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"Transparency and Accountability in Scientific Research"

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Maternal characteristics and risk factors of Hepatitis C co-infection in HIV positive pregnant women in Ukraine

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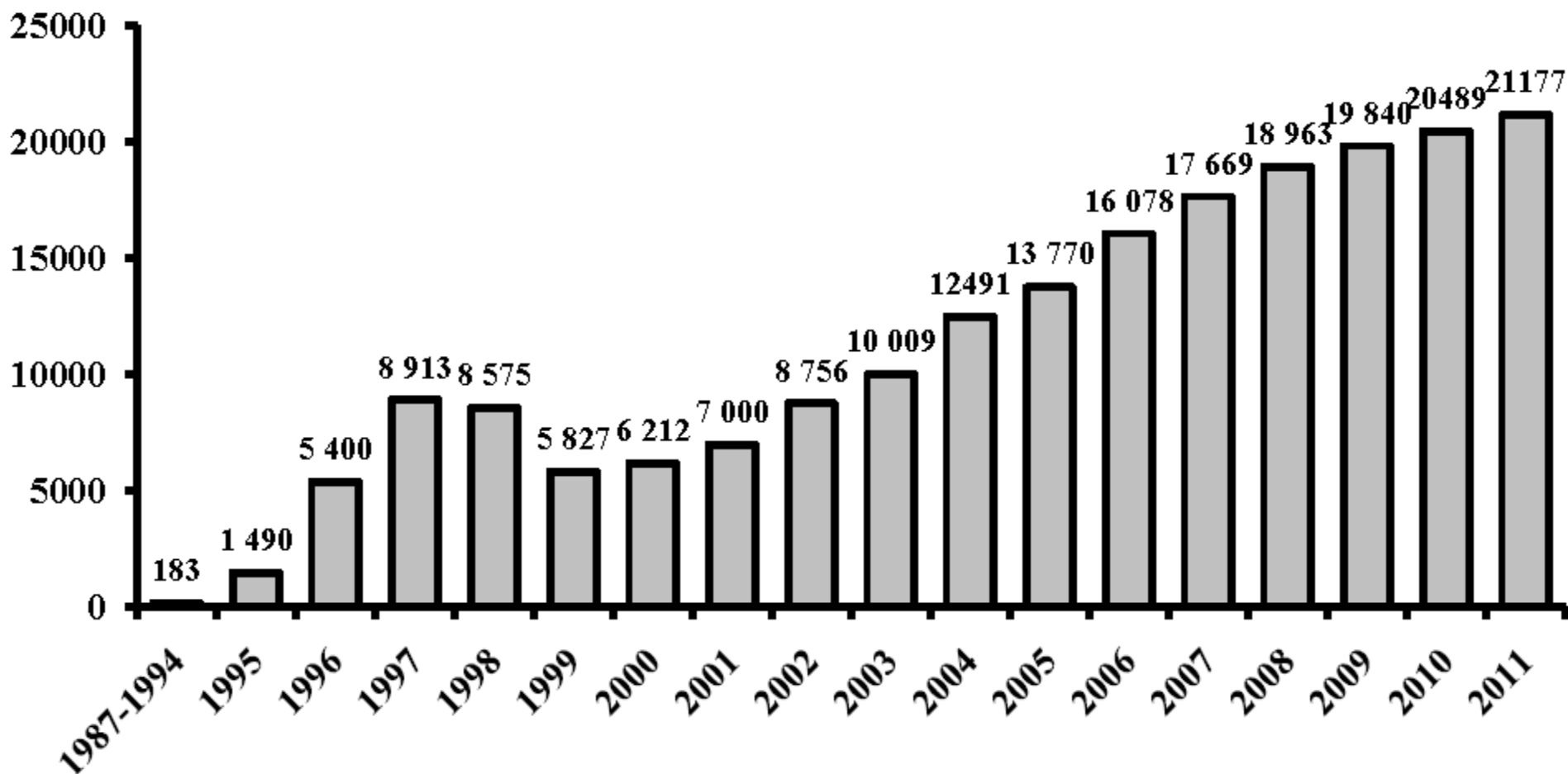
DP Public health administration

Academic supervisor: Andreeva Tatiana

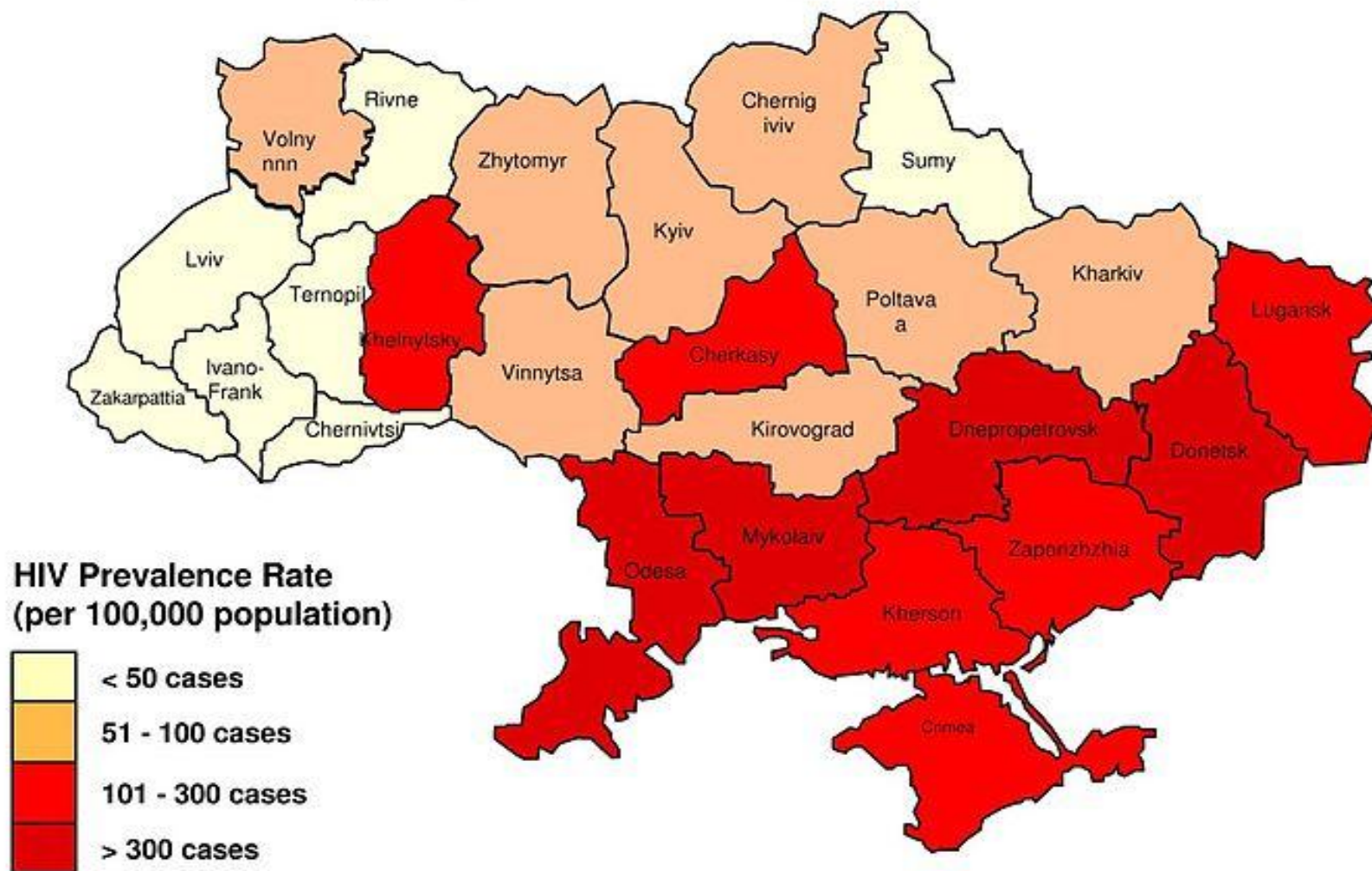
Background

- HIV and Hepatitis C are major burdens on the health care system in Ukraine
- Estimated prevalence (2011):
 - HIV – 0.58% (230,000 people)
 - HCV - 3% (1,350,000 people)

Officially registered new HIV cases, by years (1987 – 2011)

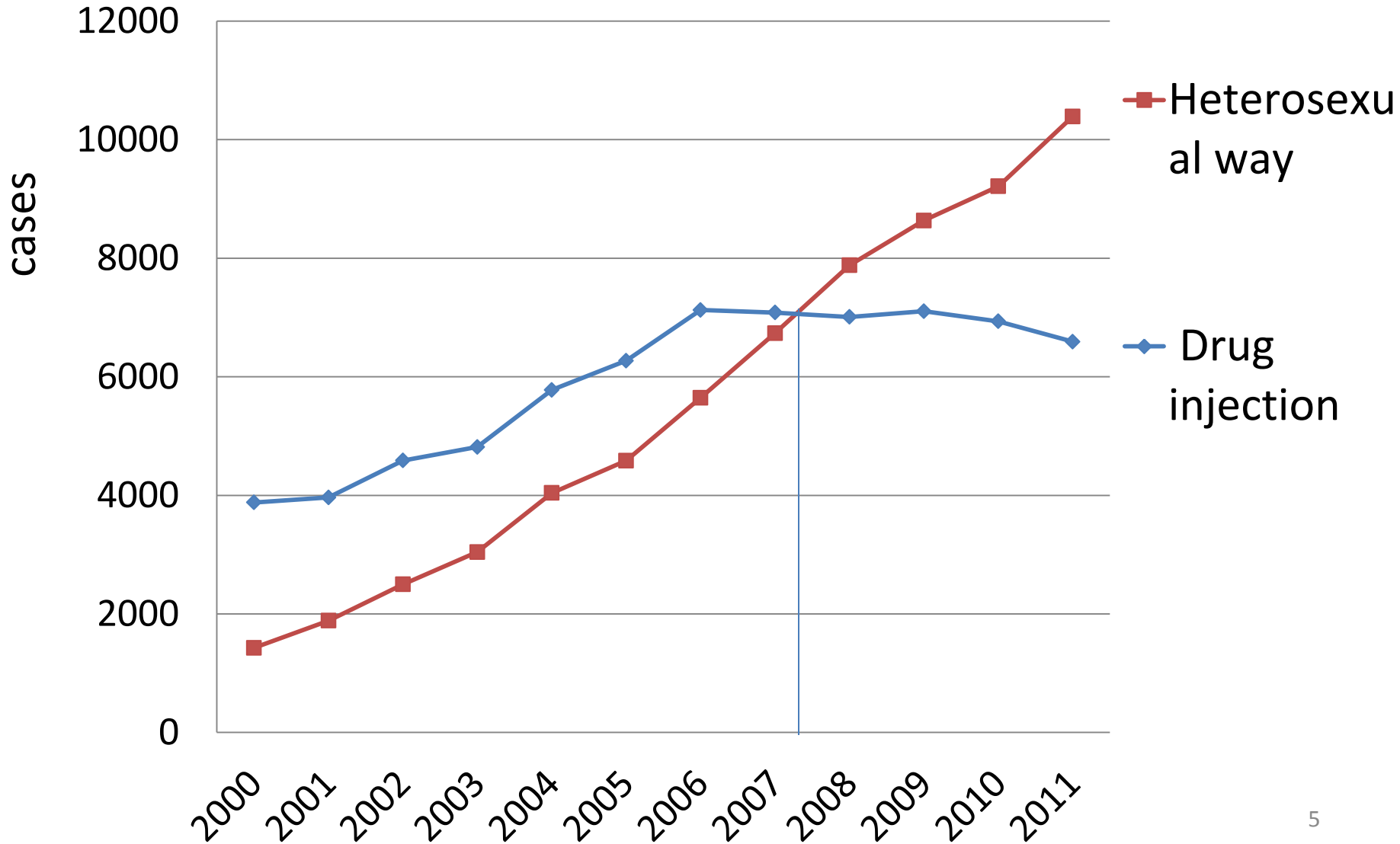


Registered HIV Prevalence for Adults and Children Living with HIV, by region of Ukraine, end-2007 *



* among citizens of Ukraine diagnosed with HIV and under medical observation

Changing the way of HIV transmission, 2000-2011



HCV in HIV epidemic setting

Official statistics:

before 2003 – no data

since 2003 - acute cases have been registered

since 2009 – registration of chronic cases has started

Prevalence HCV/HIV co-infection among risk groups:

70-95% of people living with HIV are co-infected with HCV (1)

IDU – 80-90% (2,3,4)

Differences in transmission efficiencies of HIV and HCV

HCV as biological marker of injecting behavior

1 - Aceijas, C. and Rhodes, T. (2007) Global Estimates of Prevalence of HCV Infection among Injecting Drug Users. *International Journal of Drug Policy* 18: 352–358.

2 - HIV/AIDS TREATMENT AND CARE CLINICAL PROTOCOLS FOR THE WHO EUROPEAN REGION, Ch.6, 2007

3 - Thomas DL, Leoutsakas D, Zabransky T, Kumar MS. Hepatitis C in HIV-infected individuals: cure and control, right now. *Journal of the International AIDS Society*. 2011;14:22.

4 - Strader DB. Co-infection with HIV and Hepatitis C Virus in Injection Drug Users and Minority Populations. *Clin Infect Dis*. 2005;41(Supplement 1):S7-S13.

Hypothesis

HCV co-infection in HIV positive women is associated with IDU women or their partners

Research questions

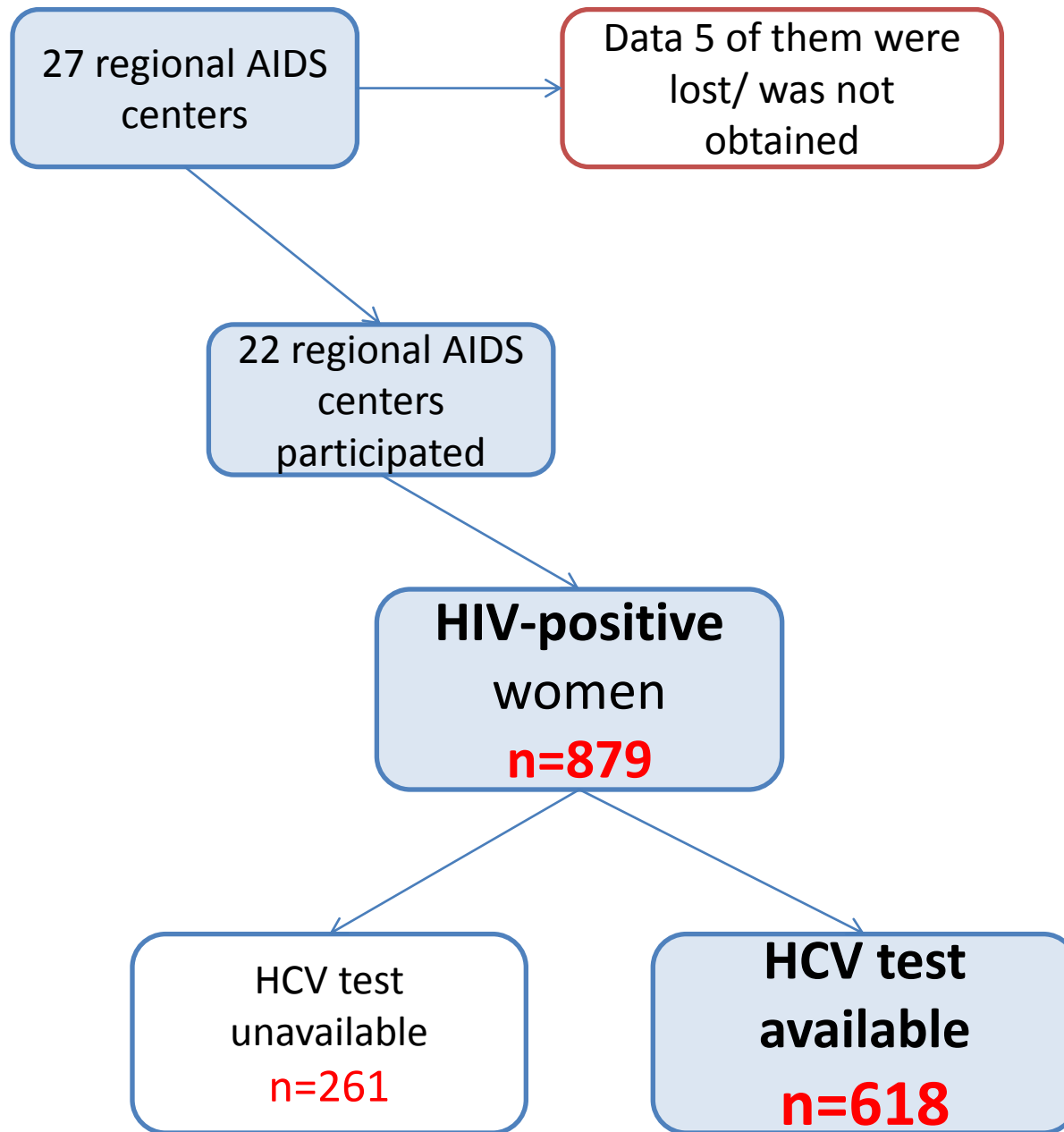
What the proportion of traditional risk groups (IDUs, sex workers, prisoners) among of women and their sexual partners?

What is the prevalence of HCV/HIV co-infection among study population?

Which risk factors are associated with HCV co-infection in HIV-positive women?

Methodology

- Secondary data analysis
- Cross-sectional design
- Study population:
 - HIV positive women who were pregnant in 2009-2010 , gave birth to child/children in 2010-2011 and sought antenatal care at medical facilities (pregnancy monitoring and/or delivery)
- Sampling - 22 regional AIDS centers (out of 27) participated
- 879 participants
- In-person interview (April-July 2011) + data from medical records (HIV related information, HCV tests results)



Statistical analysis

- Univariate analysis
- Chi-squared test of independence (p-value < 0.15 α -level)
- Poisson regression with robust variance estimates at 95% CI

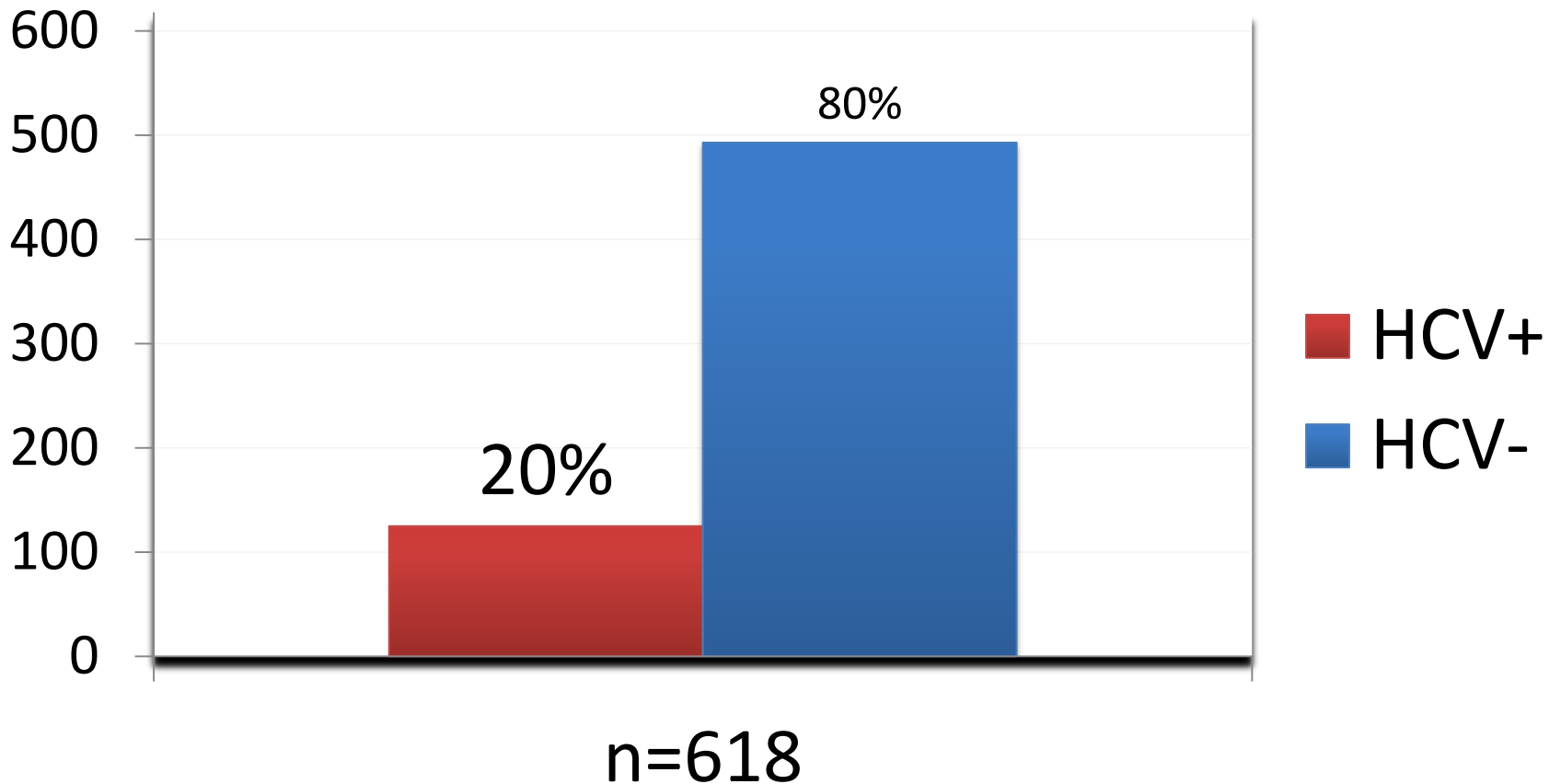
Findings: maternal behavioral characteristics

| Characteristics | n=618 | (%) |
|---|-------|--------|
| Injection drug using | | |
| Yes | 61 | (9.9) |
| No | 557 | (90.1) |
| Alcohol drinking | | |
| Yes | 512 | (82.8) |
| No | 106 | (17.2) |
| Smoking | | |
| Yes | 224 | (36.2) |
| No | 394 | (63.8) |
| History of sexual abuse | 11 | (1.8) |
| History of imprisoning | 6 | (1.0) |
| History of commercial sex | 5 | (0.8) |
| History of blood transfusion | 6 | (1.0) |
| History of a lot of medical manipulation | 22 | (3.6) |
| History of a lot of medical manipulation | 37 | (6.0) |

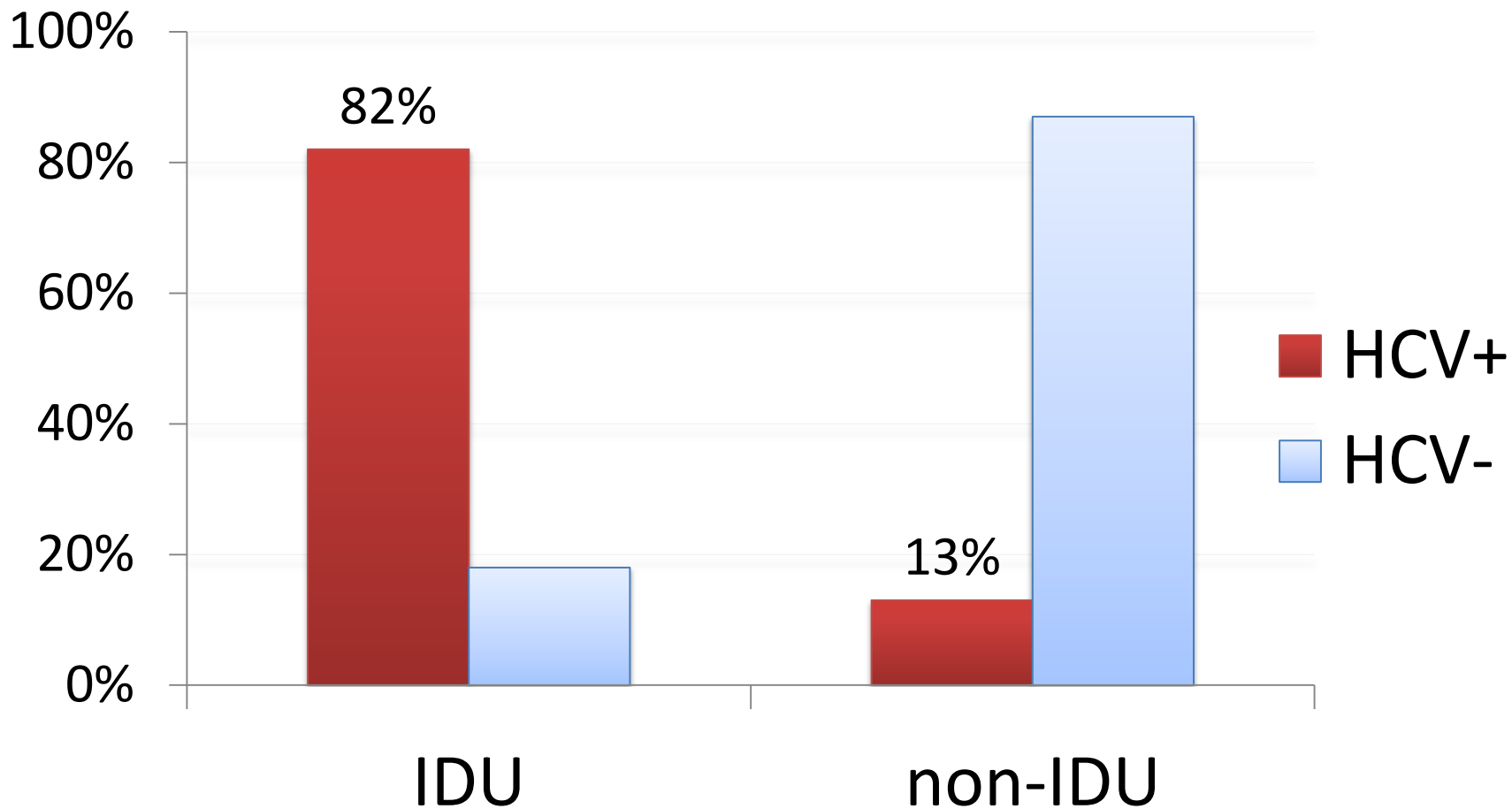
Findings: maternal behavioral characteristics

| Characteristics | n=618 | (%) |
|---|-------|--------|
| HIV status of permanent partner | | |
| Positive | 206 | (33.3) |
| Negative | 79 | (12.8) |
| Unknown | 333 | (53.9) |
| | | |
| Reported risks of permanent partners | | |
| IDU | 132 | (21.4) |
| Alcohol abuse | 103 | (16.7) |
| Numerous sexual contacts | 182 | (22.4) |
| Contact with HIV+ | 39 | (6.3) |
| Has STD | 12 | (1.9) |
| Former prisoner | 51 | (8.2) |

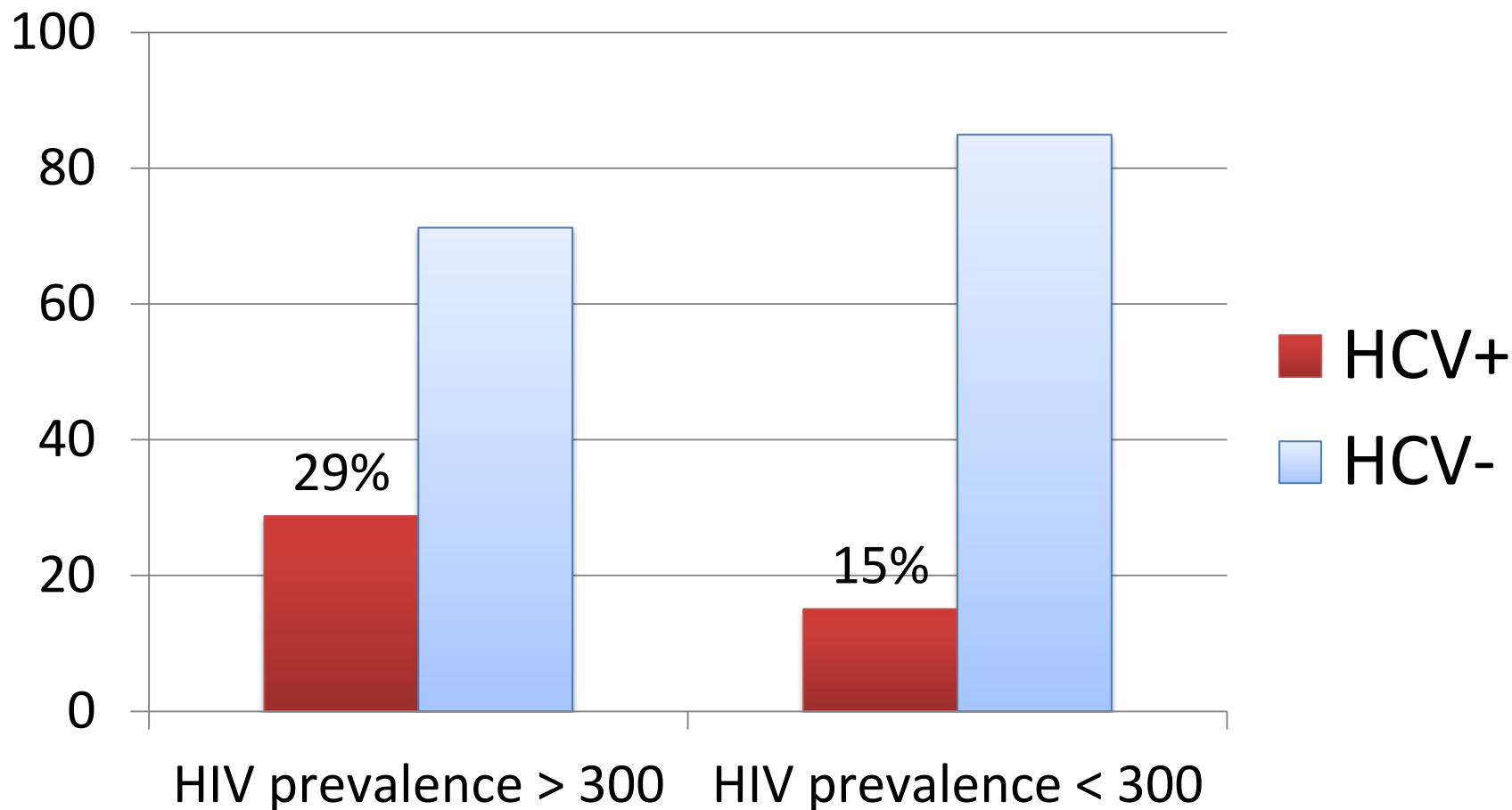
HCV prevalence among HIV positive women



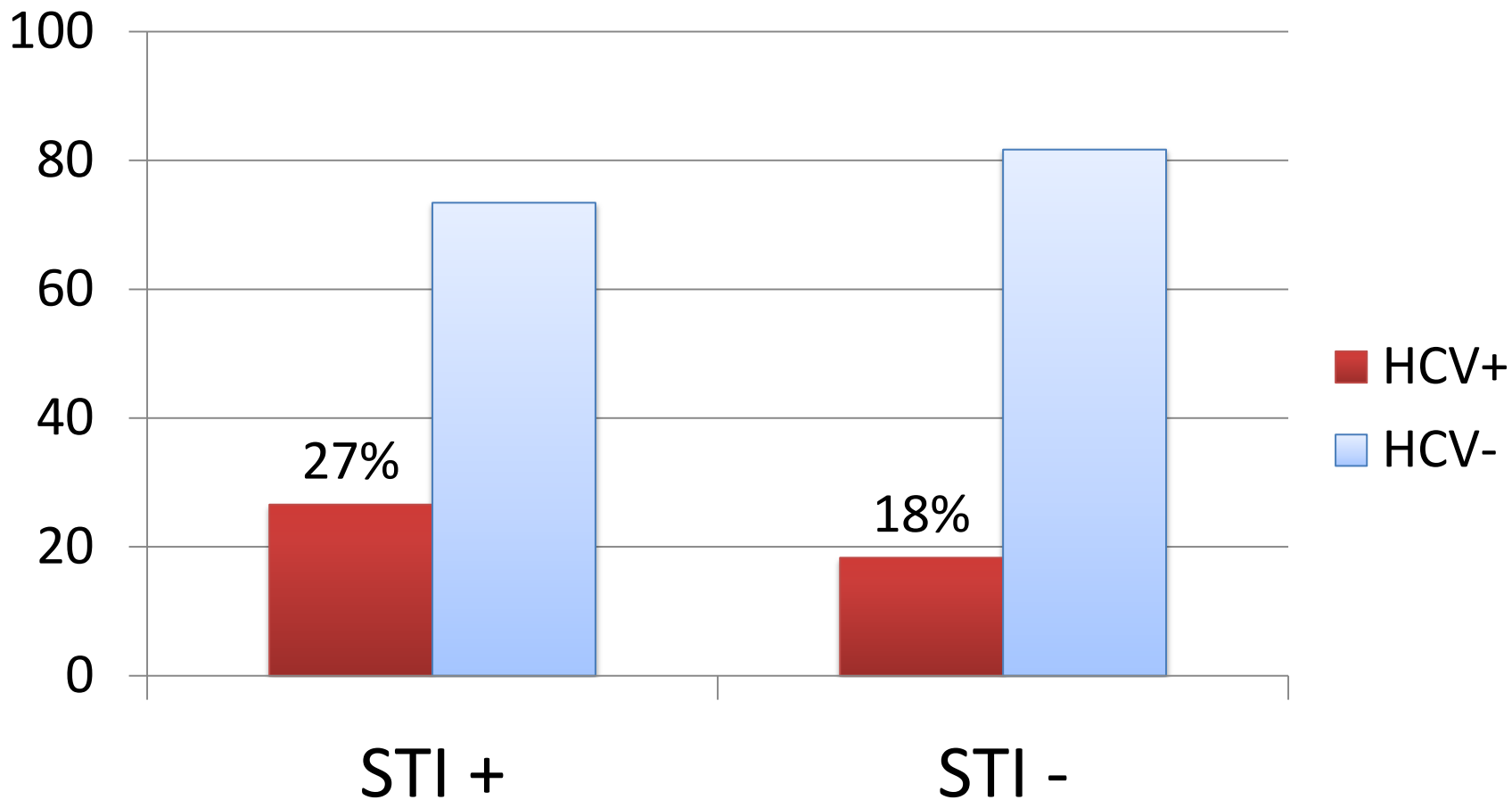
HCV prevalence among HIV positive women, by IDU status



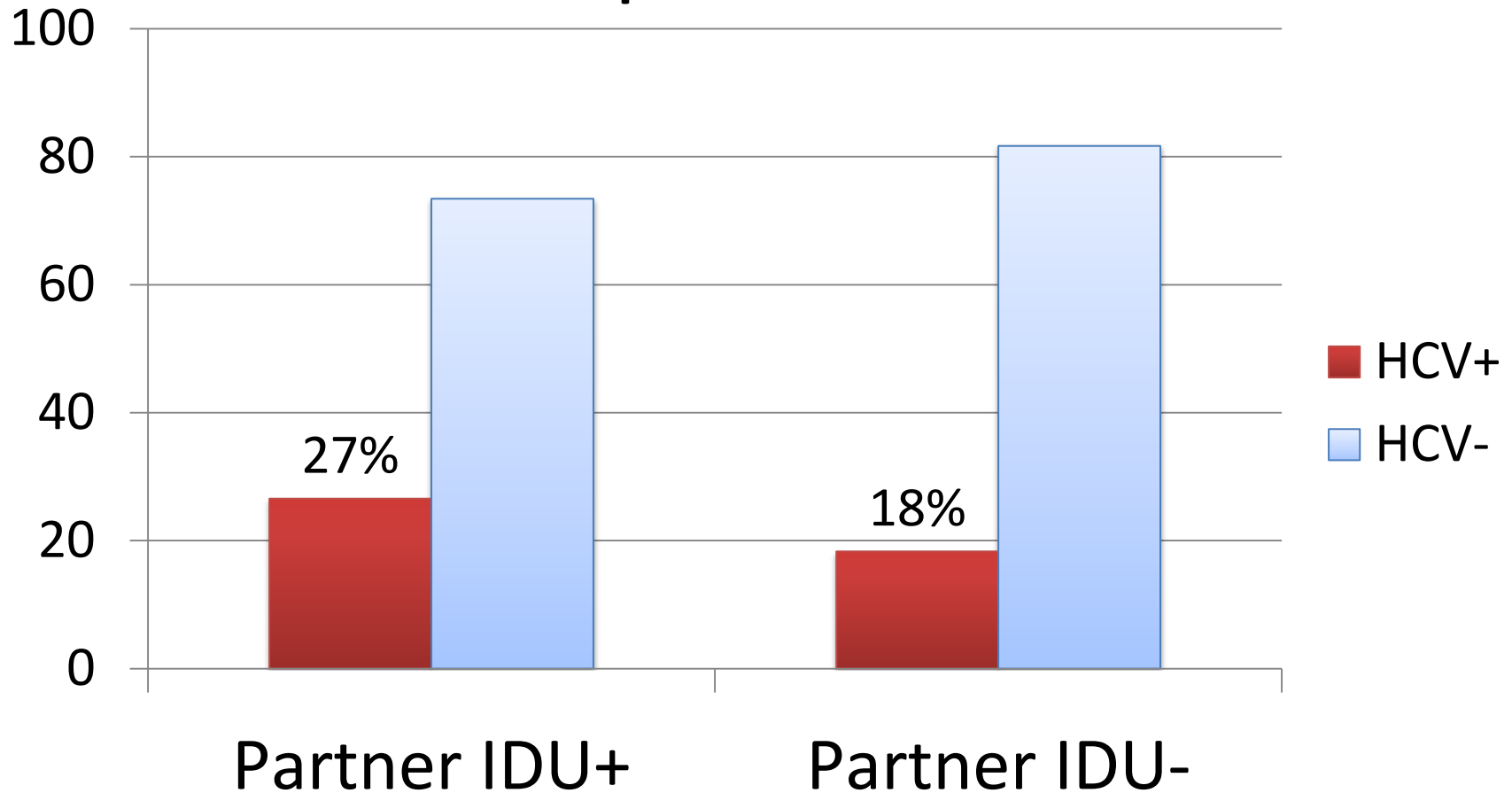
HCV prevalence among HIV positive women, by HIV prevalence in region of residence

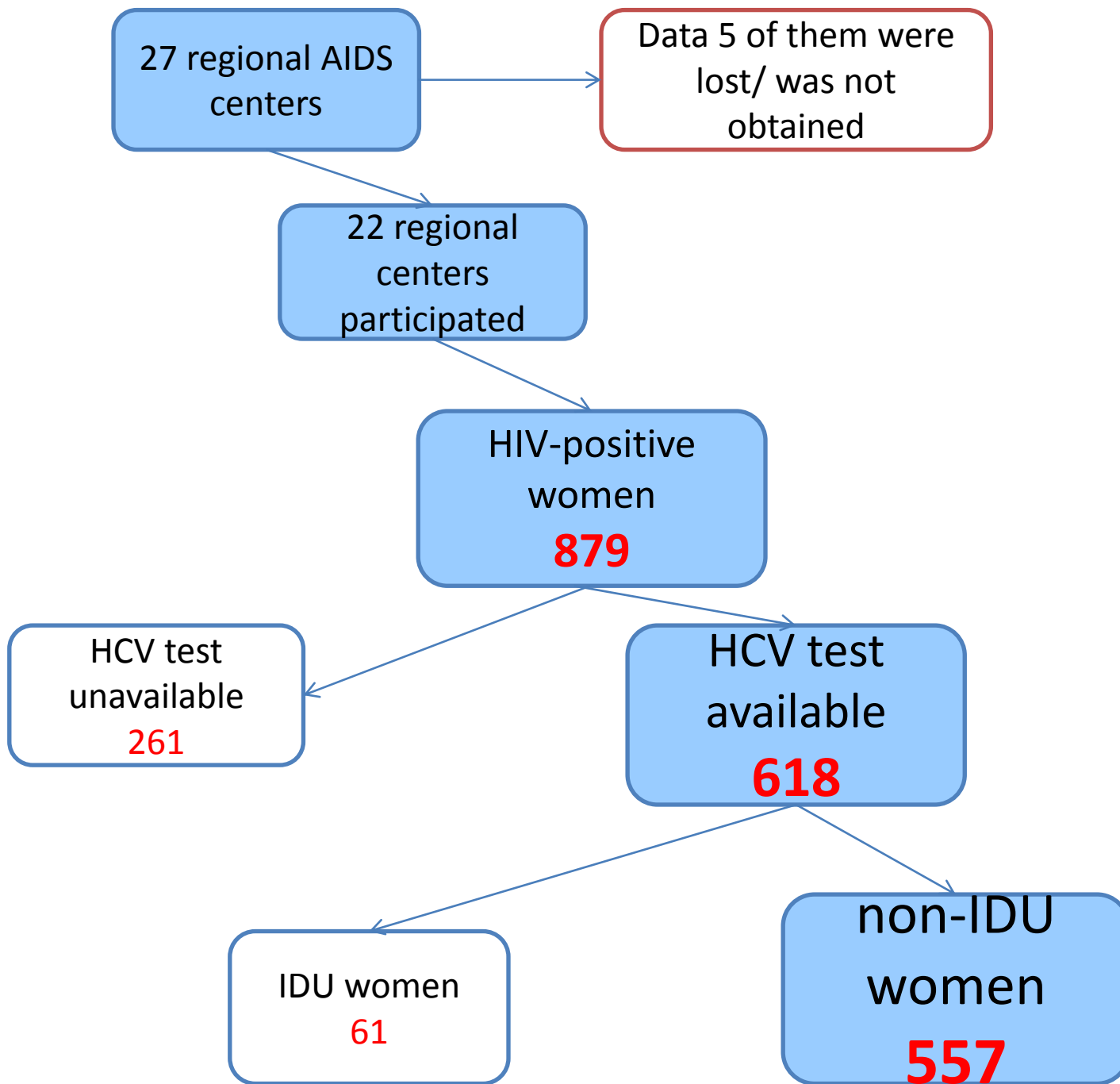


HCV prevalence among HIV positive women, by IDU status



HCV prevalence among HIV positive women, by IDU status of permanent partner





Association between risk factors and HCV co-infection among 557 non-injection drug using women with HIV

| Factors | N=557 | HCV positive | % | χ^2 p-value | Bivariate analyses, (95%CI) | Multivariate analysis, (95%CI) |
|--|-------|--------------|------|------------------|-----------------------------|--------------------------------|
| Regions | | | | p=0.002 | | |
| HIV prev. > 300/100,000 | 203 | 40 | 19.7 | | 2.0 (1.3 - 3.0) | 1.9 (1.3 – 2.8) |
| Other regions | 354 | 35 | 10.0 | | 1.00 | 1.00 |
| IDU permanent partner | | | | p=0.002 | | |
| yes | 90 | 22 | 24.5 | | 2.2 (1.4 – 3.4) | 1.9 (1.3 – 2.9) |
| no | 467 | 53 | 11.4 | | 1.00 | 1.00 |
| Imprisoning permanent partner | | | | p=0.086 | | |
| yes | 46 | 10 | 21.7 | | 1.7 (0.9 – 3.1) | 1.7 (0.9 – 3.0) |
| no | 511 | 65 | 12.7 | | 1.00 | 1.00 |
| Age | | | | p=0.015 | | |
| 19 and younger | 23 | 7 | 30.4 | | 2.4 (1.2 - 4.6) | 2.1 (1.2 – 3.7) |
| 20 and older | 534 | 68 | 12.7 | | 1.00 | 1.00 |
| Sexually transmitted infections | | | | p=0.037 | | |
| yes | 126 | 24 | 19.1 | | 1.6 (1.0 – 2.5) | 1.7 (1.1 – 2.6) |
| no | 431 | 51 | 11.8 | | 1.00 | 1.00 |
| Marital status | | | | p=0.210 | | |
| Married (official/common law) | 479 | 68 | 14.2 | | 1.00 | 1.00 |
| Other | 78 | 17 | 21.8 | | 0.6 (0.2 – 1.0) | 0.54 (0.27 – 1.1) |

Main findings

- The HCV infection among HIV positive women in Ukraine is linked to the IDU practice both women and her partners
- Strong association between high HIV prevalence in the region of women's residence and HIV/HCV co-infection support the unsafe injection behavior as the most important route of HCV transmission
- There is urgent need to increase the HCV testing of pregnant women, particularly who are IDU and women who has IDU partners

STRENGTH AND LIMITATIONS

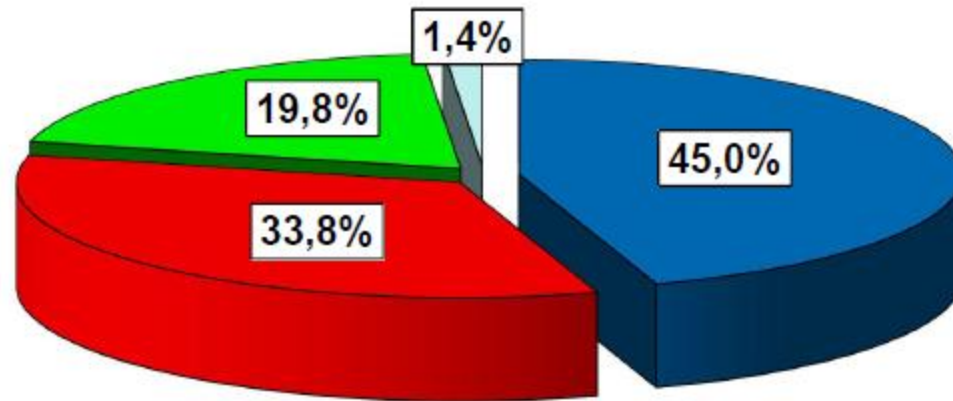
STRENGTHS:





- participants from 22 regional AIDS centers (out of 27) - representative for Ukraine
- Laboratory confirmed tests results

LIMITATIONS:

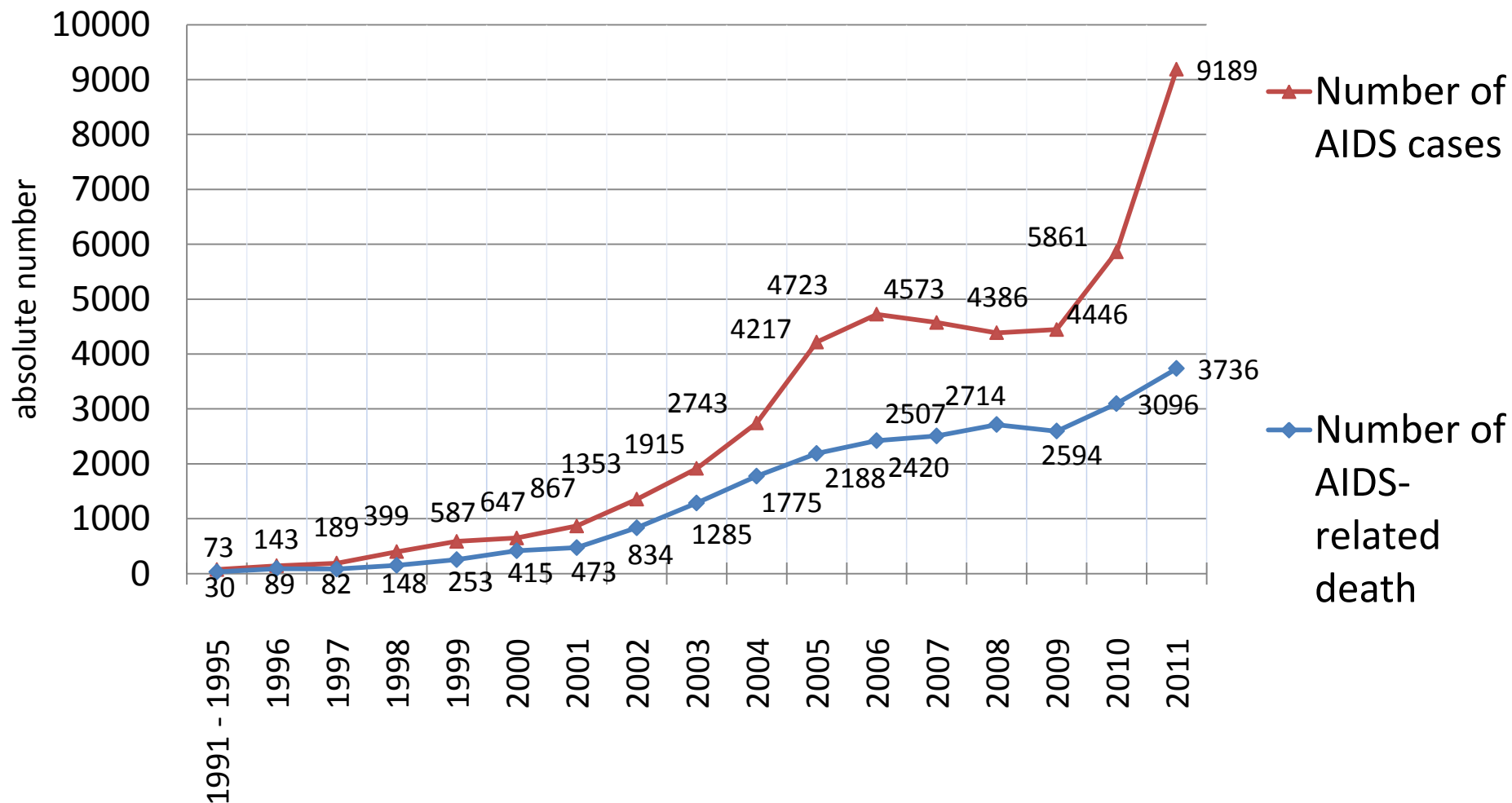
- cross-sectional design
- Self-reported information
- considering past HCV infection as current
- Donetsk region out of sample - HIV/HCV prevalence may be underreported
- Obtained information may be not representative for women with fertility problem and who are 36 and older

Modes of HIV transmission, 2010



-  drug injection
-  heterosexual way
-  mother-to-child transmission
-  undefined

Number of new AIDS cases and AIDS-related death, Ukraine 1991 – 2011



Methodology

This project is a part of in-depth study of determining the current stage of HIV infection in Ukraine and their potential for generalization of the epidemic process (Global Fund to Fight AIDS, Tuberculosis and Malaria through the ICF "International HIV / AIDS Alliance in Ukraine “)

HIV AND AIDS ESTIMATES, Ukraine (2011)

Number of people living with HIV

230,000 [180,000 - 310,000]

Adults aged 15 to 49 prevalence rate

0.8% [0.6% - 1%]

Adults aged 15 and up living with HIV

230,000 [180,000 - 300,000]

Women aged 15 and up living with HIV

94,000 [71,000 - 120,000]

Deaths due to AIDS

22,000 [16,000 - 30,000]

Background

HIV prevalence among pregnant women in recent years is growing (1)

In 2007 - HIV prevalence in this group was 0.52% (at the first half of 2009 – 0,56% , in some regions – more than 1%) (2)

1 - Comprehensive External Evaluation of the national response to AIDS in Ukraine: Summary Report (English original, January 2009)

2 - HIV infection in Ukraine. Newsletter number 35/ market, publications. MOH. - Kyiv, 2010. - Access mode: <<http://stop-aids.gov.ua>>. - Title screen.

Factors influence HIV/HCV acquisition in women

SES, employment status, kind of occupation (medical staff, migrants, sexual harassment risks at work)

Grown et al., 2005:542; Buve et al., 2002:2014, 2016; Gilbert & Walker, 2002:1103; Kehler, 2001:1; Amaro & Raj, 2000:724; Preston-Whyte, 1995:220; Gianelli et al., 2010:542)

Gender balance of power (women's victimization in relationships)

Jones & Oliver, 2007:812; Campbell, Foulis, Maimane & Sibiyi, 2005:813; Shearer et al., 2005:322; Tiessen, 2005:14; Andersson et al., 2004:952; Greig & Koopman, 2003:197; Kim & Motsei, 2002:1251; Umerah-Udezulu, 2001:4; UNAIDS, 2001:23-24; Vundule et al., 2001:73; Amaro & Raj, 2000:726; Wood & Jewkes, 1998:12-15, 24; Pettifor et al., 1996:1996

Education (less educated women are more likely to HIV because of lower economical status, dependence on partner)

Kongolo & Bamgose, 2002:86; Bowleg, Belgrave & Reisen, 2000:614

Age (in context of age of the first sexual debut, age difference between woman and her sexual partner)

Gilbert & Walker, 2002:1094; Gregson, Nyamukapa, Garnett, Mason, Zhuwau, Carael, Chandiwana & Anderson, 2002:1899; Department of Health South Africa, 2000:8; UNAIDS, 2000:11; Gray, Wawer, Brookmeyer, Sewankambo, Serwadda, Wabwire-Mangen, Lutalo, Li, Van Cott, Quinn & Rakai Project Team, 2001:1153; Pettifor et al., 1996:2003)

Marital status (monogamy as protective factor for HIV)

Bennetts(1999:649), Utulu (2007:401) Sia E Msuya (2006:3-2) Msisha (2008:1301).

Factors influence HIV/HCV acquisition in women

Sexual behavior (multiple sexual partners, extramarital sex by both partners, polygamy, unsafe sex (condom use + alcohol)

Sagay 2005:65; Johri (2010:793); Utulu 2007:40; Veldhuijzen 2011:254; Eaton et al., 2003:159; Karim et al., 2003:18; Morrison et al., 2003:162; LaBrie, Schiffman & Earlywine, 2002:145

Injection behavior (shared route of HIV and HCV transmission)

- unsafe drug injection
- non-medical injection (tatoo, piercing, ect.)

HCV in HIV epidemic setting (1)

HIV/HCV co-infection:

- affects disease progression related to both agents
- increase the rate of liver cirrhosis (people survive to develop HCV-related cirrhosis)
- challenges the clinical management and treatment of both infection
- increases hepatotoxicity of ARV therapy and treatment discontinuation

HCV in HIV epidemic setting

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before 2003 – no data

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Prevalence HCV/HIV co-infection among risk groups:

70-95% of people living with HIV are co-infected with HCV (1)

MSM - 3-8%(2,3)

IDU – 80-90% (4)

Differences in transmission efficiencies of HIV and HCV

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Predictor variables

- 1) socio demographic factors (the place of residence, region of residence, age, marital status, education)
- 2) behavioral risk factors (alcohol drinking, smoking, injection drugs using, history of imprisoning, history of commercial sex)
- 3) medical risk factors (history of blood transfusion, surgery, numerous medical manipulation, abortion, non-medical contacts – tattoo, piercing)
- 4) history of sexually transmitted infections (syphilis, gonorrhoea, chlamydiasis, herpes, trichomoniasis, candidiasis)
- 5) risk factors related to the permanent and casual partners

Outcome variable

HCV serostatus

Women were considered as HCV seropositive if any HCV test result (anti-HCV, HCV core antigen, PCR test for Hepatitis C virus RNA) was recorded as positive.

Outline

- Background
- Objective
- Methodology
- Findings
- Limitations
- Discussion

HCV in HIV epidemic setting

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HIV risk groups

HIV prevalence HIV risk groups (2011)

IDU – 21,5%

FSW - 9%

Rationale

- The prevalence of HIV infection among pregnant women quite accurately reflects and trends and HIV prevalence among the general population (1)
- HIV positive pregnant women can be link to high risk groups

Findings: maternal demographic characteristics

| Characteristics | n=618 | (%) |
|---|-------|--------|
| Place of residence | | |
| urban | 435 | (70.4) |
| rural | 183 | (29.6) |
| Age | | |
| 19 and younger | 24 | (3.9) |
| 20-29 | 410 | (66.4) |
| 30 and older | 184 | (29.7) |
| Education | | |
| Secondary education (complete or incomplete) | 258 | (41.7) |
| Professional technical (after 8/9 or 10/11 grades) | 243 | (39.3) |
| Higher education (complete or incomplete) | 116 | (18.8) |
| Illiterate person | 1 | (0.2) |
| Marital status | | |
| Married (legally or common-law marriage) | 529 | (85.6) |
| Divorced /widow/never been married | 89 | (14.4) |

Findings: maternal demographic characteristics

| Characteristics | n=618 | (%) |
|---|-----------------------------|---------------|
| Alcohol drinking | | |
| Yes | 512 | (82.8) |
| No | 106 | (17.2) |
| The average age respondents start to drink | 17 years (min 10 max 25) | |
| Smoking | | |
| Yes | 224 | (36.2) |
| No | 394 | (63.8) |
| Smoking during pregnancy (among those who smoke) | | |
| Yes | 125 | (55.8) |
| No | 99 | (44.2) |
| Injection drug using | | |
| Yes | 61 | (9.9) |
| No | 557 | (90.1) |
| Age of sexual debut | | |
| 16 years and younger | 199 | (32.2) |
| 17-19 | 279 | (45.2) |
| 20 and older | 140 | (22.6) |
| | 17.3 | ⁴⁰ |

27 regional AIDS centers

Data 5 of them were lost/ was not obtained

22 regional centers participated

HIV-positive women
879

HCV test unavailable
261

HCV test available
618

IDU women
61

non-IDU women
557