

**PUBLIC HEALTH AGENCY *of* CANADA**  
**AGENCE DE LA SANTÉ PUBLIQUE *du* CANADA**

**Epidemiology of Hepatitis C in Canada**

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Public Health  
Agency of Canada

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**Canada**

# CCDIC Mandate

1. To contribute to the prevention and control of communicable diseases in community and health care settings with a focus on specific vulnerable populations;
2. To provide specialized Branch and Agency support (e.g. modelling, notifiable diseases and other surveillance systems);
3. To lead and coordinate key horizontal initiatives at both the Branch and Agency levels (e.g. AMR, HPV, HIV/AIDS); and
4. To improve the interface between health care and public health as it relates to healthcare associated infections

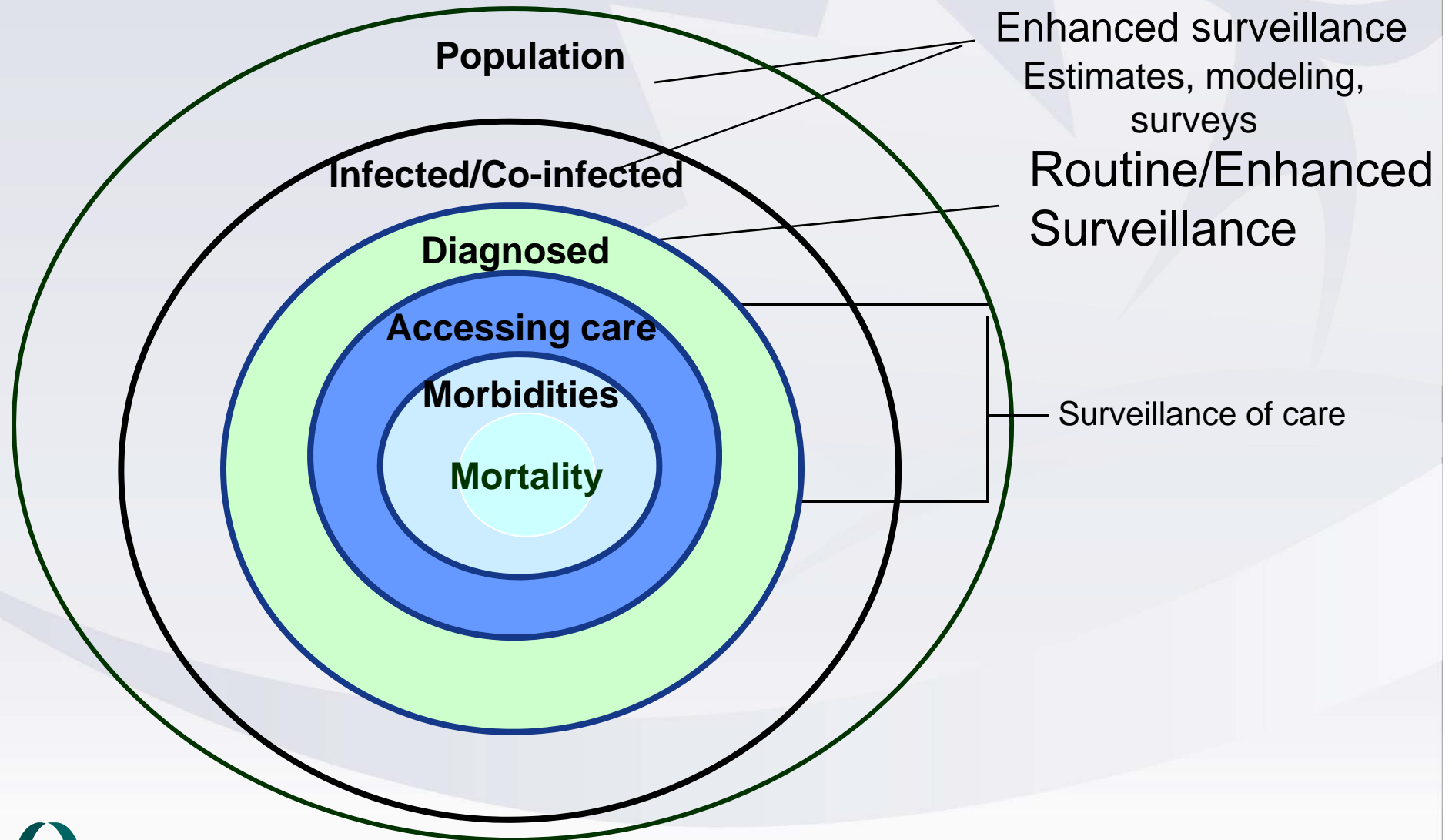
# Outline

- HCV surveillance in Canada overview
- HCV prevalence and incidence
  - Modelled estimates
  - Enhanced surveillance
- Reported HCV cases and corresponding rates
- Risk Factors
- Key Populations
- Co-infections
- Social determinants
- Public Health Implications

# Summary of Trends

- Reported HCV rates in the Canadian population are not decreasing
- Large proportion of individuals unaware of infection status
- Majority of recently acquired cases among younger females
- Injection drug use remains the most important risk factor for HCV infection in Canada
- Aboriginal populations, inmates, and street-involved youth most vulnerable to infection

# Overview of HCV Surveillance



# Modelled estimates of Canadian prevalence

- National estimates/projections of prevalence from modelling studies
  - Currently the only available population-based data source
  - In Canada, an estimated 242,500 individuals are infected with hepatitis C corresponding to a prevalence rate of approximately 0.7% of the total population.
  - Large proportion (~20%) are unaware they are infected
- Data collection underway via Canadian Community Health Survey to assess population-based HCV (and HBV and other STI) prevalence

# HCV prevalence – enhanced surveillance

- Enhanced surveillance via pan-Canadian systems
  - Enhanced Hepatitis Strain Surveillance System (EHSSS - Canadian population)
    - Differentiates acute (recently acquired) from chronic infections!!
  - I-Track (people who inject drugs)
  - M-Track (men who have sex with men)
  - E-SYS (street youth)

# HCV prevalence/ seropositivity

<b>Canadian population<sup>1</sup></b>	<b>MSM<sup>2</sup></b>	<b>IDU<sup>3</sup></b>	<b>Street Youth<sup>4</sup></b>	<b>Inmates<sup>5</sup></b>	<b>Aboriginal population<sup>1</sup></b>
0.7%	5.3%	65.7%	4.5%	31.0%	3.0%

<sup>1</sup>PHAC-Remis modeling report, 2007

<sup>2</sup>M-Track Phase 1 (2005 – 2007)

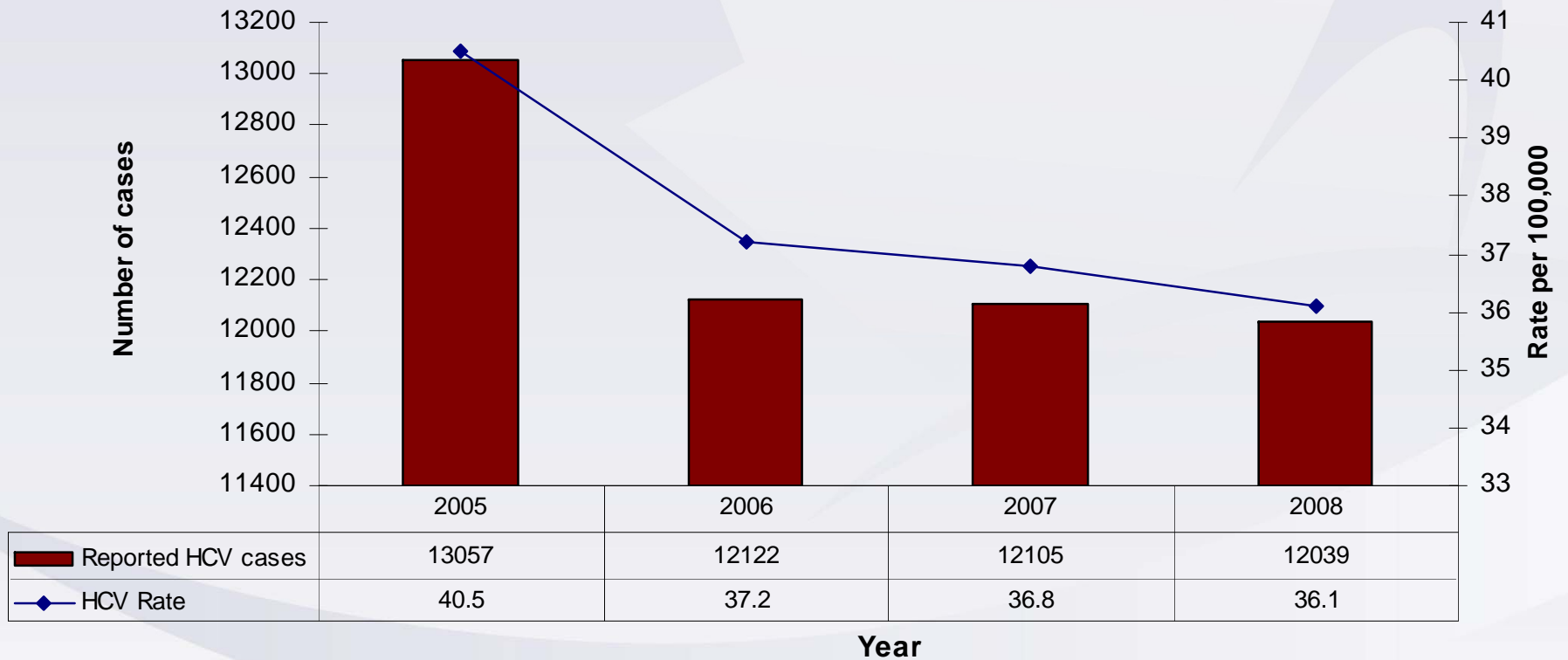
<sup>3</sup>I-Track Phase 1 (2003-2005)

<sup>4</sup>E-SYS Cycle 5 (2005-2006)

<sup>5</sup>CSC Inmate survey- HCV prevalence self reported (2007)

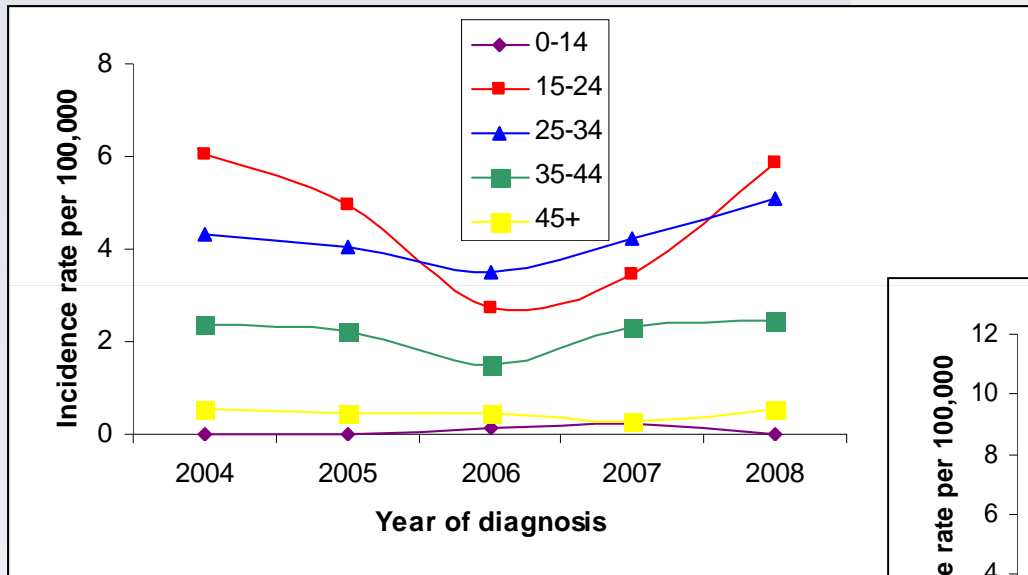
# Trends over time

Number of cases and rate of HCV reported from 2005 to 2008, CNDSS

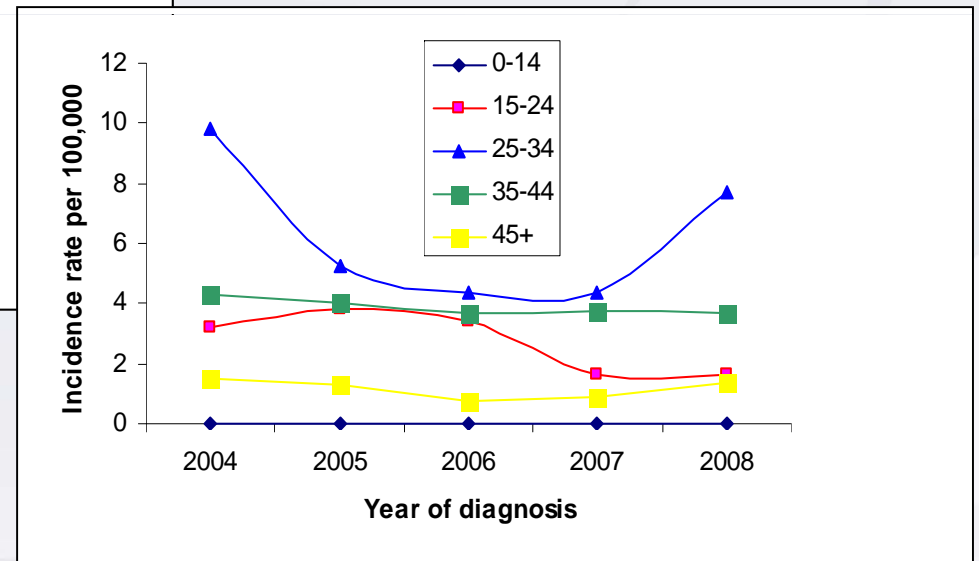


CNDSS: Canadian Notifiable Disease Surveillance System

## Reported rates<sup>1</sup> of acute HCV infection by age group and gender, EHSSS, 2004-2008<sup>2</sup>



**FEMALES**



**MALES**

1 Rates of acute hepatitis C were calculated through the use of health-region-specific 2001 and 2006 census data and intercensal population estimates

2 From January 1, 2004 through September 30, 2008

# Risk factors...



# Social Context & Determinants of Health

- HCV vulnerabilities do not occur in isolation of the social environment, such as:
  - Housing
  - Education
  - Income
  - Social isolation
- These factors can create barriers to seeking testing and treatment for HCV infection
- A comprehensive approach is needed to address the broader context of infection among vulnerable populations

# Drug use:

## Injection drug use:

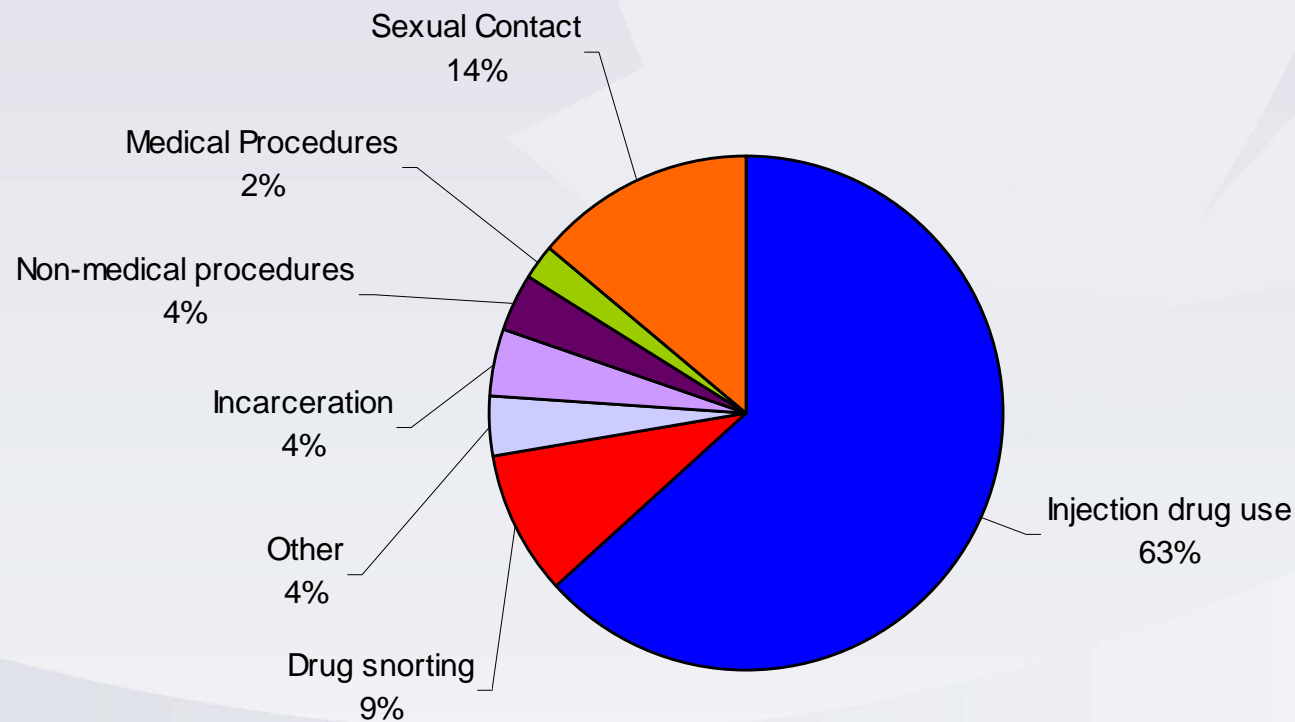
- In Canada, recreational injection drug use (IDU) continues to be the predominant risk factor for HCV acquisition and is associated with 63% of newly acquired HCV cases in Canada<sup>1</sup>

## Non-injection drug use:

- HCV prevalence among non-injection drug users remains higher than general population
- Risk factors include sharing of oral and intranasal equipment for drug use (e.g. crack pipes, straws, etc.)
- More data required to support this as an independent transmission route.

<sup>1</sup> EHSSS

## Distribution of mutually exclusive risk practices for newly-acquired HCV infection among cases with known risk factor information in EHSSS, 2004-2008<sup>1</sup>



<sup>1</sup> From January 1, 2004 through September 30, 2008

“Other” includes occupational exposure and household contact with someone HCV infected

# Key populations...

## People who use injection drugs:

- Between 2003 and 2005, the estimated **seroprevalence of HCV among IDU in Canada was 65.7%<sup>1</sup>**
- Among IDU, no difference in HCV prevalence between gender or Aboriginal status
- Older IDU (age 40+) were more likely to be infected with HCV
- **Major risk factors:** frequent injecting, borrowing needles and inconsistent use of sterile injecting equipment

<sup>1</sup>I-Track 2003-2005

# HCV Infection Among Aboriginal Persons in Canada<sup>1</sup>

**Table 5** Modeled HCV infection in the Aboriginal population, Canada, 2007

<b>Sex</b>	<b>Population</b>	<b>Proportion IDU</b>	<b>Number IDU</b>	<b>HCV-infected IDU</b>	<b>HCV-infected other</b>	<b>HCV-infected total</b>	<b>HCV-infected rate</b>
Male	572,090	6.0%	34,325	20,595	2,689	23,284	4.1%
Female	600,695	2.4%	14,417	8,650	2,931	11,581	1.9%
<b>Total*</b>	<b>1,172,785</b>	<b>4.2%</b>	<b>48,742</b>	<b>29,245</b>	<b>5,620</b>	<b>34,865</b>	<b>3.0%</b>

*\*Numbers may not add up exactly due to a combination of modelling uncertainties and the use of rounded whole numbers in the calculations*

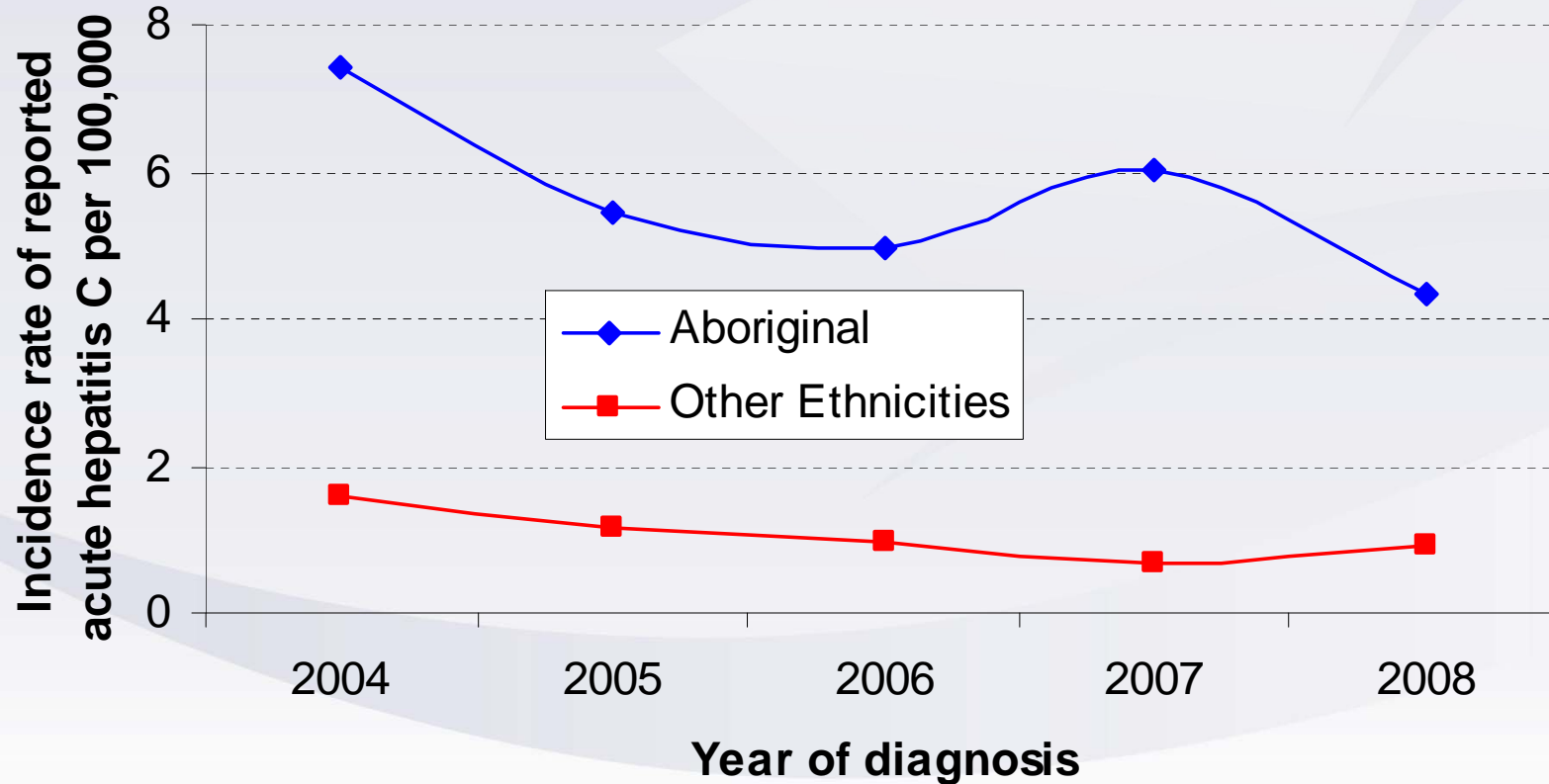
**HCV prevalence among IDUs** 60%

**HCV prevalence among others** 0.5%

<sup>1</sup>PHAC Report: Modelling the incidence and prevalence of hepatitis C infection and its sequelae in Canada, 2007 . Robert S. Remis & Community Acquired Infections Division, PHAC, 2009

# Aboriginal populations

Reported incidence of acute HCV infection by year and ethnic group in seven Canadian sites, EHSSS, 2004-2008<sup>1</sup>



# Youth at higher risk of infection:

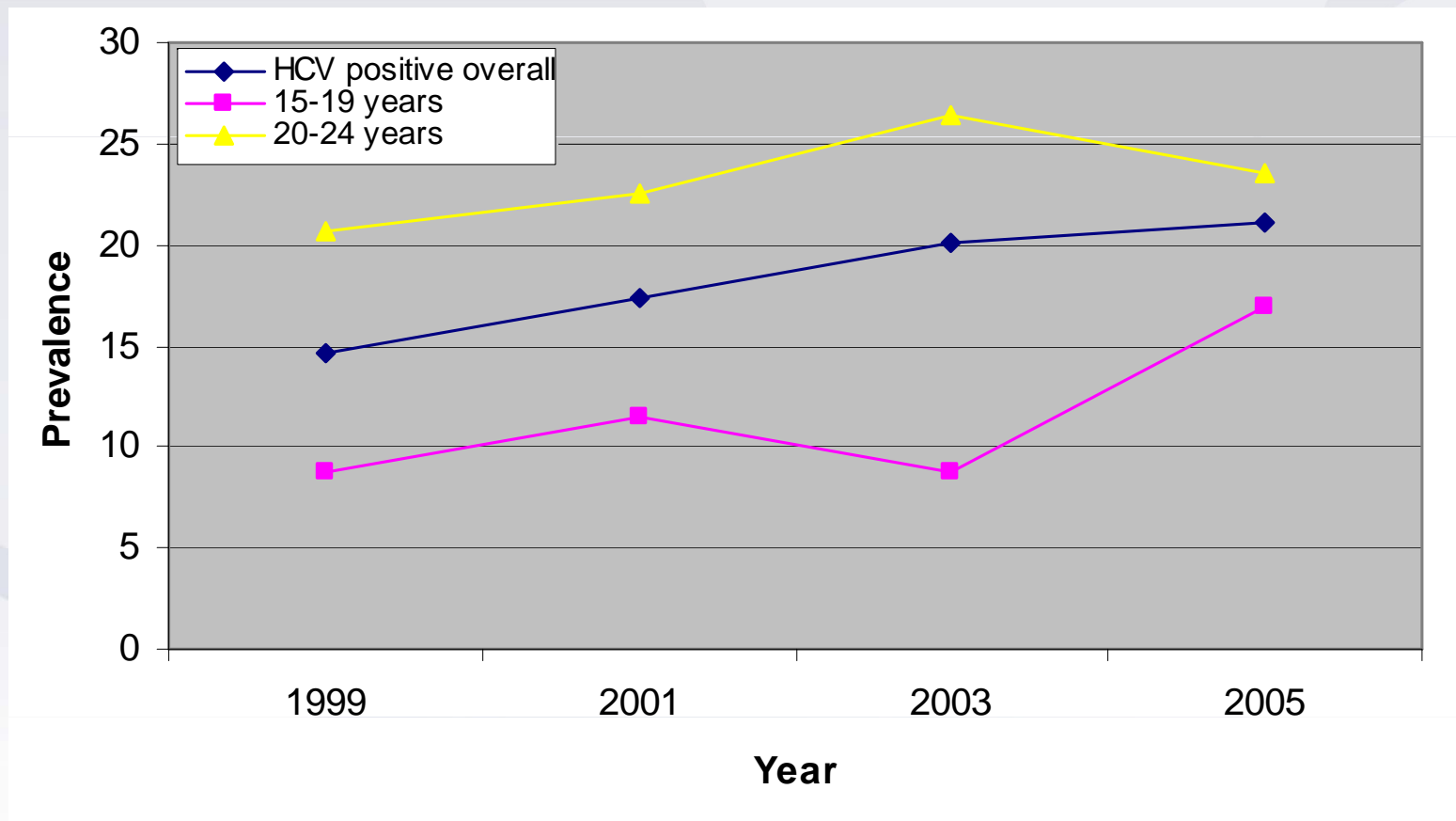
- Among street-involved youth aged 15-24<sup>1</sup> estimated prevalence of HCV was 4.5%
  - Risk factors include:
    - Being female (1.8 X males)
    - Aboriginal ethnicity (2.5X)
    - History of injecting drugs, sexual abuse or interaction with social services or the justice system
    - Involvement in illicit activities for income (e.g. stealing, sex trade, dealing drugs)
    - High-risk sexual behaviour
- Of street-involved youth who inject drugs, the estimated prevalence was 18.3%<sup>1</sup>
- HCV seroprevalence among youth 15-24yrs who inject drugs recruited through I-Track: 34.7%<sup>2</sup>

<sup>1</sup> E-SYS, 1999-2005

<sup>2</sup> I-Track, 2003-2005

# Street youth

Prevalence of HCV infection among street-involved youth who use injection drugs, E-SYS 1999-2005



# Inmates

- Among inmates of federal penitentiaries injecting with used needles in prison and serving a longer sentence associated with an increased likelihood of reporting an HCV infection since admission
- Self-reported HCV status indicate:
  - 31% (men 30.8%, women 37.0%) reported being HCV-positive
  - Aboriginal women reported the highest rates of HCV infections (49.1%)

# HIV and HCV co-seropositivity<sup>1</sup>

- **Estimate of HIV/HCV seropositivity:**
  - 14% co-seropositivity among people who use injection drugs<sup>1</sup>
  - 0.3% co-seropositivity among street youth<sup>2</sup>
- **Among those HCV seropositive**
  - Estimated that 21% of IDU and 6.8% of street youth are HIV seropositive
- **Among those HIV seropositive:**
  - Estimated that 91% of IDU and 38.2% of street youth are HCV seropositive

Sources: I-Track, 2003-2005, E-SYS 1999-2005

<sup>1</sup> HCV testing in I-Track was performed using the Ortho® HCV version 3.0 EIA. Confirmatory testing is not performed for samples that test positive. A positive result indicates past or present HCV infection, and does not discriminate acute from chronic or resolved infections.

# Public Health Implications:

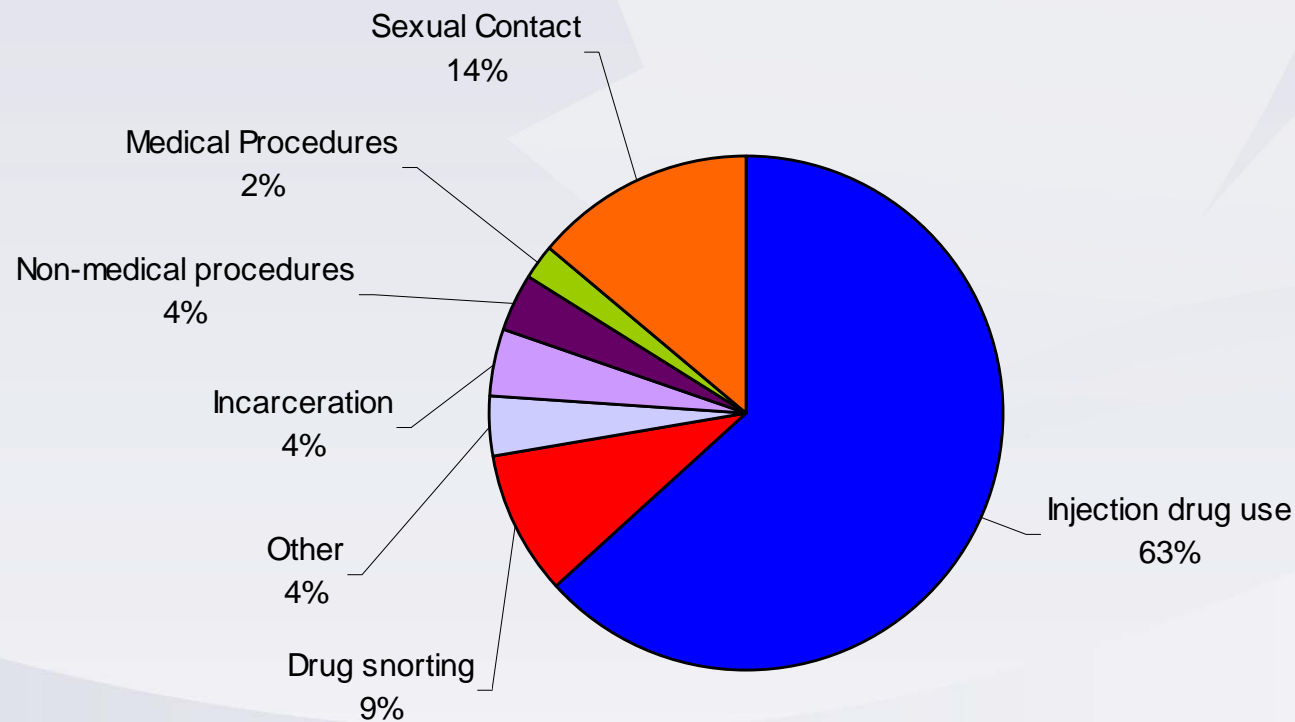
- **Opportunities for prevention**
  - Need culturally appropriate interventions to increase testing among most vulnerable groups (e.g. Aboriginal women)
  - Increase HCV testing and awareness of HCV status to prevent secondary infection
  - Targeted interventions for street-involved youth to prevent initiation of drug use
  - Co-infection:
    - Integrate services to more effectively serve high risk clients
    - Emphasis on HIV prevention among those currently HCV infected
      - » Among HCV positive: Median time to diagnosis with HIV 3.5 years
      - » Among HIV positive: median time to diagnosis with HCV 15 months<sup>1</sup>

# Acknowledgements

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- Robert Remis

# Appendices – Background Notes

## Distribution of mutually exclusive risk practices for newly-acquired HCV infection among cases with known risk factor information in EHSSS, 2004-2008<sup>1</sup>



<sup>1</sup> From January 1, 2004 through September 30, 2008

“Other” includes occupational exposure and household contact with someone HCV infected

## Drug-related risk factors for HCV seroprevalence among IDU, I-Track, 2003-2005

Risk factor	Total	HCV+ (%)	OR (95% CI)	p-value
<b>Borrowed needles in the last 6 months*</b>				
Yes	578	418 (72.3)	1.5 (1.2-1.8)	<0.0001
No	2223	1409 (63.4)	Ref	
<b>Borrowed equipment in the last 6 months</b>				
Yes	856	551 (64.4)	0.95 (0.8-1.1)	0.52
No	1947	1278 (65.6)	Ref	
<b>Frequency of injection in the last month*</b>				
Regularly (more than 1-2 times/week)	2021	1362 (67.3)	1.4 (1.2-1.7)	<0.0001
Sometimes or never	821	490 (59.7)	Ref	
<b>Injected in a public place in the last 6 months*</b>				
Yes	2591	1709 (66.0)	1.5 (1.2-2.0)	0.0024
No	222	124 (55.9)	Ref	

\* Statistically significant at  $p < 0.05$ ; OR (95% CI) = odds ratio (95% confidence interval)