

HCV: CURRENT SURVEILLANCE and EPIDEMIOLOGIC ISSUES

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Defining Clinical Cases of Acute Hepatitis C: Primarily “a diagnosis of exclusion”

Clinical criteria

- An acute illness with discrete onset of symptoms consistent with acute viral hepatitis, usually jaundice or elevated serum aminotransferase (ALT/AST) levels (>400 IU/L)

Laboratory criteria

- **Serum alanine aminotransferase (ALT) levels >400 IU/L, and**
- IgM anti-HAV negative, and
- IgM anti-HBc negative and
- **Anti-HCV positive (repeat reactive) by EIA,**
 - verified by an additional more specific assay (e.g. RIBA™ for anti-HCV or nucleic acid testing for HCV RNA) OR Anti-HCV positive (repeat reactive) by screening immunoassay with a signal to cut-off ratio predictive of a true positive as determined for the particular assay (e.g., >3.8 for enzyme immunoassay).

Acute HCV: Deduplication Process

2180



68% - duplicate/match



5% - missing s/co



2% - tests negative



1% - missing
demographics

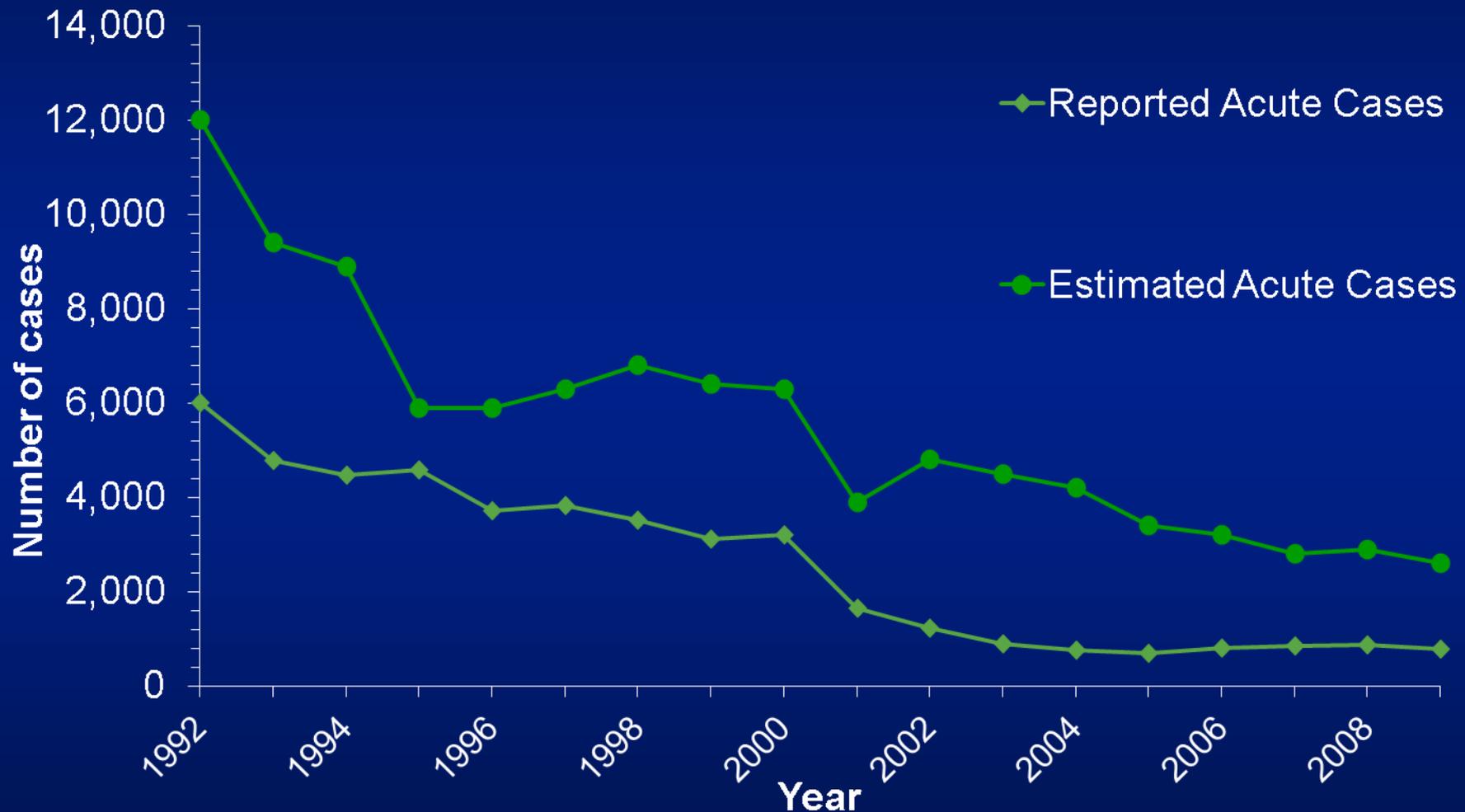
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Source: Monina Klevens et al, Emerg Infect Dis 2009;
Sept 2009; 15(9): 1499-1502

Testing for HCV

- Single or simple laboratory test(s) would be of great benefit in distinguishing:
 - Acute HCV (about 18,000/year)
 - Chronic HCV (about 3 million)
 - Resolved HCV (about 600k)

Number of reported and adjusted (for under-reporting) acute, symptomatic hepatitis C cases- US, 1992–2009



* Until 1995, acute hepatitis C was reported as “acute hepatitis, non-A /non-B.”

Source: National Notifiable Diseases Surveillance System (NNDSS)

Acute HCV: Questions about the declining incidence

- Screening of the blood supply for HCV began in 1992.
- Does this adequately explain the drop in HCV incidence?

Acute cases: epidemiology

- Injection drug users
- Healthcare associated
- Sexual transmission?
 - Among heterosexuals
 - Among HIV-infected MSM and women

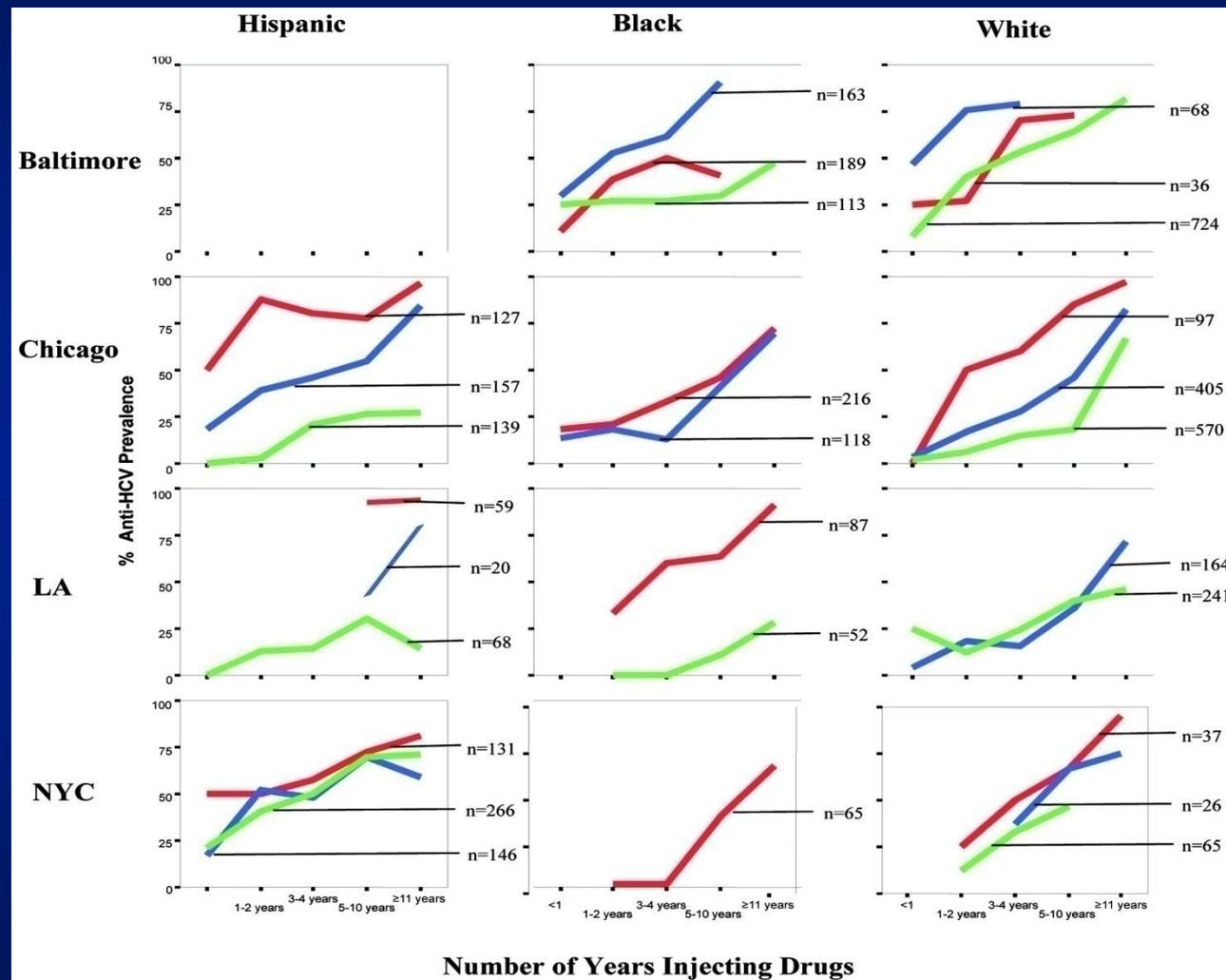
Are the dynamics of HCV infection in IDUs changing? Collaborative IDU Studies (CIDUS)

Red, CIDUS I, 1994-6.

Blue, CIDUS II, 1997-9

Green, CIDUS III, 2002-4

From: JJ Amon et al,
Prevalence of HCV Infection
among Injection Drug Users
in the US, 1994-2004. *Clin
Infect Dis* 2008;46:1852-8



Topics for thought...

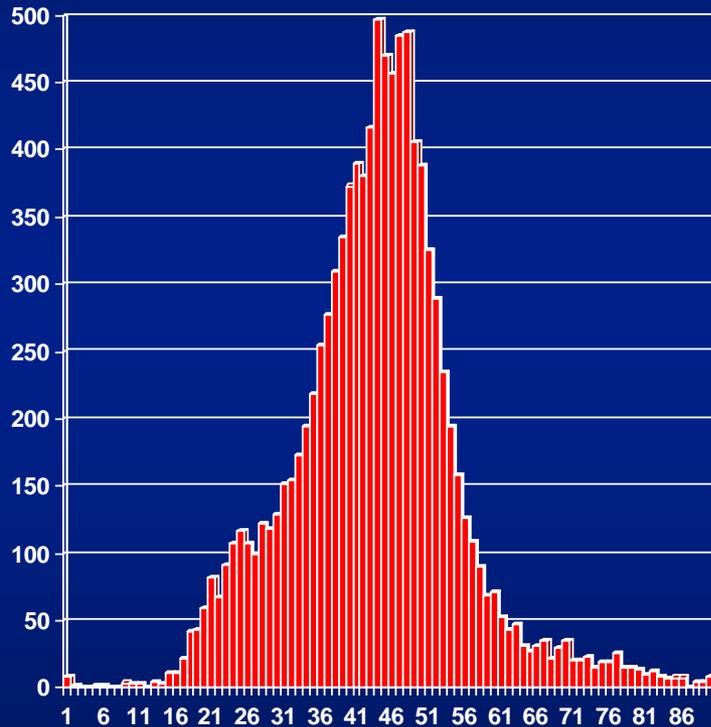
- Why have HCV infections in IDUs dropped over the last decade?
 - Shrinking pool of infected IDUs?
 - Decreases in needle-sharing?
 - Fewer IDUs?
 - Secondary benefit of HIV/AIDS knowledge/ prevention?
- Are we seeing a resurgence of IDU-associated HCV?

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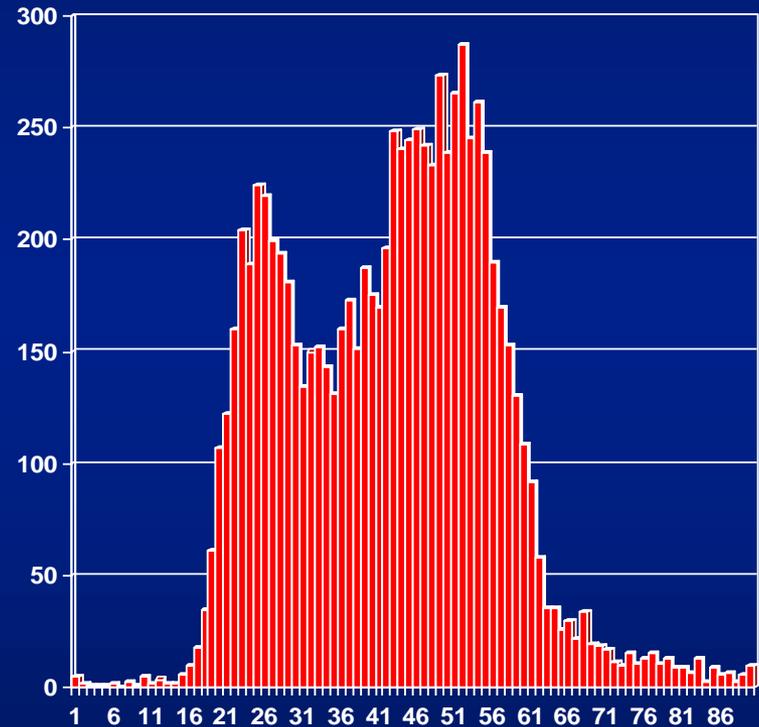
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Age Distribution of Confirmed Hepatitis C Cases- Massachusetts, 2002- 2008

HCV: The Next Generation



■ 2002: N=10366, excludes 167 missing age



■ 2008: N=8646, excludes 320 missing age

Trends observed in Massachusetts, Wisconsin, Michigan, and Ohio

- These young IDUs tend to be:
 - young (aged 20-29);
 - white; and
 - non-urban (suburban, rural)
 - previous prescription opioid ('Oxycontin,' oxycodone) users

Interview Findings (27 IDUs)

Mean age started using drugs: 13.4

	N	%	Mean age started
Marijuana	25	100%	12.76 years old
Alcohol	24	96%	13.08 years old
Powder Cocaine	24	96%	16.04 years old
Heroin	22	88%	17.68 years old
Oxycodone	21	84%	16.52 years old
Crack cocaine	21	84%	17.62 years old
Oxycontin	20	80%	16.85 years old
Hallucinogens	18	72%	16.11 years old
Tranquilizers	17	68%	16.43 years old
Methadone	12	48%	18.08 years old
Inhalants	7	28%	15.14 years old
Methamphetamines	6	24%	18.83 years old

Another important source of HCV infections in the US

HCV IN NON-HOSPITAL HEALTHCARE SETTINGS*

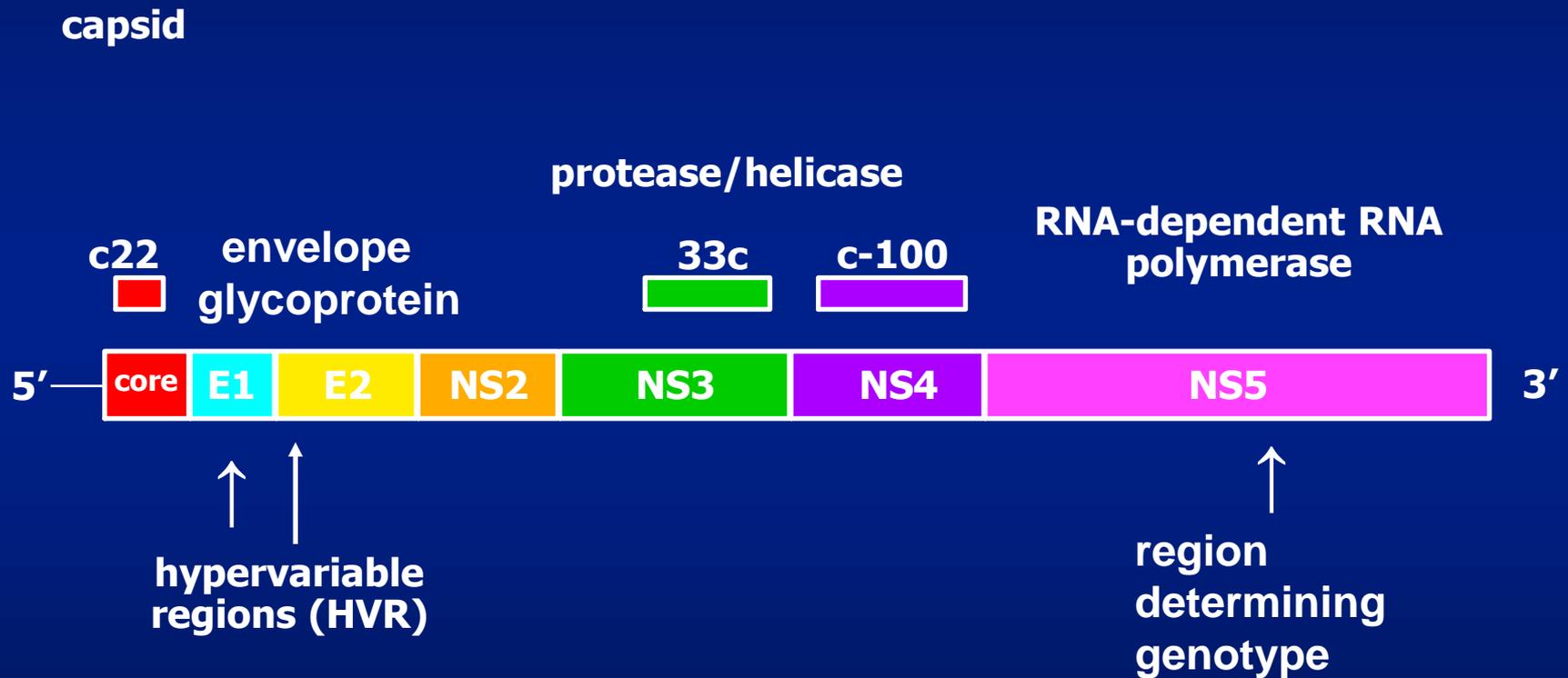
* ND Thompson et al, *Ann Intern Med* 2009; 150:33-9.

“Emerging” risk factor for HCV: healthcare setting/poor needle hygiene

- About 20 outbreaks/clusters investigated in last 10-12 years*
- Inadequate needle/syringe hygiene in non-hospital healthcare settings:
 - Colonoscopy and other med/surg clinics
 - “Alternate” care (chelation therapy)
 - Dialysis units

* Thompson et al, Ann Intern Med 2009; 150:33-39

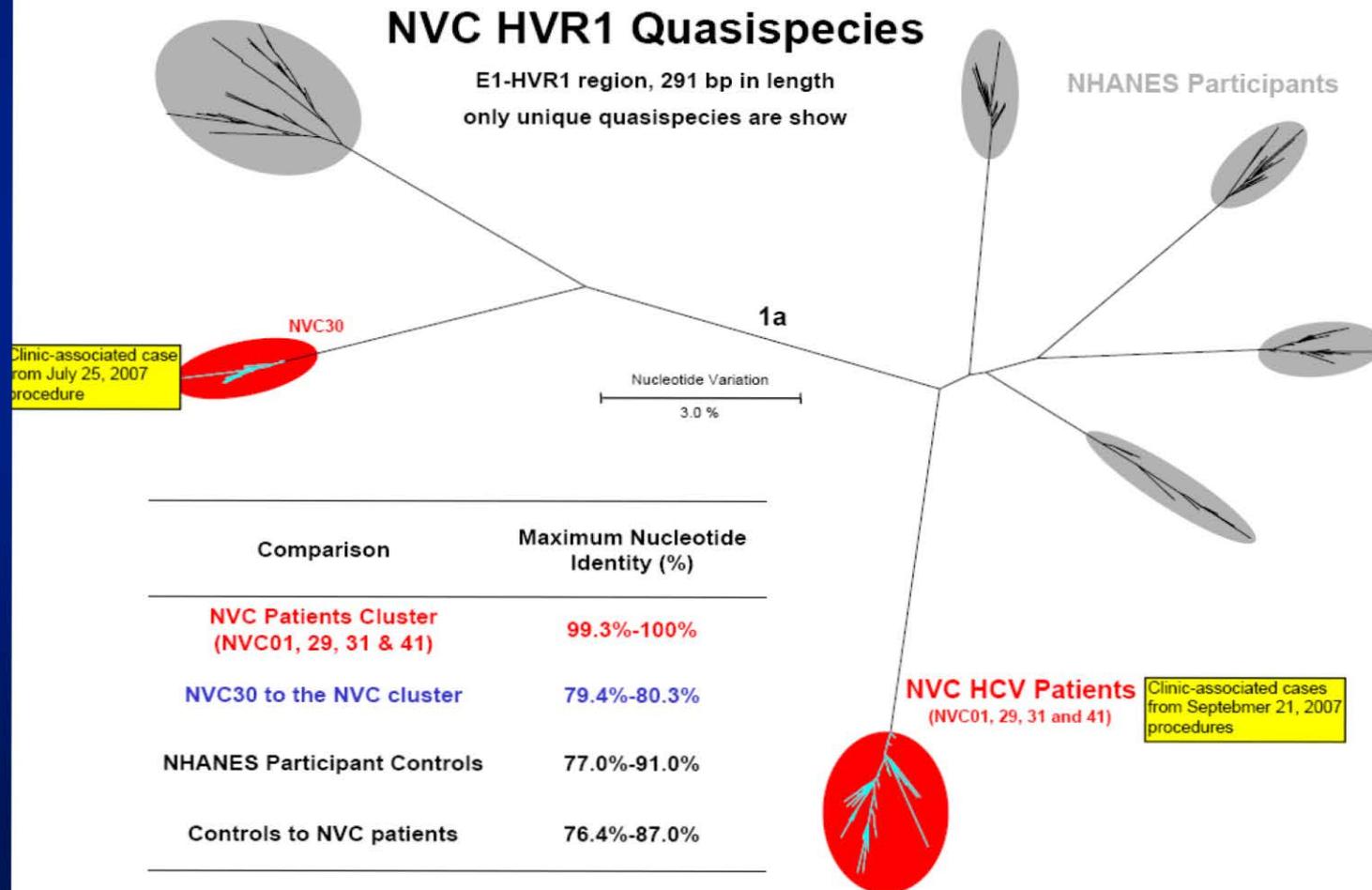
HCV Molecular Epidemiology



An example from the recent outbreak in Nevada colonoscopy clinics

Figure 4. Quasispecies analysis by HVR1 region for clinic-associated case-persons

Note: NVC numbers correspond to clinic-associated case-persons



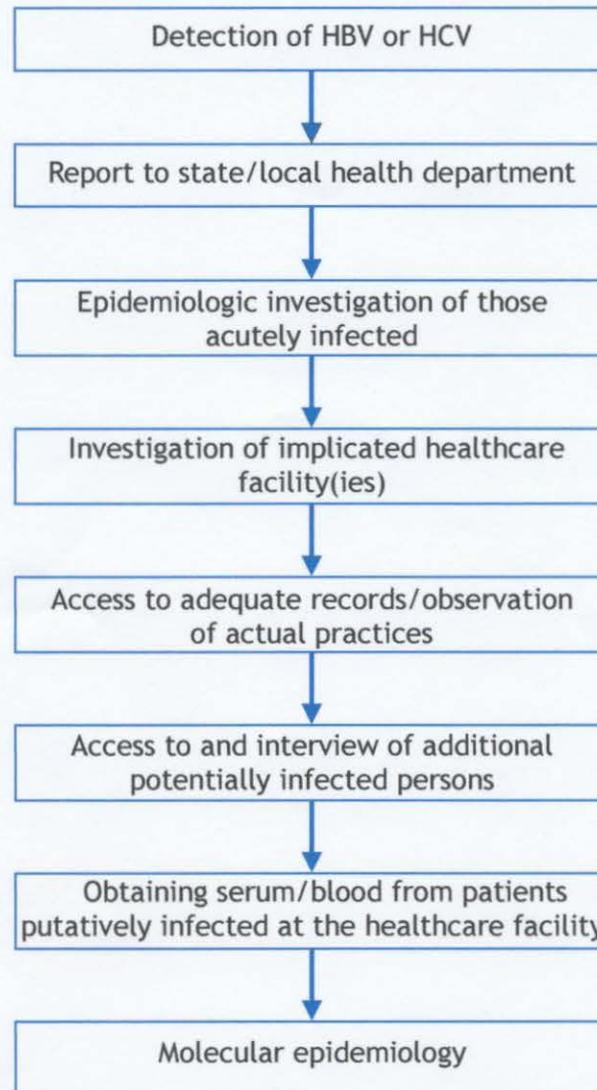
Outbreaks in Outpatient Settings

State	Setting	Year	Type	Cases	Screened	At Risk
NY	Colonoscopy	2001	HCV	19	1,315	2,192
NY	Private MD Office	2001	HBV	38	222	1,042
OK	Pain Mgmt. Clinic	2002	HBV, HCV	31, 71	795	908
NE	Hem./Onc. Clinic	2002	HCV	99	494	613
CA	Pain Mgmt. Clinic	2003	HCV	4	35	52
MD	Nuclear Imaging (3 clinics)	2004	HCV	16	75	88
FL	Chelation therapy	2005	HBV	7	106	253
CA	Alternative Med. Clinic	2005	HCV	7	15	15
NY	Multiple sites	2006	HCV	6	841	4,490
NY	Anesthesiology	2007	HCV	2	?	>10,000
NV	Endoscopy	2008	HCV	6	>12,000	>40,000

Outbreaks in Dialysis Units

State	Setting	Year	Type	Cases	Screened	At Risk
MD	Hemodialysis	1998	HCV	7	51	51
OH	Hemodialysis	2000	HCV	5	95	95
WI	Hemodialysis	2000	HCV	3	24	24
IL	Hemodialysis	2001	HCV	11	73	75
NY	Hemodialysis	2006	HCV	5	183	183
VA	Hemodialysis	2006	HCV	7	64	64

Steps and obstacles in investigating healthcare-associated HBV and HCV



Is Sexual Contact a Major Mode of HCV Transmission?*

- 80 investigations reviewed: no sexual transmission between immunocompetent adults
- Regular sex partners: no sex transmission (750,000 contacts; risk < 1/10 million sex contacts)
- HIV-infected MSMs: several studies ~ 0.5-1.0/100 py acute HCV infection

* Tohme, Holmberg. *Hepatology* 2010; 52:1497-1505

HCV in HIV-infected men, NYC*

- 74 HIV-infected men w/ no other risk than sexual contact
- Clear, epi assoc in multivariate analysis: receptive anal sex; sex while on methamphetamine
- Incidence apparently increasing

* Fierer et al, MMWR July 22, 2011

Other modes of HCV transmission: Maternal-infant

- Global rate of vertical transmission: 4-7%
- Higher (17%) if woman co-infected with HIV (an *in vivo* model of transmission)
- Probably occurs *in utero* or at birth, however, no recommendation to do C-sections
- Breast-feeding apparently carries no further risk of transmission

Perinatal HCV

- Almost always a “benign” course in infants so infected
- A few small studies of interferon monotherapy have reported sustained virological response rates of 35% to 40%.
- There are few data regarding the use of combination therapy with interferon and ribavirin in children and no information on the use of peginterferon.

Unusual and controversial modes of HCV transmission: tattoos, non-injecting drug use

- Studies are limited by high rates of confounding esp. by (unacknowledged) concomitant injection drug use
- Home-made tattoos under unsterile conditions may confer a risk (eg Australian prison)

Conclusions- I

- IDU is still the main driver of the HCV epidemic in the United States
- Some unknown proportion, possibly large, of HCV infections are acquired in healthcare settings

Conclusions- II

- HCV in HIV-infected men an “emerging” problem, but still relatively small contributor to overall incidence
- Distinguishing acute vrs chronic vrs resolved infections a major issue