Introduction

In general, prisoners have a poorer health status than the general population. Studies show that this situation is common to all high-income countries. Inmates are adversely affected by a number of social, psychological and health problems, such as infectious diseases, chronic diseases, injuries, dermatological and sensory problems, mental disorders as well as suicide and at-risk behaviours. Consequently, prison health has become a significant public health concern.

Internationally, several recommendations have been made and measures adopted, in particular concerning suicide prevention, drug addiction, health promotion and care. Today, all new prison inmates benefit from a medical examination, and prison health services have been greatly improved.

Monitoring health has become essential to estimate prisoners’ health needs, to adapt health care and to evaluate interventions in prison settings. Several epidemiological surveys have been conducted worldwide, but not all countries assign the same importance to the study of prison health nor do they use the same study means and methods. Moreover, health topics are investigated to different degrees. For example, mental health and infectious diseases have been frequently surveyed and benefit from specific monitoring systems, whereas very few studies of other health topics, like chronic diseases, dermatology and injuries, have been performed in the prison setting.

Currently, no prison health monitoring system exists in France. Although several epidemiological studies have been conducted producing data at a national level—in particular on new prison inmates—and on specific health topics such as disabilities, mental health and infectious diseases—their one-off nature prevents regular assessment of health prevalence and trends. That is why the implementation of a monitoring system of prisoners’ health is under consideration in France. The elements currently being discussed are the data to be included in such a system, appropriate system characteristics and project feasibility.

In this context, a study of foreign experience was seen as essential to first describe the range of options currently implemented worldwide. This article highlights the diversity of means and methods implemented in Western countries to evaluate and monitor prison health.

Methods

The aim of this study was to inventory and describe the various approaches implemented worldwide to monitor prison health. This included the study of national epidemiological surveys on correctional populations for countries with no specific prison health surveillance system.

The study focused on high-income countries, as they are more easily comparable with France with regard to population profile and prison characteristics. Investigations were restricted to regions having relevant information available in English or French (notably North America, Oceania and Europe). A strong focus was placed on western and northern European countries to compare France with its neighbours. The following 15 countries were studied: Australia, New Zealand, Canada, the USA, Belgium, Denmark, Finland, Germany, Italy, the Netherlands, Norway, Spain, Switzerland, the UK and France.

Information collected for each country included (where possible): (i) prison system organization (prison population size, prison population rate and the number of correctional institutions)—this information was collected to study every monitoring system or survey in its own context; (ii) the organization of prison health
care (in particular recording the specific ministry or department responsible for prison health)—this information was collected to see if the organization of health care influences health-care orientations, policies, means and methods; and (iii) implemented prison health monitoring systems or national epidemiological surveys, if any, performed to date. The main characteristics for each system and survey documented were collected including objectives, health topics covered, frequency of data collection, the target population (profile and sampling process employed) and the method used (tools and data collection).

Only national monitoring systems and surveys representative of the total prison population were retained for analysis. Systems that were not exhaustive and studies on specific groups without randomized sampling or concerning specific correctional establishments were not considered so that collected data could be deemed nationally representative.

Information was collected using three complementary steps; (i) the main study was performed using the Internet, consulting official websites dealing with prison health, i.e. national (governments, health and justice departments of each studied country) and international [international organizations, World Health Organization (WHO), Council of Europe] websites; (ii) this information was complemented with a bibliographical study using the 'Scopus' database. The latter enabled us to identify scientific publications relating to national epidemiological surveys not mentioned on the previously investigated websites; and (iii) finally, several foreign prison health representatives were directly contacted to obtain additional and updated information on prison health organization and surveillance in their country. This last step concerned only European countries where information was less accessible. For other countries (the USA, Canada, Australia and New Zealand), data were directly available online from governmental websites. European correspondents were identified through their participation in the WHO Health in Prison Project (HIPP) or in the European Commission research project 'EUPRIS'. Some were contacted by e-mail; others were met directly at the ‘Network Meeting on Prison and Health’, organized by the WHO Regional Office for Europe on 11 and 12 October 2012 in Copenhagen (Denmark).

Results

Availability of information

The level of information collected differed between the countries according to the availability, distribution and accessibility of studies and reports performed (see table 1). Information was readily available for the USA, Canada, Australia and New Zealand, but much less so for European countries. In fact, unsurprisingly, the more countries produce data, the more they make them easily available.

Characteristics of the 15 selected countries

Table 2 shows several key data highlighting similarities and major differences between the 15 studied countries.

For example, a large gap exists between the USA and other countries concerning the prison population size. With >2 million incarcerated, American prisoners represent almost a quarter of the world’s prison population. Furthermore, the US prison population rate is the highest in the world. Accordingly, directly comparing the US prison situation with that of the Scandinavian countries, such as

### Table 1 Availability and sources of information obtained by country

<table>
<thead>
<tr>
<th>Availability of information</th>
<th>Sources of the information</th>
<th>Countries</th>
</tr>
</thead>
<tbody>
<tr>
<td>Information easily available for consultation</td>
<td>Governmental websites (reports available online)</td>
<td>Australia, Canada, New Zealand, UK and USA</td>
</tr>
<tr>
<td>Information indirectly available</td>
<td>Scientific publications (indexed in English)</td>
<td>Belgium, Finland, France, Italy, Norway and Switzerland</td>
</tr>
<tr>
<td>Little information available</td>
<td>Information obtained from European correspondents or produced in other publications</td>
<td>Denmark, Germany, Netherlands and Spain</td>
</tr>
</tbody>
</table>

### Table 2 Prison characteristics of the 15 studied countries

<table>
<thead>
<tr>
<th>Country (year of measurement of indicators)</th>
<th>Prison population (n)</th>
<th>Female prisoners (%)</th>
<th>Foreign prisoners (%)</th>
<th>Prison population rate (per 100,000 of national population)</th>
<th>Number of institutions</th>
<th>Occupancy level</th>
<th>Average length of imprisonment (in months)</th>
<th>Custodial staff to inmate ratio</th>
<th>Ministry or department responsible for prison health</th>
</tr>
</thead>
<tbody>
<tr>
<td>Australia (2013)</td>
<td>30,775</td>
<td>7.6</td>
<td>19.7 (2012)</td>
<td>133</td>
<td>112</td>
<td>96.0</td>
<td>–</td>
<td>–</td>
<td>Justice or Health</td>
</tr>
<tr>
<td>Belgium (2013)</td>
<td>12,126</td>
<td>43.3</td>
<td>44.2 (2011)</td>
<td>108</td>
<td>33 (2012)</td>
<td>124.4</td>
<td>7.3</td>
<td>na</td>
<td>Justice</td>
</tr>
<tr>
<td>Denmark (2013)</td>
<td>40,91</td>
<td>4.6</td>
<td>26.8</td>
<td>73</td>
<td>52</td>
<td>98.6</td>
<td>3.3</td>
<td>1.5</td>
<td>Justice</td>
</tr>
<tr>
<td>France (2013)</td>
<td>67,050</td>
<td>3.3</td>
<td>17.5</td>
<td>100</td>
<td>190</td>
<td>116.8</td>
<td>8.9</td>
<td>2.6</td>
<td>Justice</td>
</tr>
<tr>
<td>Germany (2012)</td>
<td>63,317</td>
<td>5.8</td>
<td>27.1 (2011)</td>
<td>77</td>
<td>186</td>
<td>82.4</td>
<td>7.5</td>
<td>2.7</td>
<td>Justice</td>
</tr>
<tr>
<td>Italy (2013)</td>
<td>61,449</td>
<td>4.3</td>
<td>34.4</td>
<td>102</td>
<td>222</td>
<td>128.8</td>
<td>9.7</td>
<td>1.9</td>
<td>Health (since 1994)</td>
</tr>
<tr>
<td>Netherlands (2012)</td>
<td>13,749</td>
<td>5.8</td>
<td>24.6</td>
<td>82</td>
<td>85</td>
<td>83.4</td>
<td>3.6</td>
<td>1.7</td>
<td>Justice</td>
</tr>
<tr>
<td>New Zealand (2013)</td>
<td>8474</td>
<td>6.1</td>
<td>3.5</td>
<td>189</td>
<td>17</td>
<td>90.2</td>
<td>1.5</td>
<td>–</td>
<td>Justice</td>
</tr>
<tr>
<td>Norway (2013)</td>
<td>36,49</td>
<td>5.1</td>
<td>34.0</td>
<td>72</td>
<td>42</td>
<td>96.0</td>
<td>3.8</td>
<td>–</td>
<td>Health (since 1988)</td>
</tr>
<tr>
<td>Spain (2013)</td>
<td>66,721</td>
<td>7.6</td>
<td>31.6</td>
<td>143</td>
<td>82 (2010)</td>
<td>88.0</td>
<td>18.6</td>
<td>3.9</td>
<td>Home Office</td>
</tr>
<tr>
<td>Switzerland (2012)</td>
<td>6599</td>
<td>4.9</td>
<td>73.8</td>
<td>82</td>
<td>109</td>
<td>94.6</td>
<td>na</td>
<td>na</td>
<td>Justice or Health</td>
</tr>
<tr>
<td>UK (2013)</td>
<td>84,977</td>
<td>4.6</td>
<td>12.8</td>
<td>149</td>
<td>133</td>
<td>111.2</td>
<td>8.6</td>
<td>2.8</td>
<td>Health (since 2006)</td>
</tr>
</tbody>
</table>

Data source: http://www.prisonstudies.org/ (consulted on 7 February 2014).

a: Data are not available for every year for all countries. In this case, the year of indicator measurement is specified in brackets.
b: Data collected in SPACE I–Survey 2011 (only for European countries).
c: Prison health is the responsibility of the justice or health department according to jurisdiction or district.
na: missing data.
Norway or Denmark, which have ~4000 prisoners (table 2), is problematic. These differences of scale are not only relative to the countries’ respective sizes (and national population sizes) but also reflect the prison policies adopted, as shown by the variable prison population rates observed (e.g. from 58/100 000 in Finland to >700/100 000 in the USA) and the percentage of foreigners in prisons (6.8% in the USA and 73.8% in Switzerland; see table 2).

Despite these differences, certain data from all 15 countries are comparable:

- Most prisoners are male (women represent <10% of the prison population in each country).
- Average prison stays are relatively short, which testifies to the high turnover of prisoners in detention.
- The custodial staff to inmate ratio is high (on average, one warden per two prisoners).
- Finally, although only four countries (Belgium, France, Italy and the UK) have an official occupancy level >100%, overcrowding can be assumed to be a common problem for all high-income countries, as overcrowding is very heterogeneous between correctional establishments within the same country (In France, for example, the occupancy level is 116.8% but unevenly distributed within the 190 correctional establishments. Overcrowding mainly concerns correctional establishments for remand prisoners and condemned to short sentences, which have an average occupancy level of 135%).

Prison health care in the 15 countries studied is predominantly the responsibility of the ministry or department in charge of prison authorities, i.e. mainly the justice department (except for Spain, where the Home Office supervises prison authorities; see table 2). European countries are gradually transferring prison health care responsibilities to the public domain, a move strongly recommended by the WHO, to guarantee equality of care for prisoners and the general population. This transfer was first implemented in 1988 by Norway, then France in 1994, the UK in 2006 and more recently by Italy in 2008.

### Surveillance of prison health

Only mortality data are systematically monitored in all the countries studied. Registering deaths occurring in correctional institutions is performed by prison authorities, irrespective of the ministry or department responsible for prison health care (justice or health). Collected information mainly concerns the causes of death (natural causes, accidents and suicide) and the socio-demographic, penal and prison data relative to the prisoner. This enables prison mortality rates and in particular suicide rates to be estimated. Nevertheless, these records are not detailed and do not include medical data.

Epidemiological surveillance of prison health, policies and actions adopted worldwide is very heterogeneous. Two types of surveillance exist: one is regular, based on specific monitoring systems (general or theme-based), and the other involves national one-off studies (table 3).

### Long-term general monitoring systems

Of the 15 studied countries, only 4 have developed a long-term general monitoring system, with two different approaches being used: Canada and Belgium routinely record all prisoners’ health data, whereas the USA and Australia perform regular nationwide surveys to produce prisoners’ health data. However, the individual modalities are different as outlined below.

**Canada: an exhaustive prisoner file integrating health data** In the Correctional Service of Canada (CSC), which is responsible for Canadian Federal Inmates, all information relating to prisoners (socio-demographic, penal, health and prison data) is recorded in the Offender Management System. This database is created at the prisoner’s arrival and updated throughout his/her detention. Health data in this national database are collected according to standardized procedures and tools, including Offender Intake Assessment, Computerized Mental Health Intake Screening System and Computerized Assessment of Substance Abuse. All data are made available to research staff in the CSC to perform studies on specific health topics. Survey reports are available on the CSC website.

**Belgium: a web application centralizing prisoner health data** Since 1999, Belgian prisoners’ medical files have been electronically recorded by each correctional institution. In 2010–11, the health service department of the Justice Ministry implemented a single clinical ICT database to centralize the electronic collection of prisoner health-care data. All Belgian prisons are connected to this

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**Table 3 Monitoring systems and national surveys within the 15 studied countries**

<table>
<thead>
<tr>
<th>Country</th>
<th>Long-term monitoring systems</th>
<th>One-off and/or repeated national surveys</th>
</tr>
</thead>
<tbody>
<tr>
<td>Denmark</td>
<td>–</td>
<td>Infectious diseases (2007)</td>
</tr>
<tr>
<td>Finland</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>Germany</td>
<td>–</td>
<td>General health (2005)</td>
</tr>
<tr>
<td>Italy</td>
<td>‘Drug addiction and HIV surveillance system (stopped in 2002)’</td>
<td>Mental health (1999), General health (2005)</td>
</tr>
<tr>
<td>Norway</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>Switzerland</td>
<td>Infectious diseases surveillance system (since 2008)</td>
<td>General health (94), Mental health (1998)</td>
</tr>
<tr>
<td>USA</td>
<td>Prison survey including health data (every 5–7 years since 1974)</td>
<td>–</td>
</tr>
</tbody>
</table>
In 2008, the Federal Office of Public Health in Switzerland introduced the ‘BIG project’. Reporting cases of infectious diseases is obligatory in Switzerland. The ‘BIG project’ aims to ensure that infectious diseases in correctional facilities are highlighted in this declaration process, so that prison-based cases can be monitored.

Mental health evaluation and monitoring systems

- ‘The Census of Prison Inmate and Home Detainees’ is a biennial survey in New Zealand since 1987 that collects medical data, including the number of prisoners under psychological and psychiatric surveillance and prescriptions. These data come from the prisoners’ national file, and the information is provided by the medical staff.
- In the Netherlands, mental health screening at intake is standardized, and all psychiatric consultations are recorded by the central prison administration. Accordingly, prison authorities can analyse national statistics on mental health and addiction.

One-off national surveys

Finally, besides the monitoring systems outlined in the previous paragraphs, epidemiological reference data on prison health are mainly produced by one-off national surveys (which, on rare occasions, are repeated once). Only 5 of the 15 countries studied have not produced such studies: Denmark, Germany, the Netherlands, Spain and Switzerland. To our knowledge, these countries do not currently have a national epidemiological survey representative of the total prison population based on strong sampling methods. Existing prevalence data in these countries come from local studies or surveys performed within targeted correctional establishments or prisoner subgroups. Such surveys were not considered in the present study.

National epidemiological surveys in the 15 countries mainly pursue common objectives, including the identification of prisoners’ health problems, measuring their prevalence and estimating health-care requirements. However, the methods used are heterogeneous:

- Some surveys require direct prisoner participation and use various data collection methods, including face-to-face questionnaires administered by investigators19,33,69 or medical staff, 18,30,31 self-administered questionnaires,—28,29,36,39 health examinations, blood analyses and clinical consultations.22,24,25,37,38 For mental health studies, another source of heterogeneity exists because of the various psychometric tools used to detect psychiatric disorders.
- Other studies develop indirect approaches without the participation of inmates. These focus primarily on analysing information in medical files21–24,26,29 prescriptions,34 medical databases22 and medical staff reports.22

All these methods help investigators produce epidemiological data on prison health. However, the surveys performed are often one-off in nature and data are not updated. This is generally because such studies are complex in design and costly. Furthermore, their diversity makes international comparisons difficult.

Discussion

This study describes existing systems of data collection on prison health within 15 countries in Oceania, North America and northern and western Europe. The results show that although the study of prison health is of particular interest in these countries, surveillance is far from being systematized or organized. Only mortality data are systematically collected at a national level in all countries. However, mortality data are not yet computerized everywhere and are often limited to a simple record of death with no medical information.

Irrespective of monitoring systems already in place or a lack thereof, the majority of the countries investigated (10/15) have performed national epidemiological surveys,18,22,25,31,33,34,37 representative of the prison population. However, the data collection methods used are heterogeneous, and therefore international comparison is not still possible. Nevertheless, these surveys—generally performed using prisoner samples—produce national reference data, which allows investigators to identify and measure inmates’ health problems at a specific moment in time. These surveys’ results inform prison health.
health-care policy and promote the development, implementation and adoption of public health-care policies to the prison context. It is therefore important to repeat such surveys regularly to update data. That is why some European countries, including France, are now envisaging the implementation of long-term monitoring systems.

Currently, the few prison health monitoring systems that do exist worldwide differ considerably in terms of the target population (new prison inmates, total prison population, prisoners’ sample, medical examinations, etc.), sampling method, health topics covered, frequency (continuous data collection vs. regularly repeated) and data collection methods (medical files, self-administered questionnaires or face-to-face questionnaires administered by an investigator or member of medical staff, examinations, clinical consultations, etc.).

Although some countries have developed thematic systems on pathologies particularly frequent in prison (for example, infectious diseases), only 4 of the 15 countries studied here are equipped with a national monitoring system covering a wide range of health data (Canada, Australia, the USA and Belgium). To do this, they use two different strategies: routine data collection is performed in Canada and Belgium, while large-scale surveys are regularly repeated in the USA and Australia. This difference between these two strategies is closely linked to the development of permanent and continuous computerized systems to record health data in Canada and Belgium, which collect data during the entire prison stay. The latter require the computerization of medical services, the standardization of health data and the creation of a specific prison database. In the absence of such technical capacities, it is possible to perform long-term surveillance of prison health by implementing regular large-scale surveys, such as those performed in the USA and Australia (albeit using different methods in terms of frequency, target population, data collection and tools).

This study describes the different approaches and methods implemented worldwide to monitor prison health in high-income countries. Our results do not guarantee that the collected information is exhaustive because of (i) language barriers (investigations were restricted to the English and French languages) and (ii) the difficulty in accessing or finding data that were sometimes unavailable on governmental agencies websites. However, these limitations were reduced by a methodology based on collecting three different data sources, including institutional data, scientific data and information directly obtained from national representatives.

Taking into account the limitations outlined above, results show that there is no unique reference model concerning a monitoring system of prison health. It seems that each country has developed its own approach to monitor prison health, depending on the country’s own priorities, operating choices (particularly political choices) and especially the means assigned by the government to manage this issue. Even so, the examination of these different situations provides a valuable insight into the feasibility of developing an optimal prison health surveillance system.

In France, few prison health services have implemented electronic medical recording, and there is no national, standardized prisoner medical file. Consequently, it is not yet possible to implement a long-term prisoners’ health monitoring system, based on standardized and routinely computerized health data at the national level. While waiting for such measures to be implemented, the present study shows that it is possible to develop a reliable monitoring system using national surveys based, for example, on the American or Australian model.

**Acknowledgements**

The authors are grateful to all the European correspondents engaged in the WHO HIPP and the project EUPRIS of the European Commission who were contacted for this study by e-mail or interviewed directly at the ‘Network Meeting on Prison and Health’, organized by the WHO Regional Office for Europe on 11 and 12 October 2012 in Copenhagen (Denmark). The authors also thank Jude Sweeney for his editing and revision of the English manuscript.

**Conflicts of interest:** None declared.

**Key points**

- Prison health is a significant public health problem for which the importance of producing regular data is paramount.
- This study highlights the different approaches implemented to monitor prison health in 15 countries in Oceania, North America and northern and western Europe.
- Only mortality data are systematically collected and recorded in all 15 countries.
- There are few monitoring systems of prison health worldwide, and the methods used are very heterogeneous in terms of the routine collection of health data, case reports, nationwide repeated surveys and occasional epidemiological studies.

**References**

The problem of non-response in population surveys on the topic of HIV and sexuality: a comparative study

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Background: Throughout the Western world, response rates are falling in population surveys. The aim of the study was to explore for the presence of non-response bias in two Swedish research projects on HIV (‘HIV in Sweden’ (HIS11)) and sexuality (‘Sex and health’ (UngKAB09)). Methods: The study used four data sets (two from each project), each of which had been generated using different methods. By comparing means and percentages on 15 items across the data sets, we explore the potential presence of non-response bias due to interest in the survey topic (topic salience), and discuss the suitability of two increasingly common methods for recruiting respondents: the pre-recruited probability web panel and the self-selected web survey. Results: While a higher proportion of the respondents in the HIS11 substudies had been tested for HIV and were inclined to perceive themselves as being at high risk of HIV infection, the respondents in the UngKAB09 substudies were on average more sexually active. Further, while there was little variation in the results between the HIS11 substudies (postal/web survey and pre-recruited web panel), there were some fairly large differences in the results between the UngKAB09 substudies (web surveys, one of which was based on a self-selected sample). Conclusion: The study concludes that (i) there are signs of non-response bias that may be due to topic salience, (ii) while care must be taken when using self-selection sampling methods, the pre-recruited probability web panel might provide a cost- and time-effective alternative for recruiting respondents in future population surveys.

Introduction

As part of the measures introduced to tackle the emerging AIDS epidemic in Sweden in the mid-1980s, a study was initiated in 1986 on the public’s knowledge, attitudes and behaviour in relation to HIV (‘HIV in Sweden’ (HIS)).¹ This population survey was based on a random national sample of 3900 individuals living in Sweden. The study has thereafter been repeated every third or fourth year,