

# **Hepatitis C, HIV, and Drug Use**

**Julia Arnsten**

**Chief, Division of General Internal Medicine**

**Albert Einstein College of Medicine**

**Montefiore Medical Center**

**Bronx, NY**

# **Incidence and Prevalence Treatment and Outcomes Selected Research Projects**

# **Incidence and Prevalence**

**HCV**

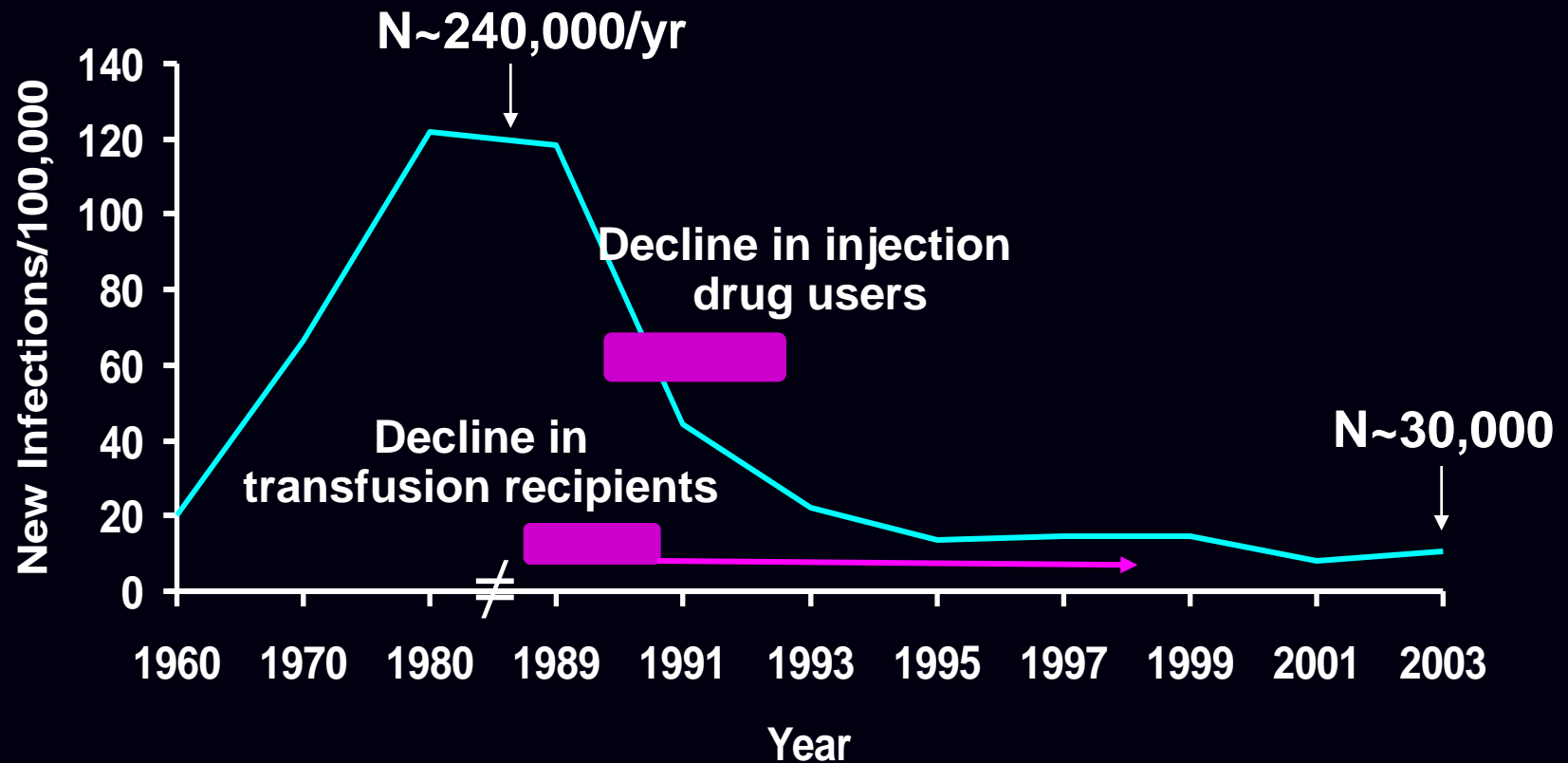
**HIV**

**Drug Users**

**Undiagnosed Disease**

# HCV Incidence

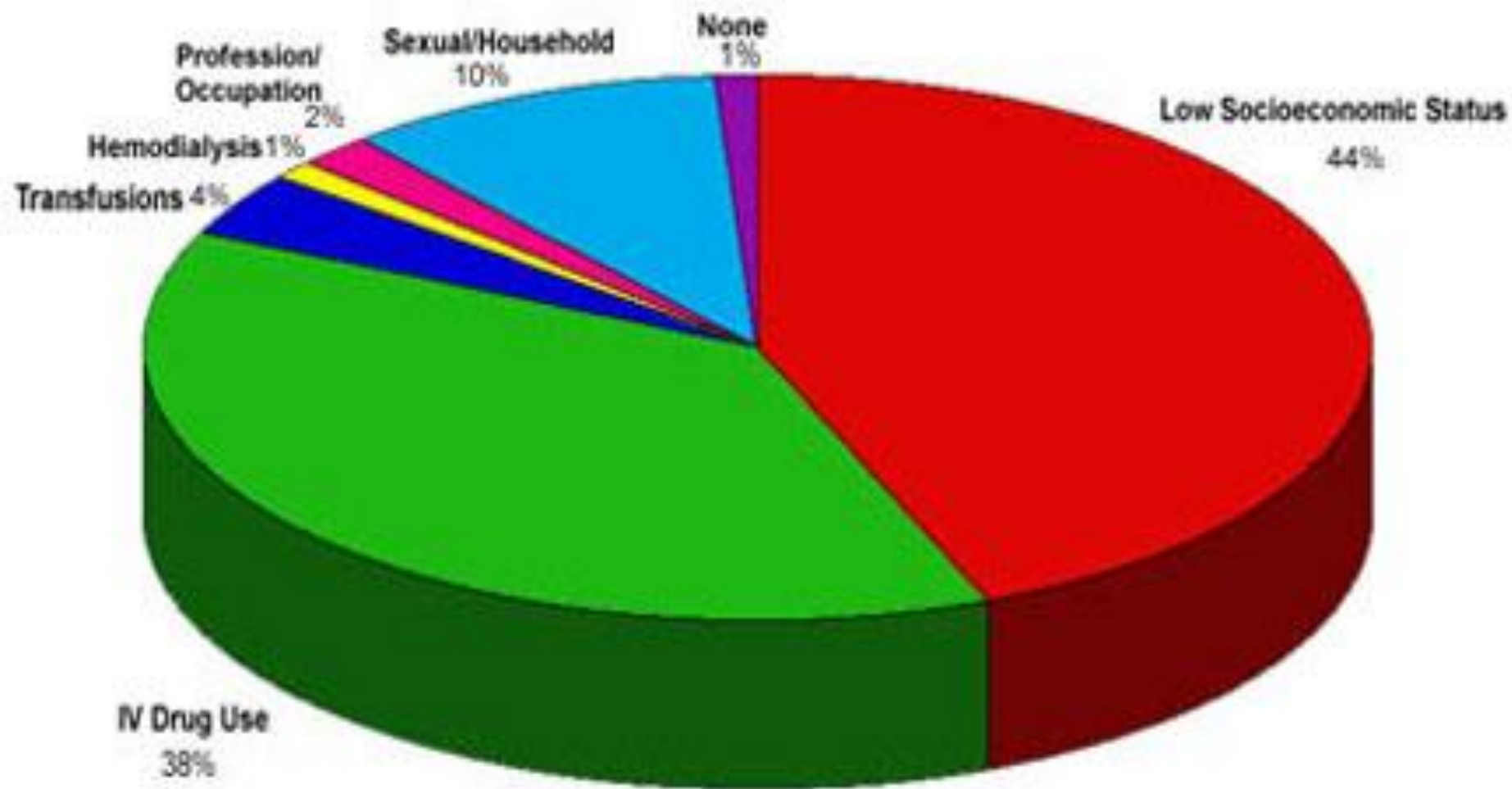
# Estimated Incidence of Acute HCV



Source: Armstrong GL. Hepatology 2000;31:777-82;  
Alter MJ. Hepatology 1997;26:62S-65S; CDC, unpublished data



## Risk Factors for Acute Hepatitis C United States, 1990-1993

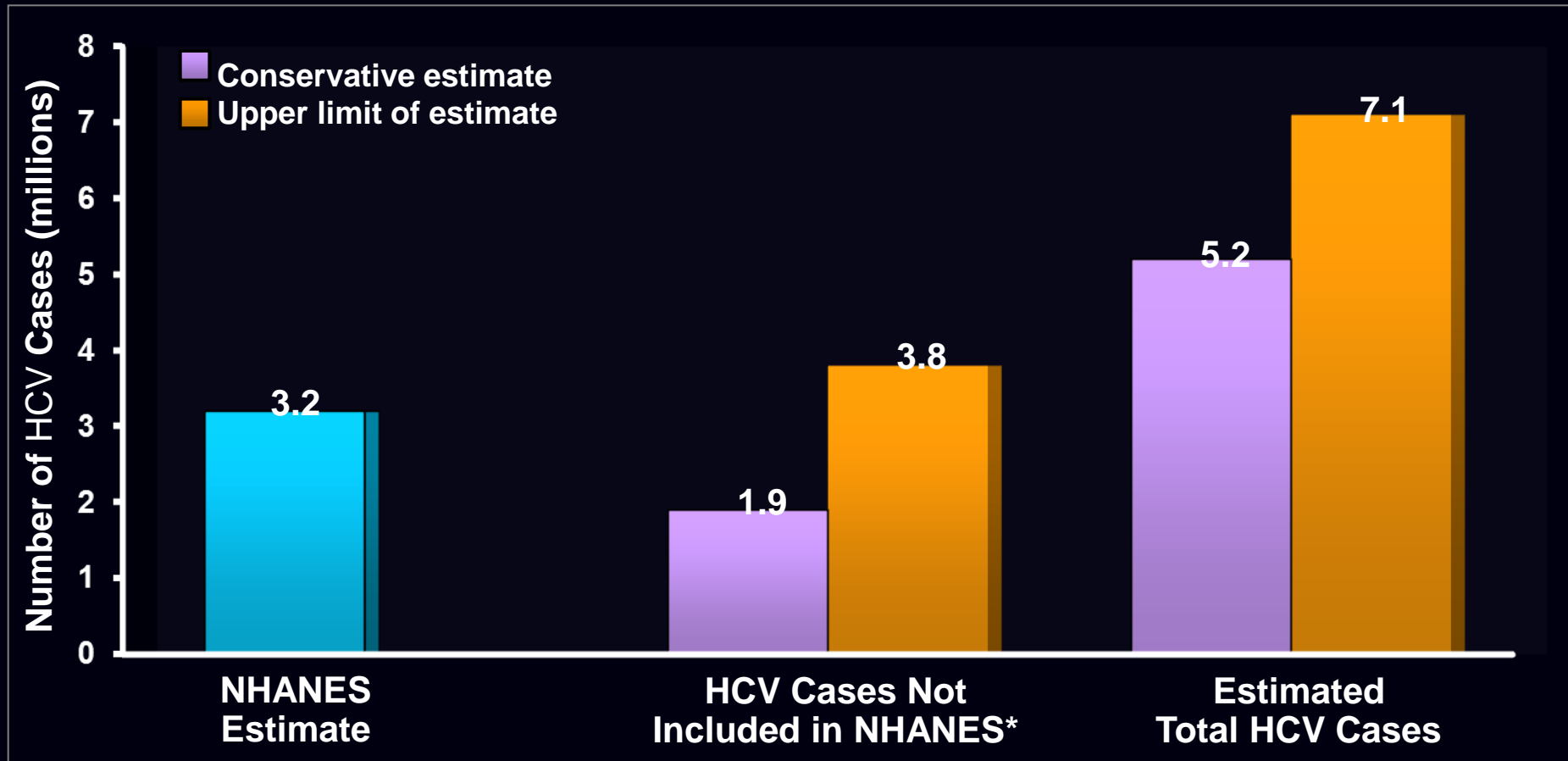


Source: CDC Sentinel Counties Study of Acute Viral Hepatitis C



# HCV Prevalence

# Over 5.2 Million People Living With Chronic HCV in the US



\*Homeless (n=142,761-337,6100); incarcerated (n=372,754-664,826); veterans (n=1,237,461-2,452,006); active military (n=6805); healthcare workers (n=64,809-259,234); nursing home residents (n=63,609); chronic hemodialysis (n=20,578); hemophiliacs (n=12,971-17,000).

Chak E, et al. *Liver Int.* 2011; 31:1090-1101.



# How many people in the U.S. have HCV ?

(Armstrong et al, 2006; Chak et al, 2011)



4.1 Million

5.2 Million – 7.1 Million

## Annals of Internal Medicine

## ARTICLE

### The Prevalence of Hepatitis C Virus Infection in the United States, 1999 through 2002

Gregory L. Armstrong, MD; Annemarie Wasley, ScD; Edgar P. Simard, MPH; Geraldine M. McQuillan, PhD; Wendi L. Kuhnert, PhD; and Miriam J. Alter, PhD

**Background:** Defining the primary characteristics of persons infected with hepatitis C virus (HCV) enables physicians to more easily identify persons who are most likely to benefit from testing for the disease.

**Objective:** To describe the HCV-infected population in the United States.

**Design:** Nationally representative household survey.

**Setting:** U.S. civilian, noninstitutionalized population.

**Participants:** 15 079 participants in the National Health and Nutrition Examination Survey between 1999 and 2002.

**Measurements:** All participants provided medical histories, and those who were 20 to 59 years of age provided histories of drug use and sexual practices. Participants were tested for antibodies to HCV (anti-HCV) and HCV RNA, and their serum alanine aminotransferase (ALT) levels were measured.

**Results:** The prevalence of anti-HCV in the United States was 1.6% (95% CI, 1.3% to 1.9%), equating to an estimated 4.1 million (CI, 3.4 million to 4.9 million) anti-HCV-positive persons nationwide; 1.3% or 3.2 million (CI, 2.7 million to 3.9 million)

persons had chronic HCV infection. Peak prevalence of anti-HCV (4.3%) was observed among persons 40 to 49 years of age. A total of 48.4% of anti-HCV-positive persons between 20 and 59 years of age reported a history of injection drug use, the strongest risk factor for HCV infection. Of all persons reporting such a history, 83.3% had not used injection drugs for at least 1 year before the survey. Other significant risk factors included 20 or more lifetime sex partners and blood transfusion before 1992. Abnormal serum ALT levels were found in 58.7% of HCV RNA-positive persons. Three characteristics (abnormal serum ALT level, any history of injection drug use, and history of blood transfusion before 1992) identified 85.1% of HCV RNA-positive participants between 20 and 59 years of age.

**Limitations:** Incarcerated and homeless persons were not included in the survey.

**Conclusions:** Many Americans are infected with HCV. Most were born between 1945 and 1964 and can be identified with current screening criteria. History of injection drug use is the strongest risk factor for infection.

Ann Intern Med. 2006;144:705-714.

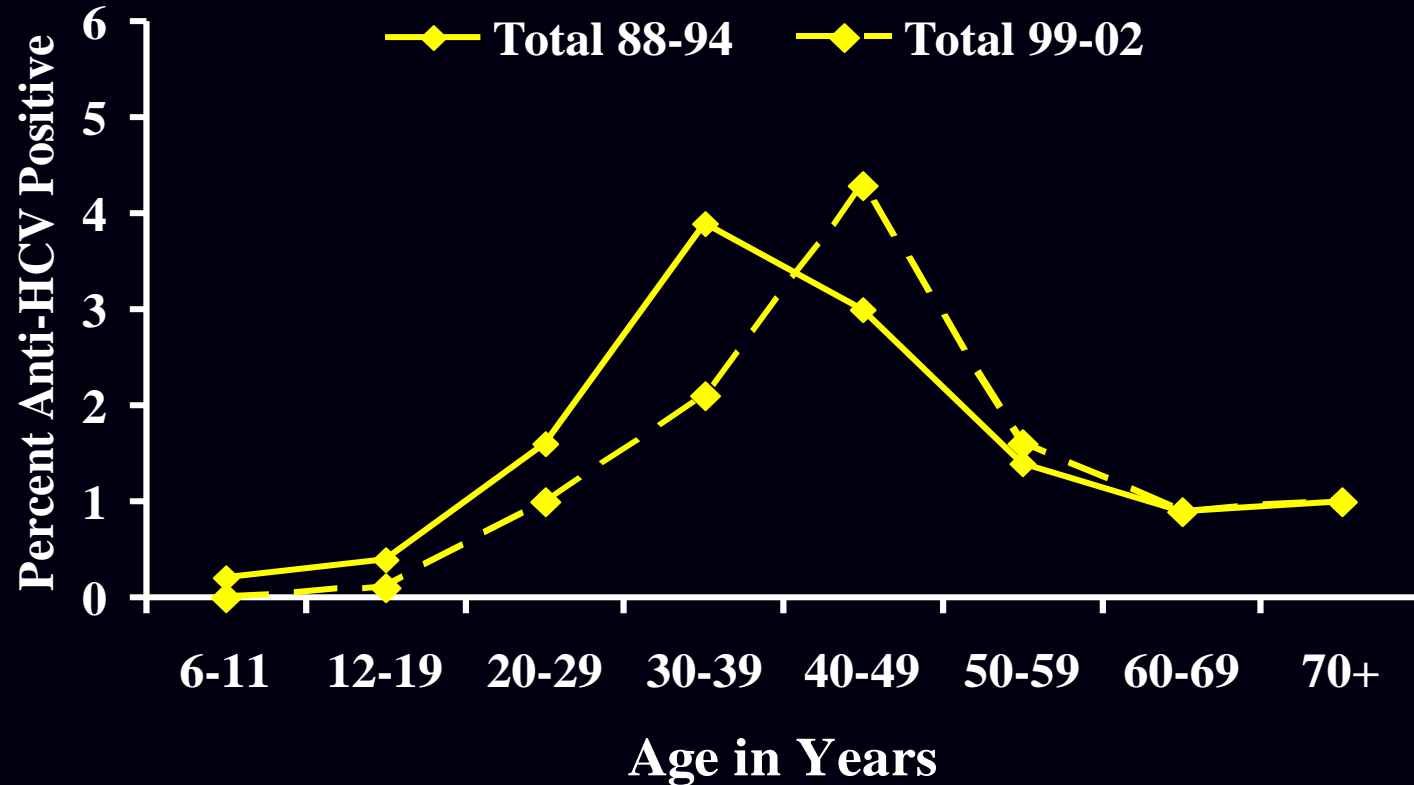
For author affiliations, see end of text.

www.annals.org

Table 6. Estimated total prevalence of hepatitis C virus in the USA

Population	Reported prevalence range	Estimated number in US population	Estimated range of HCV cases
Homeless	22.2–52.5%	643 067 (14)	142 761–337 610
Incarcerated	23.1–41.2%	1 613 656 (96)	372 754–664 826
Veterans	5.4–10.7%	22 915 943 (97)	1 237 461–2 452 006
Active military duty	0.48%	1 417 747 (98)	6805
Healthcare workers	0.9–3.6%	7 200 950 (99)	64 809–259 234
Nursing home residents	4.5%	1 413 540 (85)	63 609
Chronic haemodialysis	7.8%	263 820 (80)	20 578
Haemophiliacs with transfusions before 1992	76.3–100%	17 000 (92)	12 971–17 000
		Unaccounted number of HCV positive NHANES*	1 921 748–3 821 668
		Total	3 270 000
			5 191 748–7 091 668

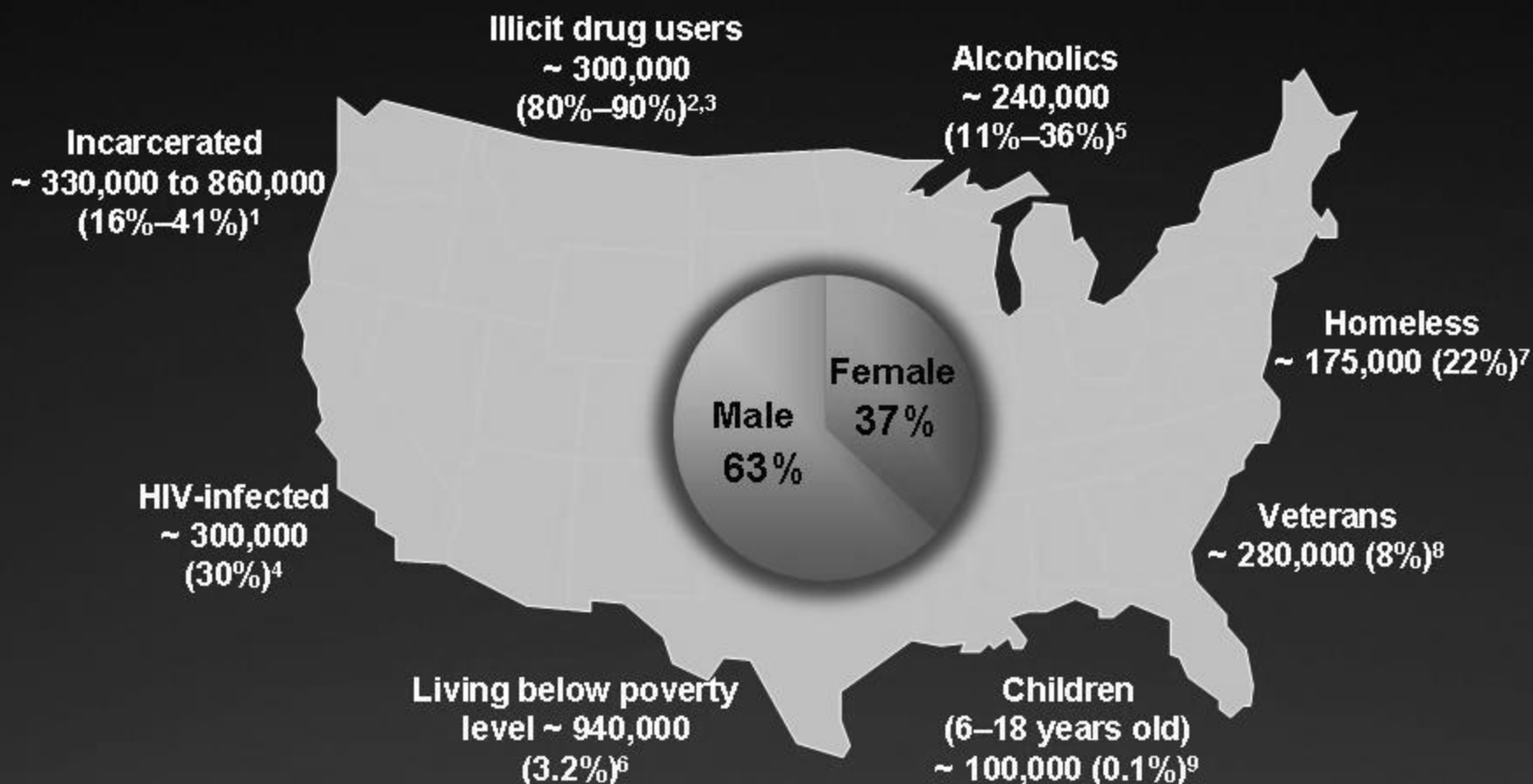
# Prevalence of HCV in U.S. General Population by Age, 1988-2002



**Source: NHANES: Alter MJ, NEJM 1999;341:556-562;  
Armstrong GL, Ann Intern Med 2006, in press**



# Prevalence of HCV in Select Populations

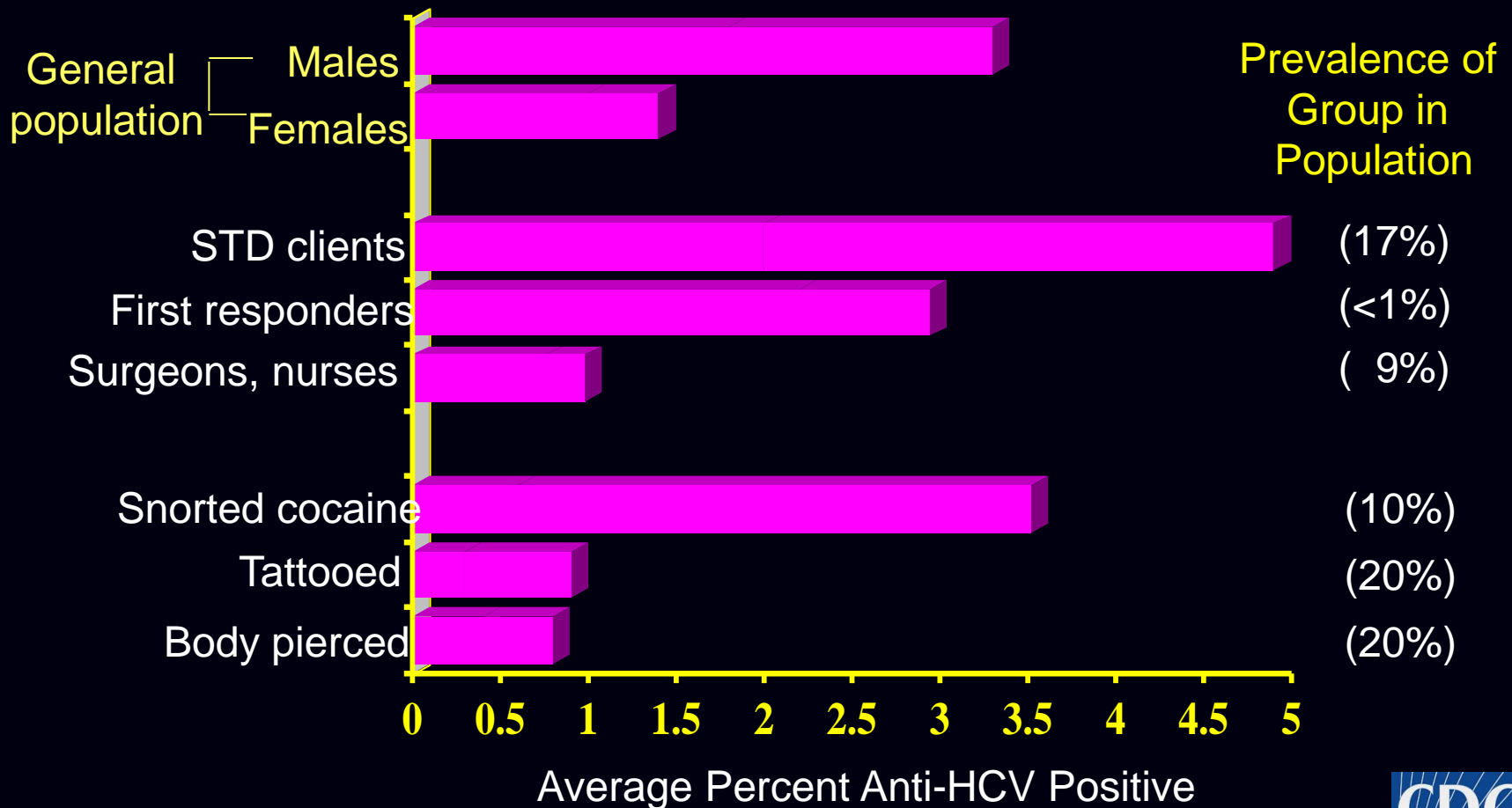


## CRIT/FIT 2013

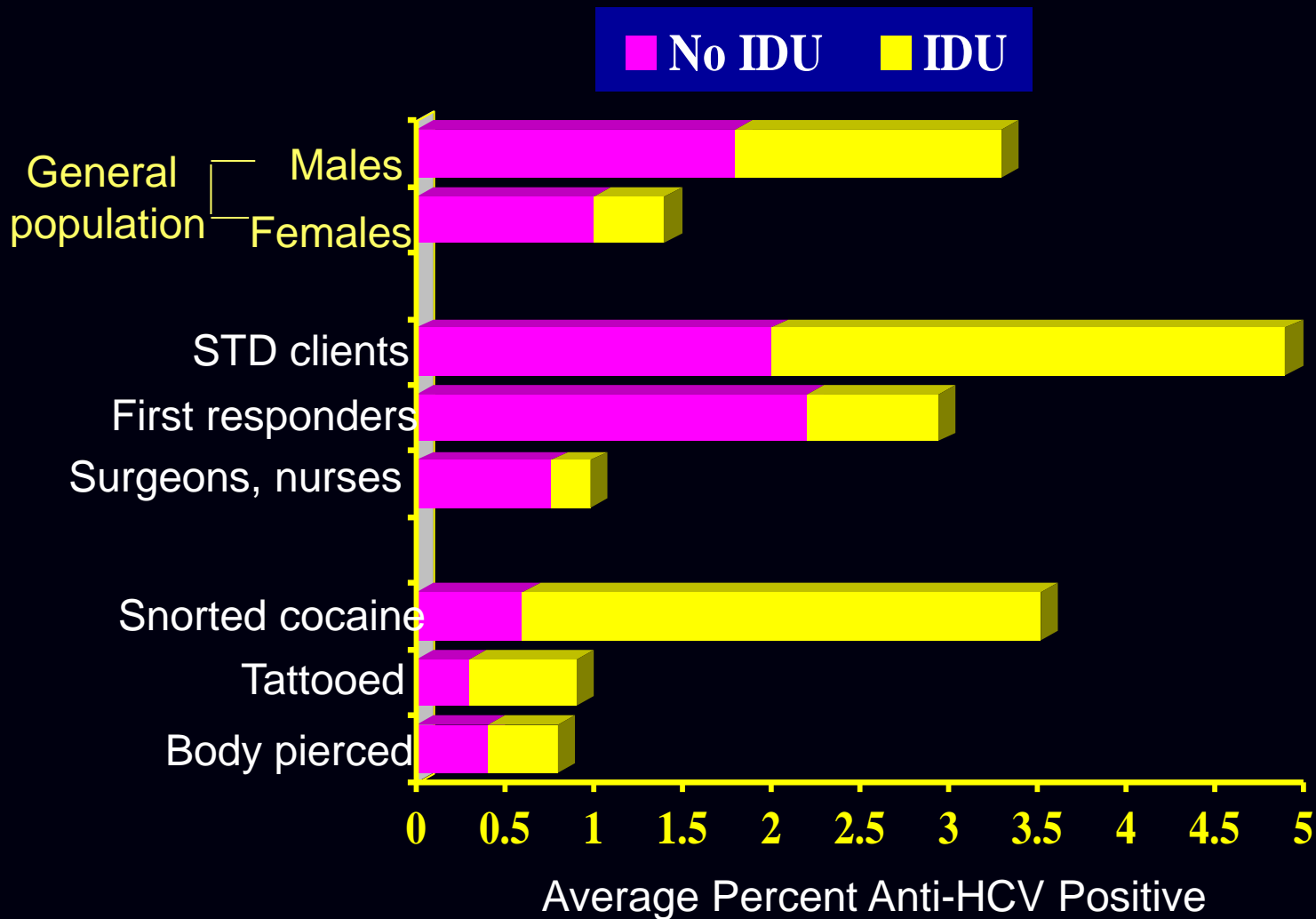
Adapted from: 1. CDC. *MMWR*. 2003;52(RR-1):1-33; 2. Edlin B. *Hepatology*. 2002;36(5 suppl 1):S210-S219; 3. NHSDA Report 2003; 4. Poles M, et al. *Clin Infect Dis*. 2000;31:154-161; 5. LaBrecque D, et al. *Hepatitis C Choices*. 2002:7-15; 6. Alter M, et al. *N Engl J Med*. 1999;341:556-562; 7. Nyamathi A, et al. *J Gen Intern Med*. 2002;17:134-143; 8. Bräu N, et al. *Am J Gastroenterol*. 2002;97:2071-2078; 9. Jonas M. *Hepatology*. 2002;36(5 suppl 1):S173-S178.

# HCV in Drug Users

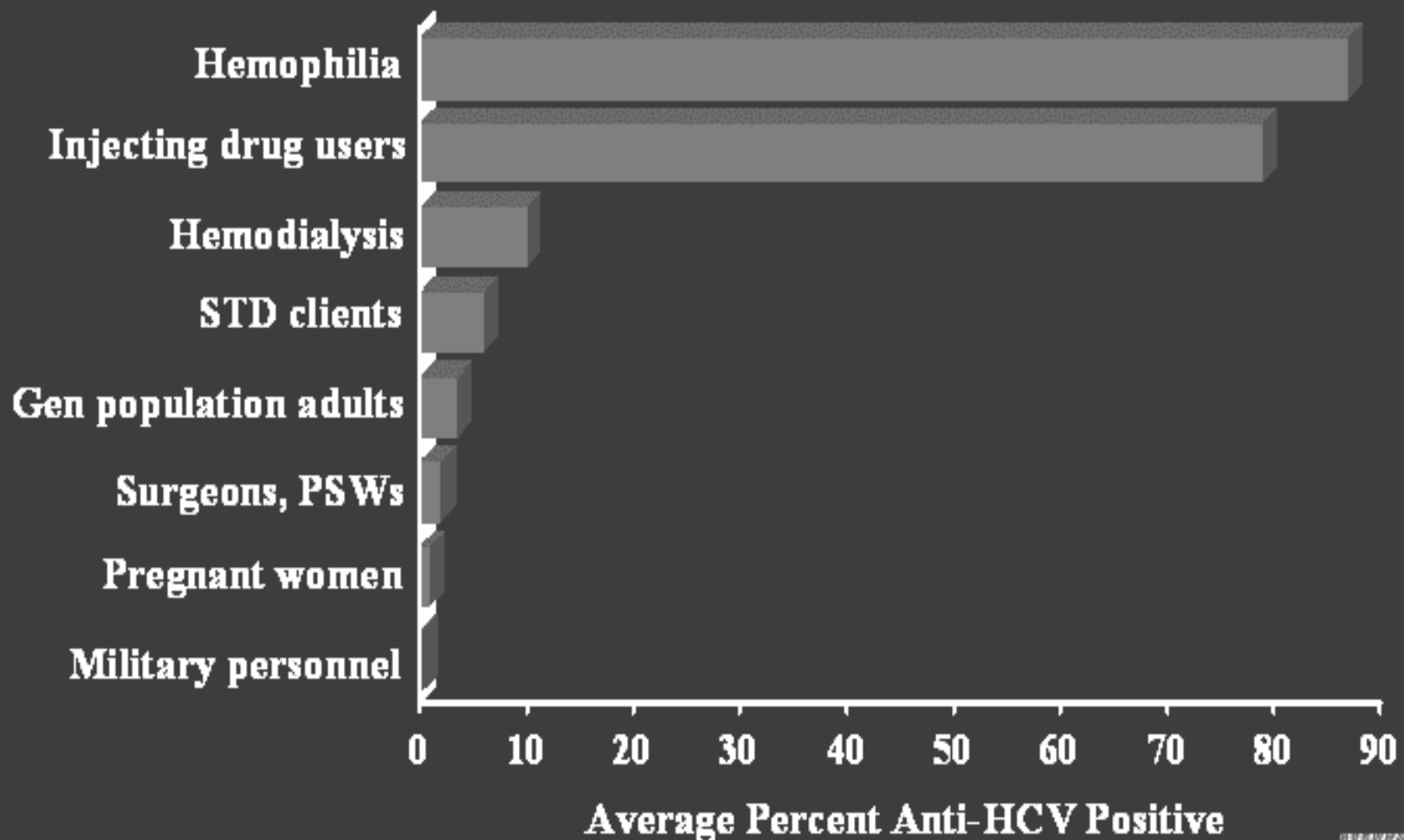
# HCV Prevalence in Selected Groups of Adults in the United States



# HCV Prevalence in Selected Groups of Adults by History of Injection Drug Use



# HCV Prevalence by Selected Groups United States





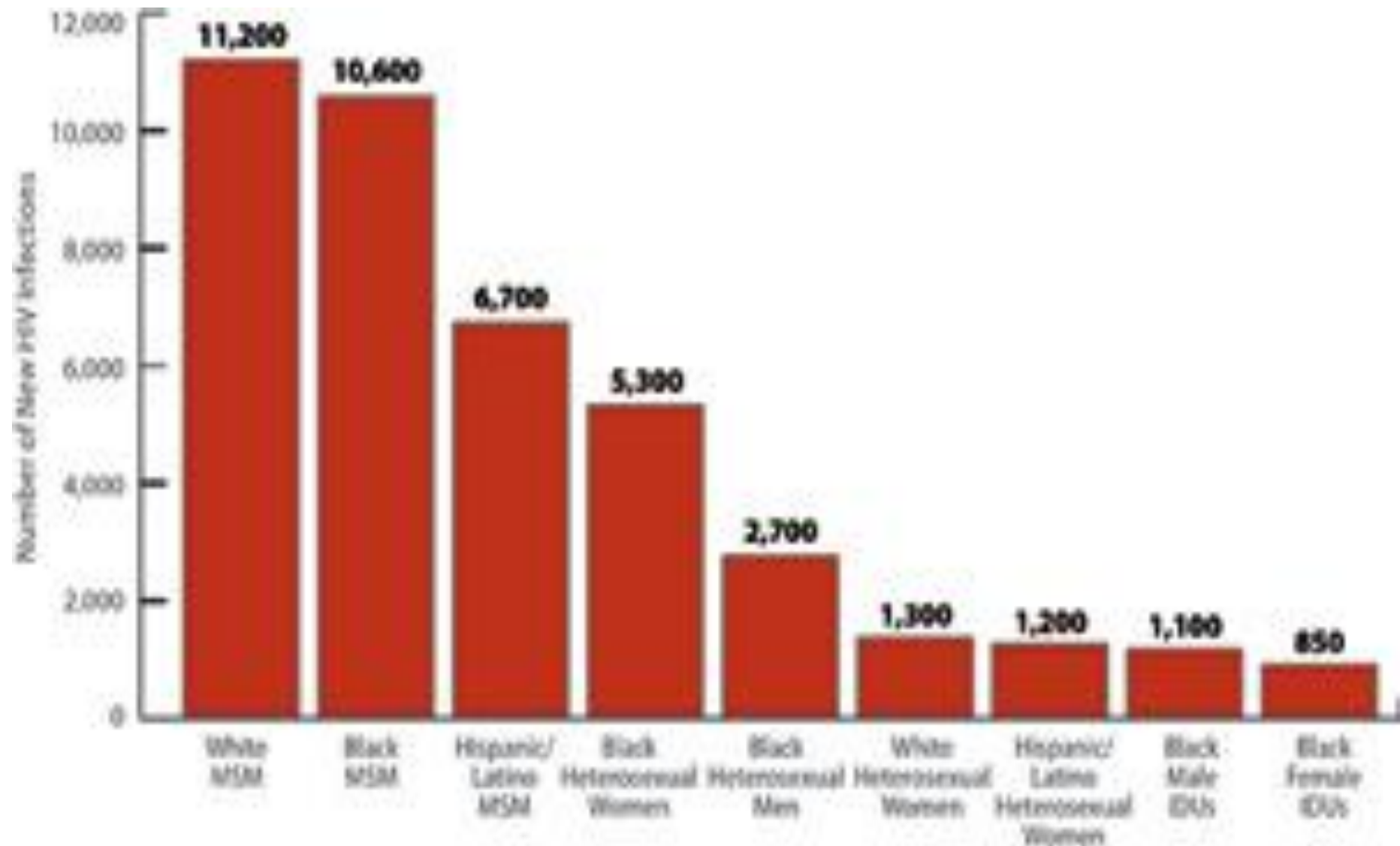
# Reasons for High HCV Risk Among Injection Drug Users

- **Contaminated needles**
- **Contaminated “works”**
  - **Syringes, cookers, cottons, rinse water**
- **Old (infected) mentor transmits to young initiate**
- **Unstable networks and supply**

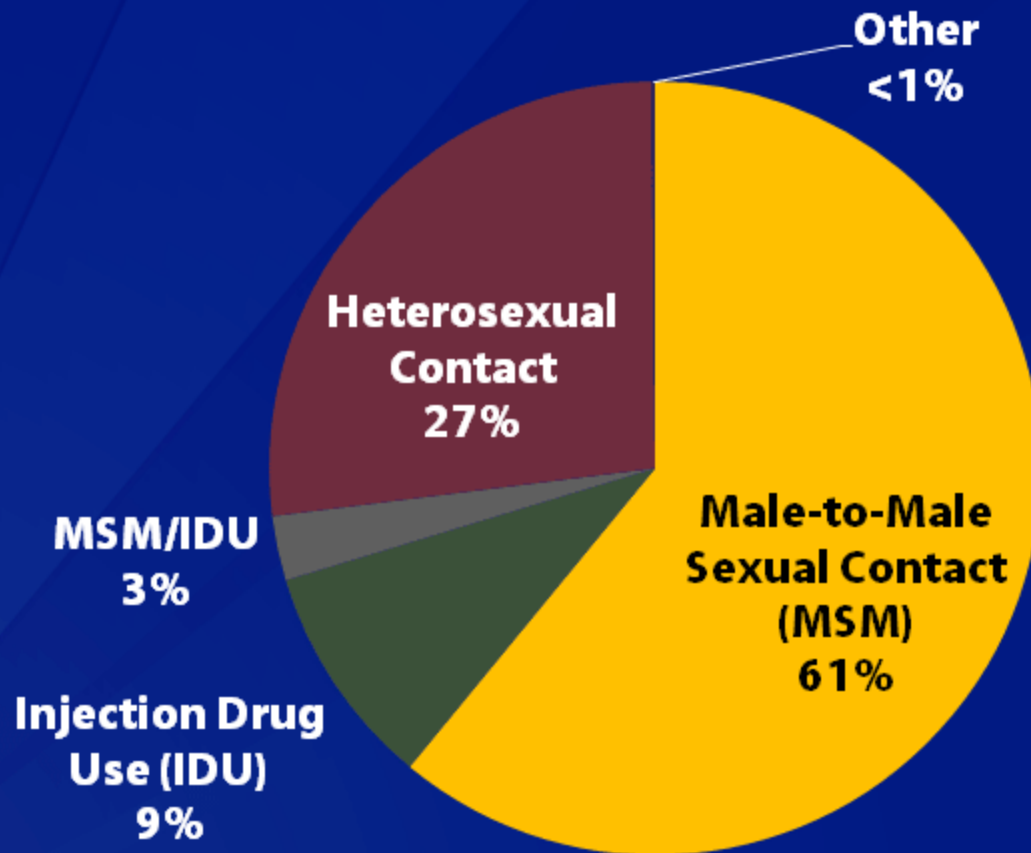
Villano SA, et al. J Clin Microbiol. 1997;35:3274-3277. Garfein RS, et al. J Acquir Immune Defic Syndr Hum Retrovirol. 1998;18(suppl 1):S11-S19. Thorpe LE, et al. Am J Epidemiol. 2002;155:645-653. Hagan H, et al. Public Health Rep. 2006;121:710-719.

# HIV Incidence and Prevalence

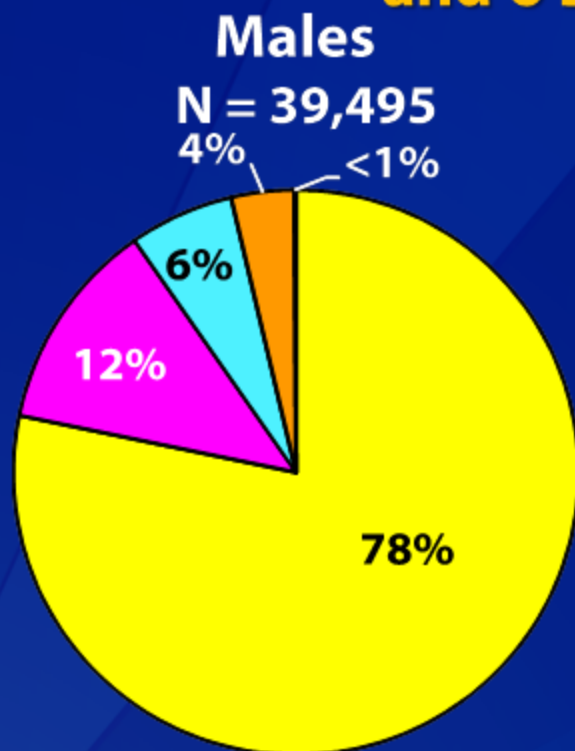
# Estimated New HIV Infections in the United States, 2010, for the Most Affected Subpopulations



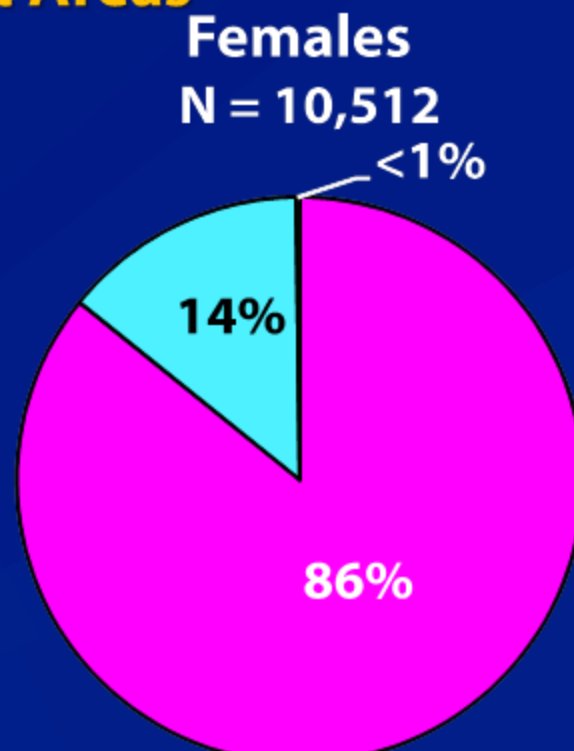
## HIV Incidence by Transmission Category, United States - 2009



# Diagnoses of HIV Infection among Adults and Adolescents, by Sex and Transmission Category, 2011—United States and 6 Dependent Areas



- Male-to-male sexual contact
- Injection drug use (IDU)
- Male-to-male sexual contact and IDU



- Heterosexual contact<sup>a</sup>
- Other<sup>b</sup>

Note. Data include persons with a diagnosis of HIV infection regardless of stage of disease at diagnosis. All displayed data have been statistically adjusted to account for reporting delays and missing transmission category, but not for incomplete reporting.

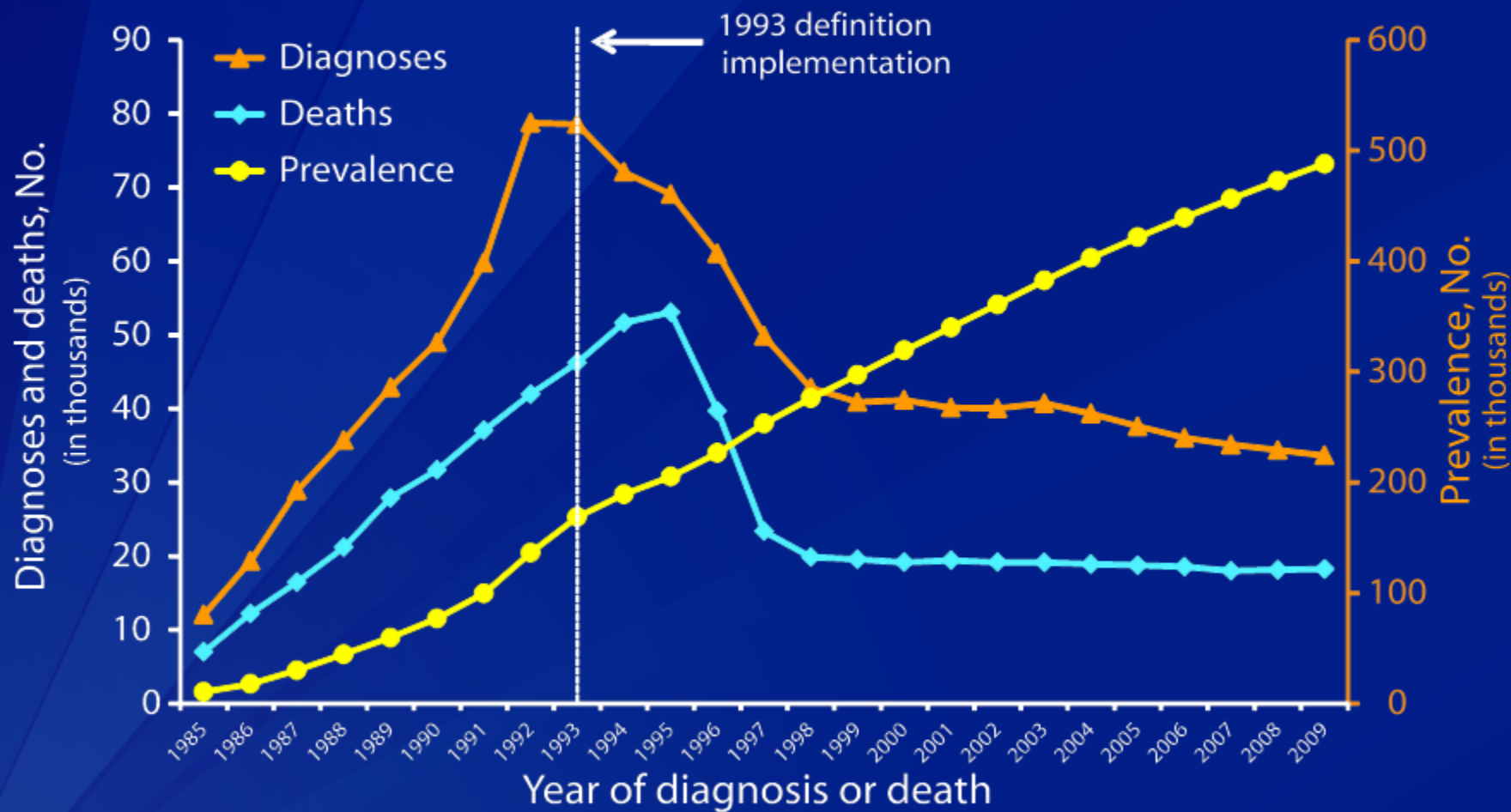
<sup>a</sup> Heterosexual contact with a person known to have, or to be at high risk for, HIV infection.

<sup>b</sup> Includes hemophilia, blood transfusion, perinatal exposure, and risk factor not reported or not identified.

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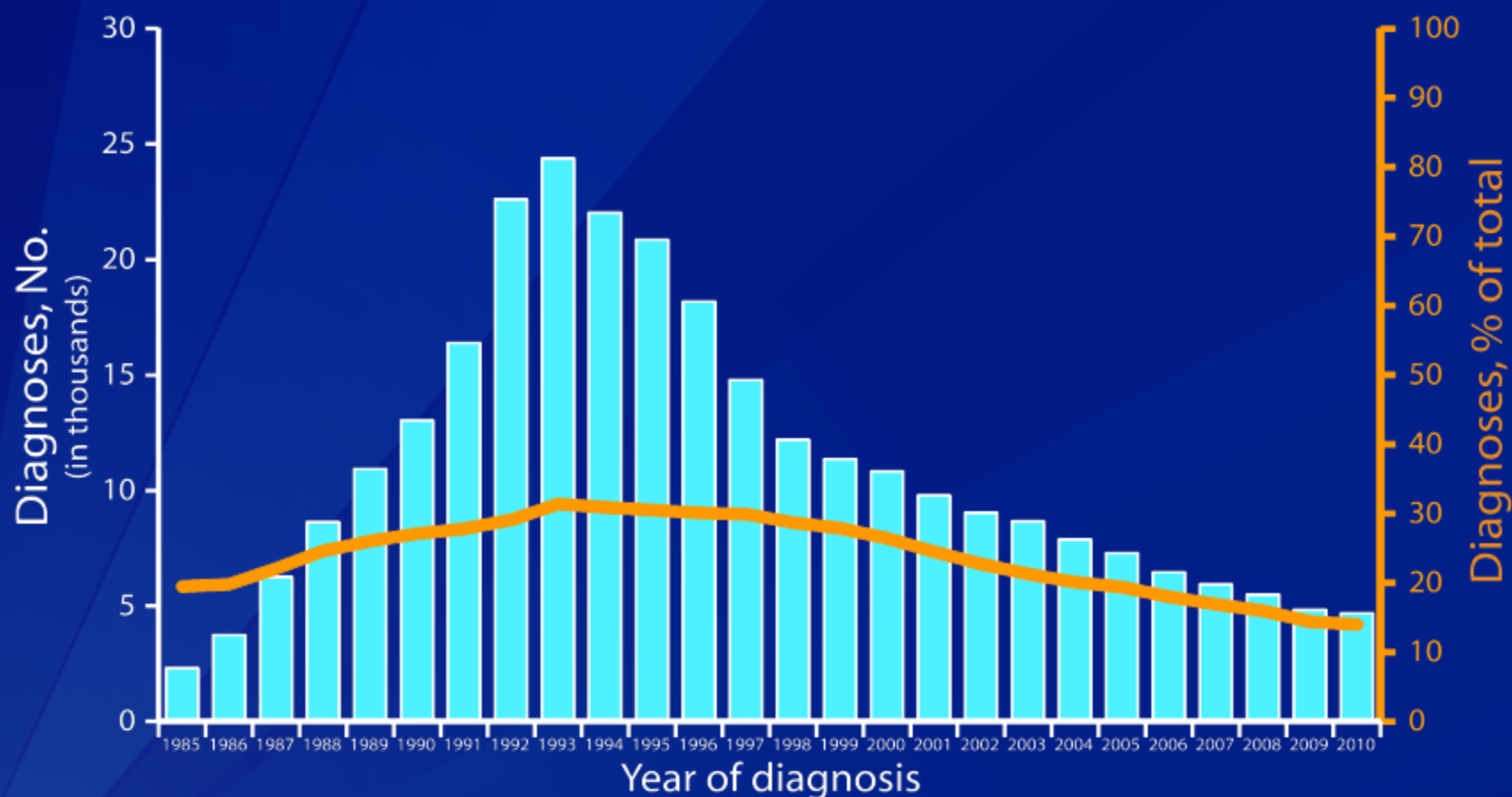


# AIDS Diagnoses, Deaths, and Persons Living with AIDS, 1985–2009—United States and 6 U.S. Dependent Areas



Note. All displayed data have been statistically adjusted to account for reporting delays, but not for incomplete reporting. Death may be due to any cause.

# AIDS Diagnoses among Injection Drug Users, 1985–2010—United States and 6 U.S. Dependent Areas



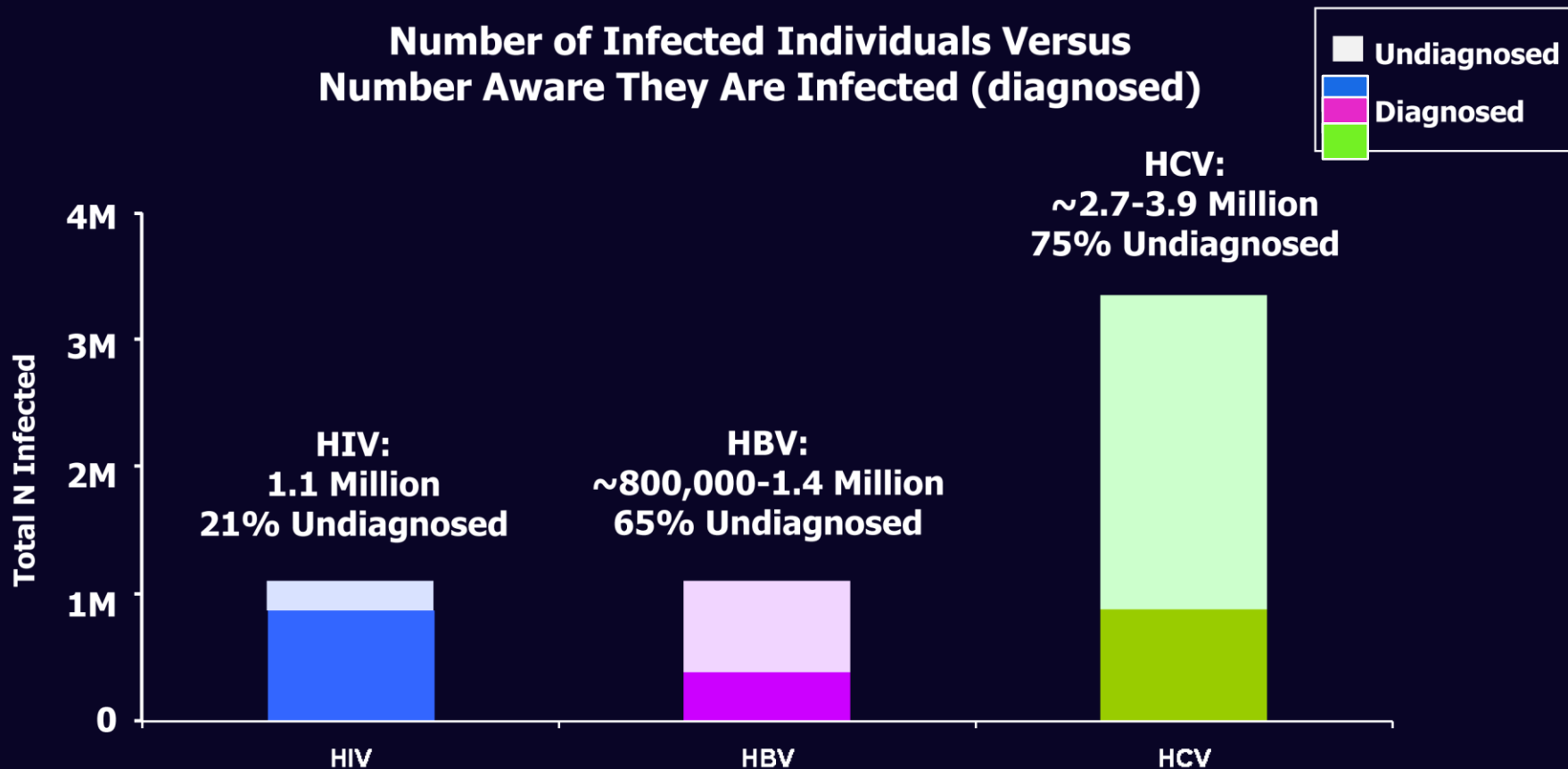
Note. All displayed data have been statistically adjusted to account for reporting delays and missing risk-factor information, but not for incomplete reporting. Data exclude men with HIV infection attributed to male-to-male sexual contact and injection drug use.





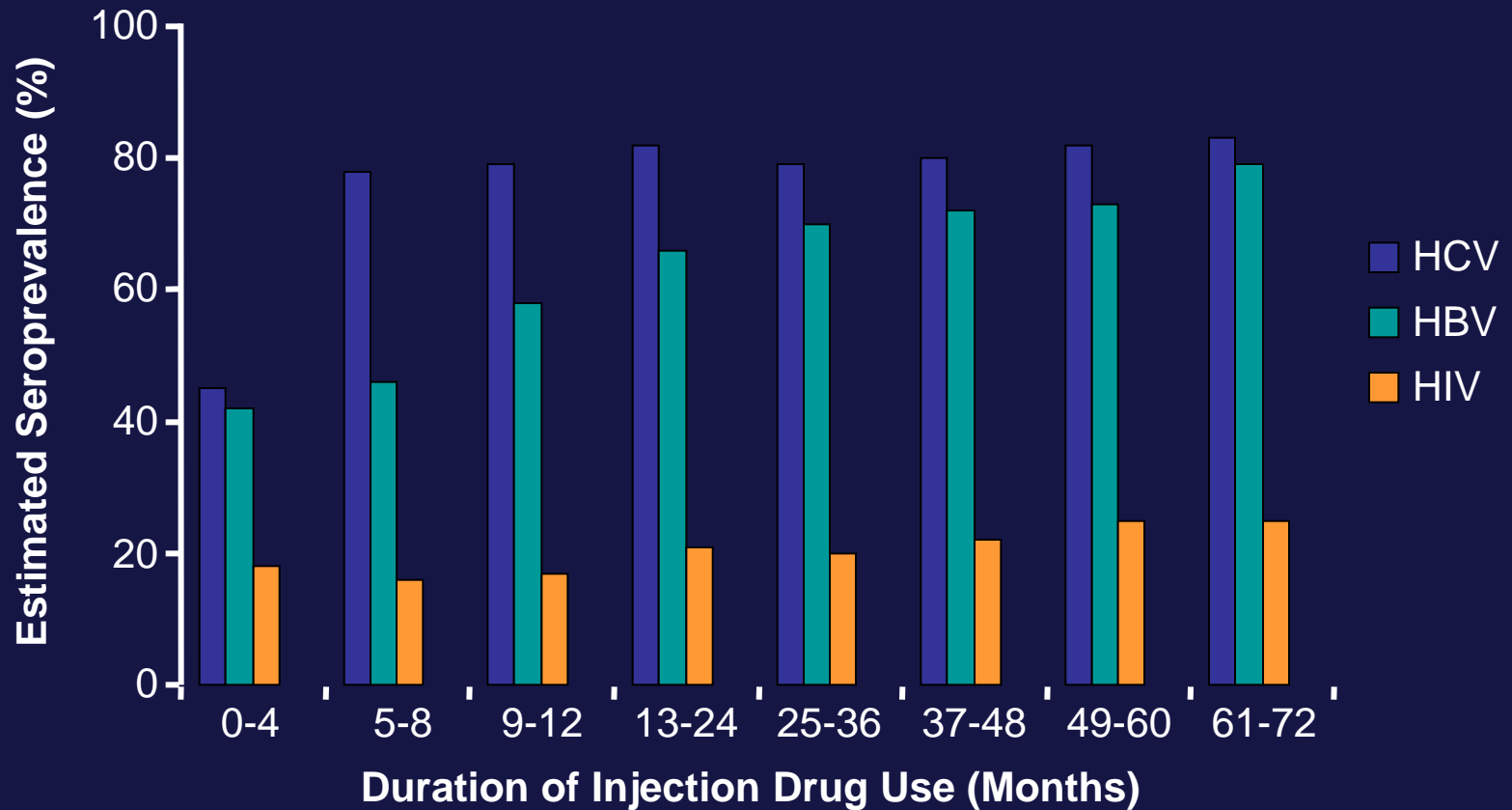
# HCV and HIV – Comparative Prevalence and Incidence

# Comparative Burden of Chronic HCV Infection in the United States

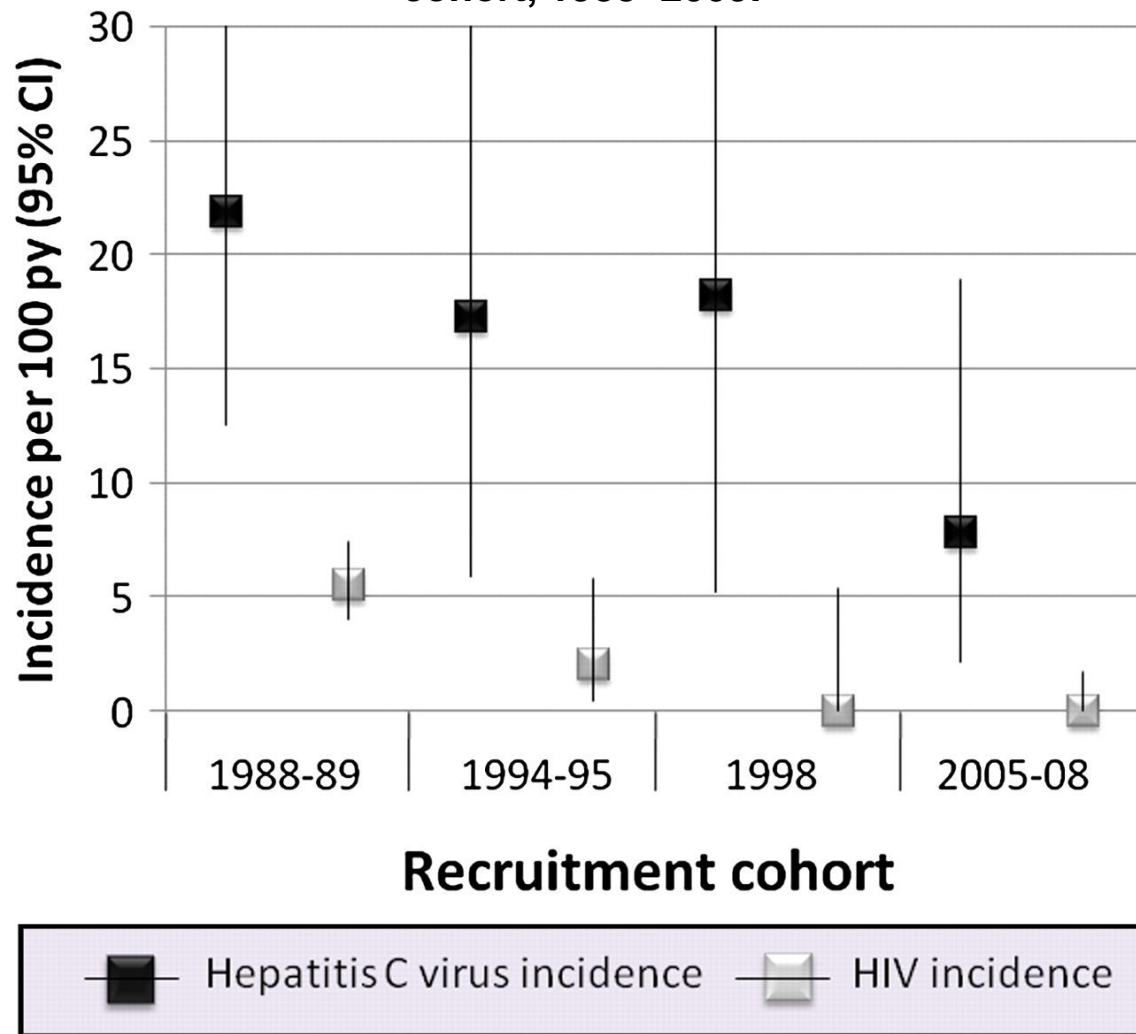


- Prevalence of HCV is 4 times greater than HIV and HBV

# Duration of Injection Drug Use and Prevalence of Blood-Borne Viruses



**Incidence per 100 person-years of human immunodeficiency virus and hepatitis C virus infection by recruitment cohort in the AIDS Linked to the Intravenous Experience (ALIVE) cohort, 1988–2009.**



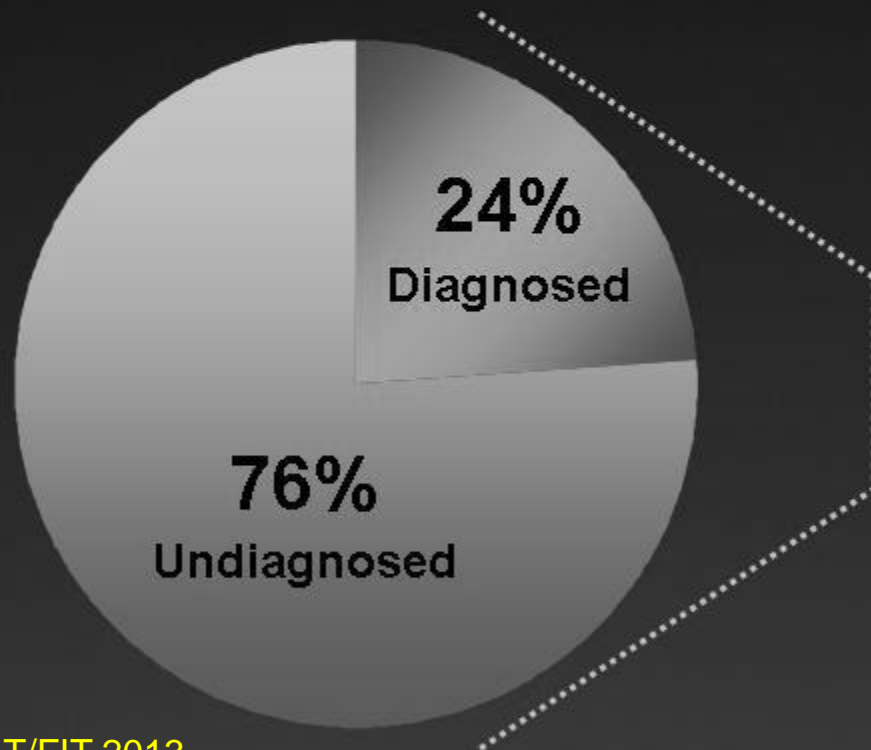
Mehta S H et al. *J Infect Dis.* 2011;infdis.jiq112

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# Undiagnosed Disease

# Hepatitis C Is Often Undiagnosed

- Despite its high prevalence, HCV often remains undiagnosed



**More than three fourths  
of those with hepatitis C  
are undiagnosed**

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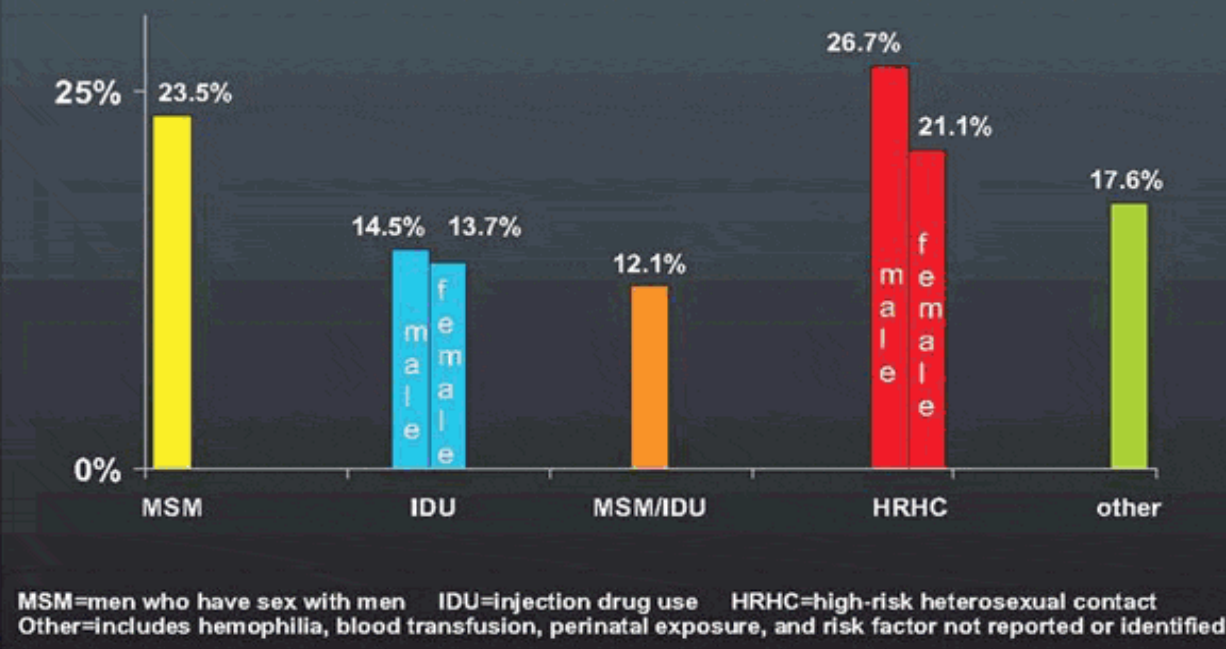


The Body PRO

## Estimated Prevalence of Undiagnosed HIV Infection in the United States at the End of 2006

6

### Percent undiagnosed by transmission category



Michael Campsmith et al. CROI 2009; abstract 1036. Reprinted with permission.

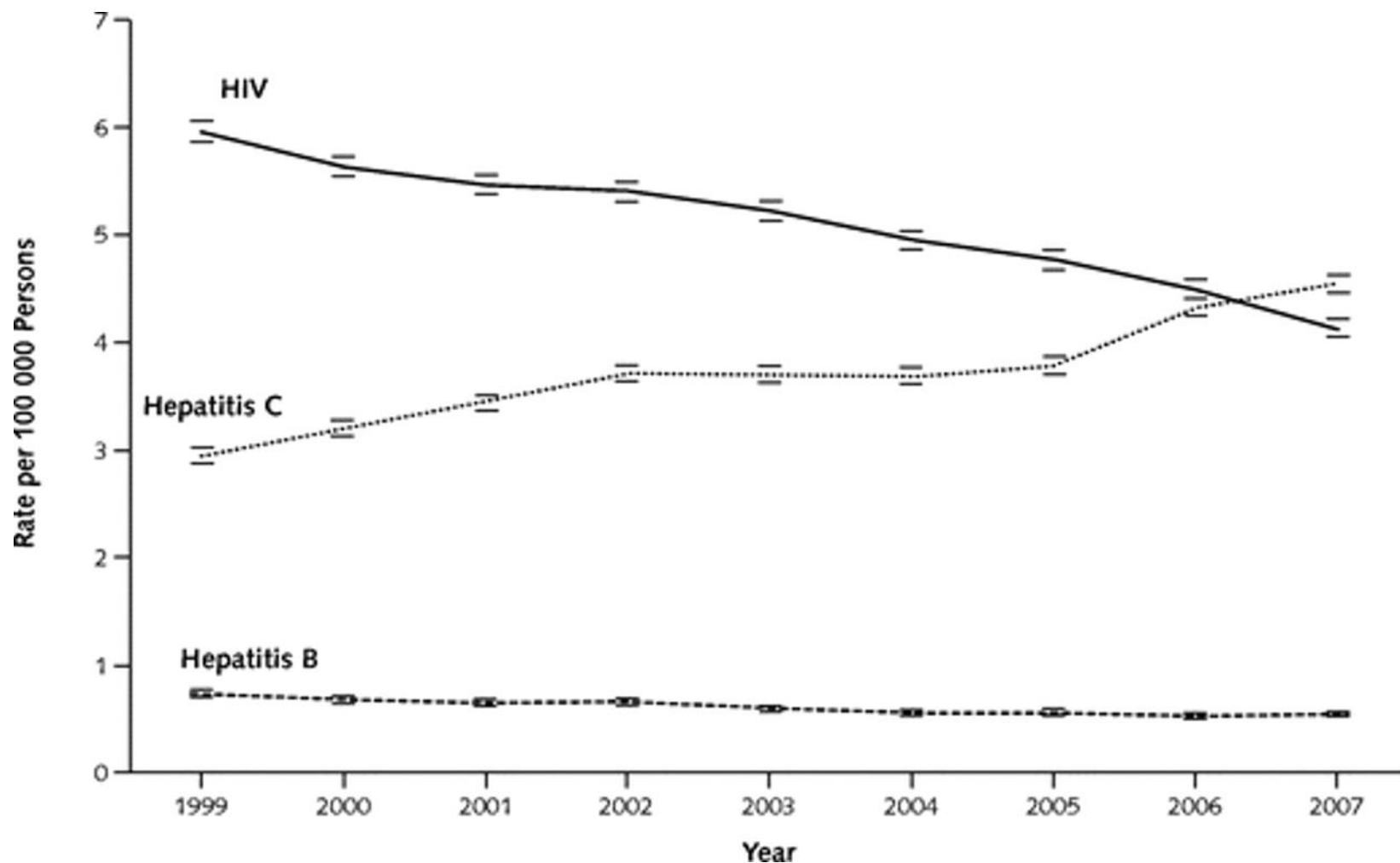


# **Treatment and Outcomes**

**Care Cascade**

**Barriers to Care**

**Annual age-adjusted mortality rates from hepatitis B and hepatitis C virus and HIV infections listed as causes of death in the United States between 1999 and 2007.**



Ly K N et al. Ann Intern Med 2012;156:271-278

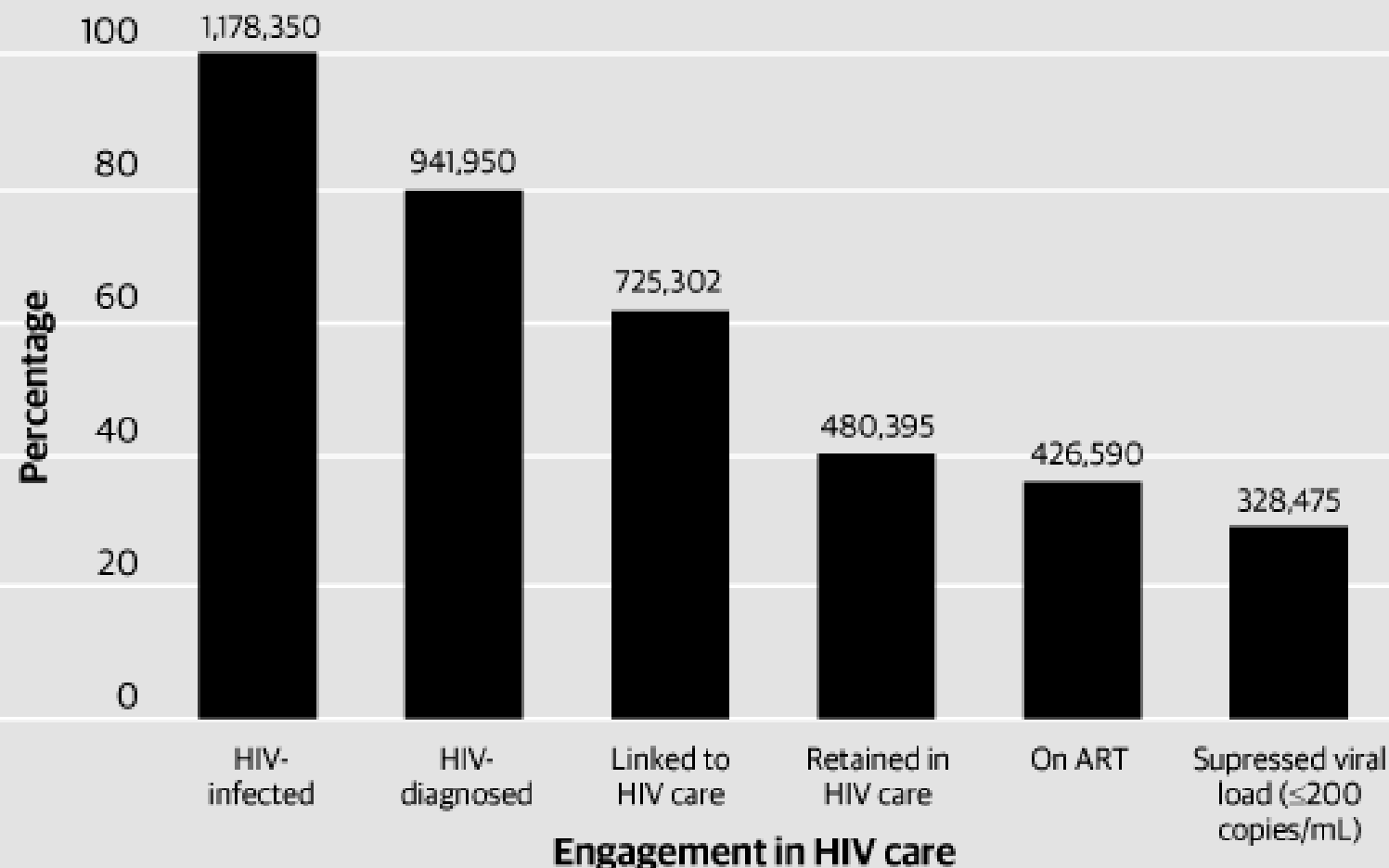
**Annals of Internal Medicine**

# Care Cascade

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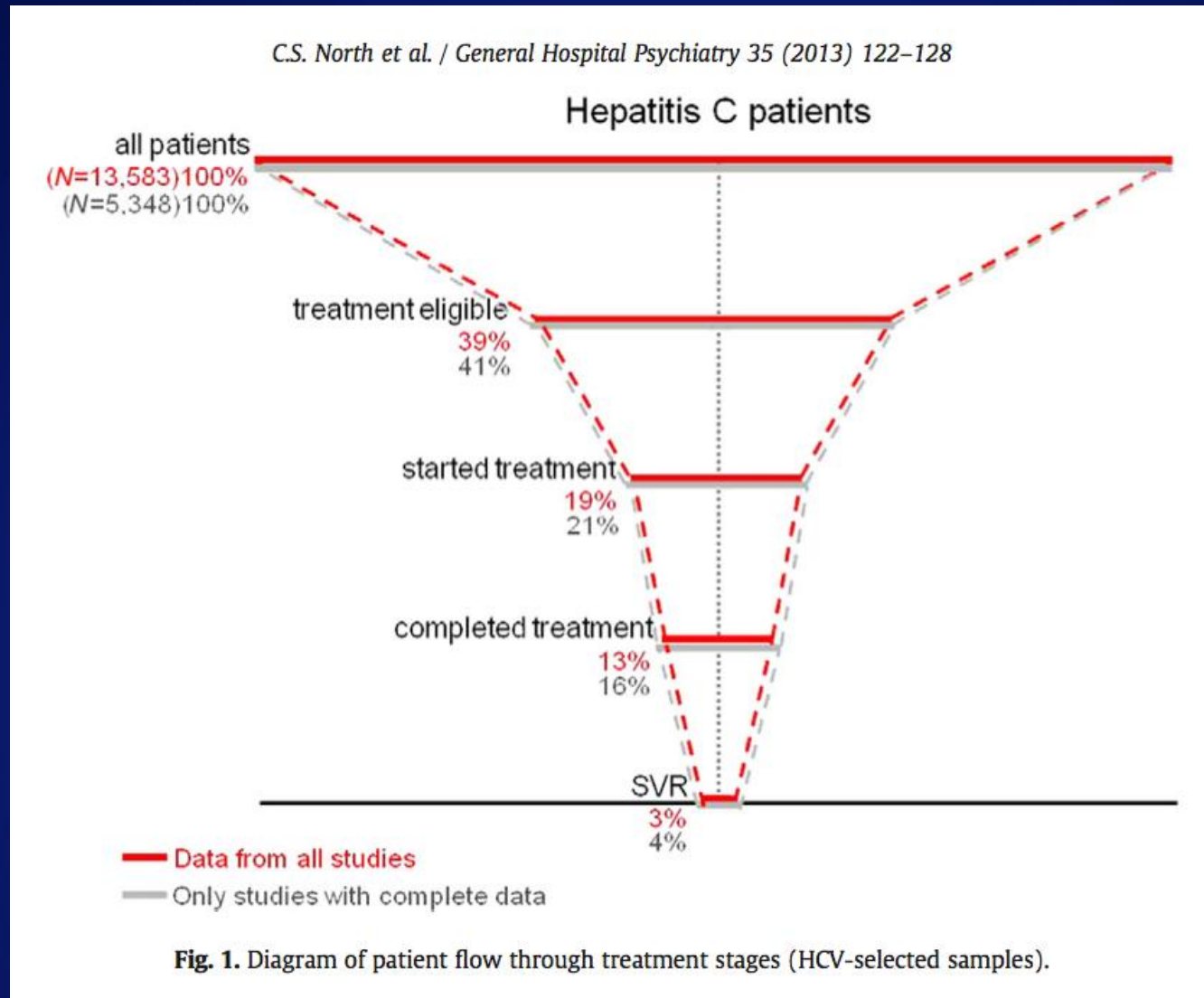
# HIV Care Cascade

**Number and percentage of HIV-infected persons engaged in selected stages of the continuum of HIV care – United States**

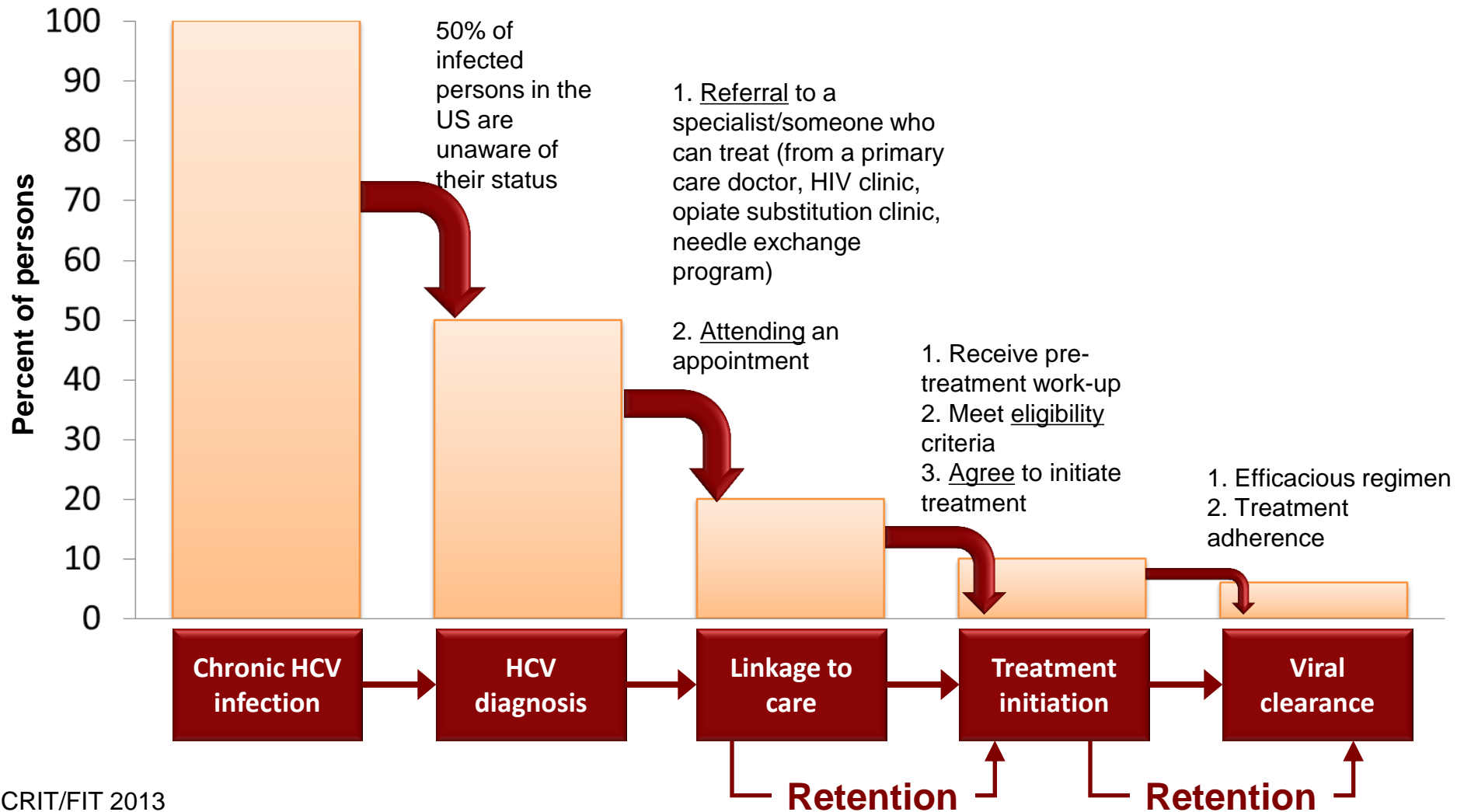


Source: Adapted from Morbidity and Mortality Weekly Report 60: 1618-1623, 2011

# Gap between Clinical Trials and the Real-World



# Hepatitis C Care Cascade



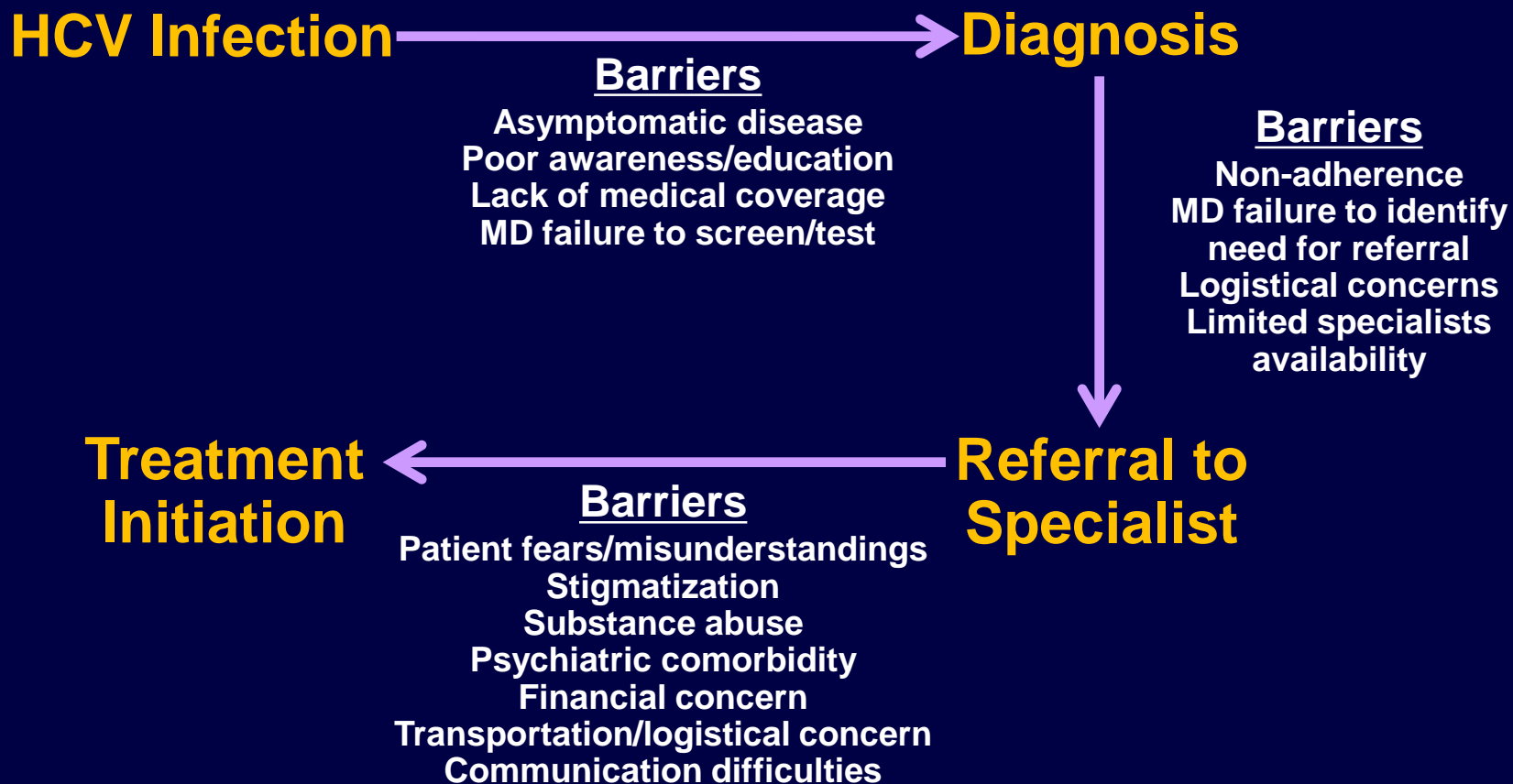
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Adeyemi 2004, Falck-Ytter 2002, Fishbein 2004, Fleming 2003, Grebely 2009, Groom 2008, Hall 2004, Hallinan 2007, Jowett 2001, Mehta 2006, Mehta 2008, Morrill 2005, Restrepo 2005, Rocca 2004, Stooze 2005

# Barriers to Care



# Stepwise Barriers to Hepatitis C Treatment



# Barriers to Treatment in Drug Users

## Patient Barriers

- Low knowledge and motivation
- Lack of positive social support
- Unstable drug +/- alcohol use
- Unstable psychiatric illness
- Medical comorbidities
- Cognitive impairment
- Competing priorities
- Mistrust of healthcare system
- Interferon syringe - a trigger
- IFN effects mimic “dope sick”
- Drug-drug interactions
- Stigma
- Fragmented healthcare system

## Provider and Structural Barriers

- Fragmented healthcare system
- Mistrust of drug users
- Incomplete knowledge and low motivation
- Competing priorities
- Practice does not accept all insurance plans
- Primary care provider who treats HIV/HCV may not be able to accept referrals from other PCPs
- Inadequate reimbursement for intensive models of care
- Interferon
- Liver biopsy

# Selected Research Projects

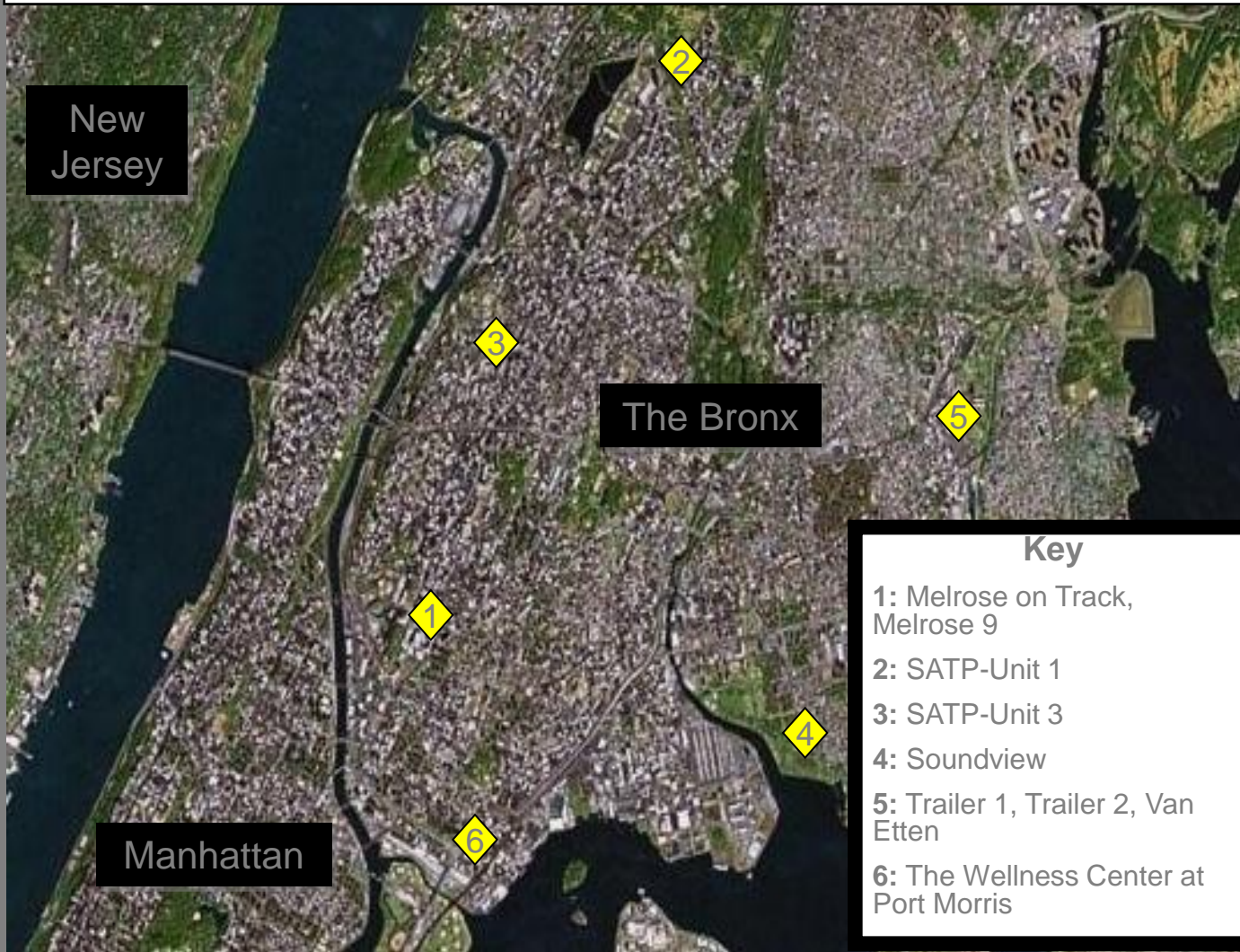
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# HIV

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## Clinic Locations

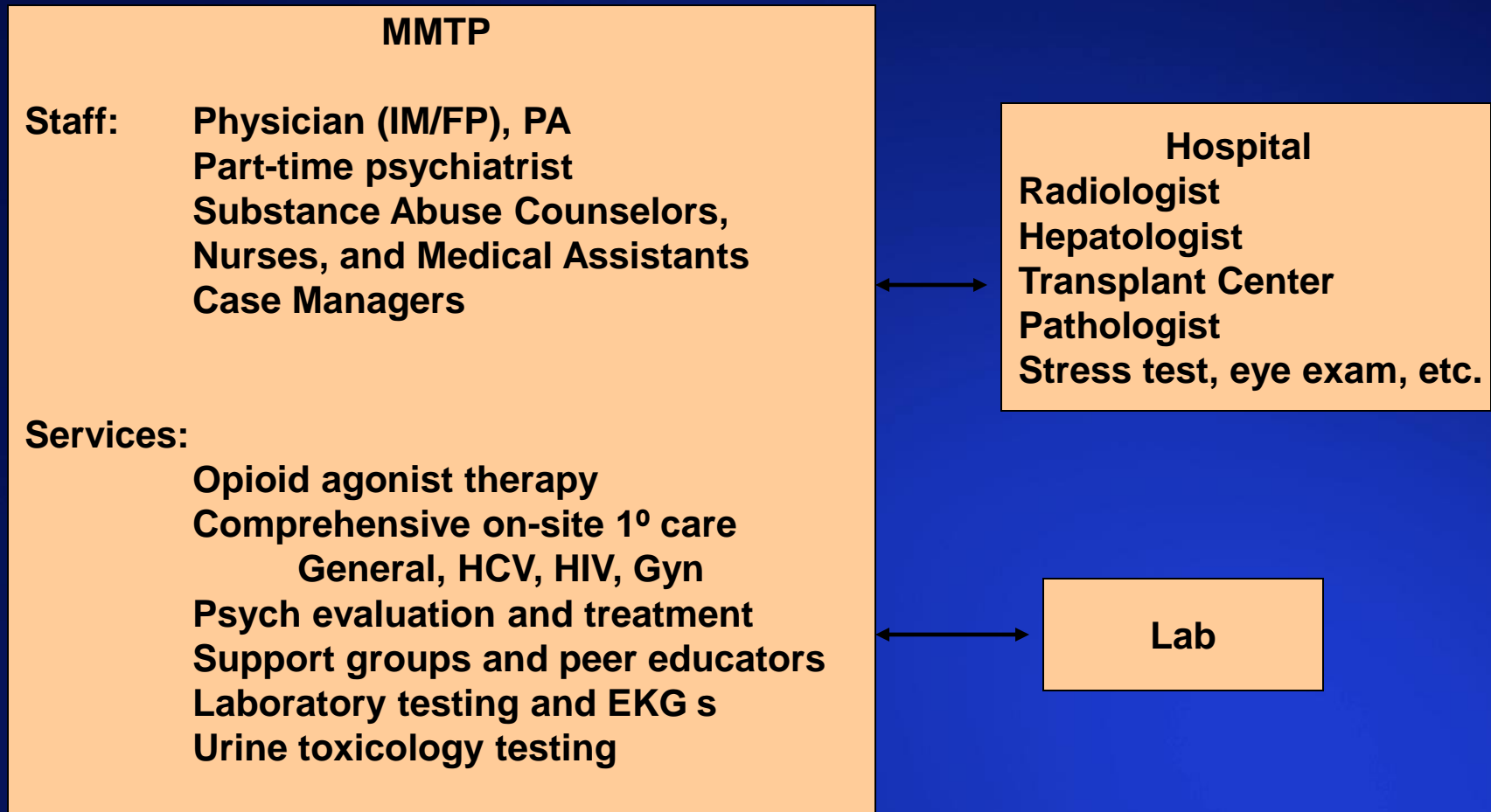


### Key

- 1: Melrose on Track, Melrose 9
- 2: SATP-Unit 1
- 3: SATP-Unit 3
- 4: Soundview
- 5: Trailer 1, Trailer 2, Van Etten
- 6: The Wellness Center at Port Morris



# Integrating HIV and HCV Care with Methadone Maintenance Therapy



Karina M. Berg, MD, MS  
Substance Abuse Research Fellow '04-'06  
Robert Wood Johnson Physician Faculty  
Scholar '06-09

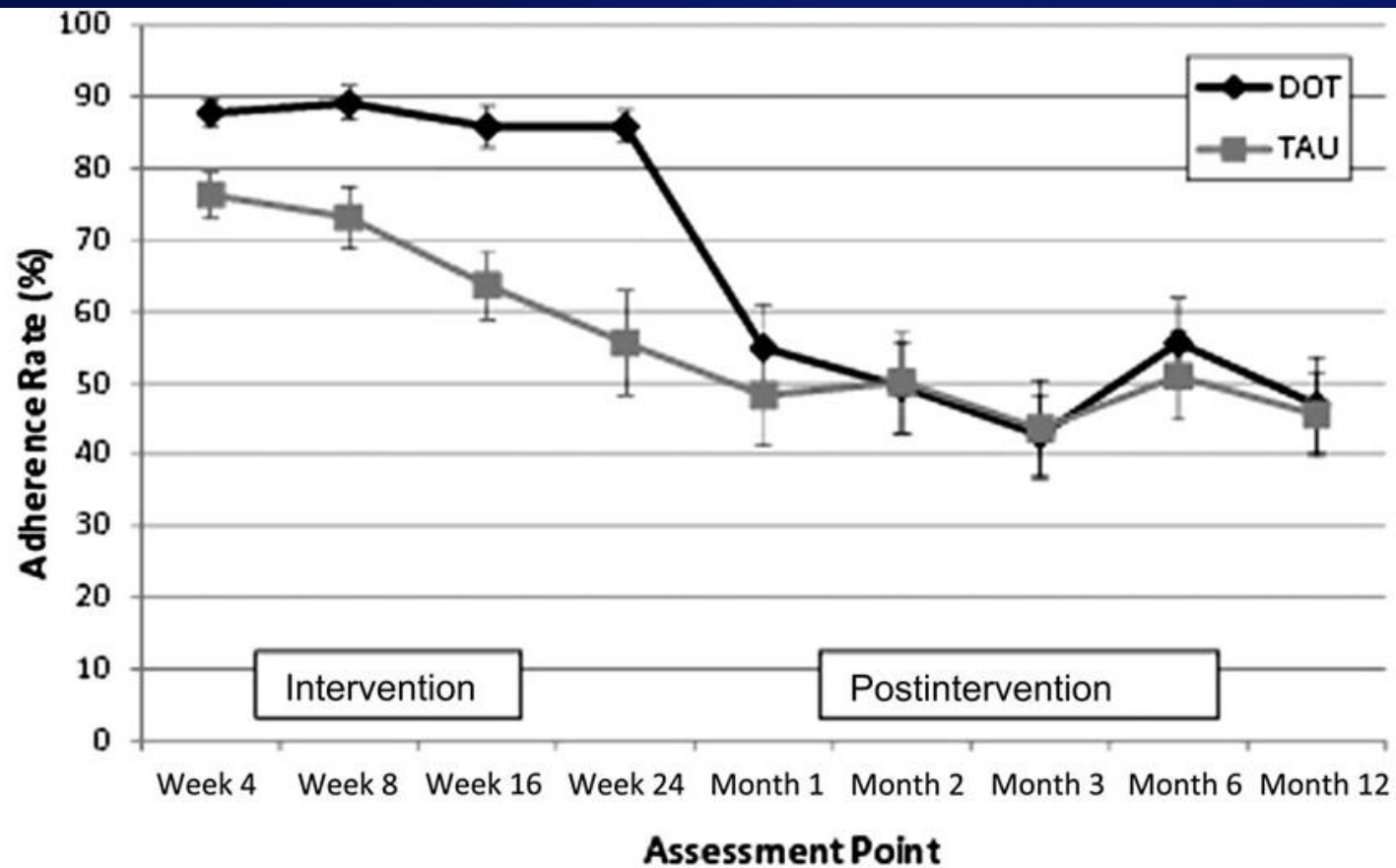


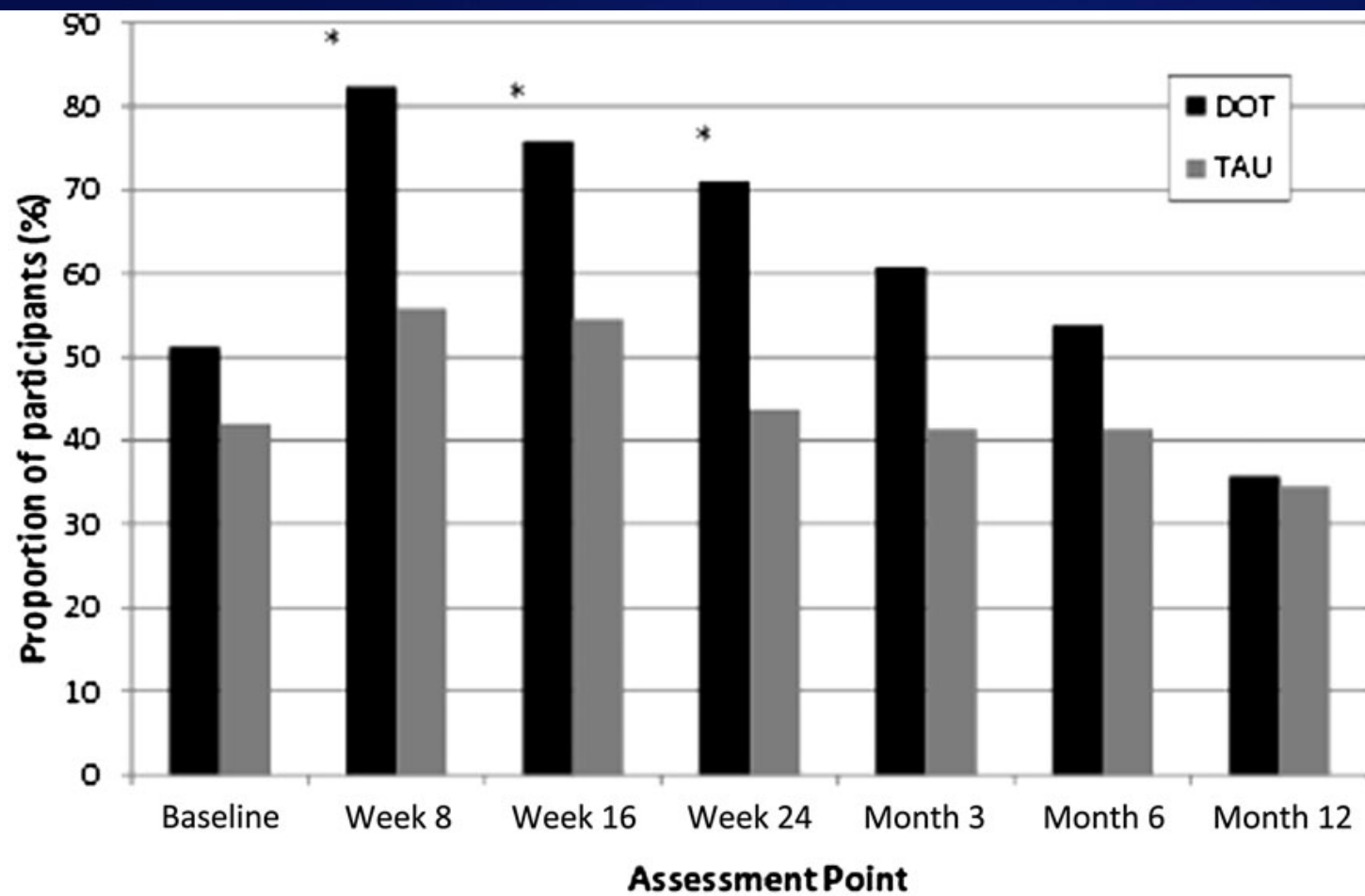
- **Robert Wood Johnson Physician Faculty Scholar award '06-'09**
- **NIDA/NIMH K23 '07-'11, to study:**
  - Composite adherence model incorporating four measurement methods
  - Agreement and validity of different adherence self-report measures
  - Cognitive processes undertaken by drug users to answer adherence questions, including question interpretation, ability to remember medication taking, and answer editing

# Directly Observed Treatment (DOT)



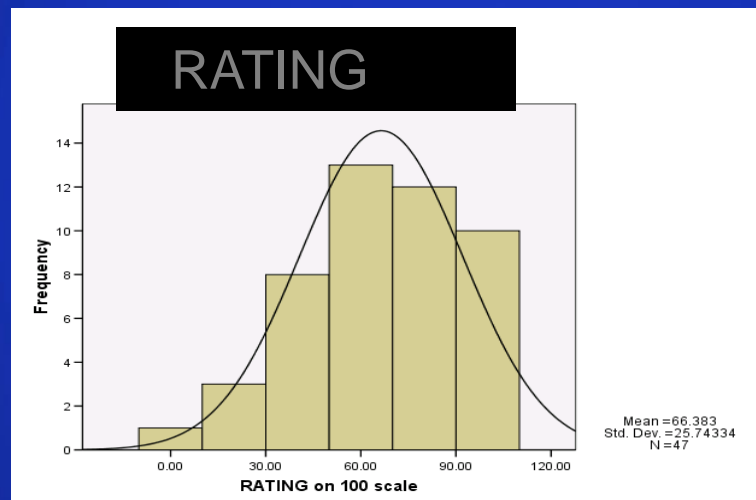
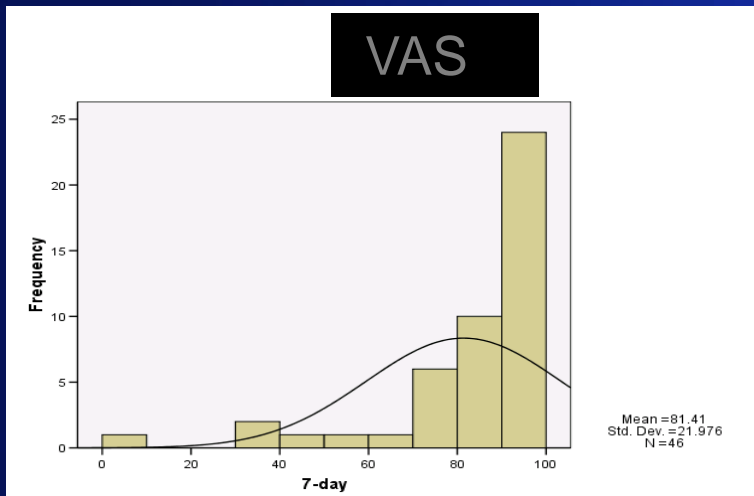
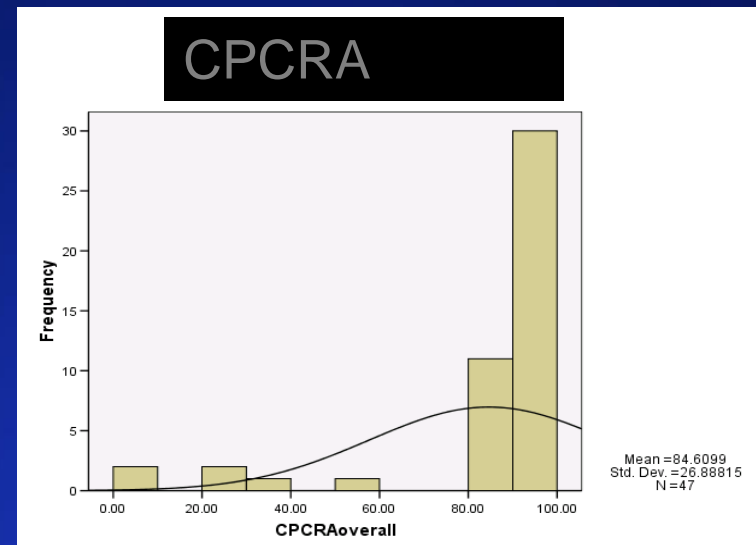
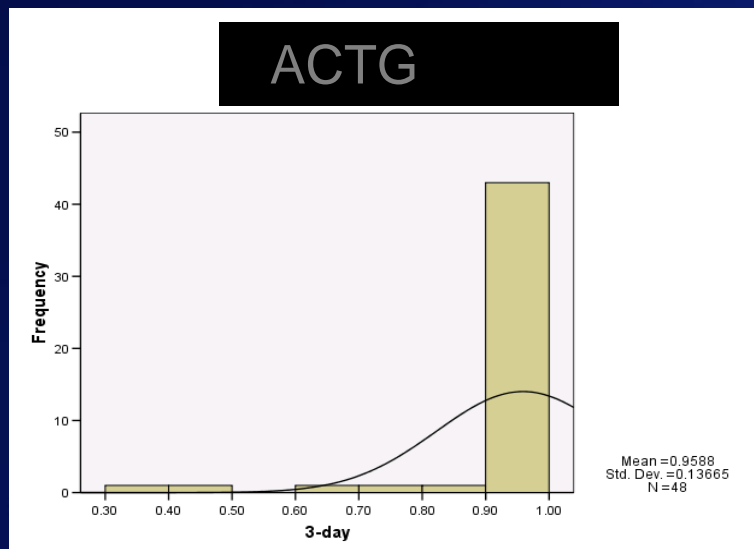






# Distribution of Answers Using Different Self-Report Scales

Berg et al, IAPAC International Adherence Conference, 2008



## Hub 1 Methadone Clinic



Alain Litwin, MD, MPH, MS  
Substance Abuse Research Fellow '04-06  
Assistant Professor of Medicine '03-'08  
Associate Professor of Clinical Medicine '08



- **Adherence with HCV treatment using DOT in methadone clinics**

NIDA K23, 2008-2013

Robert Wood Johnson Physician Faculty Scholar 2008-2011

- **Evaluating care for HCV by addiction medicine physicians**

NIDA R03 2002-2006

**Litwin AH**, Kunins HV, Berg K, Federman A, Heavner KK, Gourevitch MN, Arnsten JH. Hepatitis C management by addiction medicine physicians: results from a national survey. *Jour of Substance Abuse treatment*, 2007; 33(1):99-105.

# Integrating HCV Care with Methadone Maintenance Therapy

Retrospective chart review of on-site HCV treatment (pegylated interferon and ribavirin) provided to 73 drug users from 1/03 – 12/05

- 90% IDU
- 49% recently used illicit drugs
- 67% Latino, 21% Caucasian, 12% African American
- 32% HIV-infected
- 67% current psychiatric illness
- 38% attended HCV support groups

**Litwin et al, Jour Subs Abuse Treatment, 2009**

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# **Integrating HCV Care with Methadone Maintenance Therapy: Results**

## **HCV treatment outcomes:**

- **86% completed at least 12 weeks of treatment**
- **21% discontinued treatment due to adverse effects**
- **45% sustained viral response (SVR)**
- **Genotype 2, mild/moderate liver disease on biopsy, non-smokers, employed, and completion of at least 80% planned duration of treatment were significantly associated with SVR**
- **HIV/HCV co-infected patients achieved equivalent SVR (43%) as HCV-monoinfected patients (46%)**
- **No association found between illicit drug use during HCV treatment and HCV virological outcomes**

**Litwin et al, Jour Subs Abuse Treatment, 2009**

# **Integrating HCV Care with Methadone Maintenance Therapy**

**Harris , Arnsten, Litwin, Jour Addictive Med, 2010**

- **Retrospective chart review of all patients (n=291) in a single methadone clinic, 7/03 – 7/05**
  - **60% male**
  - **60% Hispanic, 27% Caucasian, 13% Black**
  - **Mean age = 47**
- **289 (99%) screened for HCV Ab**
  - **188 (65%) HCV Ab positive**
  - **49 (17%) HIV/HCV co-infected**
- **159 eligible for on-site care (insured by Medicaid)**
  - **125 chose on-site HCV care**
    - **83 HCV Ab positive**
    - **25 biopsies performed**
    - **45 (54%) reached a primary endpoint in 2 yrs**
    - **Of 21 treated, 38% achieved SVR**



# HCV Concurrent Group Treatment at Einstein 2009 - present



# Why Group Treatment?

**Synergy with participation of medical provider**  
**Address patient and provider barriers to treatment**



# HCV Group Treatment Model

## Health Educator / Peer

- Sets up room: coffee, snacks
- Side effect and depression surveys done
- Weights taken
- Group discussion co-facilitated by Health Educator and Peer

## Provider

- Conducts semi-private individual visits
- Vitals and focused physical
- Addresses adverse effects and adherence
- Administers peg interferon injections and growth factors as needed
- Answer group questions

Conclude with patient milestones, updates and peer-led meditation

# Group Treatment in Action



# Group Treatment Benefits

## For Patients

- Social support is built-in to treatment
- Misconceptions addressed
- Reassurance by concurrent participation of peers
- ↓ fear of side effects: side effects normalized
- Directly administered peg
- Weekly oral meds dispensed
- Support for recovery
- “Upward spiral”

## For Providers

- Frequent contact: providers and peers
- Co-management of cohort enhances expertise and confidence
- Multidisciplinary
- Natural mentoring opportunity
- Break from “the usual”

# U.S. Response to HIV and Viral Hepatitis Epidemics (Edlin, 2011)



## US RESPONSE TO HIV AND VIRAL HEPATITIS EPIDEMICS

Hepatitis C infection is at least five times more prevalent as HIV infection in the United States, yet funding lags far behind.

■ HIV ■ HBV ■ HCV

