Challenges and opportunities for the management of infectious diseases in Europes' prisons: evidence-based guidance

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People in prison have multiple complex health and social care needs. These are likely to be the result of a combination of overlapping, and sometimes interlinked, risk factors for infection, ill-health, and incarceration, such as problem drug use. Incarceration can represent a unique opportunity to make high-quality health care available to people in prison and to target socially deprived groups who are often medically underserved when living in the community they originate from. In recent years, international and European institutions have increasingly acknowledged the importance of treating prison health as an inseparable component of public health. However, numerous challenges hamper the successful implementation of such a concept, including the need for evidence-based decision making, intersectoral partnerships, and better monitoring systems. New initiatives are ongoing in the EU that might contribute to bring about positive changes, such as the publication of the first evidence-based public health guidance on prevention and control of communicable diseases in prison settings.

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Introduction

UNAIDS stated that "Prisoners are the community. They come from the community, they return to it. Protection of prisoners is protection of our communities".[1]

People in prison have multiple complex health and social care needs, including a higher prevalence of communicable diseases than in the general population.[2] These are probably due to a combination of overlapping, and sometimes interlinked, risk factors for infection, ill-health, and incarceration, such as problem drug use.[3–5]

Taking these challenges into consideration, incarceration might present a unique opportunity to make high-quality health care available to people in prison[6] and to target socially deprived groups who are often medically underserved when living in the community they originate from.[7] In recent years, international and European institutions have increasingly acknowledged the importance of treating prison health as an inseparable component of public health.[4,8,9] At the EU level, growing importance is being attached to Member States ensuring common minimum standards in prisons and exchanging best practices.[4,9] This is also a reflection of an increasing awareness of the principle of equivalence of care between community and prison (panel 1),[8] which is an internationally agreed standard enshrined in European and international prison rules.[9,10]

A public health approach to health protection in prisons

According to the latest data from 2016, about 590 000 people are held in prison on any given day in the 28 Member States of the EU. There are considerable differences between countries in the number of prisoners per 100 000 population,[11] with rates varying from 51 in the Netherlands to over 200 in the Czech Republic, Estonia, Latvia, and Lithuania. The median age of the prison population ranges from 31 years in Denmark to 46 years in Latvia. The EU prison population has a complex sociodemographic composition, with 19% of prisoners not nationals of the country of detention, and is characterised by a high turnover, with a median detention of 8·8 months.[11]

It is widely recognised that imprisonment and turnover of the prison population have an important role in the mechanism of disease concentration and increased risk of transmission.[3,12] Yet, evidence on the infectious disease burden in the prison population remains scarce. Prevalence estimates of viral hepatitis in prison are available from just over a third of EU countries, and reported a much higher proportion of infected individuals than among the general population; ranging, from 0·3% to 25·2% for hepatitis B virus (HBV) and from 4·3% to 86·3% for hepatitis C virus (HCV).[13] Similarly, for HIV, prevalence estimates in prisons were available for half of the EU countries, ranging from 0·2% to 15·8%.[14]

Systematic EU-wide reporting on new diagnoses in prison settings is available only for active tuberculosis. The most recently reported rate, in 2016, was 158·9 per 100 000 people in detention in the EU, with wide variations between countries.[15] Overall, the relative risk of detecting active tuberculosis in prison is ten times higher than in a community setting.[15,16] Additionally, data from single EU country studies indicated a higher prevalence of latent tuberculosis among the prison population.[15–17] Findings from a systematic review suggest that the risk of latent tuberculosis is also considerably higher in prisons than in the general population.[16] Despite the likelihood of a sizeable disease burden from sexually transmitted infections (STIs), influenza, and other outbreak-prone diseases in prison settings, we could not retrieve EU-representative information on these. In the context of an ageing prison population in many countries of the European Economic Area,[11] such a high underlying prevalence of communicable diseases is of further concern for its potential to exacerbate non-communicable diseases course and clinical outcome in growing numbers of polymorbid patients.[2,4,18]

***Panel 1*: Rule 24 of the The United Nations Standard Minimum Rules for the Treatment of Prisoners**

1. The provision of health care for prisoners is a State responsibility. Prisoners should enjoy the same standards of health care that are available in the community, and should have access to necessary health-care services free of charge without discrimination on the grounds of their legal status.
2. Health-care services should be organised in close relationship to the general public health administration and in a way that ensures continuity of treatment and care, including for HIV, tuberculosis, and other infectious diseases, as well as for drug dependence.

Drug use disorders (ie, substance abuse or dependence) are also dispro-portionally prevalent in prison; it is estimated that 30% of incarcerated men and 51% of incarcerated women are affected.[19] Available data on people who inject drugs show an association between infection with HIV and HCV and prison history, with longer incarceration linked to a higher prevalence.[20,21] Yet when harm reduction and treatment services, such as opioid substitution, are introduced in prisons they tend to have a considerable time lag,[22] and only some EU countries attain a level of coverage in prisons comparable to that available in the community.[23]

Additionally, poor infrastructure, overcrowding, inadequate health-care facilities, and delayed diagnoses are recognised risk factors for communicable disease transmission in prison settings,[24] as are the challenges of delivering health care in this environment.[25] However, although security is the primary concern of prison systems, there is increasing recognition of the role of health-care services in supporting safe and effective incarceration regimens and of the formal partnership work required to deliver a high-quality health system in prisons.[26]

The case for targeting prison populations

The delivery of health protection and harm reduction public health programmes in prisons not only benefits the prison population but also can reduce the risk of transmission of some infectious diseases in the community by targeting high transmission networks within or linked to prison populations, and by intervening earlier in the natural history of some diseases. This benefit of prison-based interventions for wider public health is referred to as the community dividend,[27] an approach well validated for diseases such as tuberculosis, historically considered a challenge in prison settings, or treatment of substance dependence, and with high potential for HCV, for which prevention and control interventions have rapidly developed in recent years.

The call for viral hepatitis to be eliminated as a public health threat by 2030 has created global momentum.[28] Prisons are an obvious target for microelimination initiatives, yet little has been done. Recent initiatives in countries such as the UK show the potential for HCV case detection when universal active case finding is done on admission. The advent of directly active antiviral (DAA) regimens has provided new opportunities to treat more patients with fewer clinical restrictions, lower side-effects, and in a much shorter time,[30] so that a treatment course can now be completed during the average prison stay. Accumulating evidence proves that the use of interferon-free, DAA-based treatment regimens in prison settings is feasible and well tolerated,[31] building on previous findings showing the equivalence of clinical outcomes between prison-based and community-based pre-DAA treatment.[32] In a scenario of increasing HCV treatment provision and declining cost of drugs, recent modelling studies have consistently predicted a decline in HCV incidence and prevalence in the general population following a scaling up of case finding and DAA-based HCV treatment in prison settings, making it an increasingly more attractive and financially sustainable intervention.[33–35]

A similar trajectory has been reported for another disease disproportionally affecting prison populations: HBV. A study from Scotland showed that intensifying the offer of HBV vaccination to people in prisons has resulted in an increased uptake and has been mirrored in increased coverage among people who inject drugs in the community.[36]

Despite the opportunities prison health care offers, little attention is given to it, which is reflected in the low priority it repeatedly receives in public health agendas.[14] At a national level this is also implicit in the absence of standardised monitoring of health interventions in prison compared with that in the community, in insufficient sharing of available data on access to and coverage of core interventions for the prevention and control of communicable diseases, and in the absence of exchange of good practice across the EU. In this context, the European Centre for Disease Prevention and Control and the European Monitoring Centre for Drugs and Drug Addiction (EMCDDA) have joined forces to produce the first European evidence-based public health guidance focusing on the prevention and control of communicable diseases in prison settings, with the aim of supporting EU countries in planning and implementing effective national strategies and programmes in this field.

The European public health guidance and the need for evidence-based decision making for prison health

In the past 20 years, the recognition of the value of evidence-based decision making in areas such as public health has resulted in this approach becoming mainstream. However, prison health has been at the margins of this transformation, not least because of the scarcity of related research.

The European guidance development followed the evidence-based medicine approach and several systematic literature reviews were done to collate and appraise the evidence.[17,31,37–39] The findings were assessed in detail by a multisectoral group of European prison experts, taking into account population subgroups, implementation challenges, and existing service delivery models in EU countries. The whole process was framed by the broader principles of health equity and human rights protection of people in prison, essential attributes of any intervention in prison settings to counterpoise the scarce agency of people in prison.[8,9] Taking inspiration from the five principles defined by WHO for HIV testing services (consent, confidentiality, counselling, correct results, and connection),[40] a so-called seven Cs framework was developed, covering two additional specific aspects of prison-delivered health care: continuity of care after incarceration and post release, and a supportive culture in the prison system. The resulting public health guidance[41,42] was published in 2018, and main conclusions are summarised in panel 2.

However, the guidance development process was hampered by the shortage of published data. The retrieved evidence base was largely of low quality, with very few comparative studies, and substantially reliant on grey literature sources. Prisons are probably one of the most challenging environments for conducting scientific research because of access problems for external researchers, and other discouraging factors affecting research planning and management, including ethical issues, a shortage of staff trained in conducting research, and competing pressures in the responsible institutions.[4]

To fill existing knowledge gaps, more research done in EU countries is needed. The Worldwide Prison Health Research and Engagement Network might contribute to speed up this process, not only in Europe, but globally (panel 3).

Prison health in practice: the need for intersectoral partnerships

A solid evidence base would certainly promote change but might not solve all the challenges. Providing high-quality health-care services requires synergic efforts from several actors and at different levels.

First, prisons and prison health-care services are highly interdependent, because health-care services cannot deliver high-quality health care in prisons without co-operation from the correctional system, and the prisons cannot deliver prison services that meet international standards without good health-care services.[44] WHO has published guidance for policy makers advocating that managing and coordinating all relevant agencies and resources that contribute to the health and wellbeing of prisoners is a shared responsibility of all governmental departments and that ministries of health should provide, and be accountable for, prison health-care services.[45] A momentum for change has been building since the end of the 1990s, as governance of prison health in several large European countries, such as Finland, France, Italy, Norway, and the UK,[46] has moved into the remit of the relevant ministries of health. Where they occurred, such transition resulted in improved resources and funding for key prison health issues, enhanced performance of the health services, and the inclusion of prisoners in a major public health initiative.[45] In the UK a recent review found that, since 2006, the quality of prison health care improved when commissioning of prison health services was transferred to the National Health Service.[47] Independence of health-care services from prison administration and penitentiary staff

Panel 2*: Key conclusions from the European guidance on prevention of infectious diseases in prison setting

Active case finding in prison settings[42,43]

Blood-borne viruses

Actively offer testing for HBV, HCV, and HIV to all people in prison upon admission and throughout the time in prison. Evidence shows that proactive provision leads to higher uptake; health promotion and peer education have shown to increase HIV testing uptake.

Sexually transmitted diseases

Several testing approaches can be considered, including risk based, age based, or universal testing. Evidence shows that active testing often leads to higher uptake than client-initiated testing.

Tuberculosis (active and latent)

Actively offer universal provider-initiated testing for active tuberculosis at prison intake. Offering latent tuberculosis infection testing can be considered, at least for individuals at high risk of disease progression, depending on local epidemiology and the availability of resources.

BBV prevention and control in prison settings[41,43]

Prevention

Offer a comprehensive package of preventive measures to people in prison that meets the same national standards as that recommended for community settings. Evidence shows that condoms and behavioural interventions promote safer sex; opioid substitution treatment reduces illicit opioid use and risks related to equipment sharing and, when continued on release, provides protection from death caused by overdose; and provision of clean drug injection equipment is possible in prison settings and can successfully contribute to a comprehensive programme to reduce BBV transmission.

Offer HBV vaccination to people in prison with unknown or negative serology. Evidence shows that using rapid schedules can result in a higher completion rate.

HIV and viral hepatitis treatment

Offer appropriate treatment to individuals diagnosed with HIV, HBV, or HCV in prison settings, in line with national or international guidelines; provision meeting the same standards as in the community. Evidence shows that treatment of BBV infections is feasible and effective in prison.

Continuity of care

Actively support and ensure continuity of care between prison and community. Evidence shows that release from prison is a key barrier to drug and infectious diseases treatment continuity and adherence; collaboration and partnership between prison and community health-care services promote and facilitate uninterrupted care; and active referral to external services improves treatment adherence.

HBV=hepatitis B virus. HCV=hepatitis C virus. BBV=blood-borne virus. *Reproduced from the European Centre for Disease Prevention and Control, by permission of the European Monitoring Centre for Drugs and Drug Addiction. For more background and detail see published guidance documents.[41–43]

Panel 3: Resources for quality improvement in prison health care

WEPHREN

Public Health England, in partnership with The Global Health Network and the WHO Regional Office for Europe, launched an initiative to substantially speed up evidence production and evidence gathering: the Worldwide Prison Health Research & Engagement Network (WEPHREN) is an open access international collaborative forum aiming to improve the health of people in prison through developing the evidence base, disseminating important research findings, fostering effective collaborative networks, and capacity building and professional development initiatives. It is open for participation from prison health policy makers, planners, and researchers.

For more on **WEHPREN** see https://wephren.tghn.org

EMCDDA

The EMCDDA is a specialised EU agency in charge of monitoring the drug situation in Europe. Data on drug use and related health problems in prison, as well as on responses to drug use in prison in the 28 EU Member States, Norway, and Turkey, are reported annually in the European drug report: trends and developments, and the Statistical Bulletin, and every 3 years in the European guide on health and social responses to drug problems. Based on a common monitoring framework, and in synergy with other tools, a European Questionnaire on Drug Use among Prisoners (EQDP) for cross-sectional prison surveys is available and a tool for standardised data collection on drug-related interventions in prison is in development

For more on **EMCDDA** see http://www.emcdda.europa.eu/topics/prison_en

HIPED

As the only WHO prison programme anywhere in the world, the Partnership for Health in the Criminal Justice System at the WHO Regional Office for Europe is a platform for information dissemination, networking, and good practice sharing in the area of prison health. With contributions from partners representing the main areas of the field, the platform, which is the first of its kinds, provides resources for policy makers, researchers, and members of the public interested in prison health. This includes the minimum public health dataset, the Health in Prisons European Database (HIPED), which covers data on the main areas of prison health, including prison health systems; the prison environment; risk factors for diseases; and the screening, prevention, treatment, and prevalence of communicable and non-communicable diseases.

For more on **HIPED** see http://apps.who.int/gho/data/node.prisons

is considered an enabling factor for patient's confidentiality and the respect of the patient–doctor relationship, a further guarantee of medical standards and ethics, and an essential requirement to prevent conflicts related to dual loyalty for health professionals.[4,45,48]

Transition care, or throughcare, is perhaps the best example of the need for partnership working in delivering health care in prison. It has long been identified as the weakest link in the effective management of admitting individuals with drug use disorders or special health needs (eg, chronic diseases, HIV infection, tuberculosis treatment, and mental health disorders) into prison, transferring them between prisons, and their re-entry into the community.[4] Although many factors can hinder a smooth transition, perhaps the most relevant are the separate spheres of influence and institutional responsibility and the challenges of intersectoral cooperation. These are aggravated by operational and individual issues, such as a scarcity of integrated health information systems that allow sharing of an individual's clinical data between prison and community health services, and by reliance on the self-agency of the patient to access community services post release, which is often missing.[37]

Institutional partnerships would need to trickle down to operational level and promote integration of practices and collaboration between professionals working in prisons. For example, in the Czech Republic, successful co-ordination between health and correctional services led to the introduction of a condom distribution programme in one prison.[49]

Monitoring: an essential tool for improving prison health

Supporting quality improvement in prison health care and addressing equivalence of care requires transparency, high-quality data collection, and performance monitoring.[47] To achieve this improvement, prison health would ideally be integrated into the overarching national health-monitoring system, yet this is seldom the case in EU countries.

Actively monitoring all elements of prison health and health-care provision using standardised data collection tools would not only contribute to better estimating the disease burden and correlated health needs, but also create the basis for adequate resource allocation. Ultimately, epidemiological and programmatic data from the prison system could be integrated into national and international data collection and inform comprehensive public health policy and planning.

Developmental work in this direction is ongoing at the European level, with the design of common tools for prison health data collection that build on existing data and information sources (panel 3). These unique regional initiatives can hopefully serve as a catalyst for similar activities elsewhere, to advance global exchange of experiences and benchmarking.

Conclusions

The international standard of equivalence and continuity of care between prisons and the community[8] is a silver thread connecting the 2003 WHO Moscow Declaration, which recognised the essential need for integration between public health services and prison health,[50] with the conclusions of the European prison health meeting in Lisbon,[51] organised by WHO, EMCDDA, and Public Health

England, which showed the value of evidence-based interventions. Despite many remarkable improvements in equivalence of care during the 15 years between these events, much work remains to be done to ensure that prison health is truly seen as part of wider public health. It is also evident that there has never been a more compelling case for integration to protect the health of people who live or work in prisons, and that of the wider community, from communicable diseases, or a clearer need for better data and evidence to inform policy and practice.

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Declaration of interests
We declare no competing interests.

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References

1 Joint UN Programme on HIV/AIDS. Statement by UNAIDS to the UN Commission on Human Rights. Geneva: UNAIDS, 1996.
2 Dolan K, Wirtz AL, Moazen B, et al. Global burden of HIV, viral hepatitis, and tuberculosis in prisoners and detainees. *Lancet* 2016; **388:** 1089–102.
3 Kamarulzaman A, Reid SE, Schwitters A, et al. Prevention of transmission of HIV, hepatitis B virus, hepatitis C virus, and tuberculosis in prisoners. *Lancet* 2016; **388:** 1115–26.
4 WHO Europe Office. Prisons and health. Copenhagen: WHO Regional Office for Europe, 2014.
5 Moazen B, Saeedi Moghaddam S, Silbernagl MA, et al. Prevalence of drug injection, sexual activity, tattooing, and piercing among prison inmates. *Epidemiol Rev* 2018; **40:** 58–69.
6 Baybutt M, Chemlal K. Health-promoting prisons: theory to practice. *Glob Health Promot* 2016; **23** (suppl 1)**:** 66–74.
7 Dumont DM, Brockmann B, Dickman S, Alexander N, Rich JD. Public health and the epidemic of incarceration. *Annu Rev Public Health* 2012; **33:** 325–39.
8 UN General Assembly. The United Nations standard minimum rules for the treatment of prisoners (the Nelson Mandela rules). 2015. https://www.unodc.org/documents/justice-and-prison-reform/GA-RESOLUTION/E_ebook.pdf (accessed Oct 11, 2018).
9 Council of Europe. European Prison Rules. Strasbourg: Editions du Conseil de l'Europe, 2006.
10 European Court of Human Rights. Factsheet—prisoners' health-related rights. https://www.echr.coe.int/Documents/FS_Prisoners_health_ENG.pdf (accessed Oct 11, 2018).
11 Aebi MF, Tiago MM, Berger-Kolopp L, Burkhardt C. SPACE I—Council of Europe annual penal statistics: prison populations. 2016. http://wp.unil.ch/space/files/2018/03/SPACE-I-2016-Final-Report-180315.pdf (accessed April 19, 2018).
12 Ndeffo-Mbah ML, Vigliotti VS, Skrip LA, Dolan K, Galvani AP. Dynamic models of infectious disease transmission in prisons and the general population. *Epidemiol Rev* 2018; **40:** 40–57.
13 Falla AM, Hofstraat SHI, Duffell E, Hahné SJM, Tavoschi L, Veldhuijzen IK. Hepatitis B/C in the countries of the EU/EEA: a systematic review of the prevalence among at-risk groups. *BMC Infect Dis* 2018; **18:** 79.
14 European Centre for Disease Prevention and Control. Thematic report, prisoners: monitoring implementation of the Dublin Declaration on Partnership to Fight HIV/AIDS in Europe and Central Asia: 2014 progress report. 2015. https://ecdc.europa.eu/sites/portal/files/media/en/publications/Publications/dublin-declaration-prisoners-2014.pdf (accessed April 19, 2018).
15 ECDC. Tuberculosis surveillance and monitoring in Europe 2017. Stockholm: European Centre for Disease Prevention and Control, 2018.
16 Baussano I, Williams BG, Nunn P, Beggiato M, Fedeli U, Scano F. Tuberculosis incidence in prisons: a systematic review. *PLoS Med* 2010; **7:** e1000381.
17 European Centre for Disease Prevention and Control. Systematic review on the diagnosis, treatment, care and prevention of tuberculosis in prison settings. 2017. https://ecdc.europa.eu/sites/portal/files/documents/Systematic-review-tuberculosis-in-prisons-May2017.pdf (accessed April 19, 2018).
18 Gates ML, Hunter EG, Dicks V, Jessa PN, Walker V, Yoo W. Multimorbidity patterns and associations with functional limitations among an aging population in prison. *Arch Gerontol Geriatr* 2018; **77:** 115–23.
19 Fazel S, Yoon IA, Hayes AJ. Substance use disorders in prisoners: an updated systematic review and meta-regression analysis in recently incarcerated men and women. *Addiction* 2017; **112:** 1725–39.
20 Wenz B, Nielsen S, Gassowski M, et al. High variability of HIV and HCV seroprevalence and risk behaviours among people who inject drugs: results from a cross-sectional study using respondent-driven sampling in eight German cities (2011–14). *BMC Public Health* 2016; **16:** 927.
21 Stone J, Fraser H, Lim A, et al. Incarceration history and risk of HIV and hepatitis C virus acquisition among people who inject drugs: a systematic review and meta-analysis. *Lancet Infect Dis* 2018; **3099:** 1–13.
22 Hedrich D, Alves P, Farrell M, Stöver H, Møller L, Mayet S. The effectiveness of opioid maintenance treatment in prison settings: a systematic review. *Addiction* 2012; **107:** 501–17.
23 European Monitoring Office for Drugs and Drug Addiction. Health and social responses to drug problems: a European guide. 2017. http://www.emcdda.europa.eu/system/files/publications/6343/TI_PUBPDF_TD0117699ENN_PDFWEB_20171009153649.pdf (accessed April 19, 2018).
24 Hayton P, van den Bergh B, Moller L. Health protection in prisons: the Madrid Recommendation. *Public Health* 2010; **124:** 635–36.
25 Ginn S. Prison environment and health. *BMJ* 2012; **345:** e5921.
26 HM Government. National partnership agreement for prison healthcare in England. 2018. https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/697130/moj-national-health-partnership-2018–2021.pdf (accessed April 19, 2018).
27 Public Health England, Revolving Doors Agency, Home Office. Rebalancing act: a resource for directors of public health, police and crime commissioners and other health and justice commissioners, service providers and users. 2017. http://www.revolving-doors.org.uk/file/2049/download?token=4WZPsE8I (accessed April 19, 2018).
28 WHO. Combating Hepatitis B and C To reach elimination by 2030. 2016. https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/697130/moj-national-health-partnership-2018–2021.pdf (accessed April 19, 2018).
29 Public Health England. BBV bulletin: special edition quarterly update report of the introduction of opt-out BBV testing in prisons from PHE, NHS England and HMPPS. 2017. https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/666850/BBV_bulletin_Dec_2017.pdf (accessed April 19, 2018).
30 Pawlotsky J-M, Negro F, Aghemo A, et al. EASL recommendations on treatment of hepatitis C 2018. *J Hepatol* 2018; **69:** 461–511.

31 Vroling H, Oordt-Speets AM, Madeddu G, et al. A systematic review on models of care effectiveness and barriers to hepatitis C treatment in prison settings in the EU/EEA. *J Viral Hepat* 2018; **25:** 1406–22.

32 Aspinall EJ, Mitchell W, Schofield J, et al. A matched comparison study of hepatitis C treatment outcomes in the prison and community setting, and an analysis of the impact of prison release or transfer during therapy. *J Viral Hepat* 2016; **23:** 1009–16.

33 Stone J, Martin NK, Hickman M, et al. Modelling the impact of incarceration and prison-based hepatitis C virus (HCV) treatment on HCV transmission among people who inject drugs in Scotland. *Addiction* 2017; **112:** 1302–14.

34 He T, Li K, Roberts MS, et al. Prevention of hepatitis C by screening and treatment in U.S. prisons. *Ann Intern Med* 2016; **164:** 84–92.

35 Martin NK, Vickerman P, Brew IF, et al. Is increased hepatitis C virus case-finding combined with current or 8-week to 12-week direct-acting antiviral therapy cost-effective in UK prisons? A prevention benefit analysis. *Hepatology* 2016; **63:** 1796–808.

36 Palmateer NE, Goldberg DJ, Munro A, et al. Association between universal hepatitis B prison vaccination, vaccine uptake and hepatitis B infection among people who inject drugs. *Addiction* 2018; **113:** 80–90.

37 European Centre for Disease Prevention and Control, European Monitoring Office for Drugs and Drug Addiction. Systematic review on the prevention and control of blood-borne viruses in prison settings. 2018. https://ecdc.europa.eu/sites/portal/files/documents/Prevention-control-BBV-prison-settings-systemativ-review.pdf (accessed Oct 9, 2018).

38 European Centre for Disease Prevention and Control, and the European Monitoring Centre for and Drugs. Systematic review on active case finding of communicable diseases in prison settings. 2017. https://ecdc.europa.eu/sites/portal/files/documents/Systematic-review-on-communicable-diseases-in-prison-settings-final-report.pdf (accessed April 19, 2018).

39 Tavoschi L, Vroling H, Madeddu G, et al. Active case finding for communicable diseases in prison settings: increasing testing coverage and uptake among the prison population in the European Union/European Economic Area. *Epidemiol Rev* 2018; **40:** 105–20.

40 WHO. Consolidated guidelines on HIV testing services. 2015. https://www.who.int/hiv/pub/guidelines/hiv-testing-services/en/ (accessed April 19, 2018).

41 European Centre for Disease Prevention and Control, European Monitoring Office for Drugs and Drug Addiction. Public health guidance on prevention and control of blood-borne viruses in prison settings. https://ecdc.europa.eu/sites/portal/files/documents/Guidance-on-BBV-in-prisons.pdf (accessed Oct 9, 2018).

42 European Centre for Disease Prevention and Control, European Monitoring Office for Drugs and Drug Addiction. Public health guidance on active case finding of communicable diseases in prison settings. https://ecdc.europa.eu/sites/portal/files/documents/Active-case-finding-communicable-diseases-in-prisons.pdf (accessed April 19, 2018).

43 European Monitoring Office for Drugs and Drug Addiction, European Centre for Disease Prevention and Control. Prevention and control of blood-borne viruses in prison settings: selected findings from ECDC and EMCDDA scientific guidance. 2018. http://www.emcdda.europa.eu/system/files/publications/9104/TD0318053ENN_final.pdf (accessed Nov 7, 2018).

44 European Committee for the Prevention of Torture and Inhuman or Degrading Treatment or Punishment. Developments concerning CPT standards in respect of imprisonment. 2001. https://rm.coe.int/16806cd24c (accessed April 19, 2018).

45 WHO Regional Office for Europe. Good governance for prison health in the 21st century. 2013. http://www.euro.who.int/__data/assets/pdf_file/0017/231506/Good-governance-for-prison-health-in-the-21st-century.pdf?ua=1 (accessed April 19, 2018).

46 WHO Europe Office. GHO, health in prisons European database (HIPED), prison health care oversight. http://apps.who.int/gho/data/node.prisons.Prison_Health_Care_Oversight?lang=en (accessed Oct 22, 2018).

47 Leaman J, Richards AA, Emslie L, O'Moore EJ. Improving health in prisons—from evidence to policy to implementation—experiences from the UK. *Int J Prison Health* 2017; **13:** 139–67.

48 Pont J, Enggist S, Stöver H, Williams B, Greifinger R, Wolff H. Prison health care governance: guaranteeing clinical independence. *Am J Public Health* 2018; **108:** 472–76.

49 Mravčik V. Pilot condom distribution in a Czech prison. https://harmreduction.eu/HA-REACT-Czech-condom-distribution.pdf (accessed April 19, 2018).

50 WHO Regional Office for Europe. Declaration on prison health as part of public health (adopted in Moscow on 24 October 2003). 2003. http://www.euro.who.int/__data/assets/pdf_file/0007/98971/E94242.pdf (accessed April 19, 2018).

51 WHO Europe Office. Conclusions of the WHO international meeting on prisons and health Lisbon 2017. https://rm.coe.int/final-version-lisbon-conclusions/16807af4b1 (accessed May 3, 2018).