

REVIEW

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# Hepatitis C in European prisons: a call for an evidence-informed response

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## Abstract

Globally, over 10 million people are held in prisons and other places of detention at any given time. People who inject drugs (PWID) comprise 10-48% of male and 30-60% of female prisoners. The spread of hepatitis C in prisons is clearly driven by injection drug use, with many infected prisoners unaware of their infection status. Risk behaviour for acquisition of hepatitis C via common use of injecting equipment is widespread in many prison settings.

In custodial settings, effective and efficient prevention models applied in the community are very rarely implemented. Only approximately 60 out of more than 10,000 prisons worldwide provide needle exchange. Thus, HCV prevention is almost exclusively limited to verbal advice, leaflets and other measures directed to cognitive behavioural change. Although the outcome of HCV antiviral treatment is comparable to non-substance users and substance users out of prison, the uptake for antiviral treatment is extremely low.

Based on a literature review to assess the spread of hepatitis C among prisoners and to learn more about the impact for the prison system, recommendations regarding hepatitis C prevention, screening and treatment in prisons have been formulated in this article.

## Introduction

Globally, more than 10 million people are held in prisons and other places of detention at any given time [1]. Due to the high turnover rate in the prison population, it is estimated that more than 30 million people spend time in prisons each year. Drug users in particular often spend relatively short periods in prisons before returning to their communities.

Many people held in prisons have severe problems associated with drug use, together with related health and social disadvantages. Those categorised as problematic drug users constitute a substantial proportion of prison populations in Europe. Counting only sentenced prisoners with drug offences as the main offence, 15 of 26 European countries for which information is available report proportions over 15% [2]. The number of drug users in prisons is even higher. A systematic review of international studies – with a preponderance of studies conducted in the United States – found that 10% to 48% of men and 30% to 60% of women were dependent on or used illicit drugs in the month before entering prison [3]. In the European Union,

it has been estimated that about half of all members of the prison population have used illicit drugs at some time in their lives [4].

Hepatitis C virus (HCV) infection, which is both preventable and treatable, is a major concern in correctional settings. People who inject drugs (PWID) have high rates of imprisonment, largely due to the criminalization of their drug use and to the tendency to fund drug use through crime. The dynamics of illicit drug use, HCV infection and imprisonment are closely intertwined [5]. One study found that in Australian prisons, one-third of entering inmates tested positive for HCV antibodies. The proportion of positive results among entering inmates who injected drugs was 56%. Furthermore, one-third of inmates who were anti-HCV positive were unaware of their infection status.

In general, 80% of HCV-infected individuals develop chronic HCV. Of these, 10% to 15% will develop liver cirrhosis [6]. Three to four percent of patients with cirrhosis develop hepatocellular carcinoma every year [7,8]. Worldwide, 25% of liver cancer cases are attributable to HCV infection [9].

Given the interplay between HCV, drug use and incarceration, HCV has the potential to impose a major disease burden on European prison populations. The purpose of

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this article is to review evidence and formulate recommendations regarding how to address this situation.

### **HCV transmission, risk factors and prevention in prisons**

Imprisonment is an independent risk factor for HCV infection for PWID in the community [10-15]. All modes of HCV transmission that occur in the community also occur in prisons. In particular, HBV, HCV and HIV are transmitted in prisons through the sharing of contaminated injecting equipment, and also through unsafe sexual contact, unsafe skin penetration (such as piercing and tattooing, sharing of razors, and blood-sharing rituals) and the improper sterilisation or reuse of medical or dental instruments [16]. Some PWID continue to use drugs such as opioids, including by injection, while incarcerated, and some people initiate injecting in prison [17]. In Australian prisons about half of all imprisoned people who inject drugs continue to inject drugs in prison [18].

One of the most important risk factors for HCV infection is intravenous drug use while in prison [12,15]. A meta-analysis of 30 studies from different countries showed a clear association between the prevalence of HCV infection in prisoners and their history of injecting drug use. There were weaker associations with female gender and with tattooing. The results showed that HCV seroprevalence was approximately 11% higher among already-detained inmates, as opposed to inmates entering prison. A strong association between HCV infection and the length of time spent in prison was also seen. These findings suggest that intra-prison transmission may contribute considerably to high HCV levels in prison populations [7].

The prevalence of HCV infection among prison inmates is many times higher in most custodial settings than in the general population [19,20], primarily because of the high proportion of people who inject drugs (PWID) [6] who are known to be at high risk of infection. Esteban et al concluded that HCV prevalence in the general population in Western Europe is 0.5%, and that it is 2.5% and 6% in Southern Europe and Eastern Europe respectively [21]. A meta-analysis performed by Vescio et al (2008), showed that there is a high HCV prevalence in inmates in several countries around the world. HCV prevalence in inmates was approximately 30% to 40% (range: 2%–58%) [7].

Different studies from Europe, Australia and the United States suggest that hepatitis C prevalence rates in prisons range from 8% to 57% [9,22-24].

In prisoners with a history of injecting drug use, the global summary prevalence was 64% [25]. Data on HCV antibody prevalence among injecting drug users in European prisons between 2005 and 2010 were reported by five countries, with prevalence ranging from 12% in Hungary to 91% in Luxembourg [26]. Among female

prisoners the prevalence is two in three. Among female PWID, the prevalence can be even higher, ranging from 49% to 88% [27].

Patterns of hepatitis C prevalence in custodial settings include increasing prevalence with age; higher prevalence among female prisoners; and increasing prevalence with multiple admissions to prisons (AIHW 2010). Infection with more than one strain of HCV may also be common in prison populations; one study found 24% prevalence of multiple infections within a cohort of prisoners who inject drugs [28].

The mortality rate for HCV-induced liver disease in prisons is high. Chronic liver disease-related deaths accounted for 16% of deaths among male Texan prisoners from 1989 to 2003. Either hepatitis B virus (HBV) or HCV has been identified as a causal factor in more than one-third of chronic liver disease-related deaths [29].

### **Health care for prison inmates**

Prisoners are entitled, without discrimination, to a standard of health care equivalent to that available in the outside community, including preventive measures. This principle of equivalence is fundamental to the promotion of human rights and best health practice within prisons, and is supported by international guidelines on prison health and prisoners' rights, as well as national prison policy and legislation in many countries [30].

People should not leave custody in a worse condition or with poorer health than when they entered [18]. The period of incarceration should be viewed as a public health window of opportunity, including HCV testing, treatment, care and support [31]. There is consensus among international organisations that all blood-borne virus prevention, treatment and care interventions that are available in the community, including harm reduction interventions, must also be available to prisoners [32-34].

Effective and efficient prevention models that are applied in the community are very rarely implemented in custodial settings. Only about 60 out of more than 10,000 prisons worldwide provide needle exchange [35]. Thus, HCV prevention is almost exclusively limited to verbal advice, leaflets and other measures directed toward cognitive behavioural change. As HCV spreads primarily via injecting drug use in prisons, dependence-driven behaviour can be expected to predominate [36].

### **HCV screening in prisons**

Many people enter prison with social, medical, and mental health conditions and re-enter the community with few of these conditions having been addressed while incarcerated. Hepatitis C is one such condition, and its management challenges both the correctional and public health systems. Identifying all cases of HCV among inmates is an essential first step, but testing strategies for blood-borne viruses

and test coverage vary globally between jurisdictions. In some countries there is no testing procedure at all [37], while some use voluntary screening and others use a targeted approach. This situation suggests a need for ongoing surveillance using a standardized approach to reliably report prevalence. Ideally, surveillance should include collection of data on incident cases [5].

Screening for HCV infection and uptake of antiviral therapy are low in prisons. Uptake for screening ranges between 9% and 24% [38,39]. In a nationwide survey in the United States, only one of 36 states reported routine screening, and only one reported conducting a seroprevalence study in custodial care [6]. Of 3,034 new prisoners at Dartmoor Prison (England), 12% were screened, with 16% of these found to be seropositive. Seventy-nine percent of seropositive prisoners with a positive polymerase chain reaction result were confirmed as cases of positive viremia, and 27% of these prisoners had a biopsy. Two prisoners were eligible for treatment [40].

The results of a recent cost-effectiveness study [41] indicated that the introduction of dried blood spot testing compared to venipuncture for HCV case-finding was likely to be cost-effective in prisoners in the United Kingdom and the United States if a minimum level of continuity of care in treatment or referral between prison and the community could be ensured.

Qualitative research has described barriers to testing such as a lack of proactive approaches to offering testing, prisoners' fears and lack of knowledge about HCV, low motivation for testing, and concerns about confidentiality and stigma, which may mean fewer people are tested [42,43]. More work is needed to increase the level of testing in prisons.

### **HCV treatment for prisoners**

With good adherence, HCV treatment outcomes for incarcerated patients who take combination therapy (peg-interferon and ribavirin) are comparable to those observed in non-incarcerated patients at similar stages of disease [44,45]. Studies performed in custodial settings show acceptable results and sustained viral response (SVR) rates ranging between 36% and 66% [44-49].

Rates of HCV treatment completion and SVR observed in correctional populations have been similar to those reported in community samples [44,49]. The re-infection rate after successful antiviral treatment in prisons is low (7%) [50], and is comparable to re-infection rates outside of prisons. Antiviral treatment in prison also appears to be cost-effective according to a modelling study that looked at a US prison population [51].

Several groups have argued that correctional institutions are an important setting for health interventions such as screening, diagnosis, prevention, and treatment of HCV infection [52,53,73]. One of the reasons is that in prison it

is possible to monitor patients more closely, and to address side-effects and provide psychiatric care as necessary [54]. A second reason is that prisons provide an opportunity to engage with a difficult-to-reach population – incarceration may be the first or only time that many inmates intersect with the healthcare system. A third reason is that medical management and adherence to antiviral therapy require lifestyle stability, which can be provided by incarceration, particularly for offenders with a history of mental illness or substance abuse [53].

### **Programmes developed to improve HCV treatment in prison**

In a few studies, intervention programs were developed or tested to improve the management of hepatitis C in prisons. Arora S et al developed Project ECHO, a programme that utilized teleconferencing, videoconferencing, and e-mail communication to connect specialists with primary care providers in prisons and rural areas in order to improve access to quality health care for New Mexicans with hepatitis C. [55]. Through Project ECHO, 226 patients received interferon and ribavirin treatment for hepatitis C.

In the US state of New York, a programme was created to provide continuity of HCV treatment to prisoners upon their release. [56]. A referral process was developed, staff were mobilized, and health-care facilities in the community were recruited to accept referrals. This programme included 70 prisons and 21 health care facilities. Until March 2006, 24 inmates were enrolled.

Another treatment programme was developed in the North Dakota Department of Corrections and Rehabilitation. [57]. The treatment protocol followed National Institutes of Health guidelines for primary therapy for hepatitis C, with the exception of replacing weekly pegylated interferon administration with three-times-weekly consensus interferon administration. The programme resulted in sustained viral responses of 54% for genotype 1, 75% for genotypes 2 and 3, and 64% overall.

Research indicates that nurses play a crucial role in providing education, support and management of patients infected with hepatitis C [58-61]. The involvement of nurses enhances access to treatment, treatment adherence and response to treatment [58,61,62]. A recent study by Lloyd et al (Lloyd et al. 2013) evaluated the safety and effectiveness of a nurse model of care for inmates. In this study, treatment was initiated in 108 patients (28% of the 291 patients enrolled in the study) and the SVR rate among patients with complete follow-up data was 69%. This first prospective treatment programme in a prison setting demonstrated that the nurse-led model of hepatitis C care enhanced treatment uptake and reduced the burden of disease.

### Staff training and support

Staff training and support are important because all people working in prisons should be aware of blood-borne viruses and of the universal and special precautions that are recommended for preventing transmission. Training and support should be tailored to the needs of different types of staff working within and outside of health services. Prison administrators are advised to: [24,63].

- Provide target-group specific peer education and training on hepatitis and other communicable diseases, routes of transmission in the workplace (e.g., the risk of needle-stick injuries occurring during searches of cells), confidentiality, drug use, hepatitis prevention measures, hepatitis testing and treatment opportunities, drug dependence treatment, universal precautions and use of protective equipment, and the rationale for and content of prison rules and policies related to hepatitis to all prison staff as part of their initial training, and update this training on a regular basis during the course of employment.

- Ensure that the training of prison staff addresses hepatitis-related discrimination and homophobia, reduces staff opposition to the provision of hepatitis prevention measures to prisoners, emphasises the importance of confidentiality and non-disclosure of hepatitis status and medical information, and promotes the compassionate treatment of prisoners living with hepatitis. Ensure access to appropriate post-exposure prophylaxis and counselling.

### General recommendations

The following recommendations can be made regarding hepatitis C prevention, screening and treatment in prisons:

- Close collaboration between prison and public (or community) health services is needed (e.g. in order to facilitate community follow-up of treatment; [6,64]. Ensure continued hepatitis C treatment and care when there is movement between custodial settings, and when inmates receiving treatment re-enter the community [7,18,56].

- Incarcerated persons with risk factors for HCV infection should be screened for viral hepatitis infections [65].

- There is a need to develop approaches to increase the uptake of testing by raising awareness amongst prisoners about HCV infection, optimising testing pathways that support appropriate testing at appropriate times during a prisoner's stay in prison, ensuring adequate pre- and post-test discussion, and developing care pathways for HCV that enable seamless continuity of care [42]. Proven nurse-led intervention models could be transferred into the prison setting in order to guarantee guidance.

- Prisoners should be provided with substance abuse treatment. Opiate agonist therapy (methadone, buprenorphine or diacetylmorphine) should be administered to opiate-dependent subjects with hepatitis B and C infections in order to reduce the risks of transmission and re-infection.

- There is a need to provide sterile injecting equipment and other harm reduction measures to those who inject while in prison [66,67]. HCV-infected persons should be counselled on how to avoid transmitting HCV to others. [68]

- Health education activities (including peer education) should be carried out, in particular for inmates with no or minimal prior health education [69,70].

- Depression and psychosis, which are common in prison settings, occur with interferon treatment. It is essential to provide psychiatric evaluation of patients prior to and during treatment, in order to avoid or control the possible appearance of mental side effects [53,71].

- A multidisciplinary approach through the collaboration of addiction specialists, hepatologists, infectious disease experts, clinical psychologists, nurses and prison physicians should be adopted [72].

- If possible, a directly observed treatment (DOT) strategy, which ensures supervision of oral therapy administration and the injection of subcutaneous therapy by health care professionals, should be used, as occurs in anti-HIV and tuberculosis treatment in prison inmates [19].

### Conclusion

HCV prevalence is very high in prisons. Intravenous drug use while in prison is one of the most important risk factors. The utilization of harm reduction strategies in order to prevent transmission of HCV in prisons lags far behind similar efforts taking place outside of prisons. The scarcity of prison-based needle exchange programmes is a prominent example of this problem. Although testing for HCV in prisons should be a cornerstone in the health care of prison inmates, levels of screening for HCV infection and uptake of antiviral therapy in prisons are low. Since HCV treatment outcomes for incarcerated patients are comparable to those observed in non-incarcerated patient, programmes to improve HCV treatment in prison, staff support and recommendations regarding HCV have been developed and must be implemented. Treatment for HCV in prison should be routinely available and offered under standard guidelines and protocols equivalent to those applied in the community.

### Competing interests

The authors declare that they have no competing interests.

### Declarations

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