Nonfatal, Unintentional Poisonings

MINNESOTA HOSPITAL DISCHARGE DATA 2012-2017

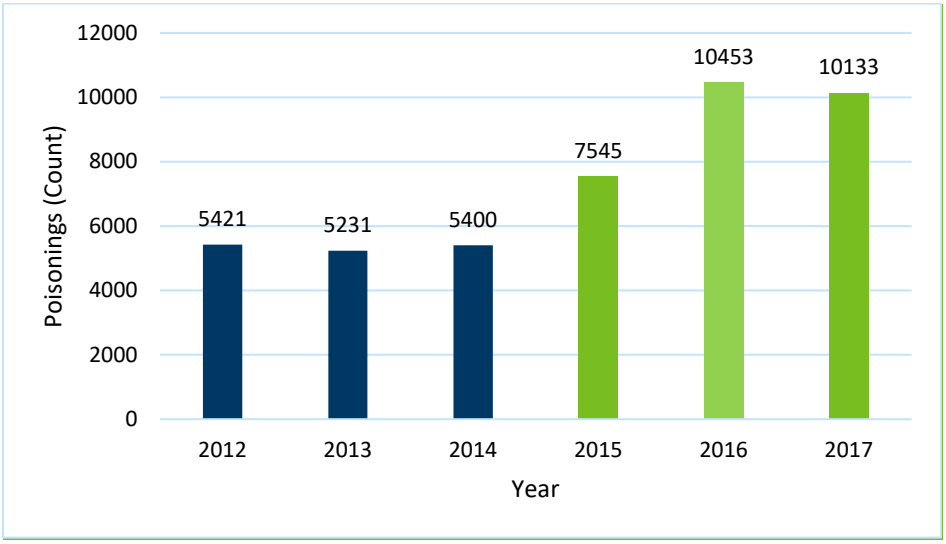
Key Findings

- Nonfatal, unintentional poisonings decreased slightly from 2016 to 2017 for the first time in many years
- Males continue to experience more overdoses than females
- Nonfatal, unintentional poisonings are highest for 1-4, 25-29, and 50-59 year olds, but are the result of different types of poisonings
- The Seven-County Metro and Greater Minnesota differ in nonfatal, unintentional poisoning trends across age groups

Annual Poisoning Counts

From 2012 to 2014, the number of nonfatal, unintentional poisonings remained consistent. There was an increase in the number of poisonings in 2015 and 2016. However, from 2016 to 2017, the number of poisonings again remained consistent (Figure 1). The change and increase in the number of poisonings from 2014 to 2016 may be attributable to the change in disease classification codes, making it difficult to make comparisons across this time period. Further analysis is needed to understand this increase and the effect of the switch to ICD-10-CM. However, it may also be related to an increase in fentanyl and fentanyl analog overdoses, as the analysis of death certificate data has shown that synthetic opioid overdoses have approximately doubled during those years[1].

Figure 1: The number of nonfatal, unintentional poisonings appears consistent, but the transition from ICD-9-CM to ICD-10-CM makes comparisons difficult

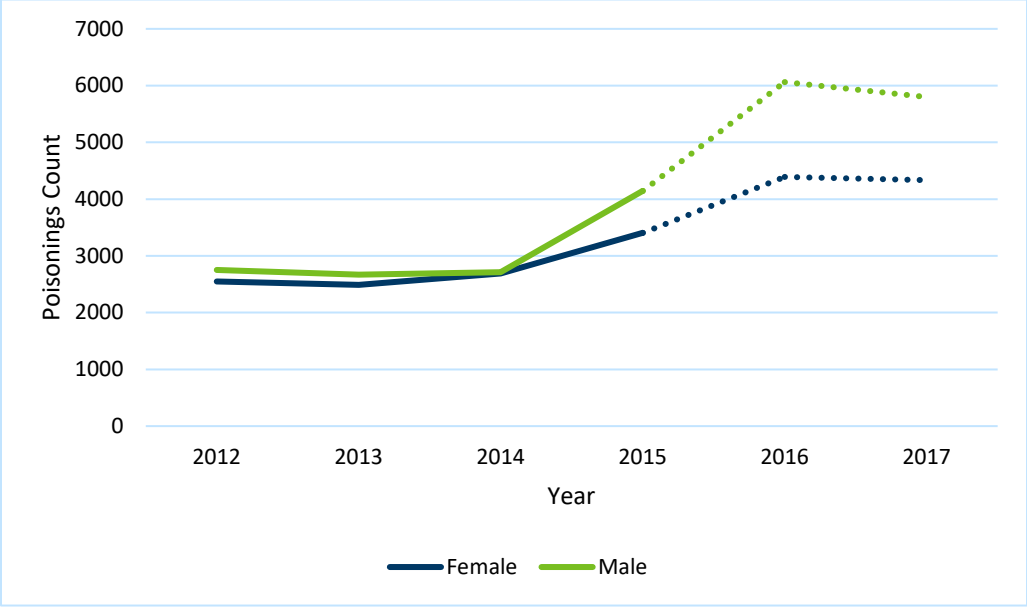


Unintentional, nonfatal poisonings from 2012-2017 (Years 2015- 2017 are highlighted, indicating the switch in disease classification codes in quarter 4 of 2015).

Gender

The data show that men had a greater number of poisonings than women consistently from 2012 to 2017 (Figure 2). The switch from ICD-9-CM to ICD-10-CM may account for the large increase in poisonings from 2015 to 2017. The previously mentioned increase in overdose deaths that involved fentanyl and fentanyl analogs may also be a driver of the increase in poisonings[1]. It is also important to highlight the fact that unintentional, nonfatal poisonings appear to decrease slightly from 2016 to 2017 for the first time in many years.

Figure 2: Males have more poisonings, and the difference in number between males and females increased following the transition to ICD-10-CM

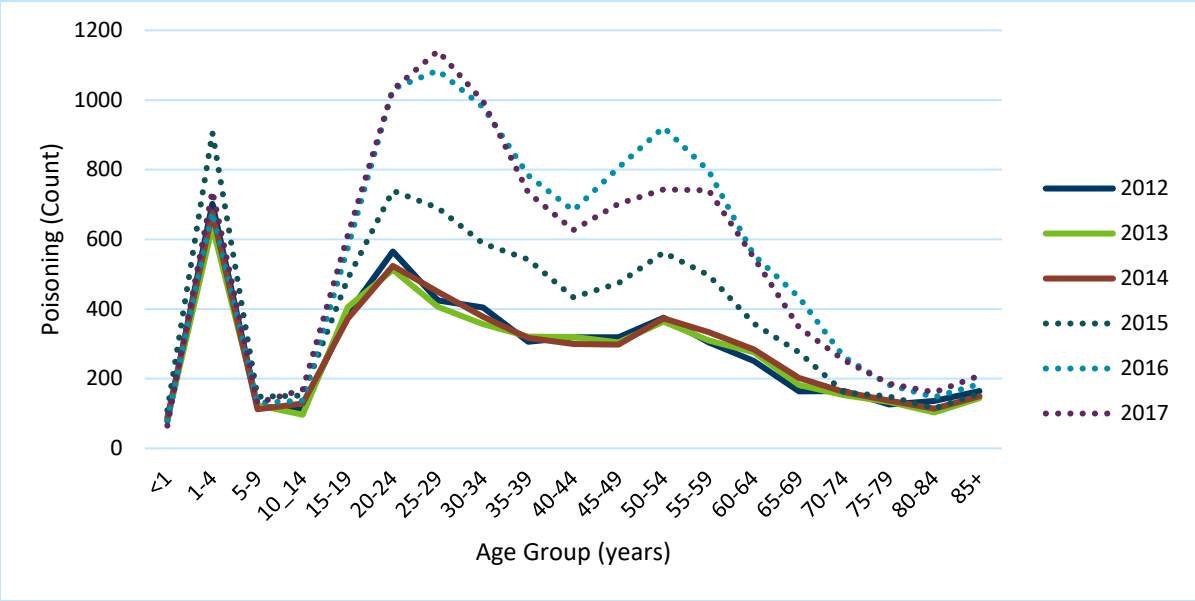


Unintentional, nonfatal poisonings from 2012-2017 (Years 2015- 2017 are dotted, indicating the switch in disease classification codes in quarter 4 of 2015).

Age

For each year, we see a trimodal trend with three peaks among the age groups. Two peaks within adults can be seen within the data - one at the 25-29 age group and the other at the 50-59 age group (Figure 3). The data show a continued increase in poisonings in the 25-29 age group, while the first decrease in poisonings in the 50-59 age group was observed from 2016 to 2017; this remains even after the previously mentioned change in disease classification codes. The rise seen in the 25-29 age group may be due to an increase in overdoses of fentanyl and fentanyl analogs, as they have continued to increase in Minnesota[1]. The decrease in the 50-59 age group could possibly be associated with the result of a leveling-off of prescription opioid overdoses in this group[1]. A third important peak can also be seen in the 1-4 age group, which may be due to household poisonings by children.

Figure 3: Poisonings peak in the 1-4, 25-29, and 50-59 year age group, but are the result of different types of poisonings

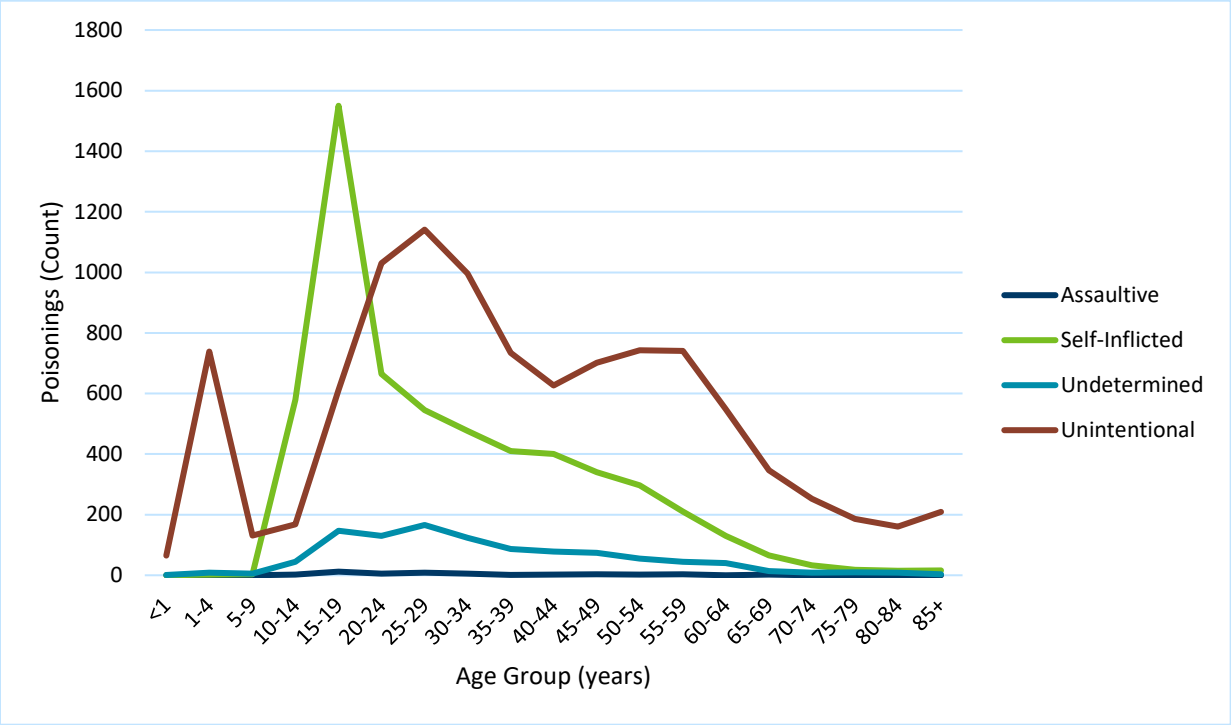


Unintentional, nonfatal poisonings from 2012- 2017 (Years 2015- 2017 are dotted, indicating the switch in disease classification codes in quarter 4 of 2015).

Manner

In the previous results, only unintentional poisonings were presented. The analysis below aims to compare the trend of nonfatal, unintentional poisonings among all ages with that of nonfatal, assaultive, self-inflicted, and undetermined poisonings. As previously discussed, unintentional poisonings show a trimodal trend of three peaks across the age groups with two of the distinct peaks at age groups 25-29 and 50-59 (Figure 4). This trimodal trend is unique to unintentional poisonings and may be directly related to drug overdoses. Self-inflicted poisonings show one large peak of poisonings in the 15-19 age group and decrease as age increases. Assaultive and undetermined poisonings remain fairly consistent across age groups.

Figure 4: Trimodal trend among age groups is unique for unintentional poisonings

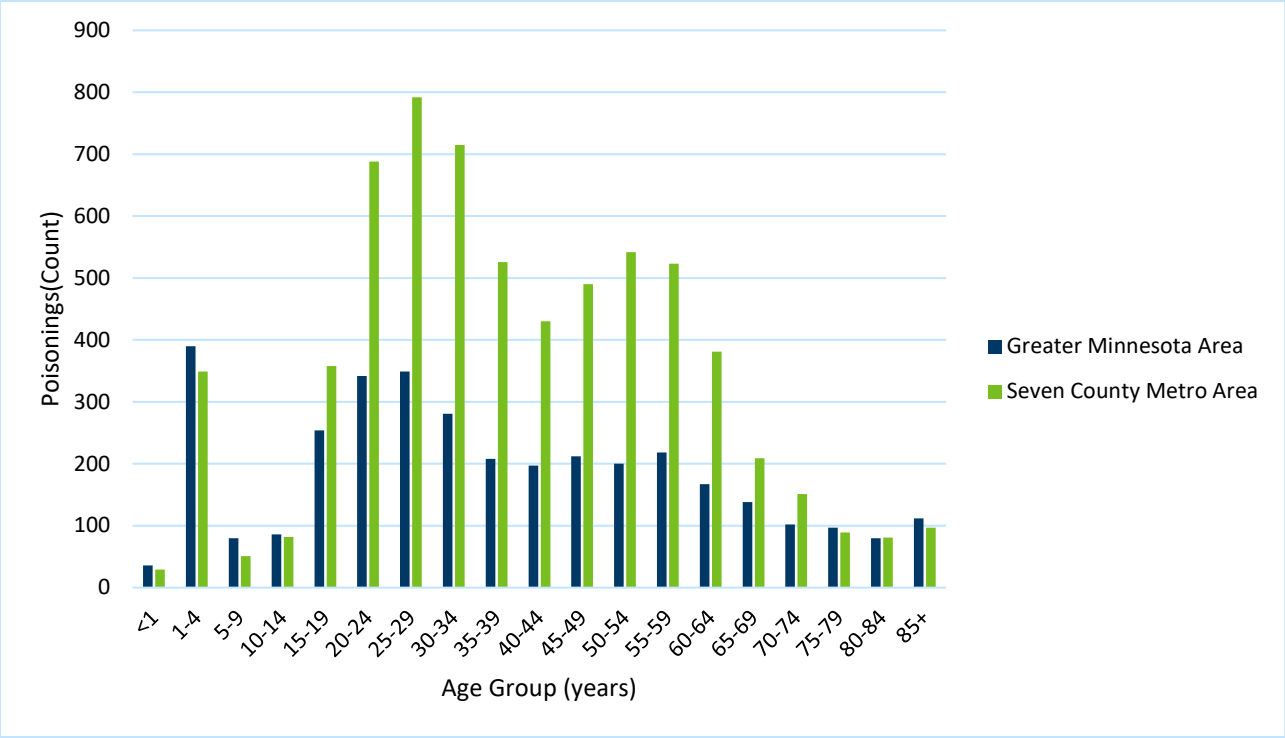


Nonfatal Poisonings from 2017 MIDAS Data

Seven-County Metro vs. Greater Minnesota

The Seven-County Metro region differs slightly compared to Greater Minnesota. Both regions show a multi-modal curve, but with different shapes. The Metro Region shows a clear trimodal curve with two of the distinct peaks at age groups 25-29 and 50-59. Conversely, the Greater Minnesota area shows a higher concentration of poisonings among the younger age groups, and declines gradually as age increases, with only a slight peak at the 50-59 age group (Figure 5).

Figure 5: Greater Minnesota area has a higher concentration of poisonings amongst younger age groups



Conclusion

This report describes the trends of unintentional, nonfatal poisonings in Minnesota from 2012 to 2017. The change in disease classification codes in the fourth quarter of 2015 makes it difficult to combine all years for analysis, but observations can be made on the four years using ICD-9-CM codes and the two years using ICD-10-CM codes. In doing so, it can be seen that men have higher overall poisoning counts than women, but that poisonings appear to decrease from 2016 to 2017 for the first time in many years. Additionally, a trimodal curve is observed for unintentional poisonings with two of the peaks in the 25-29 and 50-59 year age groups; the latter two peaks may be related to drug overdoses. The continued rise in poisonings in the 25-29 year age group from 2016 to 2017 may be due to an increase in fentanyl and fentanyl analog overdoses, as previous literature has shown that these types of overdoses have steadily risen in recent years[1]. The distribution by age can be seen in both the Seven County Metro and the Greater Minnesota area, which has higher concentrations of poisonings among children.

This report shows a brief summary of trends that can be observed, but further analysis should be conducted on the data to look at the causes of those trends. Drastically higher poison counts in men as compared to women have not historically been the trend, but differences in counts appear to increase across years in this report. Further analysis is needed to determine whether this new trend occurs due to the change in classification codes or due to a rise in opioid use. Further investigation should also occur on the rise of poisonings among younger age groups and

the lowering of poisonings among older age groups in recent years (2016-2017). This trend could be caused by an increase in fentanyl overdoses and the leveling-off of prescription drug overdoses. Future studies should attempt to uncover the significance behind the trends observed.

Methods

MIDAS Poisoning Data

The data collected for this report were extracted from the Minnesota Injury Data Access System (MIDAS) and used to analyze hospital discharge data for injuries. MIDAS captures data on all hospital-treated poisonings, which includes drug-related poisonings or overdoses, along with all household, food, and chemical-related poisonings. It does not allow the data to be sorted by type of poisonings, meaning the data included in this analysis reflects all poisonings. However, the website does allow users to categorize data by various topics, including year, location, mechanism/cause of injury, type of injury, manner of injury, type of care, outcome, and gender. This report used data that were filtered to include only poisonings under mechanism/cause, nonfatal under outcome, and unintentional under manner and intent. Each analysis selected these filters and used the compare option under each category to compare the area of interest, such as gender and manner. The data were also filtered to only contain information on unintentional and nonfatal poisonings. The full list of poisonings included can be seen in the Appendix. The yearly analysis used the same categories, but changed the dataset year. Following extraction, the data were then moved to Excel to be reorganized into tables and graphs. This report aims to provide an epidemiologic overview of unintentional, nonfatal poisonings from 2012 to 2017 in Minnesota. MIDAS (http://www.health.state.mn.us/injury/midas/injury/index.cfm) is publicly available.

Transition in Classification of Disease Codes (ICD-9-CM and ICD-10-CM)

The International Classification of Diseases (ICD) is the most widely-used method for classifying health conditions and was used in the categorization of hospital discharge data in MIDAS. Through the third quarter of 2015, diseases were classified under the ninth edition of ICD codes (ICD-9-CM), but beginning in the fourth quarter of 2015, diseases have been updated to the tenth edition of ICD codes (ICD-10-CM). The switch from ICD-9-CM to ICD-10-CM required changes to the methods for defining and accounting for poisonings. Therefore, the data may show certain uncharacteristic spikes from 2014 to 2016, and trends over this transition should be interpreted cautiously.[2]

Appendix

The codes below indicate which types of poisonings were included for analysis.

E8500
Accidental poisoning by heroin

E8501
Accidental poisoning by methadone

E8502
Accidental poisoning by other opiates and related narcotics

E8503
Accidental poisoning by salicylates

E8504
Accidental poisoning by aromatic analgesics, not elsewhere classified

E8505
Accidental poisoning by pyrazole derivatives

E8506
Accidental poisoning by antirheumatics (antiphlogistics)

E8507
Accidental poisoning by other non-narcotic analgesics

E8508
Accidental poisoning by other specified analgesics and antipyretics

E8509
Accidental poisoning by unspecified analgesic or antipyretic

E8510
Accidental poisoning by barbiturates

E8520
Accidental poisoning by chloral hydrate group

E8521
Accidental poisoning by paraldehyde

E8522
Accidental poisoning by bromine compounds

E8523
Accidental poisoning by methaqualone compounds

E8524
Accidental poisoning by glutethimide group

E8525
Accidental poisoning by mixed sedatives, not elsewhere classified

E8528
Accidental poisoning by other specified sedatives and hypnotics

E8529
Accidental poisoning by unspecified sedative or hypnotic

E8530
Accidental poisoning by phenothiazine-based tranquilizers

E8531
Accidental poisoning by butyrophenone-based tranquilizers

E8532
Accidental poisoning by benzodiazepine-based tranquilizers

E8538
Accidental poisoning by other specified tranquilizers

E8539
Accidental poisoning by unspecified tranquilizer

E8540
Accidental poisoning by antidepressants

E8541
Accidental poisoning by psychodysleptics [hallucinogens]

E8542
Accidental poisoning by psychostimulants

E8543
Accidental poisoning by central nervous system stimulants

E8548
Accidental poisoning by other psychotropic agents

E8550
Accidental poisoning by anticonvulsant and anti-parkinsonism drugs

E8551
Accidental poisoning by other central nervous system depressants

E8552
Accidental poisoning by local anesthetics

E8553
Accidental poisoning by parasympathomimetics [cholinergic]

E8554
Accidental poisoning by parasympatholytics [anticholinergics and antimuscarinics] and spasmolytic

E8555
Accidental poisoning by sympathomimetic [adrenergic]

E8556
Accidental poisoning by sympatholytics [antiadrenergic]

E8558
Accidental poisoning by other specified drugs acting on central and autonomic nervous systems

E8559
Accidental poisoning by unspecified drug acting on central and autonomic nervous systems

E856
Accidental poisoning by antibiotics

E857
Accidental poisoning by other anti-invectives

E8580
Accidental poisoning by hormones and synthetic substitutes

E8581
Accidental poisoning by primarily systemic agents

E8582
Accidental poisoning by agents primarily affecting blood constituents

E8583
Accidental poisoning by agents primarily affecting cardiovascular system

E8584
Accidental poisoning by agents primarily affecting gastrointestinal system

E8585
Accidental poisoning by water, mineral, and uric acid metabolism drugs

E8586
Accidental poisoning by agents primarily acting on the smooth and skeletal muscles and respiratory system

E8587
Accidental poisoning by agents primarily affecting skin and mucous membrane, ophthalmological, otorhinolaryngological, and dental drugs

E8588
Accidental poisoning by other specified drugs

E8589
Accidental poisoning by unspecified drug

E8600
Accidental poisoning by alcoholic beverages

E8601
Accidental poisoning by other and unspecified ethyl alcohol and its products

E8602
Accidental poisoning by methyl alcohol

E8603
Accidental poisoning by isopropyl alcohol

E8604
Accidental poisoning by fusel oil

E8608
Accidental poisoning by other specified alcohols

E8609
Accidental poisoning by unspecified alcohol

E8610
Accidental poisoning by synthetic detergents and shampoos

E8611
Accidental poisoning by soap products

E8612
Accidental poisoning by polishes

E8613
Accidental poisoning by other cleansing and polishing agents

E8614
Accidental poisoning by disinfectants

E8615
Accidental poisoning by lead paints

E8616
Accidental poisoning by other paints and varnishes

E8619
Accidental poisoning by unspecified cleansing and polishing agents, disinfectants, paints, and varnishes

E8620
Accidental poisoning by petroleum solvents

E8621
Accidental poisoning by petroleum fuels and cleaners

E8622
Accidental poisoning by lubricating oils

E8623
Accidental poisoning by petroleum solids

E8624
Accidental poisoning by other specified solvents, not elsewhere classified

E8629
Accidental poisoning by unspecified solvent, not elsewhere classified

E8630
Accidental poisoning by insecticides of organochlorine compounds

E8631
Accidental poisoning by insecticides of organophosphorus compounds

E8632
Accidental poisoning by carbamates

E8633
Accidental poisoning by mixtures of insecticides

E8634
Accidental poisoning by other and unspecified insecticides

E8635
Accidental poisoning by herbicides

E8636
Accidental poisoning by fungicides

E8637
Accidental poisoning by rodenticides

E8638
Accidental poisoning by fumigants

E8639
Accidental poisoning by other and unspecified agricultural and horticultural chemical and pharmaceutical preparations other than plant foods and fertilizers

E8640
Accidental poisoning by corrosive aromatics not elsewhere classified

E8641
Accidental poisoning by acids not elsewhere classified

E8642
Accidental poisoning by caustic alkalis not elsewhere classified

E8643
Accidental poisoning by other specified corrosives and caustics not elsewhere classified

E8644
Accidental poisoning by unspecified corrosives and caustics not elsewhere classified

E8650
Accidental poisoning by meat

E8651
Accidental poisoning by shellfish

E8652
Accidental poisoning from other fish

E8653
Accidental poisoning from berries and seeds

E8654
Accidental poisoning from other specified plants

E8655
Accidental poisoning from mushrooms and other fungi

E8658
Accidental poisoning from other specified foods

E8659
Accidental poisoning from unspecified foodstuff or poisonous plant

E8660
Accidental poisoning by lead and its compounds and fumes

E8661
Accidental poisoning by mercury and its compounds and fumes

E8662
Accidental poisoning by antimony and its compounds and fumes

E8663
Accidental poisoning by arsenic and its compounds and fumes

E8664
Accidental poisoning by other metals and their compounds and fumes

E8665
Accidental poisoning by plant foods and fertilizers

E8666
Accidental poisoning by glues and adhesives

E8667
Accidental poisoning by cosmetics

E8668
Accidental poisoning by other specified solid or liquid substances

E8669
Accidental poisoning by unspecified solid or liquid substance

E867
Accidental poisoning by gas distributed by pipeline

E8680
Accidental poisoning by liquefied petroleum gas distributed in mobile containers

E8681
Accidental poisoning by other and unspecified utility gas

E8682
Accidental poisoning by motor vehicle exhaust gas

E8683
Accidental poisoning by carbon monoxide from incomplete combustion of other domestic fuels

E8688
Accidental poisoning by carbon monoxide from other sources

E8689
Accidental poisoning by unspecified carbon monoxide

E8690
Accidental poisoning by nitrogen oxides

E8691
Accidental poisoning by sulfur dioxide

E8692
Accidental poisoning by freon

E8693
Accidental poisoning by lacrimogenic gas [tear gas]

E8694
Second hand tobacco smoke

E8698
Accidental poisoning by other specified gases and vapors

E8699
Accidental poisoning by unspecified gases and vapors

E9500
Suicide and self-inflicted poisoning by analgesics, antipyretics, and antirheumatics

E9501
Suicide and self-inflicted poisoning by barbiturates

E9502
Suicide and self-inflicted poisoning by other sedatives and hypnotics

E9503
Suicide and self-inflicted poisoning by tranquilizers and other psychotropic agents

E9504
Suicide and self-inflicted poisoning by other specified drugs and medicinal substances

E9505
Suicide and self-inflicted poisoning by unspecified drug or medicinal substance

E9506
Suicide and self-inflicted poisoning by agricultural and horticultural chemical and pharmaceutical preparations other than plant foods and fertilizers

E9507
Suicide and self-inflicted poisoning by corrosive and caustic substances

E9508
Suicide and self-inflicted poisoning by arsenic and its compounds

E9509
Suicide and self-inflicted poisoning by other and unspecified solid and liquid substances

E9510
Suicide and self-inflicted poisoning by gas distributed by pipeline

E9511
Suicide and self-inflicted poisoning by liquefied petroleum gas distributed in mobile containers

E9518
Suicide and self-inflicted poisoning by other utility gas

E9520
Suicide and self-inflicted poisoning by motor vehicle exhaust gas

E9521
Suicide and self-inflicted poisoning by other carbon monoxide

E9528
Suicide and self-inflicted poisoning by other specified gases and vapors

E9529
Suicide and self-inflicted poisoning by unspecified gases and vapors

E9620
Assault by drugs and medicinal substances

E9621
Assault by other solid and liquid substances

E9622
Assault by other gases and vapors

E9629
Assault by unspecified poisoning

E972
Injury due to legal intervention by gas

E9796
Terrorism involving biological weapons

E9797
Terrorism involving chemical weapons

E9800
Poisoning by analgesics, antipyretics, and antirheumatics, undetermined whether accidentally or purposely inflicted

E9801
Poisoning by barbiturates, undetermined whether accidentally or purposely inflicted

E9802
Poisoning by other sedatives and hypnotics, undetermined whether accidentally or purposely inflicted

E9803
Poisoning by tranquilizers and other psychotropic agents, undetermined whether accidentally or purposely inflicted

E9804
Poisoning by other specified drugs and medicinal substances, undetermined whether accidentally or purposely inflicted

E9805
Poisoning by unspecified drug or medicinal substance, undetermined whether accidentally or purposely inflicted

E9806
Poisoning by corrosive and caustic substances, undetermined whether accidentally or purposely inflicted

E9807
Poisoning by agricultural and horticultural chemical and pharmaceutical preparations other than plant foods and fertilizers, undetermined whether accidentally or purposely inflicted

E9808
Poisoning by arsenic and its compounds, undetermined whether accidentally or purposely inflicted

E9809
Poisoning by other and unspecified solid and liquid substances, undetermined whether accidentally or purposely inflicted

E9810
Poisoning by gas distributed by pipeline, undetermined whether accidentally or purposely inflicted

E9811
Poisoning by liquefied petroleum gas distributed in mobile containers, undetermined whether accidentally or purposely inflicted

E9818
Poisoning by other utility gas, undetermined whether accidentally or purposely inflicted

E9820
Poisoning by motor vehicle exhaust gas, undetermined whether accidentally or purposely inflicted

E9821
Poisoning by other carbon monoxide, undetermined whether accidentally or purposely inflicted

E9828
Poisoning by other specified gases and vapors, undetermined whether accidentally or purposely inflicted

E9829
Poisoning by unspecified gases and vapors, undetermined whether accidentally or purposely inflicted

References

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