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Testa, AC; Weilandt, C; Ncube, F; Gill, ON (2006) HIV transmission in part of the US prison system: implications for Europe. *Euro surveillance*, 11 (5). E060525.2. ISSN 1025-496X

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Several studies in developed countries have reported increases in mental health problems such as anxiety, depression, sleeplessness, and post-traumatic stress disorder among flood victims [6]. A recent survey of flooded individuals and a reference group of non-flooded individuals from the same area of residence in the United Kingdom [8] found a fourfold increase in psychological distress among adults whose homes were flooded compared with those whose homes were not (RR=4.1, 95% CI: 2.6,6.4). The risk estimates for physical illness in adults declined after adjustment for psychological distress, while psychological distress remained strongly associated with flooding after adjustment for physical illnesses. Other previous studies reported behaviour change in children as increased bedwetting and aggression [9].

There is some evidence that diarrhoea disease increases after flooding, particularly in developing countries, but also in Europe [6]. A recent UK study reported an increase in self-reported gastroenteritis associated with flooding and with increasing risk the greater the depth of household flooding (RR 1.7 [0.9,3.0] p for trend by flood depth = 0.04) and an increase in earache (RR 2.2 [1,4.1]) [7]. The large displacement of population that occurs after flooding, and poor sheltering conditions and crowding may also contribute to increase the risk of diarrhoeal and respiratory infections. Other studies refer to evidence of flood-associated outbreaks of leptospirosis in a wide range of countries, including Portugal (1969), the Russian Federation (1997), and the Czech Republic (2003) [3,6,10]. Transmission is believed to be promoted by skin and mucous membrane contact with water, damp soil, vegetation or mud contaminated with rodent urine. Prompt recognition of the disease and early treatment of cases is essential to minimise the impact of the outbreak.

Floods may lead indirectly to an increase in vectorborne diseases through the expansion in the number and range of vector habitats. Standing water caused by heavy rainfall or overflow of rivers can act as breeding sites for mosquitoes, and therefore enhance the potential for exposure of the disaster-affected population and emergency workers to infections such as dengue, malaria and West Nile fever. Flooding may initially flush out mosquito breeding, but this will return when the waters recede. Malaria epidemics in the wake of flooding are a well-known phenomenon in malaria-endemic areas worldwide. West Nile fever has emerged in Europe after heavy rains and flooding, with outbreaks in Romania in 1996-97, in the Czech Republic in 1997 and Italy in 1998 [3]. There is also an increased risk of infection of diseases contracted through direct contact with polluted waters, such as wound infections, dermatitis, conjunctivitis, and ear, nose and throat infections.

The effects in developed regions, such as Europe, may be different to those in developing regions. The World Health Organization Regional Office for Europe has been developing several programmes related to assessing the health effects of climate changes, including flooding, such as the project Climate Change and Adaptation Strategies for Human Health (cCASHh) [11] that covers aspects of impact and adaptation assessment for possible climate-related health outcomes in Europe. The recent Rapid Health Assessment of Flooding in Bulgaria [12], reported in 2005, covers the main public health issues that should be considered during and after a flood and is one of the most consistent documents on assessing the current situation and providing recommendations for local response to flooding.

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HIV TRANSMISSION IN PART OF THE US PRISON SYSTEM: IMPLICATIONS FOR EUROPE

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Published online 25 May 2006

Citation: *Euro Surveill* 2006;11(5):E060525.2. Available from: <http://www.eurosurveillance.org/ew/2006/060525.asp#2>

A study in the United States (US) [1] has shown that HIV transmission has been occurring within the prison system in the state of Georgia. Between July 1988 and February 2005, 88 prisoners tested HIV-antibody negative at mandatory testing on entry to prison, and HIV-antibody positive in a subsequent requested test, indicating seroconversion during incarceration. Risk behaviours in prison, specifically sex between men and tattooing, were associated with HIV seroconversion. The estimated HIV prevalence in the US prison population is 2% [2], and a number of European countries have a considerably higher prison HIV prevalence, in some cases, more than 10% [3]. Considering the high HIV prevalence among prisoners in some European countries, and the limited number of HIV prevention and harm reduction programmes currently in place, the US study highlights the need to address and prevent bloodborne virus transmission among prisoners in Europe [4].

The US study found that those prisoners who had seroconverted to HIV were ten times more likely to report sex between men in prison than matched controls (adjusted odds ratio [AOR] 10.1, p-value<0.01), and fourteen times more likely to have been tattooed while in prison (AOR 13.7, p-value=0.01). To a lesser degree, characteristics also associated with seroconversion in prison were having a body mass index ≤ 25 kg/m² on entry to prison (AOR 3.8, p-value=0.02), and being of black race (AOR 3.7, p-value=0.03). Prisoners themselves suggested that HIV prevention in prisons should include condom distribution (38%), HIV education (22%), and safe tattooing practices (13%). The study concluded that this clear evidence of transmission within the prison system indicated that effective HIV prevention is needed in prisons.

Injecting drug users and prisons in Europe

HIV prevalence in European prisons has been associated with injecting drug use and tattooing [5,6,7,8], but continuing HIV transmission within prisons has never been documented. Similar to other Western countries, injecting drug users are overrepresented among the European prison population [4]. A recent study among drug users in 10 European cities reported that 60% had injected drugs in the past year and 55% had already been imprisoned [9]. Studies indicate that between 8% and 60% of prisoners in Europe have used drugs in prison, including intravenously [10]. In common with the United States, European prisoners are more likely than the general population to be HIV-infected, inject drugs and share injecting equipment if they continue to inject in prison [11]. Imprisonment rates in western Europe are typically 50-100 per 100 000 population [3]. However, in the Russian Federation, the rate is 600 per 100 000 population [3], second only to the US, where the rate is over 700 per 100 000 population [12].

The prevalence of HIV in European prisons varies between less than 1% in England to 11% in Portugal and 12% in Estonia [3]. Together with high rates of imprisonment among injecting drug users, of whom about one half continue to inject in prison, and evidence of other risk behaviours for HIV transmission including sex between men and tattooing, HIV and its prevention in prisons is of considerable importance in Europe. While there is growing evidence that HIV transmission in prisons can be reduced [13], current prison HIV prevention and harm reduction provision within Europe remains scarce and frequently inferior to provision in the community.

Evidence that harm reduction and prevention programmes in prisons are effective

A review of prison-based syringe exchanges in Europe found that, overall, reported drug use decreased or remained stable over time, and that syringe sharing declined dramatically. In addition, no new cases of HIV, hepatitis B or hepatitis C transmission were reported [14]. Despite the evidence supporting the value of prison needle and syringe exchange, Spain is the only European country with a systematic programme [10]. Similarly, other HIV harm reduction measures such as substitution treatment, distribution of disinfectant tablets and condoms and other evidence based harm reduction programmes are lacking or underdeveloped and uncoordinated in European prisons.

The WHO Declaration on Prison Health as Part of Public Health calls for equivalent healthcare provision in prisons and the community [15]. Nonetheless, prison health in many European countries continues to be controversial, with relatively little advocacy for equal health protection among prisoners, many of who represent a number of marginalised populations including injecting drug users and other substance misusers, the homeless, and individuals with complex mental health needs. Controversy over healthcare provision in prisons has proved a challenge to implementing HIV harm reduction strategies, despite increasing recognition that good prison health is good public health. Missing the opportunity to address and prevent HIV transmission in prisons will result in failure to prevent HIV transmission in the community, since most prisoners are eventually released from prison and return to being citizens. The opportunity to prevent infectious disease, including HIV, in both prisons and the community is a significant and frequently unrecognised element of public health protection.

Conclusions

The demonstration of HIV transmission in prisons in part of the US highlights the following implications for European prisons:

- The value of testing programmes for bloodborne viruses that disproportionately affect the European prison population by screening on reception to and on release from prison, with tests available on request throughout the period of imprisonment.
- The importance of implementing HIV and other bloodborne

virus prevention interventions in prisons, such as harm reduction strategies, to ensure both prison and community public health protection, since released prisoners can act as a bridge to the community for infectious disease acquired in prison.

- The need for prison-specific advocacy and commitment on the political and public health agendas.
- The need to include prison staff in all stages of prevention and harm reduction.
- The need for joint efforts by all professionals working in prisons, decision makers (such as the relevant government ministries, prison administrations, and nongovernmental organisations) and international bodies (such as WHO and the United Nations Office on Drugs and Crime) to address infectious disease prevention in prisons.
- The need to adapt and introduce into prisons harm reduction approaches proven to be cost-effective and efficient in the community.

More information on drugs and infections in European prisons can be found at <http://www.endipp.net>, the website of the European Network on Drugs and Infections Prevention in Prison (ENDIPP). ENDIPP is a Europe-wide, multidisciplinary network that is active in all 25 EU member states and accession countries, and co-funded by the European Commission's Public Health Programme.

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