Reducing opioid overdose mortality: role of community-administered naloxone

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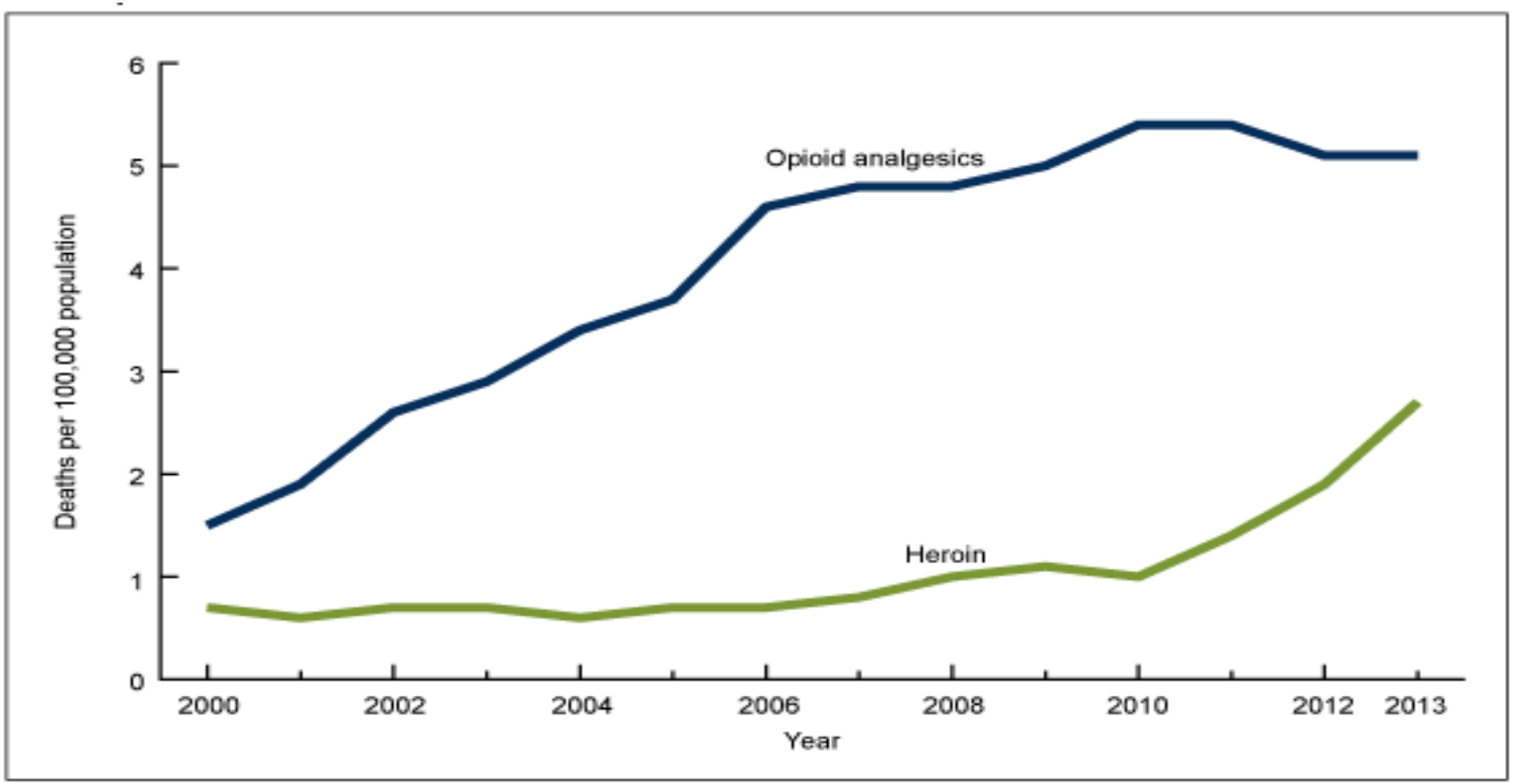
Outline

- Epidemiology of drug overdose, US and NYC
- Responses to the opioid overdose epidemic
- Community naloxone distribution: feasibility and effectiveness
- Naloxone distribution and evaluation in NYC

Opioid overdose rates increasing dramatically since 2000 (U.S.)



Age-adjusted rates of drug-poisoning deaths, United States, 2000-2013

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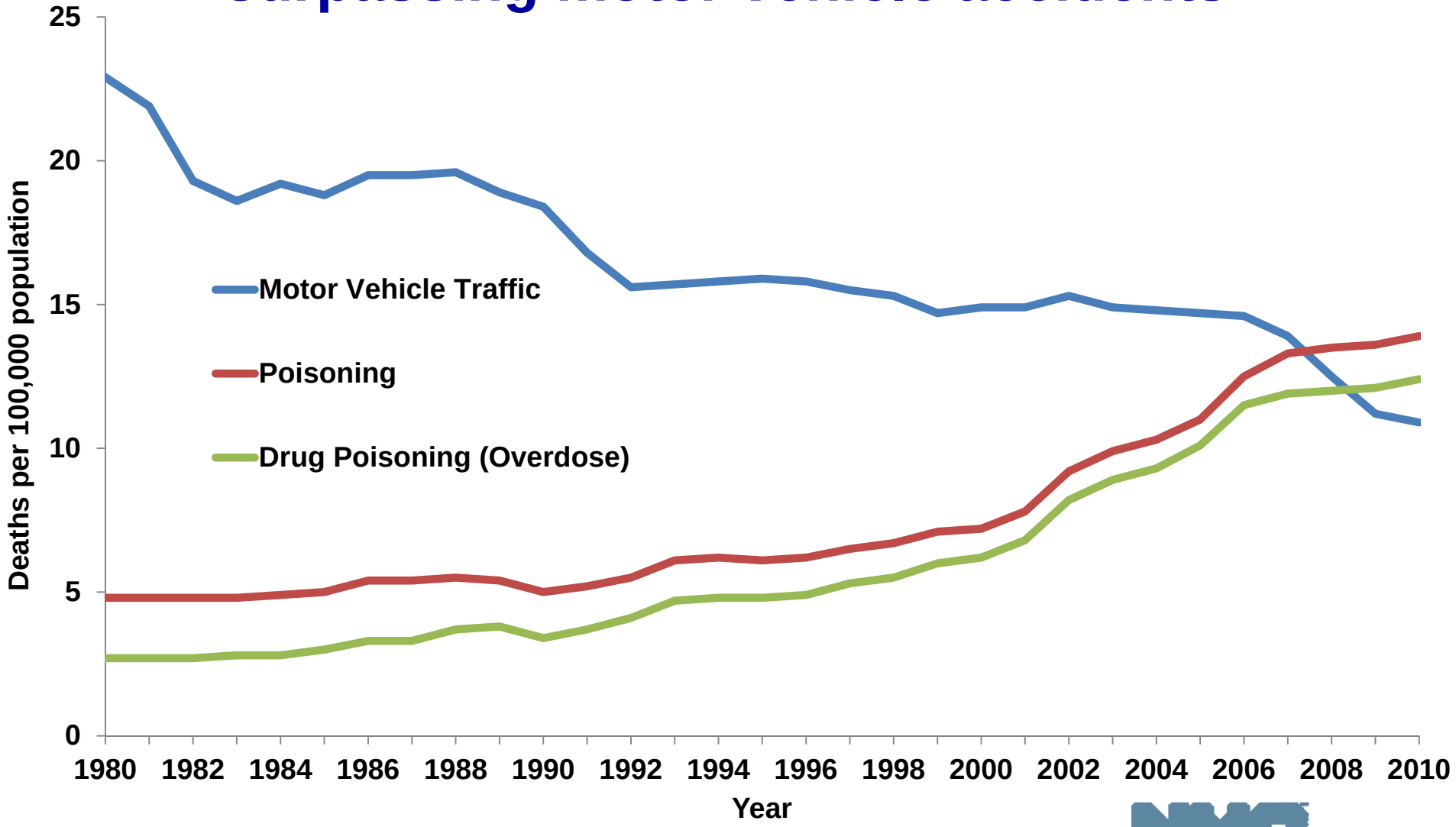
National drug poisoning death rates increased six-fold in past three decades, surpassing motor vehicle accidents



Source: NCHS Data Brief, December, 2011, Updated with 2009 and 2010 mortality data CHS Data Brief, December, 2011, Updated with 2009 and 2010 mortality data

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Opioids: The National Picture

- Nearly 3 people out of every 1,000 Americans have used heroin in the past year, and about 2 per 1,000 are dependent (2011–2013)
- ~11 million Americans report misuse of opioid analgesics within past year (2013)
- More than 47,000 deaths due to drug overdoses; 60% due to opioids (2014)
- Each day, 46 people die from an overdose of opioid analgesics and 29 from heroin (2014)

1. Centers for Disease Control. Vital Signs: Demographic and Substance Use Trends Among Heroin Users — United States, 2002–2013, 2015. MMWR 64(26);719-725
2. Substance Abuse and Mental Health Services Administration. Results from the 2011 National Survey on Drug Use and Health: Rockville, MD: Substance Abuse and Mental Health Services Administration. 2012.
3. Centers for Disease Control. Vital Signs: Opioid Painkiller Prescribing. July, 2014.
4. Centers for Disease Control, Increases in Drug and Opioid Overdose Deaths, US 2000-2014. MMWR 64 (50); 1378-82

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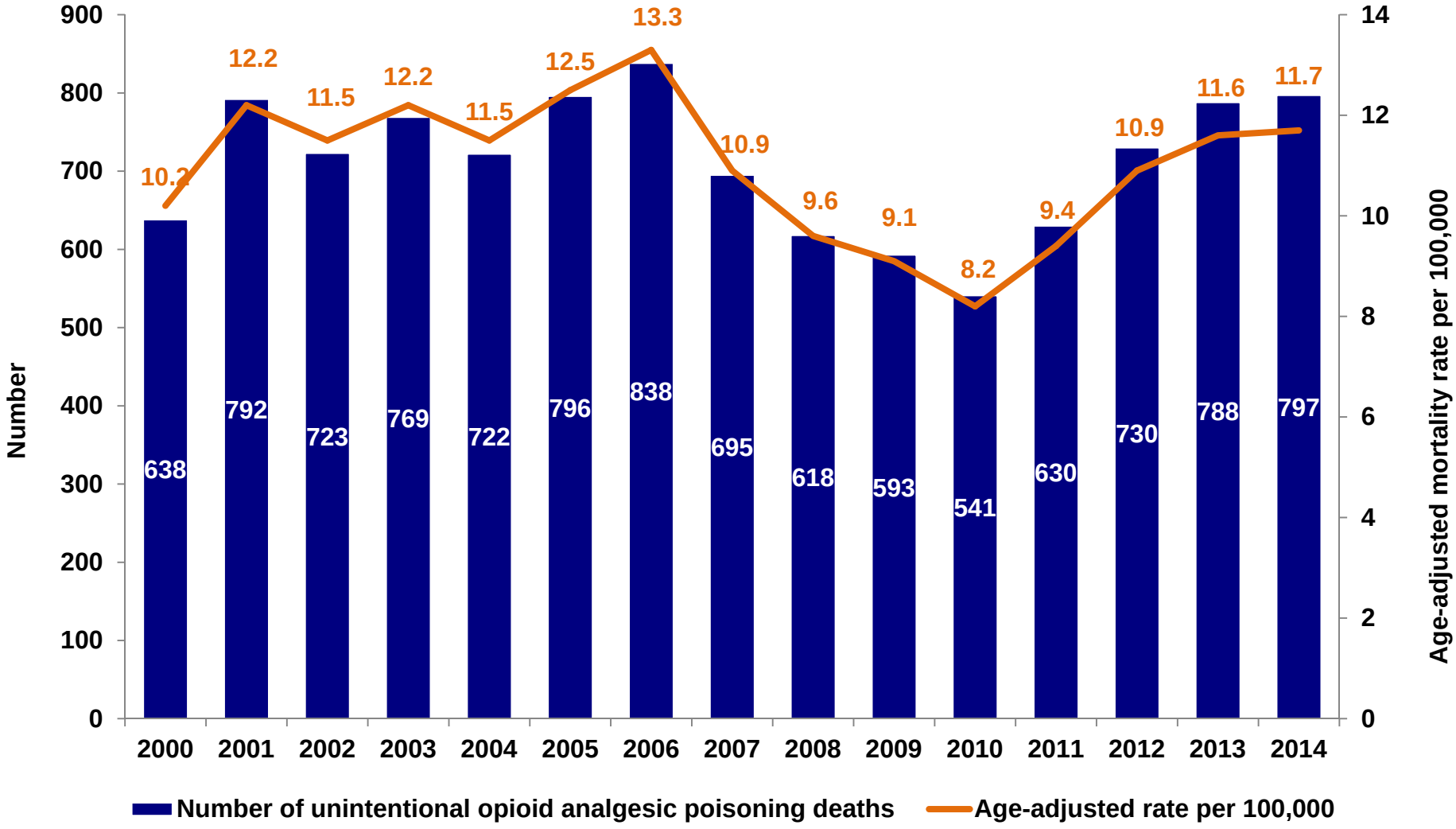
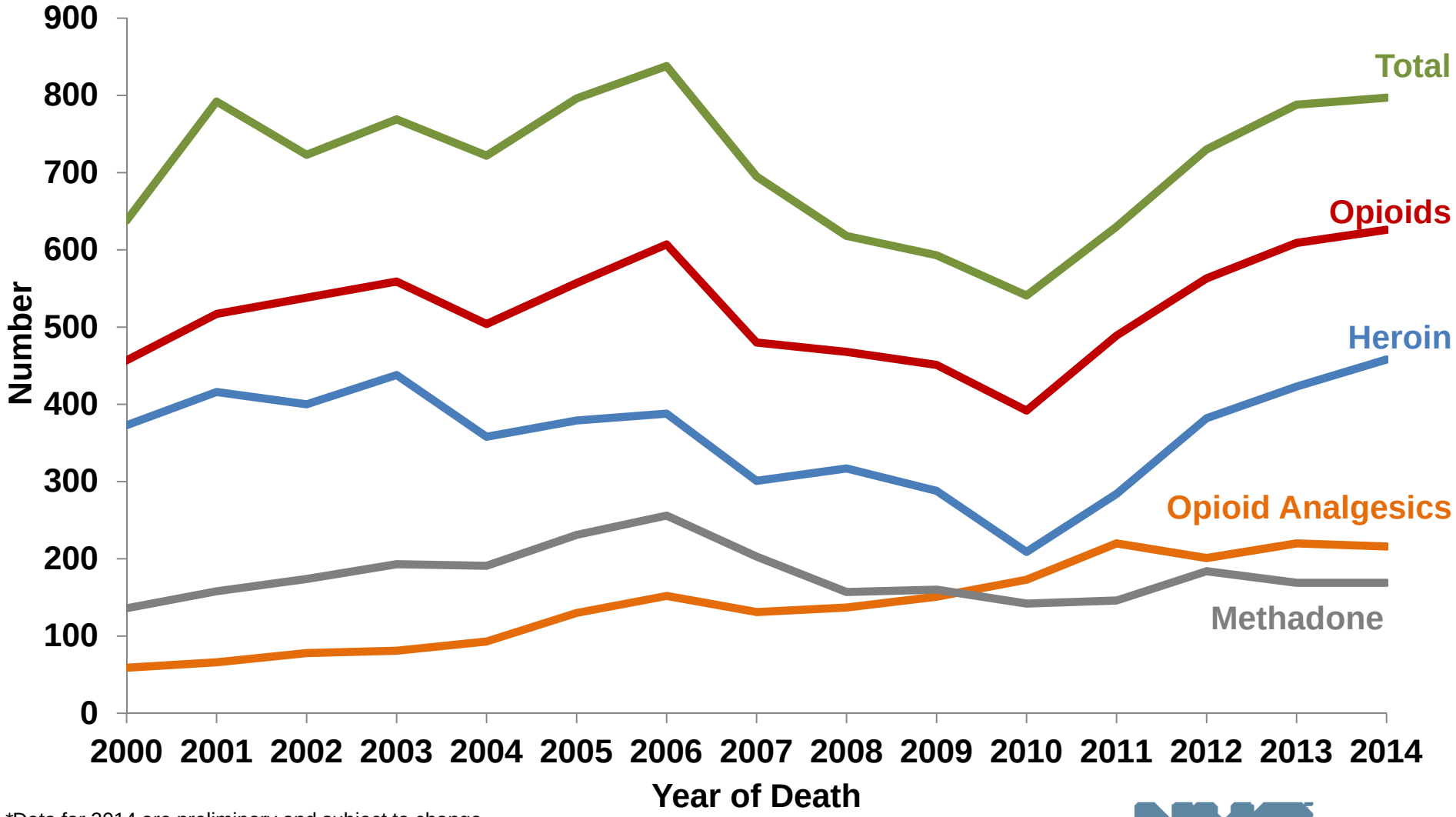
Unintentional drug poisoning deaths, NYC, 2000-2014*



*Data for 2014 is preliminary and subject to change.

*Source: New York City Office of the Chief Medical Examiner & New York City Department of Health and Mental Hygiene 2000-2014**

Opioids involved in 79% of unintentional drug poisoning deaths in NYC, 2014*



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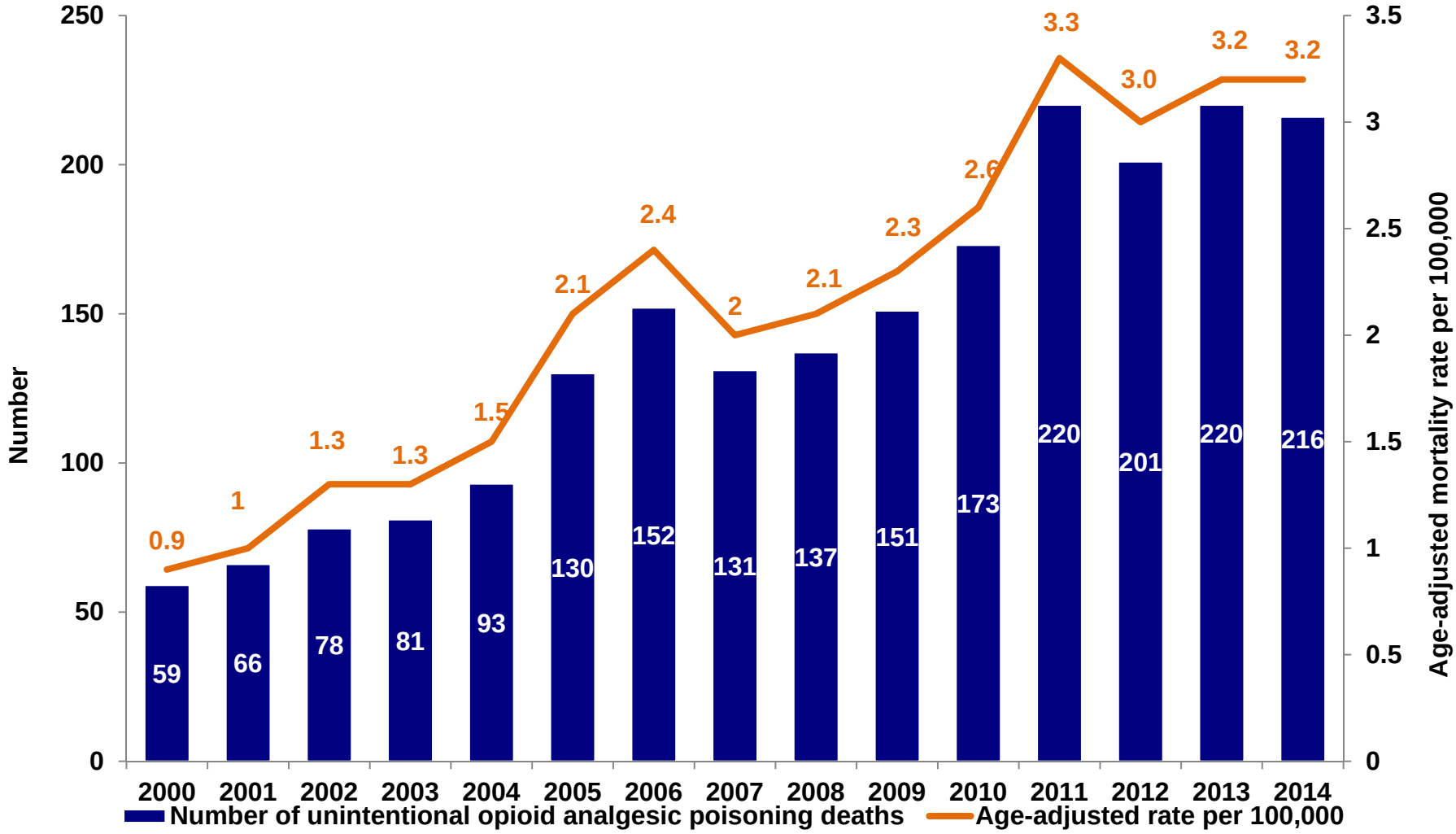
*Source: New York City Office of the Chief Medical Examiner & New York City Department of Health and Mental Hygiene 2000-2014**

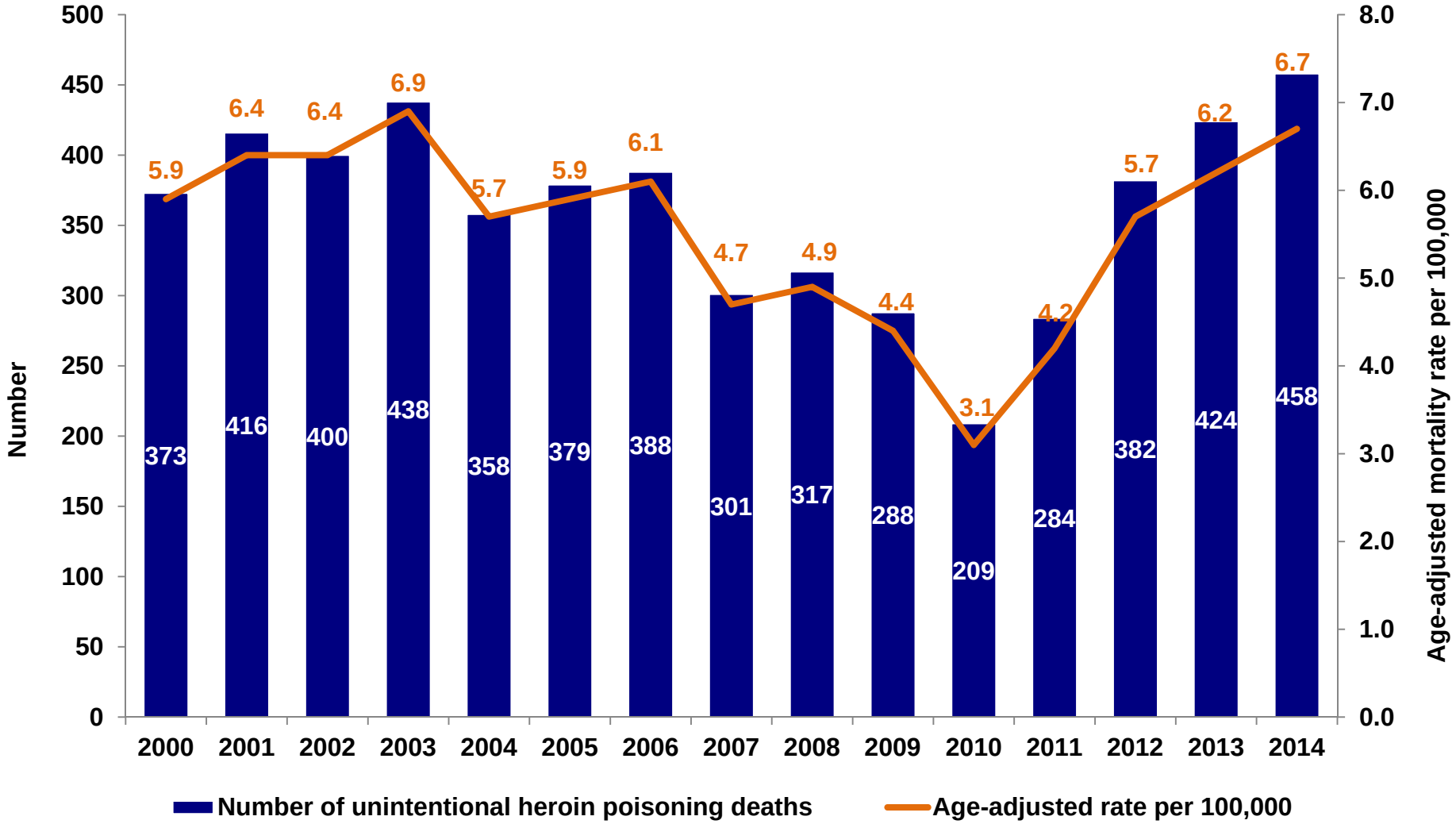
Unintentional opioid analgesic poisoning deaths increased 256% from 2000 to 2014*



*Data for 2014 are preliminary and subject to change.

Source: New York City Office of the Chief Medical Examiner &
*New York City Department of Health and Mental Hygiene 2000-2014**

Unintentional heroin poisoning deaths increased 116% from 2010 to 2014*



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Source: New York City Office of the Chief Medical Examiner &
*New York City Department of Health and Mental Hygiene 2000-2014**

How did we get here?

- Opioid Analgesics
  - Increased prescribing
    - Opioid analgesic prescribing quadrupled from 1999 to 2010
    - Promotion of opioid analgesics for use in chronic non-cancer pain
    - Misperceptions related to efficacy
  - Risk for dependence and overdose underappreciated
    - By both patients and providers
    - Because it's a prescription, people think it's less risky (but just as dangerous as many illicit drugs)
- Heroin
  - Increased availability
  - Increased exposure to opioid analgesics → transitions

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Relationship between opioid analgesics and heroin

- Both opioids
  - Similar biochemical mechanism → act on same receptors in the brain

- Addressing opioid analgesics can prevent heroin transitions

What puts people at risk for OD?

- Changes in tolerance
- Mixing drugs (Xanax, Valium, Ativan)
- Variation in strength and content of drugs
- Previous experience of non-fatal overdose
- Using alone
- Use of any opioids can put someone at risk

Public health approaches to reversing the opioid overdose epidemic

- Promote judicious opioid prescribing
  - Released opioid prescribing guidelines in 2011
    - Less often, lower doses, avoid co-prescription of opioids and benzodiazepines
    - Public health detailing in Staten Island and the Bronx and reached nearly 2,000 prescribers
- Expand access to effective treatment and services
  - Methadone and buprenorphine reduce risk of mortality
    - Will train 1,000 bupe prescribers over 3 year
  - Harm reduction services engage active drug users
    - Fund 14 syringe exchange programs (SEPs)
- Increase public awareness
- **Expand community dispensing of naloxone**

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Mechanism of Opioid Overdose Fatality

- Opioids are mu receptor agonists
  - Decreased respiratory frequency

- Overdoses progress from minutes to hours
  - "Needle in arm" stereotype is only true about 15% of the time
  - Most overdoses are witnessed, and there is time to respond
  - Allows time for naloxone intervention

White JM, Irvine RJ. Mechanism of fatal opioid overdose. *Addiction*. 1999 Jul;94(7):961-72.

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Naloxone Key Points

- Mu opioid receptor antagonist
  - Displaces opioids from receptors
  - Reverses overdose and prevents fatalities
- No clinical effect in absence of opioids
  - No known adverse side effects aside from withdrawal symptoms
- Usually takes effect within **two to five minutes**
  - Lasts for **30-90 minutes**
- Available by prescription only

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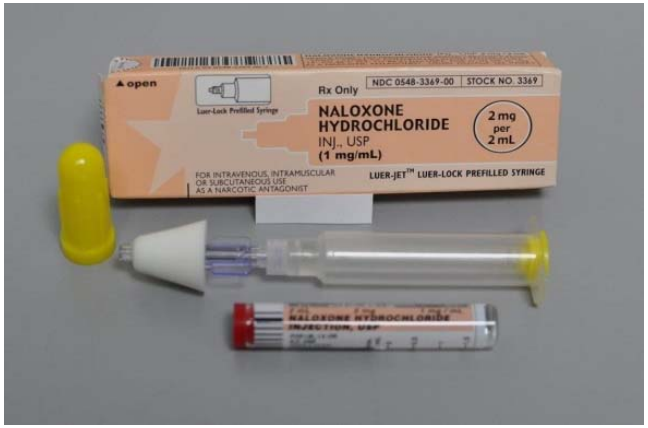
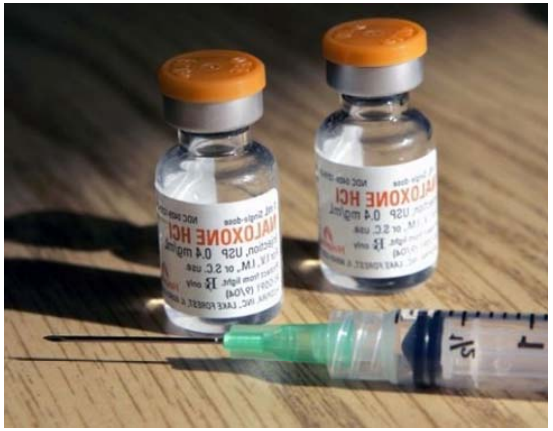
Naloxone Formulations





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Community Use of Naloxone

- Community dispensing in U.S. began in Chicago, 1996

- Laws allowing layperson naloxone use:
  - First law passed in New Mexico, 2001
  - 43 states have naloxone laws (as of September, 2015)

- Good Samaritan laws protecting bystanders from liability:
  - First law passed in New Mexico, 2007
  - 35 States have Good Samaritan laws

- New York State:
  - Opioid overdose prevention program, 2006
  - Good Samaritan law, 2011
  - Amended OOPP law to allow for non-patient prescription of naloxone, including pharmacists, 2014

Davis & Carr, Drug and Alcohol Dependence, 2015

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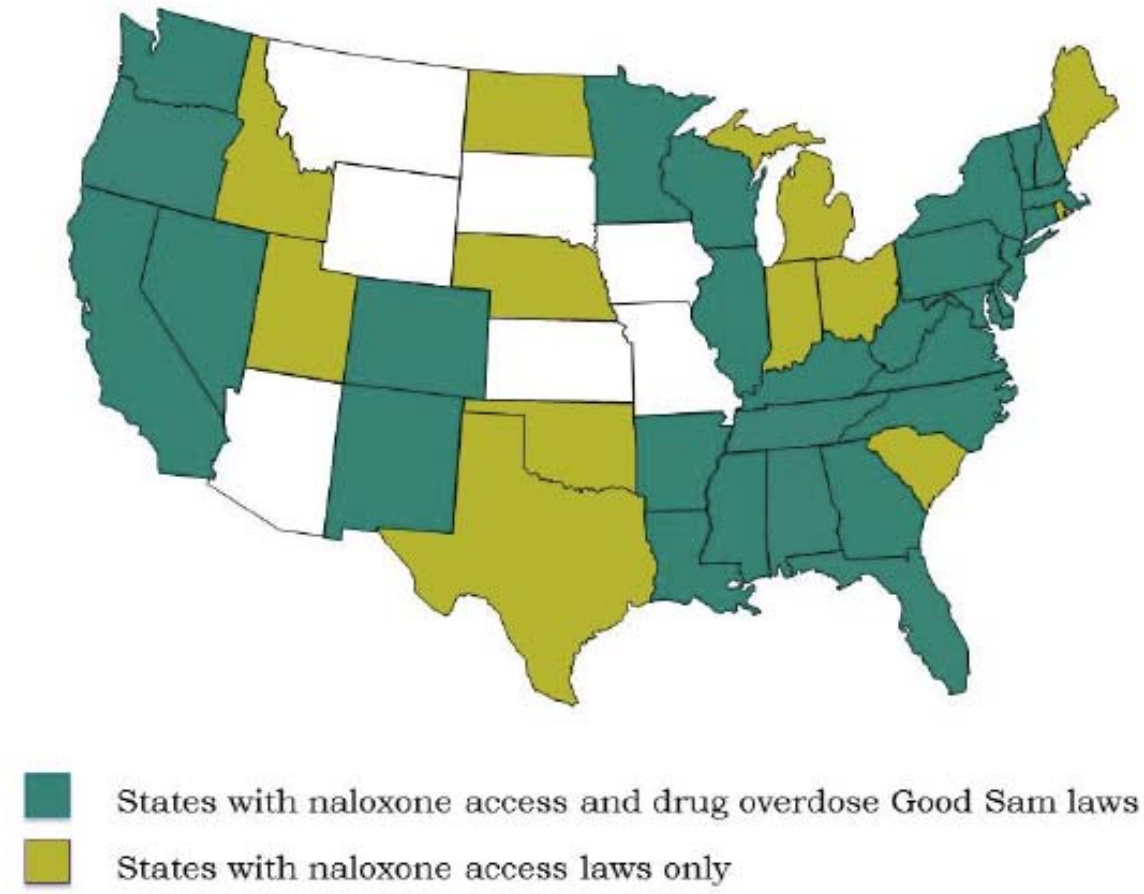
Availability and impact of naloxone programs, U.S.



As of 2014:

>150,000 laypeople trained

>26,000 reversals reported

Wheeler, MMWR, 2015

Map from Network for Public Health Law

EFFECTIVENESS OF COMMUNITY DISTRIBUTION OF NALOXONE

Evaluations of naloxone distribution programs

Feasibility

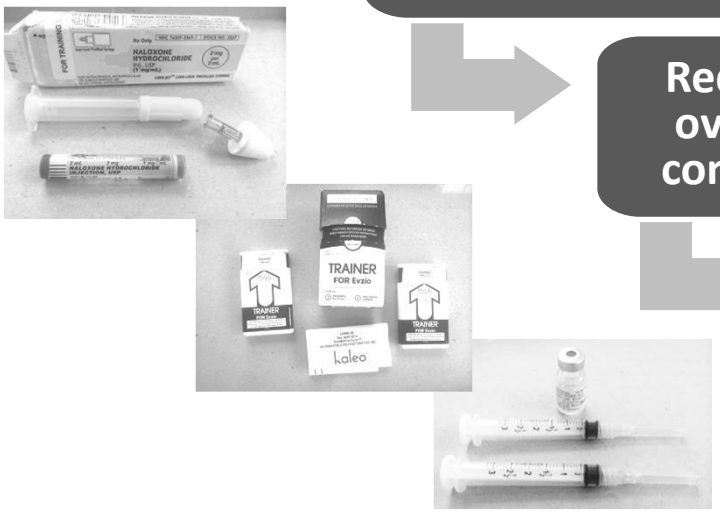
- Piper et al. Subst Use Misuse 2008: 43; 858-70.
- Doe-Simkins et al. Am J Public Health 2009: 99: 788-791.
- Enteen et al. J Urban Health 2010:87: 931-41.
- Bennett et al. J Urban Health. 2011: 88; 1020-30.
- Walley et al. JSAT 2013; 44:241-7. (Methadone and detox programs)

Increased knowledge and skills

- Green et al. Addiction 2008: 103;979-89.
- Tobin et al. Int J Drug Policy 2009: 20; 131-6.
- Wagner et al. Int J Drug Policy 2010: 21: 186-93.
- Maldjian et al, Substance Abuse, in press

No increase in use, increase in drug treatment

- Seal et al. J Urban Health 2005:82:303-11.
- Doe-Simkins et al. BMC Public Health 2014 14:297.



Reduction in overdose in communities

- Maxwell et al. J Addict Dis 2006:25; 89-96.
- Evans et al. Am J Epidemiol 2012; 174: 302-8.
- Walley et al. BMJ 2013; 346: f174.

Cost-effective
$438 (best)
$14,000 (worst)
per quality-adjusted life year gained

Coffin and Sullivan. Ann Intern Med. 2013 Jan 1;158(1):1-9.

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Community administration of naloxone by people who use drugs is feasible

- Since 1996, more than 26,000 overdoses have been reversed with naloxone across U.S.
- Trained laypeople retain knowledge at three, six, and twelve months after training.

Wheeler E, Jones S, Gilbert M, Davidson P. Opioid Overdose Prevention Programs Providing Naloxone to Laypersons — United States, MMWR, 2014.
Maldjian L, Siegler A, Kunins H, Substance Abuse, *in press*.

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Naloxone distribution not associated with increased drug use

- No evidence that naloxone availability is associated with increased drug use.
- 2 prospective studies found reductions in drug use among trained overdose responders (Seal, 2005; Wagner, 2010).

Seal KH, Thawley R, Gee L, et al. J Urban Health, 2005.
Wagner KD, Valente TW, Casanova M, et al. Int J Drug Policy, 2010.
Doe-Simkins M, Quinn E, Xuan Z et al. BMC Public Health, 2014.

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Communities with naloxone availability have lower rates of overdose mortality

- **Study** (Walley, et al, 2013): Community impact of naloxone distribution on opioid-related overdose death rates.

- **Population:** 19 Massachusetts communities, 2002 – 2009, time-series analysis
  - Compared overdose rates in communities with high and low rates of naloxone distribution versus without distribution

- **Conclusion**: Opioid-overdose death rates reduced in communities with naloxone distribution

Walley, et al, BMJ 2013;346:f174

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Communities with naloxone availability have lower rates of overdose mortality

Table 4 Models of overdose education and nasal naloxone distribution implementation and unintentional opioid related overdose death rates in 19 communities* in Massachusetts, 2002-09

Cumulative enrollments per 100 000 population	Rate ratio	Adjusted rate ratio† (95% CI)	P value
Absolute model:			
No implementation	Reference	Reference	
Low implementation: 1-100 enrollments	0.93	0.73 (0.57 to 0.91)	<0.01
High implementation: >100 enrollments	0.82	0.54 (0.39 to 0.76)	<0.01

Walley, BMJ 2013;346:f174

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Naloxone distribution is cost-effective

- **Study:** Coffin et al, 2013: Is naloxone distribution cost-effective?
  - Cost per quality-adjusted life year (QALY) of naloxone distribution
  - Used model comparing distribution to 20% of heroin users
- **Conclusions:**
  - Intervention has cost of $438 (CI $48-1796) per QALY gained
  - Worst-case scenario: incremental cost of $14,000, including if naloxone kit costs up to $4,000
- Incremental cost of less than $50,000 per QALY gained is considered cost-effective by policy makers

Coffin, Ann Intern Med. 2013;158:1-9.

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NALOXONE IN NYC

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NYC's naloxone supply

- In 2006, NYS law created Opioid Overdose Prevention Programs (OOPPs)
  - Legal to overdose prevention education and naloxone prescriptions to drug users
  - Prescribing to family members and friends is allowed
- When a program registers with the state as an OOPP:
  - Naloxone is provided free of charge
  - Prescribers and responders have liability protection

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NYC's naloxone supply

- Naloxone distributed to Opioid Overdose Prevention Programs (OOPPs) by:
  - NYC Department of Health and Mental Hygiene (DOHMH)
    - Intranasal formulation (nasal spray)
  - NYS Department of Health-AIDS Institute
    - Intranasal formulation (outside NYC), and
    - Intramuscular formulation (statewide)

- DOHMH provides:
  - Intranasal naloxone to nearly 50 OOPPs, including 14 SEPs
  - Technical assistance to register and support new OOPPs

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Naloxone distribution in NYC

- DOHMH has distributed over 31,000 kits to Opioid Overdose Prevention Programs (OOPPs) since 2009
  - Dispense free naloxone to drug users, their families and friends

Initial Adopters
- Syringe exchange
- AIDS service organizations
- Drug treatment
- Homeless shelters

Recent Settings
- Rikers Visit House
- New York Police Department
- Pharmacies

Future Expansion
- Probation & parole
- Courts
- Primary care*
- Emergency Departments*

*limited implementation

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EVALUATION OF OVERDOSE PREVENTION IN NYC

What proportion of trained NYC overdose responders use naloxone?

- Approximately 950 reported reversals since 2009 in NYC
  - An underestimate, due to low reporting
- DOHMH evaluated naloxone use among participants trained at 6 syringe exchange programs for 12 months to determine frequency of:
  - Witnessing overdoses
  - Naloxone use among trained individuals
- Enrolled 351 individuals who completed overdose prevention training (OPT)
  - Followed up at 3, 6, 12 months after baseline

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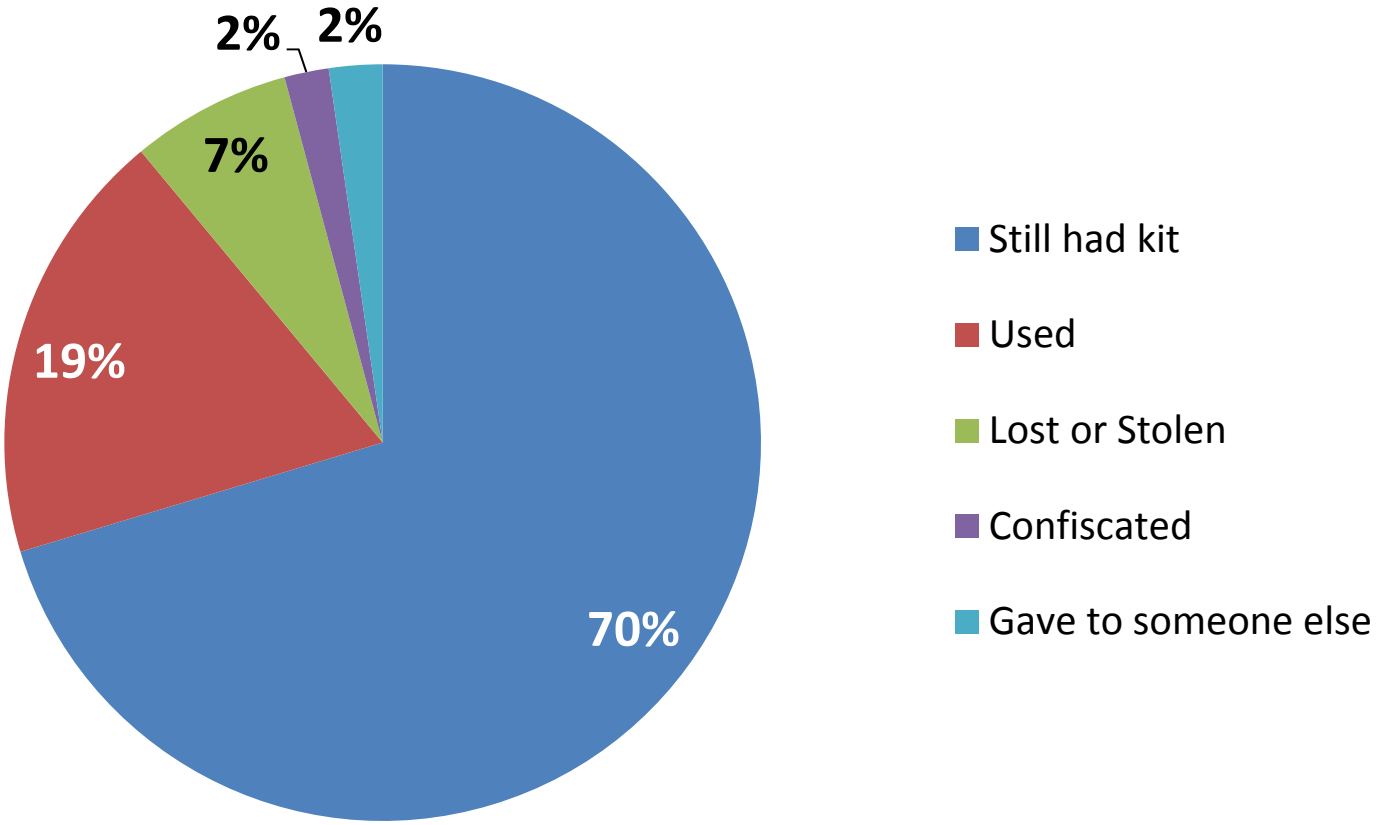
Study retention

- 12-month follow-up: 270/351 (77%)
- 299 participants (85%) had at least one follow-up in 12 months

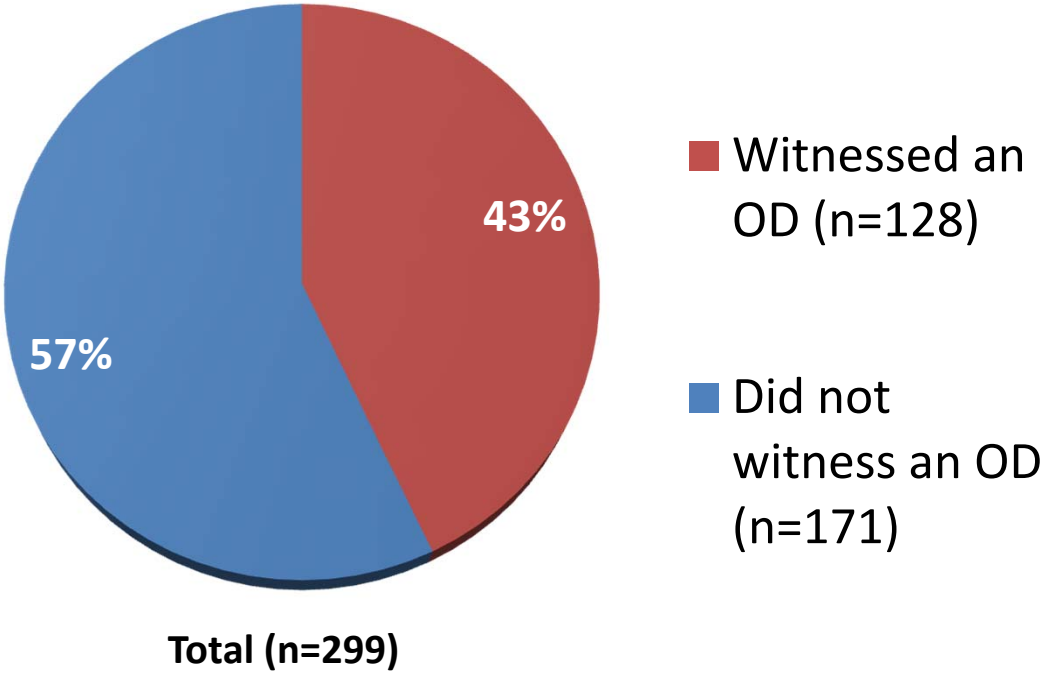
A majority of study participants retained naloxone kit at 12 months



Total N = 270

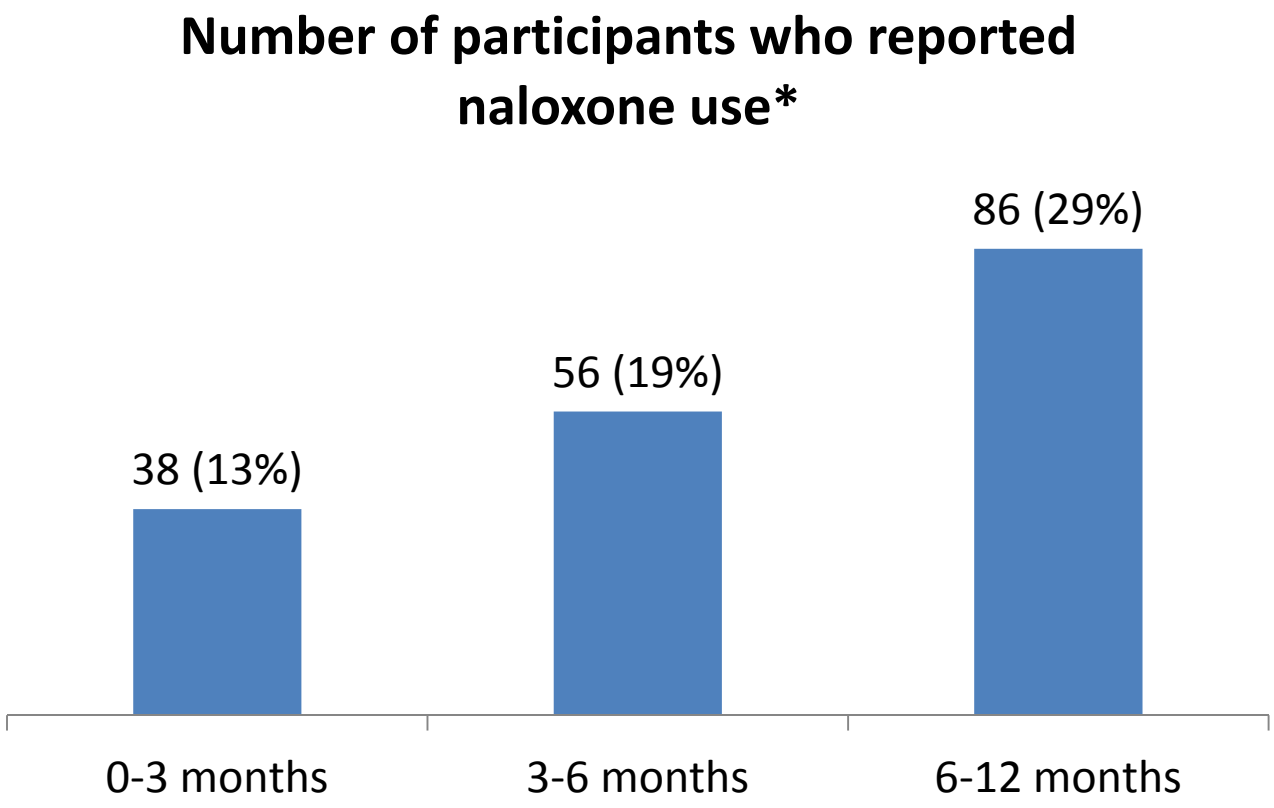
More than 2 in 5 trainees witnessed an overdose during 12-months

- 43% witnessed an overdose in following year
- A majority (66%) of participants who witnessed an overdose saw more than one
- Prior witnessing of overdose associated with witnessing overdose during study



Nearly 1 in 3 trainees used naloxone over 12 months

- 29% of trained participants (n=299) used naloxone during 12 month period



*Numbers not mutually exclusive

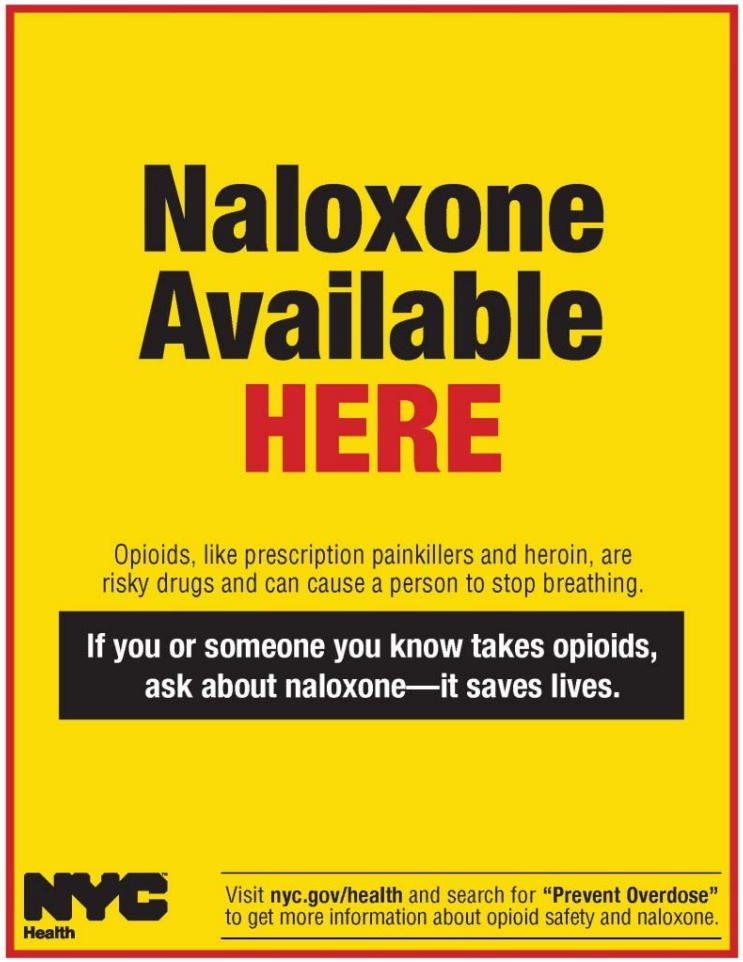
No factors identified that are associated with likelihood of naloxone use

- **No significant differences** were found in naloxone use by age, gender, race/ethnicity, education, criminal justice involvement, syringe exchange program participation, or methadone program participation

NALOXONE DISTRIBUTION IN NYC: PHARMACY STANDING ORDERS

Naloxone in NYC pharmacies

- December 7, 2015: voluntary pharmacy naloxone program began
- NYC Health Commissioner provides standing order to pharmacist to dispense naloxone
- Naloxone available upon request at >690 NYC pharmacies (as of June, 2016)



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Naloxone distribution next steps

- Expanding to new populations
  - Prescription opioid users
  - Young and new users
- Targeting neighborhoods with highest rates
- Tracking impact
  - Distribution by other new responders: NYPD
  - Pharmacy distribution

Summary

- Community use of naloxone is feasible and effective
  - In NYC, nearly one-third of individuals at high risk of opioid overdose use naloxone following training
- DOHMH is engaged in ongoing efforts to reach new populations
- Naloxone distribution in combination with other effective strategies is necessary to reverse opioid overdose epidemic

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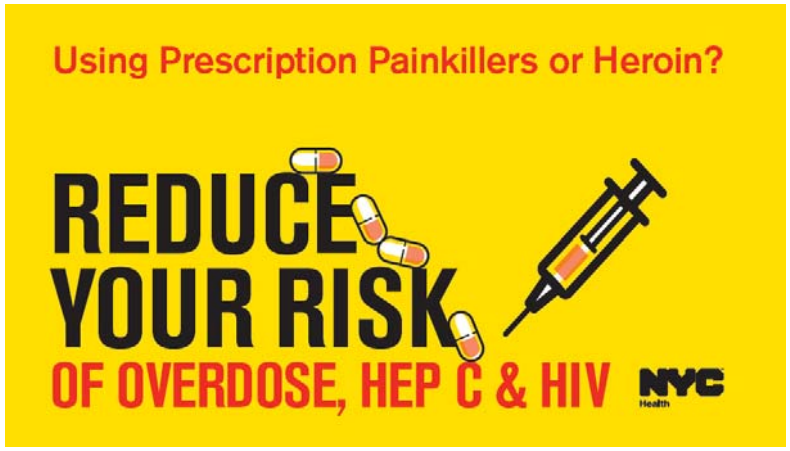
Health Department materials



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