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Infection diseases in the prisons: a public health warming. Priority action to protect general community

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Summary

■ ***The infectious diseases are the most prevalent illnesses in prisoners, and they have a relevant burden for the society. Several studies have shown that the screening and the treatment of the infectious diseases inside prisons may be effective in reducing their burden in the general community.***
The main aim of the study was to determine between 2019-2021 the incidence and the prevalence of HIV, HBV, HCV, TB and syphilis in the people inside Padua prisons.
The study has demonstrated that the screening of the infectious diseases in detainees was very high, raising in 2021 in the entrant people the 100%. The research also has shown that during 2021 the most prevalent incidence of infectious diseases was for TB (16.3%), followed by HCV (11.3%), HBV (7.9%) and HIV (1.6%). Interestingly, our data has indicated how during 2021 versus the previous years the prevalence of the infectious diseases increased for HBV (41.5%), HCV (18.8%), and TB (48.1%). These data indicate as different conditions such as the geographic origin of the prisoners people or several environmental factors such as the overcrowding may influence the prevalence of the infectious disease inside prisons.
The study suggests how the prisons may represent a place where may be easier the treatment of the patients affected by infectious diseases and how universal and periodic screening campaigns and facilitated treatment programs as the point of care may increase the access to care and to control the spread of infectious also in the general community. ■

Keywords: ***HIV, HBV, HCV, TB, Point of care, Prison, General community.***

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Introduction

The incarceration-health relationship is a strong scientific evidence and public health concern (Massoglia, Menster, 2019). Incarcerated persons have elevated rates of structural factors consistently associated with poor health, such as poverty, low levels of education, and limited vocational skills (Massoglia, Pridemore, 2015). Moreover, incarcerated persons may also have higher levels of behavioral risk factors, such as drug use or exposure to violence, than the general population (Western, 2006). Detainees have high levels of chronic conditions, and the experience of incarceration (exposure) generally has a greater effect on health than the length of incarceration (Schnittker, John, 2007; Massoglia, Pridemore, 2015). The most frequent diseases between prisoners are infection diseases, cardiovascular diseases, weight gain, hypertension, and cancer (Clarke, Waring, 2012; Houle, 2014; Howel *et al.*, 2016; Massoglia, 2008; Wang *et al.*, 2009). In general, incarcerated persons and formerly incarcerated persons have an elevated risk for these chronic health conditions compared with the general population (Clarke, Waring, 2012; Howel *et al.*, 2016; Massoglia, Pridemore, 2015; Wang *et al.*, 2009).

An interesting systematic review and meta-analysis of scientific papers published between Jan 1, 2005, and Oct 1, 2015 exanimating 7,949 articles has determined the morbidity and mortality in homeless individuals, prisoners, sex workers, and individuals with substance use disorders in high-income countries (Aldridge *et al.*, 2018). Interestingly, the study has shown that the diseases prevalence correlated with mortality for the above categories was consistently raised across the following diseases: infections (e.g. highest reported was 90% for hepatitis C, 65% for hepatitis B, 51% for latent tuberculosis infection),

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mental health (e.g. highest reported was 4% for schizophrenia), cardiovascular conditions (e.g., highest reported was 13% for coronary heart disease) and respiratory illnesses (e.g. highest reported was 26% for asthma).

The scientific evidence has shown a strong relationship between incarceration and mortality (Spoulding *et al.*, 2011; Binswanger *et al.*, 2007; Massoglia *et al.*, 2014). A study carried out in North Carolina has demonstrated that the incarcerated white men have a higher mortality rate than in non-incarcerated white men (Rosen *et al.*, 2011). The same study has indicated that the most leading causes of death in prisons were cardiovascular diseases, suicide, and AIDS (Rosen *et al.*, 2011). A recent study has analyzed a research database between Jan 1, 2000 and Nov 18, 2020 reporting HIV, HBV, HCV, TB and/or HIV/TB-related deaths among people in prisons (Bosworth *et al.*, 2022). The research was based on 78 publications drawn from seven UNAIDS regions encompassing 33 countries and reporting on 6,568 deaths in prisons over a 20-year period (Bosworth *et al.*, 2022). The study has shown that the HIV/AIDS (n = 3,305) was associated with the highest number of deaths, followed by TB (n = 2,892), HCV (n = 189), HIV/TB (n = 173), and HBV (n = 9) (Bosworth *et al.*, 2022).

The above data indicate how in prisons the infection diseases are one of the most important illness. A large of body of evidence suggests that the prisoners, compared with the general population, have a higher burden of the infectious diseases, such as HIV (Cropsey *et al.*, 2007), viral hepatitis (Cropsey *et al.*, 2007), tuberculosis (TB) (Cropsey *et al.*, 2007), and a range of sexually transmissible infections (Hanas-Hancock *et al.*, 2016; Roberts, Redman, 1993). HIV, viral hepatitis and TB are the most important infectious diseases inside prisons (Kamarulzaman *et al.*, 2016; Niveau, 2006; Rich *et al.*, 2016). Consistently, a recent study carried out in the prisons of Veneto Region has shown that on 2,119 detainees the prevalence of HIV, HBV, and HCV are 2%, 6% and 9.2%, respectively (Nava *et al.*, 2021). An interesting systematic review and meta-analysis including 72 studies has shown on 2,275,930 adult male and female prisoners that the HIV prevalence is 3.4% (95% CI 3.2.%.3.6%) (Sayyah *et al.*, 2018). On the other hand, a review has estimated that between about 10 million people incarcerated worldwide the 3.8% have HIV, 15.1% have HCV, 4.8% have chronic HBV, and 2.8% have active TB (Dolan *et al.*, 2016).

Several studies indicate that the high burden of infectious disease in prisoners is greatly due by contextual factors within prisons that may contribute to a higher risk disease transmission among people. Such factors include risk behavior, overcrowding, delay or lack of diagnosis and treatment, limited access to clean water, inadequate sanitation, and lack of harm-reduction measures such as condoms, sterile tattooing equipment and syringes, and drug treatment (Altice *et al.*, 1998; Altice *et al.*, 2005; Altice *et al.*, 2016; Roberts, Redman, 1993). The harm reduction measures may reduce the negative impact of infectious diseases between prisoners and the spread of infection. At this regard scientific evidence has shown as opioid agonist treatment (OAT) may reduce the incidence of HCV virus among incarcerated persons (Seval *et al.*, 2020). Also, decrimilization of drug use may indirectly reduce the spread of infectious disease both inside and outside prisons. Criminalization of drug use and imprisonment of people who use drugs (PWUD) have resulted in a repetitive cycle of incarceration of many individuals infected with HIV, hepatitis B virus (HBV), hepatitis C virus (HCV) and TB, and those at high risk of infections, such as people who inject drugs (PWID) (Alvarado-Esquivel *et al.*, 2005; Andrinopoulos *et al.*, 2010; Andrus *et al.*, 1989; Cropsey *et al.*, 2007; Deiss *et al.*, 2009; Degenhardt *et al.*, 2013).

The risk of infection inside prisons may also interest the general population through a contact with at-risk individuals in and out of incarceration (Azbel *et al.*, 2016). At this regard an interesting study using a dynamic model of infectious disease transmission inside prisons has shown that prison-based screening and treatment may be a highly effective strategies able to reduce the burden of HIV, TB, HCV, and other sexually transmissible infections among prisoners and in the general community (Ndeffo-Mbah *et al.*, 2017).

Several evidence suggests that incarceration may be associated with substantial short term increases in HIV and HCV acquisition risk among PWIDs and could be a significant driver of HCV and HIV transmission among PWIDs (Stone *et al.*, 2018). At this regard a systematic review and meta-analysis that has analyzed 41 studies published between Jan 1, 2000 until June 13, 2017 has shown that recent incarceration is associated with an 81% increase in HIV acquisition risk, and 62% increase in HCV acquisition risk, and past incarceration was associated with a 25% increase in HIV and a 21% increase in HCV acquisition risk (Stone *et al.*, 2018).

The aim of present study was to evaluate the incidence and the prevalence between 2019-2021 of the most important infectious diseases in the Padua prisons to program the best local health policies to limit the negative consequences and the spread of infectious diseases both inside prisons and in the general community.

Methods

The HIV, HAV, HBV, HCV, TB and syphilis were estimated in the people of the 2 Padua prisons for the years 2019-2021.

Data on HIV, HAV, HBV, HCV, TB and syphilis were evaluated both on the prison entrants (incidence) and on the entire prison population (prevalence).

The incidence and the prevalence of the infectious diseases were detected in the correctional facility (called Casa Circondariale) where there are about 150 detainees in pre-trial detention period, and in the house of imprisonment (called Casa di Reclusione) where there are about 800 prisoners serving their sentences.

The diagnosis of Human Immunodeficiency Virus (HIV), Hepatitis B (HBV), Hepatitis A (HAV), and Hepatitis C (HCV), tuberculosis (TB) and syphilis infections was based on serological testing carried out on blood samples obtained by venous puncture. HIV, HBV, HVA and HCV were diagnosed using ELISA tests. Chronic HBV was detected through the HBsAg and the IgG anti-HBc, the diagnosis of TB was performed using the QuantiFERON-TB Gold (QFT) test, and the diagnosis of syphilis using the VDRL test.

The data were collected according to the Italian law of privacy data. No specific consent was required since data were collected in anonymous and aggregate form. The data collected and elaborated in the present study are those of the data flow given every year to the Veneto Region.

Results

The number of people entrant and of imprisonment subjects between 2019-2021 in the Padua prisons are shown in Tab. 1.

Tab. 1 - Number of people entrant and of imprisonment subjects between 2019-2021 in the Padua prisons

	People entrant	*Imprisonment subjects (total on Dec 31)*
2019	**560**	**825**
2020	**439**	**611**
2021	**318**	**691**

The percentage of entrant people between 2019-21 tested in the Padua prisons was very high (Fig. 1).

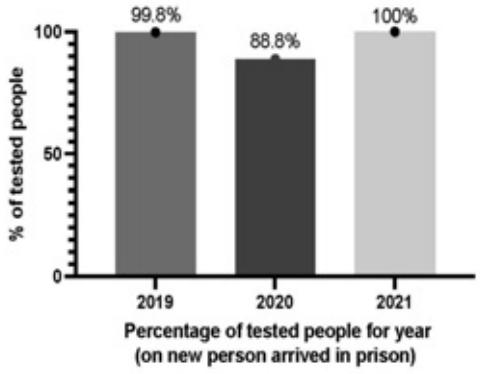
In Padua prisons the blood test screening for infectious diseases is offered to all entrant people and it is repurposed for the persons who have behavioral risk (Tab. 2).

In entrant people the percentage of HIV positive subjects was 1.2, 1.5 and 1.6 in the 2019, 2020, and 2021, respectively (Fig. 2).

Tab. 2 - Blood test screening in Padua prisons between 2019-2021

	2019	2020	2021
HIV			
Number of tested people	559	7 (1.2%)	10 (1.8%)
Number of positive patients per year (incidence)	390	6 (1.5%)	16 (4.10%)
Number of positive patients (total) (prevalence)	318	5 (1.6%)	5 (1.6%)
HAV			
Number of tested people	0	0	0
Number of positive patients per year (incidence)	0	0	0
Number of positive patients (total) (prevalence)	0	0	0
HBV			
Number of tested people	559	17 (3%)	35 (6.3%)
Number of positive patients per year (incidence)	390	13 (3.3%)	64 (16.4%)
Number of positive patients (total) (prevalence)	318	25 (7.9%)	132 (41.5%)
HCV			
Number of tested people per year	559	31 (5.5%)	65 (11.6%)
Number of positive patients per year (incidence)	390	17 (4.3%)	56 (14.3%)
Number of positive patients (total) (prevalence)	318	36 (11.3%)	60 (18.9%)
TB			
Number of tested people per year (Mantoux)	0	0	0
Number of positive patients per year (incidence)	559	80 (14.3%)	160 (28.6%)
Number of positive patients (total) (prevalence)	0	0	0
Number of tested people (Quantiferon)	390	54 (13.8%)	136 (34.9%)
Number of positive patients per year (incidence)	0	0	0
Number of positive patients (total) (prevalence)	318	52 (16.3%)	153 (48.1%)
Syphilis			
Number of tested people per year	559	6 (1%)	14 (2.5%)
Number of positive patients per year (incidence)	390	0	0
Number of positive patients (total) (prevalence)	318	3 (0.9%)	4 (1.2%)

Fig. 1 - Percentage of entrant people tested in Padua prison between 2019-2021



During the 2021 the percentage of HBV subjects increased to 7.9%, starting from the 3% and 3.3% of 2019, and 2020, respectively (Fig. 2). An increased trend in the percentage of positive subjects was also observed with HCV where was observed in 2021 the 11.3% of persons positive, versus the 5.5% and 4.3% of subjects observed in the years 2019 and 2020, respectively (Fig. 2).

The percentage of TB positive subjects was very elevated, attesting to 14.3%, 13.8% and 16.3% during the 2019, 2020, and 2021, respectively (Fig. 2).

The percentage of syphilis positive was very low, attesting to 1%, 0% and 0.9% for the years 2019, 2020, and 2021, respectively (Fig. 2).

The prevalence of HIV in prison population was 1.8, 4.1 and 1.6% in 2019, 2020 and 2021, respectively (Fig. 3). Interestingly in the 2021 was observed in the detained people a strong increase in the prevalence of HBV (41.5%), HCV (18.8%) and TB (48.1%) infection (Fig. 3).

Discussion

Our study confirms that the infectious diseases between prison population are an important warming of public health. Interestingly, our data indicate how during the 2021 the prevalence of HBV, HCV and TB was increased versus the previous years. The reasons may be due to several conditions. The first may be due by the fact that during the 2021 were increased the imprisonment people coming from the countries where are more prevalent the infection diseases such us HBV, HCV and TB. The second may be due by a reduced treatment of the infection diseases during the pandemic Covid-19 era.

The work suggests important indications for the treatment of infections diseases inside the prisons. The first is to develop screening program for all entrance people for the most important infectious diseases, the second to facilitate the diagnosis and the treatment with the realization of point of care able to treat patients inside prisons.

The study shows some limits. The first is that it does not make a population stratification in term of demographic and clinical characteristics, the second is that it does not reveal the percentage of people treated.

Finally, our study indicates how the screening and the treatment of detained people should be a strategic action of public health able to control the spread of infection inside prisons but also in the general population.

Fig. 2 - The incidence of infectious diseases in the entrant people in the Padua prisons

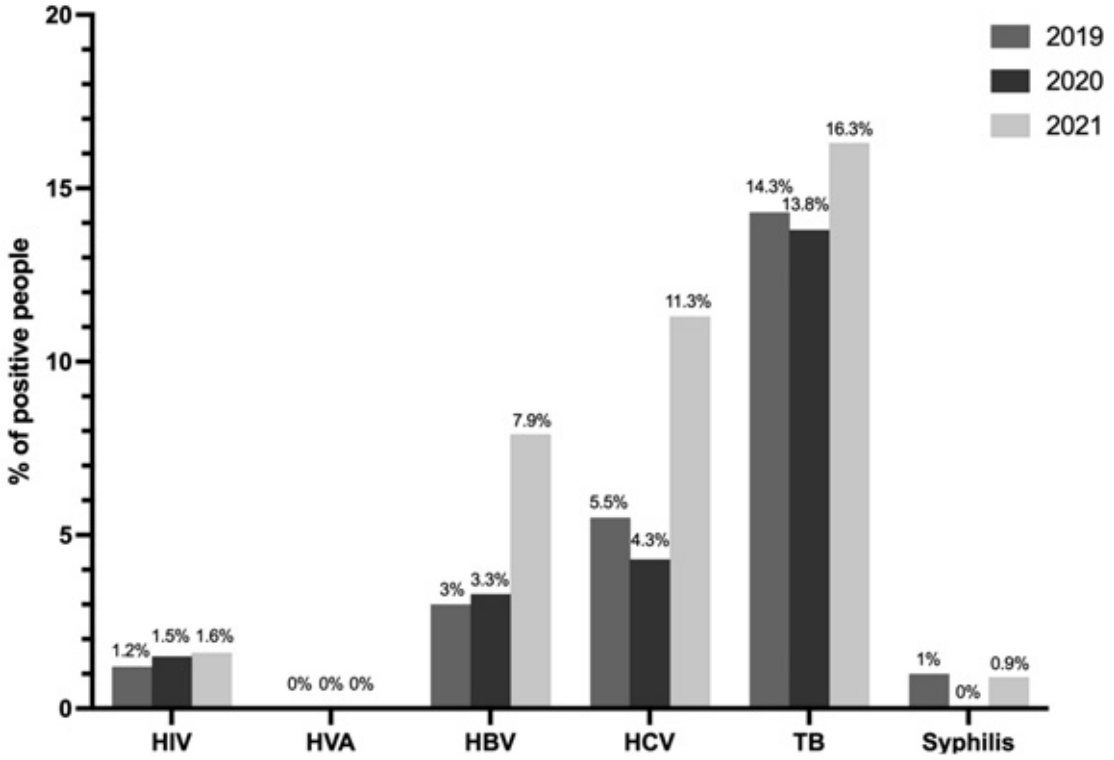
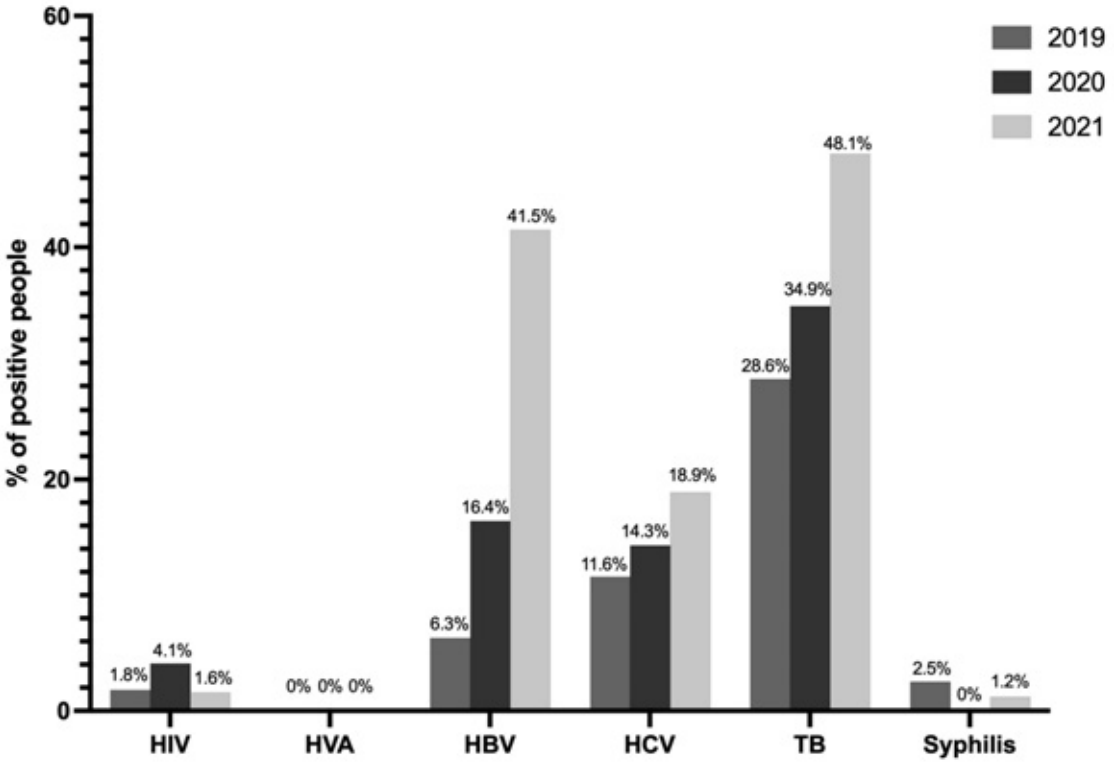


Fig. 3 - Prevalence of infectious diseases in the people of the Padua prisons



Conclusion

Our study shows how inside prisons the most prevalent illnesses are the infectious disease and how there are several barriers for the screening, the linkage of care and the treatment.
The study indicates how during the 2021 the prevalence of the infectious diseases is growing for several reasons despite there are effective treatment for most important illnesses.

Today several conditions limit the treatment of the infectious disease inside the prisons: the first is the low rate of screening; the second is the barriers of the linkage of care; the third is the evidence that only few patients receive inside prisons the specialist treatment; the fourth the non-application of the harm reduction measures, and the fifth the double stigma for detention and for the infectious disease.
The paper highlights priority areas and best practice for improving infection diseases treatment in correctional settings that are:

- changing political will, ensuring access to infectious diseases diagnosis and testing;
- promoting optimal model of infectious diseases care and treatment such as the point of care;
- improving surveillance and monitoring of the infectious diseases, reducing stigma and tracliking the social determinants of health inequalities;
- implementing infectious disease prevention and harm reduction programs, and advancing prison based research.

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