Health Outcomes Among Children Associated with Prescription Drug Misuse or Abuse

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Outline

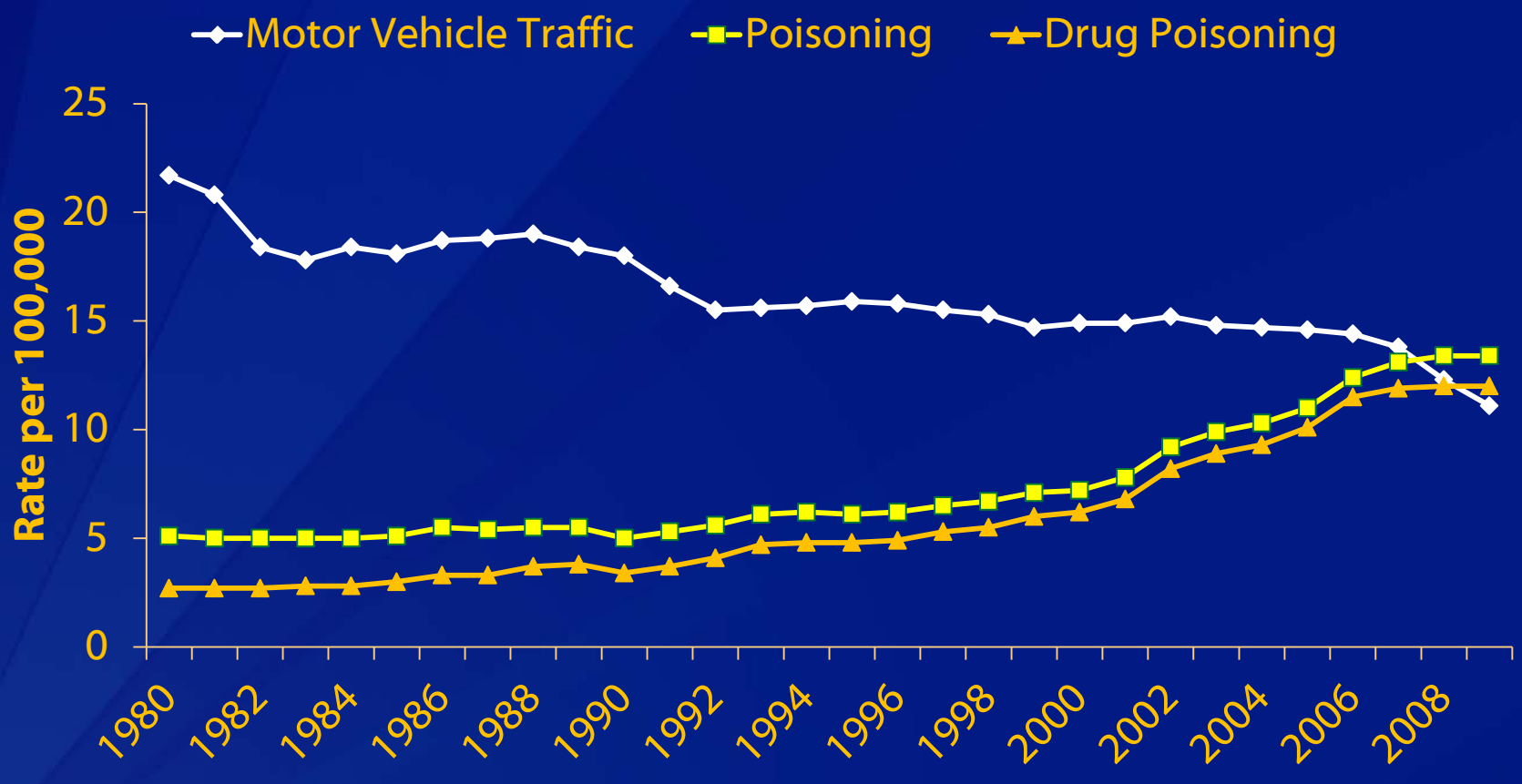
- **Overview of prescription misuse and abuse problem**
- **Health outcomes in children by stage of development:**
  - Prenatal and neonatal
  - Young children (0-6 years)
  - Adolescents (10-19 years)
- **Prevention strategies**

Overview

- **In 2008, drug overdoses in the United States caused 36,450 deaths (11.9 per 100,000)**
- **Rates by drug type were:**
  - Prescription drugs: 6.5
  - Opioid pain relievers: 4.8
  - Illicit drugs: 2.8
- **Rates by intent were:**
  - Unintentional: 9.2
  - Undetermined: 1.1
  - Suicide: 1.6

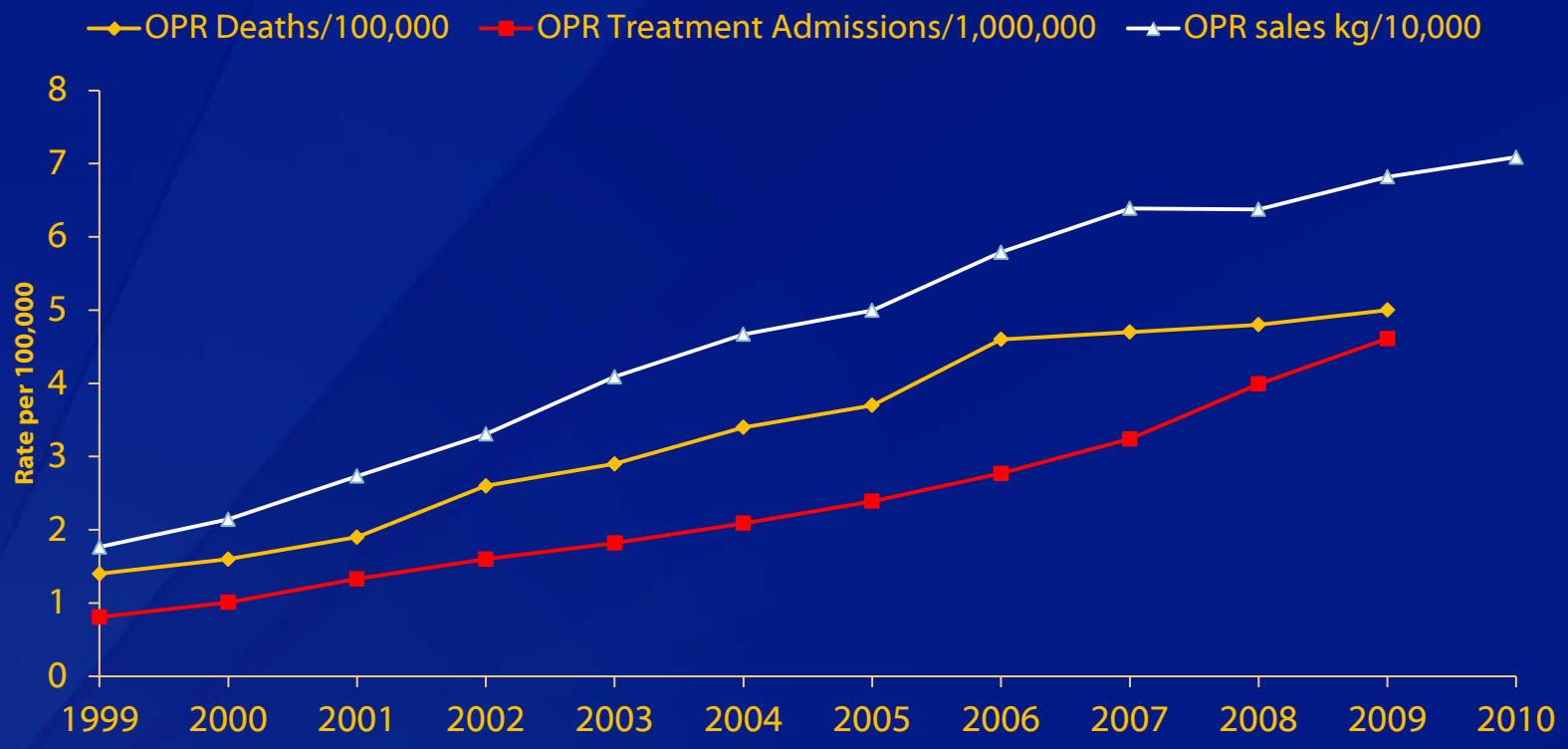
Source: CDC, MMWR 2011;60:1487-1492

Motor vehicle traffic, poisoning, and drug poisoning death rates: U.S., 1980--2009



Source: NCHS Data Brief, December, 2011, updated with 2009 mortality data

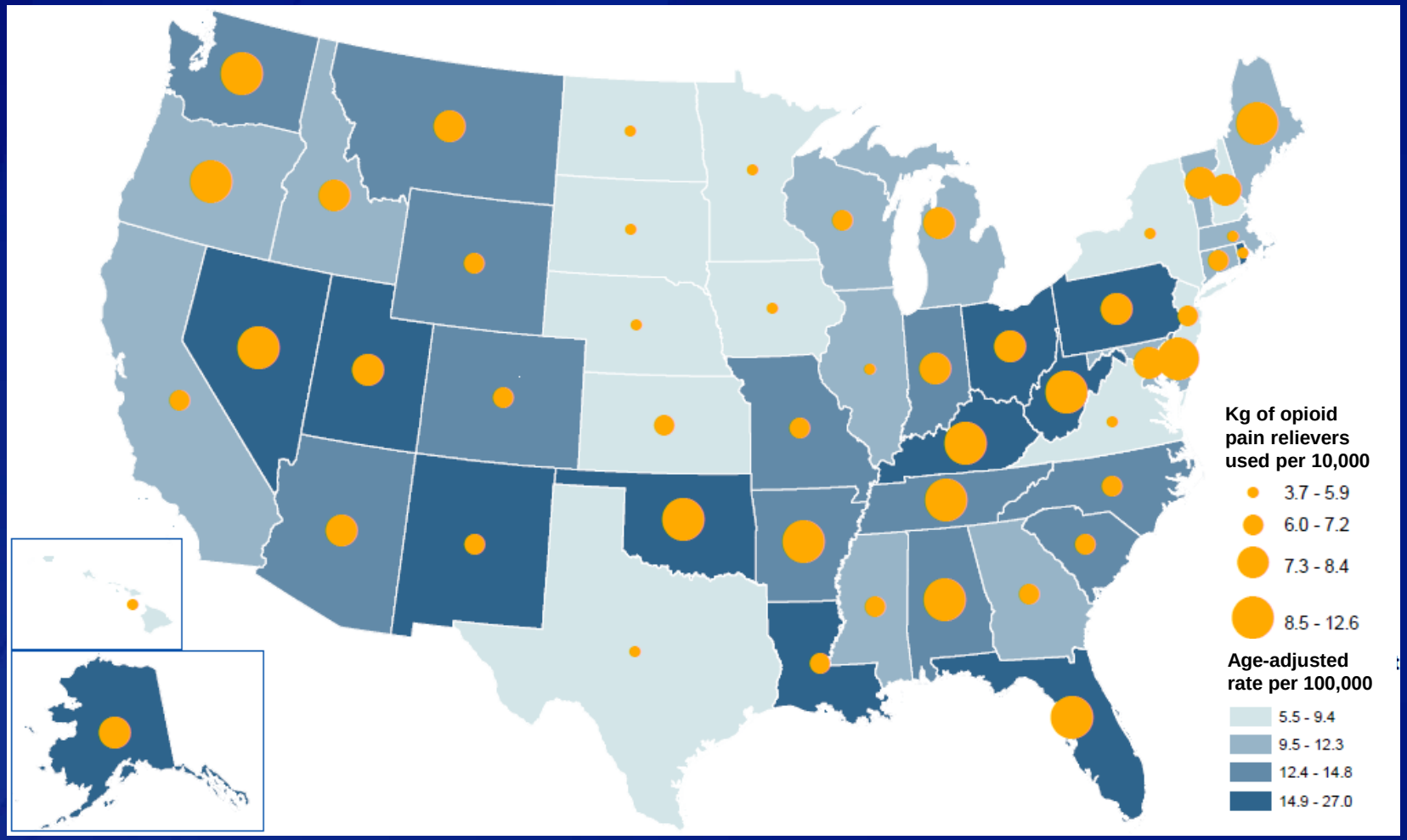
Opioid pain reliever (OPR) death rates, sales, and substance abuse treatment admission rates increased in parallel



National Vital Statistics System (99-09); Automated Reports Consolidated Orders System (99-10); Treatment Admissions Data Set (99-09)

Age-adjusted rates per 100,000 population for OPR deaths, crude rates per 10,000 population for OPR abuse treatment admissions, and crude rates per 10,000 population for kilograms of OPR sold.

Drug overdose death rate in 2008 and opioid pain reliever sales rate in 2010



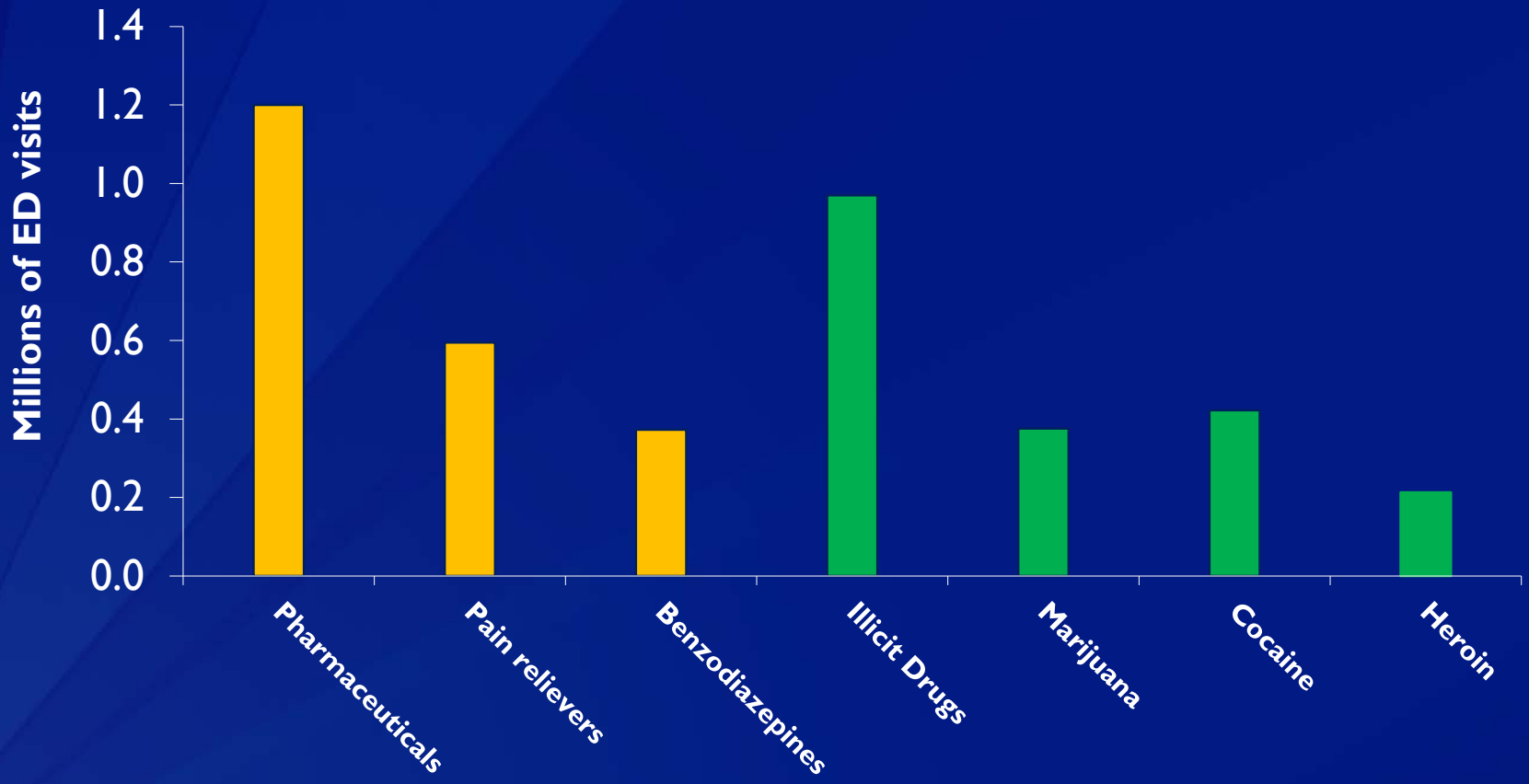
National Vital Statistics System, 2008; Automated Reports Consolidated Orders System (2010)

Prevalence of self-reported use of illicit drugs or nonmedical use of prescription drugs, U.S., 2010

Drug Type	Prevalence of use in past year
Total	**15.3**
Marijuana	11.5
Prescription-type Psychotherapeutic	6.3
Pain Reliever (incl Opioid analgesics)	*4.8*
Tranquilizer (incl Benzodiazepines)	*2.2*
Stimulants (incl Ritalin, Adderall)	*1.1*
Sedative (incl temazepam, barbiturates)	*0.4*
Cocaine	1.8
Heroin	0.2

Source: Substance Abuse and Mental Health Services, 2010 National Survey of Drug Use and Health

Estimated numbers of ED visits for misuse or abuse of drugs by drug type, U.S., 2009



Source: Drug Abuse Warning Network

Health Outcomes from Exposures to Prescription Drugs During Pregnancy

Rate of use of illicit drugs or nonmedical use of prescription drugs in past month by women aged 15-44, US, 2009-2010

Group	Prevalence (%)
Pregnant women	4.4
15-17 yrs	16.2
18-25 yrs	7.4
26-44 yrs	1.9
In first trimester	8.1
In third trimester	2.1
Nonpregnant women	10.9

Source: SAMHSA, NSDUH 2010

Rate of medical use of opioid analgesics during pregnancy, U.S.

- **0.6%** Rate of use for 1+ months during pregnancy, Mayo Clinic, MN, 1998-2009
- **2.0%** Rate of use for any duration during first trimester of pregnancy, National Birth Defects Prevention Study, 1997-2005

Sources: MN study: Kellogg, AJOG 2011;204:259.e1-4. NBDPS: Broussard, AJOG 2011;204; 314.e1-314.e11

Significant associations of birth defects with first trimester use of opioid analgesics

Type of birth defect	Adjusted Odds Ratio	95% Confidence Interval
Conoventricular septal defects of the heart	2.7	1.1-6.3
Atrioventricular septal defects of the heart	2.0	1.2-3.6
Hypoplastic left heart syndrome	2.4	1.4-4.1
Spina bifida	2.0	1.3-3.2
Gastroschisis	1.8	1.1-2.9

Source: National Birth Defects Prevention Study, Broussard, AJOG 2011;204; 314.e1-314.e11

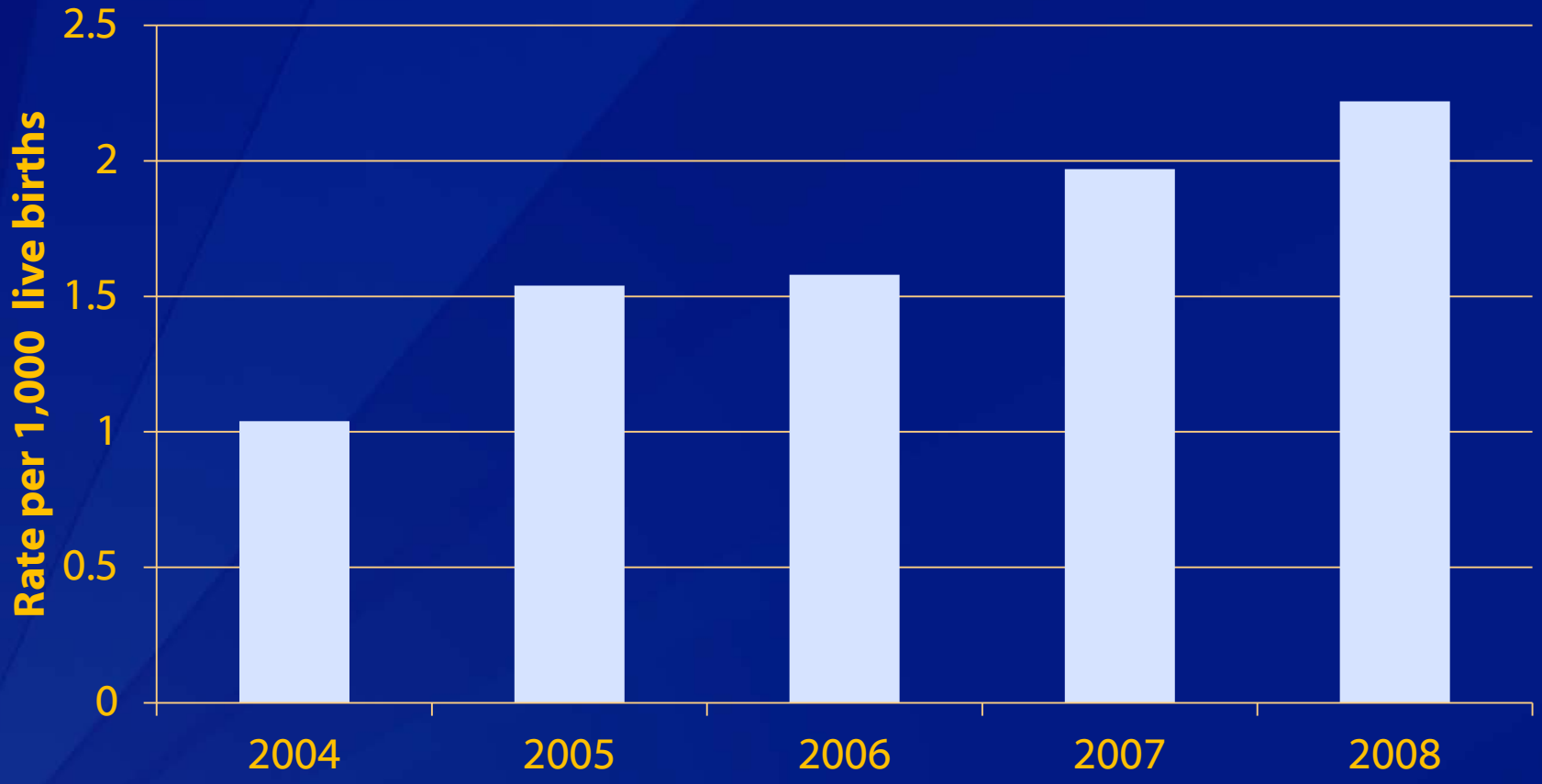
Discussion

- Since half of all pregnancies are unplanned, and women do not generally realize they are pregnant until about 8 weeks gestation, the embryo is frequently exposed to drugs taken by the mother.
- For birth defects, which generally arise in the first trimester, reducing use once pregnancy is known is often too late.
- Therefore, at least one in 50 births in the US might be exposed to teratogenic risk from opioids.
- Note that the baseline risk of these birth defects is low, so the absolute risk from opioids is still low.

Neonatal abstinence or withdrawal syndrome

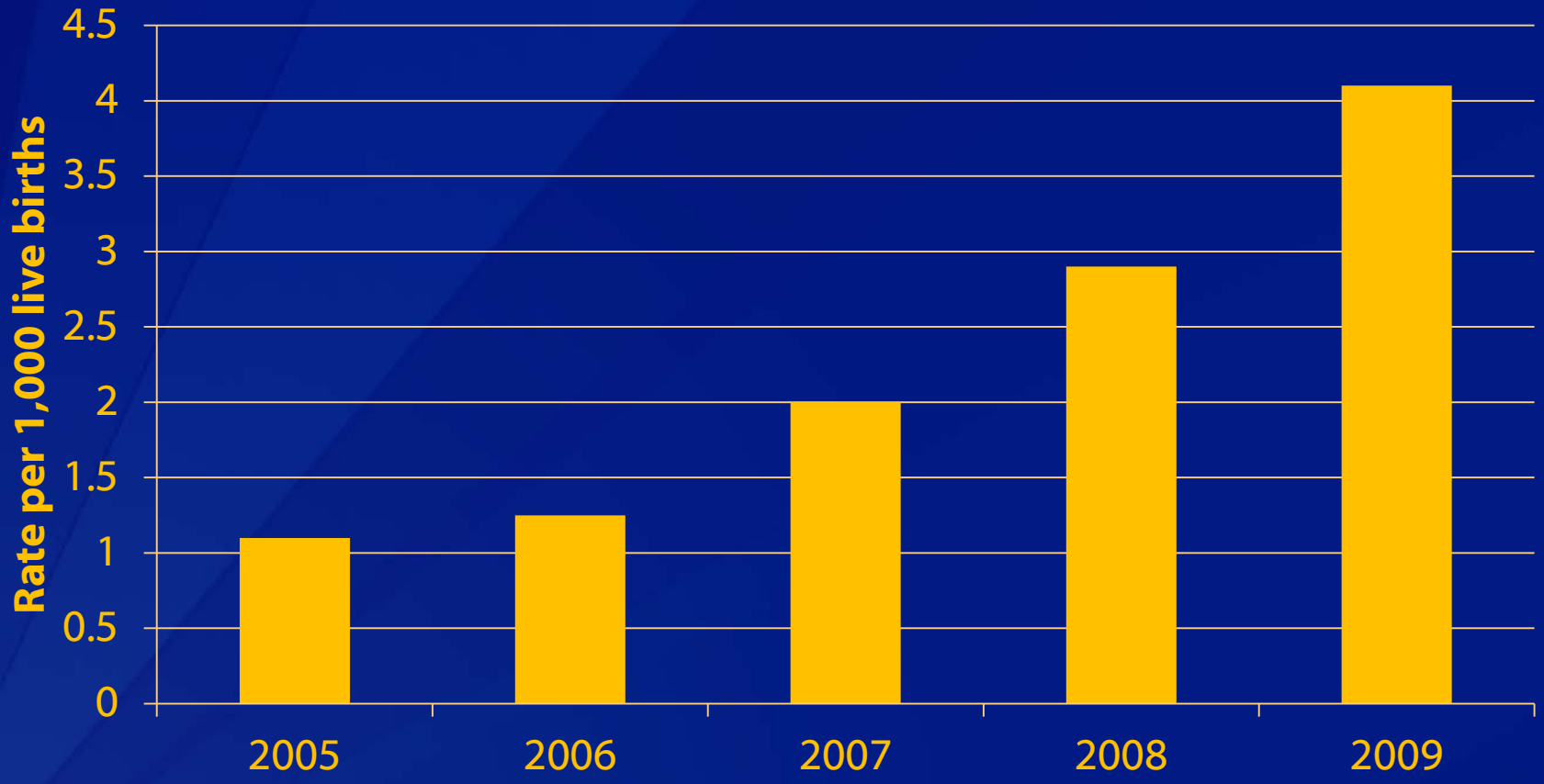
- **A risk from long term maternal drug use in the third trimester, whether medical or nonmedical**
- **Any drugs that cause dependency in the mother can cause dependency in the fetus.**
  - Prescription opioid analgesics or methadone for substance abuse treatment
  - Benzodiazepines
  - Cocaine or heroin
- **Such newborns usually require intensive care, long hospitalizations, and treatment with methadone.**

Rate of hospitalization for newborn withdrawal syndrome per 1,000 live births, NC, 2004-2008



Source: North Carolina Division of Public Health, 2011

Rate of hospitalization for newborn withdrawal syndrome per 1,000 live births, FL, 2005-2009



Source: Herald Tribune, Sarasota Florida, July 18, 2010, Data attributed to the Florida Department of Health

Discussion

- Increases in rates have also been noted in other states, such as Ohio and Washington
- Hospital discharge data does not identify the drugs involved, but the suspicion is that the trends are being driven by opioid analgesics.
- How much is the result of misuse or abuse is not yet known.
- Treatment, eg, methadone treatment for heroin abuse, might be necessary in spite of fetal exposure.

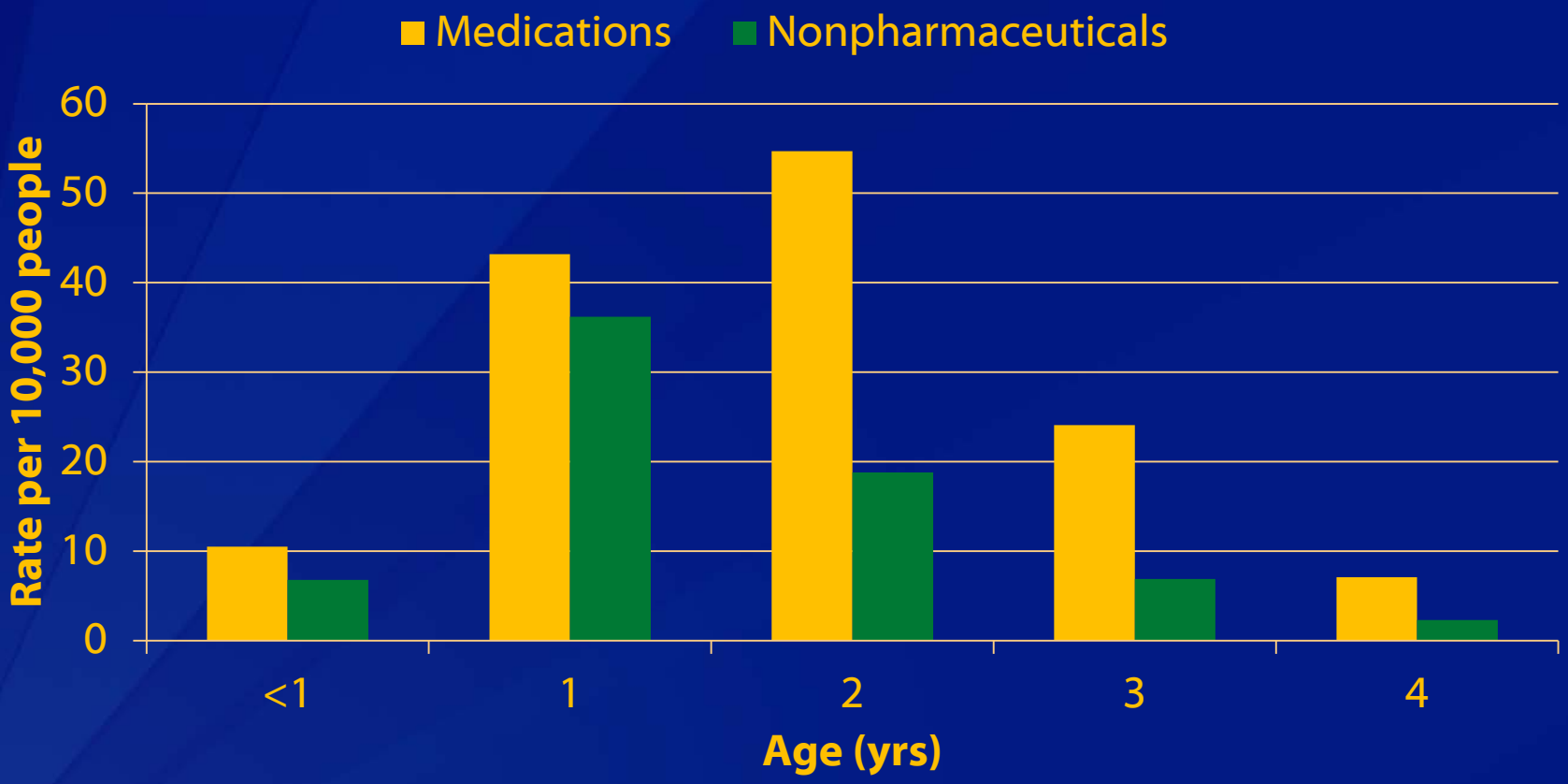
Health Outcomes in Young Children (Ages 0-6)

Drug types involved in deaths caused by drug poisoning, ages 0-4 yrs, US, 2004-2008

Type of drug	Number of deaths
Underlying cause of death	
Nonopioid analgesics, anti-inflammatory (X40)	4
Sedative, hypnotic, other psychotropic (X41)	15
Narcotics (X42) (includes heroin, cocaine, opioid analgesics)	50
Other and unspecified (X43, X44)	66
Multiple/contributing causes of death	
Aspirin, acetaminophen, NSAIDs (T39.1-T39.9)	6
Heroin or cocaine (T40.1, T40.5)	10
Opioid /narcotic analgesics (T40.2-T40.4)	55
Sedatives, antidepressants, antipsychotics (T42.0-T43.9)	17
Anti-allergy, anti-emetic drugs (T45.0)	22

Source: National Vital Statistics System accessed through CDC WONDER

Emergency department visits by children for drug overdose or overexposure by type by age, US, 2004-2005



Source: NEISS-CADES System. Schillie, SF, et al. Medication overdoses leading to emergency department visits among children. Am J Prev Med 2009;37:181-187

Leading causes of unsupervised ingestions of drugs seen in EDs, ages 0-18 yrs, US, 2004-2005

Drug type	Percent of unsupervised ingestions
Acetaminophen	10.5
Opioids/benzodiazepine	7.7
Cough and cold agent	7.4
Nonsteroidal anti-inflammatory	6.1
Antidepressant	5.9

Source: NEISS-CADES System. Schillie, SF, et al. Medication overdoses leading to emergency department visits among children. Am J Prev Med 2009;37:181-187

Rates of change in exposures[1] to single prescription drugs reported to poison centers, children ≤ 5 yrs, US, 2001-2008

Selected Type of Prescription Drug	Exposures 2001-2008	Increase 2001 to 2008 (%)
Opioid analgesics	29,368	101
Sedative-hypnotics	35,131	68
Cardiovascular drugs	39,709	27
Central nervous system stimulants	14,149	26
Antipsychotics	10,206	13
Anticonvulsants	11,254	13
Hypoglycemic agents	8,506	10
TOTAL prescription drugs	248,023	32

1. Therapeutic errors are not included.

Source: Bond GR, et al. The growing impact of pediatric pharmaceutical poisoning. J Peds 2011; doi 10.1016/j.jpeds.2011.07.042

Characteristics of exposures to opioid analgesics reported to poison centers by children ≤6 yrs, US, 2003-2006

- 9,179 children were reported to poison centers with an opioid analgesic exposure.
- Median age was 2 years
- 92% were exposed in their own home.
- 4.9% of those with documented outcomes had more than "minor" effects including 8 deaths.
- Most reports indicated the child found a lost/discarded tablet or an open container.

Source: Bailey JE, et al. Ann Emerg Med 2009;53:419-424

Discussion

- **The proportion of these poisonings due to drug misuse or abuse is not known.**
- **Rates of misuse and abuse among people of an age to be parents of young children (20's and 30's) or grandparents (50's) are growing.**
- **21% of Utah adults reported being prescribed an opioid in the past year during 2008:**
  - 72% had leftover pills;
  - 71% kept them (1)

(1) BRFSS data from Porucznik CA, et al. MMWR 2010;59:153-157

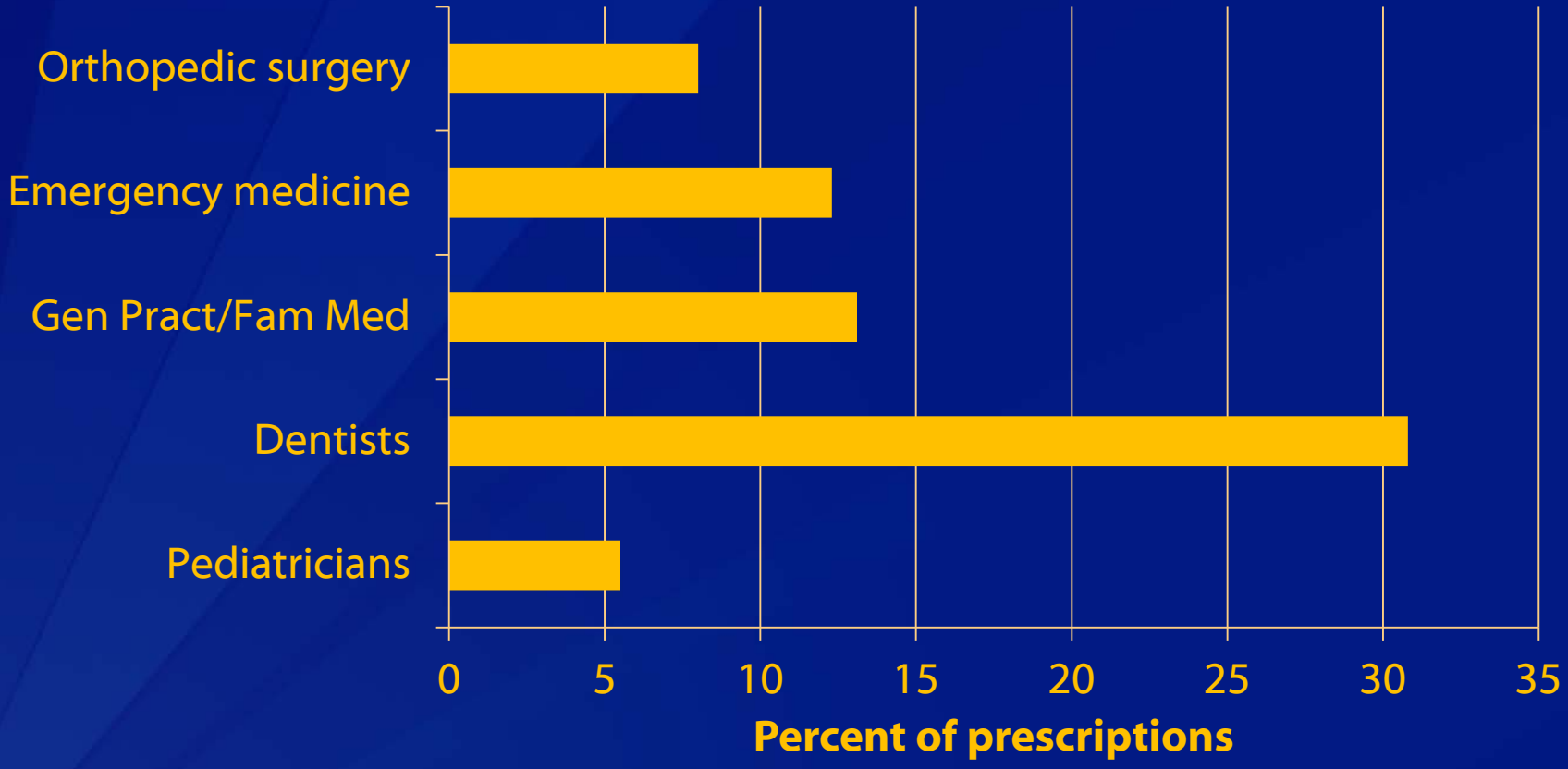
Health Outcomes in Adolescents

Percentage of visits during which controlled medications were prescribed by time period, 15-19 yrs, US

Characteristic	1994-1996 %	2005-2007 %
Site of care		
Ambulatory office	4.6	8.1
Emergency department	13.5	23.9
Reason for visit		
Injury	8.4	14.5
Other	5.2	9.6
TOTAL	6.2	10.6

Source: Fortuna RJ, et al. Pediatrics 2010;126:1108-1116.
Data from NAMCS and NHAMCS outpatient portion.

Distribution of prescriptions for opioid analgesics by physician specialty, children 10-19 yrs, US, 2009

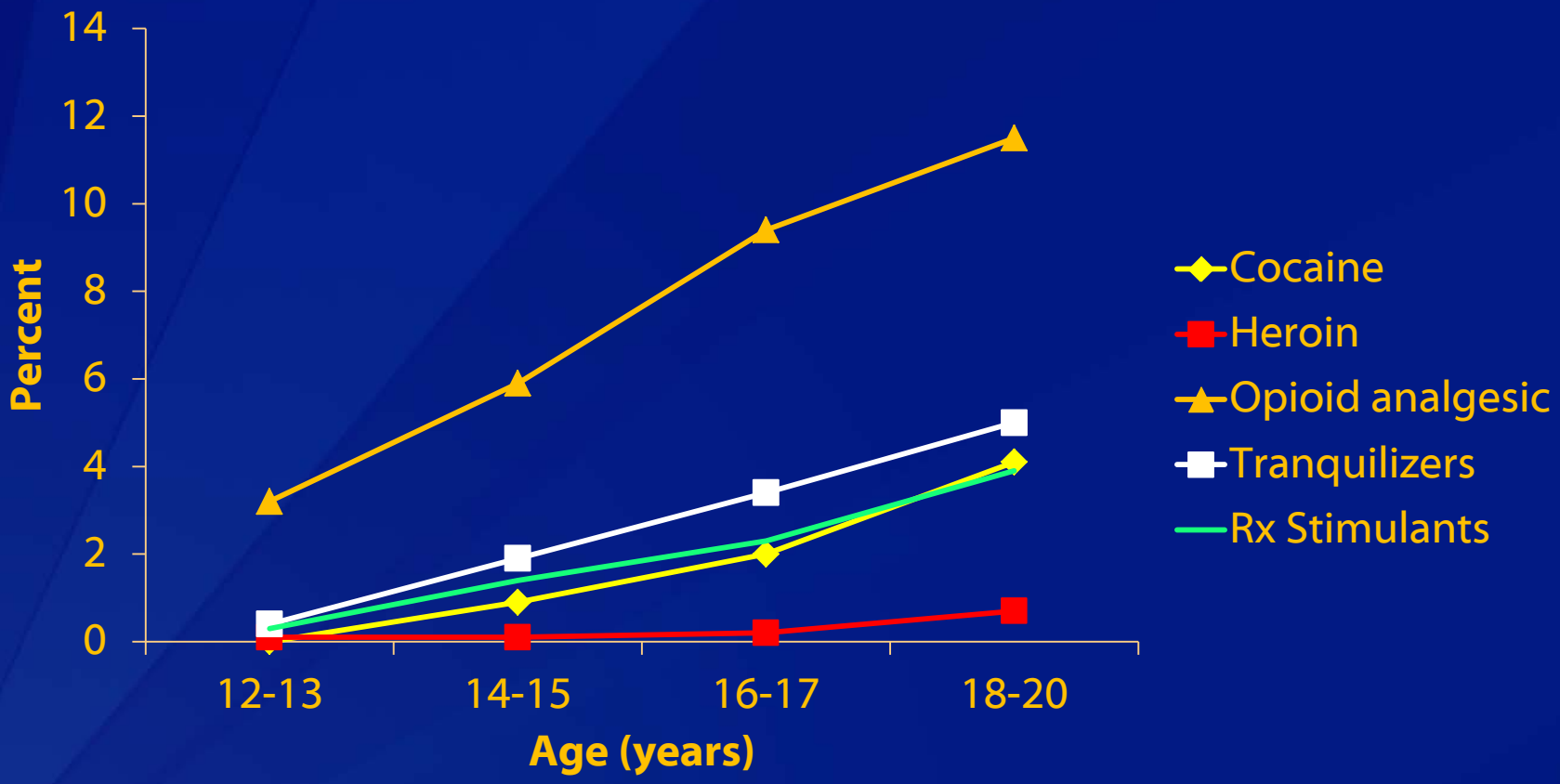


Source: Volkow ND, et al. Characteristics of opioid prescriptions in 2009. JAMA 305:13:1299-1301

Self-reported lifetime use of a prescription drug without a prescription, by grade, US, 2009

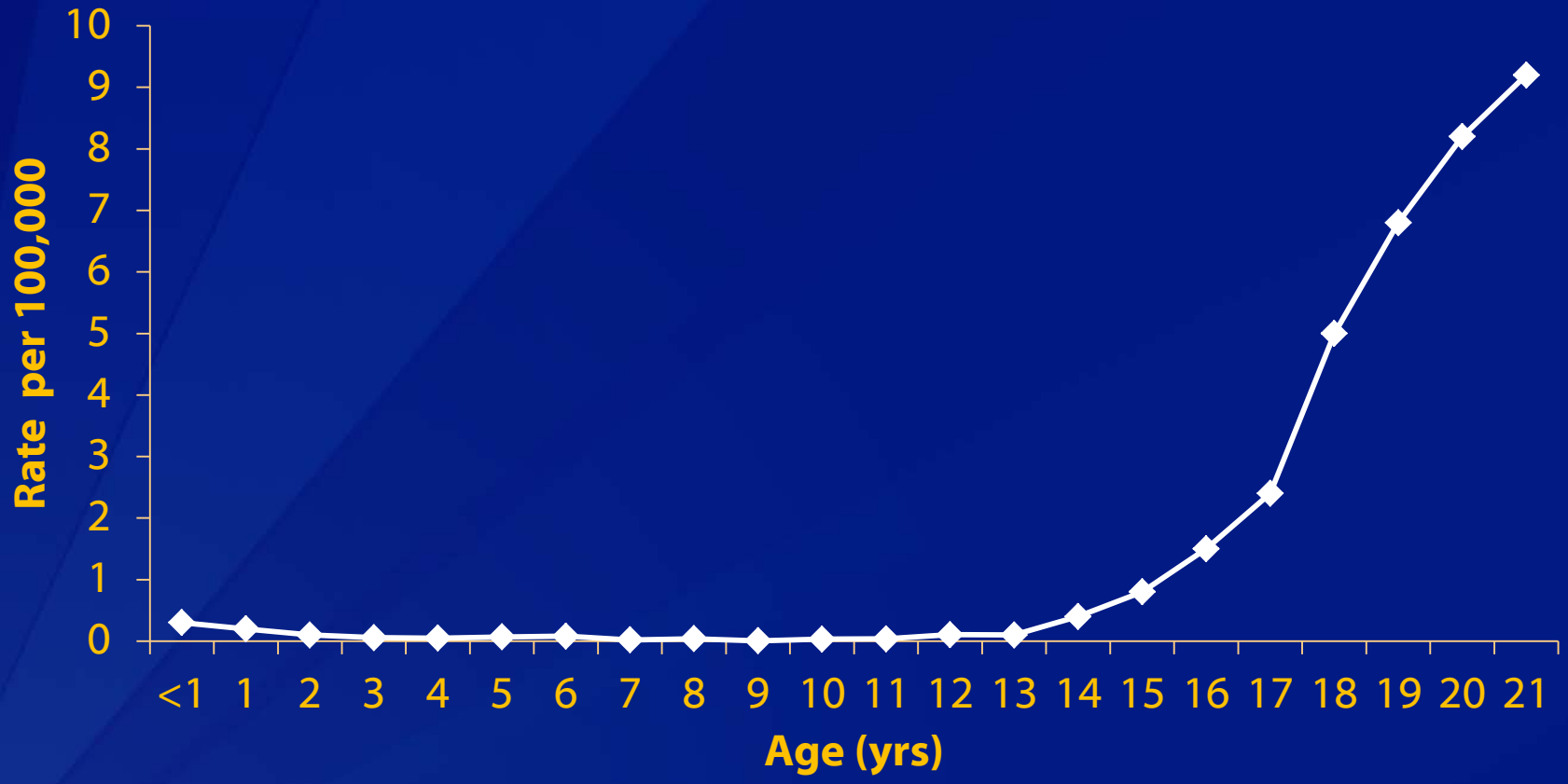
Source: CDC Youth Risk Behavior System, MMWR Surveillance Summary, 2010: 59, 17 and 87.

Self-reported illicit use in past year by drug type and age group, US, 2010



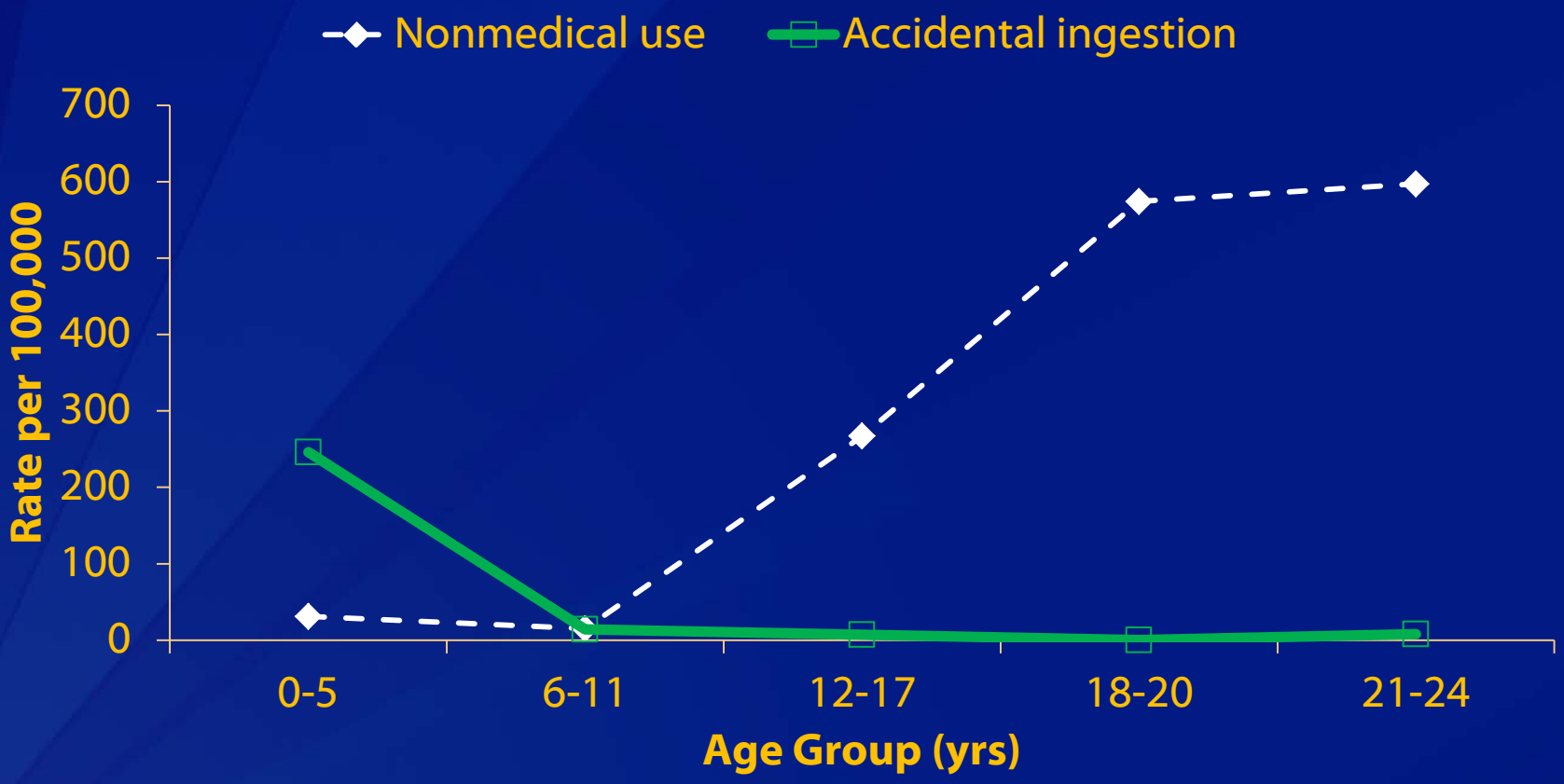
Source: Substance Abuse and Mental Health Services, 2010 National Survey of Drug Use and Health

Death rate from unintentional drug poisoning by age, US, 2005-2008



Source: National Vital Statistics System accessed through CDC WONDER

Rate of ED visits for "nonmedical use" and "accidental ingestion" of pharmaceuticals by age group, US, 2009



Source: Substance Abuse and Mental Health Services Administration, Drug Abuse Warning Network, 2009 National ED Estimates

Discussion

- Use, nonmedical use, and health outcomes related to controlled substances (CS) increase sharply during adolescence.
- A history of CS use predicts CS misuse in this age group. (1)
- The chief risk might be starting longterm, nonmedical use in adolescence that translates into serious health outcomes later in life.

(1) McCabe et al. Arch Ped Adolesc Med;2011;165:729-735

Prevention Strategies

Prevention Strategies: Prenatal

- **Minimize use of controlled substances in women of reproductive age (1)**
  - Taper usage as delivery approaches where possible.
  - Use buprenorphine instead of methadone (2)
- **Screen for substance use and misuse preconceptually and prenatally (3)**
- **Some states (WA and AZ) are developing guidelines for testing and treating newborns.**

(1) Chou et al. J Pain 2009:10:113
(2) Jones et al. NEJM 2010;363:2320-2331
(3) ACOG, Committee Opinion Number 422. At-risk drinking and illicit drug use: ethical issues in obstetric practice. 2008

Prevention Strategies: Young Children

- **Decrease use and misuse of controlled prescription drugs by adults.**
- **Health care providers can**
  - Recommend cleaning out medicine cabinets at prenatal and postnatal visits.
  - Screen for substance use and misuse in caregivers.
  - Provide the opioid antidote naloxone in the home when a resident or caregiver is using opioid analgesics medically or nonmedically.
- **Safe storage and disposal:** **http://www.aapcc.org, http://www.cdc.gov/medicationsafety/protect/protect_Initiative.html , http://www.cdc.gov/safechild/Poisoning/index.html**

Prevention Strategies: Adolescents

- **Decrease use and misuse of controlled substances by adults.**
- **Primary care providers can**
  - Recommend cleaning out medicine cabinets and appropriate disposal.
  - Screen for substance use and misuse in adolescents.
  - Provide naloxone in the home when a resident or caregiver is using opioid analgesics medically or nonmedically
- **Caregivers can monitor use of controlled substances.**
- **Dentists could use weaker opioids such as codeine.**

Thank you

- The findings and conclusions in this report are those of the authors and do not necessarily represent the official position of the Centers for Disease Control and Prevention