Review Article

Medicine in the Penal System

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Summary

Background: Infectious diseases, substance dependencies, and dental diseases are the most important health problems affecting incarcerated persons. In Germany, for example, prisoners are 48 to 69 times more likely to be infected with the hepatitis C virus (HCV) than the general population, and 7 to 12 times more likely to be infected with the human immunodeficiency virus (HIV). The prevalence of mental illnesses is also markedly higher in the incarcerated than in the general population.

Methods: This review is based on pertinent publications retrieved by a selective search in two databases (PubMed and Google Scholar) for any of the terms “health care,” “primary health care,” “mental health care,” “infectious disease,” “opioid maintenance treatment,” and “severe mental disorder” in conjunction with “prison,” “jail,” “detention,” and “incarceration.”

Results: Among prisoners in German prisons, approximately 20% consume heroin, 20–50% suffer from alcohol dependency and abuse, and 70–85% smoke. The prevalence of tuberculosis in German prisons in 2002 was 0.1%. The provision of needles to incarcerated persons has a preventive effect on infection with hepatitis C, hepatitis B, and HIV, yet programs of this type have been discontinued in most penal facilities. In a systematic review, psychotic disorders were found in 3.6% [95% confidence interval (CI): [3.1; 4.2]] of male inmates and 3.9% [95% CI: 2.7; 5.0] of female inmates. 25% of incarcerated persons suffer from attention-deficit–hyperactivity disorder. Persons recently released from prison have an above average mortality, largely due to drug intoxication.

Conclusion: An analysis of medical prescribing data reveals deficiencies in the provision of HCV treatment to all affected persons and in the provision of substitution treatment to persons with opiate dependency. In view of the known risks associated with imprisonment, greater emphasis should be placed on the provision of treatment for infectious diseases, substance dependencies, and mental illness, both in prison and in outpatient care after release.

Cite this as:

Opitz-Welke A, Lehmann M, Seidel P, Konrad N: Medicine in the penal system. Dtsch Arztebl Int 2018; 115: 808–14. DOI: 10.3238/arztebl.2018.0808

In international comparison, Germany is among those countries that have a low rate of prisoners relative to the size of its population (e1). The medical care of prisoners does not fall under the remit of the statutory health insurance schemes. Medical services are funded directly by the law enforcement authorities, with the extent of medical services regulated according to the so called equivalence principle, which stipulates that prison medical services should be equivalent to those provided by statutory health insurers (1). *Table 1* shows the epidemiological characteristics of prisoners compared with the German population (e2–e5).

The medical parameters in the existing penal healthcare system are not collected centrally; for this reason a direct comparison between intramural and extramural medical services is not possible.

In terms of providing healthcare services within the penal system, prison doctors have a key role; their clinics are open to all prisoners. On admission into the penal system, prison doctors undertake a basic medical examination of every prisoner, during which they systematically inquire about the prisoner’s general health and document their physical findings (2, 3).

In a study from Belgium, the most common reasons for contact with a doctor were administrative and psychiatric questions (35.1%). The so-called administrative questions reflect the institutional regulation—typical of the penal system—of the entire way of life. Individual wishes, such as the need and desire for different dietary provisions or a second pillow, also led to a consultation with the responsible prison doctor. Respiratory symptoms (12.9%) or gastrointestinal problems (12.5%) were the second most common causes for consulting a doctor in the Belgian study, followed by musculoskeletal symptoms and skin disorders (7.7%) (3).

No studies are available of the frequency distributions of different reasons for medical consultations in Germany’s penal facilities; in our experience the distribution mentioned in the Belgian study roughly corresponds with conditions in German prisons. Inpatient medical services are delivered in sick wards and prison hospitals, some of which also have psychiatric departments. Only in exceptional circumstances will prison inmates be transferred to external hospitals for treatment, under close guard.

Physical/somatic health problems in prison: prevalence and primary prevention

In 2007, the World Health Organization (WHO) identified communicable diseases, dependency/addiction

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TABLE 1

Comparison of medical care for the resident population and prisoners

	Population in Germany	Prisoners in Germany	Rate
Prisoners and persons in protective custody in Germany (proportions as % of the total numbers)			
Population/prison population in Germany	82 700 000	51 082 (e2)	62/100 000
Persons older than 60 years	22 659 800 (27.4%)	2029 (4.0%) (e2)	7 : 1
Proportion of women	41 928 900 (50.7%)	3033 (5.9%) (e2)	9 : 1
Prisoners, remand prisoners, persons in protective custody in Germany (proportions as % of the total numbers)			
Population/prison population in Germany	82 700 000	64 193 (e2)	
Hospital beds/ beds in prison hospitals	498 718 (e3) 6.03 beds/1000 persons	649 (e4) 10.1 beds/1000 persons	1 : 1.7
General practitioners/full time prison doctors total	55 032 (e5)	154 (e4)	1 : 3.6
N per general practitioner	1503	417	

disorders, and dental disorders as the most important primary care problems in prisons (e6).

Table 2 summarizes the results of a literature search of the frequency of somatic/physical health impairments in prisoners (7, e7–e12).

International studies of the prevalence of nicotine dependence in the penal system found a rate of 70–83% of smokers; according to a short report from the German Institute on Addiction and Prevention Research, 85% of those imprisoned in German jails were smokers (4).

An analysis of pooled data from 2005 to 2015 showed an association between repeated stays in prison of HIV positive drug addicts and the HIV prevalence in the corresponding general population (5). Screening and treatment services for prisoners infected with hepatitis C and hepatitis B virus (HBC and HBV) and HIV, as well as other sexually transmitted infections, were identified as effective measures for reducing the infection rate in the relevant general population (6). A 2006 cross-sectional study conducted by the Robert Koch-Institute found in German prisoners with a history of injecting drug use (29% of the total sample) a proportion of inmates with HCV antibodies of 57.6% (95% confidence interval [56.6; 58.7]) and with HIV antibodies of 1.3% [95% CI: 1.1; 1.5] (7). *Table 3* shows the prevalence of viral hepatitis, HIV infections, and tuberculosis (TB) in German prisoners compared with the general population (6, 7, e8, e13–e16).

With regard to TB, Germany is a low-incidence country (8). As prisoners often come from at-risk populations with a raised prevalence and incidence of TB, TB is more common in prisoners than in the general population (9). The diagnosis of a TB infection at the very start of a spell in prison enables effective treatment as well as protection from infection. To this end, active case finding is required after admission

into the penal system (e17, e18). The German Protection against Infection Act (e19) stipulates a duty to undergo the necessary screening, which includes the option of an x-ray.

Nationwide data on the prevalence of TB in penal institutions are not available. In Berlin's penal system in 2002, a TB prevalence of 0.1% was found (e20). Infection with HIV increases the risk of TB. Prisoners infected with HIV have a relative risk of 2.0–10.75 of contracting TB (10).

The prevalence of psychiatric disorders in the penal system

The prevalence of psychiatric disorders in prisoners is increased compared with the general population. A systematic review and meta-analysis of studies covering the time period 1966–2010 found in 33 588 prisoners a raised prevalence of psychosis and severe depression compared with the general population (11). Psychotic disorders were seen in 3.6% [95% CI: 3.1; 4.2] of male prisoners and 3.9% [95% CI: 2.7; 5.0] of female prisoners, and severe depression in 10.2% [95% CI: 8.8; 11.7] of male prisoners and 14.1% [95% CI: 10.2; 18.1] of female prisoners. The study in question did not differentiate by etiology of psychotic disorder; based on the authors' clinical experience we may assume that most cases were patients with schizophrenia and psychotic disorders subsequent to drug misuse.

Very few studies have investigated the prevalence of psychiatric disorders in German prisoners. Their results are summarized in *Table 4* (e21–e26). Representative samples have thus far been analyzed only in prisoners who are jailed rather than paying a fine and remand prisoners. Although neither of the currently used international classification systems ICD-10 (WHO) and DSM-5 (APA) include this diagnostic category, and although no clinical studies have confirmed a separate entity, the diagnosis of prison

TABLE 2

Rates of health impairments and causes of death in prison inmates

Authors	Baillargeon et al. 2000 (e7)	Schulte et al. 2009 (e8)	Zimmermann et al. 2014 (7)	Maruschak et al. 2016 (e9)	Moschetti et al. 2015 (e10)	Binswanger et al. 2009 (e11)	Kouyoumdjian et al. 2016 (e12)
Methods, time period	Cross sectional 1997–1998	Survey March 2006	Cross sectional 2006/2007	Survey 2011–2012	Cross sectional January 2011	Cross sectional 2002–2004	Retrospective cohort study 2000–2012
Region	USA/Texas	Germany	Germany	USA	Switzerland	USA	Canada
N	N = 170 215 (imprisonment)	N = 14 537 (imprisonment)	N = 1658 (imprisonment)	N = ?	N = 1664 (imprisonment)	N = 20 955 (im- prisonment) N = 76 597 (Bev.)	N = 48 166
Sources of information	Medical diagnosis	Medical diagnosis	Medical diagnosis	Self reported	Medical diagnosis	Self reported	Death register
	Proportions as %			Proportions as % [95% CI]		OR [95% CI]	Standardized mortal- ity ratio [95% CI]
Group of disorders							
Infections	29.6			21%	8.9 [7.6; 10.4]		7.4 [6.5; 8.5]
Soft tissue	15.3				12.8 [11.2; 14.5]		0.3 [0.0; 1.1]
Cardiovascular	14.0				6.5 [5.4; 7.8]		3.1 [2.8; 3.3]
Psychiatric	10.8						8.5 [7.3; 9.9]
Pulmonary/respiratory	6.3				5.5 [4.4; 6.7]		2.9 [2.4; 3.4]
Cancer				3.5%			1.6 [1.5; 1.7]
Gastrointestinal					9.0 [7.8; 10.6]		6.3 [5.6; 7.0]
Specific disorders							
Hypertension	9.8			26.3%	5.5 [4.3; 6.6]	1.17 [1.09; 1.27]	
Asthma	5.2			14.9%	2.3 [1.7; 3.2]	1.34 [1.41; 1.34]	
Back pain	5.1						
Viral hepatitis	5.0					4.23 [3.71; 4.82]	
Hepatitis C		14.3	20.6	9.8 %	5.0 [4.1; 6.2]		13.5 [10.8; 16.7]
Hepatitis B			2.2	2.7%			
HIV		1.2	0.7	1.3	2.7 [1.9; 3.6]		8.5 [6.9; 10.3]
Tuberculosis				6.0%	0.36 [0.13; 0.78]		
Diabetes mellitus				9.0%	2.1 [1.5; 2.9]		3.3 [2.7; 4.1]
Arthritis						1.66 [1.54; 1.80]	

CI, confidence interval; OR, odds ratio

psychosis has persisted for decades. The term describes a schizophreniform disorder or schizophrenia that develops as a reaction to the imprisonment itself and is said to have distinct symptoms from psychosis that occurs outside the prison environment (12).

The prevalence of attention deficit hyperactivity disorder (ADHD) in prisoners is notably higher than in the general population, and according to the results of a recent meta-analysis, 25.5% of all prisoners are affected (13, e27, e28). In a Swedish registry study, in a group of 25 565 documented persons with a diagnosis of ADHD, those who had received treatment were less likely to be offenders. Comparing phases

with and without treatment between patients showed that criminality rates were significantly reduced by 32% in men (estimated hazard ratio 0.68 [95% CI: 0.63; 0.73]) and 41% in women during periods on ADHD medication (estimated HR 0.59 [95% CI: 0.50; 0.70]) (14).

The fact that the suicide rate in prisoners compared with that in the general population is notably higher can be considered to be an expression of the psychosocial stress and increased mental vulnerability of prisoners (15–17). *Table 5* shows suicides in Germany. In 2000–2011, the suicide rate in male prisoners in German prisons was 5.6 times higher, and in

female prisoners 8.5% higher than in the general population (18). There is a consensus that suicide screening at admission into the penal system is an important measure for preventing prison suicide. Two German-language screening instruments are available for this purpose (19, e29, e30). Screening instruments systematically interrogate the known risk factors for suicide in prison; if the screening yields positive findings the prisoner will immediately be referred to specialist medical or psychological services.

Evidence based medical care for prisoners

Screening for communicable diseases and their treatment and prevention

The medical care of prisoners should correspond to general practice outside the penal system. This includes the provision of all screening examinations covered by the statutory health insurers. Prisoners' vaccination status at admission should be examined and their immunization should be updated according to the valid recommendations of the Standing Vaccination Committee (STIKO). Furthermore, at admission and during the further course of the imprisonment, all prisoners should be offered screening tests for HCV, HBV, HIV, and condoms should be made available free of charge (20). Prisoners who have a communicable disease should receive extensive care from a multiprofessional team in the setting of an intramural consultation and should be referred to specialized medical practices for infectious diseases after discharge (21).

A European comparison of infection prevention measures in the penal system in 2015 found substantial deficiencies in the implementation of valid WHO recommendations in all countries under study (none of the prisons under study provided needle exchange programs, and only some provided postexposure prophylaxis, disinfectants for sterilizing injection needles/syringes, and HBV vaccination); no German prisons were included in this study (22).

Studies of the practice of needle/syringe provision in the penal system have found a preventive effect for infection with hepatitis C and hepatitis B virus, as well as HIV. In a study in prisoners in Berlin, the practice of swapping needles fell from 71% to 11% after a needle/syringe program had been introduced (23). The fact that some prisons tolerated the use of illegal drugs that were injected with the needles/syringes that had been made available prompted political controversy and resulted in withdrawal of needle/syringe programs in most prisons (24).

Recent systematic studies of other measures for reducing the transmission risk for communicable diseases in Germany are not available, but an analysis of prescribing data of antiretroviral, tuberculostatic, and anti-HCV medication in German prisons imply that those infected with TB and HIV are being treated according to the estimated prevalence, whereas gaps prevail in the comprehensive availability of HCV treatment and substitution treatment in opiate addiction (25).

TABLE 3

Communicable diseases in the general population versus prison population in Germany

Infection	Population	Prisoners	Ratio
Hepatitis C	0.3% (e16)	14.3–20.6% (7, e8, e14)	1:48–69
Hepatitis B	0.3% (e16)	2.2–2.4% (6, 7)	1:7–8
HIV	0.1% (e15)	0.7–1.2% (7, e8)	1:7–12
Tuberculosis	7.2/100 000 (e13)	101.3/100 000 (e20)	1:14

Self-harming behavior, ingestion of foreign bodies, and hunger strikes

Self harming behavior is common in prisoners but less well studied as a phenomenon than suicidality. An epidemiological study of 26 510 Welsh prison inmates found self harming behavior in 5–6% of imprisoned men and 20–24% of imprisoned women (26). Injuries caused by cutting or scratching were the most common method used for self-harming, and suicide rates in this group was very high (men 450/100 000 [95% CI: 360–550/100 000], women 260/100 000 [95% CI: 140–430/100 000]). The presence of a mental disorder, especially depression, was associated with an increased probability of self-harming behavior (odds ratio in men 42.0, in women 23.7) (27). In studies of the causes of self-harming behavior in prisoners, the most commonly reported individual motivation for self-harm was a desire to regulate tension and interpersonal conflicts (28). In our experience, self-harm can also be observed in persons who experience their prison conditions as particularly stressful and express the desire to improve their situation by being transferred to another prison area.

Swallowing foreign bodies constitutes a particular form of self-harming behavior, which is well known in penal institutions worldwide. In Germany, rates of self-harming behavior have so far not been centrally documented; international studies reported a rate of 1:1900 prisoners for swallowing foreign bodies. Mostly, smaller foreign bodies are ingested, such as razor blades or paper clips (29). In most cases, narrow foreign bodies up to a length of 10 cm are evacuated naturally within a few days, without the need for invasive measures (30).

Hunger strikes as a form of protest have a long tradition in the penal system. Systematic studies have shown that 70–80% of hunger strikers in prisons end their abstinence from food after less than seven days (e31). A hunger period of 40 days is mostly tolerated without lasting damage in healthy hunger strikers; depending on the individual nutritional status at the start of the strike, continuous abstinence from food can lead to a life-threatening state after 6–10 weeks (e32). Prisoners who embark on a hunger strike should be presented to a specialist psychiatrist so as to rule out any—albeit rare—delusional motivation for refusing

TABLE 4

Psychiatric disorders in prisoners

	Konrad 2003 (e21)	Missoni et al. 2003 (e22)	von Schönfeld et al. 2006 (e23)	Müller- Foti et al. 2007 (e24)	Dudeck et al. 2009 (e25)	Schildbach 2010 (e26)
Methods	Cross-sectional study					
Group of prisoners	Imprisonment as substitute for financial fine	Remand	Prisoners	Imprisonment as substitute for financial fine	Prisoners	Imprisonment as substitute for financial fine
Diagnostic instrument	DIA-X	DIA-X	SKID I u. II	DIA-X	SKID I u. II	DIA-X
N	100	N = 107	N = 139. (63 women. 75 men)	N = 100	N = 102	N = 100 (Imprisonment as substitute for financial fine)
Psychiatric disorder according to ICD-10 in %						
Alcohol dependency and misuse	77	43	43.2	51.0	20.6	34
Nicotine dependency	64	36	N/A	86	N/A	55
Polytoxicomania	20	14	30.2	66	8.8	40
Isolated phobia	39	14	6.4	73	13.8	43
Dysthymia	21	14	6.5	11	0	11
Recurrent depressive disorder	20	40	12.9	11	3.9	15
Psychotic disorders (of which schizophrenia)	10	6	7.9 (4.3)	4	0	0
Personality disorder (of which dissocial)	N/A	N/A	53.2 (31.7)	N/A	79.8 (72.7)	N/A

DIA-X, *Diagnostisches Expertensystem für psychische Störungen* [Composite International Diagnostic Interview]; N/A, not available; SCID-I and SCID-II, structured clinical interview for DSM-IV

TABLE 5

Suicide rates in prisons in Germany in 2000–2011 compared to residential population (18)

	Residential population	Prisons (total)	Prisons (imprisonment)	Prisons (remand)
Men				
Rate/100 000	18.9	105.8	55.8	291.5
Women				
Rate/100 000	6.4	54.7	22.9	136.4

food intake. In case of a lengthy hunger strike, the threat arises of a conflict between the legal options, of force feeding according to valid penal law enforcement and the fact that force feeding is prohibited according to medical ethics and the professional code—for example, that of the World Medical Association (WMA) (e33). No centralized data collection of hunger strikers exists in the German penal system. As far as we are aware, no fatal outcomes of hunger strikes have been reported in Berlin and Brandenburg in the past 10 years.

Addiction medicine

In 2016, 6415 persons—12.6% of all prison inmates—were incarcerated in penal institutions because of offenses against the German Narcotic Drugs Act (*Betäubungsmittelgesetz*, BtMG). The number of prisoners with opiate addiction, however, should be considered to be notably greater (e34). In the representative cross-sectional study of German prison inmates conducted by the Robert Koch-Institute in 2006–7, a third (29.7%) reported ever having injected drugs, 37.7% answered in the affirmative to the question of whether they had ever consumed heroin, 22.7% reported consuming drugs inside and outside penal institutions, 12.5% reported consuming drugs only outside and 2.5% only inside (7). Systematic studies of which drugs make their way into Germany's prisons, and how they do so, do not exist.

In our experience, all illegal drugs are offered in Germany's penal institutions on the internal black market. Payment is either completed by persons outside the prison or within the internal black market by means of payment in kind, prostitution, cigarettes, or coffee. It can be assumed that the substances are mostly imported by visitors, occasionally prison staff. Alcohol in the form of fermented carbohydrate-containing foods is mostly produced by the inmates

themselves. According to our own clinical experience, the alcohol content of these products can be up to 10 volume percent. Occasionally, inmates consume medicinal alcohol in the shape of disinfectant sprays or hand disinfectants that contain highly concentrated ethyl alcohol but also propyl alcohol, which is far more intoxicating (e35).

Guideline-conform treatment of addiction-specific disorders in the penal system is hampered by the lacking free access to outpatient addiction services. Because medical parameters in the prison health system are not centrally collected, no data are available in this area either. According to the German Monitoring Centre for Drugs and Drug Addiction (*Deutsche Beobachtungsstelle für Drogen und Drogensucht*, DBDD), in 2016, 80% of opiate-dependent women were treated during their prison sentence, but only a quarter of the imprisoned men with opiate dependency (e36).

Because proportions of prisoners with dependency/addiction disorders are high, opiate and alcohol withdrawal symptoms are often observed at the start of the prison sentence. Qualified withdrawal treatment should be provided as a matter of principle (31). In systematic reviews, substitution treatment with methadone or buprenorphine has been found to be superior to abstinence-oriented treatment in opiate dependency addiction (e37). For this reason, and also because of the described protective effect against infections, ongoing opiate substitution treatment at the start of a prison sentence should be continued without complications, and where the indication exists, opiate substitution treatment during the prison sentence should be easily accessible at all times (32).

Preparation for discharge and interface management

Retrospective cohort studies have found above average mortality in discharged prisoners (33). In the decade 1999 to 2009, Binswanger et al. found in a cohort of 70 208 discharged prisoners that the risk of dying was 3.6% [95% CI: 3.48%; 3.73%] higher than in the general population. Drug intoxication, using opioids in 77% of cases, was the leading cause of death in discharged prisoners (34, 35). Most deaths from overdose occurred within the first four weeks after discharge from prison (relative risk 1.7 [95% CI: 1.3; 2.2]) (36). In a retrospective analysis of the cause of death statistic in 16 453 Australian prison inmates, continuing opioid substitution treatment was associated with the lowest risk of death from drug intoxication (37). In awareness of these risks, services providing treatment for infectious diseases and psychiatric-addiction disorders in German penal institutions should prepare the transition into an outpatient treatment setting (38, 39). In an international systematic review, the development of 12 056 offenders with psychiatric disorders was studied. The rate of criminal relapse of 4484/100 000 was lower than that of a comparable group of prison inmates without psychiatric follow-up care (40).

Key messages

- Medical services for prisoners require intensive collaboration between doctors of different specialties.
- An above average proportion of prisoners has infections, whose guideline-conform treatment constitutes an effective measure for reducing the rate of infections in the relevant general population.
- Deficits exist in addiction medicine services for prisoners.
- Because of the high rates of mental disorders in prison inmates, psychiatric specialist knowledge is obligatory for all doctors working in the penal system.
- The medical indication for substitution treatment for prisoners with opiate addiction in the penal system is at odds with the judicially/politically favored concept of drug-free penal institutions.

Conflict of interest statement

The authors declare that no conflict of interest exists.

Manuscript received on 12 February 2018, revised version accepted on 12 July 2018.

Translated from the original German by Birte Twisselmann, PhD.

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► **Supplementary material**

For eReferences please refer to:
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Supplementary material to:

Medicine in the Penal System

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Dtsch Arztebl Int 2018; 115: 808–14. DOI: 10.3238/arztebl.2018.0808

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