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Substance abuse and dependence in prisoners: a systematic review

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ABSTRACT

Aims To review studies of the prevalence of substance abuse and dependence in prisoners on reception into custody. **Design and method** A systematic review of studies measuring the prevalence of drug and alcohol abuse and dependence in male and female prisoners on reception into prison was conducted. Only studies using standardized diagnostic criteria were included. Relevant information, such as mean age, gender and type of prisoner, was recorded for eligible studies. The prevalence estimates were compared with those from large cross-sectional studies of prevalence in prison populations. **Findings** Thirteen studies with a total of 7563 prisoners met the review criteria. There was substantial heterogeneity among the studies. The estimates of prevalence for alcohol abuse and dependence in male prisoners ranged from 18 to 30% and 10 to 24% in female prisoners. The prevalence estimates of drug abuse and dependence varied from 10 to 48% in male prisoners and 30 to 60% in female prisoners. **Conclusions** The prevalence of substance abuse and dependence, although highly variable, is typically many orders of magnitude higher in prisoners than the general population, particularly for women with drug problems. This highlights the need for screening for substance abuse and dependence at reception into prison, effective treatment while in custody, and follow-up on release. Specialist addiction services for prisoners have the potential to make a considerable impact.

Keywords Alcohol dependence, drug dependence, prisoner, substance dependence, systematic review.

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INTRODUCTION

The relationship between offending and substance misuse has been demonstrated in a variety of criminal justice and medical settings. Recently, associations between individuals with a clinical diagnosis of substance abuse and subsequent violent offending have been shown in a large prospective study of patients leaving hospital [1] and in a national study of all psychiatric patients discharged into the community [2]. Estimates of the burden of substance abuse and dependence in the criminal population would therefore be useful to inform service developments and public health interventions. In particular, information on the prevalence of substance abuse and dependence in prisoners would be important, as there is scope for initiating treatment while in custody and encouraging contact with community services on release. Prison may provide the only opportunity that a marginalized population has to engage with treatment services.

A large number of studies have estimated the prevalence of substance misuse in this population, with prevalence estimates varying widely [3–7]. For example, there is a sixfold variation in reported alcohol problems, and a two- to threefold variation in the prevalence of substance dependence. This variation in prevalence is likely to be at least partly a consequence of the cross-sectional nature of some of these prison surveys and the varying availability of substances in a particular prison over a specific time period. Other possible reasons for the wide variability in prevalence estimates include differences in substance abuse habits over time and across countries in the community, and similar changes in criminal justice procedures including sentencing policies for individuals with drug-related offences. Previous surveys have also used different diagnostic criteria, such as the Michigan Alcoholism Screening Test (MAST) [8–10], 'hazardous drinking' [3] and life time use [11,12]. Possible reasons for the wide variety in prevalence in other studies of inmate sub-

stance abuse include the use of selected samples and self-report measures.

As there have been no recent reviews of substance use in prisoners, we have conducted a systematic review of the prevalence of substance abuse and dependence in prisoners on reception into prison, as this may enable estimates of appropriate provision of treatment services in custody and for the planning of throughcare services on release into the community. We included only studies that reported standardized diagnostic criteria for substance abuse. Results were subdivided by sex, type of disorder (e.g. drug or alcohol dependence) and type of prisoner (remand/detainee or sentenced). We have also presented a review of large cross-sectional studies by way of comparison.

METHOD

We identified surveys of the prevalence of any alcohol or drug abuse and dependence in general prison populations published between January 1966 and January 2004. We searched using computer-based literature indexes (EMBASE, PsycInfo, Medline, US National Criminal Justice Reference Abstract database, European Monitoring Centre for Drugs and Drug Addiction database) and scanned relevant reference lists. We used combinations of keywords relating to substance misuse (e.g. substance*, alcohol, drug*, misuse, dependen*, abuse) and to prisoners (e.g. inmate, sentenced, remand, detainee, felon, prison*).

Articles not written in English were translated. We included studies reporting diagnoses of substance abuse and dependence within the last year and who sampled prisoners within 3 months of arrival into prison. We also included only those studies with diagnoses made by clinical examination or by interviews using validated diagnostic instruments; surveys using self-report measures only [13–15] or biological markers only (e.g. hair analysis) were ineligible [16,17]. While studies reporting only life-time prevalence [11,12] were excluded, studies measuring the comorbidity of substance dependence with other psychiatric disorders were included [18–22].

Large cross-sectional prison studies (> 500 prisoners) fulfilling the other inclusion criteria were included for comparison [3,5,23–26]. A number of smaller cross-sectional studies were thus excluded [12,27–33].

There were a number of other reasons for exclusion: (1) failure to include the whole prison population or a random sample of this population [34–36]; (2) reporting of retrospective substance use while in prison in post-release prisoners [37,38]; (3) reporting estimates from only prisoners selected for assessment or treatment of substance dependence [39,40]; (4) reporting of combined results for men and women [10]; (5) reporting of combined estimates for alcohol and drug misuse [41,42]; (6) greater than 50% non-participation [43]; (7) measuring solely injectable substance use [36,39,44]; and (8) lack of standardized criteria or unclear definitions regarding either substance abuse or dependence [35,45–65]. A group of studies examining the prevalence of drug dependence as part of the Arrestee Drug Abuse Monitoring programme in the United States was excluded for this latter reason [13,14]; (9) one 1985 study that used diagnostic criteria according to the International Classification of Diseases, version 8 [66]. Sensitivity analyses demonstrated large heterogeneity between this and the others (e.g. for drug dependence in women the prevalence was 3% in this study versus 30–60% in the others); (10) use of a hierarchy of exclusive diagnoses, giving a principal diagnosis for each individual [67]. This was deemed unsuitable as it did not account for the comorbidity of mental disorders and substance dependence.

For every eligible study, SF and PB independently extracted information on geographical location, year of interview, number of prisoners included, type of prisoner, response rate, diagnostic instruments and criteria, type of interviewer, number diagnosed with substance abuse, dependence and abuse/dependence. This included abuse and dependence on alcohol and other psychoactive drugs, e.g. benzodiazepines, cannabis, cocaine and opiates. A fixed protocol was used to determine these variables; any discrepancies were resolved by further review. Clarifications were sought by correspondence with authors of relevant studies.

Where possible, prisoners were categorized as either remand (detainees) or sentenced (felons). Some studies contained subjects from either group and were therefore labelled as mixed studies.

Overall heterogeneity was calculated using Cochran's Q and the I^2 statistic. Values of I^2 higher than 75% are considered to be high, and preclude combining data in a meta-analysis [68]. Potential sources of heterogeneity were investigated further by arranging groups of studies according to potentially relevant characteristics and by performing Cochran χ^2 tests.

RESULTS

Reception studies

The final sample consisted of 13 studies. The details of these studies are summarized in Table 1. The studies included a total of 7563 prisoners: 4293 men (57%) and 3270 women (43%). The average age of subjects was 30.4 years (based on information from 10 studies, 6052 prisoners). Of the 4177 prisoners with criminological information, 606 (14.5%) were either charged or convicted with a violent offence. There were more sentenced prisoners (3105; 41%) than remand prisoners (2548;

34%). Four studies included both sentenced and remand prisoners (total $n = 1910$; 25%) (mixed studies). Two surveys (1220 prisoners) [18,69] were published before 1990. Prisoners in the included studies were primarily from the United States (6635 prisoners; 88%) [18,19,21,22,69–73], with the remainder being from the United Kingdom (548 prisoners; 7%) [4], Ireland (280 prisoners) [20,74] and New Zealand (100 prisoners) [75].

There were a number of different sampling techniques used. Some studies used simple random sampling (2310 prisoners) [19,20,70,71,74], some used stratified random sampling (2000 prisoners) [21,22] and others used the inclusion of all consecutive new receptions into prison (2448 prisoners) [4,18,69,72,73,75]. One study used a combination of these techniques (805 prisoners) [19]. The reported response rate was 100% in three studies (693 prisoners) [4,18,20]. The other surveys all had reported response rates of above 75% (6870 prisoners).

In two surveys, diagnoses of alcohol or drug abuse/dependence were made entirely using clinical interviews (783 prisoners) [4,74]. However, the majority featured trained interviewers using validated, structured instruments. Instruments used included the Structured Clinical Interview for the Diagnostic and Statistical Manual (380 prisoners) [73], the Diagnostic Interview Schedule (5550 prisoners) [18,21,22,69–72,75], the Schedule for Clinical Assessment in Neuropsychiatry (45 prisoners) [20] and the Composite International Diagnostic Interview (805 prisoners) [19].

The prevalence estimates of substance abuse and dependence are summarized in Table 2. The estimates, with 95% confidence intervals, are shown by gender in Fig. 1.

Men

Alcohol abuse/dependence

Seven surveys of alcohol abuse/dependence in men included a total of 4141 prisoners [4,21,22,69,71,73–75]. Prevalence estimates of alcohol abuse/dependence in male prisoners ranged from 17.7 to 30.0%, with much heterogeneity among these estimates ($\chi^2_6 = 43.5$, $P < 0.001$; $I^2 = 86\%$).

Drug abuse/dependence

We identified eight surveys that reported on drug abuse/dependence in male prisoners [4,21,69,71–75]. Prevalence estimates of drug abuse/dependence in male prisoners ranged from 10.0 to 48.0%, with there being substantial heterogeneity among these estimates ($\chi^2_7 = 314.5$, $P < 0.001$; $I^2 = 98\%$).

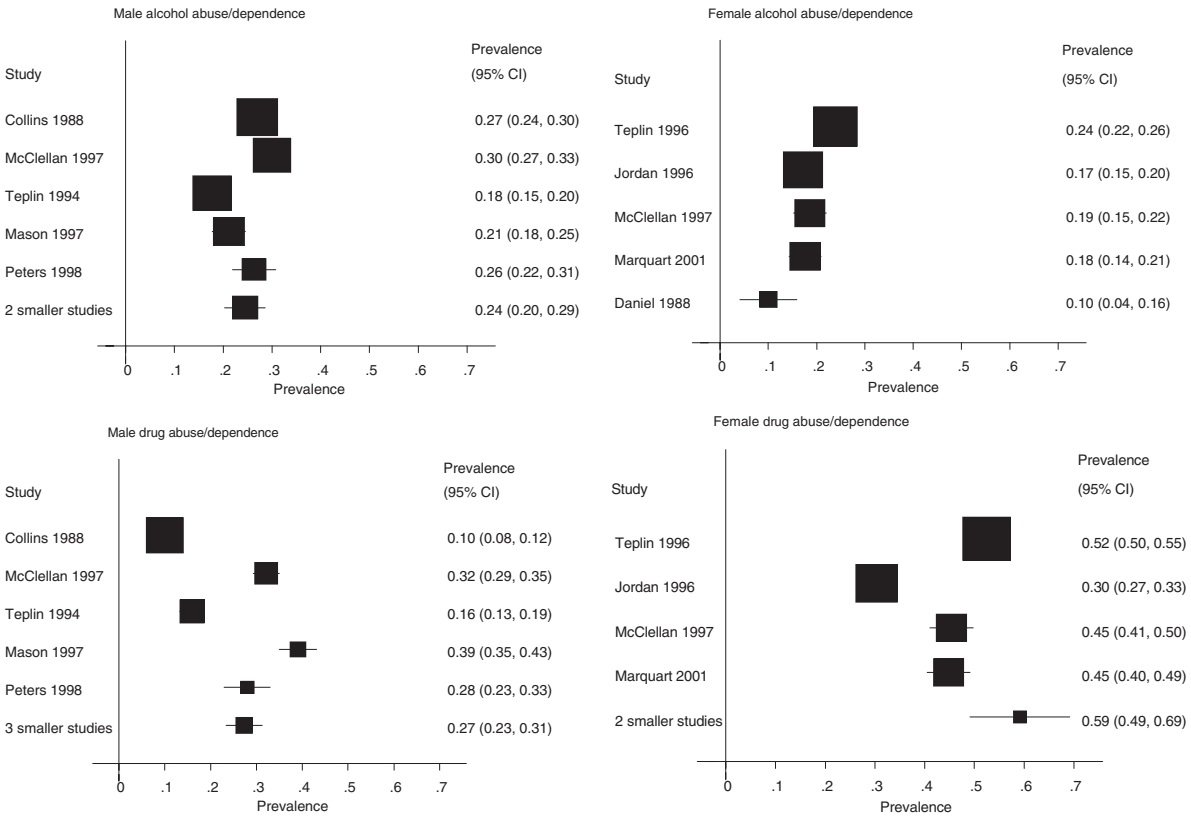

Figure 1 Prevalence of alcohol and drug abuse/dependence in male and female prisoners on reception into prison

Table 1 Details of reception studies of prisoners.

Study	*Country*	*Population*	*Sampling strategy*	*Sampling method*	*Instrument criteria*	*Diagnostic criteria*	*Mean age (years)*	*Age range*	*Psychiatric interviewer*	*Mean duration in prison*	*Type of prisoner*	*No. committed violent offences*	*No. not consenting*
Bushnell [75]	New Zealand	Medium/ maximum security male prison, Christchurch	Consecutive new arrivals over 3 months	Consecutive sampling at reception	DIS	DSM-III	28.2	SD 8.3	N	Not stated	Mixed	Not stated	6
Collins [69]	USA	North Carolina prisons	All males admitted March–June 1983	Consecutive new arrivals at reception	DIS	DSM-III	27.6	Not stated	N	Not stated	Sentenced	157	117
Daniel [18]	USA	Missouri Correctional Classification Center	Consecutive arrivals over 7 months	Consecutive sampling at reception	DIS	DSM-III	29	SD 8.2	N	Not stated	Sentenced	21	0
Jordan [19]	USA	Correctional Institution for Women, Raleigh, NC	All sentenced incoming prisoners in 1991–92	Combined consecutive and random sampling	CIDI	DSM-IIIR	31.5	18–65	Y	5–10 days	Sentenced	98	42
Lo [72]	USA	Cuyahoga County Jail, Cleveland, USA	All sentenced incoming prisoners in 1997–98	Consecutive sampling	DIS	DSM-IV	30	18–58	N	Not stated	Sentenced	Not stated	29
Marquart [70]	USA	Texas Department of Criminal Justice, institutional division	All female prisoners admitted in 1994	Simple random sampling	DIS	DSM-IV	32.3	17–63	N	1 day	Sentenced	68	72
Mason [4]	England	Durham Remand prison for men	All remands over 7 months	Consecutive sampling at reception	Clinical interview	DSM-IV	Not stated	Not stated	Y	Not stated	Remand	Not stated	0

McClellan [71]	USA	Prison unit for men and reception centre for women, Texas	All newly admitted inmates	Simple random sampling	DIS	DSM-III	32.8 male 32.3 female	Not stated	N	Not stated	Mixed	Not stated	202
Mohan [20]	Ireland	Mountjoy Prison, Dublin	Consecutive new arrivals over 3 months	Simple random sampling	SCAN	DSM-IV	25.8	17–48	Y	Not stated	Mixed	0	0
Peters [73]	USA	Holliday Transfer Facility, Texas	Consecutive new arrivals in 1996	Consecutive sampling at reception	SCID IV	DSM-IV	32.6	SD 10.2	Y	14–60 days	Sentenced	61	100
Smith [74]	Ireland	Mountjoy Prison, Dublin	All new arrivals in 1992–93	Simple random sampling	Clinical interview	DSM-III-R	Not stated	Not stated	Y	1 day	Mixed	Not stated	2
Teplin [21]	USA	Cook County Department of Corrections, Chicago	All remands 1983–84	Stratified random sampling	DIS	DSM-III-R	Not stated	Not stated	Not stated	Not stated	Remand	Not stated	35
Teplin [22]	USA	Cook County Department of Corrections, Chicago	All remands 1991–93	Stratified random sampling	DIS	DSM-III-R	28	17–67	N	Not stated	Remand	201	59

Table 2 Prevalence estimates of substance abuse and dependence in reception studies of prisoners.

Study	*Total no.*	*% male*	*No. with alcohol abuse/dependence*	*No. with drug abuse/dependence*	*Prevalence of alcohol abuse/ dependence (%)*	*Prevalence of drug abuse/ dependence (%)*
Bushnell [75]	100	100%	14	19	14.0	19.0
Collins [69]	1120	100%	302	112	27.0	10.0
Daniel [18]	100	0%	10	_	10.0	–
Jordan [19]	805	0%	244	138	30.3	17.1
Lo [72]	152 males 48 females	76%	–	73 males** 29 females**	–	Males 48.0 Females 60.4
Marquart [70]	500	0%	88	224	17.6	44.8
Mason [4]	548	100%	116	214	21.2	39.1
McClellan [71]	1030 males 500 females	67%	309 males** 93 females**	331 males** 227 females**	Males 30.0 Females 18.6	32.1 45.4
Mohan [20]	45	0%	–	26**	–	57.8
Peters [73]	400	100%	86	100	21.5	25.0
Smith [74]	235	100%	46**	63**	19.6	26.8
Teplin [21]	728	100%	116	129	15.9	17.7
Teplin [22]	1272	0%	667	304	52.4	23.9

**Figures for dependence only were given.

Women

Alcohol abuse/dependence

There were five identified studies which measured alcohol abuse/dependence in female prisoners [18,19,22,70,71]. The estimates of prevalence ranged from 10.0 to 23.9%, with heterogeneity between studies being large ($\chi^2_4 = 24.9$, $P < 0.001$; $I^2 = 84\%$).

Drug abuse/dependence

Six relevant studies on drug abuse/dependence in female prisoners were identified [18–20,22,70–72]. The prevalence estimates ranged from 30.3 to 60.4%, with the heterogeneity between these studies being substantial ($\chi^2_5 = 106.2$, $P < 0.001$; $I^2 = 95\%$).

Sources of heterogeneity

The heterogeneity between studies was very large, with I^2 values between 84 and 98%. Therefore, it was not appropriate to combine these data in a meta-analysis. Potential sources of heterogeneity were explored to assess consistency across gender and type of abuse/dependence (Table 3). The only consistent finding was that studies conducted by psychiatrists tended to give lower prevalence estimates of substance abuse/dependence than studies where the interviewer was not a psychiatrist.

Cross-sectional studies

Six cross-sectional studies were included for comparison (Table 4) with a total of 10 292 prisoners. Prisoners in the included studies were from England and Wales, Canada, New Zealand and United States. Studies included various categories of prisoner, and all but one used standardized instruments. All considered current substance use, which was defined from the last month to the last year. Prevalence estimates varied widely. For alcohol abuse and dependence in men, the estimates ranged from 2.0 to 14.9% and in women from 2.5 to 6.9%. The estimates for drug dependence varied from 3.6 to 47.2% in men and from 3.7 to 44.1% in women. These estimates are compared with the estimates from the reception studies in Table 5.

DISCUSSION

This review surveyed research from four countries with a total of 7563 prisoners interviewed on entering custody. We found significant variation in the estimates of prevalence of substance abuse and dependence. There may be a number of reasons for this heterogeneity, such as differences in study design. Some heterogeneity between studies was also explained by factors in the study design, such as whether or not the interview was conducted by a psychiatrist. Estimates of prevalence tended to be lower where interviews were conducted by a psychiatrist rather than a trained interviewer. Furthermore, sensitivity analyses indicated that the prevalence estimated from surveys giving a combined category of abuse/dependence tended to be different from those reporting dependence alone. This was particularly marked for drug diagnoses in men and suggests the need for more precise definitions of substance abuse and dependence to be employed in future prison

Table 3 Sources of heterogeneity in studies of the prevalence of substance abuse and dependence in prisoners.

	Male prisoners		*Female prisoners*	
Source of heterogeneity	*Prevalence of alcohol abuse/dependence*	*Prevalence of drug abuse/dependence*	*Prevalence of alcohol abuse/dependence*	*Prevalence of drug abuse/dependence*
US prison	26%	25%	20%	45%
Non-US	22%	31%	No studies	58%
Difference	+4%	−6%	NA	+13%
Psychiatrist interviewer	24%	25%	17%	32%
Non-psychiatrist	28%	27%	21%	49%
Difference	−4%	−2%	−4%	−17%
Remand prisoner	19%	39%	24%	49%
Sentenced	27%	27%	17%	39%
Difference	−8%	+12%	+7%	+10%
Combined abuse/dependence	18%	16%	21%	44%
Only dependence	27%	32%	16%	46%
Difference	−9%	−16%	+5%	−2%

research so that more reliable estimates of prevalence can be made.

Whether the survey included remand or sentenced prisoners also accounted for some variation in prevalence but not in a consistent way. These factors may need consideration in the design of further studies. However, it is possible that the heterogeneity between studies may be due to inherent differences in patterns of drug abuse and dependence in diverse prison populations. Nevertheless, the review provides a range of prevalence estimates that may be useful for service planning and provision, and have a number of important implications.

First, these prevalence estimates are orders of magnitude higher than those noted in general population surveys. Compared with figures for the general population of the United States of similar age, male prisoners have a slight excess of alcohol dependence and a two- to 10-fold excess of drug dependence [76]. Figures for female prisoners suggest that the difference with the general population is more marked—prisoners have a two- to fourfold excess of alcohol dependence and at least a 13-fold increase in drug dependence [76].

Secondly, the figures for substance dependence in female prisoners are of particular concern. As noted above, the relative excess compared with the general population is greater in women than men, and in addition the prevalence estimate range of drug abuse and dependence is higher in female prisoners than in males. This suggests that priority of service provision in this respect should be made for female prisoners.

Thirdly, as research has indicated that substance misuse is a risk factor for suicide within custody [77] and on leaving prison [78], treatment for such problems should be considered as part of a suicide prevention strategy in custody. Finally, the range of prevalence estimates in reception studies was higher than it was in cross-sectional studies, especially for alcohol abuse and dependence. This implies that estimating the burden of substance use problems from cross-sectional studies may underestimate the extent of treatment needs.

Substance dependence in prisoners has been of concern for many decades. In 1998, the UK government Home Office launched the National Drugs Strategy, which is a 10-year government initiative looking at ways to prevent and treat substance misuse [79] through the development of legislature and policy. In particular, it aims to increase the participation of problem drug users, including prisoners, in drug treatment programmes. Subsequently, Arrestee Drug Abuse Monitoring programmes have been implemented recently in England [80] and CARATS (Counselling, Assessment, Referral, Advice and Throughcare) workers have been introduced to support prisoners with substance misuse problems, linking them with outside agencies post-release. However, provision for substance dependent prisoners and treatment protocols currently vary considerably between different establishments, particularly regimens for detoxification and policies for maintenance prescribing. The management of prisoners with alcohol dependence is often particularly limited to detoxification, with little psychological input or provision of aftercare. Our findings suggest that there is a role for thorough screening of prisoners at reception for substance abuse and dependence and for appropriate treatment facilities, both within the prison and on release by provision of appropriate throughcare, e.g. continuing maintenance prescribing and relapse prevention work. Entry into prison may provide the only contact some individuals have with sub-

Table 4 Details of, and prevalence estimates from, included cross-sectional studies larger than 500 prisoners.

Study	*Year*	*Country*	*Population*	*Sampling strategy/method*	*Instrument*	*Diagnostic criteria*	*Type of prisoner*	*Total no.*	*Prevalence of alcohol abuse/ dependence (%)*	*Prevalence of drug abuse/ dependence (%)*
Brooke [5]	1998	England	13 male prisons, 3 YOIs, 3 female prisons in England and Wales	All subjects on remand in all prisons Stratified random sampling	Clinical interview	ICD-10	Remand	544 males 206 young offenders 245 females	Males 14.9 Females 6.9	Males 19.3 Females 29.4
Maden [6]	1990	England and Wales	17 male, 3 female prisons and 8 YOIs in England and Wales	All sentenced inmates in all included institutions Stratified random sampling	CIS	ICD-9	Sentenced	1365 males 273 females, 404 young offenders	Males 8.6 Females 4.4	Males 9.2 Females 24.2
Motiuk [24]	1991	Canada	All penitentiaries across Canada	All male inmates in 45 settings across Canada Stratified random sampling	DIS	DSM-III	Sentenced	2185 males	Males 9.8	Males 13.1
Robins [25]	1991	USA	All correctional facilities in New Haven, Baltimore, Durham and Los Angeles	All inmates in prisons in New Haven, Baltimore, St Louis, Durham and South Los Angeles Either whole population used or simple random sampling	DIS	DSM-III	Mixed	676 males and females	Males and Females 26.4	Males 19.5 Females 44.9
Simpson [26]	1999	New Zealand	All prisons in New Zealand	All subjects in all prisons Stratified random sampling	CIDI-A	DSM-IV	Mixed	1090 males 162 females	Males 2.0 Females 2.5	Males 3.6 Females 3.7
Singleton [3]	1998	England and Wales	131 prison establishments in England and Wales	All inmates in all institutions in England and Wales Stratified random sampling	SCAN AUDIT	ICD-10	Mixed	2371 males 771 females	–	Females: 44.1** Males 47.2**

**Figures for dependence only.

Table 5 Comparison of range of prevalence estimates in reception and cross-sectional studies.

Prisoner gender	*Type of substance abuse/dependence*	*Range of prevalence estimates from reception studies (%)*	*Range of prevalence estimates from cross-sectional studies (%)*
Men	Alcohol	17.7–30.0	2.0–14.9
	Drug	10.0–48.0	3.6–47.2
Women	Alcohol	10.0–23.9	2.5–6.9
	Drug	30.3–60.4	3.7–44.1

stance misuse workers. These results may also imply a need for further structured input from specialist addiction services in prison. This would conform with recommendations made by the Department of Health proposing an equivalence of care in the treatment of physical and mental illness in prisoners and the general population [81,82].

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