



World Health
Organization

European Region

Cancer and cardiovascular health inequities in prison settings

A RAPID LITERATURE REVIEW

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Abstract

This report describes a rapid review to assess inequities in cancer and cardiovascular disease care in prisons. Most of the evidence identified focused on cancer, with cervical cancer the most commonly studied disease. The evidence showed lower cancer screening rates in prison populations than in non-prison populations. People spending any time in prison present at a later stage for all cancer types and for preventable diseases. The main findings suggest that prison health screening programmes can improve health and reduce costs for health systems. Health education programmes in prison can improve screening rates and health literacy among those on low incomes and the fewest years of education. Investments made in health education have the potential to improve cardiovascular health. Gaps in the evidence, notably related to cardiovascular disease, suggest that additional research is needed on health inequities in prisons.

Keywords: health-care disparities, health inequities, prisons, noncommunicable diseases

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Key messages

The review assesses inequities in cancer and cardiovascular disease in prisons; most articles assessed cancer, with cervical cancer the most commonly studied disease.

Addressing and improving health in prison can reduce health inequities and contribute to a healthier and more equitable society.



On the whole, research still concentrates on the problems and inequities related to time spent in prison. Evidence on interventions to reduce inequities is still mainly based on research from the United States of America and on the analysis of data from prison records.

Investments made in health education have the potential to improve cardiovascular health.



Countries with universal health care do not guarantee the offer of preventive health services such as screening; as such, offering these services to people in prison may reduce inequities.



Research found lower cancer screening rates in prison populations than in non-prison populations. People spending any time in prison present at a later stage for all cancer types and for preventable diseases.

The average age of the prison population and length of stay can affect which prevention services are offered but, regardless, there are opportunities to reduce health inequities, even for people with short prison sentences.



More evidence is needed to better understand the reasons for poor-quality prevention services in prisons. The current evidence suggests that health inequities are exacerbated in prison due to poor record keeping, the low priority for some staff to address health, the inconsistent quality of health care, and poor links between prison and community health services.



Health education programmes in prison can improve screening rates and health literacy among those on low incomes and the fewest years of education.

Improving the health of the prison population can have a lasting impact on inequities in the families of people in prison and, in turn, in the communities that people return to when they are released from prison.

Improving cancer in prison through preventable health services, such as prison health screening programmes, can improve health and reduce costs for health systems.





Introduction

Health inequities are experienced by people who come into contact with the criminal justice system at any point of their life. All WHO Member States are mandated to provide health services in prisons that are of an equivalent standard to those in the wider community (1,2). Prison health is an important theme within health inequities. People in prison have poorer health and higher mortality compared with the general population and are at greater risk of many noncommunicable diseases (3–5). The prison population includes a higher proportion of people from low-income backgrounds and with fewer years of education compared with the general population; in many countries, people from ethnic minorities have higher rates of incarceration (6). This suggests that comparisons between prison and non-prison populations need to adjust for such factors. People in low-income, low-education groups live precarious lives and may not have access to or experience barriers in accessing health services and/or preventive health services. For these people, prison is often the first opportunity, or even the only chance, to access health services and preventive health services (6,7).

Addressing and improving health of people in in prison can reduce the overall burden on health systems and contribute to a healthier and more equitable society (3,6). Preventable health services, such as prison health screening programmes and brief interventions that aim to increase health literacy or modify lifestyle can improve health and reduce costs for health systems (4,5).

This rapid review aimed to identify inequities in health care in prisons, with a focus on cancer and cardiovascular disease, by addressing the question: “Are there inequities in health service provision to people in contact with the criminal justice system (ever) and the general population?”

Methodology

This rapid review provides an overview of the literature on inequities related to cancer and cardiovascular disease in prison settings. Whereas systematic reviews are the gold standard in collating and analysing evidence, rapid reviews are quicker and less expensive because they consider the needs of those commissioning the research (8,9). There is no single definition or agreed method for conducting rapid reviews; however, to adopt best practice, this rapid review was based on a systematic review approach. The review methodology differed slightly from that of a systematic review: it included a more

targeted research question, strict inclusion criteria, study selection and interpretation by a single reviewer, and a less rigid approach to the extraction and interpretation of findings (10). In addition, the extracted data was verified by a single researcher, whereas in systematic reviews this is often done by more than one researcher (11). Both authors independently screened all titles and abstracts and, in the case of disagreement, the full text was analysed and disagreement was resolved by discussion.

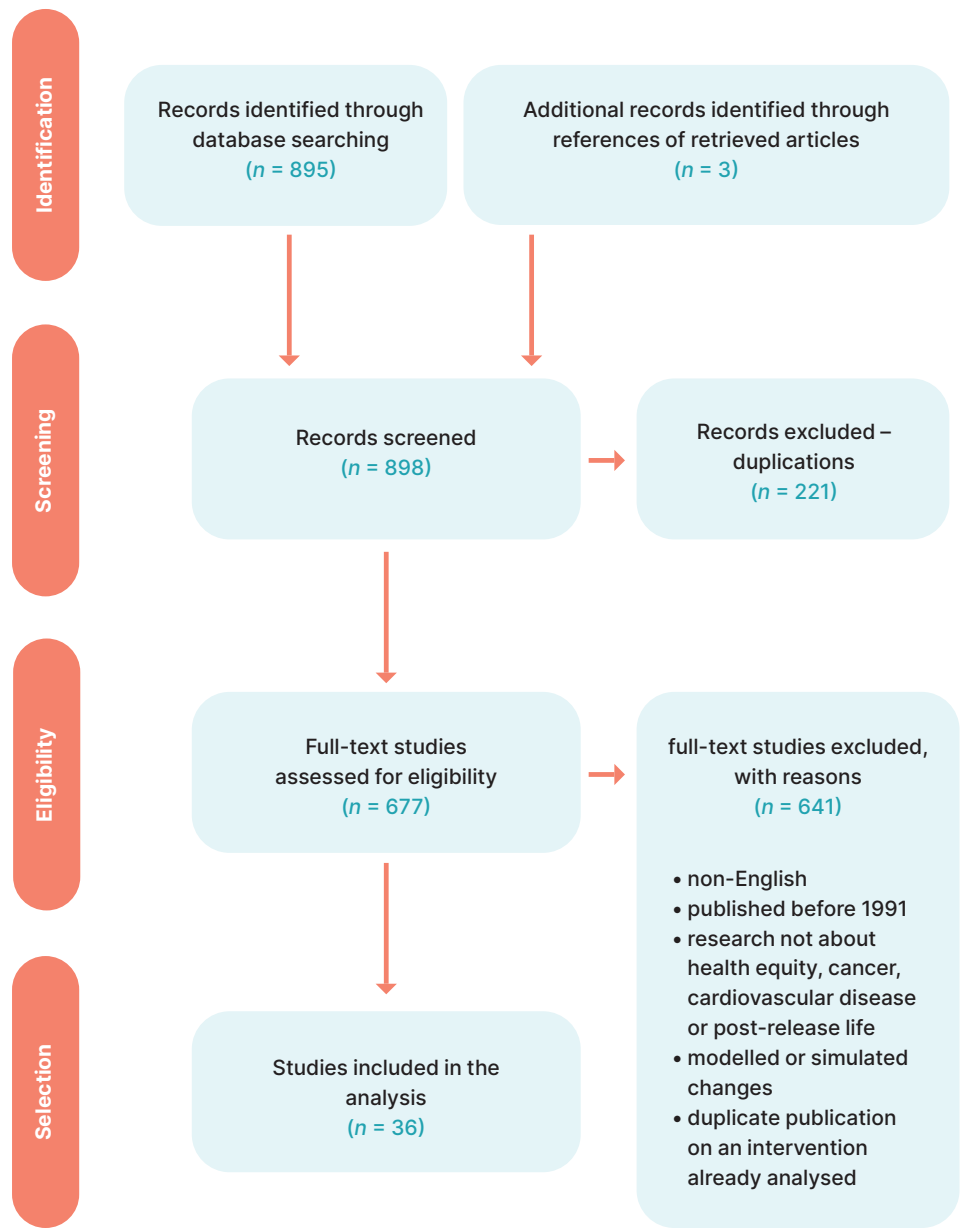
To answer the research question, searches of five electronic databases (PubMed, Ovid MEDLINE (EMBase), Science Direct, Scopus and Web of Science) were conducted between October and December 2021 to identify relevant qualitative and quantitative research articles. Search terms and selection criteria were designed to provide an accurate overview of specific research evidence of health inequities in prisons related to cancer and cardiovascular disease. Search terms were (inequ* AND cancer OR cardiovascular OR cardiovascular disease OR myocardial infarction OR stroke) AND one of the following terms (prison, inmate, incarcerated, jail, detainee, detention, person in prison, person in detention). The inclusion criteria were manuscripts written in English, published since 1991, and focused on health inequity associated with cancer and cardiovascular disease in prison settings. Studies from all countries were included. As research comparing data from prison and non-prison populations is relatively scarce, studies addressing inequities were also included. Research studies (descriptive or analytical) and editorials were included in the review; all other types of articles, such as conference papers, were excluded. Other exclusion criteria were studies that modelled or simulated changes, experimental studies, and duplicate publications and duplicate analyses of the same study. All articles that examined resource commitment by prison organizations (action, time, finances, policy) to address health inequities related to cancer and cardiovascular disease were reviewed. Studies that addressed other noncommunicable diseases or only assessed prevalence were then excluded.

The study quality was not formally assessed using checklists or other well-established criteria; instead, a mixed methods approach was used to consider both quantitative and qualitative evidence in answering the research question.

The review team comprised two researchers: TB reviewed the abstracts to assess their relevance to the research topic, applied the eligibility criteria and analysed the data; and FAC independently assessed both the included and excluded studies.

The database searches identified 895 articles, with an additional three studies obtained from other sources. After duplicate removal, 677 studies were selected for full-text analysis. of these, 36 fulfilled the inclusion criteria and were included in the review (Fig. 1).

Fig. 1. Study selection





Results

Study characteristics

Good-quality health inequities data in prison settings is not available or is challenging to collect in many countries (12). Table 1 shows that most studies were from the United States and a few other countries where data on health in prison settings is readily available.

Table 1. Country of origin of studies

Country	No. studies
USA	19
Canada	5
United Kingdom	3
Brazil	3
Other/more than 1 country	6

USA: United States of America.

Worldwide, the vast majority of people living in prison in the world are men; only an estimated 5% of the prison population are women in the WHO European Region (7% in the United States) (13,14). However, most of the included articles were on the health of the female prison population: of the 36 included studies, 23 analysed the female prison population (4,7,15–35), only six (one sixth of total) were on male prisoners (13,36–40), and seven were on the health of both female and male prisoners (6,41–46). One study that originally set out to study the male and female prison population with relevant cardiovascular diseases over a seven-year period and was forced to study only males as “there were too few female inmates with these diagnoses to provide statistical power of analysis” (36).

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5%

of the prison population are women in the WHO European Region (7% in the United States)



However, most studies on health in prison are on women's health



63.9%

studies analysed health of the female prison population

16.6%

studies analysed health of the male prison population

19.4%

studies analysed health of the male prison population

Annex 1 summarizes the data extracted from the 36 studies included in the review, in the following categories:

- main author(s) and year of publication
- country in which the intervention was implemented
- key theme
- disease analysed (cancer or cardiovascular disease)
- main research methodology
- sex of the study population.

Most of the 36 articles were quantitative and most analysed health records. Table 2 shows studies ranked by design: 19 used quantitative methods, 13 used qualitative and one used combined methods. Three were review articles.

Table 2. Research methods used in the included studies

Research method	No. studies
Data analysis	17
Survey	7
Interview	7
Systematic review	2
Review	1
Small group	1
Combination	1

Of the 36 studies, 31 addressed inequities in cancer care (prevention and treatment) four were on cardiovascular disease and one was on both diseases. Of those on cancer, most were on cervical cancer (Table 3), reflecting the large number of studies on the female prison population. However, cervical cancer is only the 18th most common cancer in the WHO European Region: breast cancer is the most common, followed by colorectal cancer and lung cancer (47). One of the cancer studies was on liver cancer (37), even though this ranks 14th for incidence and seventh for mortality in the general population (47).



Table 3. Cancer studied

Cancer type	No. studies	Incidence in the WHO European Region (rank)	Mortality in the WHO European Region (rank)
Cervix uteri	19	18	17
Breast	9	1	3
All	4	NA	NA
Colorectal	3	2	2
Lung	1	3	1
Liver	1	14	7

NA: not applicable.

Source: International Agency for Research on Cancer and World Health Organization, 2022 (47).

Thematic findings

This section outlines the key themes arising from the 36 identified studies related to health inequities and cancer and cardiovascular disease in prison settings. It considers the uptake of prevention interventions in prison, identifies reasons for the good or poor uptake of prevention interventions, and discusses effective interventions. In general, research still concentrates on the problems and inequities related to spending time in prison. A 2020 study stated that “interventions delivered in jails or prisons to increase Pap screenings are rare” and that most research on prevention focused instead on the prevalence of cervical cancer screening and follow-up rates and factors contributing to their variability (4). A 2021 review found that better data related to cancer care in the prison population is needed and that “despite some of the best efforts of health care professionals to deliver quality care, comprehensive and transparent data are lacking, limiting efforts to identify and address areas for improvement” (41).

Poor screening rates in prison populations

Every study comparing cancer screening rates (including mammograms) in prison and non-prison populations found lower rates in the prison population (6,15–22,37,42).

A 2018 study reported that the worst current mammography rates for women in prison were “relatively unchanged from older literature published 8–13 years ago, in which 41–58% reported having up-to-date mammograms” (23). A comparison of people released from prison compared with the general population found that people who experienced imprisonment were significantly more likely to be overdue for breast and colorectal cancer screening (43).

Countries with universal health care do not guarantee the offer of preventive health services such as screening; therefore, offering these services to people in prison may reduce inequities. For the three types of cancer screening recommended by WHO (breast, cervical and colorectal), coverage is lower in populations of low socioeconomic status (and also in migrant and ethnic minority populations). Therefore, assessing screening status on admission to prison provides an opportunity to catch up on screening and, as a consequence, reduce inequities. A study of women in provincial prison in Ontario, Canada (which has a universal health-care system) found that 54% of women were overdue for Papanicolaou (Pap) testing upon their release compared with 33% of the non-prison population. Three years later, 36% of women in prison had still not received cervical cancer screening, compared with 22% in the general population (19).

A 2016 review of breast cancer screening in 27 European countries found that in six countries (Cyprus, Italy, Latvia, Lithuania, Poland, Spain) coverage of vulnerable populations does not include people in prison (16). This represents a missed opportunity because women in prison are not included in policies and programmes to improve the health of vulnerable populations.

Screening for cardiovascular risk factors was reported to be common upon prison admission in the United States, although with varying practices and eligibility criteria (5). Other studies on implementing cholesterol screening in prisons reported a lower awareness about risk factors than in the general population (24). People in prison who have a cardiovascular episode (such as coronary atherosclerosis and other heart disease, and nonspecific chest pain) requiring hospitalization were found to have faster access to treatment procedures but longer hospital stays (36).

Lack of qualified specialists in prisons was highlighted as one of the reasons that quality of care in prison does not meet international standards. A study conducted in Italy concluded that a screening strategy

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Opportunistic triage through telemedicine may overcome prison health-care staff limitations and prevent cardiovascular hospitalizations (46)



Periodic use of mobile mammography units may overcome structural limitations and contribute to increase the coverage among vulnerable populations, thus potentially leading to earlier detection of breast cancer (16,34)

resorting to pre-hospital electrocardiograms performed by telemedicine to detainees with suspected acute cardiovascular disease is feasible and may overcome limitations associated with understaffing (46). The study further suggested that this intervention would prevent 99% of immediate hospitalizations. Also in cancer prevention, effective solutions have been proposed to overcome structural limitations, including the periodic use of mobile mammography units to offer women in prison the opportunity for breast cancer screening (34).

Risk factors associated with health inequities

Screening for disease is a powerful tool to reduce inequities in prison populations because people who spend any time in prison present at a later stage for all cancer types (41) and for preventable diseases (38,48).

Various types of inequities can lead to barriers in access to preventive care, including socioeconomic factors and structural barriers (lack of access to the physical location of screening services or even to universal health coverage) (33,34,49). Therefore, ensuring access for all individuals will reduce inequities. However, screening may be misused, for example, by requiring out-of-pocket payments for procedures that are not evidence based (but on commercially driven interests and supplier-induced patient demand), and this may further exacerbate inequities (49,50).

The late diagnosis of all types of cancer is more common in groups of low socioeconomic status, regardless of their legal status. People who spend time in prison “are disproportionately in poor health both before, during, and after their incarceration” (6). People in prison are at a high risk for cervical cancer because they are more likely to have a low-income background and less likely to access health services (25). A study of liver cancer in men in prison in the United States found that “HBV [human papillomavirus B] and HCV [human papillomavirus B] screening along with early intervention through alcohol abstinence or interferon treatment may reduce liver cancer-related morbidity, mortality, and costs” (37).

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Various types of inequities can lead to barriers in access to preventive care, including socioeconomic factors and structural barriers

The most commonly studied risk factors related to inequities in the prison population:

ethnicity,
income level,
education level,
homelessness



The most commonly studied risk factors related to inequities in the prison population are ethnicity, income level, education level and homelessness (23,26). Most identified articles were cervical cancer studies, and many of the common risk factors were related to women of childbearing age, including history of violence and abuse and of drug use; lifetime number of sexual partners; age at first intercourse and first pregnancy, smoking; and HIV infection (19,25,27).

A 2011 study of the wider risk factors affecting inequities found that women who reported abuse histories, including childhood physical abuse and intimate partner violence, were more likely to report having ever had an abnormal Pap smear (21). The study suggested that women's perception of violence in communities was associated with the setting where they underwent cervical cancer screening, thus highlighting the importance of understanding the role that community level violence plays in access to health care. Moreover, it suggested that access to follow-up care post-release was a problem for women in prison, and concluded that "community re-entry is often chaotic, because women are dealing with housing, childcare, and financial problems that take priority over preventive health care". A study of 3915 men in United States prisons found most were not in the age range to be eligible for colorectal screening (36,39). However, in the United States, the average age of the prison population is increasing, and cancer is the leading cause of mortality in this population (41).

Length of stay in prison

In Europe, 19% of people in prison have been sentenced to less than one year; in 2019 the average length of imprisonment in Europe was 7.8 months (51,52). A study of colorectal cancer screening in prisons in England (United Kingdom) found that it was difficult to screen men in prison on short sentences (40). In addition, since the female prison population is generally younger or have shorter sentences compared with men, there are fewer opportunities for prevention services, such as screening (15,19,28). Breast cancer screening in the general population is recommended between the ages of 50 and 69 years. Although women stay in prison for shorter periods, on average, compared with men, the evidence shows that incarceration has an

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19%

of people in prison have been sentenced to less than one year in Europe (51,52)

7.8 months

is the average length of imprisonment in Europe (51,52)

Effective referral pathways between prison and community are essential to ensure screening is followed up by diagnosis and initiation of treatment

ageing effect (53). Therefore, screening could be started at a younger age for women in the prison population than in the general population. More importantly, screening is only effective if followed up by diagnosis and initiation of treatment. Therefore, although short prison sentences may make this more challenging, effective referral pathways between prison and community health services (bidirectional) are essential to achieve a good return on investments. Nevertheless, studies emphasized that there are many opportunities to engage women in health prevention services, despite their relatively short lengths of incarceration (20,21).

A variety of factors experienced during incarceration are suggested to negatively affect cardiovascular health. These include the prison environment, where opportunities for engaging in physical activity are often limited and nutritional options may be suboptimal; restrictions on medication management practices that limit the possibility of self-management; the poor quality of medical care, often caused by insufficient health-care staff and limited staff training opportunities; and lack of coordination between prison and community health services (leading to people being released without medication or a scheduled appointment) impeding continuity of treatment (5). These factors are thought to contribute to poorer outcomes (including uncontrolled hypertension, more frequent hospitalizations and cardiovascular death) in people after leaving prison. This suggests that screening for cardiovascular risk factors is important but, if provided in isolation, will not lead to better health.

Reasons for poor disease prevention in prison

Poor record keeping


A study of prison data in Brazil found that screening was offered in a non-systematic way, with significant differences in practice between prisons (28). It found that although interviewees reported receiving cervical cancer screening, the records contradicted this or did not include any information on screening: of the 352 medical records analysed, 60% had no information on cervical cancer screening or treatment.


Low prioritization of health services


A study of bowel cancer screening in men's prisons in England (United Kingdom) found that

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Reasons for poor disease prevention in prison

Poor record keeping 

Low prioritization of health services 

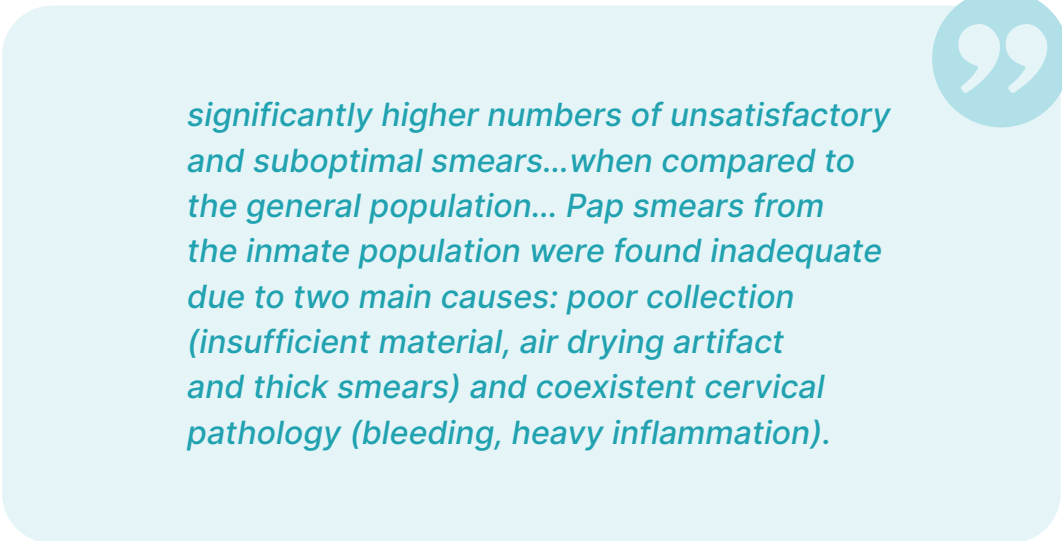
Inconsistent quality of health care 

the foremost priority both for staff and for men in prison was security, with other support services, such as health care, considered less important (40).

However, trusted health-care professionals can have a significant impact on reducing health inequities in prisons. A study of colorectal screening in a men's prison in the United States identified the importance of relationships in overcoming logistical problems in providing health interventions: "prison leadership and custody staff members were willing to facilitate access for the intervention because the medical program director and the head of health promotion were both widely trusted on the basis of years of service" (39).

Inconsistent quality of health care

A few studies have analysed the quality of care related to health inequities (29,40,41). A study of chest pain and heart disease diagnosis found that hospital stays are longer on average and first procedures are received sooner on average for the prison population compared with non-prison patients (36). A study of over 1000 health records of people in prison in the United States examined the quality of smears and biopsies and found (20):



significantly higher numbers of unsatisfactory and suboptimal smears...when compared to the general population... Pap smears from the inmate population were found inadequate due to two main causes: poor collection (insufficient material, air drying artifact and thick smears) and coexistent cervical pathology (bleeding, heavy inflammation).

There is an opportunity to address the complex health needs of people while they are in prison; however, the quality of preventive services, such as screening, are often worse than those for the general population or are not offered in prisons. A review of cancer care in prisons found that delayed access to care is a significant barrier and that abuse and neglect persists within the correctional system (41). For example, many people in prison in the United States had not received a medical examination since being admitted (41). A study of cervical screening in Brazil found that women were likely to receive appropriate screening but that staff failed to inform them of the results (28).

Few studies have examined the practicalities of offering screening and prevention services in prison. Non-prison populations can be screened in private, whereas people in prison often report poorer experiences. Bowel screening in prisons was perceived as embarrassing and undignified, and this was exacerbated by sharing cells (40). In a 2005 study of cervical cancer screening, women in prison described their negative experiences of Pap testing; these included being tested by male health-care professionals, unprofessional behaviour by health-care professionals and lack of humane treatment (29).

A more recent review (2019) of cervical cancer services and screening services found that “screening within correctional facilities is inconsistent, but generally poor. Treatment or follow-up after abnormalities is insufficient to address the potential risk of dysplasia and cancer” (15). Another research project concluded that “all health care procedures in the correctional setting should take into account that in this vulnerable population, any invasive procedure can be seen as threatening or traumatic” (39).

Investments in prevention lead to health and economic gains

The few studies that have focused on cancer care in prisons suggest rates of cancer are low in prison. However, it is unclear whether this is because cancer does not affect people in prison or whether poor-quality care (e.g. lack of or late screening) prevents these patients from being identified (44). A review of cervical screening in a Canadian prison found that incarcerated individuals were 11 times more likely to have high-grade cytological abnormalities upon Pap smear screening compared with the age-matched general population (17). Other studies suggest that cancer diagnosis at a more advanced stage in the prison population is also common for other cancer types, including colorectal, lung, oropharyngeal, prostate, and skin (38). In general, cancer diagnosis at a later

stage is associated with a higher probability of treatment failure and death; this has also been shown in prison populations, who have a 1.4–1.6 higher risk of dying from head and neck, liver and lung cancers compared with sex- and age-matched individuals in the wider community (54). Shared risk factors for these three cancers are the consumption



of alcohol and tobacco products, with a marked increase in prevalence of both among the prison population (55). Health-care costs represent around 20% of overall annual prison expenditures and the increasing need for advanced cancer care will inevitably raise this proportion (15). Therefore, investing in prevention is as important for prison health-care systems as for those serving the general community. Advancements in treatment options mean that it is now possible to eradicate previously incurable diseases. For example, hepatitis C is an intervening or contributory cause of death in 33% of liver cancer deaths in the United States prison population. Offering hepatitis C screening, along with early interventions for alcohol use disorders and prescription of the most cost-effective pharmacotherapy, would reduce liver cancer-related morbidity, mortality and costs to the health-care system (56).

Prison provides an opportunity to reduce inequities

As prison populations mainly comprise individuals from low-income households with lower education levels, people in prison often require complex medical care and have complex relationships with health services, including a lack of access to private health care (they may be uninsured) or even to public health care (because the country does not provide universal health coverage to all residents, for example, people held in detention, including those with a history of incarceration) (39). Prison health education programmes have been shown to improve literacy among those with low-income backgrounds and the fewest years in education. A 2017 study reported that a brief jail-based intervention improved cervical health literacy by increasing knowledge about cervical health and the perceived benefits of screening, and increased motivation and self-efficacy for seeking out cervical health screening and follow-up care (30). A 10-hour sexual health empowerment intervention was associated with more up-to-date cervical cancer screening in the post-intervention period compared with the baseline (4). Another study of interactive sessions for people in prison (supplemented by written information) led both incarcerated people and staff to conclude that “access to good-quality understandable information about screening was essential” and that “individuals should be provided with health care information directly to their cells early in their sentences”. For both groups, “[v]erbal discussion with health care staff was perceived to be the most favourable way of providing this information, supplemented by written information” (40).

Only a few studies asked people in prisons for their views of prevention. One study of bowel cancer screening in men’s prisons in England (United Kingdom) found high levels of willingness to be screened (40). However, other studies have also suggested that investments must be made in health education, as the main reason identified for women in prison not engaging in breast cancer self-examination, clinical examination or mammography was “not knowing how” (12).

Several studies highlighted that prisons provide an opportunity to improve health in the most challenging populations, especially those who health services have found difficult to access (15,22,31,33,34,39,42). Studies have reported that for many women in Brazil, the health services offered in prison are “the only opportunity to gain access to health services” (7,34). Furthermore, in Peru, women who were covered by health insurance were found to have undergone more frequent cytological screening for cervical cancer before incarceration (33). In health systems without universal health coverage, as in the United States, prisons are often the first opportunity for adults to access preventive and chronic medical care (38). In the United States, “[a]n estimated 40% of individuals with chronic medical conditions are diagnosed with a chronic condition while incarcerated” (6). Studies rarely discussed the views of people in prison; however, when asked, those in prison say that they want access to preventive health care. For example, a qualitative study of women in prison in the United States reported “the desire for preventive medical care, the screening for cervical and breast cancer, testing for sexually transmitted infections and hepatitis, receipt of hepatitis vaccinations, and smoking cessation, was nonetheless strong in this group” (26). This same attitude was reported in the United Kingdom, where universal health coverage exists but inequities mean that some populations have worse access to health care. Interviews with men in prison in England revealed that they “saw prison as a good opportunity to utilize health care” (40). Similarly, a Canadian study found that “incarceration provides an opportunity for preventive health care in women who might not otherwise receive it” (18).

A comparative study found that women in prison were more likely than those in the wider population to attend public health interventions, and concluded “that prison confinement presents a unique opportunity to reach financially vulnerable populations at high risk for chronic and communicable diseases” (24). Another study observed that “offering vaccines in correctional settings capitalizes on the moment of opportunity for reaching vulnerable people disconnected from traditional forms of preventive health care” (30). According to WHO recommendations: “All people in prison, and prison staff, should be vaccinated against hepatitis B. Any individual entering prisons who has not been vaccinated should be offered the hepatitis B vaccination” (57). Another study of cervical health literacy found that a brief prevention intervention delivered in prison can significantly improve cervical cancer screening rates (4).

A series of three studies in the same prison found that prison is a “revolving door” and that “women are often lost to follow-up after prison” (17,18,32). In a simple intervention, all women in the prison were asked if they would like to have a Pap smear (17). However, rates of uptake were lower than in the non-prison population, and the women had worse health. The study found that women in “prison presented with more severe

abnormalities on Pap smear screening at a younger age, and had received Pap smear screening less frequently, compared with the general population” (17). Although a degree of confounding is likely to result from lower social economic status, there is a clear need to invest in improving the health of the prison population. The follow-up study found that efforts to increase screening had led to more women being screened and to inequities being addressed as “[i]nmates with no high school education and longer lengths of incarceration were significantly more likely to receive Pap testing during the intervention period as compared to the preintervention period” (32). The study suggested that “follow-up initiatives for this high-risk population should include community health interventions” (18).

Providing coordinated health care in prison improves people’s health after their release, thereby saving money in the long term. As one study observed, “coordinating of efforts between correctional and community settings is essential, since financial constraints in correctional settings can limit the provision of preventive care, particularly if the benefit is accrued in the community following release” (45).

A study of cardiovascular risk factors and awareness levels in women in prison found a significantly higher percentage of women with high cholesterol and high blood pressure were unaware of their condition until their diagnosis in prison (24). Based on these findings, the study suggested that the benefits of additional screening are to identify women with abnormal cholesterol levels who would not have otherwise been diagnosed. It also indicated “a need to implement lifestyle intervention programs that educate incarcerated women about their conditions and ways to improve their risk factors through improved diet and increased physical activity” (24).

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Country examples



BRAZIL

For many women the health services offered in prison are the only opportunity to gain access to health services (7,34)

UNITED STATES

Prisons are often the first opportunity for adults to access preventive and chronic medical care in countries without universal health coverage (38)

UNITED KINGDOM

Men in prison in England revealed that they saw prison as a good opportunity to utilize health care (40)

CANADA

Incarceration provides an opportunity for preventive health care in women who might not otherwise receive it (18)

Indirect effects on inequities

Few of the identified articles reviewed the wider, more indirect effects of prison on health inequities. People who spend time in prison have a reduced income while in prison and fewer employment options after their release. A late diagnosis due to delays in screening and test results can affect future earnings and limit the ability of people in prison “to gain employment or assimilate back into their communities following release” (38). A study of Brazilian women in prison reached a similar conclusion, stating that prisons could “at least ... could return healthier women, more knowledgeable and better educated, to their families and these circumstances. That would at least be a demonstration of understanding and consideration” (7).

When men are incarcerated, the physical and mental health of their families and female partners are worsened, and effects on their children last into adolescence and adulthood (6). However, for women who are incarcerated, the effects on their children are less well understood.



Discussion and conclusions

This review is aimed to identify health inequities in cancer and cardiovascular disease for people in prison. The evidence was heavily skewed towards studies from the United States and focused on cervical screening. As universal health care is not available in the United States, much of the evidence from this country showed that people in prison have the opportunity to improve their health via preventive services such as screening, health education, vaccination and brief interventions to modify behavioural risk factors. However, this is also the case in countries with universal health care because screening programmes and other preventive services often have inequities in uptake, quality or continuity upon release. Mechanisms to provide universal health care, such as population screening programmes and vaccination, should be in place in all prison settings to ensure those in prison are not left behind. As every WHO Member State is mandated to provide health services in prisons of an equivalent standard to those in the wider community, people in prison have a fundamental right to equivalence of care.

Countries have an excellent opportunity to reduce health inequities by providing health care in prisons. Numerous studies show that providing good-quality cancer screening services and health education programmes to improve health literacy, even for short periods of time, have led to better outcomes for women and men in prison. Screening programmes in prisons can identify asymptomatic people at high risk of disease and maximize the benefits of early treatment or intervention.

In contrast to cancer, insufficient evidence was found for cardiovascular disease, indicating a need for further research in this area. Prison populations were described as having equal, or even higher, access to screening for risk factors upon admission, despite poorer outcomes (including poor blood pressure control, hospitalization and death) for previously incarcerated individuals. This suggests that the identification of risk factors may not lead to appropriate care for a variety of reasons, including insufficient awareness-raising interventions, low-quality medical care during incarceration, environmental factors that favour unhealthy behaviours (e.g. poor nutrition and low physical activity), practices that do not encourage self-management, and deficiencies in continuity of treatment (5,24).

Not all conditions have an adequate evidence base; therefore, as part of WHO's efforts to increase the effectiveness of screening programmes, the WHO Regional Office for Europe has published a short guide to increase understanding of this topic and inform policy-makers who are developing and implementing screening programmes in the WHO European Region (40,58).

The United Nations Office for Drugs and Crime has called for a whole-policies approach to prison reform, encompassing not only crime prevention and sentencing policies but also the care and treatment available to vulnerable groups in the community. For the right to health to be respected, access to preventive, curative, reproductive, palliative and supportive health care must be assured, in addition to access to the underlying determinants of health (57). Therefore, for planning purposes, health-care needs must be evaluated upon prison admission.

WHO recommend that all individuals are screened initially and then regularly throughout their time in prison to assess their mental and physical health. Particular recommendations are as follows (57).

- Upon arrival at prison, all individuals should be screened as soon as practicable for immediate risks (using validated screening tools), including signs of poor mental health, self-harm and suicide, and substance use disorder, and for medication reconciliation.¹
- Within the first week of custody, all individuals should undergo a thorough health assessment to identify all physical and mental health needs. Individuals requiring treatment should be referred to the appropriate health services.
- Member States should implement validated screening tools that capture information on noncommunicable diseases, including cardiovascular disease, respiratory disease, diabetes and cancer, as well as their associated risk factors – tobacco smoking, harmful alcohol use, nutrition and physical activity.

Furthermore, to enrich the body of evidence needed to derive evidence-informed policies for prison health systems, data from health screening in prison should be captured and reported at national level to monitor prevalence rates of diseases and risk factors, changes in health status, improvements in health outcomes in the prison population, and progress by the prison health systems in addressing the health needs of the people in prison (60).

The impact of having a family member in prison and on the health and well-being of the spouse and children is poorly understood. Income is a significant causal factor in health inequities; therefore, as prison reduces income in the short and long term, the indirect effects of prison on worsening health inequities must be considered (61). Interventions to improve work opportunities after release will have significant effects on health inequities and should be listed among the viable solutions to reduce health inequities.

¹ Defined as “the formal process in which health care professionals partner with patients to ensure accurate and complete medication information transfer at interfaces of care” (59).

Gaps in evidence

This rapid review identified gaps in the evidence, notably related to cardiovascular disease. Few original studies have assessed inequities in cardiovascular care, suggesting that additional research is needed. Use of more thorough methodology in a systematic review may have led to the identification of additional studies in this area. Overall shortcomings were the predominance of studies on women's health and scarcity of those on men's health in prison. As such, the evidence was inconclusive on men's cancer-related health inequities in prison. Moreover, differences in screening and treatment programmes among countries and across time periods limits the ability to identify the effectiveness of interventions and ways to reduce inequities (15). Therefore, this rapid review found that further research is needed on inequities in the prison population in Member States of the WHO European Region.

AT A GLANCE

WHO recommendations

WHO recommend that all individuals are screened initially and then regularly throughout their time in prison to assess their mental and physical health



Validated screening

Upon arrival at prison, all individuals should be screened as soon as practicable for immediate risks (using validated screening tools), including signs of poor mental health, self-harm and suicide, and substance use disorder, and for medication reconciliation



Health assessment

Within the first week of custody, all individuals should undergo a thorough health assessment to identify all physical and mental health needs. Individuals requiring treatment should be referred to the appropriate health services



Tool implementation

Member States should implement validated screening tools that capture information on noncommunicable diseases, including cardiovascular disease, respiratory disease, diabetes and cancer, as well as their associated risk factors – tobacco smoking, alcohol use, nutrition and physical activity



Data capture

To enrich the knowledge base for evidence-informed policies for prison health systems, data from health screening in prison should be captured and reported at national level to monitor and address the health needs of the people in prison



References

1. Nelson Mandela Rules [website]. New York: United Nations; 2022 (https://www.un.org/en/events/mandeladay/mandela_rules.shtml, accessed 25 February 2022).
2. United Nations rules for the treatment of women prisoners and non-custodial measures for women offenders (the Bangkok Rules). New York: United Nations; 2010 (A/RES/65/229; <https://www.ohchr.org/en/instruments-mechanisms/instruments/united-nations-rules-treatment-women-prisoners-and-non-custodial>, accessed 25 February 2022).
3. Novisky MA, Nowotny KM, Jackson DB Test A, Vaughn MG. Incarceration as a fundamental social cause of health inequalities: jails, prisons and vulnerability to COVID-19. *Br J Criminol*. 2021;61(6):1630–46. doi: 10.1093/bjc/azab023.
4. Emerson AM, Smith S, Lee J, Kelly PJ, Ramaswamy M. Effectiveness of a Kansas City, jail-based intervention to improve cervical health literacy and screening, one-year post-intervention. *Am J Health Promot*. 2020;34(1):87–90. doi: 10.1177/0890117119863714.
5. Wang EA, Redmond N, Dennison Himmelfarb CR, Pettit B, Stern M, Chen J et al. Cardiovascular disease in incarcerated populations. *J Am Coll Cardiol*. 2017;20(69):2967–76. doi: 10.1016/j.jacc.2017.04.040.
6. Wildeman C, Wang EA. Mass incarceration, public health, and widening inequality in the USA. *Lancet*. 2017;389:1464–74. doi: 10.1016/S0140-6736(17)30259-3.
7. de Araujo PF, Kerr LRFS, Kendall C, Rutherford GW, Seal DW, da Justa Pires Neto R et al. Behind bars: the burden of being a woman in Brazilian prisons. *BMC Int Health Human Rights*. 2020;20(1):28. doi: 10.1186/s12914-020-00247-7.
8. Grant MJ, Booth A. A typology of reviews: an analysis of 14 review types and associated methodologies. *Health Info Libr J*. 2009;26:91–108. doi: 10.1111/j.1471-1842.2009.00848.x.
9. Kaltenthaler E, Cooper K, Pandor A, Martyn-St James M, Chatters R, Wong R. The use of rapid review methods in health technology assessments: 3 case studies. *BMC Med Res Methodol*. 2016;16(1):108. doi: 10.1186/s12874-016-0216-1.
10. Haby MM, Chapman E, Clark R, Barreto J, Reveiz L, Lavis JN. What are the best methodologies for rapid reviews of the research evidence for evidence-informed decision-making in health policy and practice: a rapid review. *Health Res Policy Syst*. 2016;14(1):83. doi: 10.1186/s12961-016-0155-7.
11. Li T, Higgins JPT, Deeks JJ. Chapter 5: Collecting data. In: *Cochrane Handbook for Systematic Reviews of Interventions*. London: Cochrane Training; 2019 (<https://training.cochrane.org/handbook/current/chapter-05#section-5-5>, accessed 25 February 2022).
12. McLeod KE, Butler A, Young JT, Southalan L, Borschmann R, Sturup-Toft S et al. Global prison health care governance and health equity: a critical lack of evidence. *Am J Public Health*. 2020;110(3):303–8. doi: 10.2105/AJPH.2019.305465.
13. Valera P. Cigarette smoke and cancer health among incarcerated men in US Northeastern prison facilities. *J Correct Health Care*. 2019;25(3):265–76. doi: 10.1177/1078345819856905.

14. Prison statistics. In: Eurostat [website]. Luxembourg: Eurostat; 2022 (https://ec.europa.eu/eurostat/statistics-explained/index.php?title=Prison_statistics#out_of_20_adult_prisoners_are_women, accessed 25 February 2022).
15. Brousseau EC, Ahn S, Matteson KA. Cervical cancer screening access, outcomes, and prevalence of dysplasia in correctional facilities: a systematic review. *J Womens Health*. 2019;28(12):1661–9. doi: 10.1089/jwh.2018.7440.
16. Deandrea S, Molina-Barceló A, Uluturk A, Moreno J, Neamtii L, Peiró-Pérez R et al. Presence, characteristics and equity of access to breast cancer screening programmes in 27 European countries in 2010 and 2014. Results from an international survey. *Prev Med*. 2016;91:250–2. doi: 10.1016/j.ypmed.2016.08.021.
17. Martin RE. A review of a prison cervical cancer screening program in British Columbia. *Can J Public Health*. 1998;89(6):382–6. doi: 10.1007/BF03404079.
18. Martin RE, Hislop TG, Moravan V, Grams GD, Calam B. Three-year follow-up study of women who participated in a cervical cancer screening intervention while in prison. *Can J Public Health*. 2008;99(4):262–6. doi: 10.1007/BF03403751.
19. Kouyoumdjian FG, McConnon A, Herrington ERS, Fung K, Lofters A, Hwang SW. Cervical cancer screening access for women who experience imprisonment in Ontario, Canada. *JAMA Netw Open*. 2018;1(18):e185637. doi: 10.1001/jamanetworkopen.2018.5637.
20. Proca DM, Rofagha S, Keyhani-Rofagha S. High grade squamous intraepithelial lesion in inmates from Ohio: cervical screening and biopsy follow-up. *Cytojournal*. 2006;3:15. doi: 10.1186/1742-6413-3-15.
21. Ramaswamy M, Kelly PJ, Koblit A, Kimminau KS, Engelman KK. Understanding the role of violence in incarcerated women's cervical cancer screening and history. *Women Health*. 2011;51:423–41. doi: 10.1080/03630242.2011.590875.
22. Young M, Waters B, Falconer T, O'Rourke P. Opportunities for health promotion in the Queensland women's prison system. *Aust N Z J Public Health*. 2005;29:324–7. doi: 10.1111/j.1467-842x.2005.tb00201.x.
23. Pickett ML, Allison M, Twist K, Klemp JR, Ramaswamy M. Breast cancer risk among women in jail. *Biores Open Access*. 2018;7(1):139–44. doi: 10.1089/biores.2018.0018.
24. Khavjou OA, Clarke J, Hofeldt RM, Lihs P, Loo RK, Prabhu M et al. A captive audience. bringing the WISEWOMAN Program to South Dakota prisoners. *Womens Health Issues*. 2007;17(4):193–201. doi: 10.1016/j.whi.2007.02.008.
25. Plugge E, Fitzpatrick R. Factors affecting cervical screening uptake in prisoners. *J Med Screen*. 2004;11(1):48–9. doi: 10.1177/096914130301100111.
26. Nijhawan AE, Salloway R, Nunn AS, Poshkus M, Clarke JG. Preventive health care for underserved women: results of a prison survey. *J Womens Health*. 2010;19(1):17–22. doi: 10.1089/jwh.2009.1469.
27. Kelly PJ, Allison M, Ramaswamy M. Cervical cancer screening among incarcerated women. *PLOS One*. 2018;13(6):e0199220. doi: 10.1371/journal.pone.0199220.

28. da Silva ERP, de Souza AS, de Souza TGB, Tsuha DH, Barbieri AR. Screening for cervical cancer in imprisoned women in Brazil. *PLOS One*. 2017;12(12):e0187873. doi: 10.1371/journal.pone.0187873.
29. Magee CG, Hult JR, Turalba R, McMillan S. Preventive care for women in prison: a qualitative community health assessment of the Papanicolaou test and follow-up treatment at a California State women's prison. *Am J Public Health*. 2005;95(10):1712–17. doi: 10.2105/AJPH.2005.063677.
30. Ramaswamy M, Lee J, Wickliffe J, Allison M, Emerson A, Kelly PJ. Impact of a brief intervention on cervical health literacy: a waitlist control study with jailed women. *Prev Med Rep*. 2017;6:314–21. doi: 10.1016/j.pmedr.2017.04.003.
31. Binswanger IA, Mueller S, Clark CB. Risk factors for cervical cancer in criminal justice settings. *J Womens Health*. 2011;20(12):1839–45. doi: 10.1089/jwh.2011.2864.
32. Martin RE, Hislop TG, Grams GD, Calam B, Jones E, Moravan V. Evaluation of a cervical cancer screening intervention for prison inmates. *Can J Public Health*. 2004;95(4):285–9. doi: 10.1007/BF03405133.
33. Ruiz-Maza JC, Soto-Azpilcueta RA, Sanchez-Salvatierra J, Torres-Prado Y. Cytological screening for cervical cancer and associated factors in the penitentiary population of Peru. *Rev Esp Sanid Penit*. 2018;20(3):103–10. PMID: 30908565.
34. Vieira RA, Silveira SF, Da Silva DR, Tramonte MS, de Oliveira-Junior I, Lattari MCT et al. Knowledge and attitudes about breast cancer care in female inmates in Sao Paulo State/Brazil. *Breast J*. 2018;24(4):686–7. doi: 10.1111/tbj.13025.
35. Williams RD, Mahoney TD, Williams RM. Breast cancer detection among women prisoners in the Southern United States. *Fam Commun Health*. 1998;21(3):32–41.
36. Winter SJ. A comparison of acuity and treatment measures of inmate and noninmate hospital patients with a diagnosis of either heart disease or chest pain. *J Natl Med Assoc*. 2011;103(2):109–15. doi: 10.1016/s0027-9684(15)30259-5.
37. Harzke AJ, Baillargeon JG, Karen J, Pruitt SL. Liver cancer mortality among male prison inmates in Texas, 1992–2003. *Prev Med*. 2009;48(6):588–92. doi: 10.1016/j.ypmed.2009.03.011.
38. Sunthankar KI, Griffith KN, Talutis SD, Rosen AK, McAneny DB, Kulke MH et al. Cancer stage at presentation for incarcerated patients at a single urban tertiary care center. *PLOS One*. 2020;15(9):e0237439. doi: 10.1371/journal.pone.0237439.
39. Dumont DM, Davis D, Sadacharan R, Lamy E, Clarke JG. A correctional–public health collaboration for colorectal cancer screening in a state prison system. *Public Health Rep*. 2021;136(5):548–53. doi: 10.1177/0033354920974668.
40. Blagden S, Simpson C, Limmer M. Bowel cancer screening in an English prison: a qualitative service evaluation. *Public Health*. 2020;180:46–50. doi: 10.1016/j.puhe.2019.10.024.
41. Aziz H, Ackah RL, Whitson A, Oppong B, Obeng-Gyasi S, Sims C et al. Cancer care in the incarcerated population. barriers to quality care and opportunities for improvement. *JAMA Surg*. 2021;156(10):964–73. doi: 10.1001/jamasurg.2021.3754.

42. Binswanger IA, White MC, Perez-Stable EJ, Goldenson J, Tulskey JP. Cancer screening among jail inmates: frequency, knowledge, and willingness. *Am J Public Health*. 2005;95(10):1781–7. doi: 10.2105/AJPH.2004.052498.
43. McConnon A, Fung K, Lofters A, Hwang SW, Kouyoumdjian FG. Colorectal and breast cancer screening status for people in Ontario provincial correctional facilities. *Am J Prev Med*. 2019;56(4):487–93. doi: 10.1016/j.amepre.2018.11.011.
44. Davies EA, Sehgal A, Linklater KM, Heaps K, Moren C, Walford C et al. Cancer in the London prison population, 1986–2005. *J Public Health*. 2010;32(4):526–31. doi: 10.1093/pubmed/fdq009.
45. Binswanger IA, Redmond N, Steiner JF, Hicks LS. Health disparities and the criminal justice system: an agenda for further research and action. *J Urban Health*. 2011;89(1):98–107. doi: 10.1007/s11524-011-9614-1.
46. Brunetti ND, Dellegrottaglie G, De Gennaro L, Blase M. Telemedicine pre-hospital electrocardiogram for acute cardiovascular disease management in detainees: an update. *Eur Res Telemed*. 2015;4(1):25–32. doi: 10.1016/J.EURTEL.2015.02.002.
47. International Agency for Research on Cancer, World Health Organization. WHO Europe (EURO): 2020 factsheet. In: *Cancer Today* [website]. Lyon: Global Cancer Observatory; 2022 (<https://gco.iarc.fr/today/data/factsheets/populations/994-who-europe-euro-fact-sheets.pdf>, accessed 15 February 2022).
48. Population screening: reducing inequalities in secure settings [website]. London: Public Health England; 2021 (<https://www.gov.uk/government/publications/population-screening-reducing-inequalities-in-secure-settings>, accessed 25 February 2022).
49. Sagan A, McDaid D, Rajan S, Farrington J, McKee M. Screening: when is it appropriate and how can we get it right? Copenhagen: WHO Regional Office for Europe; 2020 (<https://apps.who.int/iris/handle/10665/330810>, accessed 25 February 2022).
50. Screening programmes: a short guide. Increase effectiveness, maximize benefits and minimize harm. Copenhagen: WHO Regional Office for Europe; 2020 (<https://apps.who.int/iris/handle/10665/330829>, accessed 25 February 2022).
51. Imprisonment rates continue to fall in Europe according to the Council of Europe's Annual Penal Statistics on prison populations for 2020 [website]. Strasbourg: Council of Europe; 2022 (<https://www.coe.int/en/web/portal/-/europe-s-imprisonment-rate-continues-to-fall-council-of-europe-s-annual-penal-statistics#:~:text=In%20the%2050%20prison%20administrations,an%20overall%20decline%20of%2020%25,> accessed 25 February 2022).
52. Prisons in Europe. 2019 report on European prisons and penitentiary systems. Rome: European Prison Observatory; 2019 (<http://www.prisonobservatory.org/upload/Prisons%20in%20Europe.%202019%20report.pdf>, accessed 25 February 2022).
53. Munday D, Leaman J, O'Moore É, Plugge E. The prevalence of noncommunicable disease in older people in prison: a systematic review and meta-analysis. *Age Ageing*. 2019;48(2):204–12. doi: 10.1093/ageing/afy186.

54. Kouyoumdjian FG, Pivnick L, McIsaac KE, Wilton AS, Lofters A, Hwang SW. Cancer prevalence, incidence and mortality in people who experience incarceration in Ontario, Canada: a population-based retrospective cohort study. *PLOS One*. 2017;12(2):e0171131. doi: 10.1371/journal.pone.0171131.
55. Binswanger IA, Krueger PM, Steiner JF. Prevalence of chronic medical conditions among jail and prison inmates in the USA compared with the general population. *J Epidemiol Community Health*. 2009;63(11):912–19. doi: 10.1136/jech.2009.090662.
56. Harzke AJ, Baillargeon JG, Kelley MF, Diamond PM, Goodman KJ, Paar DP. HCV-related mortality among male prison inmates in Texas, 1994–2003. *Ann Epidemiol*. 2009;19(8):582–9. doi: 10.1016/j.annepidem.2009.03.009.
57. Enggist S, Møller L, Galea G, Udesen C, editors. Prisons and health. Copenhagen: WHO Regional Office for Europe; 2014 (<https://apps.who.int/iris/handle/10665/128603>, accessed 25 February 2022).
58. A short guide to cancer screening: increase effectiveness, maximize benefits and minimize harm. Copenhagen: WHO Regional Office for Europe; 2022 (<https://apps.who.int/iris/handle/10665/351396>, accessed 25 February 2022).
59. Medication safety in transitions of care: technical report. Geneva: World Health Organization; 2019 (<https://apps.who.int/iris/handle/10665/325453>, accessed 25 February 2022).
60. Status report on prison health in the WHO European Region. Copenhagen: WHO Regional Office for Europe; 2019 (<https://apps.who.int/iris/handle/10665/329943>, accessed 25 February 2022).
61. Why promote prison reform? [website]. Vienna: United Nations Office on Drugs and Crime; 2022 (<https://www.unodc.org/unodc/en/justice-and-prison-reform/prison-reform-and-alternatives-to-imprisonment.html>, accessed 25 February 2022).



Annex 1. Data extraction

Table A1 describes the data extracted from the included studies. NB: references are given in the main reference list.

Table A1. Data extracted from included studies on cancer and cardiovascular disease care in prison settings

Author and date	Country	Key theme	Disease	Method	Sex
Aziz et al., 2021 (41)	Multiple	Review	Cancer (all)	Review	Both
Binswanger et al., 2005 (42)	USA	Attitudes towards screening	Cancer (cervical, breast)	Interview	Both
Binswanger et al., 2011 (31)	USA	Pap testing in different criminal justice settings	Cancer (cervical)	Survey	Female
Binswanger et al., 2011 (45)	Multiple	Future research agenda	Cancer (all)	Review	Both
Blagden et al., 2020 (40)	United Kingdom	Attitudes towards screening	Cancer (bowel)	Interview	Male
Brousseau et al., 2019 (15)	Multiple	Cervical screening in prison settings	Cancer (cervical)	Review	Female
Brunetti et al., 2015 (46)	Italy	Feasibility of telemedicine to assist screening in prisons	Cardiovascular disease	Data analysis	Both
Da Silva et al., 2017 (28)	Brazil	Cervical screening in Brazil prisons	Cancer (cervical)	Data analysis	Female
Davies et al., 2010 (44)	United Kingdom	Identify cancer cases and most common diagnoses and place of death	Cancer (all)	Data analysis	Both

Table A1 (contd)

Author and date	Country	Key theme	Disease	Method	Sex
de Araujo et al., 2020 (7)	Brazil	Survey of women's health in prison	Cancer (breast, cervical)	Survey	Female
Deandrea et al., 2016 (16)	Multiple	Access to breast cancer screening programmes in 27 European countries	Cancer (breast)	Review	Female
Dumont et al., 2021 (39)	USA	Improve colorectal screening	Cancer (colorectal)	Data analysis	Male
Emerson et al., 2020 (4)	USA	Improve cervical health literacy and screening	Cancer (cervical)	Health literacy	Female
Harzke et al., 2009 (37)	USA	Liver cancer trends	Cancer (liver)	Data analysis	Male
Kelly et al., 2018 (27)	USA	Assessment of cervical cancer screening	Cancer (cervical)	Data analysis	Female
Khavjou et al., 2007 (24)	USA	Risk factors	Cardiovascular	Data analysis	Female
Kouyoumdjian et al., 2018 (19)	Canada	Comparison of cervical screening in prison and general populations	Cancer (cervical)	Data analysis	Female
Magee et al., 2005 (29)	USA	Quality of Pap testing	Cancer (cervical)	Interview	Female
Martin, 1998 (17)	Canada	Review of a Pap smear screening programme	Cancer (cervical)	Data analysis	Female
Martin et al., 2004 (32)	Canada	Review of a Pap smear screening programme	Cancer (cervical)	Data analysis	Female
Martin et al., 2008 (18)	Canada	Review of a Pap smear screening programme	Cancer (cervical)	Data analysis	Female

Table A1 (contd)

Author and date	Country	Key theme	Disease	Method	Sex
McConnon et al., 2019 (43)	Canada	Assessment of overdue colorectal and breast cancer screening	Cancer (breast, colorectal)	Data analysis	Both
Nijhawan et al., 2010 (26)	USA	Attitudes to health prevention	Cancer (cervical)	Survey	Female
Pickett et al., 2018 (23)	USA	Assessment of breast cancer screening	Cancer (breast)	Data analysis	Female
Plugge and Fitzpatrick, 2004 (25)	United Kingdom	Assessment of cervical cancer screening	Cancer (cervical)	Data analysis	Female
Proca et al., 2006 (20)	USA	Cervical screening with surgical biopsy follow-up	Cancer (cervical)	Data analysis	Female
Ramaswamy et al., 2011 (21)	USA	Sociodemographic and community characteristics of women in prison	Cancer (cervical)	Interviews	Female
Ramaswamy et al., 2017 (30)	USA	10-hour health literacy intervention	Cancer (cervical)	Small group	Female
Ruiz-Maza et al., 2018 (33)	Peru	Prevalence and risk factors associated with cervical cancer screening	Cancer (cervical)	Data analysis	Female
Sunthankar et al., 2020 (38)	USA	Chart review of men's cancer	Cancer (all)	Data analysis	Male
Valera, 2019 (13)	USA	Smoking behaviours and cancer health	Cancer (all)	Survey	Male

Table A1 (contd)

Author and date	Country	Key theme	Disease	Method	Sex
Vieira et al., 2018 (34)	Brazil	Knowledge and attitudes about breast cancer care	Cancer (breast)	Survey	Female
Wildeman and Wang, 2017 (6)	USA	Health care in prisons	Cardiovascular	Review	Both
Williams et al., 1998 (35)	USA	Breast cancer detection practices	Cancer (breast)	Survey	Female
Winter, 2011 (36)	USA	Comparison of quality of care for heart disease or chest pain in prison and non-prison populations	Cardiovascular	Data analysis	Male
Young et al., 2005 (22)	Australia	Comparison of health in prison and non-prison populations	Cancer (cervical)	Data analysis	Female

USA: United States of America.

The WHO Regional Office for Europe

The World Health Organization (WHO) is a specialized agency of the United Nations created in 1948 with the primary responsibility for international health matters and public health. The WHO Regional Office for Europe is one of six regional offices throughout the world, each with its own programme geared to the particular health conditions of the countries it serves.

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