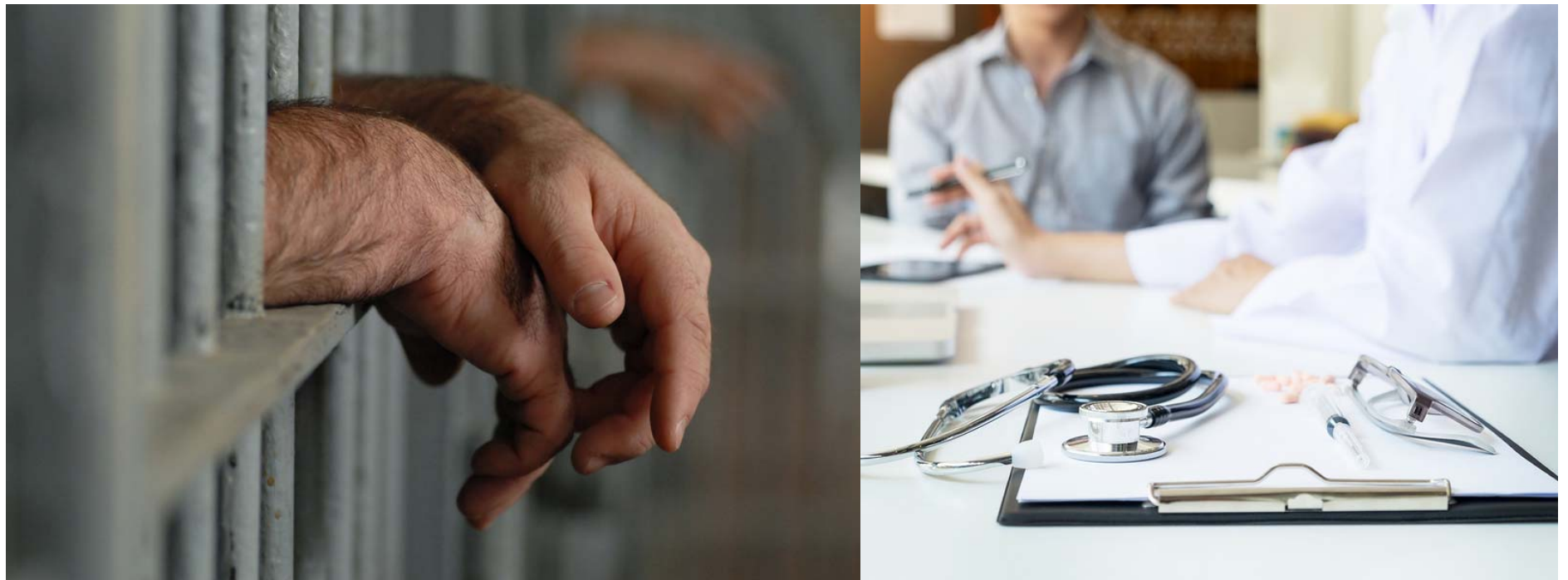


SYSTEMATIC REVIEW OF HEALTHCARE USE AND NEEDS OF PRISONERS



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MICHAL WITKOWSKI, POLLYANNA HUDSON, SARAH BATSON, BRIGITTE MOORE, STEPHEN MITCHELL



Title:	Systematic review of healthcare use and needs of prisoners
Authors:	Michal Witkowski (DRG Abacus), Pollyanna Hudson (DRG Abacus), Sarah Batson (DRG Abacus), Brigitte Moore (DRG Abacus), Stephen Mitchell (DRG Abacus)
Project coordinator:	Marijke Eyssen (KCE)
Reviewers:	Wendy Christiaens (KCE), Chris De Laet (KCE), Raf Mertens (KCE)
Belgian experts / stakeholders	See chapter 11: List of contributing experts and stakeholders
International experts	See chapter 11: List of contributing experts
External validators:	Kristel Beyens (VUB), Eamonn O'Moore (PHE), Hans Wolff (HCUGE) Kristel Beyens (Vrije Universiteit Brussel, Department of Criminology, Belgium), Eamonn O'Moore (National Lead for Health & Justice, Public Health England & Director of the UK Collaborating Centre for WHO Health in Prisons (European Region). Hans Wolff (Médecin-chef du service de médecine pénitentiaire, Hôpitaux Universitaires de Genève, Suisse)
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- The external experts were consulted about a (preliminary) version of the scientific report. Their comments were discussed during meetings. They did not co-author the scientific report and did not necessarily agree with its content.
- Subsequently, a (final) version was submitted to the validators. The validation of the report results from a consensus or a voting process between the validators. The validators did not co-author the scientific report and did not necessarily all three agree with its content.
- Finally, this report has been approved by common assent by the Executive Board.
- Only the KCE is responsible for errors or omissions that could persist. The policy recommendations are also under the full responsibility of the KCE.

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LIST OF ABBREVIATIONS

ABBREVIATION	DEFINITION
ADHD	Attention Deficit Hyperactivity Disorder
ARV	Antiretroviral
BME	Black and Ethnic Minorities
BMI	Body Mass Index
CAAP	Coordination des Associations Actives en Prisons
CAP	Centraal Aanmeldings Punt
CI	Confidence Interval
CGG	Centrum voor Geestelijke Gezondheidszorg
CPITN	Community Periodontal Index of Treatment Need
D/DMFT	Percentage of Decayed or total DMFT
DMFT	Decayed, Missing and Filled Teeth
DMFS	Decayed, Missing and Filled Surfaces
DS	Decayed Surface
DS/DFS	Percentage of decayed of total decayed and filled surfaces
DSM	Diagnostic and Statistical Manual of Mental Disorders
DT	Decayed Teeth
DT/DFT	Percentage of Decayed Total or Decayed and Filled Teeth
DUI	Driving Under Influence
EOL	End-of-Life
FAS	Foetal Alcohol Spectrum
FASD	Foetal Alcohol Spectrum Disorders
FE	Fixed Effect
FS	Filled Surface



FT	Filled Teeth
GP	General Practitioner
HBV	Hepatitis B Virus
HCV	Hepatitis C Virus
HIV	Human Immunodeficiency Virus
ID	Intellectual Disabilities
IDU	Injection Drug User
IQ	Intelligence Quotient
IQR	Interquartile range
IPT	Isoniazid Preventive Therapy
ISPOR	International Society for Pharmacoeconomics and Outcomes Research
LOC	Loss of Consciousness
LPPR	Law on Prisons and Prisoner's Rights
M/DMFT	Percentage of missed of total DMFT
MS	Missing Surface
MT	Missing Teeth
NEP	Needle Exchange Programme
NHS	National Health Service
NPS	Novel Psychoactive Substance
NR	Not Reported
NSSI	Non-Suicidal Self-Injury
OCD	Obsessive Compulsive Disorder
OST	Opioid Substitution Therapy
OR	Odds Ratio



PD	Personality Disorders
PEP	Post-Exposure Prophylaxis
PHE	Public Health England
PRISMA	Preferred Reporting Items for Systematic Reviews and Meta-Analyses
PTSD	Post-Traumatic Stress Disorder
PY	Person-Years
RE	Random Effect
SCID-II	Structured Clinical Interview for DSM-IV Axis II Disorders
SD	Standard Deviation
SDU	Social Defence Unit
Siréas	Service international de Recherche, d'Education et d'Action Sociale
SMD	Standard Mean Difference
SR	Systematic Review
STI	Sexually Transmitted Diseases
TB	Tuberculosis
TBI	Traumatic Brain Injury
UK	United Kingdom
UNODC	United Nations Office on Drugs and Crime
US	United States
VAGGA	Vereniging Ambulante Geestelijke Gezondheidszorg Antwerpen
WHO	World Health Organization



■ SCIENTIFIC REPORT

1 INTRODUCTION

1.1 Background information

In 2005, the Principles of Prison Administration and Prisoners' Legal status was passed, and put forward two guiding rules with regards to the healthcare provision in prisons: (i) health care in prisons and in the open society should be equivalent; and (ii) healthcare should be adapted to the specific medical needs of each prisoner.

Recently, a World Health Organization (WHO) expert panel also recommended that health ministries should provide and be accountable for healthcare services in prisons¹. In accordance with this guidance, several member states in the WHO European Region have already transferred the responsibility of prison healthcare to their health ministries, including Norway, France, Italy, Ireland, the UK, and two autonomous regions of Spain.

Belgium is also considering the implementation of such a reform in the near future. In this context, an in-depth and independent revision of healthcare services in prisons is required, in order to conform to international and national laws.

1.2 Objective

The purpose of the current systematic review (SR) was to identify published evidence regarding the healthcare needs and healthcare use of prisoners, specifically in Belgian and Western prisons. Data from the review will inform a wider healthcare needs assessment analysing the medical, organisational, financial, sociological, ethical, and quality aspects of healthcare services in prisons. The final anticipated output will be a proposal for an actionable reform of the organisation of healthcare services in prisons to ensure equivalence between the provision of healthcare in open society and in prisons, but also adjusting for the specificities of the prison setting.



2 METHODS

2.1 Protocol registration

The protocol for this review was designed by DRG Abacus, and approved by KCE. The protocol was not registered in a publicly available database but it is held with DRG Abacus and KCE.

2.2 Eligibility criteria

The PICOS (population, interventions, comparators, outcomes, and study design) statement applied during the review is summarised in Table 1.

Table 1 – Eligibility criteria for prisoner review

Criteria	Include	Exclude
Population	Adult persons who are in detention (accused, condemned, mentally ill offenders) with no restriction with regard to age, gender, ethnicity, or prison type (category of prison, security status, capacity). [Studies comparing outcomes of interest between prisoners and free citizens are also of interest and will be considered for inclusion in the review.]	Persons who are arrested and stay in police custody
Intervention/ comparators	No restriction	-
Outcomes	- Incidence/prevalence statistics regarding diseases/health complaints in prisons - Self-expressed/self-perceived/other reported healthcare needs in prisons - Unmet healthcare needs - Utilisation of different types of healthcare services/providers in prisons	Organisation of care in prisons without relation to healthcare needs
Study design	- Randomised controlled trials; no restriction with regard to phase or blinding - Prospective observational studies - Qualitative studies - Reviews	-
Countries of interest	Belgium and West European countries, the US, Canada, and Australia	Non-Western countries
Language of publication	No restriction. Studies published in a foreign language will be flagged, and their inclusion decided on in conjunction with KCE.	-
Date of publication	2006 to present	Studies published pre-2006



2.3 Information sources

2.3.1 Electronic database search

The electronic database search was conducted in two stages:

- Identification and screening of systematic reviews
- Identification and screening of primary studies relating to the Belgian setting

Relevant primary studies relating to the non-Belgian setting (restricted to countries of interest, as outlined in Table 1) were also included.

To identify relevant studies, the following databases were interrogated on the 1st April 2016 (searches were restricted from the year 2006 onwards):

- Embase
- MEDLINE
- Cochrane Library, consisting of:
 - o CENTRAL: Belgian search
 - o Cochrane Database of Systematic Reviews: systematic review search
 - o Database of Abstracts of Reviews of Effects (DARE): systematic review search
- CINAHL
- PsychInfo

2.3.2 Search strategies

Detailed search strategies were developed by an information specialist at KCE, to identify relevant studies from the published literature. The full search strategies used, including text words (free text), subject index headings (for example, MeSH), and the relationship between search terms (for example, Boolean), are provided in Appendix 1.

2.3.3 Supplementary data sources

Additional hand searching was performed to identify further relevant studies not captured in the electronic database searches. Hand-searching of the International Society for Pharmacoeconomics and Outcomes Research (ISPOR) conferences was limited to the last three years (2013-2016 inclusive). Hand-searching was performed for the years 2006-2016 for all other sources. The following sources were interrogated:

- ISPOR
- Belgian journals Fatik and Panopticon
- UK prison Service Journal
- Infection inside (publication from public health England [PHE])
- Belgian University repositories
- FPS Justice library

The ISPOR conference proceedings, UK prison service Journal and Infection inside are English language publications. In addition, a number of the University repositories were available in English language.

Where databases for the above sources were available searches of titles/abstracts and full texts (if this functionality was available) were performed using the following key words:

- Prison, Prisoner, Offender, Inmate, Incarcerated

The Belgian Universities repositories were also searched using the following Dutch and French terms:

- Dutch: Gevangenis, gevangene, overtreder, gedetineerde, opgesloten, detentie and justitie
- French: détenu, prisonnier, offenseur, carcéral and pénitentiaire



The Belgian journals *Fatik* and *Panopticon* are published in Dutch language. As the theme of these journals is prisons search terms were limited to health and health services using the following key words:

- gezond(heid), zorg, geneeskunde, welbevinden, gezondheidszorg, arts(en), dokters, verpleegkundige(n), verpleegster(s), verpleger(s), medisch(e), psychiatrisch, psychiater, mentaal, psychisch, geestelijke gezondheidszorg, hulpverlening, dienstverlening, verzorging, verpleging

The library of the FPS Justice was searched using 'Santé'

In addition, the reference lists of included publications were also scanned for relevant articles.

3 STUDY SELECTION

3.1 Belgium-specific search

The electronic database searches for the Belgium-specific part of the review identified a total of 566 citations; duplicates were removed as part of the search strategies. Following screening on the basis of title and abstract, 498 articles were excluded, and 68 were deemed to be potentially relevant. These citations were retrieved for full publication review. Upon review of the full publications, a further 49 articles were excluded. Hand searching yielded an additional 47 relevant publications for inclusion, resulting in a total of 65 included publications from the Belgian search²⁻⁶⁶. Characteristics of included studies can be found in Appendix 2.

The process of the study selection is documented in the PRISMA flow diagram shown in Figure 1. A list of studies excluded from the review on the basis of full publication, along with a rationale for exclusion, is provided in Appendix 3.

3.2 Systematic review search

The electronic database searches for systematic reviews identified a total of 1,941 citations; duplicates were removed as part of the electronic searches. Following screening of titles and abstracts, 1,649 articles were excluded, and 292 articles included for full publication review. Upon review of the full publications, a further 194 articles were excluded. An update search in CINAHL database resulted in additional three SRs included. This resulted in a total of 101 relevant systematic reviews for inclusion⁶⁷⁻¹⁶⁷. None of the identified systematic reviews focused only on a Belgian population. Characteristics of included studies can be found in Appendix 2.

The process of the systematic review selection is documented in the PRISMA flow diagram shown in Figure 2. A list of studies excluded from the review on the basis of full publication, along with a rationale for exclusion, is provided in Appendix 3.



Figure 1 – PRISMA flow diagram for the Belgian search

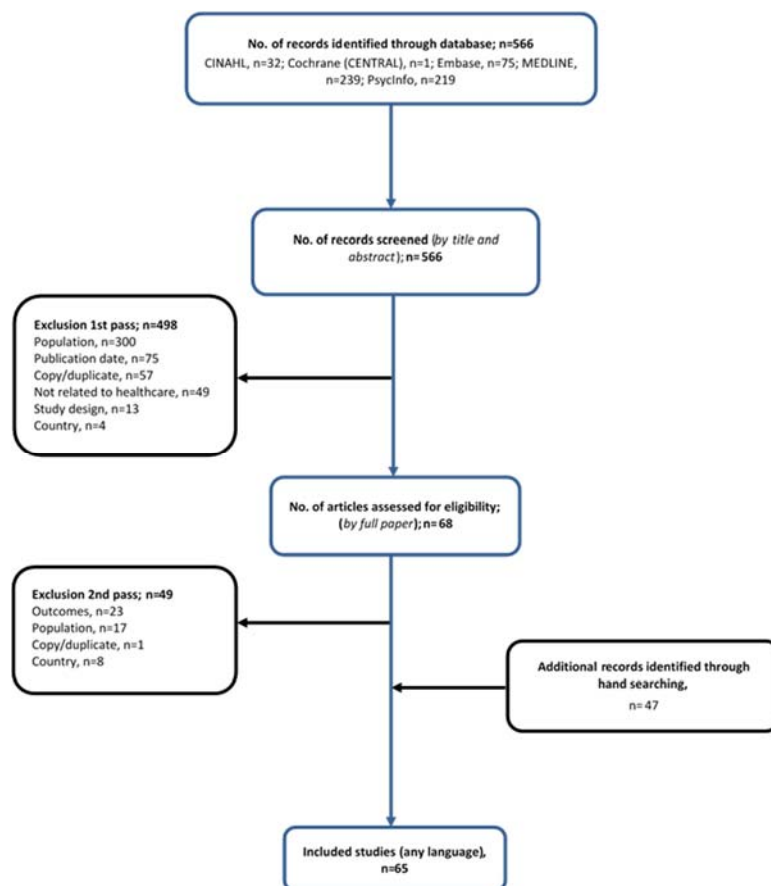
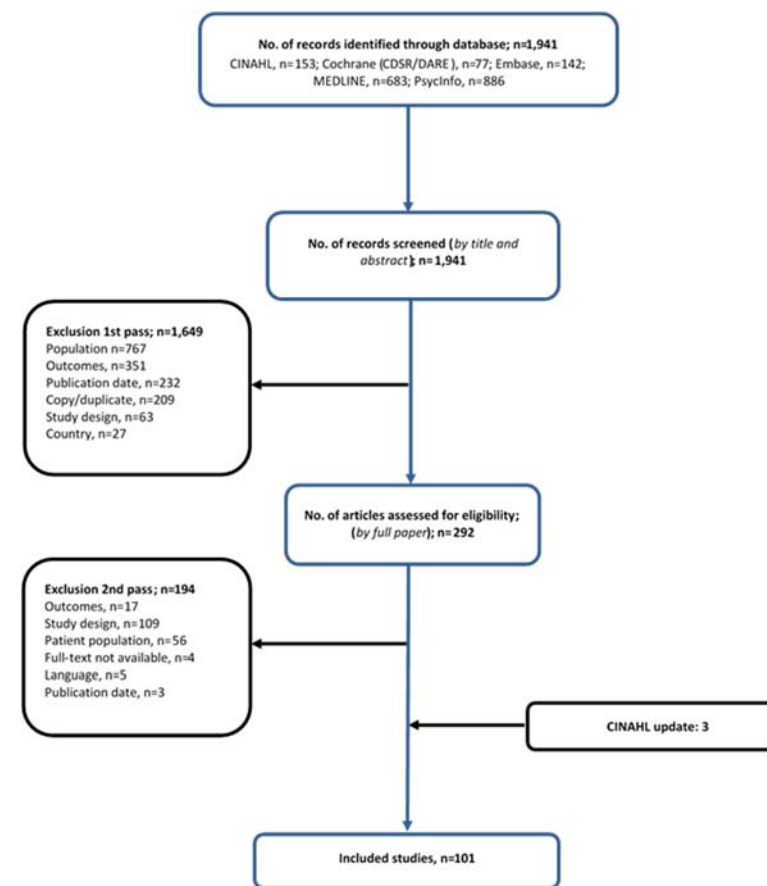


Figure 2 – PRISMA flow diagram for the systematic review search





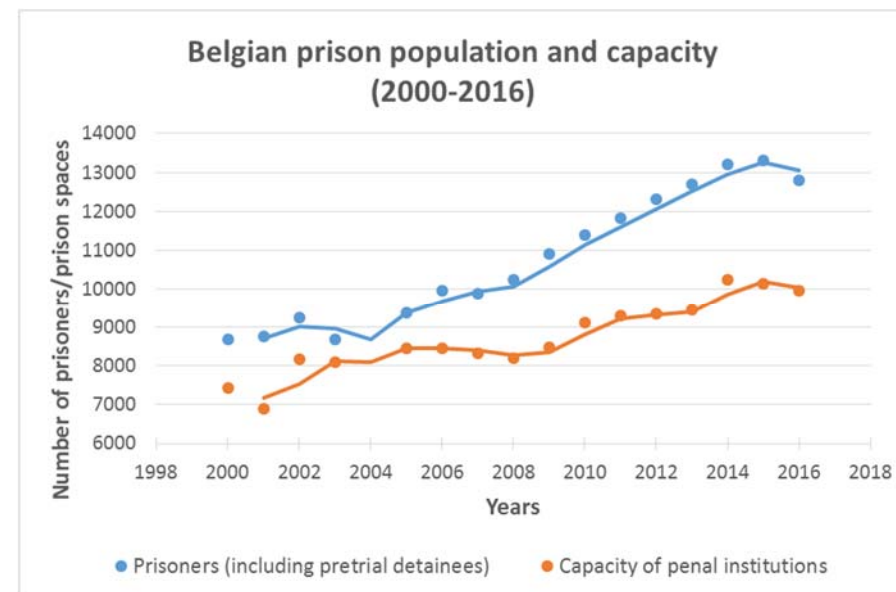
4 RESULTS

4.1 Background

There are 35 prisons in Belgium; 16 in Flanders, 16 in Wallonia and two in Brussels. Additionally, due to prison overcrowding, Belgium rents a prison in Tilburg in the Netherlands (650 places) close to the Belgium-Netherlands border.¹⁶⁸

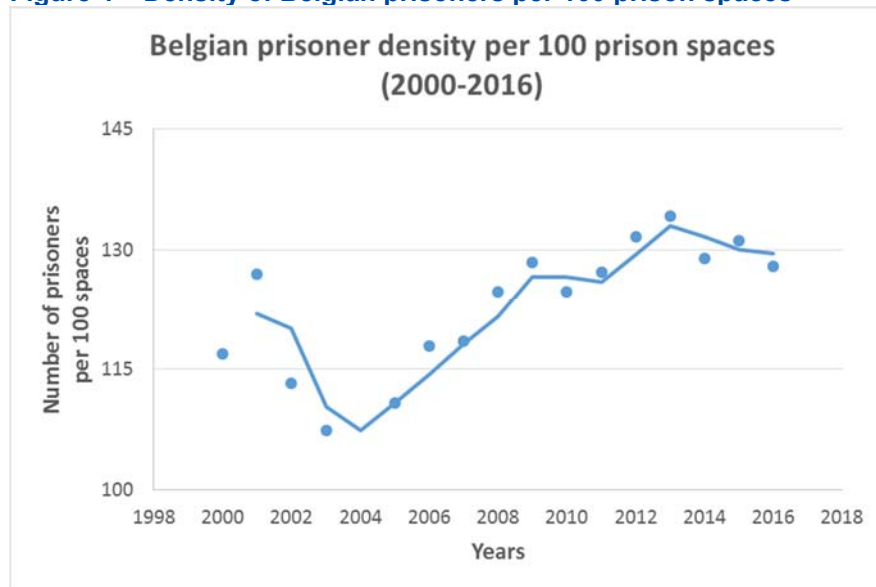
Belgium has a population of 10.4 million, with a reported incarceration rate of 100 per 100,000 population (in 2007).^{10, 42} For perspective, the Belgian incarceration rate is lower than that in the US (753 per 100,000) or in England and Wales (154 per 100,000), but higher than in France (96 per 100,000) or Sweden (74 per 100,000).¹⁰ Over the last ten years, the Belgian penitentiary population has increased by 21%.¹⁰ As of 1st January 2016, Belgian prisons house 12,799 prisoners (including pre-trial detainees), compared with a capacity of 9,962 spaces. In 2015, the average daily penitentiary population was 11,040.¹⁶⁹ Prison overcrowding is a growing problem, and there are concerns over the adequate provision of prisoner healthcare needs.¹⁰ Data obtained from yearly SPACE questionnaire reports from the Council of Europe Annual Penal Statistics indicate prison overcrowding is a growing problem in Belgium (Figure 3), with numbers of prisoners increasing faster than prison capacity.

Figure 3 – Belgian prison population and capacity from 2000-2016



Data derived from Council of Europe Annual Penal Statistics SPACE reports, years 2000-2016.^{170, 123}

The number of prisoner places available per 100 prisoners further highlights overcrowding; as of 1st January 2016, the prison density was 111.1 prisoners per 100 prison spaces (Figure 4).¹⁷⁰ Specifically in Gent, in 2012, prison capacity was 292, whereas mean occupancy was 434.7.³⁹ In 2015, an occupation rate of at least 25% was observed in 12 prisons (Antwerpen, Berkendael, Dinant, Forest/Vorst, Huy, Jamioulx, Lantin, Mechelen, Mons, Namur, Nivelles, Saint-Gilles/Sint-Gillis).¹⁶⁹

**Figure 4 – Density of Belgian prisoners per 100 prison spaces**

Data derived from Council of Europe Annual Penal Statistics SPACE reports, years 2000-2016.^{170 123}

Key organisational aspects of Belgian prisons with regard to healthcare:^{42, 171}

- The Central Medical Service is responsible for the organisation, management, supply and supervision of healthcare in penitentiaries⁴²
- Access to healthcare and treatment, somatic as well as psychiatric, is free for prisoners⁴²

As of 12th of January 2005 a law concerning the legal position of detainees¹⁷¹ was passed (the legal framework implements the European Prison Rules). According to this law detainees must access the same quality as healthcare in the free community and which should be adapted to their specific needs⁴². Healthcare in prison is based on four fundamental principles:

- Equivalence of care (to outside of prison)
- Continuity of care (before, during and after imprisonment)
- Specificity of care
- Independence of care providers
- Healthcare in prison should be curative, address prevention, and protect general health, thus indirectly contributing to reintegration into society upon release.
- ‘An accused person who has committed a crime or an offence and who is either in a state of insanity, or in a state of severe mental unbalance, or in a state of severe mental deficiency rendering him/her incapable of controlling his/her actions will be interned’⁴². Internment is not a punishment and there is no sentence; it is a measure of social protection⁴²
- In 2007 a new Act relating to the internment of persons with a mental illness was passed (*Moniteur Belge*, 13th July, 2007), replacing the previous Act of 1964 (1st July, 1964). The act still allows for the internment of mentally ill offenders without criminal sanction, with internees sent to prison or psychiatric institutions. The execution of internment is the task of the multi-disciplinary Courts for Implementation of Sentences (previously undertaken by the Social Protection Committee)⁵⁹ A further change in the law, from May 2014, came into force on the 1st of January 2016. Main changes, briefly, include the following:
 - o Introduction of strict quality standards for psychiatric diagnosis
 - o Creation of “Social Protection Chambers”, which will decide placement and transfer of internees (a responsibility which lay with Social Defence)
 - o After the prison sentence of an internee has been served, the new regulations of internment will apply



Since 1999, Belgian prisoners' medical files have been electronically recorded by each correctional institution. In 2010/11, the health service department of the FPS Justice implemented a single clinical ICT database to centralize the electronic collection of prisoner health-care data. All Belgian prisons are connected to this database (EPICURE).⁶⁰

4.2 General health and healthcare-seeking behaviour

4.2.1 Belgian studies

Based on the visit of two Belgian prisons, the European Committee for the prevention of torture and inhuman or degrading punishment or treatment created a report for the Belgian government (2012).^{8, 172} Medical care is only one of several topics addressed by the report. Table 2 outlines the available facilities/services and the associated report recommendations.

Table 2 – Key healthcare recommendations by the European Committee for the prevention of torture and inhuman or degrading punishments or treatments⁸

	Status/topic	Recommendation
Forest/Vorst prison	30 hours of GP presence/week	GP hours are insufficient for the 700 prisoners and need to be increased
	Nurses present from 7 am to 9 pm, weekdays only	24/7 nurse presence needs to be assured, especially in view of the psychiatric annex (100 inmates)
	Dentist presence 8 hours/week, long waiting list	Increase required
	Medical exam on prison entry consists of nurse completing a checklist	Appropriate GP exam required
	Medical confidentiality assured	Adequate
	Facilities and equipment	Adequate
	Psychiatric annex patients get only pharmacological treatment and there are no individual treatment plans.	A second psychiatrist position is recommended. Treatment to be improved, but status is due to legal situation

	There is one psychiatrist position.	
Andenne prison	GP presence 3-4 hours per day, psychiatrist available twice a week, nurses available from 7 am to 9 pm	38 extra hours of GP time required, as well as more nurse time
	Two dentists visiting on a temporary basis	Dentist waiting times are too long
	Radiotherapy and physiotherapy	Adequate provision
	Outside medical services	
	Medical exam on prison entry consists of nurse completing a checklist	Access needs to be facilitated by increased availability of security staff to allow transfers for treatment in a timely fashion
	Prison personnel strikes and similar issues restricted prisoners' access to medical services	Appropriate GP exam required
		Similar situations need to be prevented

Abbreviation: GP, general practitioner

In their 2013 report, the European Committee for the prevention of torture and inhuman or degrading punishments or treatments noted that nurse presence was sufficient in the visited establishments,¹⁷² which is an improvement from 2012. However, physician presence/time was still found to be largely insufficient. Psychiatric care was also still found insufficient. Psychiatric annexes are highlighted as a special problem, with mentally ill prisoners spending too much time in these institutions, which are intended as temporary accommodation only. A severe lack of psychiatrists was noted.

2012 data from a retrospective review¹⁷³ in the prison of Ghent confirm that the demand for services can't be met by the services available and that the care ends with prisoner transfer or release.



- 61 people asked for assistance from OBRA (<http://www.obra.be/wiezijnwe.htm>) who gives counselling to persons with a handicap; 20 were approved
- 20 prisoners (30calls) called prison tele-onthaal, where they can talk anonymously about their fears and worries
- 96 prisoners were referred to the 'Centrum Geestelijke Gezondheidszorg Eclips' (Centre for Mental Health Care; <http://www.cggeclips.be/>); 68% of these were admitted (57 active care-periods). Main reasons for admission were mental problems (suicide-thoughts and -attempts, depressive feelings, stress), coping problems or behavioural issues (aggression).
- The "Centraal AanmeldingsPunt" (<http://www.verslaafdenzorg.be/index.php/component/content/article/22-cap/31-centraal-aanmeldpunt-voor-druggebruikers-in-de-gevangenis>) that offer counselling with regard to drug-use received 151 service requests, resulting in 125 service offers (237 sessions). Of these people, 32.8% were heroine-users and 18.4% speed and cocaine-users.
- 22 prisoners made use of the Anonymous Alcoholics services

These results confirm those of an earlier, similar publication by Hellemans et al, 2008²⁸ who aimed to evaluate the implementation of the Flemish 'hulp-en dientsverlening' intervention in Flemish prisons and to gain insight into what the service offer means for the prisoners. Although many different services are offered to deal with a variety of health and social problems, these are insufficient – there are long waiting lists. Only 42% of prisoners were found to have a good overview over the services available.

A 2015 report by Vyncke et al⁶⁴ describes the health of prisoners in Flemish and Brussels prisons, based on questionnaires given to 1,000 prisoners; 782 analysable questionnaires (from 12 prisons) were collected. The results are summarised in Table 3.

Table 3 – General health state of Belgian prisoners

	Prisoners	General population
In good health	51.2%	74.1%
Chronic disease	35.7%	30.9%
Diabetes	7%	5.7%
Hypertension	21.8%	17.9%
Airway problems	18.4%	NR
STI	2.6%	NR
Pain	69.6%	52.4%
Overweight	50.5%	31.1%
Sleeping problems	55.3%	22.5%
Suicidal ideation	37.6%	11.7%
Suicide attempt in past year	6%	0.4%
Smoker	69.6%	23.6%
Mean stress score	8.4	7.8
Mean anxiety score	8.5	NR
Mean depression score	7.6	?
Mean loneliness score	2.42	1.45

Based on Vyncke et al, 2015.⁶⁴ The WIV data health questionnaire 2008 or the Social Capital and Wellbeing in Ghent (SWING)-study 2015 were used for comparisons with the general population.

An important component of assessing prisoner healthcare needs is understanding what drives help-seeking behaviour. In Belgium, primary care is provided to prisoners by general practitioners (GPs); there are no waiting lists and consultations are free of charge, providing easy access.²⁵ Feron et al. states that on average, 10% of Belgian prisoners see a GP every working day,²⁵ with a wide variance in attendance rates between prisoners (mean: 17.2 contacts/year, SD: 25), which is 3.8 times more often than the rest of the population (result standardised according to age and sex, and excluding examination on entry).²⁴ A retrospective study of prisoners (n=513) in



Belgian prisons (n=33) by Feron et al, 2005²⁴ reported on this substantial use of primary healthcare by prisoners. The study included 3328 GP contacts and 3655 reasons for encounter. The most common reasons for prisoner GP attendance were administrative procedures (22%), psychological (13.1%), respiratory (12.9%), digestive (12.5%), musculoskeletal (12%) and skin problems (7.7%). For GP encounters at the prisoners request, the most frequent medical complaints were mental health issues (n=481). Yet, despite mental health issues representing the primary reason for GP encounters at the prisoners' request, mental health issues are not even in the top five most common health problems reported by prisoners on imprisonment. The five most common health problems reported by prisoners (n=439) at the time of imprisonment were drug misuse (n=97, 22.1%), chronic alcohol misuse (n=21, 4.8%), viral hepatitis (n=19, 4.3%), asthma (n=17, 3.9%) and peptic ulcer (n=13, 3.0%).²⁴ Requesting a drug prescription (40%) was the main reason for prisoners GP attendance over mental health issues. Based on these data, Feron et al, 2005,²⁴ reported potential reasons for the substantial use of prison healthcare: imprisonment with pre-existing health problems, lack of access to informal types of healthcare, and development of mental health issue due to prison life.

Subsequently, these reasons for substantial healthcare use by prisoners were the focus of another study by Feron in 2008.²⁵ The study interviewed 25 prisoners to evaluate prisoner help-seeking behaviour.²⁵ Five driving social factors of prisoner help-seeking behaviour were identified:

- Prisoners' negative perception of imprisonment. Prison conditions by nature cause anxiety, depression and other somatic disorders which can reduce the prisoners threshold to tolerate illness
- Prisoners' regaining a measure of control. The prisoners' right to healthcare is seen as an option to regain a measure of control over their lives, of which they have been deprived with imprisonment
- The role of the doctor. GPs report a situation where there are few justified patients with 'real diseases' (e.g diabetes, heart disease). Some prisoners present feigning disease, such as depression, in order to obtain sedatives (for personal use or drug dealing)

- Health professionals' control over prisoners. Prison is a controlled environment and consequently prisoners are more likely to adhere to GP ordered appointments. Prescription of sedative drugs is also a factor in prisoner GP attendance
- Lack of alternatives to healthcare. Access to informal healthcare in prisons is often limited. Consequently, the GP is often the only outlet for prisoner healthcare needs

Vandeveldt et al, 2007,⁵⁸ conducted qualitative interviews of drug-involved incarcerated offenders (n=18), recently released offenders (n=15) and treatment staff members (n=18) to assess the treatment needs of incarcerated drug-involved offenders. Released offenders interviewed placed importance on prison based-treatment; 88.6% were in favour of treatment services in prison. Additionally, 90.2% of incarcerated offenders indicated a positive attitude to in-prison treatment when interviewed. A binary logistic regression using the EuropASI severity scores as independent variables indicate that released offenders are significantly more likely to suffer psychological problems than incarcerated offenders ($p<0.05$).⁵⁸ Alternatively, greater psychological problems encountered after release may be due to poor preparation by prison services for release back to the real world, insufficient community treatment services, or released offenders may chose not to attend treatment. The latter may be a valid reason; prison treatment is much more structured and prisoner attendance may be positively skewed due to incorporation of treatment stipulations in early release programmes (i.e. good attendance of treatment sessions while in prison may have a positive impact on early release, whereas there is no such incentive after release).

Studies have highlighted prisoner distrust of prison staff providing treatment, specifically with regard to mishandling of confidential information. Feron et al, 2008²⁵ report that many prisoners do not believe caregivers are independent of the prison institution.



4.2.2 Systematic reviews

A systematic review by Hickey et al. 2014¹¹³ aiming to determine perceived health in incarcerated adults reported that:

- Previous lifestyle practices (smoking, substance abuse, lack of preventive care) exacerbate inmate health conditions
- Predictors of worse perceived health status were: older age, lower education level, frequent experience of negative feelings, suicide attempt in prison, and reported health problems upon entry to prison
- Former incarcerated drug users reported significantly more gain in health status while in prison as compared with non-drug users
- All documented inmates reported poorer perceived health than their non-incarcerated counterparts. Self-reported ratings using a one-item questionnaire that measures perceived health varied from excellent to poor; however, increasing age and lower educational levels were both correlated with worse perceived health. Results from the SF-36 data also revealed lower perceived health among prisoners; however, for some, health improved with imprisonment, as inmates reported better health on the SF-36 subscales after imprisonment.

Goncalves et al. 2014¹⁰¹ examined predictors of healthcare utilisation in prisons. Older age, general physical symptoms, and prior mental health treatment was found to be the strongest predictors of healthcare utilisation, while neurological problems, substance abuse, or long sentence were found to have a moderate effect on the healthcare utilisation.

4.3 Tuberculosis

4.3.1 Belgian studies

A study by Aerts et al, 2006² focused on the control of TB in European prisons. A questionnaire was sent to the 52 European countries of the WHO European Region. The results from the questionnaire for Belgium (data was collected in 2003 and 2004) indicated that the prison population consisted of 9,037 individuals, of which 21 prisoners had confirmed or suspected TB (19 cases of bacteriologically confirmed TB [12 with positive TB culture,

seven with smear and positive culture] and two cases of unknown bacteriological status),² i.e. 89.6 prisoners with TB/100,000 population. The study did not specify which Belgian prisons responded to the questionnaire. This contrasts starkly with the rate of TB in civilians (12.6 civilians with TB/100,000 population), suggesting prison conditions, such as overcrowding, lack of ventilation and poor hygiene, favour the spread of TB. At the time data of collection (2002) by Aerts et al, 2006² the total TB drug resistance rate in Belgian prisons was 6.7%. Encouragingly, Aerts et al, 2006² reported that the majority of countries participating in the questionnaire reported performing TB screening for prisoners upon entry (90.9%) and during detention (63.6%). Unfortunately, although requested, Belgium could not provide separate data on entry and periodic screening, with all screening data compiled under periodic screening.² From the data, Belgian prisons periodically (period unspecified) screened 51.7% of prisoners for TB (range of other included countries 0% [Norway] to 100% [Malta, Moldova]).² The TB detection rate from periodic screening in Belgian prisons was 115.5 cases of TB/100,000 prisoners screened. The treatment completion rate amongst Belgian prisoners was 20% (minimum 0% [Belarus, Latvia], maximum 58% [Romania]).²

Also in 2006, the Scientific Committee of the Foundation Against Tuberculosis and Respiratory diseases⁶⁵ published recommendations around the control of TB in prisons. The recommendations were created in collaboration with experts from the Prison Health Service (SSP), the Department of Health Surveillance of the Public Service for Prevention and Protection at Work (SCPPT) and the Internal Service of Prevention and Protection at Work (SIPPT). Data from 2001 to 2004 show that the incidence of TB is more or less stable in the general population (at approximately 12/100,000 population), whereas the incidence of TB detection in the prison population is not only >10 times higher, but increases over time (from 117/100,000 in 2001 to 193/100,000 in 2004) (Table 4).

The treatment rates reported in this study⁶⁵ differ from the ones in the study by Aerts.² In prisoners incarcerated in 2002, 52% were considered treated, 19% stopped prematurely their treatment and 19% were lost to follow-up.

The authors set out four cornerstones for the combat of TB in prisons:

- Detection and early treatment



- A specific and adapted approach is required
- Prevention and/or control of mini-epidemics with an exhaustive investigation of contacts
- Control of TB in those who are at risk of infection

Table 4 – Evolution of TB detection rate in prisoners and incidence in the general population (per 100,000)

	2001	2002	2003	2004
Detection in prisoners (active screening)	117	116	133	193
Incidence in the general population	12.9	12.7	10.9	11.8

Abbreviation: TB, tuberculosis.

4.3.2 Systematic reviews

The incidence and prevalence of TB in the custodial setting are higher than in the general population, although the exact rates vary in the literature, due to a number of plausible factors (year of the study, countries included in the review, sampling technique, diagnosis methods, inconsistent reporting). Baussano 2010⁷⁴ reported that in high-income countries the median estimated fraction (PAF%) of TB in the general population attributable to the exposure in prisons for TB was 8.5% (IQR: 1.9% to 17.9%). This figure was 13.1% (IQR: 8.1% to 30.0%) for latent tuberculosis. This review also reported that in the USA the rate of TB infection could be 5 to 83 times higher in prisons than in the general population. Kouyoumdjian 2016¹¹⁸ also mentioned a rate 5 times higher in Canada. Co-infection with HIV is a risk factor for TB^{68, 158}, as well as drug abuse.

Isoniazid preventive therapy (IPT) is effective to reduce TB incidence, but the IPT treatment rate was highly variable across studies, in relation to adverse events⁶⁸.

Vinkeles Melchers et al. 2013¹⁵⁸ and Dara et al. 2015⁸⁵ identified key barriers to tackling TB in prisons. Most commonly reported were limited accuracy of diagnostic algorithms, lack of adequate laboratory facilities and lack of well-

organised health services or adequate referral. In some prison settings the diagnostic testing and medical follow-up was allowed only for those presenting with symptoms, while quality control of smear examinations was not always present in local laboratories. In addition, infection control and adequate isolation of cases could be limited by prison infrastructure, but also neglects hard-to-reach populations (e.g. female and/or foreign-borne inmates) who may encounter violence, discrimination or language barriers.

4.4 HIV, viral hepatitis, and bacterial STI

4.4.1 Belgian studies

In 2008, the HIV prevalence in prison was 1%, i.e. five times higher than in the general population, whereas hepatitis C prevalence was 7%, i.e. seven times higher than in the general population.¹⁷⁴

There is a paucity of more recent data.

A study by Michel et al, 2015³¹ assessed the availability of recommended HIV-HCV prevention interventions and hepatitis B virus (HBV) vaccination for prisoners based on WHO/United Nations Office on Drugs and Crime (WHO/UNODC) recommendations. Data were collected using a postal/electronic questionnaire, sent to all prisons in Austria, Belgium, Denmark and Italy, referred to as the E4 analysis.³¹ The response rate for Belgium was 17/34 prisons, representing 47% of the Belgian prison population (representative of the total Belgian prison population as of 1st of January 2014, according to the council of Europe's annual penal statistics). A score of adherence to the WHO/UNODC recommendations was built; ranging from zero (no adherence) to 12 (full adherence). The questionnaire collected data about the organisational characteristics of the prisons assessed (such as provision of doctors, nurses, security and sanitary staff) and availability of different specific prevention measures (such as bleach, condoms, needle exchange programmes, post-exposure prophylaxis [PEP], antiretroviral [ARV] therapy, opioid substitution treatment, information-education-communication and prevention measures for tattooing/piercing)³¹ (Table 5). The overall global adherence score of participating Belgian prisons was four out of a score of 12. When the global score is broken down into individual sub scores, Belgium scored zero for the provision of



information-education-communication, testing and counselling, provision of needle exchange programmes (as did all other countries in the E4 analysis), provision of bleach, HBV vaccination and PEP (Table 5).³¹ However, adherence scores were reported for provisions of condoms/lubricants (score of nine), opioid substitution therapy (score of four), ARV treatment (score of 14) and prevention of transmission through tattooing/piercing (score of two).³¹

Table 5 – E4 analysis – proportion of adherence to the different WHO/UNODC guidelines among all participating prisons (n=109)

	Belgium (N=17/35)	Austria (N=28/28)	Denmark (N=29/50)	Italy (N=35/205)
Information-Education-Communication, n	0	0	0	0
Testing – counselling, n	0	0	0	0
Condoms – lubricants, n	9	8	2	0
Opioid substitution therapy, n	4	6	7	5
Bleach, n	0	11	11	0
HBV vaccination, n	0	4	3	18
PEP, n	0	11	1	27
NEP, n	0	0	0	0
ARV treatment, n	14	27	29	33
Prevention of transmission through tattooing	2	0	5	0
Total score, median (Q1-Q3)	4.0 (3.5-4.5)	4.5 (3-6.5)	4.0 (3.0-4.5)	3.5 (2.5-4)

Abbreviations: ARV, antiretroviral; HBV, hepatitis B virus; NEP, needle exchange programme; PEP, post-exposure prophylaxis; UNODC, United Nations Office on Drugs and Crime; WHO, World Health Organisation. Table adapted from Michel et al, 2015.³¹

The questionnaire also assessed the number of staff available to prisoners. The number of staff available (mean, range) were: doctors (3, 1–7), nurses (10, 1–36), security staff (254, 42–707), social workers (7, 1–18) and sanitary staff (14, 3–48).³¹ Table 6 outlines the number of personnel available per 100 prisoners in all countries involved in the E4 analysis. The Belgian prisons have a lower number (mean, SD) of doctors (1, 0.4–6) and sanitary staff (4, 2–12) and similar numbers of nurses (3, 1–6) and social workers (2, 0.4–7) available per 100 prisoners when compared with other countries (Table 6).³¹ However, the mean number of security staff per 100 prisoners was the highest in Belgian prisons (70, 48–86) (Table 6).³¹

Table 6 – Prison staff per 100 prisoners

Number of personnel available/100 prisoners – Mean (min-max)	Belgium (N=17)	Austria (N=27)	Denmark (N=29)	Italy (N=35)
Doctors	3 (1–7)	5 (1–28)	2 (1–7)	14 (3–43)
Nurses	10 (1–36)	5 (1–44)	3 (0–19)	10 (2–34)
Security staff	254 (42–707)	109 (22–421)	77 (11–460)	211 (30–950)
Social worker	7 (1–18)	4 (1–12)	2 (1–8)	5 (1–17)
Sanitary staff	4 (3–12)	10 (2–69)	5 (2–18)	8 (2–37)

Abbreviations: Max, maximum; Min, minimum. Table adapted from Michel et al, 2015.³¹

Only two participating Belgian prisons had consultation available for HIV (2/17, 11.8%) and HBV/HCV (2/17, 11.8%). Psychiatric consultation was available to prisoners in 14/17 (82.4%) of Belgian prisons. The other countries in the E4 analysis all offered consultation in a higher percentage of prisons than Belgium (Table 7).³¹

**Table 7 – Availability of HIV, HCV/HBV and psychiatric consultations to prisoners**

Available consultation	Belgium N=17 prisons, n (%)	Austria N=28, n (%)	Denmark N=29, n (%)	Italy N=35, n(%)
HIV	2 (11.8)	28 (100)	28 (95.6)	30 (85.7)
HBV/HCV	2 (11.8)	28 (100)	28 (95.6)	30 (85.7)
Psychiatric	14 (82.4)	26 (92.9)	25 (86.2)	35 (100)

Abbreviations: HBV, hepatitis B virus; HCV, hepatitis C virus; HIV, human immunodeficiency virus. Table adapted from Michel et al, 2015.³¹

4.4.2 Systematic reviews

International studies report similar prevalence of HIV among prisoners as in Belgium,^{84, 103, 114, 118, 146, 158}. The rates of HCV are much higher than those reported in Belgium, going up to 30%^{81, 118, 146}

The proportion of HIV-positive prisoners who were receiving treatment during incarceration was reported in two identified SRs^{114, 118} and was comparable between studies (~65%). One SR reported that the treatment rates, and rates of virological suppression, were higher during incarceration (65%) compared with rates before incarceration (54%) and after release (37%). One study¹⁴⁶ reported on HIV testing coverage according to testing models and found that between 3% and 90% of prisoners were covered by opt-out HIV testing, while the coverage of opt-in HIV testing ranged between 25% and 72%. Culbert et al. 2011⁸⁴ reported that HIV education and prevention counselling delivered by inmate peer educators resulted in increased number of HIV tests and was associated with reduction in post-release risk behaviours. In addition, interventions focused on prevention of HIV and opportunistic disease transmission found to be effective in reducing viral infections and decrease in risk behaviours. These interventions included syringe exchange programmes and treatment with buprenorphine among incarcerated, opioid-dependent, HIV-positive men.⁸⁴

4.5 Mental health

4.5.1 Belgian studies

4.5.1.1 Psychological problems in detainees

In general, available data indicate that the prevalence of mental disorders among prisoners is high.^{10, 42} However, it has also been reported that there is a scarcity of scientific data to confirm this.^{10, 42} A study by Thiry et al, 2012⁴⁶ assessed the personality disorders of 262 French-speaking prisoners (248 [94.7%] criminally convicted and 14 [5.3%] interned mentally ill offenders provided with psychiatric care) in Belgian prisons, who were eligible for early release. Personality disorders were assessed using a self-reported evaluation of personality disorders, the NEO PI-R assessment.⁴⁶ The results indicated that Belgian prisoners (when compared with a French normative sample) were as stable, as extroverted, more closed, more agreeable and more conscientious when compared with the normative French sample.⁴⁶ In contrast to the comparative population, two personality disorders with medium effect sizes were observed in the prisoner's: high obsessive compulsive personality disorder and low histrionic personality. The differences between the mean effect sizes of the Belgian prisoner population and the French normative sample were small for antisocial personality (low score), psychopathy (low), narcissistic personality, schizoid personality and borderline personality (a small effect size indicates little difference between the groups with regard to personality disorders).⁴⁶

Thus, as there were small effect sizes between the two populations, Thiry et al. 2012⁴⁶ concluded that high prevalence of psychiatric illness of prisoners may be overestimated in Belgian prisons. This is in contrast with reports from systematic reviews with rates of mental health diseases in prisoners much higher than in the general population (see 4.5.2). This difference may also highlight the difficulties in accurately diagnosing psychiatric problems in a prison setting, specifically with the use of a standardised test. Thiry et al. 2012⁴⁶ also concludes that inmates may minimize dysfunctional personality characteristics in a self-reported context. Intriguingly, these results are not consistent with previous studies, in particular the meta-analysis by Fazel and Daesh et al, 2002¹⁷⁵ (62 studies involving 22,790 prisoners) of serious mental disorder in prisoners from 12 countries. This



study reported that prisoners were several times more likely to have psychosis and major depression, and ten times more likely to have antisocial behaviour than the general population.¹⁷⁵

Dressing et al, 2009,¹⁸ give an overview of the concepts of the provision of mental health services for prisoners in 24 European Union countries, including Belgium. Experts stated that there was a large gap between psychiatric care in and out of prison, mostly due to lack of places/beds for psychotherapeutic treatment and the lack of trained staff. Aftercare (after release) is important, but in Belgium a mental state assessment prior to release from prison is only performed for sex offenders and prisoners who served more than five years.¹⁸

A 2013 report by Brosens et al (Vrije Universiteit Brussel)⁵ aimed to investigate the actual use and needs of prisoners in the Antwerp prison, with regard to 'hulp- en dienstverlening'-services. They used a literature review, as well as a focus group (45 participants) and a questionnaire (507 participants). More than 70% reported serious psychological complaints (compared with 25% in the general population); 71% feel unhappy, 45% have sleeping problems and 31% feel depressed. In the population of mentally ill offenders >80% report serious psychological complaints: 18% of respondents have made use of VAGGA (Vereniging Ambulante Geestelijke Gezondheidszorg Antwerpen), where 20% wanted to talk about their fears and depression, 12% about their use of/addiction to alcohol or drugs, 8% about sexual problems and 5% about suicidal thoughts. Of the 5% stating that they have a psychiatric problem, 78% want to talk about it.

In their 2014 publication, van den Ameele⁵³ give an overview of the use of the CGG (Centrum voor Geestelijke Gezondheidszorg) in three Flemish prisons. Medical files between 2009 and 2014 were analysed. Of the 171 prisoners referred to the CGG in this period, 15% were mentally ill offenders. The most common diagnoses are listed in Table 8. In 67% of cases treatment ended after ≤5 sessions, often due to release (27%) or transfer (23%). The authors also remark that more coordination between different providers of mental healthcare is required.

Table 8 – Diagnoses among prisoners referred to the CGG

Diagnosis	% (N=171)
Personality disorder	19.4
Adjustment disorder with anxiety or depression symptoms	17.7
Substance abuse	14
Mood disorder	11.8
Anxiety	7.8
Impulse control problems	5.7
Intellectual disability	3.1

Data for period 2009-2014, three Flemish prisons. From van den Ameele⁵³

Based on an analysis of 2012 data for the Antwerp prison, Vandeurzen et al. 2013,⁵⁷ report data for the use of CGG or CAP (Centraal Aanmeldings Punt) services by the prison population. CGG services were requested by 102 prisoners, and a further 106 prisoners were referred to the CGG. Treatment was initiated for 144 prisoners (the remaining subjects were released or transferred). The main reasons for treatment were general mental health problems (anxiety, depression, PTSD) (35%); addiction (25%); sexually deviant behaviour (13%); aggression (10%) and partner violence (6%). 195 prisoners requested CAP service for drug related problems, of which 120 were accepted, leading to a total 176 sessions; in 66% of cases information was the only treatment.

In a study by Thiry and Thiriez, 2014,⁴⁷ four psychologists (practicing in Belgian prisons) were asked six questions about their employment choice and personal motivations, and their work. The results of this analysis showed that work in prison is difficult and contradictory; psychologists find that prisoners are usually more interested in tangible benefits than psychotherapy. Psychologists also often feel hampered by lack of cooperation or outright obstruction by prison procedures. The authors raise the question whether one can really speak of psychotherapy. Psychologists are in the middle of a conflict between punishment and care.



4.5.1.2 Mentally ill offenders in prisons

Under Belgian law, mentally ill offenders can be interned (without any criminal sanction) for the protection of society.^{10, 59} The number of mentally ill offenders in prison is decreasing over the years: 1,307 in 2004⁹, 969 in 2010⁷, and 904 (8.2% of all prisoners) in 2015.¹⁶⁹

Using medical file analysis, Dheedene et al, 2015,¹⁷ aimed to gain insight into the specific care needs of mentally ill offenders in Belgium. Point data from the 24th December 2013 were used. There were 3,820 mentally ill offenders in Belgium at that time point, of which 1,087 were in prison, of which 712 were in Flemish prisons (study population). The reported data on diagnoses are summarised in Table 9.

Table 9 – Diagnosis data of mentally ill offenders in Flemish prisons

Diagnosis	% (N=712) [†]
Personality disorder	28.4
Psychosis	15.7
Intellectual handicap	12.3
Substance abuse	21.1
Sexual problems	9.8
Other psychiatric disorder	23.6
Single diagnosis	26.6
Two diagnoses	53.3
≥3 diagnoses	21.3

[†] From Dheedene et al, 2015¹⁷

An overview of the prevalence of different mental health conditions among mentally ill female offenders is given by A. Maertens.¹⁷⁶ The sample consisted of 85 mentally ill female offenders in prison, and 31 who had been released.

Table 10 – Prevalence of mental health issues among female mentally ill offenders

Mental health issue	% (N=85)
Psychosis	32
Mood disturbance	5
Personality disorder	34
Intellectual deficit disorder	18
>1 psychiatric disorder	63
Substance abuse	48
Aggression	41

Table adapted from Maertens, 2014¹⁷⁶

In 2011, the National Association of the Mentally Handicapped^a published a white paper summarising their claims/demands to improve the conditions under which mentally ill offenders are held.³ Their demands focus on separating interned and prisoners, as well as on increasing the involvement of trained psychiatrists and individual treatment plans.

Despite the high prevalence of psychiatric disorders among incarcerated offenders, the current provision of treatment in European prisons, including Belgium is described as alarmingly scarce.⁵⁹ Many mentally ill patients are incarcerated in prisons rather than specialised psychiatric prisons and do not receive appropriate treatment. The result is a large population of interned individuals incarcerated in an already overcrowded general prison. These interned mentally ill offenders are primarily held in prison or social defence unit psychiatric wards for a short period before transfer to the required psychiatric treatment facility.⁴⁹ Due to the lack of space available at specialised psychiatric treatment facilities, mentally ill offenders are often held in general prisons. This increases the burden on prison psychiatric staff, who are now split between treating the psychiatric needs of the general prison population and the specialised needs of mentally ill offenders.⁴⁹ In 2013, de Greef et al¹¹ highlighted, with a brief review, the fact that the needs of inmates of psychiatric annexes of prisons continue to be ignored, 10 years

^a Association Nationale d'Aide aux Handicapés Mentaux



after they were identified by the Human Rights Committee. Psychiatric annexes of prisons remain understaffed and unable to provide appropriate care. Transfers to Social Defence institutions are often not possible due to a lack of spaces. The fact that many mentally ill offenders are held in prison annexes, under conditions of insufficient care, often even mixed with the general prison population, is also reported by Mormont in 2013.³³ The study by Cartuyvels et al, 2010⁷ confirmed that psychological staff are stretched and overworked, and commented on poor availability of psychiatric ward spaces in prison. Additionally, it has been reported that prison psychiatric staff often do not have the specialised training or experience to effectively treat mentally ill offenders.¹⁰ A European Committee for the Prevention of Torture and Inhuman or Degrading Treatment or Punishment (CPT) report, which included the Namur prison in Belgium and focused on detention of mentally ill offenders, highlighted unacceptable living conditions for mentally ill offenders outside the psychiatric annex of the prison.⁶² The committee stated that such conditions had potentially grave effects on hygiene and mental health for mentally ill offenders.⁶²

Additionally, Cosyns et al, 2008,⁹ reported that up to 75% of mentally ill offenders in prison have more than one diagnosis. The most common diagnoses (irrespective of comorbidity) are personality disorders (29.6%), schizophrenia and other psychotic disorders (29.0%), mental disability (16.8%) and paraphilia (13.5%). Among patients with a single diagnosis, the pattern is similar with 41.1% personality disorders, 33.7% schizophrenia or other psychotic disorders, 9.4% mental disability and 5.4% paraphilia. The most common principal diagnoses (in case of multiple diagnoses) are again personality disorders (28.4%), schizophrenia and other psychotic disorders (25.2%), mental disability (20.4%) and paraphilia (14.7%).

The Belgian government commissioned a research project to develop a screening and assessment protocol, specifically aimed at the detection of dual diagnosis in prisoners.¹³ In spite of this government research project, there has been no standardised screening assessment implemented in the Belgian prison setting (as of 2011, according to Vandeveldt et al, 2011),⁵⁹ which may lead to inconsistent diagnosis and possible administration of suboptimal treatment to mentally ill offenders.

Article 21 allows prisoners to be interned, if they present with a severe mental disturbance during imprisonment. Vicenzutta and Pham, 2015,⁶³

compared the psychiatric profiles of 32 interned prisoners and 279 interneers and found no differences between the groups with regard to IQ, psychiatric profile, or personality disorders.

In a report published in 2011, Oswald³⁵ described the “Epiceas” project conducted in the Establishment of Social Defence of Tournai (Belgium), which aimed to get sex offenders with a medium risk of relapse released. The authors considered the Social Defence overcautious, making it hard to get people out again. The waiting lists were long for social defence institutions, and patients spend about 2 years in psychiatric annexes of prisons. The authors have increasingly observed that mentally healthy sex offenders are put in Social Defence, just for convenience.

A study by Pham et al. 2007³⁷, discussed the expertise practice in relation to Belgian Social Defence law, among a sample of 98 mentally disordered offenders, and reported on the prevalence of major mental health problems in that population.

Table 11 – Prevalence of major mental problems among mentally disordered offenders

Mental problem	% (N=98)
Alcohol abuse/dependence	61
Phobia	42
Depression	40
Substance abuse/dependence	35
Anxiety	26
Somatisation	19
Schizophrenia	16
OCD	11
Personality disorders	At least one personality disorder: 70 Two or more personality disorders: 45

Abbreviations: OCD, obsessive compulsive disorder. Table based on data reported in Pham et al. 2007³⁷



Another questionnaire-based study by Pham et al. 2010³⁶ conducted in a Belgian security hospital, aimed to compare 20 criminal psychopaths and 19 non-psychopaths, under the identification of emotional states, the expression of emotion states to others, operative thinking and emotional intelligence questionnaire results. The results regarding both alexithymia and emotional intelligence failed to conform to the long-standing hypothesis of a global emotional deficit in psychopaths.

A study by To et al. 2015⁴⁸, aimed to assess the perspectives of medium- and high-risk mentally ill offenders on their treatment in forensic institutions in Flanders, Belgium. Mentally ill offenders from either treatment or correctional setting emphasised the importance of privacy and “good” staff in treatment. However, the views differed on two other themes. The feeling of lacking control and the feeling of too much pressure in treatment were described by mentally ill offenders in treatment settings, whereas offenders in prison settings experienced the opposite.

4.5.1.3 Trauma/post-traumatic stress disorder

In an analysis published in 2011, Dudeck et al¹⁹ present the results of a questionnaire-based analysis of any traumatic background of 47 male long-term prisoners. The percentages of those having had at least one traumatic experience in the past are high (Table 12), with 7.1% suffering from post-traumatic stress disorder and 69% requiring treatment.

Table 12 – Prevalence of traumata in Belgian male long-term prisoners

Trauma	% (N=47)
Serious accident, fire or explosion	42.9
Natural disaster	19
Non-sexual assault – family member	23.8
Non-sexual assault – stranger	38.1
Sexual assault – family member	7.1
Sexual assault – stranger	4.8
Military combat or war zone	19
Sexual contact under 18	19
Imprisonment	61.9
Torture	23.8
Life-threatening illness	23.8
Other traumatic event	23.8

Abbreviations: Max, maximum; Min, minimum. Table adapted from Michel et al, 2015.³¹

4.5.1.4 Suicide

Data on suicide rates in prison, compared with the general population, were included, based on the assumption that increased suicide rates could be due to a lack of appropriate psychiatric/psychological support. Fazel et al, 2011,²³ as well as Windham-Thomas et al, 2012,⁶⁶ have investigated suicides in prisons. Fazel et al, 2011,²³ compared the suicide rates in prisons and the general population in 12 different countries (Figure 5). In a sample size of 810 male and 51 female suicides in prison, they found that suicide rates for men are consistently higher in prison than in the general population, independent of the suicide rate in the general population. In women, suicide rates in prison were highly variable, but were mostly also higher than those in the general population. Themselves quoting a 2009 source,^b which in turn refers to an unreferenced 2004 study, Windham-Thomas et al, 2012,⁶⁶ in a Siréas publication, claim that the suicide rate in Belgian prisons is 10 times

^b <http://www.liguedh.be/2009/641-mais-que-se-passe-t-il-en-prison>, last accessed 1st July 2016



higher than that in the general Belgian population (which contrasts with the study data from Fazel et al, shown in Figure 5). Such ratio is also reported in a 2015 study by Favril and Vander Laenen.²² They used database analysis and reviewed the literature for 2014. The suicide rate in 2014 was 96 per 100,000 (n=18), compared with 14-18 per 100,000 in the general population in Belgium.

All publications agree that the high prison suicide rate is due to the conditions in prison and insufficient psychiatric/psychological support. Windham-Thomas et al, 2012,⁶⁶ list a number of measures which have already been taken to address this problem (e.g. availability of suicide helplines, surveillance, or planned measures against overcrowding), but which can only be the beginning of a concerted effort.

Figure 5 – Rates of male prison suicide compared with general population male suicide rates

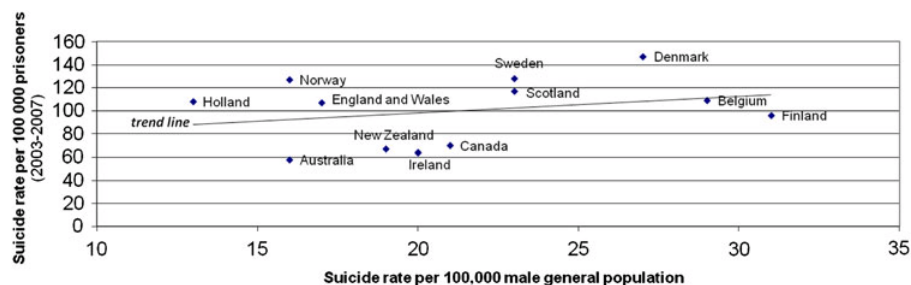


Figure retrieved from Fazel et al, 2011²³

4.5.2 Systematic reviews

Sixty-one identified SRs^{67, 69, 71-73, 75, 78, 80-83, 86-88, 91-100, 102, 105, 106, 109-111, 113, 115, 116, 118-121, 123, 127, 130-134, 137-142, 144, 148, 151, 152, 155, 159, 161, 162, 164, 166, 167} reported on evidence related to the burden on mental health problems among prisoner population.

Twenty two identified SRs^{69, 78, 81, 86, 87, 93, 95, 97, 99, 100, 106, 110, 113, 115, 116, 118, 133, 144, 152, 162, 164, 166, 167} reported on epidemiologic burden of mental health disorders. These reviews report high prevalence of intellectual disability, attention deficit hyperactivity disorder (ADHD), psychotic disorders, bipolar disorders, depression, anxiety disorders, obsessive-compulsive disorders, trauma- and stressor-related disorders, sleep-wake disorders, personality disorders, and suicidal and self-harming behaviours. Mental health problems are much more prevalent in prisoners than in the general population (Table 13).


Table 13 – Mental health disorders prevalence in general and prison populations

Disease	General population	Prison population
ADHD	4.1% ^{177†}	10% to 25.5% ^{116, 144, 166}
Agoraphobia	0.8% ^{177†}	3% to 17% ^{144, 152}
Antisocial personality disorder	1.0% ^{177†}	31% to 81% ^{78, 118, 152}
Any anxiety disorder	18.1% ^{177†}	11% to 51% ^{78, 133, 144, 152}
Any mood disorder	9.5% ^{177†}	19% to 29% ⁷⁸
Any personality disorder	9.1% ^{177†}	SR of SRs 3% to 56.7% ^{78, 118, 152}
		Belgium-specific data 29.6% (mentally ill offenders) ¹⁰ 41.1% (mentally ill offenders with single diagnosis) ¹⁰ 28.4% (mentally ill offenders with multiple diagnosis) ¹⁰
Bipolar disorder	2.6% ^{177†}	2% to 16.1% ^{78, 99, 144}
Borderline personality disorder	1.6% ^{177†}	26% ¹⁵²
Dysthymic disorder	1.5% ^{177†}	1.5% to 12% ¹⁴⁴
Generalised Anxiety Disorder	3.1% ^{177†}	1% to 35% ^{144, 152}
Major Depression	6.6% ^{177†}	9% to 77% ^{78, 93, 97, 133, 144}
Mental/intellectual disability	0.05% to 0.8% ^{178§}	SR of SRs 0% to 80% ^{95, 110}
		Belgium-specific data 16.8% (mentally ill offenders) ¹⁰ 9.4% (mentally ill offenders with single diagnosis) ¹⁰ 20.4% (mentally ill offenders with multiple diagnosis) ¹⁰
OCD	1.0% ^{177†}	2% to 10% ^{144, 152}
Panic Disorder	2.7% ^{177†}	4% to 12% ^{144, 152}
PTSD	3.5% ^{177†}	4% to 48% ^{69, 78, 100, 144, 152}
		7.1% ¹⁹
Schizophrenia	1.1% ^{177†}	SR of SRs 2% to 11% ^{78, 93, 118, 144}



		Belgium-specific data 29.0% (mentally ill offenders) ^{10‡} 33.7% (mentally ill offenders with single diagnosis) ^{10‡} 25.2% (mentally ill offenders with multiple diagnosis) ^{10‡}
Social Phobia	6.8% ^{177†}	1% to 10% ^{144, 152}
Specific phobia	8.7% ^{177†}	4% to 5% ¹⁴⁴

†12-month prevalence (US adult population); ‡Schizophrenia and other psychotic disorders; §Adults

These high prevalence contribute to the vicious circle of conflict with other inmates or prison guards, disciplinary sanctions, sleep disorders⁸⁶ and more severe mental disorders. This may contribute also to higher rate of suicides.^{94, 99, 164}

Contributing factors to such high prevalence of mental diseases are: worry, guilt and judgement related to the crime; prolonged imprisonment; and/or fear of violence⁸⁶; inadequate sleep hygiene including daytime inactivity and/or high caffeine and nicotine intake;⁸⁶ attitudes of the security staff;⁷⁵ insufficient or inaccessible services for prisoners,¹⁰² prison overcrowding,^{102, 159} solitary confinement.¹⁵⁹ Duration of imprisonment appears to have no significant impact on mental health¹⁵⁹. As regards suicide, Pompili et al. 2009¹⁴² reported that being bullied,¹⁴² having serious physical illnesses (such as cancer or HIV),¹⁴² being held in isolation^{92, 142}, having a detainee/remand status⁹², serving a life sentence⁹² or having experienced sexual assault were risk factors¹⁴². Suicides were more likely during periods of reduced staffing, or when staff were poorly trained with regard to suicidal behaviour or incidents.¹⁴² Marzano et al. 2016¹²⁷ and Fazel 2013⁹⁴ point out the interaction with major depressive symptoms, psychosis, anxiety and drug misuse disorders.

A variety of interventions for mental health problems used in incarceration settings were identified and included pharmacologic and non-pharmacologic interventions. Non-pharmacologic interventions, included individual or group psychotherapy (i.e. cognitive behavioural therapy [CBT], dialectical behaviour therapy [DBT], narrative exposure therapy [NET], trauma incident reduction [TIR])^{111, 123}, stress management techniques (SMTs)¹²⁰, Buddhist-derived interventions¹⁵¹, art therapy^{80, 82, 83, 119, 130}, yoga or acupuncture¹¹⁹

and telemedicine interventions (i.e. telepsychological services)⁷³. Pharmacologic therapies included psychotropic drugs^{86, 98, 105, 119}, and opioid maintenance therapy among prisoners with substance-related disorders^{131, 137, 138, 141}. One SR¹¹⁵ focused on smoke-free policies implemented in US prisons and jails, and one¹³⁴ reported on animal prison programmes.

4.5.2.1 Effectiveness of interventions for anxiety Disorders

A SR by Leigh-Hunt et al. 2015¹²³, which aimed to review interventions for anxiety, depression, and PTSD in adult offenders, found that TIR, self-help booklets, and phenytoin appeared effective for anxiety. Videotape presentation aimed at dispelling myths around psychotherapy, misconceptions around mental illness, and explaining the purpose of psychotherapy and how to maximise the benefits of receiving it immediately prior to psychotherapy was not found to be effective on anxiety levels compared with psychotherapy alone.

4.5.2.2 Effectiveness of interventions for depressive disorders

A SR by Leigh-Hunt et al. 2015¹²³ found that NET and TIR appear effective therapies for depression. Dialectical behaviour therapy and exercise appeared less effective for depression. A 12-week exercise and health education programme resulted in reduced psychological distress in older male prisoners. Group cognitive therapy did not appear effective at reducing symptom severity as assessed by clinical scales of the Minnesota Multiphasic Personality Inventory (MMPI) in 10 male prisoners in a maximum-security prison¹²³.



4.5.2.3 *Effectiveness of interventions for trauma- and Stressor-Related Disorders*

Of the interventions for PTSD assessed by Leigh-Hunt et al. 2015¹²³, only TIR and NET appeared effective for PTSD. Cognitive behavioural therapy was only found to be marginally effective on PTSD symptoms as assessed by Clinician-Administered Post-traumatic Stress Disorder Scale-1 (CAPS-1).

4.5.2.4 *Effectiveness of interventions for sleep-wake disorders*

Dewa et al. 2015⁸⁶ found that meditation and relaxation techniques (non-pharmacological treatment for insomnia in a prison environment) were associated with significant reduction of sleep problems.

4.5.2.5 *Effectiveness of interventions for suicidal and/or self-harming behaviours*

Barker et al. 2014⁷¹ assessed the effectiveness of programmes involving the management of suicidal and self-harming behaviours in prisons. Effective multi-factored programmes may include screening and assessment of inmates on intake, improved staff training, post-intake observation for suicide risk, monitoring and psychological treatment of suicidal inmates, limited use of isolation and increased social support, and adequate and safe housing facilities for at-risk individuals. The authors indicate that programmes implemented as prisoners arrive and maintained until inmates leave the facility are most likely to succeed. Of the procedures implemented after a suicide or serious suicide attempt, such as internal and external review processes and staff debriefing and support, could also aid in preventing further incidents and lower the burden of these events on staff. Successful suicide prevention programmes (SPP) do not appear to be limited to multi-factored programmes. Programmes aimed at providing support and observation of suicidal prisoners through the use of trained inmates may help to prevent suicides and limit the negative effects of isolation; however, inmate observers must be carefully selected and trained, and inmate observation must be coupled with frequent observation by trained staff members.

4.5.2.6 *Effectiveness of other interventions*

Twelve identified SRs^{72, 73, 80, 82, 83, 98, 111, 120, 130, 132, 134, 151, 155} reported on the effectiveness of other interventions related to mental health problems. The results of these reviews are summarised in section 5.2.3.7. Of note, Batastini et al. 2015⁷³ evaluated the effectiveness of telepsychological services that involve videoconferencing equipment among criminal justice-involved or substance abuse clients, and reported no significant differences between the two approaches, except for programme performance (outcome measure: drug-positive urinalysis), where telepsychology services were found to outperform in-person services by a medium magnitude (SMD=0.50 [95% CI: 0.10 to 0.91] for telepsychology). There is evidence that music therapy can improve the mental health of prisoners.^{80, 82, 83, 119, 130}

Henwood et al. 2015¹¹¹ assessed the effectiveness of Cognitive Behavioural Therapy-informed interventions or anger management interventions on adult offenders sentenced to probation orders or incarceration. The study showed that the participants in intervention arms had reduced risk for general reconviction (RR=0.77 [95% CI: 0.62 to 0.96]) and violent reconviction (RR=0.72 [95% CI: 0.55 to 0.93]), compared with offenders not exposed to the intervention. Moreover, compared with non-completers, treatment completers had a reduced risk of general recidivism (RR=0.58 [95% CI: 0.39 to 0.87], 42% reduced risk of reconviction if treatment completed) and violent recidivism (RR=0.44 [95% CI: 0.27 to 0.71], 56% reduced risk of reconviction if treatment completed).¹¹¹ Stress management techniques, including meditative practices, were also effective in improving mental health.^{120, 151}



4.6 Drugs and drug addiction in prison

4.6.1 Belgian studies

In 2012, the European Monitoring Centre for Drugs and Drug Addiction published a report entitled "Prisons and drugs in Europe: The problem and responses".²⁰ This detailed review on drug use and health responses in prisons is primarily based on the 2010 Reitox national reports, but also published literature and other sources. The report outlines that both drug use and drug use-related health problems are far more common among prisoners than in the general population. Lifetime prevalence of substance use, including illicit drug use, is reported to be very high among prisoners, with levels of up to 80% for tobacco and cannabis use and up to 50% for cocaine, heroin and amphetamines. Although many prisoners stop or reduce their drug use when they enter prison, some continue to use drugs, sometimes switching to different substances or starting an additional drug while incarcerated. There is also evidence that some prisoners, who have never used drugs before, are introduced to illicit drugs in prison. Data specific to Belgium indicate that 3-10% of prisoners received opioid substitution treatment (OST) in 2010. In August 2012, almost 4% of the total Belgian prison population received OST. Methadone is used for 74% of those treated with OST and buprenorphine is prescribed in the other 26% of the cases.³⁸ The (lifetime) prevalence of injected drug use prior to imprisonment is reported at 15.2%, and as 2.3% during imprisonment.

In collaboration with the European Monitoring Centre for Drugs and Drug Addiction, the Scientific Institute of Public Health published a national (Belgian) report on drugs for 2014.³⁸ Although this is a general report, there is a section on drug abuse in prisons. The report highlights a number of programmes which are available for drug users, and are being increasingly implemented. These range from substitution therapy and specific medical consultations to information brochures, group therapy and cognitive-behavioural interventions.

Two specific strategies for risk reduction in relation to drugs, specific for the Brussels/Wallonia-Brussels region are reported by Béduwé et al, 2014,⁴ and Carael 2012,⁶ respectively. The report by Carael is generic, but focuses on the prison environment in a subsection: In 2008, 36% of prisoners admitted having consumed one or more illegal substances during their time in prison. Most used were cannabis, heroine, benzodiazepines and cocaine; 3% injected at least once, and 1% shared needles. These numbers are likely to be underestimates; of 10% of prisoners who were on a drug substitution treatment upon admission, only half continued that treatment in prison. The report sets out an action plan, specifically targeting improvement of

- The legal situation concerning health in Belgian prisons
- Access to risk reduction means
- Continuity of health services (between inside and out of prison)
- Collaboration between prison and outside services

Béduwé et al, 2014,⁴ list 16 priority actions to address drug use and infectious disease risks associated with drug use, based on the fact that the hepatitis B and C risks in prison are 4 and 10 times as high, respectively, as in the general population, and that >30% of prisoners are in prison for drug-related crimes. The priority actions listed focus on information and (specialised) medical personnel.

Todts et al, 2009,⁵⁰ present a follow-up of their prisoner questionnaire-based study (already implemented in 2003 and 2006). Their data confirm that >30% of prisoners are in prison due to drug-related charges and that drug use remains an important issue, also leading to prisoners being at an increased risk of infectious diseases. Although substitution treatment in prison is possible, 18.5% of prisoners said they had to stop their substitution treatment in prison (dictated by the medical personnel) and 24.1% were made to gradually reduce it. With regard to prisoners' rights to diagnostic tests for HIV and hepatitis, prisoners are largely unaware and therefore don't use these opportunities. The authors consider that drug use in prison cannot be eradicated and therefore measures need to be taken to minimise the consequences of drug use. Todts et al suggest that the following measures are key:

- A political will to make the necessary legal changes



- Prisons following those laws
- Training of prison staff and prison healthcare professionals
- Participation of prisoners

Commissioned by the Belgian Science Policy Office, Vander Laenen et al, 2013,⁵⁶ performed an analysis to provide an extensive and up-to-date overview of key elements of substitution treatment in Belgium. Although this analysis is general, there is a chapter dedicated to prisons. An overview of the average number of substitution therapy clients in prison in January 2011 is reproduced below (Table 14). Data on self-reported opiate use and substitution therapy in Belgian prisons in 2008 are shown in Table 15. No publications with more recent results were retrieved.

Table 14 – Average number of substitution therapy clients in prisons in January 2011

	Average number
Flanders (January 2011)	
Antwerp	11.7
East-Flanders	11
Limburg	48
West-Flanders	7.85
Flemish Brabant	2
TOTAL	16.11
Wallonia (June-July 2012)	
Hainaut	10.5
Liège	17.66
Namur	17.25
Luxembourg	10.5
Walloon Brabant	7.5
Total	12.68
Brussels capital region (June-July 2012)	
	20

Table from Vander Laenen et al, 2013.¹⁷⁹ Quoted data source: Directoraat-generaal Penitentiaire Inrichtingen for 2011; data as reported in source publication

Table 15 – Self-reported opiate use and substitution treatment in Belgian prisons in 2008

Opiate use	N (%)
% opiate use in prison	125 (32.2)
% intravenous opiate use in prison	34 (8.7)
% of use black market methadone or buprenorphine	51 (13.1)
% substitution therapy in Belgian prisons	71 (18.25)
Heroin initiation in prison	61 (15.7)
Total sample	389 (100)

Table from Vander Laenen et al, 2013.¹⁷⁹

Substitution therapy is provided for detoxification in all prisons, but only in 10/15 for maintenance treatment. Table 16 shows the medication used for substitution therapy in Belgian prisons.

Table 16 – Medication used for substitution therapy in Belgian prisons in 2011

Medication	N of prisons (%)
Flanders	
Methadone	12 (36.4)
Methadone + buprenorphine	14 (42.4)
Methadone + buprenorphine + naloxone	5 (15.2)
No medication reported	2 (6.1)
Wallonia	
Methadone	1 (10)
Buprenorphine	1 (10)
Methadone + buprenorphine	6 (60)
Methadone + suboxone	2 (20)
Brussels capital region	
Methadone	1 (50)
Methadone + buprenorphine	1 (50)

Table from Vander Laenen et al, 2013.¹⁷⁹ Quoted data source: Directoraat-generaal Penitentiaire Inrichtingen for 2011.



According to the SUBANOP study,¹⁷⁹ the provision of psychosocial support for prisoners on substitution treatment varies, some prisons providing no such service, others not providing specific training for staff involved, while others do provide such support by trained staff, sometimes in collaboration with professionals outside the prison.

In their 2013 publication, Favril and Vander Laenen²¹ attempted to gain insight into the drug policy in prison, based on face-to-face interviews with 13 prisoners. Help with drug problems was considered very hard to come by, four prisoners mentioning that counselling could only start when the release date was close. Both the CAP (n=8) and CCG (n=4) services were used, but experiences were generally negative. Medical services or the PSD were not considered as potential ports of call for drug issues.

In a study by Decorte et al. 2007¹⁵, examined practices and policies in place for the provision of targeted prevention and treatment of stimulant drug users. The study found that the use of stimulants in prison is associated with aggression and violence, financial problems, and psychological and physical problems in prisoners. The prison staff often feel ill-equipped to deal with stimulant-related problems, leading to a lack of equivalence of care for stimulant users in prison, therefore the variety and quality of drug services outside is not reflected sufficiently inside prison. The authors conclude that there is a need for more specific product information and harm reduction material on stimulants, for clear guidelines for the management of acute stimulant intoxication and stimulant withdrawal, for structural adjustments to improve potential diagnosis of personality and psychiatric disorders, for more non-pharmacological treatment strategies and more opportunities for prisoners to engage in purposeful activities.

4.6.2 Systematic reviews

Eleven identified SRs provided epidemiologic data on substance-related and addictive disorders, including smoking^{67, 81, 115, 118, 133}, substance use disorders^{78, 91, 106, 118, 152, 162} and gambling¹¹³. Four identified SRs included studies conducted worldwide^{69, 113, 152, 162} and of the remaining ones, three SRs focused on studies conducted in the US, two in the UK^{81, 106}, and one in Canada¹¹⁸. The prevalence of substance abuse disorders is much higher in prisoners than in the general population (Table 53). More details on prevalence figures are presented in Table 44. Sirdifield et al. 2009¹⁵² reported very high rates of comorbidity of mental health and/or substance use disorders in the prison population. Promotion of smoking cessation in the prison setting was described as unique and challenging, due to a "pro-smoking" culture in prison and the entrenched role of tobacco in prison society.⁸⁸ Moreover, availability of tobacco and lack of diversionary activities was reported as obstacle which makes quitting during imprisonment a hard task.⁸¹ Inconsistent anti-smoking policies were associated with haphazard and generally poor implementation of smoking cessation initiatives.⁸⁸ Under-resourcing or understaffing resulted in inconsistent delivery of smoking cessation programmes. Smoking cessation outcomes received lower priority than issues deemed more "important" (i.e. drug misuse, infection control, mental health).⁸⁸

Table 17 – Prevalence of substance abuse disorders in general and prison populations

Disease	General population	Prison population
Alcohol abuse	3.1% ^{177†}	Prevalence of alcohol abuse and dependence ⁹¹ : - Male prisoners: 18% to 30% - Female prisoners: 10% to 24%
Alcohol dependence	1.3% ^{177†}	
Drug abuse	1.4% ^{177†}	Prevalence of drug abuse and dependence ⁹¹ : - Male prisoners: 10% to 48% - Female prisoners: 30% to 60%
Drug dependence	0.4% ^{177†}	
Substance use disorder	39.6% ¹¹⁸	87.2% ¹¹⁸

†12-month prevalence (US adult population)



Fifteen included SRs reported on the effectiveness of interventions targeting addictions. Eleven SRs^{67, 96, 109, 119, 121, 131, 137-139, 141, 161, 162} provided data on interventions related to substance abuse, including pharmacologic interventions (opioid substitution therapy [OST])^{109, 119, 121, 131, 137-139, 141, 162}, therapeutic community programmes^{119, 131, 137}, psychosocial interventions^{119, 139}, prison-based substance abuse programmes^{67, 96}, counselling programmes or boot camps¹³¹ and compulsory treatment for drug dependence¹⁶¹. Three SRs^{81, 88, 115} reported on interventions aimed to reduce tobacco smoking burden.

4.6.2.1 Opioid substitution therapy

The effectiveness of OST interventions were reported in nine identified SRs^{109, 119, 121, 131, 137-139, 141, 162}. Available data indicate that OST interventions seem to be effective in preventing/delaying relapse to opioid use^{109, 119, 121, 137, 139, 141, 162} and in the reduction of risk behaviours like needle/syringe sharing^{109, 121}. However, one study¹³¹ reported that OST had no significant effect on drug use. The summary of the results is reported in Table 46

4.6.2.2 Therapeutic community programmes

Therapeutic community programmes (TCP) are the most intensive of all incarceration-based drug treatment programs. While the components of TCPs vary, there are several common components. TCPs house participants in a distinct treatment unit away from the anti-social influences of the general correctional environment to create an atmosphere focused on rehabilitation and reformation. Another core component of the TCP model is that participants are instrumentally involved in running the TCP (i.e. participants lead treatment sessions, monitor other residents for rule compliance, maintain the treatment unit, and resolve disputes)¹³¹.

The effectiveness of TCP was reported in three identified SRs^{119, 131, 137}. Therapeutic community programme interventions were associated with statistically significant reductions in re-offending¹³¹, decreased drug or alcohol use^{119, 137}, and reduced criminal activity¹³⁷. The summary of findings is presented in Table 47

4.6.2.3 Psychosocial interventions

Two included SRs^{119, 140} assessed the effectiveness of the psychosocial interventions among prisoners. Perry et al. 2015¹³⁹, which focused on female drug-using offenders, found that compared with usual treatment, psychosocial interventions had an impact on reducing subsequent re-incarceration, but not re-arrest or drug misuse. In addition, individual psychosocial interventions had differing effects¹⁴⁰. Kouyoumdjian et al. 2015¹¹⁹ reported that psychotherapy was associated with lower anxiety and depression levels. The summary of the findings is presented in Table 48.

4.6.2.4 Other interventions

Among other identified interventions, the prison-based substance abuse treatment programmes were associated with lower recidivism or post-release drug use rates⁶⁷, and improved problem-solving and coping skills⁹⁶. Counselling programmes reduced re-offending rates, but the impact of intervention on drug use was not conclusive.¹³¹ Boot camps¹³¹ and compulsory treatment for drug dependence¹⁶¹ were not effective. The summary of the findings is reported in Table 49.

4.6.2.5 Tobacco smoking

Three identified SRs^{81, 88, 115} reported on the effectiveness of interventions aimed to reduce tobacco smoking burden. The data indicate that smoking cessation programmes, pharmacologic therapy combined with psychological therapy and introduction of smoke-related policies are effective in reducing tobacco smoking burden^{81, 88, 115}. The summary of findings is presented in Table 50



4.7 Ageing in prison

4.7.1 Belgian studies

The Belgian prison population is ageing. Table 18 shows the evolution of prisoners' age from 2009 to 2013;⁴⁰ there was a considerable increase in older prisoners, especially between the ages of 60 and 70 years. The author states that the penal system suffers from "security at any price", making conditional releases rare. Due to the sanitary and health conditions and other factors associated with imprisonment, prisoners often show signs of ageing early. Prisons are not designed for the elderly, lacking appropriate facilities. For elderly prisoners, the issue of resocialisation often becomes insurmountable.

Table 18 – Age distribution of prisoners, from Pourveur, 2015⁴⁰

Age range, years	%age of prisoners	
	2009	2013
40-50	2,136	2,649
50-60	861	1,132
60-70	237	407
70-80	62	72
80 or more	9	7

Van Hecke (2012)⁵⁵ performed a qualitative analysis of the care trajectory of elderly mentally ill offenders, based on interviews with eight elderly, mentally ill offenders, three of which were in prison. Most subjects were found to have long care trajectories, of up to 30 years, and underwent several treatments. Multiple treatments over the years were not perceived positively. In contrast, prison and the care in prison were seen as positive. Subjects feel powerless and would like more input in treatment choices.

A questionnaire-based study by M. Deceuninck, 2010,¹⁴ aimed to explore how elderly detainees feel/experience prison stay on several life domains. Both healthcare professionals (number unclear, results also not clearly reported) and prisoners (n=31, from three prisons) were included. Many (not specified) prisoners report suffering from health- and/or mental issues and consider the relevant services offered insufficient. The PSD (psychosocial service) was used by 80% (64% on their own initiative); 65% consider PSD service quality insufficient. Only 10% used the medical care team in the preceding months; information on available services appears to be insufficient. A total of 68% of respondents had had serious health problems in the past five years, with 29% reporting having had a serious psychological issue in the past five years.

Using the WHOQOL-bref in open interviews, an exploratory analysis by A. Sorber⁴⁴ investigated the health state and quality of life in older prisoners. An overview of the results is given in Table 19.

Table 19 – Health and quality of life in older prisoners

Questionnaire item	Range (mean)
General health	50-100 (67.5)
Physical health	20-96 (70.3)
Psychological health	12-87 (65.9)
Social relationship quality	17-83 (45.5)
Environmental dimension	14-100 (72.9)

Table based on Sorber, 2013¹⁸⁰ Values are derived from the QHOQOL-brief questionnaire, based on scales of 0-100, where 100 is the best value achievable. Based on data from 11 elderly prisoners.

Another questionnaire-based study by De Smet 2015 et al.,¹² aimed to analyse the older mentally ill offenders' perceptions on their detention and care trajectory. The results of the study reveal that older mentally ill offenders mentioned more positive and less negative experiences in penitentiary settings when compared with institutional care settings, and the independent living was the most favoured option for care.



4.7.2 Systematic reviews

Five identified SRs^{108, 125, 129, 154, 163} provided insights into the health care of older inmates and end-of-life care in prisons. Two SRs^{108, 125} focused on the health of older prisoners, and three^{129, 154, 163} reported on the evidence related to end-of-life care (EOL) in prisons.

Two included studies^{108, 125} reported on the health status of older inmates (Table 64**Error! Reference source not found.**). Loeb et al. 2006¹²⁵ provided data on the impact of prison experience on the health status of older inmates (Table 65), while the health needs of prisoners were reported on two identified SRs^{108, 125} (Table 66).

Linked with the population ageing is the increase prevalence of chronic diseases.^{69, 81, 112} These include diabetes, high BMI, hypercholesterolemia, respiratory diseases, and musculoskeletal diseases. Inmates have a higher burden of most chronic medical conditions than the general population.⁶⁹ Prison inmates have higher odds of chronic diseases compared with non-institutionalised adults including: diabetes, hypertension, angina, left ventricular hypertrophy, and myocardial infarction⁶⁹, and compared with general community sample of most disadvantaged men, higher proportion of prisoners had ≥ 3 cardiovascular risk factors (10% vs 39%, respectively)⁶⁹. Condon et al. 2007⁸¹ found that epilepsy, asthma and diabetes are among the most common reasons for consultation among the non-elderly general population.

Arries et al. 2013⁶⁹ reported on CVD risk factors awareness and lifestyle interventions among prisoners, and found that high self-efficacy levels associated with enhanced knowledge about one's risk for an adverse event has led to better engagement with health-promoting behaviours and improved health during incarceration⁶⁹. Moreover, light activity for a period of 30 minutes was associated with improvement in outcomes for blood pressure, total cholesterol, triglycerides, and BMI in female prisoners and were more significant among pre-menopausal women.⁶⁹ In addition, compared with non-incarcerated women, incarcerated women reported higher attendance rates for lifestyle interventions (0.4 vs 2, $p < 0.05$), higher intervention take-up rates (53.3% vs 22.6%), and higher completion rates (3.6% vs 42.5%).⁶⁹

4.8 Euthanasia (Belgian publications)

In their 2015 publication, Snacken et al⁴³ discuss the issue of euthanasia in prisons. In Belgium, euthanasia, under certain conditions, is a patient right. As prisoners should have the same rights to medical care as any other citizen, they should have the same rights with regard to euthanasia. In fact, since introduction of the euthanasia law in December 2011, two euthanasia were performed in the medical facilities of Belgian prisons, on patients with terminal cancer. However, between 2012 and 2015 17 further requests from prisoners for euthanasia were received, all of them based on insupportable psychological suffering. Such requests raise ethical and legal dilemmas, which remain to be solved. This issue is also briefly discussed by Nau, 2014,³⁴ on the bases of two specific cases.

Based on a database, prisoner interviews, and analysis of medical files, Devynck and Snacken, 2016,¹⁶ analysed euthanasia request from prisoners, between 2011 and 2015. Twenty relevant request were identified. Most requests came from mentally ill offenders and were based on unbearable psychological burden.

4.9 Medication use in prison (Belgian publications)

Verelst published and analysis of medication use in Belgian prisons, based on medical files, in 2015.⁶¹ A summary of the data is provided in Table 20.

Table 20 – Medication and psychotropic drug use in Belgian prisoners

	% (N=NR)	
	2012	2010
Any drug	59.1	52.8
Neuroleptics	20.2	20.8
Antidepressant	18.5	16.3
Heroin substitution drug	3.9	3.3

Abbreviation: NR, not reported. Table based on Todts and Van Meir, 2011⁵²



Todts and Van Meir, 2010⁵¹ and 2011⁵² analysed the prescription and use of psychotropic drugs in Belgian prisons, using medical file analysis (2010 data). An overview of the results is shown in Table 21. The main psychotropic drugs used were neuroleptics (21%), benzodiazepines (20%) and antidepressants (16.3%). 3.4% of prisoners received heroine substitution drugs. The prevalence of pharmacotropic drug prescription was found to increase with prisoner age.

Table 21 – Medication and psychotropic drug use in Belgian prisoners

	% (N=NR)	
	Any drug	Pharmacotropic drug
Overall	52.8	38
Not yet condemned	45	31.4
Condemned	53	36.5
Mentally ill	77.3	64.1

Abbreviation: NR, not reported. Table based on Todts and Van Meir, 2011⁵²

4.10 Issues specific to female prisoners

4.10.1 Belgian studies

V. Spelters, 2014⁴⁵ aimed to gain insight in needs of female prisoners for 'hulp- en dienstverlening'. Using a literature search and semi-structured interviews of healthcare professionals, the author concludes that there is a pressing need for help with drug abuse issues as well as suicide prevention.

Experts recognise a possible need for fertility treatment in prison, but disagree how and to what extent these needs should be fulfilled.⁴¹ In 2007, 13 prisoners gave birth in prison.⁴¹

4.10.2 Systematic reviews

Four included SRs^{97, 133, 135, 147} provided perinatal-related data in prison population. In one SR¹³³ the prevalence of mental health issues among pregnant inmates were reported, and the summary of findings is provided in Table 22.

Table 22 – Imprisoned mothers/pregnant women - incidence/prevalence data

Study ID [Country] [Population]	Epidemiologic results
Mukherjee 2014 ¹³³ [US] [Pregnant prisoners]	• % of pregnant women offenders with psychiatric problems: 36% • % of pregnant women with clinical depression: 77% • % of pregnant women with higher than normal levels of anxiety: 30% • % of pregnant women smoking during pregnancy, range %: >50% to 84% • % of pregnant women with substance abuse problems: 85%

Foley et al. 2013⁹⁷ reported on stresses and risks of BME perinatal inmates. The summary of findings is provided in Table 23.

Table 23 – Stresses and risks of BME perinatal inmates

Study ID [Country] [Population]	Epidemiologic results
Foley 2013 ⁹⁷ [UK, US] [Incarcerated BME women]	• Pregnancy in prison is risky for both mother and infant from a psychological and physical perspective and often have associated complex factors such as increased psychological distress • Psychological stress in pregnancy may affect a variety of perinatal outcomes such as growth restriction and low birth weight • Separation from children can cause depression, anxiety and fear for all imprisoned mothers, but might have more serious consequences for foreign nationals who face the added stress of not being in the same country as their children



Factors relating to introduction of parenting programmes in prison were reported in a SR by Newman et al. 2011¹³⁵, and the summary of findings is provided in Table 24.

Table 24 – Factors relating to introduction of parenting programmes in prison

Factor	Results
Access and security	• Movement of prisoners within the prison system • Overriding requirements of unplanned court appearances or disciplinary acts
Prison culture	• Lack of understanding by prison staff about the importance of parenting education and support • Lack of encouragement for prisoners to attend the programme session • Peer pressure to avoid programme attendance
Incarcerated population	• Low literacy level of many of prisoners • Differing needs and experiences of incarcerated parents
Data collection	• Lack of understanding of prison staff about the collection of data • The release or transfer of prisoners prior to programme completion • Difficulty of collecting follow-up data once prisoners are released

Table adapted from Newman et al. 2011¹³⁵

Shaw et al. 2015¹⁴⁷ reported on the complex associations between incarceration and birthweight. Among included studies, a single study noted that women incarcerated during pregnancy had progressively higher odds of low birth weight and preterm birth through age 39 years. Another study found that those admitted earlier in pregnancy had heavier babies if they attended more sessions, whereas those admitted at between 14–20 weeks and after week 34 had lighter babies the more sessions they attended. The interaction between both gestation and ethnicity was the focus of another study and the authors found an interaction between these elements. The

authors of another study note that babies born to white women with higher levels of substance dependency seemed to benefit from longer incarceration. A final quantitative study examined the socio-demographics and mental health of women in prison mother and baby units in the UK. The main finding was that women in this situation were more likely to be depressed compared with other women in prison and women in the population, based on comparisons from Office of National Statistics data. However, they were less likely to be suffering from psychosis. Two qualitative studies encompassed the lived experience of pregnancy for women in a high security prison and the mother-infant bonding experience when separation was imminent. In both studies, apprehension, grief and loss were evident. In the case of the pregnant women, these emotions were mediated by positive or negative relationships with prison staff, prison regime and policy.



5 LIMITATIONS

No doubt due to the generally less than ideal healthcare conditions in Belgian prisons, prison healthcare is a popular topic, with a large body of publications. However, only few of these publications contain data on healthcare conditions, use of services or the prevalence of diseases. In addition, where data are reported, the methods are often unclear, datasets used are restricted, and reporting of data is incomplete, hampering interpretation of the evidence. This report is based on a systematic review of the literature, applying stringent criteria to identify the most relevant and reliable evidence, and represents a comprehensive overview of the data available regarding the status of Belgian prison healthcare.

The main limitation of the review of SRs is that, by using reviews, it is not possible to draw conclusions from the results of the original studies, and that details of the individual studies are washed out. Formal quality assessment of included SRs was not performed. Only studies published in 2006 and later were included.

6 DISCUSSION

In 2007, D. Laroche,²⁹ in a brief article, highlight the lack of adequate healthcare in Belgian prisons. The prisoners' health state is described as "dramatic". Security is always given precedence over healthcare and waiting times are often unacceptable (as much as 10 days for a broken bone or 15 days for a dentist appointment). Although, 10% of prisoners see a GP every day, these appointments are generally used to provide some change, get out of the cell, or obtain some not-health related benefits. The prescription of anti-anxiety drugs or sleeping pills is common.

A Health Working Group (Groupe de Travail Santé), created by the Permanent Pilot Committee (Comité de Pilotage Permanent) of the CAAP (Coordination des Associations Actives en Prisons) created recommendations for prison healthcare in 2010.²⁷ The 16 recommendations focus on prevention and risk reduction, using information, personnel, cooperation with outside services and continuity of health services.

Information for prisoners about the available services, the risks and their rights, is key in many proposed strategies to improve prison healthcare. Modus Vivendi, an organisation working in prisons, created a health information booklet for prisoners in 2010, which gives a detailed overview of available services and risky behaviours.³²

In 2011, the Belgian newspaper "LE SOIR" published an article, by V. Van der Plancke (vice president of the league of human rights) and other people holding key positions in prison surveillance, which alerted readers to the fact that, in Belgium, imprisonment leads to serious deterioration in prisoners' health.⁵⁴ The article counters other reports, which publicise choice facts, which appear to indicate that there is overspending on prison healthcare or abuse of the offered healthcare option by prisoners (as demonstrated by, for example, a short news article on the "Het Laatste Nieuws" website in 2011).¹⁸¹ In practice there is a lack of health personnel, overmedication for psychological problems, overcrowding and bad hygienic conditions. Infectious diseases are highlighted as a problem, which will fall back on society, as most prisoners are eventually released.

These sources all highlight the suboptimal healthcare conditions prevalent in Belgian prisons.



Not least due to the lack of adequate healthcare provisions, infectious diseases are more common in the prison population than in the general population:

The burden of TB is greater in the prison population than in the general population.¹⁷⁵ Unfortunately, recent Belgian data on TB incidence, screening and treatment were not available. Management of TB is challenging in prison.^{85, 158, 182} There is a real concern about the spread of TB from prisoners to the general population. Prisoner populations have a high turnover, often interacting with visitors and prison staff, which could lead to the spread of disease to the wider public. This is of particular concern with multi-drug resistance TB, which can develop if TB is improperly controlled.¹⁸³

HIV and viral hepatitis infection rates are higher in prisons than in the general population. Culbert et al. 2011⁸⁴ identified several factors impacting on the HIV burden among prison populations, including: lower health functioning through exposure to stress and infectious disease; interruption of HIV treatment due to incarceration; inadequate or negligent healthcare; injection drug use, tattooing, and consensual and coercive sexual activity between inmates; lack of the training and resources; lack of staff specialised in HIV treatment; correctional staff beliefs; fear of discrimination, segregation, work restrictions, inferior healthcare, and possible retaliation as a result of lacking confidentiality on inmates' HIV-status; awareness of state statutes that criminalise intentionally or recklessly exposing another person to HIV; and the substance abuse disorders which may prevent many prisoners from accessing healthcare after release.

Mental health care is provided in different structures in Belgium, including psychiatric annexes in prison.²⁶ Mental health issues are a major problem in Belgian prisons, consisting of two different elements. Firstly, due to a scarcity of places in specialised mental health institutions, internees are alternatively placed in psychiatric wards of prison or incarcerated with the general prison population.^{49, 59} This creates multiple issues throughout the prison system. Often, psychiatric staff at general prisons are trained to provide psychiatric care to the general prison population.^{59, 184} Consequently, they are often not sufficiently trained or equipped to provide specialised treatments internees require. Preferably, internees should be housed in specialised psychiatric hospitals. Secondly, the growing number of internee's in general Belgian prisons in the past (numbers have recently

started to decrease) may be putting a greater burden on the psychiatric staff, which may affect the availability of the prison psychiatric staff to tend to the psychiatric needs of the general prison population.

Indeed, the study by Feron et al, 2005²⁴ reported that for GP encounters at the prisoners' request, the majority of medical complaints were mental health issues. This suggests a substantial amount of mental health issues among the prison population. However, the mental health issues were not even in the top five most common health problems reported by prisoners at the time of imprisonment. Additionally, prisoners may try to obtain psychoactive prescription drugs; drug prescription was the main reason for prisoners GP attendance over mental health issues reported by Feron et al, 2005.²⁴ It may be hard to distinguish between patients seeking psychoactive medication for genuine mental health issues or for other use, such as recreational use or prescription drug dealing. Alternatively, prisoners may not self-report mental health issues upon screening for imprisonment.

With respect to infectious diseases, Belgium has similar problems as other EU states. The study by Michel et al, 2015³¹ revealed that adherence levels of Belgian prisons to WHO/UNODC recommendations for HCV-HIV prevention interventions and HBV vaccination for prisoners was poor. However, similar poor adherence was reported for prison in the other countries included in the study; Austria, Denmark and Italy.³¹ However, the availability of HIV/HBV/HCV consultations for prisoners in these countries was excellent (range 85.7–100%). In contrast, the availability of the same consultation services in Belgian prisons was very poor (11.8%). Tuberculosis is another infectious disease of concern in Belgian prisons, with 89.6 prisoners with TB/100,000 population (in contrast to 12.6 cases of TB/100,000 in the civilian population). The European countries participating in the study by Aerts et al, 2006,² reported performing TB screening for prisoners upon entry (90.9%) and during detention (63.6%). While screening rates for prisoners entering Belgian prisons were not reported, it was reported that 51.7% of prisoners were screened periodically for TB. Prison conditions such as overcrowding and poor ventilation are favouring the spread of TB. In particular, there is concern about the development of multi-drug resistant TB, and with prisoner interaction with prison staff and civilian visitors there is potential to spread the disease to the wider public. The reduction of substance abuse in prisoners is a potential method to prevent



the development and spread of infectious disease in prisons. Substance abuse can lead to a variety of health problems, including HIV/HCV, which can increase risk factors for other infectious diseases such as TB.² The introduction of more treatment programmes for substance abuse could represent a viable option for reducing the spread of infectious disease by improving general prison health. In fact, a study by Vandeveldt et al, 2007,⁵⁸ reported that 90.2% of drug-involved prisoners indicated a positive attitude to in-prison treatment when interviewed. This evidence suggests prisoners may be amenable to more treatment options which may benefit their overall health and prison health.

Overcrowding is a common theme among the Belgian specific studies, with the Belgian penitentiary population increasing by 21% over the last ten years¹⁸⁴ (Figure 3). Cosyns et al, 2007¹⁸⁴ report that the Belgian prison population on any given day was more than 10,000, with only 9,000 prison places available (most recent figures from the Council of Europe Annual Penal Statistics report 12,799 prisoners with 9,962 spaces available [as of 1st January 2016]).¹⁷⁰ Overcrowding can be seen as a common cause of various healthcare problems for prisoners. Overcrowding can lead to mental health issues, spread of infectious disease and can decrease the effectiveness of prison staff as they are unable to serve such a large proportion of prisoners. Adding to this overcrowding is the lack of specialised psychiatric hospitals for internees, resulting in placement of internees in general population prisons. Therefore, the obvious solution is to increase capacity in both general prison facilities and specialised psychiatric hospitals. In fact, there is evidence that increased availability of spaces in specialised psychiatric hospitals may reduce the number of internees residing in general prison populations. In 2010, the Minister of Justice approved a plan to renovate existing prisons and construct new prisons (new prisons were expected to be ready in 2013). In March 2004, council ministers gave the go-ahead for the construction of specialised forensic psychiatric hospitals in Gent and Antwerp (predicted to be operational by 2010).⁴² In 2016, new plans were approved,¹⁸⁵ taking a global approach, encompassing repatriation, modifications of the justice system and rehabilitation, as well as improvements to and extensions of and new prisons. Specifically, space for an additional 860 internees is to be created, with 120 additional places for long-term detention in Alost (Flanders), 240

places in existing psychiatric or care wards in Flanders and Brussels, and 500 places in two planned establishments in Wallonia.

Another issue which is discussed in the literature is the option of euthanasia for prisoners. While there is little controversy in cases like terminal cancer, a number of requests (n=20 between 2011 and 2015)¹⁶ are made on the basis of unbearable psychological burden, which raises ethical issues which have yet to be resolved.

The Belgian prison population is ageing,^{40, 186, 187} which presents specific challenges for the prison system, which is not prepared for caring for the elderly and providing adequate support and facilities.⁴⁰ Due to their age and the (often long) time spent in prison, resocialisation of prisoners becomes increasingly challenging with prisoner's age.⁴⁰

Data on medication use in Belgian prisons are scarce.^{51, 52, 188} However, the high proportion of psychotropic drugs prescribed to prisoners is striking.^{51, 52, 188}

Drug addiction is common in European prisons. Up to 80% of prisoners use tobacco or cannabis and up to 50% use cocaine, heroin or amphetamines.²⁰ Numbers for Belgium have not been identified. However, it has been reported that 4% of Belgian prisoners receive OST.³⁸ A number of programmes are available, addressing both medical and psychosocial aspects of drug addiction.^{21, 179, 189}



■ APPENDICES

APPENDIX 1. SEARCH STRATEGIES

Appendix 1.1. Belgium-specific search strategies

CINAHL Belgian search strategy: accessed 1st April 2016

Search	#
S1 TI (prison or prisons or jail or jails or jailhouse or jailhouses or penitentiary or penitentiaries or correctional or 'penal institution' or 'penal institutions' or lockup or 'penal facility' or 'penal facilities' or 'solitary confinement' or 'confinement facility' or 'confinement facilities' or 'confinement unit' or 'confinement units' or 'preventive confinement' or 'criminal confinement' or custody or (detention not ((immigra* or refugee? or pond?) adj3 detention)) or 'behind bars' or prisoner or prisoners or inmate or inmates or convict or convicts or detainee or detainees or criminal or criminals or offender or offenders or incarcerated or incarceration or imprisoned)	7,718
S2 AB (prison or prisons or jail or jails or jailhouse or jailhouses or penitentiary or penitentiaries or correctional or 'penal institution' or 'penal institutions' or lockup or 'penal facility' or 'penal facilities' or 'solitary confinement' or 'confinement facility' or 'confinement facilities' or 'confinement unit' or 'confinement units' or 'preventive confinement' or 'criminal confinement' or custody or (detention not ((immigra* or refugee? or pond?) adj3 detention)) or 'behind bars' or prisoner or prisoners or inmate or inmates or convict or convicts or detainee or detainees or criminal or criminals or offender or offenders or incarcerated or incarceration or imprisoned)	7,062
S3 MW (prison or prisons or jail or jails or jailhouse or jailhouses or penitentiary or penitentiaries or correctional or 'penal institution' or 'penal institutions' or lockup or 'penal facility' or 'penal facilities' or 'solitary confinement' or 'confinement facility' or 'confinement facilities' or 'confinement unit' or 'confinement units' or 'preventive confinement' or 'criminal confinement' or custody or (detention not ((immigra* or refugee? or pond?) adj3 detention)) or 'behind bars' or prisoner or prisoners or inmate or inmates or convict or convicts or detainee or detainees or criminal or criminals or offender or offenders or incarcerated or incarceration or imprisoned)	13,039
S4 (MH "Correctional Facilities") OR (MH "Correctional Health Services")	3,917
S5 S1 OR S2 OR S3 OR S4	17,767
S6 TI Belgium or belgian* or Belgique or Belgie or Belgien	995
S7 AB Belgium or belgian* or Belgique or Belgie or Belgien	1,579
S8 MW Belgium or belgian* or Belgique or Belgie or Belgien	3,391
S9 TI (Bruxell* or Brussel* or Ghent* or Antwerp* or Liege* or Leuven or Louvain* or Namur or Mons or FNRS)	161
S10 AF (Bruxell* or Brussel* or Ghent* or Antwerp* or Liege* or Leuven or Louvain* or Namur or Mons or FNRS)	9,995
S11 (S6 OR S7 OR S8 OR S9 OR S10)	11,787
S12 S5 AND S11	48
S13 S5 AND S11	45

**Cochrane Library Belgian search strategy: accessed 1st April 2016**

Search	#
S1 (prison or prisons or jail or jails or jailhouse or jailhouses or penitentiary or penitentiaries or correctional or 'penal institution' or 'penal institutions' or lockup or 'penal facility' or 'penal facilities' or 'solitary confinement' or 'confinement facility' or 'confinement facilities' or 'confinement unit' or 'confinement units' or 'preventive confinement' or 'criminal confinement' or custody or (detention not ((immigra* or refugee or refugees or pond or ponds) near/3 detention)) or 'behind bars' or prisoner or prisoners or inmate or inmates or convict or convicts or detainee or detainees or criminal or criminals or offender or offenders or incarcerated or incarceration or imprisoned):ab,ti	1,554
S2 (mh prisons)	13
S3 (mh prisoners)	18
S4 #1 or #2 or #3 Publication Year from 2001 to 2016	1,002
S5 (mh belgium)	305
S6 (Belgium or belgian* or Belgique or Belgie or Belgien):ti,ab	1,252
S7 (Bruxell* or Brussel* or Ghent* or Antwerp* or Liege* or Leuven or Louvain* or Namur or Mons or FNRS):ti	36
S8 #5 or #6 or #7	1,577
S9 #4 and #8	7

Embase systematic review search strategy: accessed 1st April 2016

Search	#
1A prison:ab,ti OR prisons:ab,ti OR jail:ab,ti OR jails:ab,ti OR jailhouse:ab,ti OR jailhouses:ab,ti OR penitentiary:ab,ti OR penitentiaries:ab,ti OR correctional:ab,ti OR 'penal institution':ab,ti OR 'penal institutions':ab,ti OR lockup:ab,ti OR 'penal facility':ab,ti OR 'penal facilities':ab,ti OR 'solitary confinement':ab,ti OR 'confinement facility':ab,ti OR 'confinement facilities':ab,ti OR 'confinement unit':ab,ti OR 'confinement units':ab,ti OR 'preventive confinement':ab,ti OR 'criminal confinement':ab,ti OR custody:ab,ti OR (detention:ab,ti NOT (immigra*:ab,ti OR refugee:ab,ti OR refugees:ab,ti OR pond:ab,ti OR ponds:ab,ti AND adj3:ab,ti AND detention:ab,ti)) OR 'behind bars':ab,ti OR prisoner:ab,ti OR prisoners:ab,ti OR inmate:ab,ti OR inmates:ab,ti OR convict:ab,ti OR convicts:ab,ti OR detainee:ab,ti OR detainees:ab,ti OR criminal:ab,ti OR criminals:ab,ti OR offender:ab,ti OR offenders:ab,ti OR incarcerated:ab,ti OR incarceration:ab,ti OR imprisoned:ab,ti	55,823
2A 'prisoners'/exp	13,422
3A 'prisons'/exp	12,819
4A #1 OR #2 OR #3	62,589
5A #4 AND [2001-2016]/py	36,675
6A #5 NOT [medline]/lim	12,257
7A #6 NOT ([conference abstract]/lim OR [conference paper]/lim OR [conference review]/lim)	8,347
8A #7 AND ('meta-analysis'/exp OR 'meta-analysis' OR 'systematic review'/exp OR 'systematic review')	177



9A	belgium:de,ad,ab,ti OR belgique:de,ad,ab,ti OR belgie:de,ad,ab,ti OR belgien:de,ad,ab,ti OR belgian:de,ad,ab,ti	314,740
10A	bruxell*:ad,ti OR brussel*:ad,ti OR ghent*:ad,ti OR antwerp*:ad,ti OR liege*:ad,ti OR leuven:ad,ti OR louvain*:ad,ti OR namur:ad,ti OR mons:ad,ti OR fnrs:ad,ti	269,709
11A	'belgium'/exp	19,665
12A	#9 OR #10 OR #11	324,637
13A	#7 AND #12	86

MEDLINE systematic review search strategy: accessed 1st April 2016

Search	#
1 (prison? or jail? or jailhouse? or penitentiary or penitentiaries or correctional or 'penal institution' or 'penal institutions' or lockup or 'penal facility' or 'penal facilities' or 'solitary confinement' or 'confinement facility' or 'confinement facilities' or 'confinement unit' or 'confinement units' or 'preventive confinement' or 'criminal confinement' or custody or (detention not ((immigra* or refugee? or pond?) adj3 detention)) or 'behind bars' or prisoner? or inmate? or convict? or detainee? or criminal? or offender? or incarcerated or incarceration or imprisoned).ab,ti,kw,kf,jw.	45,873
2 (Belgium or belgian* or Belgique or Belgie or Belgien).ti,ab,in,hw.	164,883
3 (Bruxell* or Brussel* or Ghent* or Antwerp* or Liege* or Leuven or Louvain* or Namur or Mons or FNRS).ti,in,hw.	142,881
4 exp Belgium/	15,735
5 ("JBR-BTR" or "Acta Belg Hist Med" or "Acta Belg Med Phys" or "Arch Belg" or "J Belge Med Phys Rehabil" or "Acta Rhumatol Belg" or "J Belge Med Phys" or "Bull Mem Acad R Med Belg" or "Verh K Acad Geneeskde Belg" or "Acta Neurol Belg" or "Acta Psychiatr Belg" or "Acta Clin Belg Suppl" or "J Belge Rhumatol Med Phys" or "Rev Belge Med Dent" or "Acta Stomatol Belg" or "Acta Tuberc Pneumol Belg" or "J Stomatol Belg" or "J Belge Med Phys Rhumatol" or "Acta Belg Arte Med Pharm Mil" or "Acta Urol Belg" or "Acta Anaesthesiol Belg" or "Acta Neurol Psychiatr Belg" or "Acta Tuberc Belg" or "Acta Otorhinolaryngol Belg" or "Acta Chir Belg" or "Acta Clin Belg" or "Acta Gastroenterol Belg" or "Acta Orthop Belg" or "Acta Paediatr Belg" or "Acta Physiother Rheumatol Belg" or "Arch Belg Med Soc" or "Psychol Belg" or "Rev Belge Sci Dent" or "Belg Tijdschr Geneesk" or "Verh K Vlaam Acad Geneeskde Belg" or "Rev Belge Stomatol" or "J Pharm Belg" or "Bull Biol Fr Belg" or "Annu Stat Belg Congo Belge" or "J Dent Belge" or "Ann Belg Med Mil" or "Mem Acad R Med Belg" or "Bull Acad R Med Belg" or "Verpleegkd Gem" or "Louv Med" or "Ann Soc R Sci Med Nat Brux" or "Rev Med Liege" or "Rev Med Brux" or "Verh K Vlaam Acad Geneeskde Belg" or "Vlaams Diergeneeskde Tijdschr" or "Brux Med" or "Rev Med Louvain" or "Rev Univ Brux").ja.	63,952
6 2 or 3 or 4 or 5	221,666
7 limit 1 to yr="2001 -Current"	26,801
8 limit 7 to systematic reviews	714
9 remove duplicates from 8	685
10 editorial.pt.	398,973
11 9 not 10	683



PsychInfo Belgian search strategy: accessed 1st April 2016

	Search	#
1	exp prisoners/	7,687
2	prisons/	5,005
3	correctional institutions/	1,923
4	incarceration/	3,385
5	maximum security facilities/	225
6	1 or 2 or 3 or 4 or 5	14,106
7	Journal of Correctional Health Care.jn.	292
8	New England journal on prison law.jn.	0
9	Journal of prison & jail health.jn.	29
10	7 or 8 or 9	321
11	(prison? or jail? or jailhouse? or penitentiary or penitentiaries or correctional or 'penal institution' or 'penal institutions' or lockup or 'penal facility' or 'penal facilities' or 'solitary confinement' or 'confinement facility' or 'confinement facilities' or 'confinement unit' or 'confinement units' or 'preventive confinement' or 'criminal confinement' or custody or (detention not ((immigra* or refugee? or pond?) adj3 detention)) or 'behind bars' or prisoner? or inmate? or convict? or detainee? or criminal? or offender? or incarcerated or incarceration or imprisoned).ab,ti,kw,kf,jw.	65,927
12	6 or 10 or 11	66,461
13	limit 12 to yr="2001 -Current"	49,257
14	(Belgium or belgian* or Belgique or Belgie or Belgien).ti,ab,in,hw.	27,809
15	(Bruxell* or Brussel* or Ghent* or Antwerp* or Liege* or Leuven or Louvain* or Namur or Mons or FNRS).ti,in,hw.	25,041
16	14 or 15	28,090
17	13 and 16	306
18	((comprehensive* or systematic*) adj3 (bibliographic* or review* or literature)) or (meta-analy* or metaanaly* or "research synthesis" or ((information or data) adj3 synthesis) or (data adj2 extract*))).ti,ab,id. or ((review adj5 (rational or evidence)).ti,ab,id. and "Literature Review".md.) or (cinahl or (cochrane adj3 trial*) or embase or medline or psyclit or (psycinfo not "psycinfo database") or pubmed or scopus or "sociological abstracts" or "web of science").ab. or ("systematic review" or "meta analysis").md.	57,113
19	13 and 18	1,093
20	needs.mp.	129,759
21	health care.mp.	132,680
22	health services.mp.	49,649
23	treatment.mp.	465,786
24	20 or 21 or 22 or 23	664,518
25	19 and 24	501



Appendix 1.2. Systematic review search strategies

CINAHL systematic review search strategy: accessed 1st April 2016

Search	#
S1 TI (prison or prisons or jail or jails or jailhouse or jailhouses or penitentiary or penitentiaries or correctional or 'penal institution' or 'penal institutions' or lockup or 'penal facility' or 'penal facilities' or 'solitary confinement' or 'confinement facility' or 'confinement facilities' or 'confinement unit' or 'confinement units' or 'preventive confinement' or 'criminal confinement' or custody or (detention not ((immigra* or refugee? or pond?) adj3 detention)) or 'behind bars' or prisoner or prisoners or inmate or inmates or convict or convicts or detainee or detainees or criminal or criminals or offender or offenders or incarcerated or incarceration or imprisoned)	7,718
S2 AB (prison or prisons or jail or jails or jailhouse or jailhouses or penitentiary or penitentiaries or correctional or 'penal institution' or 'penal institutions' or lockup or 'penal facility' or 'penal facilities' or 'solitary confinement' or 'confinement facility' or 'confinement facilities' or 'confinement unit' or 'confinement units' or 'preventive confinement' or 'criminal confinement' or custody or (detention not ((immigra* or refugee? or pond?) adj3 detention)) or 'behind bars' or prisoner or prisoners or inmate or inmates or convict or convicts or detainee or detainees or criminal or criminals or offender or offenders or incarcerated or incarceration or imprisoned)	7,062
S3 MW (prison or prisons or jail or jails or jailhouse or jailhouses or penitentiary or penitentiaries or correctional or 'penal institution' or 'penal institutions' or lockup or 'penal facility' or 'penal facilities' or 'solitary confinement' or 'confinement facility' or 'confinement facilities' or 'confinement unit' or 'confinement units' or 'preventive confinement' or 'criminal confinement' or custody or (detention not ((immigra* or refugee? or pond?) adj3 detention)) or 'behind bars' or prisoner or prisoners or inmate or inmates or convict or convicts or detainee or detainees or criminal or criminals or offender or offenders or incarcerated or incarceration or imprisoned)	13,039
S4 S1 OR S2 OR S3	17,767
S5 meta-analysis	24,867
S6 PT review	105,370
S7 PT systematic review	39,007
S8 (S5 OR S6 OR S7)	156,631
S9 (S5 OR S6 OR S7) AND (S4 AND S8)	328

**Embase systematic review search strategy: accessed 1st April 2016**

Search	#
1A prison:ab,ti OR prisons:ab,ti OR jail:ab,ti OR jails:ab,ti OR jailhouse:ab,ti OR jailhouses:ab,ti OR penitentiary:ab,ti OR penitentiaries:ab,ti OR correctional:ab,ti OR 'penal institution':ab,ti OR 'penal institutions':ab,ti OR lockup:ab,ti OR 'penal facility':ab,ti OR 'penal facilities':ab,ti OR 'solitary confinement':ab,ti OR 'confinement facility':ab,ti OR 'confinement facilities':ab,ti OR 'confinement unit':ab,ti OR 'confinement units':ab,ti OR 'preventive confinement':ab,ti OR 'criminal confinement':ab,ti OR custody:ab,ti OR (detention:ab,ti NOT (immigra*:ab,ti OR refugee:ab,ti OR refugees:ab,ti OR pond:ab,ti OR ponds:ab,ti AND adj3:ab,ti AND detention:ab,ti)) OR 'behind bars':ab,ti OR prisoner:ab,ti OR prisoners:ab,ti OR inmate:ab,ti OR inmates:ab,ti OR convict:ab,ti OR convicts:ab,ti OR detainee:ab,ti OR detainees:ab,ti OR criminal:ab,ti OR criminals:ab,ti OR offender:ab,ti OR offenders:ab,ti OR incarcerated:ab,ti OR incarceration:ab,ti OR imprisoned:ab,ti	55,823
2A 'prisoners'/exp	13,422
3A 'prisons'/exp	12,819
4A #1 OR #2 OR #3	62,589
5A #4 AND [2001-2016]/py	36,675
6A #5 NOT [medline]/lim	12,257
7A #6 NOT ([conference abstract]/lim OR [conference paper]/lim OR [conference review]/lim)	8,347
8A #7 AND ('meta-analysis'/exp OR 'meta-analysis' OR 'systematic review'/exp OR 'systematic review')	177
9A belgium:de,ad,ab,ti OR belgique:de,ad,ab,ti OR belgie:de,ad,ab,ti OR belgien:de,ad,ab,ti OR belgian:de,ad,ab,ti	314,740
10A bruxell*:ad,ti OR brussel*:ad,ti OR ghent*:ad,ti OR antwerp*:ad,ti OR liege*:ad,ti OR leuven:ad,ti OR louvain*:ad,ti OR namur:ad,ti OR mons:ad,ti OR fnrs:ad,ti	269,709
11A 'belgium'/exp	19,665
12A #9 OR #10 OR #11	324,637
13A #7 AND #12	86

**MEDLINE systematic review search strategy: accessed 1st April 2016**

Search	#
1 (prison? or jail? or jailhouse? or penitentiary or penitentiaries or correctional or 'penal institution' or 'penal institutions' or lockup or 'penal facility' or 'penal facilities' or 'solitary confinement' or 'confinement facility' or 'confinement facilities' or 'confinement unit' or 'confinement units' or 'preventive confinement' or 'criminal confinement' or custody or (detention not ((immigra* or refugee? or pond?) adj3 detention)) or 'behind bars' or prisoner? or inmate? or convict? or detainee? or criminal? or offender? or incarcerated or incarceration or imprisoned).ab,ti,kw,kf,jw.	45,873
2 (Belgium or belgian* or Belgique or Belgie or Belgien).ti,ab,in,hw.	164,883
3 (Bruxell* or Brussel* or Ghent* or Antwerp* or Liege* or Leuven or Louvain* or Namur or Mons or FNRS).ti,in,hw.	142,881
4 exp Belgium/	15,735
5 ("JBR-BTR" or "Acta Belg Hist Med" or "Acta Belg Med Phys" or "Arch Belg" or "J Belge Med Phys Rehabil" or "Acta Rhumatol Belg" or "J Belge Med Phys" or "Bull Mem Acad R Med Belg" or "Verh K Acad Geneeskde Belg" or "Acta Neurol Belg" or "Acta Psychiatr Belg" or "Acta Clin Belg Suppl" or "J Belge Rhumatol Med Phys" or "Rev Belge Med Dent" or "Acta Stomatol Belg" or "Acta Tuberc Pneumol Belg" or "J Stomatol Belg" or "J Belge Med Phys Rhumatol" or "Acta Belg Arte Med Pharm Mil" or "Acta Urol Belg" or "Acta Anaesthesiol Belg" or "Acta Neurol Psychiatr Belg" or "Acta Tuberc Belg" or "Acta Otorhinolaryngol Belg" or "Acta Chir Belg" or "Acta Clin Belg" or "Acta Gastroenterol Belg" or "Acta Orthop Belg" or "Acta Paediatr Belg" or "Acta Physiother Rheumatol Belg" or "Arch Belg Med Soc" or "Psychol Belg" or "Rev Belge Sci Dent" or "Belg Tijdschr Geneesk" or "Verh K Vlaam Acad Geneeskde Belg" or "Rev Belge Stomatol" or "J Pharm Belg" or "Bull Biol Fr Belg" or "Annu Stat Belg Congo Belge" or "J Dent Belge" or "Ann Belg Med Mil" or "Mem Acad R Med Belg" or "Bull Acad R Med Belg" or "Verpleegkd Gem" or "Louv Med" or "Ann Soc R Sci Med Nat Brux" or "Rev Med Liege" or "Rev Med Brux" or "Verh K Vlaam Acad Geneeskde Belg" or "Vlaams Diergeneeskde Tijdschr" or "Brux Med" or "Rev Med Louvain" or "Rev Univ Brux").ja.	63,592
6 2 or 3 or 4 or 5	221,666
7 limit 1 to yr="2001 -Current"	26,801
8 limit 7 to systematic reviews	714
9 remove duplicates from 8	685
10 editorial.pt.	398,973
11 9 not 10	683
12 6 and 7	251
13 remove duplicates from 12	245



PsychInfo systematic review search strategy: accessed 1st April 2016

	Search	#
1	exp prisoners/	7,687
2	prisons/	5,005
3	correctional institutions/	1,923
4	incarceration/	3,385
5	maximum security facilities/	225
6	1 or 2 or 3 or 4 or 5	14,106
7	Journal of Correctional Health Care.jn.	292
8	New England journal on prison law.jn.	0
9	Journal of prison & jail health.jn.	29
10	7 or 8 or 9	321
11	(prison? or jail? or jailhouse? or penitentiary or penitentiaries or correctional or 'penal institution' or 'penal institutions' or lockup or 'penal facility' or 'penal facilities' or 'solitary confinement' or 'confinement facility' or 'confinement facilities' or 'confinement unit' or 'confinement units' or 'preventive confinement' or 'criminal confinement' or custody or (detention not ((immigra* or refugee? or pond?) adj3 detention)) or 'behind bars' or prisoner? or inmate? or convict? or detainee? or criminal? or offender? or incarcerated or incarceration or imprisoned).ab,ti,kw,kf,jw.	65,927
12	6 or 10 or 11	66,461
13	limit 12 to yr="2001 -Current"	49,257
14	(Belgium or belgian* or Belgique or Belgie or Belgien).ti,ab,in,hw.	27,809
15	(Bruxell* or Brussel* or Ghent* or Antwerp* or Liege* or Leuven or Louvain* or Namur or Mons or FNRS).ti,in,hw.	25,041
16	14 or 15	28,090
17	13 and 16	306
18	((((comprehensive* or systematic*) adj3 (bibliographic* or review* or literature)) or (meta-analy* or metaanaly* or "research synthesis" or ((information or data) adj3 synthesis) or (data adj2 extract*))).ti,ab,id. or ((review adj5 (rational or evidence)).ti,ab,id. and "Literature Review".md.) or (cinahl or (cochrane adj3 trial*) or embase or medline or psyclit or (psycinfo not "psycinfo database") or pubmed or scopus or "sociological abstracts" or "web of science").ab. or ("systematic review" or "meta analysis").md.	57,113
19	13 and 18	1,093
20	needs.mp.	129,759
21	health care.mp.	132,680
22	health services.mp.	49,649
23	treatment.mp.	465,786
24	20 or 21 or 22 or 23	664,518
25	19 and 24	501



APPENDIX 2. CHARACTERISTIC OF INCLUDED STUDIES

Appendix 2.1. Characteristics of included SRs

Author-year	Study objective	Study design	Study designs of included studies	Study population	Study time-frame	Disease/Indication	Country	Number of included studies	Number of prisoners in included studies	Belgian specific sample size
Adams 2008	To summarise the recent literature on the treatment needs of women offenders with substance abuse problems and critically examine the few gender-specific programmatic interventions designed for women offenders.	SR	Quasi-experimental studies, longitudinal studies, uncontrolled studies	Women offenders	1997 to 2007	Mental disorders Substance abuse/dependence	US	45	2,532 (7 intervention studies)	NA
Al-Darraj 2012	To explore published studies that were applicable to correctional facility inmates to address issues related to the initiation and completion of IPT either within these settings or after release, to provide empiric guidance for public policy and provide insight into future research studies.	SR	Prospective cohort studies (n=10), cross-sectional studies (n=5), RCTs (n=3)	Prisoners	1989 to 1999	Communicable diseases Tuberculosis, HIV	Worldwide	18	25,961	NA
Arries 2013	To critique published empirical research studies on cardiovascular risk factors among prisoners and to summarise and synthesise current knowledge and findings across these studies.	IR	RCTs, longitudinal studies, cross-sectional studies	Prisoners	2000 to 2011	Non-communicable diseases Cardiovascular diseases (CVD)	Worldwide	12	~29,600	70
Bagnall 2015	To examine the effectiveness and cost-effectiveness of peer interventions in prison settings.	SR	Quantitative, qualitative and mixed method evaluations	Adult prisoners and juvenile offenders	1985 to 2012	Peer support	Worldwide	57	NR	NA
Barker 2014	To systematically analyse existing literature testing the effectiveness of programmes involving the management of	SR	NR	Prisoners	1990 to 2012	Mental disorders Suicidal and/or self-harming behaviours	Worldwide	12	NR	NA



Author-year	Study objective	Study design	Study designs of included studies	Study population	Study time-frame	Disease/Indication	Country	Number of included studies	Number of prisoners in included studies	Belgian specific sample size
	suicidal and self-harming behaviours in prisons.									
Bartlett 2015	To examine the evidence for the success of any intervention, whether or not explicitly labelled a mental health intervention, which has been used with women offenders to produce a positive mental health outcome.	SR	Non-randomised controlled trials (n=2) RCTs (n=9) (only studies included in meta-analysis)	Women offenders	January 1998 to June 2013 (last data-base search: 28/06/2013)	Mental health disorders Depression, trauma	UK and US	11	1,293 (prisoners included in the meta-analysis) 37 (mental health patients discharged from secure hospital)	NA
Batastini 2016	To quantitatively summarise all identified empirical evaluations of telepsychological services that involve videoconferencing equipment and criminal justice-involved or substance abuse clients.	SR	RCTs and non-RCT	Criminal justice-involved clients	2000 to 2014	Mental health disorders	NR	5	402	NA
Baussano 2010	To provide relative and absolute estimates of the risk of TB associated with incarceration, and of the potential impact of specific preventive measures to control TB transmission in the prison setting.	SR	NR	Prisoners	January 1980 through June 2010	Communicable diseases Latent tuberculosis infection, tuberculosis	Worldwide	25	670 (latent tuberculosis infection) 1,719 (tuberculosis)	NA
Bennett 2014	To identify barriers to and levers for implementing suicide and self-harm prevention policies in the prison service for adult inmates.	IR	Studies of varied methodologies were included	Adult prisoners	2000 to 2012	Mental health disorders Suicidal and/or self-harming behaviours	Worldwide	12	2,706 (including prison officers or other staff)	NA
Bernstein 2016	To review the literature related to chlamydia, gonorrhoea, and syphilis screening in US correctional settings, bathhouses and sex venues, self-collected at-	SR	NR	Adult and juvenile prisoners, and community	Jan 2000 to Dec 2014	Communicable diseases Bacterial STIs	US	33 (overall) 21 (incarcerated population)	804,286 (overall incarcerated population including juveniles)	NA



Author-year	Study objective	Study design	Study designs of included studies	Study population	Study time-frame	Disease/Indication	Country	Number of included studies	Number of prisoners in included studies	Belgian specific sample size	
	home testing, and other non-clinical sites.										
Bilby 2006	To evaluate a range of psychological interventions for adults who have been convicted, or cautioned, for sexual offences or who sought treatment or were considered to be at risk of sexual offending.	SR	Quasi-experimental and qualitative studies	Sexual offenders	NR	Mental disorders	health	Worldwide	21	NR	NA
Blodgett 2015	To describe the prevalence of mental health problems among justice-involved veterans	SR	Administrative data and formal studies	Justice-Involved Veterans	1987 to 2013	Mental disorders	health	US	18 samples (prisons: 7; jails and courts: 6; unspecified institutions: 2; community setting: 3)	NR	NA
Brooks-Gordon 2006	To evaluate a range of psychological interventions for adults who have been convicted, or cautioned, for sexual offences or who sought treatment or were considered to be at risk of sexual offending.	SR	RCTs	Sexual offenders	up to 2003	Mental disorders	health	Worldwide	9	567	NA
Chen 2016	To assess the effectiveness of music therapy on improving the mental health of offenders in correctional settings	SR and meta-analysis	RCTs and quasi-RCTs	Offenders in correctional settings	to 2015	Apr	Music therapy	Worldwide	5	409	NA
Condon 2007	To provide a systematic overview of the policy and practice literature concerned with the primary healthcare needs of prisoners in England and Wales and to address the implications of these health	Primary care nursing literature review	NR	Prisoners	1995 to 2005		Primary care nursing	UK	575	NR	NA



Author-year	Study objective	Study design	Study designs of included studies	Study population	Study time-frame		Disease/Indication		Country	Number of included studies	Number of prisoners in included studies	Belgian specific sample size
	needs for nurses working in prisons.											
Coutinho 2015a	To summarise the available literature on active music making interventions with adult offenders in forensic settings.	SR	NR	Adult offenders	to 2013	Apr	Music therapy		Worldwide	28	~750	NA
Coutinho 2015b	To summarise the available literature on active music making interventions with adult offenders in forensic settings.	SR	NR	Adult offenders	to 2013	Apr	Music therapy		Worldwide	28	~750	NA
Culbert 2011	To review the literature on the health needs of incarcerated men living with HIV/AIDS.	Narrative review	NR	Incarcerated men living with HIV/AIDS	NR		Communicable diseases HIV/AIDS		NR	NR	NR	NA
Dara 2015	To summarise published knowledge on the challenges of TB control in prison systems and discuss potential solutions, including research priorities for TB control in prisons, in relation to the three pillars of the End TB Strategy.	SR	NR	Prisoners	1990 to 2014		Communicable diseases Tuberculosis (TB)		Worldwide	96	NR	NA
Dewa 2015	To synthesise and appraise the research that examines insomnia in a prison environment.	IR	NR	Prisoners	1946 to 2013		Mental disorders Insomnia		Worldwide	33	14,863 (adult) 732 (juvenile)	NA
Dixon-Gordon 2012	To integrate existing research on non-suicidal self-injury (NSSI) within correctional settings.	SR	NR	Young and adult offenders in prisons or forensic psychiatric hospital/treatment unit.	1980 to present		Mental disorders Suicidal and/or self-harming behaviours		Worldwide	46	934 (young offender inmates) 26,502 (adult inmates) 496 (forensic psychiatric patients) 230 (staff)	NA



Author-year	Study objective	Study design	Study designs of included studies	Study population	Study time-frame	Disease/Indication	Country	Number of included studies	Number of prisoners in included studies	Belgian specific sample size
Djachenko 2015	To review the available literature relating to smoking cessation for the male prisoner population.	SR	Before-after study (n=1) Pilot study (design not reported) (n=1) Qualitative study (n=3) Quantitative study (n=6) RCT (n=1)	Male prisoners	1990 to 2012	Mental disorders Substance abuse/dependence	Worldwide	12	2,809	NA
Edlin 2015	To develop a more accurate estimate of the national burden of hepatitis C.	SR	NR	Excluded populations, including prisoners	2003 to 2010	Communicable diseases HCV	Worldwide	36	205,917	NA
Farrer 2012	To better characterise the association between traumatic brain injury and incarceration.	SR and meta-analysis	Cross-sectional studies	Incarcerated adults and juveniles	to Feb 2010	Non-communicable diseases Traumatic brain injury	Worldwide	24	5,049	NA
Fazel 2006	To review studies of the prevalence of substance abuse and dependence in prisoners on reception into custody.	SR	NR	Prisoners	January 1966 and January 2004	Mental disorders Substance abuse/dependence	Worldwide	13	7,563	NA
Fazel 2008a	To examine factors associated with suicide in prisoners.	SR	NR	Prisoners	to February 2007	Mental disorders Suicidal and/or self-harming behaviours	Worldwide	34	4,780 (suicide cases)	NA
Fazel 2008b	To conduct a systematic review of surveys of the prevalence of intellectual disabilities among general prison populations to inform researchers, practitioners, and policy makers.	SR	Surveys	Prisoners	January 1966 and June 2004	Mental disorders Intellectual disabilities	Worldwide	10	11,969	NA
Fazel 2012	To systematically review prevalence studies for psychotic illness and major depression in prisoners, provide summary estimates and investigate sources of heterogeneity between	SR and meta-regression analysis	NR	Prisoners	1 January 1966 to 31 December 2000	Mental disorders Psychosis, depression	Worldwide	81 (56 from previous review; 25 from current one)	33,588	NA



Author-year	Study objective	Study design	Study designs of included studies	Study population	Study time-frame	Disease/Indication	Country	Number of included studies	Number of prisoners in included studies	Belgian specific sample size
	studies using meta-regression.									
Fazel 2013	To examine the risk of suicide and suicide attempts in prisoners with bipolar disorder and other psychiatric disorders compared with prisoners without psychiatric disorders.	SR	Observational studies	Prisoners	Up to July 2012	Mental disorders Suicidal and/or self-harming behaviours	Worldwide (non-English language publications included)	5	237,654 (6,285 with bipolar disorder)	NA
Finfgeld-Connett 2011	To explicate attributes of optimal therapeutic strategies for treating incarcerated women who have a history of substance abuse.	SR	Qualitative research reports	Incarcerated women	1980 to Sep 2010	Mental disorders Substance abuse/dependence	US	9	364	NA
Foley 2013	To explore the perinatal mental health needs of BME women in prison and examines whether these are being met.	IR	Research studies using quantitative, qualitative or mixed methods	Incarcerated black and ethnic minority women	1980 to 2011	Health services in prison	UK and US	11 (6 primary papers; 5 secondary papers)	1,776 (primary papers) 1,839 (secondary papers)	NA
Fontarosa 2013	To comprehensively review the evidence for treatments for offenders with serious mental illness (i.e. schizophrenia, schizoaffective disorder, bipolar disorder, or major depression) in jail, prison, or forensic hospital, or transitioning from any of these settings to the community.	SR	RCTs and non-RCT	Adult offenders with serious mental illness	1990 to 2012	Mental disorders Serious mental illness	Worldwide	9	617 (prisons) 446 (forensic hospitals)	NA
Fovet 2015	To examine the complex relationship between patients with bipolar disorder and the justice system.	Critical review	NR	Individuals with bipolar disorder involved in criminal justice system	to 2014	Mental disorders Bipolar disorder	Worldwide	35	NR	NA



Author-year	Study objective	Study design	Study designs of included studies	Study population	Study time-frame	Disease/Indication	Country	Number of included studies	Number of prisoners in included studies	Belgian specific sample size
Goff 2007	To conduct a systematic review of the literature with the specific questions: does any epidemiological study of sentenced prisoners include data on prevalence of PTSD while in prison? If so, what is the prevalence in this group?	SR	Epidemiological studies	Prisoners	1974 to 2004	Mental disorders Post traumatic stress disorder	Worldwide	4	1,783	NA
Goncalves 2014	To examine predictors of two indicators of inmates' adjustment to prison life: institutional infractions and healthcare utilisation.	SR and meta-analysis	NR	Prisoners	to October 2012	Healthcare utilisation	Worldwide	n=90 (overall number of included studies; the level of detail reported in the study do not allow to distinguish the number of studies reporting on healthcare utilisation)	444,016 (overall number of included prisoners; the level of detail reported in the study do not allow to distinguish the number of prisoners included in the analysis on healthcare utilisation)	NA
Goomany 2015	To review the evidence relating to the influence that the prison climate has on the mental health of prisoners.	SR	Qualitative studies	Adult prisoners	NR	Mental disorders health	Worldwide	5	611	NA
Gough 2010	To summarise the published literature on HIV incidence rates and other key blood-borne infections, such as HBV and HCV, in US correctional facilities; and to compare these with infection rates among non-incarcerated individuals who bear high burdens of blood-borne infections and sexually-transmitted infections.	SR and meta-analysis	NR	US correctional populations and high risk groups	1990 to 2009	Communicable diseases HIV	Worldwide	4 (studies on continuously incarcerated inmate population) 4 (inmates released and reincarcerated)	NR	NA



Author-year	Study objective	Study design	Study designs of included studies	Study population	Study time-frame	Disease/Indication	Country	Number of included studies	Number of prisoners in included studies	Belgian specific sample size	
Greig 2011	To identify documented outbreaks, worldwide, of enteric illness in correctional facilities over the last 10 years to understand the epidemiology of the outbreaks and explicitly identify effective infection control measures.	SR	NR	Prisoners	1999 to 2009	Communicable diseases Enteric outbreaks	Worldwide	72 (outbreaks)	33,505 (HIV) 2,092 (HCV) 1,831 (HBV)	NA	
Griffiths 2012	To compile, evaluate and discuss the literature on the prescribing of psychotropic drugs for prisoners.	SR	NR	Prisoners	January 1999 and October 2009	Mental disorders Psychotropic prescribing	health drug	Worldwide	32	14,915 SR included also studies reporting on data obtained from in-prison staff.	One study on Belgian population (n=513)
Griffiths 2015	To critically evaluate the current evidence for peer support in prisons.	SR	Quantitative and qualitative studies	Prisoners	to 2014	Mental disorders Peer support	health	Worldwide	24	>3,700 SR included also studies reporting on data obtained from in-prison staff.	NA
Gronnerod 2015	To examine the effectiveness of psychological treatment of sexual offenders against children.	Meta-analytic review	Prospective retrospective and studies	Sexual offenders against children	2010 to 2014 (study based on data identified in previous SR and updated with most current data)	Mental disorders Sexual offenders	health	Worldwide	14	1,421 (adult offenders) 1,509 (non-treated controls)	NA
Harris 2007	To provide evidence of the healthcare needs of prisoners in relation to gender, age and ethnicity.	SR	NR	Prisoners	1994 to 2005	Health needs		UK	575	NR	NA
Hedrich 2012	To review evidence on the effectiveness of opioid maintenance treatment	SR	RCTs (n=6) Observational (n=15)	Prisoners	to January 2011	Mental disorders	health	Worldwide	21 (27 publications)	1,243 (in prison) 651 (pre- and post-release)	NA



Author-year	Study objective	Study design	Study designs of included studies	Study population	Study time-frame	Disease/Indication	Country	Number of included studies	Number of prisoners in included studies	Belgian specific sample size
	(OMT) in prison and post-release.					Substance abuse and dependence			5,697 (post-release) 870 (multi-variate analysis of predictors of outcome)	
Hellenbach 2016	To investigate the prevalence of intellectual disabilities among prison inmates.	SR	NR	Prisoners with intellectual disabilities	July 2004 and July 2014	Mental disorders Intellectual disabilities	Worldwide	4	4,563	NA
Henwood 2015	To assess the effectiveness of CBT informed interventions or anger management interventions on adult offenders sentenced to probation orders or incarceration.	SR and meta-analysis	RCT, randomised studies, case control or cohort studies	Adult male offenders	to 2014	Mental disorders Anger management	Worldwide	14 (13 publications)	2,791 (prisoners only)	NA
Herbert 2012	To synthesise current evidence on the prevalence of risk factors for non-communicable diseases in prison populations worldwide and to highlight areas for action and further research.	SR	Prevalence studies, cross-sectional and cohort studies	Male and female adults prisoners	1980 to 2011	Non-communicable diseases Obesity and overweight, physical activity	Worldwide	31 (29 publications) 19 studies included in qualitative synthesis	60,027	NA
Hickey 2014	To determine perceived health and gambling behaviour in incarcerated adults (ages 18–49), measures of perceived health and gambling behaviour, and relationships between perceived health and gambling behaviour.	IR	Quantitative studies	Incarcerated adults	1997 to 2012	Non-communicable diseases	Worldwide	13	4,536	NA
Iroh 2015	To summarise HIV testing, treatment, and linkage to care efforts in the incarcerated and recently released population; to determine the estimates in the cascade of care for HIV-infected individuals before,	SR	Retrospective cohort studies; longitudinal studies; descriptive studies; prospective	HIV-infected individuals before, during, and after incarceration	to 2015	Communicable diseases HIV	US and Canada	92	2,822,856	NA



Author-year	Study objective	Study design	Study designs of included studies	Study population	Study time-frame	Disease/Indication	Country	Number of included studies	Number of prisoners in included studies	Belgian specific sample size
	during, and after incarceration; and to identify research gaps and targets for future interventions to improve outcomes in the HIV-infected population involved in the criminal justice system.		studies; non-randomised and randomised trials							
Kennedy 2015	To review the literature on the extent, nature, and impact of smoke-free policy implementation in US prisons and jails.	SR	Qualitative and quantitative studies	Jail or prison inmates	to 2014	Non-communicable diseases	US	26	NR	NA
Knecht 2015	To systematically review the literature on the epidemiological, neurobiological, and other risk factors contributing to relationship between ADHD, comorbid substance use disorders, and the emergence of delinquency and other criminal behaviours.	SR	NR	Adult and adolescent prisoners	to 31 July 2014	Mental disorders ADHD	Worldwide	148	6,325 (adult population only)	NA
Kouyoumdjian 2012	To systematically review the peer-reviewed literature and to conduct a meta-analysis to obtain estimates of the prevalence of Chlamydia trachomatis, Neisseria gonorrhoeae and Treponema pallidum in incarcerated populations, and also to identify subgroups with the highest rates of infection.	SR and meta-analysis	NR	Incarcerated adults and juveniles	to Apr 2010	Communicable diseases Bacterial STIs	Worldwide	60	NR	NA
Kouyoumdjian 2015	To systematically review RCTs of interventions to improve the health of people during imprisonment or in the year after release.	SR	RCT	Adult and juvenile prisoners	to 2014	Mixed	Worldwide	95 (125 publications)	~16,500 (total population included)	NA



Author-year	Study objective	Study design	Study designs of included studies	Study population	Study time-frame	Disease/Indication	Country	Number of included studies	Number of prisoners in included studies	Belgian specific sample size
Kouyoumdjian 2016	To review the literature for quantitative research on the health status of persons in custody in provincial, territorial, and federal correctional facilities in Canada, and summarize recent evidence.	Narrative review	Quantitative studies	Prisoners	1993 to 2014	Mixed	Canada	NR	NR	NA
Kristofersson 2013	To identify the state of knowledge about using stress management techniques (SMTs) in the prison setting for reducing psychological problems and/or behavioural problems in male and female adult prison populations.	Critical review	NR	Prisoners	to 2011	Mental disorders Stress	Worldwide	29 (32 publications)	NR	NA
Larney 2010	To review systematically the evidence on opioid substitution treatment (OST) in prisons in reducing injecting-related human immunodeficiency virus (HIV) risk behaviours.	SR	RCT, quasi-randomised controlled trials, non-randomised studies	Prisoners	NR (no restrictions to publication year)	Mental disorders Substance abuse and dependence	Worldwide	5	1,036	NA
Larney 2013	To determine the rate of incident HCV infection and the prevalence of anti-HCV among detainees in closed settings.	SR and meta-analysis	Prospective and retrospective studies	People detained in prisons and other closed settings	to 2012	Communicable diseases HCV	Worldwide	128	NR	NA
Leight-Hunt 2015	To identify randomised controlled trials of pharmacological and non-pharmacological interventions in adult offenders in prison or community settings.	SR	RCTs	Adult offenders with anxiety, depression or PTSD	to 2011 Jan	Mental disorders Anxiety, depression, PTSD	Worldwide	14	675	NA
Lichtenstein 2010	To review the literature on HIV-related interventions for US women prisoners, with a focus on identifying strategies that enabled women to	Critical review	NR	Women prisoners	1994 to 2009	Communicable diseases HIV	US	9	1,601	NA



Author-year	Study objective	Study design	Study designs of included studies	Study population	Study time-frame	Disease/Indication	Country	Number of included studies	Number of prisoners in included studies	Belgian specific sample size
	practice safer sex, reduce drug use, and to avoid recidivism									
Loeb 2006	To identify the minimum age used to denote older inmates; to determine what health-related variables have been examined in empirical studies of this population; and, based on these findings to describe what is known about the health status of older inmates, including the impact of incarceration on their health; and finally, to describe the availability of prison policies, programmes, and facilities that are relevant to older inmates' health and well-being.	IR	Comparative, descriptive and correlational studies	Older prisoners	1980 to 2005	Older prisoners	Worldwide	21	NR	NA
Martin 2012	To consider the effectiveness of interventions for criminally involved adults with a mental disorder targeting either improved criminal justice or mental health outcomes.	SR and meta-analysis	NR	Criminally involved individuals with major mental disorders	1989 to 2008	Mental disorders Major disorder	Worldwide	25	15,678 (total sample) 4,487 (incarcerated) 1,173 (institution)	NA
Marzano 2016	To synthesise findings of research on near-lethal attempts in prisons, and consider their implications for suicide prevention policies and practice, in the context of other research in custody and other settings.	SR	Prospective and retrospective studies	Prisoners	2000 to 2014	Mental disorders Suicidal and/or self-harming behaviours	Worldwide	8 (13 publications)	941	NA
Maschi 2011	To review the empirical literature that investigates the trauma and stress among older adults in the criminal justice system.	SR	Cross-sectional (n=15) Studies with a comparison group (n=4)	Older adults involved in criminal justice system	1985 to 2010	Mental disorders Trauma/stress, PTSD	Worldwide	19 (overall) 8 (older adult analysis) 11 (mixed age adult sample)	3,439	NA



Author-year	Study objective	Study design	Study designs of included studies	Study population	Study time-frame	Disease/Indication	Country	Number of included studies	Number of prisoners in included studies	Belgian specific sample size
Maschi 2014	To identify common elements of promising palliative and end-of-life services in prison, and what factors facilitate or create barriers to implementation.	SR	All of the empirical studies used cross-sectional study design (n=22) Non-empirical studies (n=27)	Prisoners	1991 to 2013	End-of-life care	Worldwide	22 (empirical studies) 27 (non-empirical studies)	3,541 (empirical studies; overall sample including inmates, staff)	NA
Meekums 2011	To address the research question: do the arts have any role to play in therapeutic goals for offenders?	SR	RCTs, cohort studies, qualitative research	Offenders	to 2010	Art therapy	Worldwide	9	~475 (sample size details reported for only part of included studies)	NA
Mitchell 2007	To synthesise results from studies of incarceration-based drug use treatment programmes using meta-analysis.	SR and meta-analysis	Experimental and quasi-experimental comparative studies, including a 'no-treatment' or 'minimal treatment' group	Adults or juveniles in a correctional facility	1980 to 2004	Mental disorders Substance abuse/dependence	Worldwide	53 (66 evaluations)	NR	NA
Morgan 2012	To examine, using meta-analysis, whether interventions available in correctional facilities are effective across mental health and criminal outcomes in offenders with mental illness.	SR and meta-analysis	Controlled/comparative or before/after study design	Offenders with mental illness	1973 to 2004	Mental disorders Variety of mental disorders	Worldwide	26	1,649	NA
Mukherjee 2014	To examine the prevalence and correlates of mental health issues among pregnant inmates.	SR	Community-based experimental, retrospective cohort, cross-sectional, exploratory descriptive, prospective, or mixed-methods studies	Pregnant prisoners	1950 to Jul 2013	Mental disorders Substance abuse and dependence	US	11	1,376 (prisoners only)	NA
Mulcahy 2013	To review the literature of prison animal programmes	SR	Quantitative or qualitative studies	Adult or juvenile prisoners in	No restriction	Mental disorders	US, Australia	11	NR	NA



Author-year	Study objective	Study design	Study designs of included studies	Study population	Study time-frame	Disease/Indication	Country	Number of included studies	Number of prisoners in included studies	Belgian specific sample size
				a correctional setting (juvenile detention centre, prison, prison farm, forensic psychiatric unit)		Prison programs animal				
Newman 2011	To examine the existing literature relating to the evaluation of parenting programmes for incarcerated parents and provides an outline of the literature reviewed to inform the development of a Mothering at a Distance programme that aims to provide parenting education and support to incarcerated mothers in New South Wales, Australia.	SR	NR	Incarcerated women	1976 to 2009	Health needs	Australia	95	NR	NA
O'Rourke 2016	To systematically explore the literature surrounding the rates of TBI and their co-occurrences in a prison population	SR	Qualitative studies (cross-sectional, longitudinal, comparative and secondary analyses)	Prisoners	1980 to 2014	Non-communicable diseases Traumatic brain injury	Worldwide	26	23,820	NA
Perry 2006	To assess the effectiveness of interventions for drug-using offenders in reducing criminal activity and drug use in the courts, secure establishments (e.g. special hospitals and prisons) and community-based settings.	SR	RCTs only	Drug-using offenders in the courts, secure establishments and the community	1980 to 2004	Mental disorders Substance abuse/dependence	Worldwide	Overall, n=24 1) Community (n=13) 2) Court setting (n=7) 3) Secure establishment (n=4)	9,113 (combined) 1,640 (prisoners)	NA



Author-year	Study objective	Study design	Study designs of included studies	Study population	Study time-frame	Disease/Indication	Country	Number of included studies	Number of prisoners in included studies	Belgian specific sample size
Perry 2009	To evaluate the effectiveness of interventions solely for drug-using offenders, using two broad outcomes: drug use and criminal behaviour.	SR	RCTs only	Drug-using offenders in the courts, secure establishments and the community	1980 to 2004	Mental disorders Substance abuse/dependence	Worldwide	24 (overall) 13 (community setting) 7 (court setting) 4 (secure establishment)	5,536 (combined) Number of prisoners not reported separately	NA
Perry 2015a	To assess the effectiveness of interventions for drug-using offenders with co-occurring mental illness in reducing criminal activity or drug use or both.	SR	RCTs only	Drug-using offenders with co-occurring mental illness	1999 to 2014	Mental disorders Drug misuse with co-occurring mental illness	Worldwide	8 (14 publications) 6 (secure setting) 2 (court setting)	2,163 (combined) 1,739 (prisoners)	NA
Perry 2015b	To assess the effectiveness of pharmacological interventions for drug-using offenders in reducing criminal activity and/ or drug use.	SR	RCTs only	Drug-using offenders	Electronic databases : to 2014 Additional web sources: 2004 - 2011	Mental disorders Substance abuse/dependence	Worldwide	14 (18 publications) 5 (community setting) 9 (secure setting)	2,647 (combined)	NA
Perry 2015c	To assess the effectiveness of interventions for female drug-using offenders in reducing criminal activity, or drug use, or both.	SR	RCTs	Female drug-using offenders	to 2014 May	Mental disorders Substance abuse/dependence	US and Spain	24	2,268	NA
Pompili 2009	To discuss the management of suicidal behaviour in psychiatric hospitals and correctional facilities.	SR – general overview	NR	Prisoners in prison or jail	1980 to 2008	Mental disorders Suicidal and/or self-harming behaviours	NR	567 (of which the most relevant articles were selected for discussion)	NR	NA
Popova 2011	To conduct a systematic search of the literature for studies that have estimated the prevalence/incidence of Foetal Alcohol Syndrome	SR	Surveys, interviews, case studies	Offenders with foetal alcohol spectrum disorder	to 2010	Non-communicable disease FAS/DASD	Canada and US	6	3,230,446 (overall) 654 (youths)	NA



Author-year	Study objective	Study design	Study designs of included studies	Study population	Study time-frame	Disease/Indication	Country	Number of included studies	Number of prisoners in included studies	Belgian specific sample size
	(FAS)/Foetal Alcohol Spectrum Disorder (FASD) in correctional systems in different countries.									
Prins 2014	To summarise and synthesise research on the prevalence of mental illnesses in US state prisons.	SR	NR	Prisoners	From 1989 and August 2013	Mental disorders Variety of mental disorders	US	28	225,169	NA
Rietmeijer 2008	To evaluate the recent US literature on chlamydia positivity in chlamydia screening programs among asymptomatic men in non-sexually transmitted disease clinic settings	SR	NR	Men in various venues (including prisons)	1995 to 2007	Communicable diseases Bacterial STIs	US	54	8,776 (adults in correctional setting)	NA
Rumble 2015	To review existing literature concerning the impact of routine BBV testing in prisons, to describe the components of routine BBV testing policies and to quantify BBV testing acceptance, coverage, result notification and diagnoses under such policies.	SR and meta-analysis	Descriptive (n=14), cross-sectional (n=14), qualitative (n=2), before-after (n=1), longitudinal (n=1), and cost-effectiveness (n=3) studies Prospective controlled trials (n=3) Reviews (n=6)	General correctional facility populations	Autumn 2013	Communicable diseases Blood-borne viruses (HIV, HCV, HBV)	Worldwide	44	1,279,905 (SR included also studies reporting on data obtained from in-prison service providers, health care workers, jurisdictions, agencies and facilities)	NA
Shaw 2015	To review published studies reporting maternity experiences and outcomes for pregnant incarcerated women and their babies.	Systematic mixed-methods review	Any design	Pregnant prisoners	1995 to 2014	Non-communicable diseases Pregnancy in prison	US and UK	7	1,020	NA
Shelton 2010	To review the factors associated with psychotropic medication adherence and strategies that may facilitate adherence.	SR	All designs and methodologies	Prisoners in correctional facilities	1973 to 2009	Mental disorders Psychotropic medication	NR	9	4,223 (overall) 150 (parolees) 60 (forensic psychiatric unit) 214 (adolescent)	NA
Shiroma 2010	To systematically analyse the reported prevalence rates of TBI in offender populations in	SR and meta-analysis	Epidemiological studies	Prisoners with	1983 to 2009	Non-communicable diseases	Worldwide (restricte	20	4,865 (overall)	NA



Author-year	Study objective	Study design	Study designs of included studies	Study population	Study time-frame	Disease/Indication	Country	Number of included studies	Number of prisoners in included studies	Belgian specific sample size
	terms of gender proportion, case definition of TBI, method of determining TBI, and the referenced source population.			traumatic brain injuries		Traumatic injury	brain d to English language)			
Shiroma 2012	To systematically analyse the prevalence of TBI in offender populations.	SR and meta-analysis	NR	Adult offenders	1983 to 2009	Non-communicable diseases Traumatic brain injury	NR	20	4,865 (overall)	NA
Shonin 2013	To systematically review the evidence for Buddhist-derived interventions (BDIs) in correctional settings,	SR	RCTs and non-RCT	Prisoners	to Sep 2012	Mental health	US and Taiwan	8	2,841	NA
Sirdifield 2009	To investigate whether the gaps in knowledge identified in the previous review had been filled, and also whether the focus of research in this field had widened.	SR	NR	Prisoners	2002 and August 2006 (update of the original review)	Mental disorders Personality and anxiety disorders	Worldwide	18	7,770	NA
South 2014	To synthesise the evidence on peer-based interventions in prison settings by carrying out a systematic review and holding an expert symposium.	SR	Quantitative, qualitative and mixed-methods evaluations	Prisoners	1985 to Apr 2012	Peer support	Worldwide	57	NR	NA
Stone 2012	To review the evidence for the US and UK on promotion of palliative care in the prison sector.	IR	Quantitative and qualitative studies, reviews and grey literature	Prisoners requiring palliative care	2000 to 2011	End-of-life care	US and UK	21	NR	NA
Tripodi 2011	To assess the effectiveness of medical interventions for female prisoners.	SR and meta-analysis	Experimental, quasi-experimental, and before and after studies	Adult female prisoners in a women prison	1988 to 2008	Mixed	US	24	NR	NA
Underhill 2014	To summarise and appraise the most methodologically rigorous evidence for the effectiveness of HIV prevention efforts among	SR	RCTs and quasi-RCTs	Adults with criminal justice involvement	to 2014 Jan	Communicable diseases HIV	Worldwide	37 (67 publications)	12,629 (overall) 6,329 (incarcerated)	NA



Author-year	Study objective	Study design	Study designs of included studies	Study population	Study time-frame	Disease/Indication	Country	Number of included studies	Number of prisoners in included studies	Belgian specific sample size
	adults with criminal justice involvement, including both incarceration and community setting.									
Vescio 2008	To analyse risk factors for HCV infection and to assess HCV seroprevalence and incidence in prison.	SR and meta-analysis	Cross-sectional (n=24) and longitudinal (n=6) studies	Prisoners	to June 2005	Communicable diseases HCV	Worldwide	30	31,358	NA
Vinkeles Melchers 2013	To explore screening practices and describe TB occurrence in prison facilities worldwide.	SR	Cross-sectional (n=39) and cohort studies (n=13)	Prisoners	Literature search: 01/01/1990 to 01/06/2011 Conference proceedings: 01/01/2010 to 01/06/2011	Communicable diseases Tuberculosis, HIV	Worldwide	52	438,610	NA
Walker 2014	To develop an understanding of the stability of mental health during imprisonment through review of existing research evidence relating physical prison environment to mental state changes in prisoners.	SR	Longitudinal studies	Prisoners	1976 to 2011	Mental health	Worldwide	15	~183,500	NA
Walsh 2008	To establish the nature of research into dental health undertaken in prisons.	SR	Cross-sectional studies, retrospective studies, qualitative studies	Prisoners	to 2007	Dental health	Worldwide	21	6,383	NA
Werb 2016	A systematic review assessing the outcomes of compulsory treatment for drug dependence, the primary outcome of interest	SR	RCTs and observational studies	Subjects referred to compulsory drug treatment	No date limits	Mental disorders Substance abuse/dependence	Worldwide	9 (overall) 6 (compulsory inpatient or drug)	10,699 (combined) 700 (prisoners)	NA



Author-year	Study objective	Study design	Study designs of included studies	Study population	Study time-frame	Disease/Indication	Country	Number of included studies	Number of prisoners in included studies	Belgian specific sample size
	was post-treatment drug use, the secondary outcome of interest was post-treatment criminal recidivism.							detention) 1 (prison/detention-based treatment) 2 (compulsory community-based treatment)		
Westra 2009	To develop an evidence based guideline for pharmaceutical therapy for addicted prisoners.	SR	Systematic reviews of RCT's	Prisoners	1995 to 2009	Mental disorders Substance abuse/dependence	Worldwide	99	NR	NA
Wion 2016	To determine the current state of the science regarding end-of-life (EOL) care for prisoners and suggest implications for nursing practice and areas for future research.	SR	Quantitative and qualitative studies	Prisoners	to 2014	End-of-life care	Worldwide	19	NR	NA
Wortzel 2009	To assess the risk of suicide of the incarcerated population compared to that of the general veteran population.	SR	NR	Incarcerated veterans	2000 onwards	Mental disorders Suicidal and/or self-harming behaviours	NR	NR	NR	NA
Wright 2011	To review systematically the available literature relating to the implementation of peer education to promote health and healthy behaviour in prisons.	SR	RCTs, quasi-experimental studies, cohort studies, case controlled studies and qualitative research	Prisoners	to 2010	Health promotion	Worldwide	10	~4,440	NA
Young 2015a	The aim of this meta-analysis was to determine the prevalence of ADHD in incarcerated populations.	SR and meta-analysis	Primary research articles	Adult and juvenile prisoners	1980 to 2012	Mental disorders ADHD	Worldwide	42	26,641	NA
Young 2015b	To ascertain the psychiatric co-morbid conditions associated with a clinical diagnosis of ADHD in both	SR and meta-analysis	NR	Prisoners	1980 to 2011	Mental disorders ADHD	Worldwide	18	1,615	NA



Author-year	Study objective	Study design	Study designs of included studies	Study population	Study time-frame	Disease/Indication	Country	Number of included studies	Number of prisoners in included studies	Belgian specific sample size
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youth and adult prisoners
using meta-analysis.

Abbreviations: ADHD, attention deficit hyperactivity disorder; CVD, cardiovascular diseases; FAS, foetal alcohol syndrome; FASD, foetal alcohol spectrum disorder; HBV, hepatitis B virus; HCV, hepatitis C virus; HIV, human immunodeficiency virus; IR, integrative review; NA, not applicable; NR, not reported; PTSD, post-traumatic stress disorder; RCT, randomised controlled trial; SR, systematic review, STI, sexually transmitted infections; UK, United Kingdom; US, United States



Appendix 2.2. Characteristics of included Belgian studies

Author-year	Title	Citation Details	Study objective	Study design category	Study design details	Study time-frame	Belgian specific sample size	Study population category
Aerts 2006	Tuberculosis and tuberculosis control in European prisons.	Int J Tuberc Lung Dis 2006;10(11):121-5-23.	To obtain an overview of the TB control interventions in prisons and to evaluate their efficacy.	Questionnaire	A questionnaire was sent to 52 EuroTB correspondents asking for 2002 data on the total number of inmates, number of prisoners with TB, resistance rates, screening strategies, monitoring and responsibilities.	The questionnaire dealt with data from 2002, and data collection took place in 2003 and 2004.	A total of 23,425 prisoners from Belgium	Not reported
Association Nationale D'aide Aux Handicapés Mentaux 2011	Dungeon politics: La politique des oubliettes. Les personnes handicapées mentales et/ou malades mentales internées]	Not applicable	This is described as a white paper/dossier. A number of demands are outlined.	Other	Unclear. It is not referenced.	Not reported	Belgian population of mentally handicapped prisoners	Mentally ill offenders
Beduwe 2014	Brussels' plan for the reduction of risks associated with drug use - The prison environment: priority actions	Bruxelles: Modus Vivendi; 2014.	To set out the Brussels action plan for the reduction of the risks of drug abuse in the prison environment.	Other	Not applicable	2013	Brussels, 1,517 prisoners (almost 62 of these prisoners have not been sentenced yet and should therefore be presumed innocent)	Prisoners
Brosens 2013	Hulp- en dienstverlening gevangenis Antwerpen: een onderzoek naar de behoeften van gedetineerden Participatie aan hulp- en dienstverlening in de	3 publications; report is used as main source	To investigate the actual use and needs of prisoners in the Antwerp prison with regard to 'hulp- en dienstverlening'-services	Questionnaire	Literature review Focus groups Questionnaire	2011-2012	45 participants in focus groups 432/604 male detainees; 21/52 male mentally ill offenders; 54/73 female detainees and mentally ill offenders (total	Prisoners Mentally ill offenders



Author-year	Title	Citation Details	Study objective	Study design category	Study design details	Study time-frame	Belgian specific sample size	Study population category
	gevangenis van Antwerpen: Van onderzoek tot actie						507, response rate 73.4%)	
Capron 2015	Health in prison [La santé en prison]	Trait d'union 2015(5):1-52.	To prepare voluntary prison visitors for what they are going to experience	Other	Not applicable	Not reported	Total Belgian prison population.	Prisoners
Carael 2012	Concerted strategies for prevention and risk reduction of drug abuse in the Wallonia-Brussels region	Eurotox; 2012.	Project by the ministry of health. This is a general paper, but there is a section on the prison environment.	Other	Project by the Ministry of Health	Not reported	Not reported	Prisoners
Chartuyv els 2010	Social defense in Belgium, between care and safety/security. An empiric approach.	Déviance et société 2010 2010;34(4):615-645.	None given. Review-type article with some analysis	Review	Review Exploratory interviews and group analysis	April 2008 to August 2008 (for the analysis). The review seems to focus on 2007	Please see "study population" for the analysis. All of Belgium for the review.	Healthcare professionals
Cosyns 2008	The interned in Belgium. The numbers	Revue de droit pénal et de criminologie 2008(4):364-380.	To quantitatively describe internalised persons and study the sociobiographical and psychiatric pathology of internalised persons	Medical analysis	file Retrospective database analysis	Data was collected with 15 September 2004 as reference date	3,306 internalised persons	Patients
Cosyns 2013	Penitentiary Mental Health Care in Belgium	Ethical Issues in Prison Psychiatry, International Library of Ethics, Law, and the New Medicine 46, DOI 10.1007/978-94-007-0086-4_7	Review of penitentiary mental healthcare in Belgium.	Review	Review	Unclear, not reported	Belgian prison system	Prisoners
Council of Europe 2012	Report to the Belgian government by the European Committee for	European Commission; 2012.	To assess the current status in Belgian prisons, relating to torture, inhuman punishments or degrading treatment, with special	Other	The CTP visited 2 Belgian prisons. (The Forest and Andenne prisons)	23-27 April 2012	Forest prison: around 700 prisoners Andenne	Prisoners



Author-year	Title	Citation Details	Study objective	Study design category	Study design details	Study time-frame	Belgian specific sample size	Study population category
	the prevention of torture, inhuman punishments or degrading treatment, based on a visit to Belgium		focus on overcrowding, as well as the consequences of strikes and other social movements among the prison staff.				prison: around 425 prisoners	
de Greef 2013	Psychiatric annexes: 10 years of extreme urgency	La Libre Belgique 2013.	Highlighting the health needs of inmates of psychiatric annexes. This is almost like a petition, as it ends with a statement along the lines of "we, the undersigned, urge the government to sort this out by providing the means".	Other	This is like a news article. Data sources unclear.	Not reported	Belgian prisoners in psychiatric wards	Mentally ill offenders
De Smet 2015	Treatment and Control: A Qualitative Study of Older Mentally Ill Offenders' Perceptions on Their Detention and Care Trajectory	International Journal of Offender Therapy and Comparative Criminology 2015, Vol. 59(9) 964 –985 DOI: 10.1177/0306624X14521129	To analyse personal stories from older mentally ill offenders (OMIOs)	Questionnaire	Through in-depth interviews, stories from OMIOs under supervision of the commission of social defence in Ghent (Belgium) were analysed in the phenomenological research tradition.	From 2011 until September March 2012.	Older mentally ill interned offenders in the Flanders region, Belgium.	Mentally ill offenders
De Wilde 2007	Substance use and psychopathology in correctional settings: an exploratory study on the development of a method	Academia Press 2007.	The finality of this study was the development of an adapted assessment method for the screening of psychiatric disorders and substance abuse disorders in newly arrived detainees and incarcerated mentally ill offenders in (psychiatric wards of) Belgian correctional establishments and other secure settings.	Other	The main objective was obtained by: 1. Mapping the current state-of-the-art of existing procedures for diagnosis and assessment, 2. Developing an adapted assessment method, with a script coupled to this method; 3. Mapping the 'setting specific conditions', including: professional secrecy, the role of psychosocial services, and exploration of financial and organizational implications of the developed method.	Not reported	Not reported	Prisoners



Author-year	Title	Citation Details	Study objective	Study design category	Study design details	Study time-frame	Belgian specific sample size	Study population category
Deceuninck 2010	De problematiek van oudere gedetineerden. Een behoefteonderzoek naar de hulp- en dienstverlening in gevangenissen		To explore how elderly detainees feels/experiences his prison stay on several life domains	Questionnaire	Questionnaire under prisoners Interviews with health care professionals in prisons	2010	Not reported	Prisoners Healthcare professionals
Decorte 2007 (linked to Decorte et al 2006, which includes more detail)	Problems and needs of stimulant users prisons	International Journal of Prisoner Health, 3(1): 29-42, DOI: 10.1080/17449200601149122	To investigate if the use of stimulating agents in prison create problems, if users have special requirements for help, and if these problems and needs are sufficiently addressed in (European) prisons	Questionnaire	Qualitative study (interviews)	Prisons were visited during 2005 and 2006 (except for Malta for which data was collected over distance due to time and budget restrictions)	Two prisons (not reported how many prisoners were interviewed)	Prisoners
Devynck 2016	Ondraaglijk psychisch lijden en euthanasieverzoeken van gedetineerden en geïnterneerden		to analyse euthanasia request from prisoners	Other	Database of euthanasia request Interviews with prisoners Medical file analysis	2011-2015	Not reported	Prisoners Mentally ill offenders
Dheedene 2015	De geïnterneerden populatie in Vlaamse gevangenissen: enkele cijfergegevens.	2 publications; the Fatik publication van Dheedene is derived from van der Auwera report	to get insight in the specific care needs of mentally ill offenders in Belgium	Medical file analysis	Day prevalence 24/12/13 of all mentally ill offenders resorring under the Flemish 'commissies tot de bescherming van de maatschappij' en the CBM Vorst Site visits Sidis suite analysis	2013	Not reported	Mentally ill offenders
Dressing 2009	Pathways to Psychiatric Care in European Prison Systems	Behavioral Sciences and the Law Behav. Sci. Law 27: 801-810(2009)	To describe and analyse the concepts of provision of mental health services for prison inmates in 24 countries in the European Union and	Questionnaire	Data were gathered by means of a structured questionnaire that was completed by national experts in the participating countries.	The study was conducted from October 1, 2005, to October 31, 2007.	Not reported	Healthcare professionals



Author-year	Title	Citation Details	Study objective	Study design category	Study design details	Study time-frame	Belgian specific sample size	Study population category
		DOI:10.1002/bsl.893	the European Union and European Free Trade Association (EFTA)					
European Monitoring Centre for Drugs and Drug Addiction 2012	Prisons and drugs in Europe: the problem and responses	European Monitoring Centre for Drugs Addiction and Drug Addiction. doi: 10.2810/73390. http://www.emcdda.europa.eu/publications/selected-issues/prison .	In- depth review of prisons and drugs in Europe based on information provided by EU member states and candidate countries and Norway as part of the national reporting process	Review	Review	Report published in 2012 and Belgian specific data extracted relates to 2010 data	Belgian prison population	Prisoners
Dudek 2011	Traumatization and mental distress in long-term prisoners in Europe	Punishment & Society 2011;13(4):403-423.	To investigate the prevalence of traumatization and mental distress in a sample of 1055 male European long-term prisoners as part of a wider study of the living conditions of prisoners serving sentences of at least five years in Belgium, Croatia, Denmark, England, Finland, France, Germany, Lithuania, Poland, Spain and Sweden.	Questionnaire	Survey	Between October 2007 and February 2009 in two to six prisons per country	n=47	Prisoners
Favril 2013	Een geïntegreerd drugsbeleid in de gevangenis: zorgen voor morgen		To get insight in needs of prisoners concerning penitentiary drugs policy	Qualitative study	Face to face interviews with detainees in Gent prison	2013	Not reported	Prisoners
Favril 2015	Suïcidaliteit in detentie: over kwetsbare personen in een stressvolle context		To explain suicide rates in Belgian prisons	Other	Database analysis Literature review	2014	Not reported	Prisoners



Author-year	Title	Citation Details	Study objective	Study design category	Study design details	Study time-frame	Belgian specific sample size	Study population category
Fazel 2011	Prison suicide in 12 countries: an ecological study of 861 suicides during 2003-2007	Soc Psychiatry Epidemiol. 2011 Mar;46(3):191-5. doi: 10.1007/s00127-010-0184-4.	To examine rates of prison suicide in different countries and compare them with general population rates of suicide and rates of incarceration in each country	Medical analysis	file Data were collected from prison administrations and compared with rates of suicides in the general population separated by gender using Pearson's correlations. Linear regression was used to examine any association after adjustment for rates of incarceration	Data collected from prison administrations for 2003-2007. General population data were collected for 2003-2005 for Canada and 2003-2006 for Denmark, New Zealand, Norway and Belgium. Information on rates of incarceration were drawn from the world prison population list which reported on prisoner numbers for 2005 and 2006.	There were 50 male prisoner suicides and 3 female prisoner suicides	Prisoners
Feron 2005	Substantial use of primary health care by prisoners: epidemiological description and possible explanations	Epidemiol Community Health 2005;59:651-655. doi: 10.1136/jech.2004.022269	To describe the use of primary care services by a prisoner population so as to understand the great number of demands and therefore to plan services oriented to the specific needs of these patients	Medical analysis	file Retrospective cohort study of a sample of prisoners' medical records.	Prisoners were identified from those released from Belgian prisons from 1 September to 30 November 2002	513 prisoners over a total of 182 patient years	Patients
Feron 2008	High and variable use of primary care in prison. A qualitative study to understand help-seeking behaviour.	Int J Prison Health. 2008;4(3):146-55. doi: 10.1080/17449200802264696.	To have a clearer understanding of social factors influencing inmates' help-seeking behaviour and demand for primary care.	Questionnaire	A qualitative study was carried out in five Belgian prisons (three Dutch-speaking and two French-speaking. A total of 25 male inmates were interviewed face-to-face and 18 caregivers (seven nurses and 11 GPs) in focus groups. From the results a descriptive framework for analysis was drafted and analysed further to result in the definition of five main social factors which could explain inmates' help-seeking behaviour and demand for primary healthcare.	Unclear.	25 male inmates and 18 caregivers (seven nurses and 11 GPs)	Prisoners



Author-year	Title	Citation Details	Study objective	Study design category	Study design details	Study time-frame	Belgian specific sample size	Study population category
Gerkens 2010	Belgium: Health system review	Gerkens S, Merkur S. Belgium: Health system review. Health Systems in Transition, 2010, 12(5):1–266.	To conduct a Health Systems in Transition (HiT) profiles report that provides a detailed description of a health system and of reform and policy initiatives in progress or under development in a specific country (in this case, Belgium).	Other	Report	from 2007-2010 (year of report publication)	Not specified. Covers general health services provided for the Belgian population, including mental health care.	Patients
Groupe de travail santé (comité de pilotage permanent) 2010	Recommendations approved by the permanent pilot committee in their meeting of the 7th September	Not reported	To issue recommendations	Other	Not reported	Not reported	Belgian prison population	Prisoners
Helleman s 2008	Externe evaluatie strategisch plan hulp- en dienstverlening aan gedetineerden. Eindrapport		To evaluate the implementation of the Flemish 'hulp- en diensverlening' intervention in the Flemish prisons and to get insight what the service offer means for the prisoners	Other	Document analysis Interviews with stakeholders Activity registration Written questionnaire with prisoners Focus groups with prisoners	2007-2008	Not reported	Prisoners Healthcare professionals
Hln.be 2011	Healthcare for prisoners costs 100 million € per year	Het Laatste Nieuws 2011.	Sensationalism	Other	None	Not specified	Belgian prison population	Prisoners
Laroche 2007	Health behind bars	En marche 2007.	What is the status of healthcare in overcrowded prisons? Are prisoners treated just like any other patient?	Review	Review	Unclear, not reported	Not reported	Prisoners
Mertens 2014	Vrouwen die te gek zijn om los te lopen? Een verkennende dossierstudie naar vrouwelijke		To get insight in the 'profiles' of female mentally ill offenders in the Gent prison and to compare these to the profiles of	Other	Medical file analysis Interviews with health care professionals	2013	Not reported	Mentally ill offenders



Author-year	Title	Citation Details	Study objective	Study design category	Study design details	Study time-frame	Belgian specific sample size	Study population category
	geïnterneerden binnen de Commissie ter Bescherming van de Maatschappij Gent		female mentally ill offenders that were released					
Michel 2015	Insufficient access to harm reduction measures in 5 countries (PRIDE Europe): a shared European public health concern.	BMC Public Health (2015) 15:1093 DOI 10.1186/s12889-015-2421-y	To compare the levels of environmental infectious risk in prisoners between four different countries, by measuring to what extent prisons in these countries adhere to international recommendations for HIV prevention. To identify which particular characteristics of prison settings and penitentiary policies are correlated with non-adherence to WHO/UNODC recommendations.	Questionnaire	A nationwide survey targeting all prisons in four European countries: Belgium (35 prisons), Austria (28 prisons), Denmark (50 prisons) and Italy (205 prisons). An electronic/postal survey questionnaire focusing primarily on the availability of HIV-HCV preventive measures and HBV vaccination for prisoners was sent to the heads of medical units in all the prisons (conducted as per a previous survey conducted in France).	The survey was conducted between June 2013 and April 2014.	17/34 prisons in Belgium participated in the study representing 50% of the total prison population. Note that complete data were not available for all prisons.	Prisoners
Modus Vivendi 2010	Keep focused! Health in prison, every information is useful	Bruxelles Modus Vivendi; 2010.	Health information for prisoners	Other	Not applicable	Not applicable	Not applicable	Prisoners
Mormont 2013	Interned behind bars: punished or taken care of?	Alter échos 2013;366.	To highlight the fact that psychiatric annexes of prisons are overused and misused.	Other	This is the equivalent of a newspaper article	Not reported	General mentally ill prison population	Mentally ill
Nau 2014	The urgency to kill: two cases of contemporary ethics	2014. http://www.revmed.ch/rms/2014/RMS-N-443/L-urgence-a-tuer-deux-cas-concrets-d-ethique-contemporaine .	Not reported	Other	Two cases are described	Not reported	n=1	Prisoners



Author-year	Title	Citation Details	Study objective	Study design category	Study design details	Study time-frame	Belgian specific sample size	Study population category
Oswald 2011	Care and constraints of the sex offenders and nursing in Social Defence. The project "Épicéas"	2011. http://www.cairn.info/revue-cahiers-critiques-de-therapiefamiliale-2011-1-page-127.htm Cahiers critiques de thérapie familiale et de pratiques de réseaux 2011/1 (n° 46), p. 127-138. DOI 10.3917/ctf.046.0127	"Épicéas" is composed of caregivers from diverse backgrounds. The project is developing a comprehensive approach, while emphasizing humanistic and systemic aspects. Addressing patient sex-offenders and their families, under the stress of confinement, is a field still little marked by systemic therapists. But alongside the more traditional approaches, we argue here that the systemic tool is particularly suited to our patients and their families.	Other	Not applicable. This is a report of the Epiceas programme.	Not reported	150 mentally ill sex offenders in a Social Defence institution (Tournai) in Belgium	Mentally ill offenders
Pham 2007	Expertise within the framework of the Social Defense Law of Belgium: Diagnosis benchmarks and recommendations	Annales Médico Psychologiques 165 (2007) 49–55	Discussion of the expertise in Social Defence Law	Other	Description of legal requirements Prevalence of clinical syndromes (in terms of major mental problems) (axis 1) and of personality disorders (axis 2) among a sample of interneers (n=98)	The paper was published in 2007. Time frame of study unclear.	98 interneers, which are not representative of the population of the Social Defence, but rather represent patients described as "stabilised". Those with acute psychiatric problems or with too big intellectual deficiency were excluded. Mean age at imprisonment was 31.6 years and mean IQ was 76.	Mentally ill offenders



Author-year	Title	Citation Details	Study objective	Study design category	Study design details	Study time-frame	Belgian specific sample size	Study population category
Pham 2010	Psychopathy, Alexithymia and Emotional Intelligence in a Forensic Hospital	International Journal of Forensic Mental Health February 2010 DOI: 10.1080/14999013.2010.484641	To compare 20 criminal psychopaths and 19 non-psychopaths under the identification of emotional states, the expression of emotion states to others, operative thinking and emotional intelligence questionnaire results.	Questionnaire	The Hare's Psychopathy Checklist PLC-R, the Toronto Alexithymia Scale and the Emotional Intelligence Questionnaire (TEIQue) were used.	Not reported	20 criminal psychopaths and 19 no psychopaths, all French speaking males, confined in a Belgian security hospital.	Mentally ill offenders
Pletlinckx 2014	National drug report 2014 - trends and developments	Ce document est disponible sur le site Web du Programme Drogues (drugs.wiv-isp.be) et de l'Institut Scientifique de Santé Publique (www.wiv-isp.be)	National drug report	Other	National drug report. This is a general drug report, but Section 9 deals with drug abuse in prisons	2013	Population of Belgium	Prisoners
Polfliet 2013	Jaarverslag Hulp- en dienstverlening aan gedetineerden in de gevangenis van Gent â€ 2012		Annual report of service offers in Prison gent	Other	Record analysis of activities performed by 'hulp- en diensverlening'-services	2012	Capacity in prison is 292, mean occupation rate was 434.7	Prisoners
Poupart 2012	The psychologist in the prison environment and the improvement of the function of the SPIP (Penitentiary services of	n/a	Review	Review	Review	From the 70ies to 2012	General	Prisoners



Author-year	Title	Citation Details	Study objective	Study design category	Study design details	Study time-frame	Belgian specific sample size	Study population category
	resocialisation and probation							
Pourveur 2015	Ageing in prison: a new challenge for our prisons.	http://www.justice-en-ligne.be/article751.html	Raising the issue of elderly prisoners	Other	Not applicable	Not reported	Not reported	Prisoners
Raadgevend Comité voor Bio-ethiek 2009	Advies nr. 46 van 19 januari 2009 betreffende fertiliteitsbehandelingen op verzoek van een gedetineerde		To formulate recommendations about fertility problems and assisted reproduction needs in female prisoners	Other	Legal document analysis Expert opinions	2009	Not reported	Healthcare professionals
Salize 2007	Mentally Disordered Persons in European Prison Systems -Needs, Programmes and Outcome (EUPRIS).	Central Institute of Mental Health; 2007.	To describe and analyse the concepts of and approaches to the provision of psychiatric services for mentally ill or disordered prison inmates in the included countries and its outcomes. Additional aims were to explore and analyse the availability of information about these issues on an official national level (health reporting or juridical data).	Questionnaire	Questionnaire developed to collect data from experts of each country	Conducted from 1st October to 31st October 2007.	Belgian prison system	Healthcare professionals
Snacken 2015	Euthanasia requests in Belgian prisons. Between psychological suffering, human dignity, and death penalty	n/a	Review	Review	Review	December 2011 (when euthanasia law was passed) to publication time.	n=17 (prisoners requesting euthanasia)	Prisoners
Sorber 2013	Exploratief onderzoek naar de kwaliteit van		To get insight in the (perceived) quality of life of elderly mentally ill offenders	Qualitative study	Open interviews Measurement with WHOQOL-brief	2012	Not reported	Mentally ill offenders



Author-year	Title	Citation Details	Study objective	Study design category	Study design details	Study time-frame	Belgian specific sample size	Study population category
	leven bij oudere geïnterneerden							
Spelters 2014	Noden en behoeften op het vlak van hulp-dienstverlening aan gedetineerde vrouwen. Een explorerende studie.		To get insight in needs of female prisoners for 'hulp-en diensverlening'	Qualitative study	Literature study Semi structured interviews with 'trajectbegeleiders' (unclear n) form 3 Flemish prisons	2013	Not reported	Healthcare professionals
Thiry 2012	An assessment of personality disorders with the Five-Factor Model among Belgian inmates.	International Journal of Law and Psychiatry 35 (2012) 327–333	The study proposes a self-reported evaluation of personality disorders using the NEO PI-R.	Questionnaire	The NEO PI-R was obtained during a comprehensive psychological assessment. The psychologist in charge of the psychological assessment met the inmate in a quiet and private office.	Unclear	244 male and 18 female Belgian French speaking inmates (all eligible for early release).	Prisoners
Thiry 2014	The topic of practice of psychotherapy in prison	PSYCHOTHERAPIES, EDITIONS MEDECINE ET HYGIENE. 0251-737X ISSN: 2014 Year: 34 Volume: 3 Issue: 185-192	Aims to identify the details of psychotherapy in prison.	Questionnaire	This study replicates that of Bertrand-Godfrey and Lowenthal from 2011 (set in London) in a French-speaking setting. Psychologists were asked six questions about their job choice and personal motivations and their work.	Unclear. Published in 2014	Four psychologists working with prisoners	Healthcare professionals
To 2015	The Treatment Perspectives of Mentally Ill Offenders in Medium- and High-Secure Forensic Settings in Flanders	International Journal of Offender Therapy and Comparative Criminology 2015, Vol. 59(14) 1605–1622 DOI: 10.1177/0306624X14566355	This study focuses on the treatment perspectives of mentally ill offenders in treatment as well as in prison settings in Flanders.	Qualitative study	Seventeen MIOs were interviewed about the treatment they received. Data were analysed using thematic analysis to derive key themes while acknowledging the individuality of the participants' experiences.	Unclear, published in 2015	Treatment settings consisted of eight treatment wards located in all medium-secure forensic institutions existent in Flanders. Seventeen MIOs took part in the research,	Mentally ill offenders



Author-year	Title	Citation Details	Study objective	Study design category	Study design details	Study time-frame	Belgian specific sample size	Study population category
							of which 16 men and 1 women (only 1 medium-secure forensic institution included women).	
Todts 2009	Drug use in Belgian prisons: monitoring of health risks	n/a	Questionnaire of 10% of Belgian prisoners. This is considered a comparative update vs the 2003 and 2006 questionnaires.	Questionnaire	Questionnaire	2008	Belgian prison population	Prisoners
Todts 2010 Todts 2011	Todts 2010: Onderzoek psychiatrische medicatie Todts 2011: Het gebruik van psychofarmaca in de Belgische gevangenissen	2 publications	To get insight in the prescription and use of psychotropic pharmaceuticals in Belgian prisons	Medical file analysis	Analysis of daily list of prescribed pharmaceuticals in (all, with exception of Tongeren, Everberg and Wortel) Belgian prisons	2010	Not reported	Prisoners
Todts 2013 (Medical director Prison health Service)	Mental Health services in Belgian Prisons	Medical Health and Addiction in Prisons. Written contributions to the International Conference on Mental Health and Addiction in Prisons 27-28 February, Bucharest	Article with no clear objectives other than to review the mental health services in Belgian prisons.	Review	Review	Statistics available as of February 2013 presented.	Total Belgian prison population	Prisoners
van den Ameele 2013	Psychologische hulp aan gedetineerden: een evaluatie van vijf jaar CGG Eclips binnen de gevangenis en		Overview of use of CGG (mental health care) service use in 3 Flemish prisons	Medical file analysis	Analysis of file records of CGG eclips	2009-2014	Not reported	Prisoners



Author-year	Title	Citation Details	Study objective	Study design category	Study design details	Study time-frame	Belgian specific sample size	Study population category
Van Der Plancke 2011	Imprisonment is seriously damaging to the prisoner's health	n/a	Highlighting the health needs of prisoners	Other	This is like a news article. Data sources unclear.	Not reported	Belgian prison population	Prisoners
Van hecke 2012	Kwalitatief onderzoek naar het zorgtraject en de gepercipieerde uitsluitingscriteria van behandeling bij oudere geïnterneerde n		To get insight in the (perceived) care trajectory of elderly mentally offenders	Qualitative study	Depth-interviews with 8 elderly mentally ill offenders (7 males, 1 female; 3 in prison, 4 at home 1 in psychiatric institution)	2011	Not reported	Mentally ill offenders
Vander Laenen 2013	Analysis and Optimization of Substitution Treatment in Belgium (SUBANOP)	ISBN 978 90 382 2172 4 D/2013/4804/14 2 U 2041	To provide an extensive and up-to-date overview of key elements of substitution treatment in Belgium	Other	Multi-method research design (using both qualitative and quantitative methods). Data on therapy in Flemish prisons were collected via an online survey	Data from the online survey were collected in 2011 (Flemish prisons) and 2012 (BCR and Walloon prisons)	Belgian prisons	Prisoners
Vandeurzen 2013	Jaarverslag Hulp- en dienstverlening aan gedetineerden. Gevangenis Antwerpen â€” 2012		Overview of use of CGG (mental health care) and CAP (central intake point for drugs related problems) service use in Antwerp prison	Other	Record analysis of activities performed by 'hulp- en dienstverlening'-services	2012	Not reported	Prisoners
Vandeveld de 2007	How do drug-involved incarcerated and recently released offenders and correctional treatment staff perceive treatment? A qualitative study on treatment needs and	Psychology, Crime & Law, 12:3, 287-305, DOI: 10.1080/10683160500336420 http://dx.doi.org/10.1080/10683160500336420	To explore the needs and expectations of criminal offenders with regard to support and treatment during and after their time in Flemish correctional establishments.	Questionnaire	Qualitative in-depth Interviews of drug-involved incarcerated offenders, recently released prisoners and treatment staff members were conducted. The transcribed interviews were analysed by means of qualitative software package WinMAX98.	The participating prisoners in the study were selected from a research cohort of a larger study, which was initiated in 2000. It is unclear when the interviews were conducted.	18 drug involved incarcerated offenders, 15 recently released prisoners and 18 treatment staff members.	Prisoners



Author-year	Title	Citation Details	Study objective	Study design category	Study design details	Study time-frame	Belgian specific sample size	Study population category
	motivation in Belgian prisons.							
Vandeveld de 2011	Mentally ill offenders in prison: The Belgian case	International Journal of Law and Psychiatry 34 (2011) 71–78 doi:10.1016/j.ijlp.2010.11.011	To summarise and discuss the available knowledge on incarcerated mentally ill offenders.	Review	Review	Review conducted in 2011.	Belgian prisons	Mentally ill offenders
Verdot 2014	Monitoring systems and national surveys on prison health in France and abroad	European Journal of Public Health, Vol. 25, No. 1, 167–172 doi:10.1093/eurpub/cku141	To identify and describe various prison health monitoring approaches implemented worldwide.	Review	Review	Review conducted of National databases in either 2012 or 2013	2013 Prison population= 12,126. 2012 Number of prisons= 33	Prisoners
Verelst 2015	De psychiatrische hulpverlening in het Belgische gevangeniswezen		To give an overview of medication use in Belgian prisons	Medical file analysis	Clear methodology is lacking	2014		Prisoners
Vermeulen 2011	Material detention conditions, execution of custodial sentences and prisoner transfer in the EU member states	Principal European Commission DG Justice (JLS/2009/JPE N/PR/0031/E4) ISBN 978-90-466-0456-4 D/2011/1997/48 NUR 824	Study of Member States' material detention conditions as well as on early/conditional release and earned remission provisions and sentence execution modalities	Questionnaire	The team collated information on key legislation and policy which impacts on prison conditions via an electronic online questionnaire. Completed legal framework questionnaires were received from 24 of the 27 EU Member States the study also assessed practitioners' views on cross border execution of custodial sentences. Questionnaires were addressed to key legal practitioners with knowledge of issues concerning material detention conditions, custodial sentence execution and the transfer of prisoners across the EU and was executed, as above, using an electronic online system.	Unclear but the research for this study ended in June 2011	Belgian prison system.	Healthcare professionals



Author-year	Title	Citation Details	Study objective	Study design category	Study design details	Study time-frame	Belgian specific sample size	Study population category
Verstraeten 2007	Methadonsubstitutie in de gevangenis		To give an overview of prevalence of heroine-substitution users in Belgian prisons	Other	Unclear	2002; 2004; 2005	Not reported	Prisoners
Vicenzutto 2015	Sentenced prisoners who are committed: More crazy? More sick? Focus on the specific law of Social Defence in Belgium.	Annales Medico-Psychologiques 173 (2015) 629-630 http://dx.doi.org/10.1016/j.amp.2015.07.007	To explore whether prisoners, interned under article 21, present a more severe psychiatric profile than those patients interned under the Social Defense law.	Questionnaire	32 interned prisoners (article 21) and 279 interneers (according to the Social Defense law), were compared. Participation was voluntary. The French version of the Mini International Neuropsychiatric Interview was used, for disorders of Axis 3, and the DSM-IV (French version) for personality disorders.	Unclear, not reported	32 interned prisoners (article 21) and 279 interneers (according to the Social Defense law)	Prisoners
Vyncke 2015	Onderzoeksrapport Gezondheidsprofiel Gedetineerden		To describe health, health profiles of prisoners in Flemish and Brussels prisons	Questionnaire	A sample was drawn of 1000 prisoners from 12 selected prisons; of which 817 prisoners participated (among them 73 female) and of which 782 were analysable Use of WIV data health questionnaire 2008 to make comparisons between prison and general population Use of Social Capital and Wellbeing in Ghent (SWING)-study 2015 to make comparisons between prison and general population in case lack of data in WIV	2015	Not reported	Prisoners
Wanlin 2006	Control of tuberculosis in prisons	n/a	These are recommendations by the Scientific Committee of the foundation against tuberculosis and respiratory diseases (Belgian committee)	Questionnaire	A small group of the scientific committee was asked to prepare the document in collaboration with experts from the Prison Health Service (SSP), the department of health surveillance of the public service for prevention and protection at work (SCPPT) and the internal service of prevention and protection at work (SIPPT).	Presumed 2004	2001-2004 There were 9,232 prisoners in Belgium in 2004	Prisoners



Author-year	Title	Citation Details	Study objective	Study design category	Study design details	Study time-frame	Belgian specific sample size	Study population category
Windham-Thomas 2012	The problem of suicide in prison	n/a	Investigation of the problem of suicides in prison	Review	This is a publication by SIREAS (International service of research, education, and social action). It is unclear what data this is based on. Probably most resembles a review.	2012-2016	Not reported	Prisoners

Abbreviations: GP, general practitioners; HiT, Health Systems in Transition; OMIOs, older mentally ill offenders; SCPPT, Department of health surveillance of the public service for prevention and protection at work; SIPPT, Internal service of prevention and protection at work; SSP, Prison Health Service; TB, tuberculosis; TEIque, Emotional Intelligence Questionnaire; WHO, World Health Organisation; WHOQOL-brief, WHO Quality of Life-BREF



APPENDIX 3. EXCLUDED STUDIES

Appendix 3.1. List of studies excluded on the basis of full publication review from the Belgium-specific search

Reference		Rationale for exclusion
Studies excluded from the Belgium-specific search (n=49)		
1	Berg, J., Kaltiala-Heino, R., VÄ, LimÄ, Ki, M. Management of aggressive behaviour among adolescents in forensic units: a four-country perspective J PSYCHIATR MENT HEALTH NURS 2011; 18(9):776-785.	Population; adolescents
2	Bogaerts, S., Polak, M., Spreen, M., Zwets, A. High and low aggressive narcissism and anti-social lifestyle in relationship to impulsivity, hostility, and empathy in a group of forensic patients in the Netherlands. J. For. Psychol. Prac. 2012; 12(2):147-162.	Outcomes; pre-specified outcomes of interest not reported
3	Bogaerts, S., Daalder, A., Vanheule, S., Desmet, M., Leeuw, F. Personality disorders in a sample of paraphilic and nonparaphilic child molesters: a comparative study. Int J Offender Ther Comp Criminol. 2008; 52(1):21-30.	Population; only a proportion of patients in prison, results for prisoners not reported separately
4	Bogaerts, S., Vanheule, S., Desmet, M. Personality disorders and romantic adult attachment: a comparison of secure and insecure attached child molesters. Int J Offender Ther Comp Criminol. 2006; 50(2):139-47.	Population; only a proportion of patients in prison, results for prisoners not reported separately
5	Boudoukha, Halim Abdel, Altintas, Emin, Rusinek, Stephane, Fantini-Hauwel, Carole, Hautekeete, Inmates-to-staff assaults, PTSD and burnout: Profiles of risk and vulnerability Journal of Interpersonal Violence 2013; 28(11):2332-2350.	Country; non-Belgian
6	Bradt, L., Bie, Bouverne-De Maria. Victim-offender mediation as a social work practice. International Social Work. 2009; 52(2):181-193.	Outcomes; review paper not related to healthcare needs of prisoners
7	Bradt, L. Data recording and social work: From the relational to the social. British Journal of Social Work. 2011; 41(7):1372-1382.	Outcomes; pre-specified outcomes of interest not reported
8	Bradt, L. Victim-offender mediation and social work: Focus groups with mediators in Flanders. International Social Work. 2014; 57(2):121-130.	Outcomes; review paper not related to healthcare needs of prisoners
9	Capron C, Pourveur S. La Santé en prison Trait d'union. 2015(5):1-52.	
10	Colins, O., Vermeiren, R., Schuyten, G., Broekaert, E. Psychiatric disorders in property, violent, and versatile offending detained male adolescents Am J Orthopsychiatry 2009; 79(1):31-8.	Population; adolescents
11	Colins, O., Vermeiren, R., Vahl, P., Markus, M., Broekaert, E., Doreleijers, T. Psychiatric disorder in detained male adolescents as risk factor for serious recidivism Can J Psychiatry 2011; 56(1):44-50.	Population; adolescents
12	Colins, Olivier F., Vermeiren, Robert, De Bolle, Marleen, Broekaert, Eric Self-reported psychopathic-like traits as predictors of recidivism in detained male adolescents Criminal Justice and Behavior 2012; 39(11):1421-1435.	Population; adolescents



13	Colins, O., Vermeiren, R., Vahl, P., Markus, M., Broekaert, E., Doreleijers, T. Parent-reported attention-deficit hyperactivity disorder and subtypes of conduct disorder as risk factor of recidivism in detained male adolescents European Psychiatry 2012; 27(5):329-334.	Population; adolescents
14	Colins, Olivier F., Vermeiren, Robert R., Noom, Marc, Broekaert, Eric Psychotic-like symptoms as a risk factor of violent recidivism in detained male adolescents Journal of Nervous and Mental Disease 2013; 201(6):478-483.	Population; adolescents
15	Colman, C., Vander Laenen, F. Recovery came first: desistance versus recovery in the criminal careers of drug-using offenders. The scientific world journal. 2012; 657671.	Population; prisoners not considered
16	Cosyns, P., Koeck, S., Verellen, R.. De justitiabele met een psychische stoornis in Vlaanderen (2008). Tijdschrift voor Psychiatrie. 63-8	Population: no data on prisoners
17	De Leeuw, M., Jacobs, W. Forensic emergency medicine: old wine in new barrels Eur J Emerg Med 2010; 17(4):186-91.	Outcomes; pre-specified outcomes of interest not reported
18	De Clercq, M., Vander Laenen, F. Gebruik van testinstrumenten in psychiatrische deskundigenverslagen bij internering; een exploratief dossieronderzoek in het gerechtelijk arrondissement Gent. Tijdschr Psychiatr. 2013 ;55(5):337-47.	Copy
19	De Clercq, M., Laenen, F.. The use of psychodiagnostic tests in forensic psychiatric reports within the framework of internment: An exploratory study of records on interneers in the judicial district of Ghent (2013). Tijdschrift voor Psychiatrie.55.5.337-347	Outcome
20	Dequelson, Angelique, Saloppe, Xavier, Bandinelli, Insight, sigma and self-stigma: The personal conviction applied to schizophrenia patients hospitalized in forensic hospital Annales Medico Psychologiques 2015; 173(10):913-915.	Outcomes; pre-specified outcomes of interest not reported
21	Douglas, T. Coercion, incarceration, and chemical castration: An argument from autonomy. Journal of Bioethical Inquiry. 2013; 10(3):393-405.	Population; prisoners not explicitly considered
22	Garcet, S.. TRIBULATIONS D'UNE VIEILLE DAME. De la "loi relative aux anormaux et délinquants d'habitude" a la "loi relative a l'internement des personnes atteintes d'un trouble mental" (2015). Rev Med Liege.70.12.644-8	Outcome
23	Goethals, K., Buitelaar, J., van Marle, H. Psychotic symptoms and prior use of psychiatric services in psychotic offenders detained under the Dutch Entrustment Act (TBS): An exploratory study The International Journal of Forensic Mental Health 2010; 9(4):324-333.	Country; non-Belgian
24	Gunst, X. Experiential psychotherapy with sex offenders: Experiencing as a way to change, to live more fulfilling lives, to desist from offending. Person Centred and Experiential Psychotherapies. 2012; 11(4):321-334.	Outcomes; pre-specified outcomes of interest not reported
25	Henrichs, J., Bogaerts, S., Sijtsema, J., Klerx-van Mierlo, F. Intimate partner violence perpetrators in a forensic psychiatric outpatient setting: criminal history, psychopathology, and victimization. J Interpers Violence. 2015; 30(12):2109-28.	Outcomes; pre-specified outcomes of interest not reported
26	Jugheli, L., Rigouts, L., Shamputa, I. C., Bram de Rijk, W., Portaels, F. High levels of resistance to second-line anti-tuberculosis drugs among prisoners with pulmonary tuberculosis in Georgia Int J Tuberc Lung Dis 2008; 12(5):561-6.	Country; non-Belgian



27	Lecocq. The constrained treatment of sexual offenders (2011). Cliniques méditerranéennes: Psychanalyse et Psychopathologie Freudienne.84..243-257	Outcome
28	March, J.C., Oviedo-Joekes, E., Romero, M. Factors associated with reported hepatitis C and HIV among injecting drug users in ten European cities. <i>Enferm Infecc Microbiol Clin.</i> 2007; 25(2):91-7.	Population; does not specify a prisoner population
29	Nioche, A., Pham, T., Ducro, C., de Beaurepaire, C., Chudzik, L., Courtois, R., Reveillere, C.. Psychopathy and associated personality disorders: Searching for a particular effect of the borderline personality disorder? (2010). <i>L'Encephale: Revue de psychiatrie clinique biologique et thérapeutique.</i> 36.3.253-259	Outcome
30	Pham, T., Ducro, C., Martin, M., Pihet, B. Project for the ongoing evaluation of the offence characteristics, diagnostic aspects, social environment and treatment of sex offenders by specialized healthcare teams in the Walloon region of Belgium. <i>Ann. Med.-Psychol.</i> 2010; 168(6):458-461.	Population
31	Pham, T. Influence of psychopathy on self-perceived quality of life in forensic patients: A cohort study in Belgium. <i>Journal of Forensic Psychiatry & Psychology.</i> 2013; 24(1):31-47.	Outcomes; pre-specified outcomes of interest not reported
32	Pouls, C. Psychopathy in offenders with intellectual disabilities: A comparison of the PCL-R and PCL: SV. <i>The International Journal of Forensic Mental Health.</i> 2014; 13(3):207-216.	Outcomes; pre-specified outcomes of interest not reported
33	Poupart M. Le psychologue en milieu pénitentiaire et l'amélioration du fonctionnement des SPIP. <i>Revue pénitentiaire et de droit pénal.</i> 2012 1:43-52.	Outcomes; pre-specified outcomes of interest not reported
34	Prior, P.M. Mentally disordered offenders and the European Court of Human Rights. <i>Int J Law Psychiatry.</i> 2007; 30(6):546-57.	Population
35	Protais, C. Psychiatric care or social defense? The origins of a controversy over the responsibility of the mentally ill in French forensic psychiatry. <i>Int J Law Psychiatry.</i> 2014; 37(1):17-24.	Outcomes; pre-specified outcomes of interest not reported
36	Puthooppambal, S.J., Bjerneld, M. Detainees, staff, and health care services in immigration detention centres: a descriptive comparison of detention systems in Sweden and in the Benelux countries. <i>Glob Health Action.</i> 2016; 9(30358).	Population; does not considered a prisoner population
37	Sakelliadis, E.I., Spiliopoulou, C. A., Papadodima, S. A. Health care provision in prisons: a review on European and international guidelines. <i>Acta Clin Belg.</i> 2009; 64(5):399-405.	Outcomes; pre-specified outcomes of interest not reported
38	Shamputa, I. C., Jugheli, L., Sadradze, N., Willery, E., Portaels, F., Supply, P., Rigouts, L. Mixed infection and clonal representativeness of a single sputum sample in tuberculosis patients from a penitentiary hospital in Georgia <i>Respiratory Research</i> 2006; 7(99)	Country; non-Belgian
39	Smets, H., Verelst, R., Vandenberghe, J.. Mentally ill and dangerous: Civil commitment or internment? The Belgian judicial framework (2009). <i>Tijdschrift voor Psychiatrie.</i> 51.4.217-225	Outcome
40	Smet De, S. Older offenders deemed criminally irresponsible in Flanders (Belgium): Descriptive results from a retrospective case note study. <i>International Journal of Law and Psychiatry</i> Mar. 2016.	Outcomes; pre-specified outcomes of interest not reported
41	Sneyers, M., Sloore, H., Rossi, G., Derksen, J. J. Using the Megargee system among Belgian prisoners: cross-cultural prevalence of the MMPI-2 based types. <i>Psychol Rep.</i> 2007; 100(3 Pt 1):746-54.	Outcomes; pre-specified outcomes of interest not reported



42	Toit, K., Altraja, A., Acosta, C. D., Viiklepp, P., Kremer, K., Kummik, T., Danilovitš, M., Vandenberg, R., Harries, A. D. Supply, P. A four-year nationwide molecular epidemiological study in Estonia: Risk factors for tuberculosis transmission. Public Health Action. 2014; 4():S34-S40.	Population; does not specify a prisoner population
43	Tonnaer, F., Cima, M., Sijtsma, K., Uzieblo, K., Lilienfeld, S. O. Screening for psychopathy: Validation of the psychopathic personality inventory-short form with reference scores. J. Psychopathol. Behav. Assess. 2013; 35(2):153-161.	Population; does not specify a prisoner population
44	Tulkens, Prisons in Europe: Recent developments in the jurisprudence of the European Court of Human Rights Deviance et Societe 2014; 38(4):425-448.	Population; does not specify a prisoner population
45	Tyczyno, M., Halota, W., Nowak, W., Pawlowska, M. Distribution of HCV genotypes in the populations of inmates in polish prison potulice and patients hospitalised in bydgoszcz Hepat. mon 2014; 14(5):e14559.	Country; non-Belgian
	van der Heijden, P.T., Egger, J. I., Rossi, G. M., Derksen, J. J. Integrating psychopathology and personality disorders conceptualized by the MMPI-2-RF and the MCMI-III: a structural validity study. J Pers Assess. 2012; 94(4):345-57.	Outcomes; pre-specified outcomes of interest not reported
46	van der Kraan, J., Verkes, R. J., Goethals, K., Vissers, A., Brazil, I., Bulten, E. Substance use disorders in forensic psychiatric patients Int J Law Psychiatry 2014; 37(2):155-9.	Country; non-Belgian
47	Verstraeten K, Decorte Tp. Methadonsubstitutie in de gevangenis. 2007; 2007.	Outcomes; pre-specified outcomes of interest not reported
48	Vilibic-Cavlek, T., Kucinar, J., Kaic, B., Vilibic, M., Pandak, N., Barbic, L., Stevanovic, V., Vranes, J. Epidemiology of hepatitis C in Croatia in the European context World J. Gastroenterol. 2015; 21(32):9476-9493	Country; non-Belgian
49	Willemsen, J., Verhaeghe, P. Psychopathy and internalizing psychopathology. Int J Law Psychiatry. 2012; 35(4):269-75.	Outcomes; pre-specified outcomes of interest not reported



Appendix 3.2. List of studies excluded on the basis of full publication review from the systematic review search

Reference		Rationale for exclusion
Studies excluded from the systematic review search (n=276)		
1	A crime to be punished or a problem to be solved? J INTELLECT DISABIL OFFENDING BEHAV. 2014 5(2):1-25 25p	Full-text not available
2	A Day, D Chung, P O'Leary, E Carson Programs for men who perpetrate domestic violence: an examination of the issues underlying the effectiveness of intervention programs J FAM VIOLENCE. 2009 24(3):203-212 10p	Study design
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