	
Age Group	**2007-15**	**Rate per 100,000 persons**	**2008-15**	**Rate per 100,000 persons**
0-14	0	0	31	0.1
15-34	32	4.7	6656	7.5
34-64	124	14.9	15789	20.9
65+	14	8.0	1803	4.9
Total	**170**	**9.3**	**24,279**	**8.0**

**California accidental poisoning data only*

RACE MORTALITY DEMOGRAPHICS

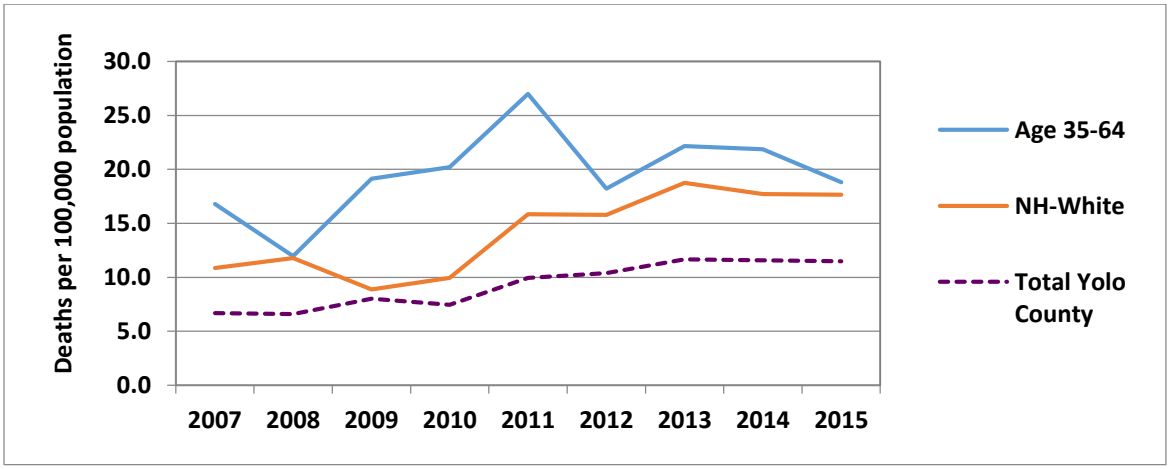
From 2007 to 2015, non-Hispanic blacks had the highest drug-related death rate (15 deaths per 100,000 persons) but accounted for only 4% of all drug-related deaths in Yolo County (Table 3). This rate is similar to non-Hispanic whites (14 deaths per 100,000 persons), which account for 75% of all drug-related deaths in the county (Figure 2). An increasing linear trend (ρ^2=0.73) was observed among non-Hispanic whites from 2007 to 2015, with an increase of 64% in the death rate from 2007 (11 per 100,000 persons) to 2015 (18 per 100,000 persons). There was no such increase in the rate for non-Hispanic blacks from 2007 to 2015, although the small numbers of deaths render the data inadequate for statistical analysis. Drug-related deaths rates were low in Other and Hispanic race-ethnicities, at 5 deaths per 100,000 persons, and lowest for Asian/Pacific Islander (PI) at 2 deaths per 100,000 persons. Yolo County had no drug-related deaths reported for American Indians from 2007 to 2015. Refer to Table 3 for the confidence intervals (LCL and UCL).

Table 3. Drug-Related Deaths by Race

	Yolo County		96% Confidence Interval	
Race	**2007-15**	**Deaths per 100,000 persons**	**LCL**	**UCL**
Asian/PI	4	1.6	0.4	4.2
American Indian	0	0.0	ND	ND
Black	7	14.8	5.9	30.5
Hispanic	26	4.7	3.1	7.0
Other	3	5.0	1.0	14.6
Unknown	2	ND	-	-
White	128	14.0	11.8	17.0
Total	**170**	**9.3**	**8.0**	**11.0**

ND=Not done

Figure 2. Drug-Related Death Rates per 100,000 for Select Subgroups, Yolo County 2007-2015



Non-Hispanic blacks had low numbers and unstable rates, therefore were not included on the chart.

CITY, COUNTY, & STATE OF CALIFORNIA MORTALITY DEMOGRAPHICS

From 2007 to 2015, the city of West Sacramento had the highest rate of drug-related death among Yolo County's three largest cities at 18 per 100,000 persons, followed by the city of Woodland and all other areas (with include the city of Winters) with a rate of 9 deaths per 100,000 persons (Table 4). The lowest drug-related death rate occurred in the city of Davis at 4 deaths per 100,000 persons. The city of West Sacramento accounted for 46% of all drug-related deaths in Yolo County from 2007 to 2015. During this time period, its drug-related death rate was higher than any other city or area in Yolo County, except in 2007 when the city of Woodland had the highest rate (Figure 3).

The West Sacramento drug-related death rate of 18 per 100,000 persons was double the California rate of 9 per 100,000 persons (California accidental poisoning data only. There was no linear trend in the rate for the city of West Sacramento. The city of Woodland's cumulative rate from 2007 to 2015 was similar to the State of California drug-related death rate at 9 deaths per 100,000 persons. Its rate increased by 77% from 2007 (7.9 per 100,000 persons) to 2015 (14 per 100,000 persons). The rates for the city of Davis and other areas were below the State of California.

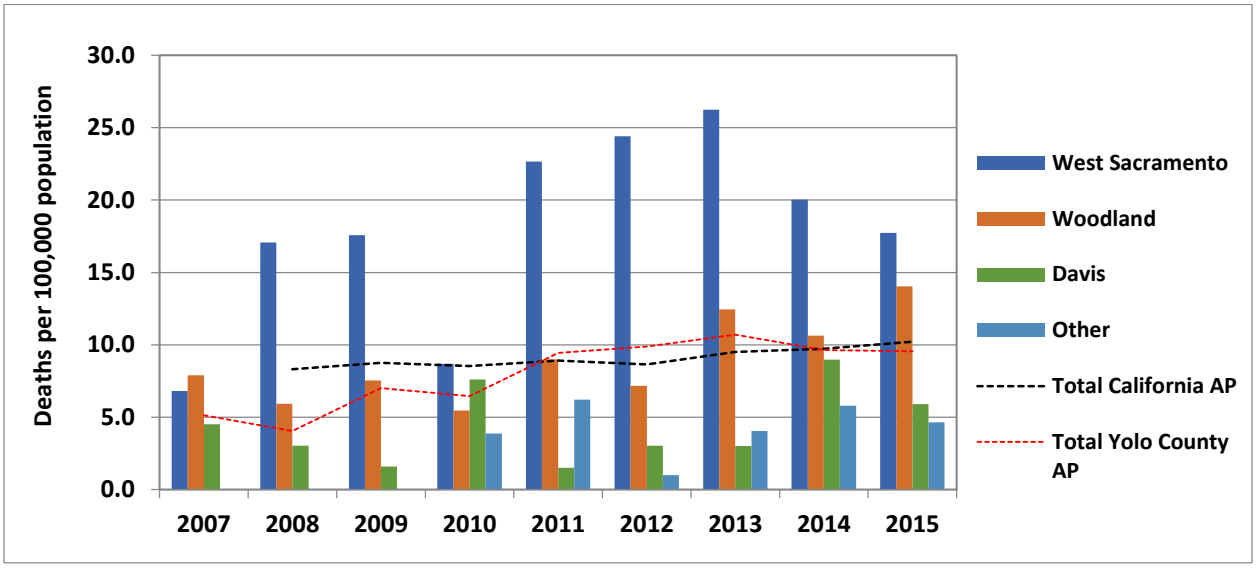
Table 4. Drug-Related Death Rates per 100,000 Persons by City for Yolo County vs. California, 2007-2015.

Year	West Sacramento	Woodland	Davis	All other areas (incl. Winters)	Missing City	Total Yolo County*	Total California*
2007	6.8	7.9	4.5	0.0	-	5.1	-
2008	17.1	5.9	3.0	0.0	-	4.0	8.3
2009	17.6	7.5	1.6	0.0	-	7.0	8.8
2010	8.7	5.5	7.6	3.9	-	6.5	8.5
2011	22.7	9.0	1.5	6.2	-	9.4	8.9
2012	24.4	7.2	3.0	1.0	-	9.9	8.6
2013	26.2	12.5	3.0	4.1	-	10.7	9.5
2014	20.0	10.6	9.0	5.8	-	9.6	9.7
2015	17.7	14.0	5.9	4.7	-	9.6	10.2
2007-15 Total Rate	**18.1**	**9.0**	**4.4**	**8.6**	**-**	**8.0**	**9.1**
2007-15 Total No. Deaths	**78**	**44**	**26**	**12**	**10**		

** Accidental poisoning rate data only*

Excluding deaths from suicide and undetermined intent in the period 2007 to 2011, Yolo County's cumulative rate of 8.6 accidental poisoning deaths per 100,000 persons was marginally lower than the State of California's rate in the same time period (9.1 per 100,000 persons). In 2015, Yolo County's rate of 9.6 per 100,000 remained lower than the State of California at 10.2 per 100,000 persons. However, between 2011 and 2013, Yolo County's rate exceeded California's.

Figure 3. Drug-Related Death Rates Overall for Select Cities in Yolo County vs. Yolo County and the State of California, 2007-2015.

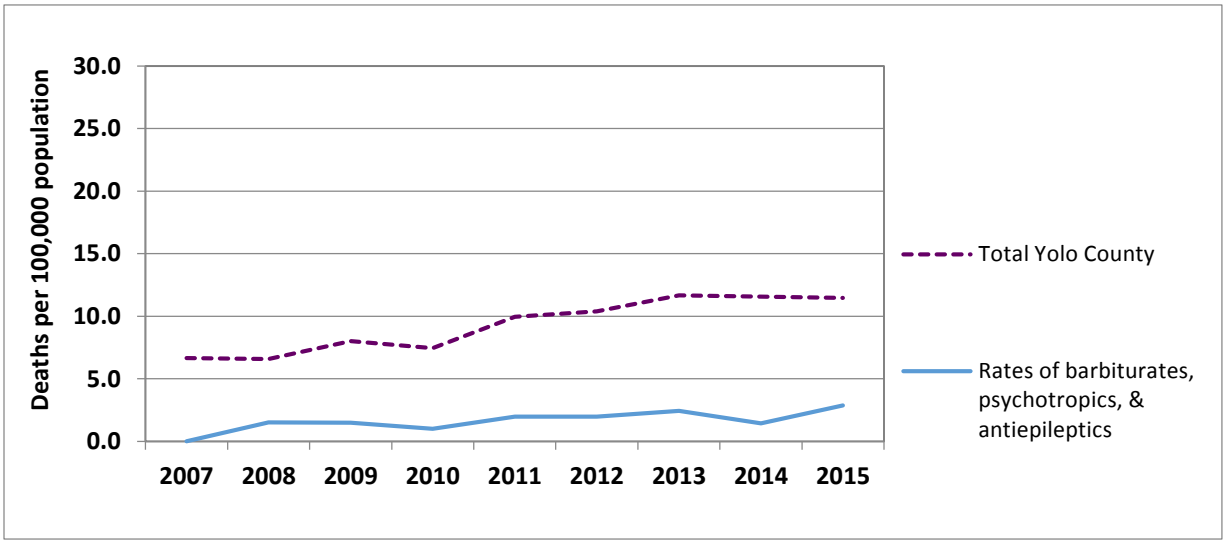


AP: accidental poisoning data only
Source for population estimates: CA DOF, 2013 projections

MORTALITY DUE TO SEDATIVE-HYPNOTICS, PSYCHOTROPICS AND ANTIEPILEPTICS

The underlying cause code for this group of drugs deaths corresponds to the ICD-10 underlying cause codes X41, X61 and Y11. From 2007 to 2015, 17.7% (n=30) of all the drug-related deaths in Yolo County were due to accidental poisoning, suicide, and undetermined intent by exposure to antiepileptics, sedative-hypnotic, and psychotropic drugs (Table 4). These groups include antidepressants, barbiturates, hydantoin derivatives, iminostilbenes, methaqualone compounds, neuroleptics, psychostimulants (such as methamphetamine), succinimides, oxazolidinediones, and tranquillizers. There was no increasing trend in the rate of drug-related deaths for this group of drugs from 2007 to 2015 (Figure 4).

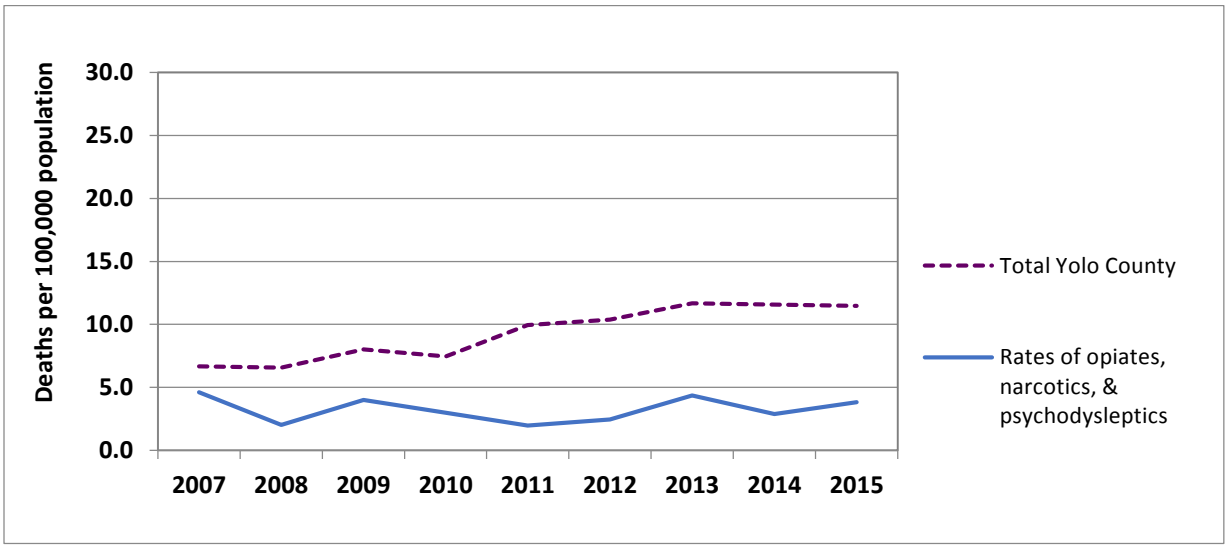
Figure 4. Drug-Related Death Rates for Total (all Drugs) vs. Barbiturates, Psychotropics and Antiepileptics (ICD-10 Code X41, X61 and Y11) Yolo County, 2007-2015.



MORTALITY DUE TO OPIATES, NARCOTICS AND PSYCHODEYLEPTICS

The underlying cause code for this group of drugs deaths corresponds to the ICD-10 underlying cause codes X42 and X62. From 2007 to 2015, 34.7% (n=57) of all the drug-related deaths were due to accidental poisoning and suicide by exposure to opiates, narcotics and psychodysleptic drugs (Figure 5). These groups include cannabis (derivatives), cocaine, codeine, heroin, lysergide (LSD), mescaline, methadone, morphine, and opium (alkaloids). There was no increasing trend in the rate of drug-related deaths from this group of drugs between 2007 and 2015 (Figure 5).

Figure 5. Drug-Related Death Rates for Total (All Drugs) vs. Opiates, Narcotics and Psychodysleptics (ICD-10 Code X42 and X62), Yolo County, 2007-2015.

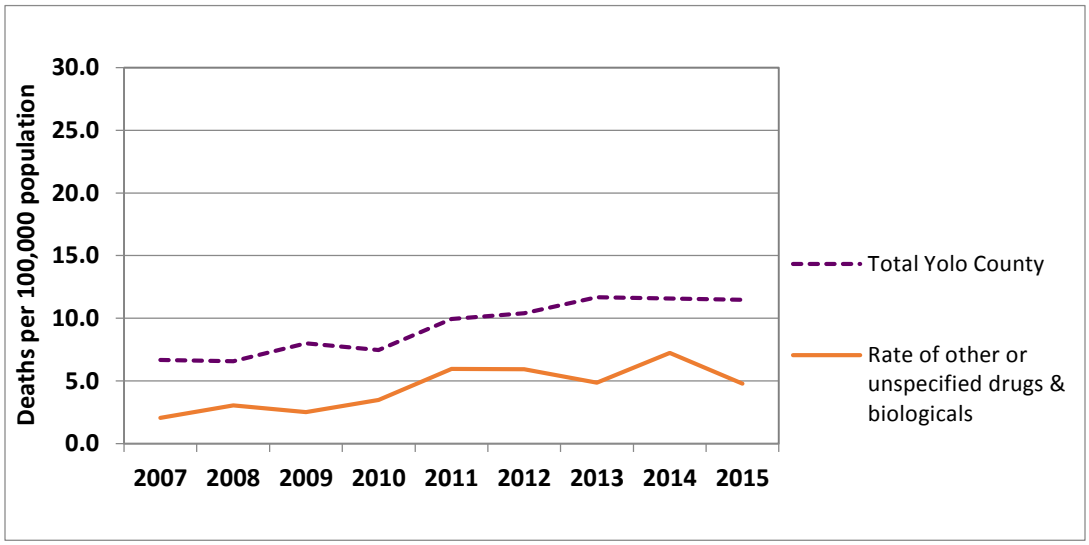


MORTALITY DUE TO OTHER OR UNSPECIFIED DRUGS & BIOLOGICALS

The leading cause of drug-related deaths from 2007 to 2015 was from accidental poisoning (i.e., overdose), suicide, and undetermined intent to other or unspecified drugs and biologicals, accounting for close to half (47.6%, n=81) of all Yolo County drug-related deaths (Figure 6). The underlying cause code for this group of drugs deaths corresponds to the ICD-10 underlying cause codes X44, X64, and Y14. This group includes agents primarily acting on smooth and skeletal muscles, the respiratory system, anesthetics, drugs affecting the cardiovascular and gastrointestinal systems, hormones and synthetic substitutes, systemic and hematological agents, systemic antibiotics and other anti-infectives, therapeutic gases, topical preparations, vaccines, water-balance agents and drugs affecting mineral and uric acid metabolism, and other unspecified drugs (including multidrug intoxication or polypharmacy).

According to the death certificates, multidrug intoxication accounted for a total of 24 deaths and polypharmacy accounted for a total of 21 deaths. (The death certificates did not specify which drugs were combined.) A total of 22 (7 also including alcohol) were listed as multidrug toxicity with at least one or more of the combined drugs being an opioid (e.g., hydrocodone, heroin, fentanyl, methadone, oxycodone, morphine). A total of 4 were listed as multidrug intoxication combined with alcohol. Another 5 were listed as multidrug only (no alcohol or opioids included).

Figure 6. Drug-Related Death Rates for Total (All Drugs) vs. Other or Unspecified Drugs and Biologicals (X44, X64 and Y14), Yolo County, 2007-2015.



SUMMARY AND CONCLUSIONS

The drug-related death rate in Yolo County has increased by 71% from 2007 to 2015. This statistic mirrors the State of California's increasing trend in drug-related deaths. From 2007 to 2015, persons aged 35 to 64 years old accounted for 73% of all drug-related deaths in the County. In the same time period, the city of West Sacramento accounted for 46% of all drug-related deaths (the highest drug-related death rate for a city in Yolo County) in the County. Non-Hispanic whites accounted for 75% of all drug-related deaths in Yolo County.

Much work has already been done by the CDPH and the Centers for Disease Control and Prevention (CDC) to address the increasing rates of drug-related death over the past decade, especially those related to use of opioids. California is aggressively dealing with the addiction of patients to opioid painkillers, including imposing more stringent rules about prescribing medication for medical providers and new worker's compensation medical regulations. The State has also sought funding from the CDC for the state's prescription drug monitoring program.

In 2014, the CDPH launched a new state taskforce called the Prescription Opioid Misuse and Overdose Prevention Workgroup. This workgroup has helped to develop strategies to curb prescription and opioid use, including the promotion of revised guidelines for prescribing controlled substances for pain with the Medical Board of California (MBC). The workgroup helped develop a public education campaign to increase the public's awareness about the dangers of addiction to opioid prescription medications. The CDPH has also coordinated and partnered with three large healthcare systems in California, all of which have reduced opioid prescribing by 25-50%.

Yolo County must continue to work with other agencies to address the drug-related deaths rate. Multi-sector collaborations at the federal, state, and local level agencies are important to move forward with plans to reduce opioid abuse in the County. The County should also work with various healthcare institutions and local physicians regarding the promotion of safe opioid prescribing.

New and revised policies at the state and local government level should be created to improve the health of the public and ultimately reduce opioid painkiller addiction. Substance abuse treatment needs to remain available for addicted individuals as well as continued provider education.

Yolo County will need to continue data collection and review of drug-related deaths to understand risk factors and trends. There is a real-time need for the surveillance and analysis of drug-related death data. Currently, there is no established way for the County to track specific opioid overdose and suicide. The ICD-10 coding system does not allow for specific substances to be identified. This coding system may need to be updated to include specific drugs, such as fentanyl. In 2016, California experienced a temporary spike in accidental fentanyl overdoses (with 52 overdoses and 2 deaths in Sacramento County alone). There was no established method to track the specific drug that was harming the public. A database that allows pharmacists and other providers to track the prescription of certain drugs to patients should be created. The CDPH has recently developed a database of drug indicators called the Controlled Substance Utilization Review and Evaluation System (CURES). This database is a prescription drug-monitoring program for dispensers and prescribers. Yolo County will continue to work with CDPH to monitor the number of prescriptions and type of drugs prescribed by medical providers.

The County will need to increase public awareness about the potential dangers of opioid drugs and to educate the public about addiction resulting from the use of opioids for pain treatment. There needs to be a reduction of the stigma regarding drug addiction (in particular around prescription painkiller

addiction) through education and public awareness. The County will also need to be involved in educating consumers, pharmacists, and prescribing providers about the dangers of opioid painkillers. This includes counseling patients on the safe use, storage, and disposal of opioids and other prescription drugs.