HIV/HCV related risk factors of people who inject drugs in Hungary, 2008-2015

Ph.D. thesis

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Introduction

In Hungary, analysis of HIV/HCV-related risk factors of people who inject drugs (PWID) at national level is an unresearched area. PWID is one of the main at-risk groups in terms of HIV/HCV virus acquisition.

Both in Europe and in Hungary, injecting drug use is the third most common transmission mode in terms of HIV while the primary one in terms of HCV.

HIV prevalence is between 0-34.7% among PWID in EU countries while HCV is between 15% and 84% (2013-2015 data). In Hungary, HIV prevalence has been around 0% since decades. The prevalence of HCV until 2011 was also moderately low at European level, around 25% at national level, but rose to 49% by 2014.

Previously, injecting drug use was associated traditionally with heroin and amphetamine. In 2010, however, this changed due to the significant decline of heroin supply (heroin drought) and the rapid emergence of new psychoactive substances (NPS), primarily synthetic cathinones in several European countries, including Hungary. In most European countries where injecting of NPS has been reported, 2015 data suggest a declining trend. In Hungary, however, NPS injecting became the dominant injecting pattern among PWID.

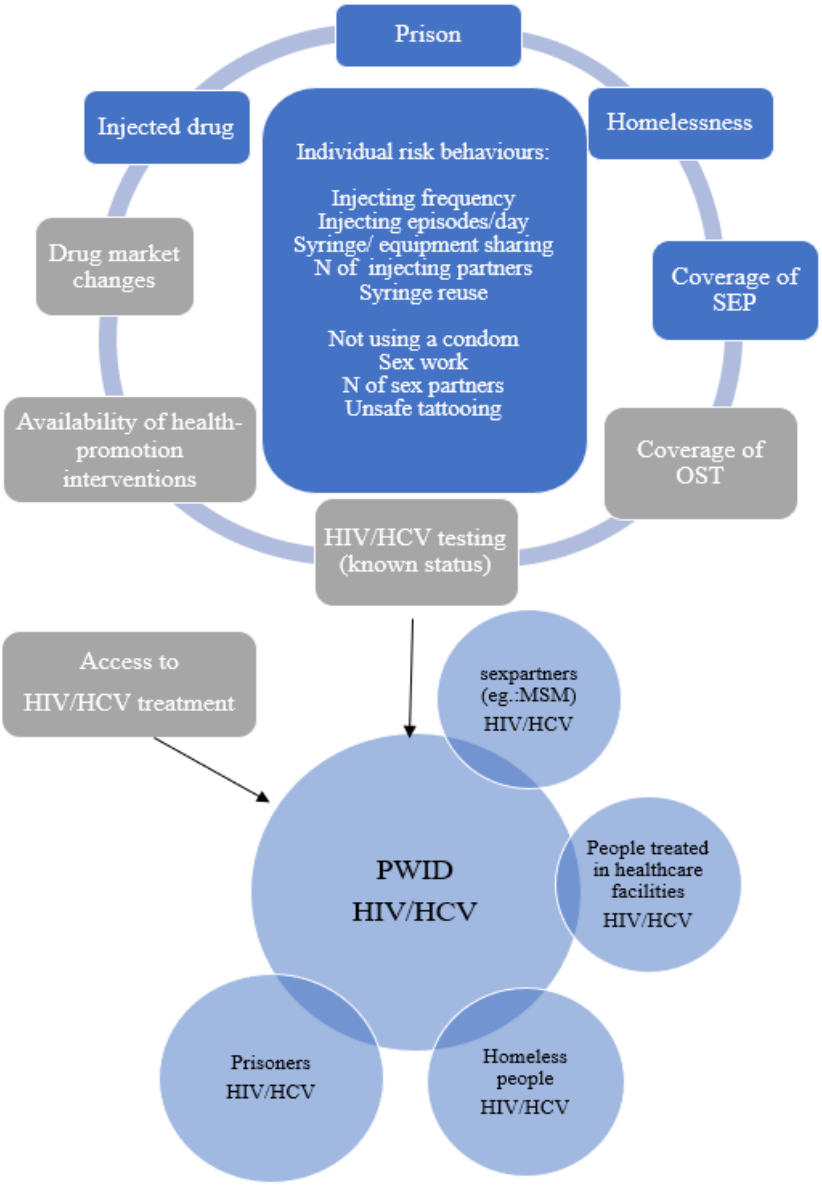
NPS injectors are reported to have more frequent injecting episodes than users of traditional substances. A higher number of injections elevates the risk of sharing syringes and other injecting paraphernalia and the exposure to blood-borne infections such as HIV and HCV. Unsafe sexual behaviour, imprisonment, or homelessness may facilitate transmission among and beyond the PWID population. The risk of spread to the wider population is also present trough nosocomial infection.

Many European countries such as Hungary in the field of drug-related infectious diseases prevention programs experienced decreasing availability of funds during the post-2008 economic recession. In some

countries including neighbouring Romania, an HIV outbreak among PWID starting in 2011 was primarily attributed to the switch from traditional substances to NPS, decreasing levels of harm reduction programmes, which was occurring against a background of high HCV prevalence.

I conceptualized the system of risk factors of PWID associated with HIV/HCV transmission (see figure below). Individual risk behaviours are also influenced by external environmental risk factors that may further increase the prevalence of individual risk behaviours. Individual and external risk factors jointly influence HIV/HCV transmission in the PWID population. Access to HIV/HCV treatment have a direct effect on HIV/HCV transmission in PWID as it can reduce the pool of infectious people, thus transmission risks.

The system of HIV/HCV related risk factors of PWID and their indirect effects to other risk groups (I examined the factors marked with a blue background)



Since HIV prevalence has been very low among Hungarian PWID for decades and has not changed between 2008-2015, during the statistical analysis I only examine the correlations between HCV and the risk factors, and I have put this infectious disease into the focus of my research. However, discussion of HIV infection is still essential, as the transmission risk factors identified for HCV infection are also relevant to HIV, both in terms of HIV risk assessment and in the case if HIV infection would start to spread among Hungarian PWID. Due to the cost of prevalence studies and their ad hoc nature, it is important to know the prevalence of risk factors in the population, which may be a predictor of the spread of HIV infection: if the number of reported new HIV cases increases in the risk group, then based on the known characteristics of the risk network, the changes in HIV prevalence and the dynamics of the spread of the infection can be assumed. Furthermore, changes in HCV epidemiology may also be a predictor of changes in HIV prevalence within the target population.

Aims

During my research, I examine the rate of HIV/HCV transmission risks among Hungarian PWID through their individual risk behaviours and external risk environment factors between 2008 and 2015. I also study how the analysed phenomena affect each other, and if transmission risks go beyond PWID extending to the wider population.
Primarily, I was focusing on active PWID (injecting in the last month) since they are the most exposed to virus transmission and represent most accurately current behavioural and injecting drug use patterns. Since shorter time series data were available in case of active PWID, for some variables, I analysed data of the total sample (including ever injecting drug users) to observe trends in a longer period of time. I considered the examination of young (under 25 years) and new

(injecting for less than two years) PWID to be of utmost importance since prevalence and trends measured among them can be interpreted as the proxy indicator of incidence of the given phenomenon.
Changes in the drug market (regarding the supply) induced to research the prevalence of injected drugs in detail and to examine HCV prevalence and risk factors broken down by injected drug type. As funding resources for harm reduction interventions decreased, analysing coverage of syringe exchange programmes (SEPs) was important to accurately reveal risk factors in the risk environment.
During my research, I sought the answers to the following questions at national level with regard to the examined time period (2008-2015):

1. What is the rate of HIV and HCV transmission risks among Hungarian PWID on the basis of individual and external risk factors?

2. How did drug market changes transform injecting drug use patterns of Hungarian PWID?

3. Are NPS injectors at higher risk of HIV/HCV virus acquisition than injectors of other substances?

4. What effect do drug market changes (assumed spread of NPS injecting) and the (presumably decreasing) availability of sterile syringes have on risk behaviours and HCV prevalence?

5. Does prison as a risk environment increase HCV transmission in the injecting drug user population?

6. What further public health consequences can emerge as a result of HCV transmission among PWID?

7. Are there HIV/HCV transmission risks to other risk groups?

To answer my questions, I defined the following main research tasks:

1. to assess the prevalence and trend of injected drugs among PWID
2. to analyse the prevalence and trend of HCV broken down by injected drug among all, active, young and new PWID
3. to examine the prevalence and trend of injecting related risk behaviours among active, young and new PWID
4. to analyse the prevalence of sexual risk behaviours and external risk factors among active PWID
5. to identify risk behaviours that are significantly related to HCV infection among Hungarian active PWID
6. to identify risk factors associated with HCV infection among all prisoners and among prisoners who ever injected drugs
7. to analyse trends of availability and coverage of SEPs

Methods

I used the following four datasets for analysis: databases of (1) the national HIV/HCV sero-behavioural prevalence surveys (2008-2014) and (2) regional diagnostic testing programmes (2012) carried out in PWID, (3) database of the HIV/HCV sero-behavioural survey among prisoners (2008-2009), and the (4) national SEP turnover database (2008-2015). To assess SEP coverage, I applied available PWID population size estimates. I also conducted retrospective quantitative and qualitative research among SEPs to explore injecting drug use patterns of SEP clients and to understand better background factors of SEP availability.

As regards the first three databases contingency tables to describe distribution, chi-square tests (or Fisher's exact tests when necessary)

with corresponding p values ($p<0.05$ or $p<0.1$) to determine significant correlations, and the T-test to compare group means were used. Data management and analysis were carried out using Microsoft Office Excel, the SPSS 16 and 20 programme package. Regarding SEP quantitative data (4. database and my research on SEP clients) I used Microsoft Office Excel to manage, recode, clean and analyse data. Qualitative data of SEPs was also managed by Microsoft Office Excel programme.

At the level of data analysis, if data was available from multiple quantitative data sources by phenomenon, or the same phenomenon was examined with different methods (quantitative and qualitative), I validated the results by triangulation of different quantitative data sources or quantitative and qualitative data. In this way validity of results and identified trends were improved and validity and reliability characteristics of each database were balanced. To answer my study questions, I synthesized the different results I had received at each phenomenon.

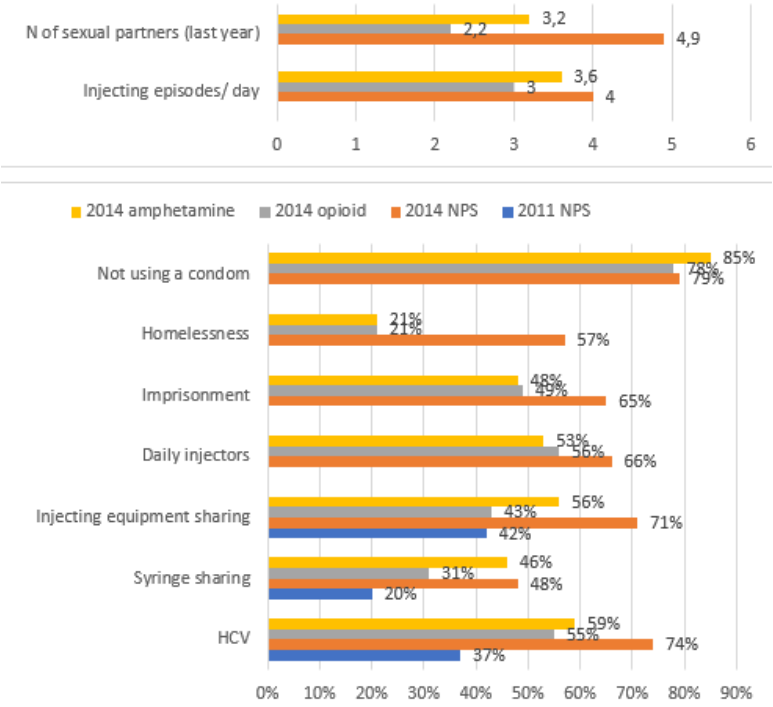
In my research I grouped self-reported street-names ‘mephedrone’, ‘kati’, ‘MDPV’, ‘MP’, ‘MP3’, ‘MP4’, ‘penta’, ‘crystal’ ‘pentedrone’, ‘pental crystal’, ‘music’, ‘benzon’, ‘4-MEC’, ‘methylone’ or ‘designer drugs’ as NPS in all data sources.

Results

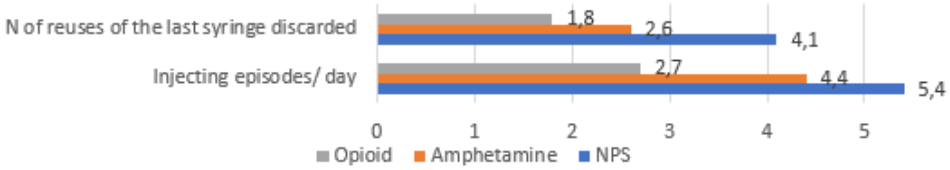
The transformation of injecting drug use patterns among Hungarian PWID and the emergence of high risk NPS injecting

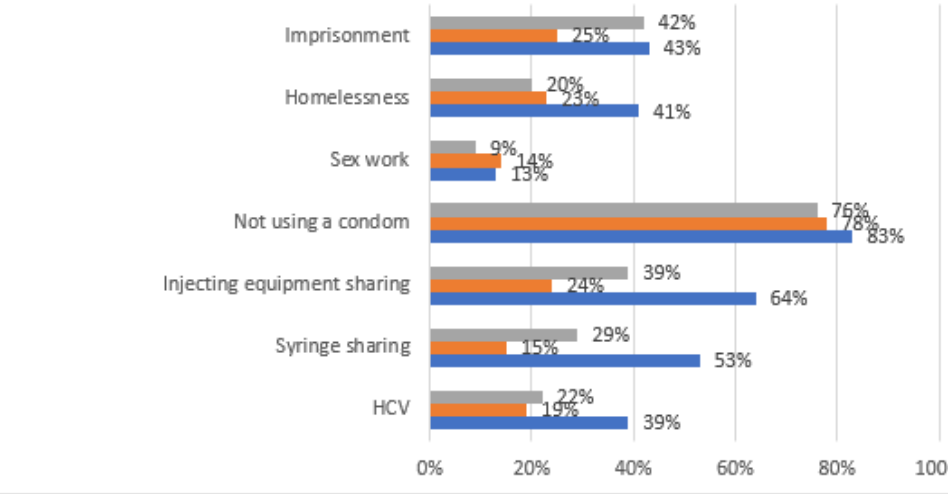
The prevalence of NPS injecting among SEP clients (national coverage, all clients) increased from 26% to 80% (2011-2015), while heroin injecting decreased from 56% to 3% (2009-2015), and amphetamine injecting from 45% to 10% (2010-2015). In my analyses (2011-2014 and 2012 database), I consequently measured significantly higher rates among NPS injectors compared to the other PWID groups in terms of HCV prevalence, mainly all risk behaviours and external risk factors.

HCV prevalence and risk factors by primary injected drug among PWID participating in the national HIV/HCV sero-behavioural survey series (2011-2014)



HCV prevalence and risk factors by primary injected drug among PWID participating in the HIV/HCV routine diagnostic testing programme, 2012





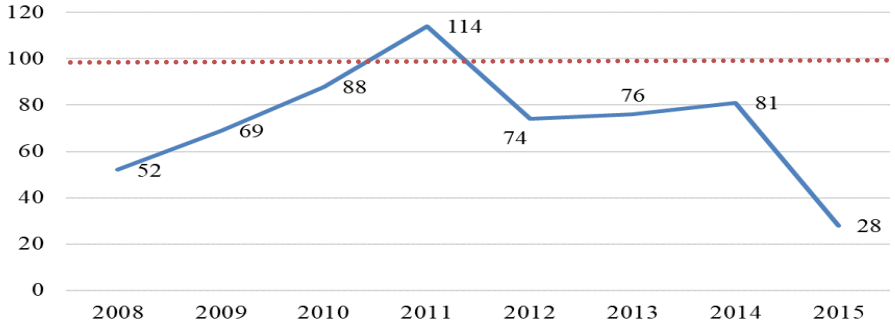
NPS injecting was highly prevalent among young and new PWID. Among all young SEP clients prevalence of NPS injecting was 88% in 2015. According to the data of the national sero-behavioural survey series, in the group of young and new injectors in 2014, the majority were NPS injectors (64% and 73% respectively increased from 20% and 31% in 2011). Among them HCV prevalence was 76% and 42%, significantly higher than in 2011 (12% and 13%) representing a 7-fold and 4-fold increase. Any equipment sharing was highly prevalent among both young and new NPS injectors (79% and 72%), while

syringe sharing was high among young NPS injectors only (62% vs. 32%) in 2014.

Weakening of the most important pillar of HIV/HCV prevention among PWID

Based on the estimated number of PWID, the number of sterile syringes distributed per PWID gradually increased from 2008 to 2011 (114 syringes) probably mainly due to the increasing need for sterile syringes as a result of spreading NPS injecting. After funding resources decreased, this number dropped to 74 in 2012 and remained at this level in the next two years (2013: 76, 2014: 81). In 2015, following the closure of the two largest SEPs, the already not powerful (according to WHO standards), low coverage fell even deeper to 28 syringes/PWID. The number of contacts halved in 2015 (2015: 24 368 contacts), the number of clients decreased by about 1 000 (2015: 3436 persons), indicating a growing number of PWID out of reach of prevention services.

The distribution of the number (n) of sterile syringes per PWID per year between 2008 and 2015 according to the minimum threshold set by the WHO (prevention power of SEPs is low if coverage is under 100 syringes)



Reduced availability of SEPs (along with injecting pattern changes caused by NPS injecting) can also be associated with the increasing prevalence of risk behaviors. National trend data originating from the national sero-behavioural survey series between 2009 and 2014 shows that prevalence of syringe sharing increased from 26% to 43%, while injecting equipment sharing from 40% to 59% among all active PWID.

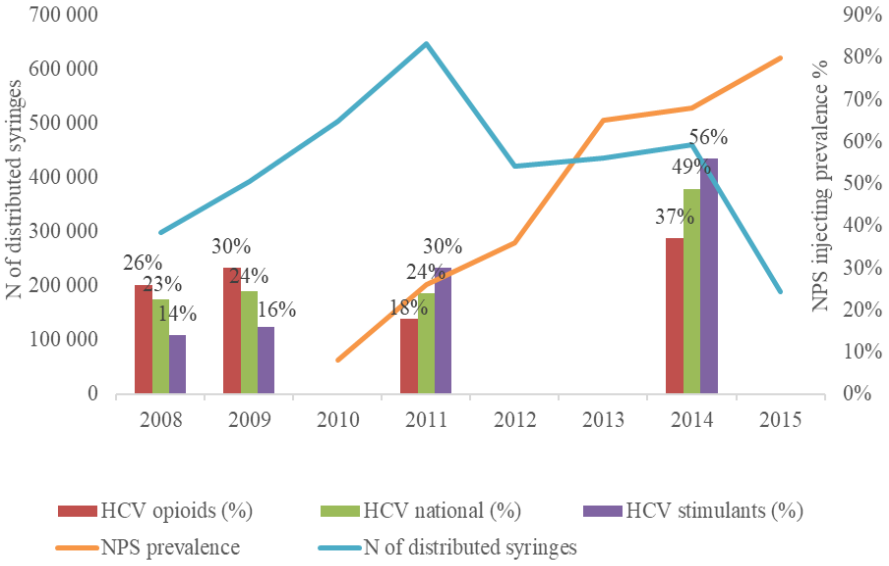
The transformation of HCV epidemiology in Hungary among PWID

The impact of emerging high-risk NPS injecting meeting with weakening SEP coverage can be seen in the transformation of HCV prevalence by primarily injected drug type (See figure below).
Before 2011 the proportion of opioid injectors was higher in the sample than that of stimulant injectors and HCV prevalence was always higher in the opioid injector group. The situation, however, reversed: in 2011 HCV prevalence rate was significantly higher among stimulant injectors and lower among opioid injectors. Actually, HCV prevalence values by drug type changed places, while the national HCV prevalence did not change significantly in 2011 (24%).
The higher than in previous years prevalence of HCV among primarily stimulant injectors could have been an indication that increased HCV transmission was happening in this group of PWID in 2011. However, it was also found that the overall prevalence of HCV was relatively unchanged, which implies that instead of experiencing an HCV outbreak among stimulant users, a probable HCV serosorting has taken place based on drug types: a group of high-risk opioid injectors with longer drug injecting careers and higher prevalence of HCV started to enter the sub-population of stimulant injectors (by switching over from injecting opioids to injecting amphetamines or NPS), thus increasing HCV prevalence in that group and reducing prevalence in the opioid injector group. If that is the case, the changes in the drug market may have resulted in the restructuring of the risk networks of PWID in a way

that it created a high-risk and high HCV prevalence core group of stimulant – especially NPS – injectors that were linked not only to other stimulant injectors (new peers) but also to their former opioid injector peers. The transformation of risk networks coupled with new high-risk injecting drug use patterns further increased virus transmission risks.

In 2014, HCV prevalence doubled both among opioid and stimulant injectors and thus in the total sample as well. HCV increase can be largely attributed to the weakening of harm reduction efforts (SEPs) (beside high-risk NPS injecting), as all injector groups were affected independent of the primary injected drug type.

The impact of the spread of NPS injecting (among SEP clients) and the decrease in the number of distributed syringes on HCV prevalence by primary injected drug type (national coverage, ever injectors) between 2008-2015



Public health implications: HCV-related disease burden, HIV risk, transmission risks to other risk groups

The characteristics of NPS injectors coupled with their likely large number (extrapolating the 80% among SEP clients would suggest at least some 5 360 primary NPS injectors on the basis of our PWID population size estimate at 6707 persons in 2015) constitute a serious threat of health-related risks and consequences in Hungary, both in terms of future liver disease as well as regarding the risk of an HIV outbreak and spread of other blood borne diseases.

My results underline that pathways for the potential transmission of HCV and HIV beyond the PWID community may already exist: In 2014, 56% of active PWID has already been to prison in their lives. HCV prevalence was 77% among them. The proportion of homeless people (last year prevalence) was 39%, and HCV prevalence was also 77% in that group. According to the 2012 data, 11% of active PWID (having a sexual intercourse in the last month) provided sex for money, drugs, or other benefits in the past month, while in 2014 the number of sexual partners of PWID averaged 4 (last year). In 2014, 80% of active PWID (having a sexual intercourse in the last month) did not use condoms at their last sexual intercourse, which poses a very high risk in terms of HIV. Mathematical models suggest that in a PWID population an increase in HIV prevalence is highly probable above a 30-35% HCV prevalence threshold. According to the latest data, national prevalence of HCV was 49% in 2014 among all PWID. If only active PWID are considered, HCV prevalence was 65%.

The impact of the prison setting as a risk environment on HCV prevalence among Hungarian PWID

Analysing data from the survey conducted in 2008/2009 among prisoners, I have found that elevated HCV prevalence in Hungarian prisons (4% versus 1% estimated in the general population) is due to the high HCV prevalence (23%) found among prisoners who have ever injected drugs, as HCV prevalence among non-injecting drug users and non-drug users were 1.5% and 1% respectively.

This HCV prevalence (23%) was almost equal to rates of HCV measured among PWID outside the prison in those years (2008: 23% 2009: 24%). There were no significant associations between HCV infection and years of imprisonment, tattooing in prison, and unsafe sexual behaviour in the total sample. Within the sample of prisoners having ever injected drugs, HCV positive inmates were typically older, with shorter detention time than those who tested HCV negative. Unsafe sexual behaviour and tattooing inside prison did not show associations with HCV infection among them. The results suggest that in these years prison as a risk environment did not increase the transmission of HCV infection among prisoners and thus prisoners with an injecting drug user past.

13.5% of the total sample said they had ever injected drugs, but the prevalence of injecting during imprisonment was low at 1.2%. Thus, the rate of exposure to HIV/HCV risks due to injecting was low inside the prison walls. It is likely that most of the HCV positive prisoners acquired HCV infection prior to imprisonment (76% of HCV positive inmates injected drugs previously, among them the detention time period was significantly lower than among HCV negative inmates with injecting drug use history). Among prisoners who ever injected drugs, risk behaviours (syringe sharing ever; injecting equipment sharing ever) showed a strong association with HCV infection, which also suggests

that HCV acquisition among them probably happened during their earlier (high-risk) drug injecting career.

According to the 2014 national sero-behavioural survey data, 56% of active PWID has been imprisoned (65% in case of NPS injectors). In 2014 HCV prevalence among PWID ever been imprisoned was 77%, significantly higher than among those PWID who have never been in prison (HCV: 49%). It remains a question whether my 2008/2009 result that prison as a risk environment does not increase HCV prevalence among Hungarian PWID is still valid or the increased HCV prevalence is due to the fact that those PWID who have ever been imprisoned have a higher risk profile in terms of injecting patterns outside the walls. In any case, it is important to take into account that HCV prevalence among PWID entering prison is much higher now than during the 2008/2009 study, therefore the risk of HCV transmission inside the prison is possibly also increasing.

Conclusions

By 2015 injecting patterns of Hungarian PWID have completely transformed. The vast majority of PWID in Hungary primarily inject NPS (80%) which displaced heroin and amphetamine.
The prevalence of NPS injecting is the highest among young (under 25 years) PWID (88%).

Hungarian PWID, especially NPS injectors are at a very high risk of HIV/HCV acquisition and transmission due to elevated levels of injecting-related and sexual risk behaviours within a high-risk environment that includes constantly low SEP provision for years (that in 2015 declined even more drastically) and high levels of homelessness and a history of imprisonment.

High and strongly increasing HCV levels suggest that tipping over of the current 0%-0.3% HIV prevalence cannot be excluded.

Without a strong scale-up of evidence-based prevention measures, primarily in terms of SEP coverage and expansion of HCV treatment, with a special focus on young and new injectors and also including the prison setting (with regard to interventions feasible in that setting), transmission of HCV is likely to continue in this population. This implies a large future disease burden among PWID, costs for the treatment system and risk of spread to other risk groups and to the wider population (eg. through nosocomial infections).

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