



## Adolescents and Young Adults: the Overlooked Core of Hepatitis C Virus

Finding cases in unexpected places

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## Disclosure



### HCV Infection Surveillance

- Hepatitis C virus (HCV) is a leading cause of chronic liver disease in the United States
- ~80% of acute HCV infections are asymptomatic
  - no serologic markers for recent infection exist
- Distinguishing recent from distant infection based on serology alone is challenging
  - HCV Surveillance goal is to identify acute disease to link infected into care



### Adolescents and Young Adult HCV

- Little is known about HCV in U.S. adolescents and young adults
- Many at-risk never screened
  - 86 IDUs age 18-25 yrs\*
  - 87% ever tested for HIV
  - 51% ever tested for HCV
- Juvenile detention HCV studies find ~2% HCV+
  - Drug use major risk factor

\*Pugatch D, et al. J Adolesc Health 2006;38:302-4.



### HCV infection in Texas adolescent detainees

- Adolescents aged 10-18 yrs in Texas juvenile detention facility in 2000-2001
- Behavior questionnaire
- HCV testing

RM Blair, et al. Arch Pediatr Adolesc Med. 2005;159:1015-1018.



### HCV infection in Texas adolescent detainees

- Many high-risk behaviors reported (n= 1,002)
  - 85% ≥ 1 sexual partner
    - 13% engaged in anal intercourse
  - 56% intranasal cocaine or heroin use
  - 51% tattoos (93% from noncommercial settings)
  - 38% ≥ 5 lifetime sexual partners
  - 25% pierced body parts other than ears
  - 5% IDU

RM Blair, et al. Arch Pediatr Adolesc Med. 2005;159:1015-1018.

### HCV infection in Texas adolescent detainees

- HCV prevalence = 2.0% (95%CI: 1.2-3.1)
  - 20 cases/1,002 adolescent detainees
- H/O IDU was only significant association with HCV infection
- IDU reported by 5% of total sample but by 95% of HCV-infected

RM Blair, et al. *Arch Pediatr Adolesc Med.* 2005;159:1015-1018.

### HCV infection in California adolescent detainees

- Adolescents age up thru 18 yrs in CA juvenile detention facilities
- Behavior questionnaire
- HCV testing
- 2 months during 1998-1999

GM Feldman, et al. *J Adol Health.* 2004;35:505-508

### HCV infection in California adolescent detainees

- HCV prevalence = 2% in juvenile detainees
  - Compared to 25% HCV+ among adults incarcerated in the same jail system
- IDU strongest risk factor

GM Feldman, et al. *J Adol Health.* 2004;35:505-508

### HCV infection in Chicago IDUs age 18-30 yrs

- HCV prevalence = 27% (192/702)
- HCV incidence among 353 HCV- IDUs
  - 29/353 seroconverted to HCV+ at ~12 mo f/u
  - HCV incidence = 10.0/100 person-yrs (95% CI: 6.7-14.4)
  - Sharing cookers was strongest predictors of new infxn

Thorpe LE, et al. *Am J Epidemiol.* 2002;155:645-53.

### HCV infection in San Francisco IDUs age 15-29 yrs: Epidemiology

- HCV prevalence = 39% (304/776)
- HCV incidence among 195 HCV- IDUs
  - 48 seroconversion over 191 person yrs
  - HCV incidence = 25.1/100 person-yrs (95% CI: 18.7-32.9)

Hahn JA, et al. *J Infect Dis.* 2002; 186:1558-64

### HCV infection in San Francisco IDUs age 15-29 yrs: Risk Factors

- Sharing needles with infected sex partner or with person who was not sex partner
- sharing non-sterile drug preparation equipment
- pooling \$ with another IDU to buy and use drugs
- exchange sex for \$

Hahn JA, et al. *J Infect Dis.* 2002; 186:1558-64

# HCV in Erie County

## Cluster Investigation

Leuchner L, Lindstrom H, Burstein GR, et al. Use of Enhanced Surveillance for Hepatitis C Virus Infection to Detect a Cluster Among Young Injection-Drug Users --- New York, November 2004--April 2007  
MMWR 2008; 57:517-521.

## Hepatitis Surveillance: Background

- In 2003, chronic HBV and HCV added to Nationally Notifiable Diseases list
- In 2004, NYSDOH received CDC Emerging Infections Program (EIP) grant to conduct enhanced hepatitis surveillance in 34 counties
  - Erie County participating

## Hepatitis Enhanced Surveillance

- Priority follow-up on all HCV+ lab results among persons <30 yrs
  - Most likely new onset disease
- Follow-up varies depending on disease status
  - may include provider interview, medical record review, and patient interview

## Hepatitis C Cluster: Background

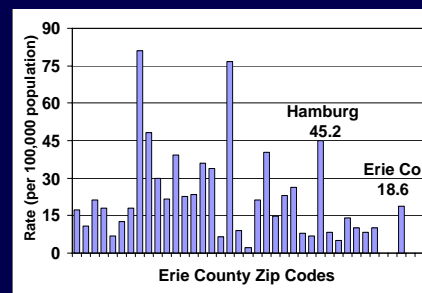
- March 2007, EIP surveillance activities identified a possible acute HCV cases cluster among young adults in Hamburg
  - zip code 14075
- Hamburg, NY
  - 42,000 persons
  - 98.6% white
  - Median Age = 40 yrs
  - Median Household Income (2000) = \$47,888

## Cluster Identification of new HCV reports during November 2004--April 2007

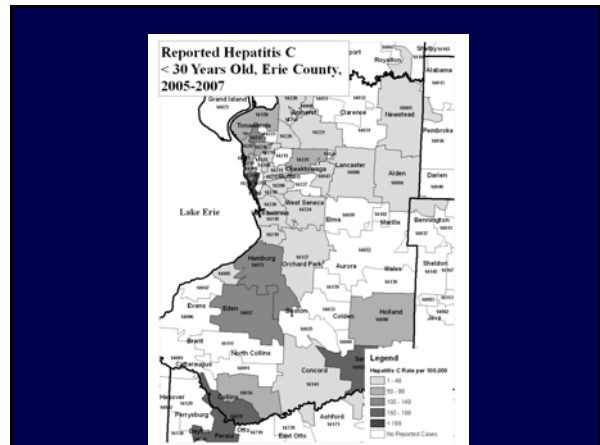
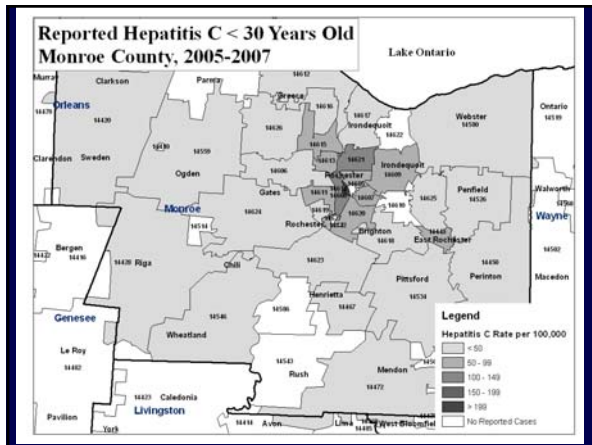
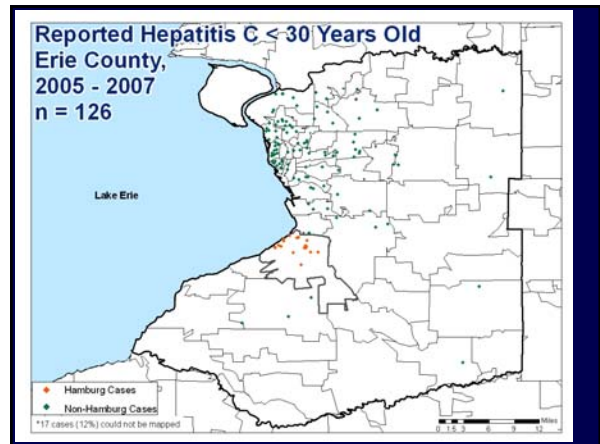
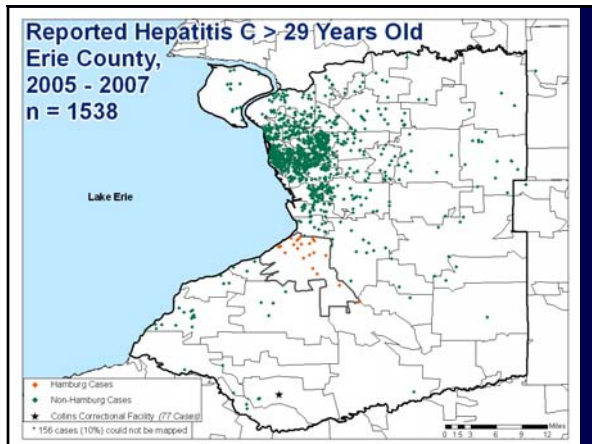
- Lab reporting identified 20 Hamburg residents <30 yrs old who newly tested HCV+
  - 15/20 diagnosed in 2006 - 2007
- Examples of incident HCV infection rates\* among persons <30 yrs
  - Erie County (total): 18.6
  - Hamburg: 47.5
  - 2 suburban postal codes with similar populations, socioeconomic composition, and proximity to the inner city as Hamburg: 7.0 and 4.9

\*cases per 100,000 population

## Rate of HCV Case Reports by Zip Code in Erie County, Nov 2004-Apr 2007 (n=34)



HCV case rates in Hamburg are higher than most zip codes and the mean rate throughout Erie County. Excludes 23 zip codes with no reported cases and one outlying zip code (rate = 297.3)



- ### Next Steps: Disease Investigation
- Gather more information
    - Define cluster more precisely
    - Determine if cases are related
  - Collaboration
    - Erie County Department of Health (ECDOH)
    - NYSDOH
      - Bureau of Communicable Disease Control (BCDC), Hepatitis Unit
      - Bureau of STD Control (BSTDC)
      - AIDS Institute (AI)
    - NYS Office of Alcohol and Substance Abuse Services (OASAS)

- ### Epidemiologic Investigation: Goals
- 1) Describe the Hamburg HCV+ cases
  - 2) Identify specific HCV risk factors
  - 3) Educate HCV-infected and at-risk
  - 4) Educate providers serving community at risk

## Comprehensive Strategy

- Epidemiologic investigation
- Staff Training
- Resource Manuals
  - HCV cases and at-risk
  - Providers
- Academic Detailing

## Epidemiologic Field Investigation

May – June, 2007

## Epidemiologic Field Investigation

- 2-Person team
  - ECDOH and NYSDOH
  - used interview and chart abstraction tools developed for this investigation
- 11 (55%) the 20 HCV patients interviewed
  - Located in jails, rehabs, patient's residence
  - Interviews lasted 1 to 2.5 hours
  - Resource Manual distributed
  - 9 cases lost to follow-up

## Epidemiologic Field Investigation

### Results

## HCV case demographics and risk factors (n=20)

- Case demographics
  - Median age: 19 yrs (range: 17-29 yrs)
  - Race: 100% Caucasian
  - Gender: 15 (75%) male
  - School: 19 (95%) had attended same Hamburg high school
- Risk factors
  - 19 (95%) reported IDU

## Symptoms (n=11)

- 10/11 (91%) denied symptoms
- Cases reported symptoms among individuals in social network
  - Likely many more undiagnosed cases in community

## HCV Status (n=11)

- All 11 cases were aware of HCV+ status
  - 3 (27%) believed they were false positive results and were never infected
  - None of the interviewed cases received treatment

## Risk Factors: Drug Use (n=11)

- 10/11 (91%) reported h/o oral and IDU/needle sharing
  - including heroin, cocaine, crack cocaine, loritabs, oxycodin, morphine, valium
  - all denied current IDU
- Street drug use initiated at median age 14 yrs (range: 9--17 yrs)
- IDU initiated at median age 16.5 yrs (14--26 yrs)
- Drug progression similar
  - Marijuana → pills → injection
- Heroin purchased in same inner city Buffalo location

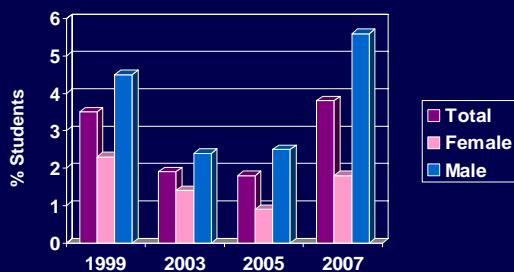
## High School Drug Use

- All interviewed cases described school drug use problem
- Drugs bought, sold, and used in school
- All IDUs admitted to drugs use in school
- Students formed IDU Networks
  - ensured members had consistent drug supply by sharing economic and drug resources
  - members often shared needles
  - heroin parties facilitated multiple needle-sharing contacts

## Barriers to Clean Needle Usage

- Lack of time when "drug sick"
- Failure of pharmacy to sell needles
- Too young to purchase clean needles
- Needles break easily
- Limited hours of operation of Needle Exchange Programs
- Believe less risk when sharing with sexual partner

% NY State\* high school students reporting any lifetime heroin use



2007 CDC Youth Risk Behavior Surveillance System.  
Available at: <http://apps.nccd.cdc.gov/yrbss/index.asp>

\*excluding NYC

## Buffalo News

Heroin use rising dramatically among area youth

Rehab facilities note rise in admissions

By Natalie Morera  
08/29/08

## ● ● ● Buffalo News story: statistics

- "...alarming rise in heroin use across the county."
  - significant number of users are young people as young as 12 yrs"
- Rise in local rehab check-ins for heroin and other opiates in past 5 years
  - Erie County 89.5% ↑ from 1,362 in 2002 to 2,581 in 2006
  - for all 8 WNY counties, check-ins ↑102.4%

## ● ● ● Buffalo News story: statistics

- Heroin use ↑
- # of WNY rehabilitation centers not matching demand
  - Inpatient: 13 in 2002 → 8 in 2007
  - Outpatient: 47 in 2002 → 48 in 2007
- Availability of prescription narcotics ↑↑↑

- "For young people, the drug of choice has become prescription opiates.
  - Often, the pills were legally prescribed for someone in the family."
- "Experts say abuse of pain relievers increasingly leads to heroin use."
- "[Pain relievers are] a gateway not only to heroin and the problems that go with heroin. But [they] may also be a gateway moving from oral medications and the risks that go with that, to injecting."

*Buffalo News, August 29, 2008*

● ● ● "We're seeing heroin in Springville. We never thought we'd see it there."

Capt. Ron Kenyon of the Erie County Sheriff's Office

*Buffalo News, August 29, 2008*

## ● ● ● Buffalo News story

- "Number of [Erie County] teens seeking treatment for addiction to opiates and heroin has increased significantly."
- When the Renaissance Campus opened in 1990, residents ~17 yrs old
  - Now average age is ~14 yrs
  - youngest patient to try heroin was 13 yrs
  - youngest to try pain relievers was 12 yrs

## ● ● ● Risk Factors: Sex (n=11)

- Median reported number of lifetime sex partners = 10 (range: 4-100)
- 1 case who denied IDU reported IDU sex partners

## Risk Factors: Health Care (n=11)

### Health Insurance\*

- 6 (54%) commercially insured
- 2 (18%) Medicaid
- 3 (27%) uninsured

### Health seeking behaviors\*

- 7 reported having primary care providers
  - 4 reported had seen specialist
- None received HCV treatment

\*self-reported information

## Barriers to HCV Treatment

- Health insurance
  - Medicaid or uninsured
- Lack of knowledge/information of treatment services availability
- Lack of providers capable and/or willing to treat HCV cases with IDU or mental health issues

## ECDOH Additional Steps

- Cases referred to Peer Navigators
  - HIV risk assessment and personalized intervention development
- Hamburg outreach screening program
  - HCV, HIV and STI screening
- Needle exchange programs
- Academic detailing intervention
  - Partner with NYSDOH and GlaxoSmithKline

## Academic Detailing

- Office-based medical education intervention with food (provided by GSK)
- Provide information and tools to assist primary care provider address Erie Co HCV outbreak
  - Screening
    - Risk behaviors
    - HCV testing for at-risk pts
  - Prevention
    - HAV and HBV immunization
    - Education and substance use treatment referral

## Risk behaviors screening

- Confidential history
  - Teens need alone-time with provider
  - Ask questions confidentially
- Tools to assist
  - NYSDOH questionnaire
  - GAPS
  - Others



Developed as part of NYSDOH Office of Managed Care initiative to improve preventive health service delivery to adolescents

Questionnaire intent is to provide a standardized mechanism to identify adolescents engaging in risk behaviors and to promote discussions between adolescents and health professionals.

Available at:  
[www.urmc.rochester.edu/pediatrics/training/fellowship/programs/adolescent\\_medicine/technicalresources.cfm#PrimaryCare](http://www.urmc.rochester.edu/pediatrics/training/fellowship/programs/adolescent_medicine/technicalresources.cfm#PrimaryCare)

## HCV laboratory tests

### Screening and Confirmatory

## ECDOH HCV Screening Recommendations\*

Persons at increased HCV risk should be screened with HCV antibody (EIA).

Table 1 Relative Risk Factors for Hepatitis C Transmission		
High Risk	Injection drug use	Blood or blood product transfusion or transplantation prior to 1992
Moderate Risk	High-risk sexual activity*	Vertical transmission from mother to baby
Low risk	Occupational exposure	Sexual activity between long-term spouses/sexual partners
Very low/No risk	Casual contact	Household contact

\*Sexual transmission of HCV is not clearly understood. However, certain high risk sexual behaviors have been associated with HCV transmission such as anal sex, sex with trauma, sex in the presence of a sexually transmitted disease (STD), and sex without a condom.

Available at: [www.erie.gov/health/services/health\\_pros\\_alert168.asp](http://www.erie.gov/health/services/health_pros_alert168.asp)

\*Developed in collaboration with local GI docs

## HCV screening recommendations

- No recommendation for HCV screening unless repeat or ongoing high-risk behavior
- HCV testing should be available to any patient who requests it, but...
  - insufficient evidence to support routine screening in Asx persons not at increased HCV risk
  - risks of screening and the subsequent diagnostic testing in a low risk population, if positive, may have risks outweighing the benefits

## Case-control study of risk factors among ECDOH STD clinic patients\*

Risk factor prevalences compared among HCV+ (n=172) and HCV- (n=1,095) STD clinic patients

\*Russell M, et al. Am J Public Health. In Press

## Results: HCV risk factors

- Black race (OR = 2.4)
- IDU (OR = 20.3)
- Sharing straws (OR = 1.8)
- Sharing razors (OR = 7.8)
- Exposure to bleeding caused by intimate partner violence (OR = 5.5)
- Risky sexual behavior and exposure to blood or sores during sex was not associated with HCV

Russell M, et al. Am J Public Health. In Press

## Screening test: HCV EIA antibody test

- 3rd-generation test sensitivity=98.8-100%
- Recommended screening test for HCV infection
- False-negative results more common in immunocompromised patients

## HCV Confirmatory tests

- *Qualitative* HCV RNA RT-PCR amplification or TMA of viral RNA genome
  - + result confirms HCV infection
  - - result may be due to low viral load and does not confirm absence of infection → repeat in 6 mo
- *Quantitative* HCV RNA PCR or signal amplification method to quantify HCV RNA blood levels
  - Less sensitive than the qualitative HCV RNA test
  - Viral load

Rustgi VK. J Gastroenterol 2007; 42:513-521

## Prevention

- Substance abuse treatment referral
- HAV and HBV Immunization
- Education

## HAV immunization recommendations for special populations\*

- Men who have sex with men
- Users of illegal injection and noninjection drugs
- Persons who have chronic liver disease
- Persons who have clotting-factor disorders
- Persons who have occupational risk for infection

\*[www.cdc.gov/hepatitis/HA/HA/faq.htm#vaccine](http://www.cdc.gov/hepatitis/HA/HA/faq.htm#vaccine)

## Information

Hepatitis			
Get Tested for Hepatitis C	Booklet	9336	English
		9337	Spanish
Hepatitis B: It's No Game!	Poster	1824	English
		1825	Spanish
Hepatitis B Carrier: Care for Yourself & Protect Others	Brochure	1821	English
		1822	Spanish
		1823	French
		1834	Arabic
		1825	Creole/Haitian
		1836	Russian
		1837	Serbo-Croatian
		1838	Urdu
Hepatitis C Prevention	Booklet	9338	English
If You Have Hepatitis C	Brochure	9339	English
One Less Thing to Worry About (for Parents)	Poster	1826	English
		1827	Spanish
10 Reasons Why Your Child Needs to be Protected Against Hepatitis B Virus	Brochure	1828	English/Spanish
You... Your Baby... and Hepatitis B Virus	Brochure	1807	English
		1808	Spanish

Available at:  
[www.health.state.ny.us/nysdoh/publication\\_catalog/h\\_mpub.htm#hepatitis](http://www.health.state.ny.us/nysdoh/publication_catalog/h_mpub.htm#hepatitis)

## Epilogue: Since the 2007 investigation

- EPI and Surveillance
  - 14 additional HCV cases <30 yrs
  - HCV epidemiology position has been eliminated from the Erie Co budget
- Outreach
  - Needle distribution
  - School and professional educational sessions (by request)
  - Peer navigation outreach

## ● ● ● Acknowledgements

- NYSDOH
  - Kristen Mulhern
- ECDOH
- GlaxoSmithKline