Prevalence of severe mental illness among people in prison across 43 countries: a systematic review and meta-analysis

Christina Emilian, Noura Al-Juffali, Seena Fazel

Summary

Background Prison populations have been increasing worldwide. Previous studies suggest that there is a high burden of psychiatric morbidity in people in prison, but, to our knowledge, the last published meta-analysis of prevalence is more than a decade old. We aimed to describe the pooled prevalence of depression, psychosis, bipolar disorder, and schizophrenia spectrum disorders for people who are incarcerated.

Methods In this updated systematic review and meta-analysis, we searched six databases and grey literature published from database inception until Aug 8, 2024, with no language or geographical restrictions. We included primary quantitative studies that reported the prevalence of depression and psychotic disorders in the unselected prison population, based their diagnoses on clinical examination or from interviews and by the use of validated diagnostic instruments, met standardised criteria of the ICD or the Diagnostic and Statistical Manual of Mental Disorders for the diagnoses, and provided pooled prevalences for psychosis in the previous 6 months and clinical depression in the previous 2 weeks to 1 month. We excluded studies that used selected samples or were only qualitative. We investigated bipolar and schizophrenia spectrum disorders as separate diagnostic subcategories. We synthesised studies using random-effects meta-analysis and explored heterogeneity with meta-regression and subgroup analyses. The protocol is registered with PROSPERO, CRD42022378568.

Findings We identified 131 publications reporting the prevalence of mental illness in 58 838 people in prison in 43 countries. We estimated that the prevalence of depression was 12·8% (95% CI 11·1–14·6) and for any psychosis was 4·1% (3·6–4·7). For diagnostic subcategories, we found that the prevalence of bipolar disorder was 1·7% (1·0–2·6) and schizophrenia spectrum disorders was 3·6% (1·3–7·1). Between-study heterogeneity was substantial for these estimates (I^2 69–97%) with few explanations. However, subgroup analyses revealed that people in prison in low-income and middle-income countries had higher prevalences for depression (16·7% [95% CI 13·6–20·0]) than in high-income countries (10·8% [9·0–13·0]), and that, for people with psychosis who are incarcerated, psychiatrists were less likely to diagnose (3·5% [2·8–4·3]) than were non-psychiatrists (4·7% [3·9–5·5]).

Interpretation Our study indicates that the prevalence of severe mental illness in people who are incarcerated worldwide is considerable. Meeting the treatment needs of people in prison who have mental ill health remains an ongoing challenge for public mental health. More evidence on how to improve the assessment, treatment, and linkage to services on release, which will require more research-friendly prison services, is now needed.

Funding None.

Lancet Public Health 2025; 10: e97–110

Department of Psychiatry, University of Oxford, Oxford, UK (C Emilian MSc, N Al-Juffali PhD, Prof S Fazel MD)

Correspondence to: Prof Seena Fazel, Department of Psychiatry, University of Oxford, Oxford OX3 7JX, UK
seena.fazel@psych.ox.ac.uk

Introduction

More than 11·5 million people are imprisoned worldwide, including about 1·8 million in the USA and around 90 000 in the UK.[1] The global prison population has increased by around a third of a million in the past year (2023–24).[1] Previous research has shown that mental illnesses are prevalent in prison populations and are more frequent than in people of a similar age living in the community. People who are incarcerated who have untreated mental health disorders are at increased risk of self-harm and suicide attempts,[2] mortality, and recidivism.[3] However, to our knowledge, the most recent meta-analysis[4] of severe mental illness in people who are incarcerated across all countries was completed in 2011 and needs updating because there have been many new primary studies, especially from low-income and middle-income countries (LMICs), which comprise about 70% of the world's total prison population.[1] In addition, changing demographics and increasing overcrowding within prisons have been reported in some jurisdictions. Furthermore, previous reviews have not examined individual diagnostic groups for severe mental illness, for which specific treatments now have robust evidence.

We aimed to systematically appraise and synthesise research evidence on severe mental illness in unselected prison populations. Compared with previous reviews in which psychoses were combined, our synthesis also aims to estimate bipolar disorder and schizophrenia spectrum disorders separately.

Research in context

Evidence before this study

We searched MEDLINE, Embase, Web of Science, PsycInfo, Global Health, and Scopus for studies published between database inception and Aug 8, 2024, without language restrictions, to identify studies reporting the prevalence of severe mental illnesses in the unselected prison population. We identified 46 reviews and meta-analyses that examined the prevalence of mental illness in people in incarceration. 20 studies examined a single country (ie, Canada, Ethiopia, Greece, France, Iran, Ireland, India, or the USA) and of those that were not based on a single country, eight were on high-income countries (HICs), three on low-income and middle-income countries (LMICs), and one was regional (Africa). There were 14 reviews, two of which were meta-analyses, based on worldwide studies, but the last meta-analysis, to our knowledge, was published in 2012. It showed a prevalence of 4% for psychosis and 11% for depression in people in incarceration, with some of the heterogeneity explained by country income level (LMICs reported higher morbidity than for HICs) and the use of the Diagnostic and Statistical Manual of Mental Disorders (DSM) for diagnoses (studies based on DSM criteria reported higher prevalences for depression than did those using the ICD). We identified no meta-analyses of bipolar and schizophrenia spectrum disorders as distinct diagnostic categories, and their contribution to the burden of mental illness in people who are incarcerated is uncertain.

Added value of this study

This updated systematic review and meta-analysis represents the most comprehensive study to date, synthesising 131 studies from 58 838 people who are incarcerated across 43 countries over a five-decade period. We found that the pooled prevalence of depression in the unselected prison population was 12·8% and that of psychosis was 4·1%. For the first time, we report pooled prevalence estimates for bipolar disorder of 1·7% and schizophrenia spectrum disorders of 3·6%. Our findings also indicate a high degree of between-study heterogeneity, which was expected given the diversity of included jurisdictions and prison systems. Subgroup and meta-regression analyses indicated that people who are incarcerated in LMICs had higher rates of depression than did those in HICs and that psychiatrists were less likely than non-psychiatrists to diagnose people in incarceration with psychosis, but provided few other explanations for the observed heterogeneity.

Implications of all the available evidence

Our study provides a substantial body of literature across multiple countries and regions that indicate a high burden of severe mental illness among people in incarceration. New primary studies on prevalence in HICs are unlikely to yield clear additional value. However, in LMICs, the reported heterogeneity in findings suggests that more research is required to understand these differences, and national and local studies might usefully inform service planning. Future research should focus on how to better treat these illnesses, including for people at the earlier stages of the criminal justice system and people on release.

Methods

Search strategy and selection criteria

In this systematic review and meta-analysis, we included observational studies that: (1) reported the prevalence of depression, psychosis, bipolar disorder, or schizophrenia spectrum disorders or provided sufficient information to calculate their prevalences; (2) sampled the study population from the unselected prison population; (3) based diagnosis either on clinical examination or from interviews and by use of validated diagnostic instruments; (4) met standardised criteria for the diagnoses of the respective mental illness based on current or previous versions of the ICD or Diagnostic and Statistical Manual of Mental Disorders (DSM); and (5) provided the prevalence for psychosis in the previous 6 months and clinical depression in the previous 2 weeks or 1 month, depending on the study (ie, excluding studies reporting solely lifetime diagnoses). Studies were excluded if they: (1) used selected samples (eg, populations sampled by offence type or age, or studies on people who were incarcerated or detained in health-care settings); (2) were solely qualitative; and (3) were non-primary studies, such as systematic or scoping reviews.

See Online for appendix

We systematically searched six electronic databases (MEDLINE, Embase, PsycInfo, and Global Health via Ovid, and Scopus and Web of Science) using controlled search terms for papers published from database inception until Aug 8, 2024, with no language or geographical restrictions. The search terms used for each database search are presented in the appendix (pp 2–5). In addition, we screened the citations from the reviews that were identified during the database search. We also searched grey literature using Google (appendix p 5). Retrieved titles and abstracts were uploaded to Rayyan and independently screened by two researchers (CE and NA-J) double-blind (ie, two researchers assessed each paper) according to inclusion and exclusion criteria. Remaining papers were subsequently double screened in full text. In case of disagreement, consensus on inclusion or exclusion was reached by discussion by CE and NA-J; the κ coefficient between both reviewers was 0·81 indicating almost perfect agreement.[5]

The protocol for this systematic review and meta-analysis, available online,[6] and findings are reported following the PRISMA guidelines.[7] We deviated from the protocol by including studies from LMICs given that we

identified substantial new research from LMICs during the screening process.

Data analysis

CE and NA-J extracted relevant information using a pre-piloted data extraction form. They extracted author names, study design, study period, description of the population (ie, sex and mean age), status of the person in prison (ie, sentenced or on remand), reception status (ie, interviewed in the first 2 weeks of arrival or later), participation rate, geographical location, mental illnesses assessed, diagnostic criteria (ie, ICD or DSM), ascertainment of diagnosis (ie, clinical interview or diagnostic instrument), interviewer (ie, psychiatrist or non-psychiatrist), prevalence of illness, and sample size. Data for bipolar and schizophrenia spectrum disorders were extracted from Jan 1, 2011, to Aug 8, 2024. Because our two preceding systematic reviews and meta-analyses[4,8] had reported on depression and psychotic disorders from Jan 1, 1966, we used this date as the start date for the search for depression and psychosis.

We calculated pooled prevalences for four diagnostic categories: depression, psychotic disorders, bipolar disorder, and schizophrenia spectrum disorders. Most primary studies reported multiple diagnoses. When possible, we reported separate diagnostic categories. We have assumed that having comorbidity for psychosis and depression was possible. We included bipolar disorder in two meta-analyses: first, we implemented a meta-analysis of any type of bipolar disorder as a separate diagnostic category; second, we combined bipolar I disorder with diagnoses of schizophrenia spectrum and other psychotic disorders if cases of these disorders were reported in the respective study, for the meta-analysis on psychosis. In accordance with standard diagnostic criteria, an individual diagnosed with bipolar disorder cannot be diagnosed comorbidly with schizophrenia spectrum disorders or with both bipolar disorder and depression. Therefore, when relevant and based on study-level data, we used this hierarchical approach to diagnoses. Thus, the summary scores of the meta-analyses of psychosis, bipolar disorder, and schizophrenia spectrum disorders refer to each individual being only counted once.

We used the reported, or calculated, prevalences of each study and applied double arcsine Freeman–Tukey transformed proportions to calculate pooled prevalence with random-effects meta-analysis. When studies reported no cases, we applied a continuity correction with a baseline of 0·5 to zero cells to calculate prevalences using standard methods[9] with 95% CI. We did sensitivity analyses to investigate the presence of outliers using the influence function in the metafor package in R. This function covers eight outlier tests, including externally standardised residuals, covariance ratios, and leave-one-out estimates of the amount of heterogeneity. Outliers were excluded from the subsequent analyses. Individual studies could report multiple prevalence scores fulfilling inclusion criteria (ie, depression, psychosis, bipolar disorder, and schizophrenia spectrum disorders). Therefore, if a study reported an outlier for one of these illnesses, this specific prevalence was excluded while the remaining illnesses were retained in the analysis if not outliers.

To assess study quality, we used a risk-of-bias tool for prevalence studies that consists of ten items addressing four domains of bias—selection bias, non-response bias, measurement bias, and bias related to the analysis—and a summary risk-of-bias assessment.[10] Discrepancies in the assessment were resolved through discussion by SF and CE.

We did subgroup analyses and meta-regressions to investigate heterogeneity. To ensure adequate power and consistency, we followed Cochrane guidelines,[11] which require at least ten studies to be available for each moderator to be tested in meta-regression or subgroup analysis. Subgroup analyses and meta-regression were implemented by including moderators to provide variable adjusted effects. In the multivariable model, moderators were added simultaneously. Most subgroups were prespecified because they had been included in the previous systematic reviews[4,8] for clinical and methodological reasons. Two additional variables were tested (Mini International Neuropsychiatric Interview [MINI] *vs* the Structured Clinical Interview for DSM [SCID] diagnostic instrument, and clinical interview *vs* any other method) to test whether between-study heterogeneity was associated with diagnostic methods. Subgroups were: male versus female population, on remand (or detainee) versus sentenced people who are incarcerated, psychiatrist versus non-psychiatrist interviewers, DSM versus ICD diagnostic criteria, participation rate of less than 80% versus 80% or higher, sample size of less than 500 participants versus 500 or more, MINI versus SCID diagnostic instrument, clinical interview versus other diagnostic instrument, arrival at prison (reception) within the previous 2 weeks versus more than 2 weeks previously, the USA versus rest of the world, and high-income countries (HICs) versus LMICs (according to the World Bank definition[12]). Additionally, we presented studies by continent, regions, and countries. To investigate the effects of continuous measures, meta-regression was done, investigating the mean age of the prison population, year of data collection, participation rate, and sample size.

Heterogeneity was investigated with Higgins I^2, which is a relative measure of heterogeneity that compares the expected with the observed between-study variance (0–40% for not important, 30–60% for moderate, 50–90% for substantial, and 75–100% for considerable heterogeneity)[13] and Cochrane's Q test. The I^2 heterogeneity categories are meant to overlap because additional evidence needs to be considered to establish the most appropriate rating. We based ratings on the strength of evidence for heterogeneity, the magnitude of effect, a visual inspection of forest plots, and the number of small studies. Publication bias was assessed with a funnel plot, and the Begg and Egger test

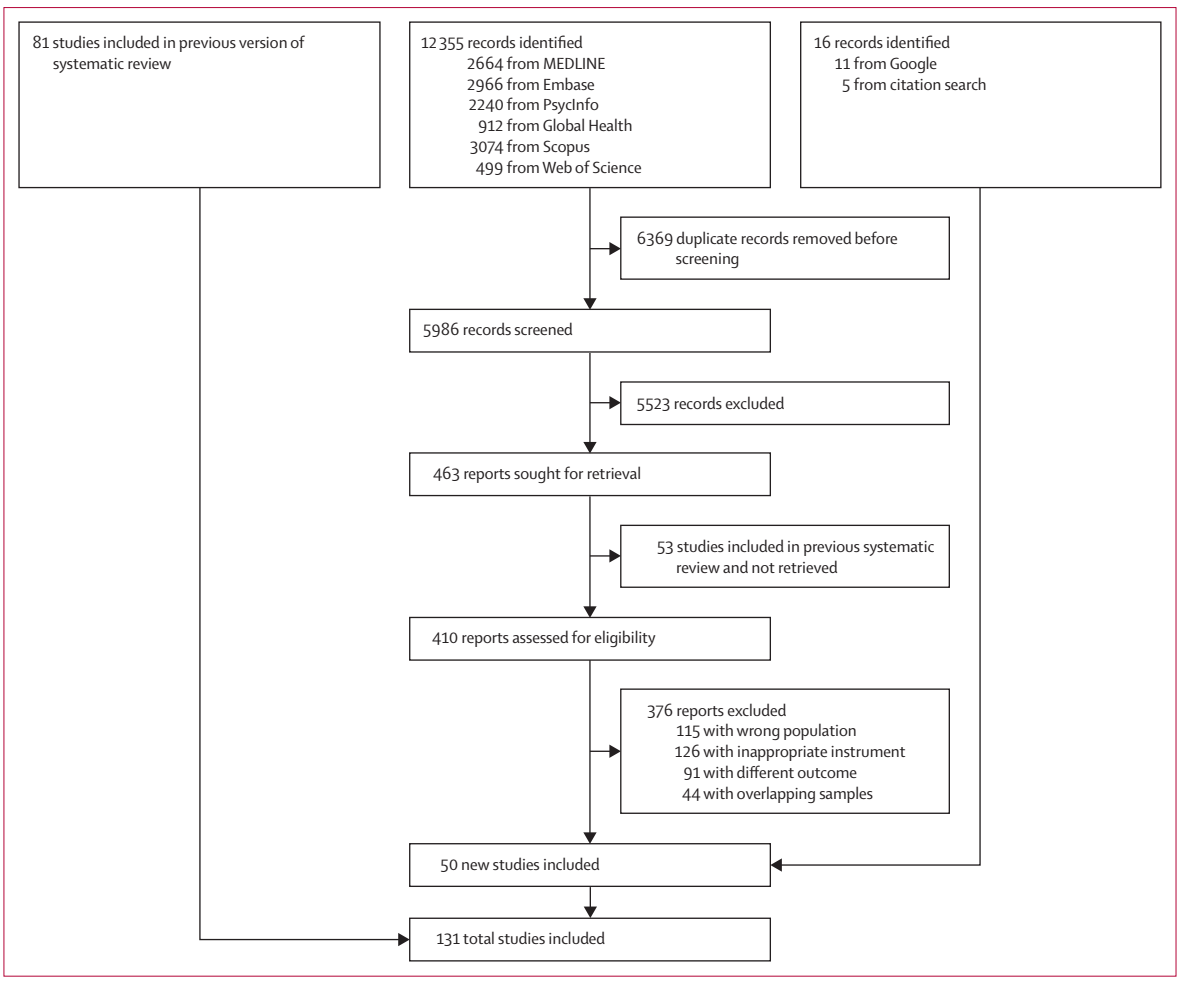

Figure 1: **Study selection**

was used for outcomes with a minimum of ten unique included studies (appendix pp 6–9). All analyses were implemented in R (version 4.3.1) with the metafor package (version 4.4.0). The study was prospectively registered with PROSPERO (CRD42022378568).

Role of the funding source

The funder of the study had no role in study design, data collection, data analysis, data interpretation, writing of the manuscript, or decision to submit.

Results

The database search yielded 12 355 articles. After screening and full-text assessment, the removal of duplicates, and searches of grey literature, 50 new studies were identified for this update.[14–63] Therefore, with the publications from the previous review,[4] this systematic review and meta-analysis is based on 131 publications, including a total of 58 838 people who are incarcerated (figure 1). Overall, the primary research was done in 43 countries covering 45 territories. 93 investigations[14,17,21,22,28,29,31,32,36,39,40,43,44,49,52,53,59,60,64–137] were in 23 HICs, 35 studies[15,16,18–20,23–27,33–35,37,38,41,42,45,46,51,54–58,61–63,138–144] in 16 middle-income countries, and four[30,47,48,50] in four low-income countries.

A total of 40 852 people in prison were assessed for depression in 95 studies.[14–17,19–22,24–27,29–38,41,42,44–48,50,52–65,68,70–74,76,77,79–89,92,94,96,97,99,101,106,109,110,112–116,118–123,125,128,131–136,138,139,142,144] Of these people, 30 140 (73·8%) were men, 8252 (20·2%) were women, and the remaining 2460 (6·0%) were from mixed-sex samples. In total, 8854 (21·7%) of the sample population were on remand, 21 223 (52·0%) were sentenced, and the remaining 10 775 (26·4%) were combined samples with both people on remand and people who were sentenced. Overall, the pooled random-effects prevalence of depression was 12·8% (95% CI 11·1–14·6, I^2=96%) or 5217 people who were incarcerated (figure 2). By sex, the prevalence of depression was 13·0% (3912 people; 10·9–15·2, 96%) in men and 14·5% (1281; 11·6–17·6, 90%) in women. These data are random-effects estimates, which will differ from crude proportions due to weighting; the same applies for prevalence estimates reported for other diagnoses and by region.

In subgroup analyses, the prevalence of depression was higher in LMIC countries (16·7% [95% CI 13·6–20·0],

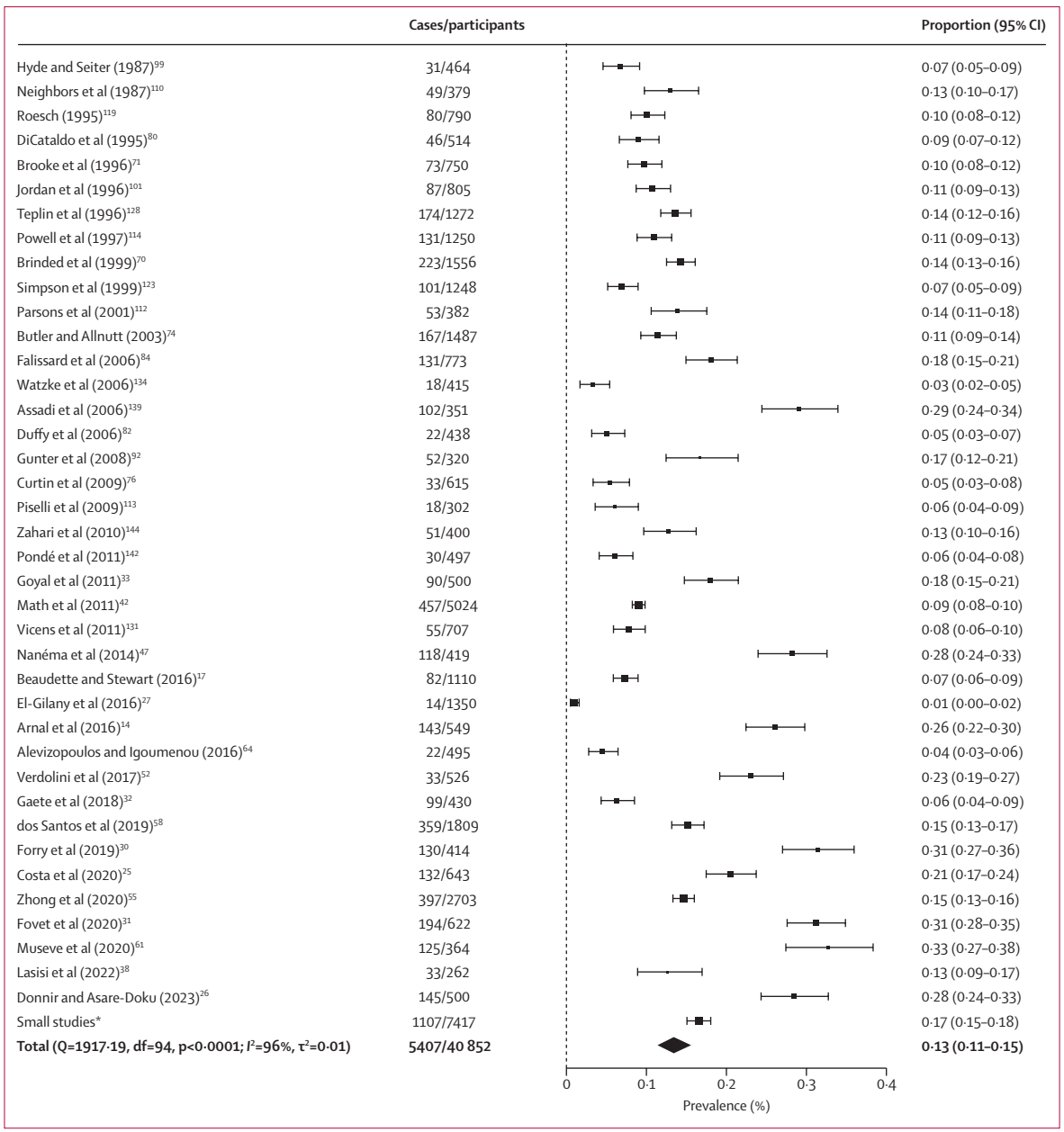

Figure 2: **Prevalence of depression in people who are incarcerated**
Random-effects proportions and pooled prevalence are presented. The point size of the individual study effect shows their weight towards the overall score. Note that small studies (ie, sample size <250 participants) were combined visually for the forest plot, but the underlying analyses were based on unaggregated data.
*References for depression small studies.[15,16,19–22,24,29,34–37,41,44–46,48,50,53,54,56,57,59,60,62,63,65,68,72,73,77,79,81,83,85–89,94,96,97,106,109,115,116,118,120–122,125,132,133,135,136,138]

I^2=97%) than in HIC countries (10·8% [9·0–13·0], 94%; p=0·0037; table). By region, depression was more prevalent in African (794 of 3547 people, 22·4% [17·8–27·3], 90%) and Latin American prisons (903 of 4503, 20·1% [13·4–27·6], 96%), and was less prevalent in Oceania (397 of 4628, 8·6% [5·3–12·5], 91%; figure 3), which was consistent with univariate meta-regression (appendix pp 10–12). Depression estimates, reported as Freeman–Tukey double arcsine transformed proportions, have increased over time in HICs (1·7% [0·3 to 3·1]), in the USA (4·0% [1·5 to 6·4]), and worldwide (1·7% [0·4 to 2·9]), but not in LMICs (–1·0% [–5·5 to 3·5]). Furthermore, studies that used MINI for diagnostic purposes reported higher depression prevalences than those using SCID. All other heterogeneity analyses had no differences (table). Findings were not significant when we conducted multivariable meta-regression with diagnostic instrument (ie, SCID and MINI; p=0·063) and country income (ie, LMIC and HIC; p=0·74).

	Prevalence of depression (95% CI)	p value	Prevalence of psychosis (95% CI)	p value
Continuous variables				
Mean age (per 5-year increase)	2·1% (–1·6 to 4·9)	0·16	–0·4% (–2·5 to 1·7)	0·72
Participation rate (per 5% increase)	0·6% (–0·6 to 1·7)	0·32	–0·1% (–1·2 to 0·06)	0·074
Sample size (per 100 people)	–0·2% (–0·6 to 0·2)	0·42	–0·1% (–3 to 0·04)	0·13
Over time in the USA (5 years)	4·0% (1·5 to 6·4)	0·0018	–1·2% (–2·9 to 0·1)	0·18
Over time in HICs (5 years)	1·7% (0·3 to 3·1)	0·022	0·1% (–0·5 to 0·7)	0·73
Over time in HICs, excluding the USA (5 years)	1·7% (–0·1 to 3·6)	0·094	0·4% (–0·3 to 1·1)	0·31
Over time in LMICs (5 years)	–1·0% (–5·5 to 3·5)	0·65	0·3% (–2·9 to 3·5)	0·85
Over time worldwide (5 years)	1·7% (0·4 to 2·9)	0·0093	0·2% (–0·4 to 0·7)	0·57
Dichotomous variables				
Remand (ref) *vs* sentenced	9·7% (6·2 to 13·0) *vs* 12·4% (10·3 to 14·6)	0·15	3·9% (3·0 to 4·8) *vs* 3·9% (3·2 to 4·6)	0·95
Male (ref) *vs* female	13·0% (10·9 to 15·2) *vs* 14·5% (11·6 to 17·6)	0·73	4·1% (3·5 to 4·7) *vs* 3·7% (2·6 to 4·9)	0·74
Psychiatrist (ref) *vs* non-psychiatrist	10·9% (8·1 to 13·9) *vs* 13·5% (10·9 to 16·3)	0·20	3·5% (2·8 to 4·3) *vs* 4·7% (3·9 to 5·5)	0·041
DSM (ref) *vs* ICD	13·2% (10·8 to 15·8) *vs* 13·3% (9·2 to 18·0)	0·98	4·0% (3·4 to 4·7) *vs* 3·0% (2·1 to 4·0)	0·76
MINI (ref) *vs* SCID	18·8% (15·5 to 22·2) *vs* 9·0% (6·1 to 12·3)	<0·0001	5·0% (3·7 to 6·5) *vs* 3·8% (2·6 to 5·2)	0·23
Clinical interview (ref) *vs* other instrument	11·1% (6·5 to 17·3) *vs* 13·1% (11·3 to 15·1)	0·55	4·4% (3·1 to 5·9) *vs* 4·1% (3·4 to 4·7)	0·64
Participation rate (ref) <80% *vs* ≥80%	11·8% (8·5 to 15·7) *vs* 14·4% (11·3 to 17·7)	0·30	4·9% (3·7 to 6·1) *vs* 3·9% (2·8 to 5·0)	0·24
Sample size (ref) <500 *vs* ≥500 people	11·9% (8·4 to 16·0) *vs* 13·0% (11·1 to 15·1)	0·63	4·3% (3·7 to 5·0) *vs* 3·4% (2·3 to 4·6)	0·18
Arrival at prison within the previous <2 weeks (ref) *vs* ≥2 weeks	13·6% (9·4 to 18·3) *vs* 12·6% (10·8 to 14·6)	0·71	4·2% (3·1 to 5·4) *vs* 4·2% (3·5 to 4·9)	0·97
World (ref) *vs* USA	13·2% (11·1 to 15·2) *vs* 10·5% (6·7 to 15·1)	0·27	4·2% (3·6 to 4·8) *vs* 4·2% (2·9 to 5·6)	0·98
HIC (ref) *vs* LMIC	10·8% (9·0 to 13·0) *vs* 16·7% (13·6 to 20·0)	0·0037	4·0% (3·4 to 4·6) *vs* 4·8% (3·7 to 6·0)	0·22

Continuous variables are reported as Freeman–Tukey double arcsine transformed proportions. The moderation effects of continuous variables were multiplied by the number indicated in parentheses (eg, per 5-year increase in mean age, per 5% increase in participation rate, or per 100-person increase). Categorical moderators are reported as prevalences with each category being reported separately (reference categories are stated first). DSM=Diagnostic and Statistical Manual of Mental Disorders. HIC=high-income countries. LMIC=low-income and middle-income countries. MINI=Mini International Neuropsychiatric Interview. SCID=Structured Clinical Interview for DSM.

Table: **Subgroup analysis and univariate meta-regression of depression and psychosis**

Psychosis was assessed in 48 427 people in prison in 109 studies,[14–17,19,21–24,27,28,31,33–35,37,39,40,42–49,51,52,54–57,59,61,62,64–73,75–82,84–87,89–93,95–100,102–131,133–140,142–144] of whom 38 278 (79·0%) were men, 7689 (15·9%) were women, and the remaining 2460 (5·1%) were from mixed-sex samples. Overall, 11 678 (24·1%) of the sample population were on remand, 27 520 (56·8%) were sentenced, and the remaining 9229 (19·1%) were combined samples with both people on remand and people who were sentenced. The pooled prevalence of psychosis was 4·1% (95% CI 3·6–4·7, I^2=87%) or 1995 people who are incarcerated (figure 4). By sex, the random-effects pooled prevalence of psychosis was 4·1% (1562 people; 3·5–4·7, 86%) in men and 3·7% (285 people; 2·6–4·9, 75%) in women.

By region, psychosis was more prevalent in African (141 of 2114 people, 6·7% [95% CI 4·3–9·4], I^2=79%) and Latin American (104 of 1621, 6·4% [4·4–8·7], 53%) prisons, and was less prevalent in Europe (532 of 15 547, 3·4% [2·6–4·3], 84%) and Oceania (45 of 1838, 2·4% [1·2–4·1], 34%; figure 5), which was consistent with meta-regression (appendix pp 10–12). Subgroup analysis revealed that psychiatrists diagnosed people who are incarcerated less often (3·5% [2·8–4·3]) than non-psychiatrists (4·7% 3·9–5·5]; p=0·041; table). All other analyses were not significant.

Bipolar disorder was assessed in 5776 people in prison in 15 studies,[17,21,22,24,27,33,35,37,45,46,49,52,53,131,142] of whom 3979 (68·9%) were men, 447 (7·7%) were women, and the remaining 1350 (23·4%) were from mixed-sex populations. In this sample, 5455 people (94·4%) were sentenced, 103 (1·8%) were on remand, and the remaining were combined samples with both people on remand and people who were sentenced. The prevalence of bipolar disorder was 1·7% (95% CI 1·0–2·6, I^2=69%), or 98 people who are incarcerated. By sex, the prevalence of bipolar disorder was 1·7% (68 people; 1·0–2·5, 52%) in men and 3·4% (15; 0·6–8·0, 70%) in women.

Schizophrenia spectrum disorders were investigated in 8433 people who are incarcerated in nine studies,[19,27,33,35,37,42,51,53,131] of whom 7026 (83·3%) were men, 57 (0·7%) were women, and 1350 (16·0%) were from mixed-sex samples. Most people in this sample were from prisons containing both people who are on remand and sentenced (5392 [63·9%]); 2941 (34·9%) were sentenced, 100 (1·2%) were unknown, and no studies had only people on remand. The overall prevalence of schizophrenia spectrum disorders was 3·6% (95% CI 1·3–7·1, I^2=97%), or 307 people who are incarcerated. By sex, the prevalence of schizophrenia was 4·0% (284 people; 1·4–7·9, 96%) in men, 3·9% (two; 0·0–22·3, 77%) in women, and 1·3% (17; 0·7–1·9, 0·0%) in mixed-sex populations. These data

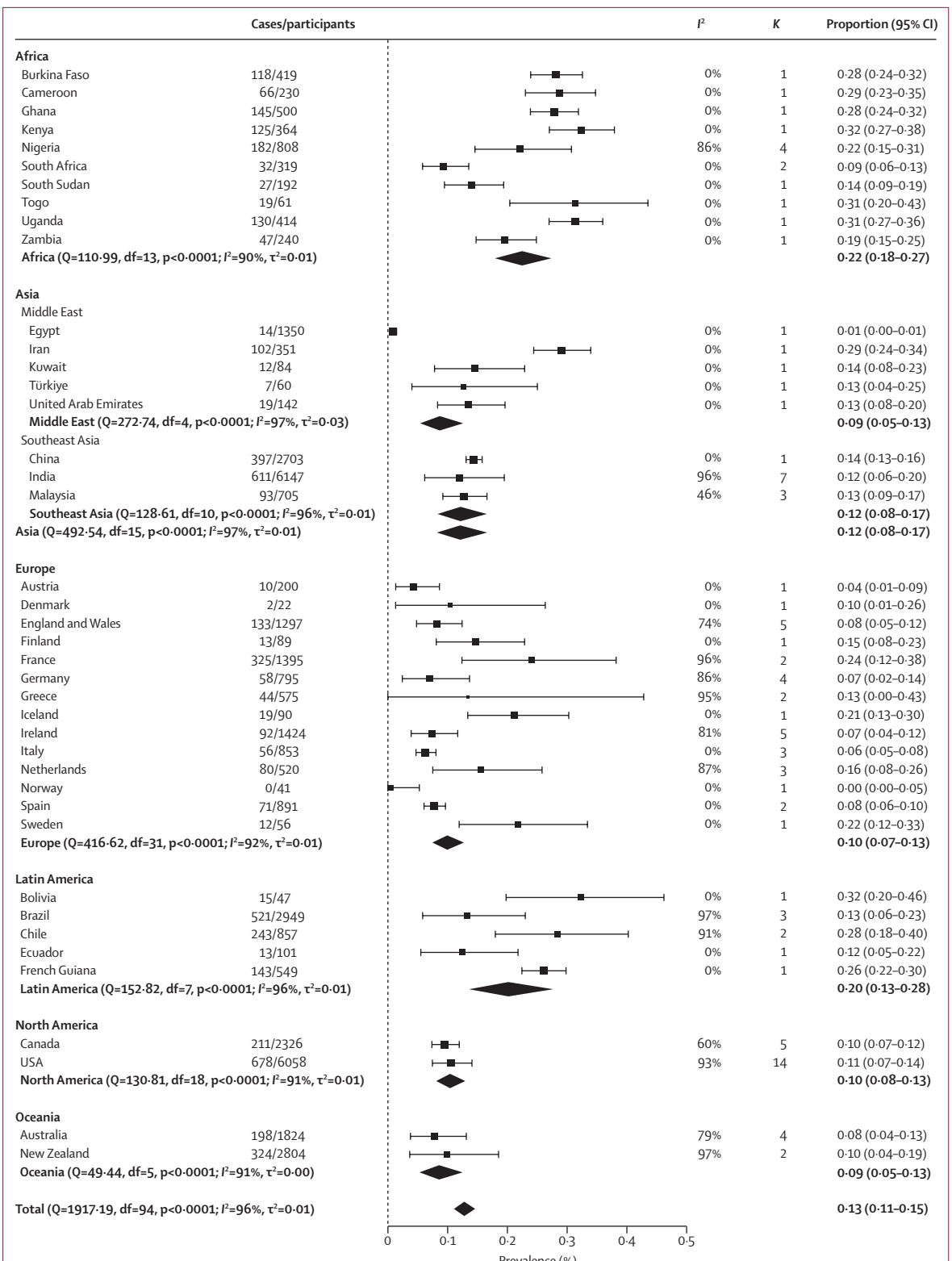

Figure 3: **Prevalence of depression in people in incarceration by region and country**

K represents the number of studies and τ^2 represents the overall estimate of the variance. The point size of the individual country effect shows their weight towards the overall score. Each line of this forest plot depicts an independent meta-analysis based on study-level data, thus each line (ie, country) can include more than one study (and the underlying I^2 reflects all studies contributing to each subgroup).

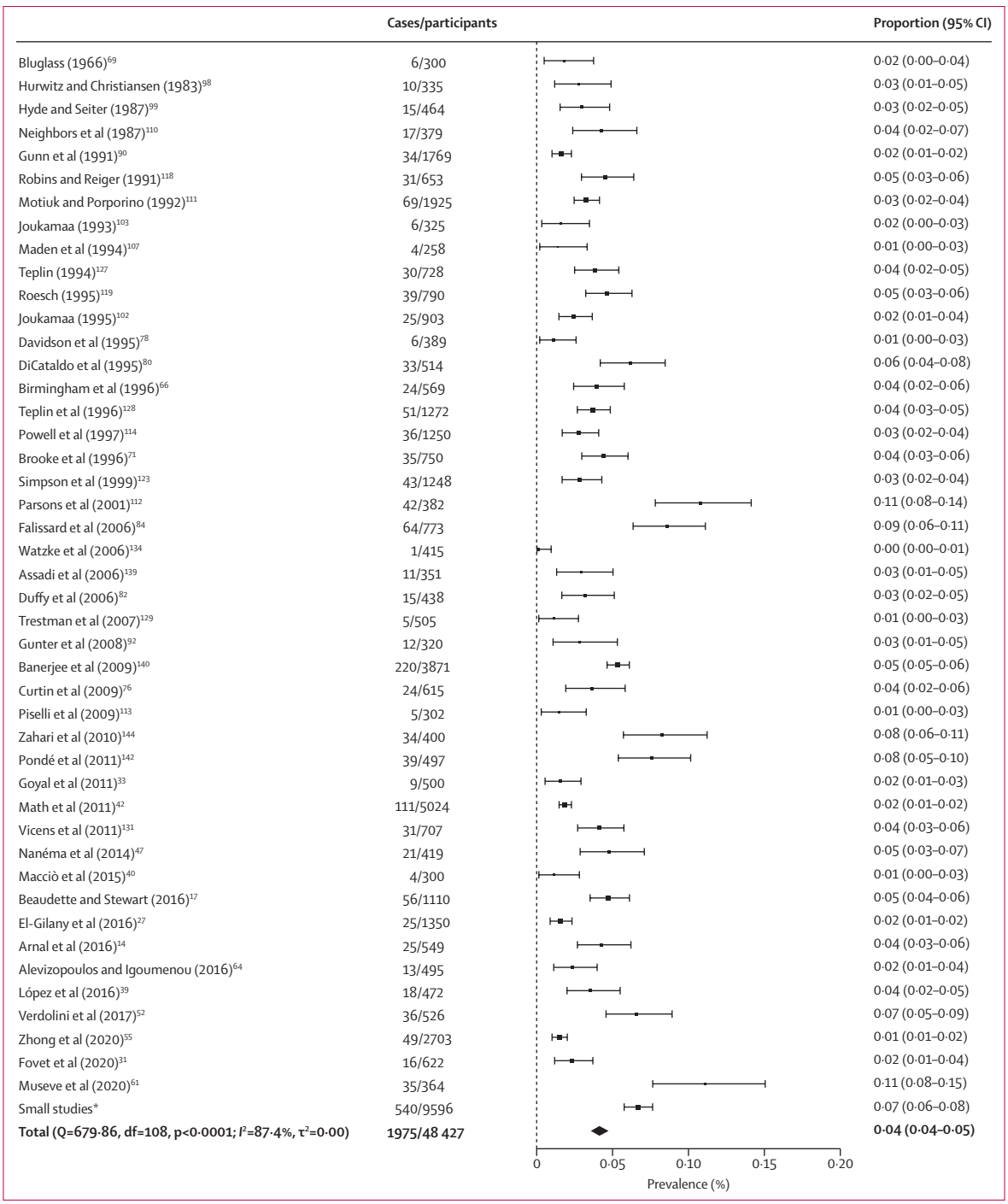

Figure 4: **Prevalence of psychosis in people in incarceration**

Random-effects proportions and pooled prevalence are presented. The point size of the individual study effect shows their weight towards the overall score. Note that small studies (ie, sample size <250 participants) were combined visually for the forest plot, but the underlining analyses were based on unaggregated data.

*References for small studies.[15,16,19,21–24,28,34,35,37,43–46,48,49,51,54,56,57,59,62,65,67,68,70,72,73,75,77,79,81,85–87,89,91,93,95–97,100,104–106,108,109,115–117,120–122,124–126,130,133,135–138,143]

are random-effects estimates, which differ from crude proportions due to sample size weighting. Schizophrenia spectrum disorders are a subgroup of psychosis; thus, the number of included studies is considerably less than included in the analysis of psychosis, which leads to less precision and wider confidence intervals than for those observed for psychosis. Due to having fewer data than the other disorders examined, we could not conduct subgroup analyses or meta-regression on the bipolar and schizophrenia spectrum disorder studies.

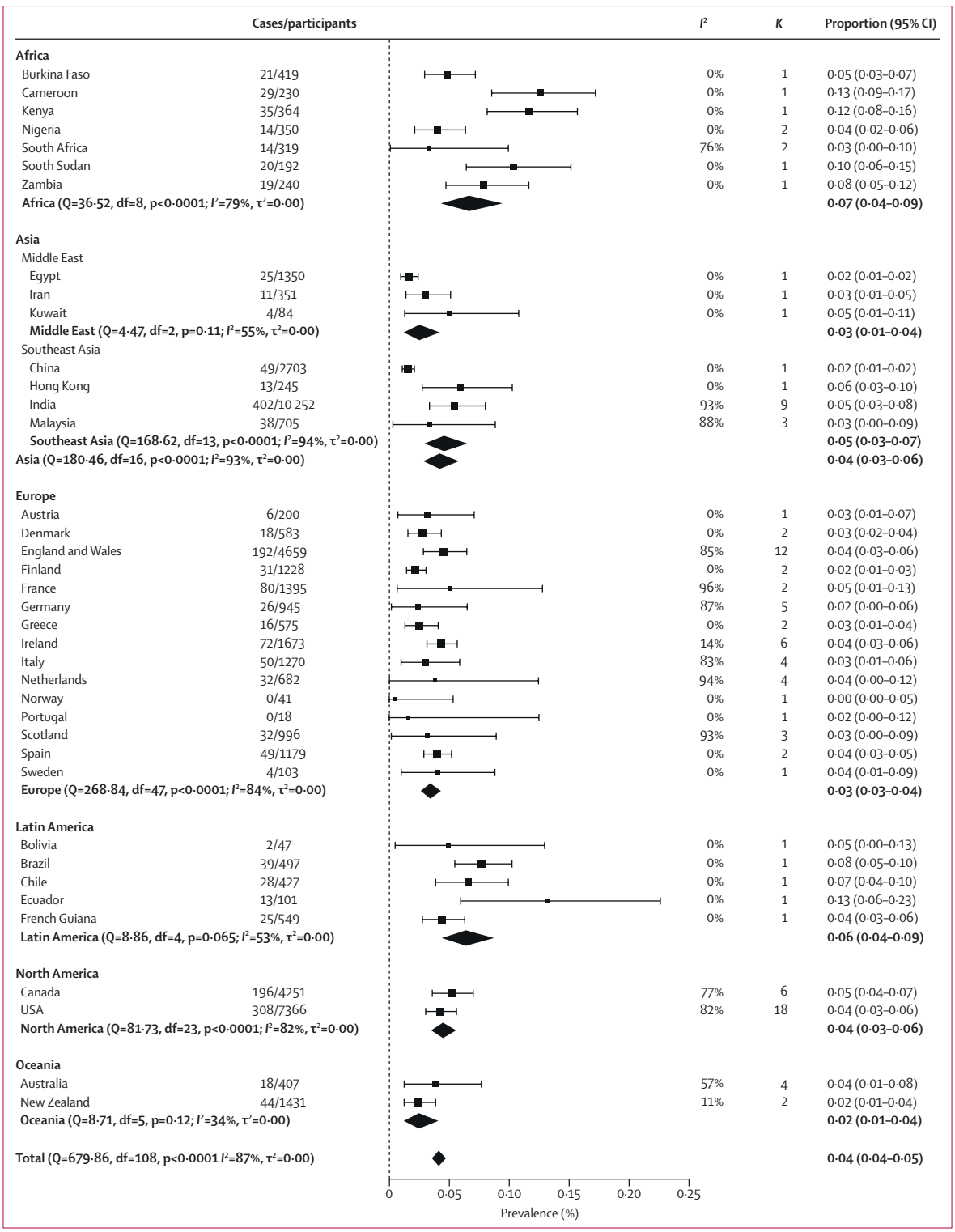

Figure 5: **Prevalence of psychosis in people in incarceration by region and country**
The point size of the individual country effect shows their weight towards the overall score. Each line of this forest plot depicts an independent meta-analysis based on study-level data, thus each line (ie, country) can include more than one study (and the underlying I^2 reflects all reports contributing to each subgroup).

The quality of the included studies was mostly good to excellent. Due to our strict selection criteria, items evaluating the internal validity and population selection had a low bias risk and only 19 studies[21,28,31,48,66,67,70,82–84,94,96,97,102,106,113,116,123,142] had a high risk of non-response bias, with a response rate of less than 75% (appendix p 13).

Sensitivity analyses indicated one outlier for depression,[141] three for psychosis,[18,30,53] one for bipolar disorder,[30] and none for schizophrenia spectrum disorders, which were excluded from the main analysis. This finding did not influence the results (appendix pp 14–16).

Discussion

This updated systematic review and meta-analysis of the prevalence of severe mental illness included 58 838 people who are incarcerated in 43 countries, studied over five decades. It provides new information on bipolar disorder and schizophrenia spectrum disorders as separate diagnostic categories. Overall, the pooled prevalence of depression was 12·8% and of psychosis was 4·1%, suggesting that at least one in seven people who are incarcerated have a severe mental illness.

Several explanations have been put forward for these high prevalences. In psychotic illnesses, there is an association with serious crimes that translates to prison sentences.[145] People with mental illness can have less access to employment, housing, and mental health care, which in turn can increase risks of crime. Furthermore, symptoms of depression and anxiety could be maintained and exacerbated by stressors of the prison environment, such as exposure to victimisation, minimal social contact, solitary confinement, and illicit drug use.[146]

We found some differences in prevalence of psychiatric morbidity between world regions. Overall, for depression, subgroup and meta-regression analyses reported higher prevalences in LMICs than in HICs. Further analyses suggested higher rates of depression and psychosis in African and Latin American countries than in all other continents. However, these are based on a small number of studies and other explanations should be considered, including the use of different diagnostic thresholds.

Altogether, we found no strong evidence of temporal change. The previous 2011 meta-analysis[4] showed an increasing trend in depression in US studies, but there have been no new US studies since and no overall trend in HICs when excluding the USA. Similarly, LMICs showed no increase. The overall worldwide rise in the prevalence of depression in people who are incarcerated was explained by newer LMIC studies with a high prevalence. We identified no new studies since 2008 from the USA, which continues to have the largest prison population.

We found that psychosis was less likely to be diagnosed by psychiatrists than by other interviewers. This finding could, in part, be attributed to the challenges in diagnosing psychotic illnesses, given the complexity of presentations, comorbidity with other mental conditions, and the difficulty in differentiating symptoms from diagnoses.

Overall, between-study heterogeneity was substantial for the investigated diagnoses, most of which was not explained by subgroup and meta-regression analyses. However, this heterogeneity is expected due to the many different jurisdictions and prison systems with different types of people being remanded and sentenced and who reside under varying security levels.

The high psychiatric morbidity highlights the need for identification, assessment, and treatment of people who are incarcerated with these illnesses, which is a basic human right to health.[147] In addition, receiving treatment in prison has additional benefits, including reducing the risks of self-harm and suicide,[2] drug-related deaths upon release,[148] and reoffending.[3] Addressing this problem will require a combination of primary, secondary, and tertiary prevention approaches. Primary prevention will include the diversion of people at sentencing towards community sentences and, in line with mental health legislation in some countries, hospital transfer. The evidence for secondary prevention is poorer: screening strategies are widely implemented but not evaluated for outcomes.[149] Tertiary prevention in the form of mental health treatment for common mental disorders, in contrast, has trial evidence in support.[150]

The burden of mental illness in prisons has been consistently reported and widely replicated between and within countries. An umbrella review[151] from 2024 highlighted the poor health of people who are incarcerated, reporting higher prevalences of physical disorders compared with the general population, including infectious diseases, and also psychiatric conditions (relying on a 2011 systematic review)[4] and substance misuse. This high morbidity extends beyond people who are incarcerated to people at all stages of the criminal justice system, starting with the first contact with the police, when people with mental illness are at higher risk than the general population to be arrested[152] and charged.[153] People with mental health problems are also over-represented in court, with studies suggesting that between half[154] and three-quarters[155] of criminal defendants examined have a mental illness compared with about a fifth[154] of the general population. On release from prison, people with a mental illness are at increased risk of dying from a range of preventable causes, particularly within the first week, with alcohol and drug poisoning, suicide, and cardiovascular disease being the most common causes.[156] In addition, psychiatric disorders are associated with an increased risk of violent reoffending[157] whereas treatment with psychotropic medication is associated with lower violent reoffending rates among people who were formerly incarcerated.[3]

Taken together, these findings suggest that mental illness needs to be assessed, identified, and treated at all stages of the criminal justice system. Violence prevention in those with a mental illness (which could be addressed by mental health services) and the early identification

and diversion of people at the police and sentencing stage to health-care services (a focus for multi-agency services) should be considered as part of a comprehensive public health approach. Such an approach would encompass collaboration between police and mental health services to prevent the escalation of harm and to allow for the diversion of people with severe mental illness to hospitals during sentencing, address treatment needs in prisons at levels at least equivalent to the community, and improve the linkage to community mental health and addiction services upon release.

We found that more people who are incarcerated were diagnosed with depression with the MINI semi-structured tool (18·8%) than with SCID (9·0%). This finding could have been driven by study selection because HICs, where depression was less prevalent, used the SCID more than twice as often as LMICs. When we limited analyses to SCID, the difference between HICs and LMICs remained, suggesting that the difference between regions is not solely due to the diagnostic tools used. Furthermore, random-effects meta-analyses were done, which can be influenced by smaller studies that are more prone to bias. However, in our review, meta-regression analyses did not show that small studies differed from larger ones in their effect sizes.

Studies from LMICs have become increasingly available in the past decade. Nine studies from LMICs were included in our 2012 meta-analysis,[4] which has risen to 38 studies in this current review. Although we identified few studies from several large middle-income countries, including Russia (fifth largest prison population) and Thailand (seventh largest prison population),[1] the scarcity of resources for prison research in these countries suggests that research on treatment might take priority over prevalence studies. With 131 studies worldwide on prevalence over five decades, and no material change in prevalence of the main treatable psychiatric conditions, research could now address how to better identify and treat these disorders in prison, and how to maintain any improvement in care with linkage to community services. The transition from prison to community is a high-risk period for non-adherence, relapse, and premature mortality.[156,158] For future research, if local surveys are done, we recommend doing sample size calculations and discourage two-step and non-random sampling. Furthermore, we suggest reporting key background characteristics, which are important to examine heterogeneity, and data stratified by gender or sex and prisoner status (ie, on remand or sentenced).

Although primary research has increased, including in LMICs, severe mental illness continues to be prevalent, affecting one in seven people who are incarcerated. Prison services should review their liaison with other criminal justice agencies, before and after custody, and with community mental health services to address the substantial psychiatric morbidity of people in prison.

Contributors
SF had the original idea and developed the study protocol with support from CE. CE searched the literature. CE and NA-J screened the titles, abstracts, and full texts, and extracted data. CE did the risk-of-bias assessment and statistical analysis, and wrote the initial draft of the manuscript. SF contributed to the revision of the manuscript, provided critical feedback, and supervised. CE and NA-J directly accessed and verified the underlying data reported in the manuscript. All authors had full access to all the data in the study and approved the final version.

Declaration of interests
SF has provided expert evidence in coroner inquests for deaths in custody and is an expert member of the UK's Independent Advisory Panel on Deaths in Custody. CE and NA-J declare no competing interests.

Data sharing
Tabular data can be requested by email to the corresponding author after the approval of a proposal, with a signed data access agreement. The study protocol was published with PROSPERO (CRD42022378568) and is available at https://www.crd.york.ac.uk/prospero/display_record.php?RecordID=378568.

Acknowledgments
CE is supported by the Forschungsförderungsgesellschaft Niederösterreich. SF is supported by the National Institute for Health and Care Research Oxford Health Biomedical Research Centre (BRC-1215-20005).

References

1 World Prison Brief. Highest to lowest—prison population total. 2024. https://www.prisonstudies.org/highest-to-lowest/prison-population-total?field_region_taxonomy_tid=All (accessed July 2, 2024).
2 Carter A, Butler A, Willoughby M, et al. Interventions to reduce suicidal thoughts and behaviours among people in contact with the criminal justice system: a global systematic review. *EClinicalMedicine* 2022; **44:** 101266.
3 Chang Z, Lichtenstein P, Långström N, Larsson H, Fazel S. Association between prescription of major psychotropic medications and violent reoffending after prison release. *JAMA* 2016; **316:** 1798–807.
4 Fazel S, Seewald K. Severe mental illness in 33,588 prisoners worldwide: systematic review and meta-regression analysis. *Br J Psychiatry* 2012; **200:** 364–73.
5 Landis JR, Koch GG. The measurement of observer agreement for categorical data. *Biometrics* 1977; **33:** 159–74.
6 Emilian C, Al-Juffali N, Fazel S. A systematic review and meta-analysis of the prevalence of severe mental illness among prisoners in high-income countries. Nov 25, 2022. https://www.crd.york.ac.uk/prospero/display_record.php?RecordID=378568 (accessed Dec 12, 2024).
7 Page MJ, McKenzie JE, Bossuyt PM, et al. The PRISMA 2020 statement: an updated guideline for reporting systematic reviews. *BMJ* 2021; **372:** n71.
8 Fazel S, Danesh J. Serious mental disorder in 23000 prisoners: a systematic review of 62 surveys. *Lancet* 2002; **359:** 545–50.
9 Sweeting MJ, Sutton AJ, Lambert PC. What to add to nothing? Use and avoidance of continuity corrections in meta-analysis of sparse data. *Stat Med* 2004; **23:** 1351–75.
10 Hoy D, Brooks P, Woolf A, et al. Assessing risk of bias in prevalence studies: modification of an existing tool and evidence of interrater agreement. *J Clin Epidemiol* 2012; **65:** 934–39.
11 The Cochrane Collaboration. Cochrane handbook for systematic reviews of interventions: chapter 10.11.5.1: ensure that there are adequate studies to justify subgroup analyses and meta-regressions. https://training.cochrane.org/handbook/current/chapter-10#section-10-11-5 (accessed Nov 12, 2024).
12 World Bank. The world by income and region. 2023. https://datatopics.worldbank.org/world-development-indicators/the-world-by-income-and-region.html (accessed July 2, 2024).
13 The Cochrane Collaboration. Cochrane handbook for systematic reviews of interventions: : chapter 10.10.2: identifying and measuring heterogeneity. https://training.cochrane.org/handbook/current/chapter-10#section-10-10-2 (accessed Nov 12, 2024).

14 Arnal R, Ayhan G, Pinganaud É, Basurko C, Jehel L. Le trouble de stress post-traumatique parmi les détenus en centre pénitentiaire en Guyane Française. *Sante Ment Que* 2016; **41:** 251–65.

15 Ayirolimeethal A, Ragesh G, Ramanujam JM, George B. Psychiatric morbidity among prisoners. *Indian J Psychiatry* 2014; **56:** 150–53.

16 Azlin B, Akhtar MS, Ruzyanei NN, Hazli Z, Normala I. Psychiatric disorders among young male adult prisoners: a cross sectional study in a Malaysian prison. *Malays J Med Health Sci* 2010; **6:** 65–70.

17 Beaudette JN, Stewart LA. National prevalence of mental disorders among incoming Canadian male offenders. *Can J Psychiatry* 2016; **61:** 624–32.

18 Benavides A, Chuchuca J, Klaic D, Waters W, Martín M, Romero-Sandoval N. Depression and psychosis related to the absence of visitors and consumption of drugs in male prisoners in Ecuador: a cross sectional study. *BMC Psychiatry* 2019; **19:** 248.

19 Bioku AA, Alatishe YA, Adeniran JO, et al. Psychiatric morbidity among incarcerated individuals in an underserved region of Nigeria: revisiting the unmet mental health needs in correction services. *J Health Care Poor Underserved* 2021; **32:** 321–37.

20 Boşgelmez S, Aker T, Köklük ÖA, Ford JD. Assessment of lifetime history of exposure to traumatic stressors by incarcerated adults with the Turkish version of the Traumatic Events Screening Instrument for Adults (TESI-A): a pilot study. *J Trauma Dissociation* 2010; **11:** 407–23.

21 Brown GP, Barker J, McMillan K, Norman R, Derkzen D, Stewart LA. National prevalence of mental disorders among federally sentenced women offenders: in custody sample. Correctional Service of Canada. July, 2018. https://publications.gc.ca/collections/collection_2018/scc-csc/PS83-3-406-eng.pdf (accessed Dec 12, 2024).

22 Brown GP, Barker J, McMillan K, et al. Prevalence of mental disorder among federally sentenced women offenders: in-custody and intake samples. Correctional Service of Canada. July, 2018. https://publications.gc.ca/collections/collection_2018/scc-csc/PS83-3-420-eng.pdf (accessed Dec 12, 2024).

23 Chow KK, Chan O, Yu MW, et al. Prevalence and screening of mental illness among remand prisoners in Hong Kong. *East Asian Arch Psychiatry* 2018; **28:** 134–38.

24 Molina-Coloma V, Pérez JI, Salaberría K. Diferencias generales y entre sexos en salud mental: un estudio comparativo entre población penitenciaria y población general. *Rev Mex Psicol* 2018; **35:** 117–30.

25 Costa CR, Sassi RAM, Tímbola VDS, Lazzari TR, Reis AJ, Gonçalves CV. Prevalence and associated factors with depression and anxiety in prisoners in South of Brazil. *Arch Clin Psychiatry* 2020; **47:** 89–94.

26 Donnir GM, Asare-Doku W. Prevalence of psychiatric disorders among sentenced prisoners in a medium security prison in Ghana: implications for mental health assessment and service. *Crim Behav Ment Health* 2023; **33:** 354–68.

27 El-Gilany A, Khater M, Gomaa Z, Hussein E, Hamdy I. Psychiatric disorders among prisoners: a national study in Egypt. *East Asian Arch Psychiatry* 2016; **26:** 30–38.

28 Facer-Irwin E, Karatzias T, Bird A, Blackwood N, MacManus D. PTSD and complex PTSD in sentenced male prisoners in the UK: prevalence, trauma antecedents, and psychiatric comorbidities. *Psychol Med* 2022; **52:** 2794–804.

29 Ferraro L, Nuzzo MC, Sideli L, et al. Psychopathology and female detention at the "Pagliarelli" jail of Palermo: preliminary results. *Mediterr J Clin Psychol* 2018; **6:** 2.

30 Forry JB, Ashaba S, Rukundo GZ. Prevalence and associated factors of mental disorders among prisoners in Mbarara municipality, southwestern Uganda: a cross-sectional study. *BMC Psychiatry* 2019; **19:** 178.

31 Fovet T, Plancke L, Amariei A, et al. Mental disorders on admission to jail: a study of prevalence and a comparison with a community sample in the north of France. *Eur Psychiatry* 2020; **63:** e43.

32 Gaete J, Labbé N, Del Villar P, Allende C, Araya R, Valenzuela E. Mental health and associated factors among young offenders in Chile: a cross-sectional study. *Crim Behav Ment Health* 2018; **28:** 13–27.

33 Goyal SK, Singh P, Gargi PD, Goyal S, Garg A. Psychiatric morbidity in prisoners. *Indian J Psychiatry* 2011; **53:** 253–57.

34 Joshi P, Kukreja S, Desousa A, Shah N, Shrivastava A. Psychopathology and other contributing stressful factors in female offenders: an exploratory study. *Indian J Forensic Med Toxicol* 2014; **8:** 149–55.

35 Kancharla SR, Karthikeyan SK, Kumar VP. A study of criminality and psychiatric morbidity among prison inmates. *Int J Indian Psychol* 2020; **8:** 224–32.

36 Konstenius M, Larsson H, Lundholm L, et al. An epidemiological study of ADHD, substance use, and comorbid problems in incarcerated women in Sweden. *J Atten Disord* 2015; **19:** 44–52.

37 Kumar V, Daria U. Psychiatric morbidity in prisoners. *Indian J Psychiatry* 2013; **55:** 366–70.

38 Lasisi MD, Nuhu FT, Adebayo F, Eseigbe EE, Sheikh TL. Spectrum and predictors of suicidal risk among incarcerated youth in a correctional facility in Kaduna, Northern Nigeria. *Vulnerable Child Youth Stud* 2022; **17:** 147–58.

39 López M, Saavedra FJ, López A, Laviana M. Prevalence of mental health problems in sentenced men in prisons from Andalucía (Spain). *Rev Esp Sanid Penit* 2016; **18:** 76–84.

40 Macciò A, Meloni FR, Sisti D, et al. Mental disorders in Italian prisoners: results of the REDiMe study. *Psychiatry Res* 2015; **225:** 522–30.

41 Majekodunmi OE, Obadeji A, Oluwole LO, Oyelami RO. Depression in prison population: demographic and clinical predictors. *J Forensic Sci Med* 2017; **3:** 122–27.

42 Math SB, Murthy P, Parthasarathy R, Kumar CN, Madhusudhan S. Mental health and substance use problems in prisons: the Bangalore Prison Mental Health Study: local lessons for national action. 2011. https://nimhans.co.in/wp-content/uploads/2021/09/Mental-Health-and-Substance-Use-Problems-in-Prisons_Local-Lessons-for-National-Action.pdf (accessed Dec 12, 2024).

43 Mir J, Kastner S, Priebe S, Konrad N, Ströhle A, Mundt AP. Treating substance abuse is not enough: comorbidities in consecutively admitted female prisoners. *Addict Behav* 2015; **46:** 25–30.

44 Mundt AP, Kastner S, Larraín S, Fritsch R, Priebe S. Prevalence of mental disorders at admission to the penal justice system in emerging countries: a study from Chile. *Epidemiol Psychiatr Sci* 2016; **25:** 441–49.

45 Naidoo S, Subramaney U, Paruk S, Ferreira L. Mental illness and HIV amongst female inmates in Durban, South Africa. *S Afr J Psychiatr* 2022; **28:** 1628.

46 Naidoo S, Mkize DL. Prevalence of mental disorders in a prison population in Durban, South Africa. *Afr J Psychiatry* 2012; **15:** 30–35.

47 Nanéma D, Goumbri P, Karfo K, Ouango JG, Ouédraogo A. Epidemiological and clinical aspects of mental disorders in prisons in Ouagadougou, Burkina Faso. *Ann Afr Psychiatr* 2014; **3:** 59–75.

48 Ndetei D, Khasakhala L, Mutiso V, Harder V. Mental disorders and HIV risk behaviors among prisoners in South Sudan. United Nations Office On Drugs And Crime, 2008.

49 Rijo D, Brazão N, Barroso R, et al. Mental health problems in male young offenders in custodial versus community based-programs: implications for juvenile justice interventions. *Child Adolesc Psychiatry Ment Health* 2016; **10:** 40.

50 Salifou S, Wenkourama D, Soedje KMA, Anagonou L, Agouda B, Dassa KS. Santé mentale des femmes détenues à la prison civile de Lomé. *Health Sci Dis* 2018; **19:** 46–50.

51 Tirumani SR, Vennam BSV, Seepana R. A study on prevalence of psychiatric morbidity and substance abuse among prisoners. *Open J Psychiatry Allied Sci* 2020; **11:** 96–99.

52 Verdolini N, Murru A, Attademo L, et al. The aggressor at the mirror: psychiatric correlates of deliberate self-harm in male prison inmates. *Eur Psychiatry* 2017; **44:** 153–60.

53 Zabala-Baños MC, Segura A, Maestre-Miquel C, et al. Mental disorder prevalence and associated risk factors in three prisons of Spain. *Rev Esp Sanid Penit* 2016; **18:** 13–23.

54 Zamzam R, Hatta SM. Specific psychiatric disorders among convicted female offenders in a Malaysian prison. *Malays J Psychiatry* 2000; **8:** 34–42.

55 Zhong S, Zhu X, Chen Y, et al. High psychiatric morbidity and comorbidity among female prisoners in Hunan, China. *Front Psychiatry* 2020; **11:** 271.

56 Arroyo GR. Prevalence of psychiatric disorders at admission to the Palmasola prison in Bolivia, a pilot study. 18th WPA World Congress of Psychiatry, Sept 27–30, 2018.

57 Chinyama J, Menon J. Mental health and healthcare provision in Zambian correctional facilities. *Med J Zambia* 2021; **47:** 208–14.

58 dos Santos MM, dos Santos Barros CR, Andreoli SB. Fatores associados à depressão em homens e mulheres presos. *Rev Bras Epidemiol* 2019; **22:** e190051.

59 Driessen M, Schroeder T, Widmann B, von Schönfeld C-E, Schneider F. Childhood trauma, psychiatric disorders, and criminal behavior in prisoners in Germany: a comparative study in incarcerated women and men. *J Clin Psychiatry* 2006; **67:** 1486–92.

60 Einarsson E, Sigurdsson JF, Gudjonsson GH, Newton AK, Bragason OO. Screening for attention-deficit hyperactivity disorder and co-morbid mental disorders among prison inmates. *Nord J Psychiatry* 2009; **63:** 361–67.

61 Museve JL, Angira CHO, Aloka PJ. Prevalence and associated factors of mental disorders among prisoners in Kenya. *Int J Health Sci Res* 2020; **10:** 261–71.

62 Lele Nkoagne EC, Nguendo Yongsi HB. Ending up in prison healthy and getting out mentally ill: prevalence and risk factors of psychiatric illnesses among jail inmates at the Kondengui central prison (Yaoundé-Cameroon). *J Ment Health Hum Be* 2018; **23:** 43–51.

63 Rao SS, Shankar MU, Kumar CM. A cross sectional study of personality dimension and psychiatric morbidity in the male inmates of prison. *Int Arch Integr Med* 2021; **12:** 81–90.

64 Alevizopoulos G, Igoumenou A. Psychiatric disorders and criminal history in male prisoners in Greece. *Int J Law Psychiatry* 2016; **47:** 171–75.

65 Andersen HS, Sestoft D, Lillebaek T, Gabrielsen G, Kramp P. Prevalence of ICD-10 psychiatric morbidity in random samples of prisoners on remand. *Int J Law Psychiatry* 1996; **19:** 61–74.

66 Birmingham L, Mason D, Grubin D. Prevalence of mental disorder in remand prisoners: consecutive case study. *BMJ* 1996; **313:** 1521–24.

67 Bartholomew AA, Brain LA, Douglas AS, Reynolds WS. A medico-psychiatric diagnostic review of remanded (without a request for a psychiatric report) male minor offenders. *Med J Aust* 1967; **1:** 267–69.

68 Bland RC, Newman SC, Dyck RJ, Orn H. Prevalence of psychiatric disorders and suicide attempts in a prison population. *Can J Psychiatry* 1990; **35:** 407–13.

69 Bluglass R. A psychiatric study of Scottish convicted prisoners. MD thesis, University of St Andrews, 1966.

70 Brinded PMJ, Stevens I, Mulder RT, Fairley N, Malcolm F, Wells JE. The Christchurch prisons psychiatric epidemiology study: methodology and prevalence rates for psychiatric disorders. *Crim Behav Ment Health* 1999; **9:** 131–43.

71 Brooke D, Taylor C, Gunn J, Maden A. Point prevalence of mental disorder in unconvicted male prisoners in England and Wales. *BMJ* 1996; **313:** 1524–27.

72 Bulten B. Gevangen tussen straf en zorg. Kluwer Academic Publishers, 1998.

73 Bulten E, Nijman H, van der Staak C. Psychiatric disorders and personality characteristics of prisoners at regular prison wards. *Int J Law Psychiatry* 2009; **32:** 115–19.

74 Butler T, Allnutt S. Mental illness among New South Wales prisoners. NSW Correction Health Service, 2003.

75 Cooke DJ. Psychological disturbance in the Scottish prison system: prevalence, precipitants, and policy. Scottish Prison Service, 1994.

76 Curtin K, Monks S, Wright B, Duffy D, Linehan S, Kennedy HG. Psychiatric morbidity in male remanded and sentenced committals to Irish prisons. *Ir J Psychol Med* 2009; **26:** 169–73.

77 Daniel AE, Robins AJ, Reid JC, Wilfley DE. Lifetime and six-month prevalence of psychiatric disorders among sentenced female offenders. *Bull Am Acad Psychiatry Law* 1988; **16:** 333–42.

78 Davidson M, Humphreys MS, Johnstone EC, Owens DG. Prevalence of psychiatric morbidity among remand prisoners in Scotland. *Br J Psychiatry* 1995; **167:** 545–48.

79 Denton B. Psychiatric morbidity and substance dependence among women prisoners: an Australian study. *Psychiatr Psychol Law* 1995; **2:** 173–77.

80 DiCataldo F, Greer A, Profit WE. Screening prison inmates for mental disorder: an examination of the relationship between mental disorder and prison adjustment. *Bull Am Acad Psychiatry Law* 1995; **23:** 573–85.

81 Dudeck M, Kopp D, Kuwert P, et al. Die Prävalenz psychischer Erkrankungen bei Gefängnisinsassen mit Kurzzeitstrafe. *Psychiatr Prax* 2009; **36:** 219–24.

82 Duffy D, Linehan S, Kennedy HG. Psychiatric morbidity in the male sentenced Irish prisons population. *Ir J Psychol Med* 2006; **23:** 54–62.

83 Eyestone LL, Howell RJ. An epidemiological study of attention-deficit hyperactivity disorder and major depression in a male prison population. *Bull Am Acad Psychiatry Law* 1994; **22:** 181–93.

84 Falissard B, Loze J-Y, Gasquet I, et al. Prevalence of mental disorders in French prisons for men. *BMC Psychiatry* 2006; **6:** 33.

85 Faulk M. A psychiatric study of men serving a sentence in Winchester prison. *Med Sci Law* 1976; **16:** 244–51.

86 Fido AA, al-Jabally M. Presence of psychiatric morbidity in prison population in Kuwait. *Ann Clin Psychiatry* 1993; **5:** 107–10.

87 Fotiadou M, Livaditis M, Manou I, Kaniotou E, Xenitidis K. Prevalence of mental disorders and deliberate self-harm in Greek male prisoners. *Int J Law Psychiatry* 2006; **29:** 68–73.

88 Ghubash R, El-Rufaie O. Psychiatric morbidity among sentenced male prisoners in Dubai: transcultural perspectives. *J Forensic Psychiatry* 1997; **8:** 440–46.

89 Gibson LE, Holt JC, Fondacaro KM, Tang TS, Powell TA, Turbitt EL. An examination of antecedent traumas and psychiatric comorbidity among male inmates with PTSD. *J Trauma Stress* 1999; **12:** 473–84.

90 Gunn J, Maden A, Swinton M. Treatment needs of prisoners with psychiatric disorders. *BMJ* 1991; **303:** 338–41.

91 Gunn J, Robertson G, Dell S. Psychiatric aspects of imprisonment. Academic Press, 1978.

92 Gunter TD, Arndt S, Wenman G, et al. Frequency of mental and addictive disorders among 320 men and women entering the Iowa prison system: use of the MINI-Plus. *J Am Acad Psychiatry Law* 2008; **36:** 27–34.

93 Guy E, Platt JJ, Zwerling I, Bullock S. Mental health status of prisoners in an urban jail. *Crim Justice Behav* 1985; **12:** 29–53.

94 Haapasalo J. Vankien lapsuuden kaltoinkohtelu kaytosonogelmat ja aikuisian psyykkiset hairiot truama. *Psykologia* 2000; **35:** 45–57.

95 Harper D, Barry D. Estimated prevalence of psychiatric disorder in a prison population. *Abs Crim Pen* 1979; **19:** 237–42.

96 Herrman H, McGorry P, Mills J, Singh B. Hidden severe psychiatric morbidity in sentenced prisoners: an Australian study. *Am J Psychiatry* 1991; **148:** 236–39.

97 Hurley W, Dunne MP. Psychological distress and psychiatric morbidity in women prisoners. *Aust N Z J Psychiatry* 1991; **25:** 461–70.

98 Hurwitz S, Christiansen K. Criminology, 2nd edn. George Allen & Unwin, 1983.

99 Hyde P, Seiter R. The prevalence of mental illness among inmates in the Ohio prison system. Ohio Department of Mental Health, 1987.

100 James JF, Gregory D, Jones RK, Rundell OH. Psychiatric morbidity in prisons. *Hosp Community Psychiatry* 1980; **31:** 674–77.

101 Jordan BK, Schlenger WE, Fairbank JA, Caddell JM. Prevalence of psychiatric disorders among incarcerated women. II. Convicted felons entering prison. *Arch Gen Psychiatry* 1996; **53:** 513–19.

102 Joukamaa M. Psychiatric morbidity among Finnish prisoners with special reference to socio-demographic factors: results of the Health Survey of Finnish Prisoners (Wattu Project). *Forensic Sci Int* 1995; **73:** 85–91.

103 Joukamaa M. Mental health of Finnish prisoners—results of a survey. *J Forensic Psychiatry* 1993; **4:** 261–71.

104 Krefft KM, Brittain TH Jr. A prisoner assessment survey: screenings of a municipal prison population. *Int J Law Psychiatry* 1983; **6:** 113–24.

105 Levander S, Svalenius H, Jensen J. Alarmerande siffror om intagna på svenska fängelser: psykiska skador vanliga bland interner. *Lakartidningen* 1997; **94:** 46–50.

106 Linehan SA, Duffy DM, Wright B, Curtin K, Monks S, Kennedy HG. Psychiatric morbidity in a cross-sectional sample of male remanded prisoners? *Ir J Psychol Med* 2005; **22:** 128–32.

107 Maden T, Swinton M, Gunn J. Psychiatric disorder in women serving a prison sentence. *Br J Psychiatry* 1994; **164:** 44–54.

108 Maden A, Taylor C, Brooke D, Gunn J. Mental disorder in remand prisoners. Home Office Research and Planning Unit, 1996.

109 Mohan D, Scully P, Collins C, Smith C. Psychiatric disorder in an Irish female prison. *Crim Behav Ment Health* 1997; **7:** 229–35.

110 Neighbors H, Williams D, Gunnings T, Lipscomb W, Broman C, Lepkowski J. The prevalence of mental disorder in Michigan prisons. Michigan Department of Corrections, 1987.

111 Motiuk L, Porporino F. The prevalence, nature and severity of mental health problems among federal male inmates in Canadian penitentiaries. Correctional Service of Canada, 1992.

112 Parsons S, Walker L, Grubin D. Prevalence of mental disorder in female remand prisons. *J Forensic Psychiatry* 2001; **12:** 194–202.

113 Piselli M, Elisei S, Murgia N, Quartesan R, Abram KM. Co-occurring psychiatric and substance use disorders among male detainees in Italy. *Int J Law Psychiatry* 2009; **32:** 101–07.

114 Powell TA, Holt JC, Fondacaro KM. The prevalence of mental illness among inmates in a rural state. *Law Hum Behav* 1997; **21:** 427–38.

115 Poythress NG, Hoge SK, Bonnie RJ, Monahan J, Eisenberg M, Feucht-Haviar T. The competence-related abilities of women criminal defendants. *J Am Acad Psychiatry Law* 1998; **26:** 215–22.

116 Rasmussen K, Storsaeter O, Levander S. Psychiatric disorders in a Norwegian prison population. *Nord Psykiatr Suppl* 1998; **41:** 79–80.

117 Robertson G. Correlates of crime among women offenders. *Med Sci Law* 1990; **30:** 165–74.

118 Robins R, Reiger D. Psychiatric disorders in America: the epidemiologic catchment area study. The Free Press, 1991.

119 Roesch R. Mental health interventions in pretrial jails. In: Davies GM, Lloyd-Bostock S, McMurran M, Wilson C, eds. Psychology and law: advances in research. De Greuter, 1995: 520–31.

120 Schoemaker D, VanZessen G. Psychische Stoornissen bij Gedetineerden. Trimbos-Instituut, 1997.

121 von Schönfeld C-E, Schneider F, Schröder T, Widmann B, Botthof U, Driessen M. Prävalenz psychischer Störungen, Psychopathologie und Behandlungsbedarf bei weiblichen und männlichen Gefangenen. *Nervenarzt* 2006; **77:** 830–41.

122 Schuckit MA, Herrman G, Schuckit JJ. The importance of psychiatric illness in newly arrested prisoners. *J Nerv Ment Dis* 1977; **165:** 118–25.

123 Simpson A, Brinded P, Laidlaw T, Fairley N, Malcolm F. The national study of psychiatric morbidity in New Zealand prisons. Department of Corrections, 1999.

124 Smith C, O'Neill H, Tobin J, Walshe D, Dooley E. Mental disorders detected in an Irish prison sample. *Crim Behav Ment Health* 1996; **6:** 177–83.

125 Stompe T, Brandstätter N, Ebner N, Fisher-Danzinger D. Psychiatric disorders in prison inmates. *J Neurol Neurochir Psychiatr* 2010; **11:** 20–23.

126 Swank GE, Winer D. Occurence of psychiatric disorder in a county jail population. *Am J Psychiatry* 1976; **133:** 1331–33.

127 Teplin LA. Psychiatric and substance abuse disorders among male urban jail detainees. *Am J Public Health* 1994; **84:** 290–93.

128 Teplin LA, Abram KM, McClelland GM. Prevalence of psychiatric disorders among incarcerated women. I. Pretrial jail detainees. *Arch Gen Psychiatry* 1996; **53:** 505–12.

129 Trestman RL, Ford J, Zhang W, Wiesbrock V. Current and lifetime psychiatric illness among inmates not identified as acutely mentally ill at intake in Connecticut's jails. *J Am Acad Psychiatry Law* 2007; **35:** 490–500.

130 Van Panhuis P. De psychotische patient in de TBS. Gouda Quint, 1997.

131 Vicens E, Tort V, Dueñas RM, et al. The prevalence of mental disorders in Spanish prisons. *Crim Behav Ment Health* 2011; **21:** 321–32.

132 Washington P, Diamond RJ. Prevalence of mental illness among women incarcerated in five California county jails. *Res Community Ment Health* 1985; **5:** 33–41.

133 Watt F, Tomison A, Torpy D. The prevalence of psychiatric disorder in a male remand population: a pilot study. *J Forensic Psychiatry* 1993; **4:** 75–83.

134 Watzke S, Ullrich S, Marneros A. Gender- and violence-related prevalence of mental disorders in prisoners. *Eur Arch Psychiatry Clin Neurosci* 2006; **256:** 414–21.

135 Wilkins J, Coid J. Self-mutilation in female remanded prisoners: an indicator of severe psychopathology. *Crim Behav Ment Health* 1991; **1:** 247–67.

136 Wright B, Duffy D, Curtin K, Linehan S, Monks S, Kennedy HG. Psychiatric morbidity among women prisoners newly committed and amongst remanded and sentenced women in the Irish prison system. *Ir J Psychol Med* 2006; **23:** 47–53.

137 Zoccali R, Muscatello MRA, Bruno A, et al. Mental disorders and request for psychiatric intervention in an Italian local jail. *Int J Law Psychiatry* 2008; **31:** 447–50.

138 Agbahowe SA, Ohaeri JU, Ogunlesi AO, Osahon R. Prevalence of psychiatric morbidity among convicted inmates in a Nigerian prison community. *East Afr Med J* 1998; **75:** 19–26.

139 Assadi SM, Noroozian M, Pakravannejad M, et al. Psychiatric morbidity among sentenced prisoners: prevalence study in Iran. *Br J Psychiatry* 2006; **188:** 159–64.

140 Banerjee A, Sengupta P, Ray TK. Persons with major psychiatric illness in prisons: a three years study. *J Indian Med Assoc* 2009; **107:** 14–16.

141 Bermúdez EC, Mendoza MPR, Ruiz EMR, Durand-Smith AL, Hernández GJS. Female depression and substance dependence in the Mexico penitentiary system. *Salud Ment* 2007; **30:** 53–61.

142 Pondé MP, Freire ACC, Mendonça MSS. The prevalence of mental disorders in prisoners in the city of Salvador, Bahia, Brazil. *J Forensic Sci* 2011; **56:** 679–82.

143 Sharma A, Nijahawan M, Sharma DK, Sushil CS. Psychosocial and psychiatric aspect of criminal behavior. *Indian J Psychiatry* 2010; **52:** 37.

144 Zahari MM, Hwan Bae W, Zainal NZ, Habil H, Kamarulzaman A, Altice FL. Psychiatric and substance abuse comorbidity among HIV seropositive and HIV seronegative prisoners in Malaysia. *Am J Drug Alcohol Abuse* 2010; **36:** 31–38.

145 Whiting D, Gulati G, Geddes JR, Fazel S. Association of schizophrenia spectrum disorders and violence perpetration in adults and adolescents from 15 countries: a systematic review and meta-analysis. *JAMA Psychiatry* 2022; **79:** 120–32.

146 Favril L. Drug use before and during imprisonment: drivers of continuation. *Int J Drug Policy* 2023; **115:** 104027.

147 United Nations Office on Drugs and Crime. The United Nations standard minimum rules for the treatment of prisoners (the Nelson Mandela Rules). Dec 17, 2015. https://www.unodc.org/documents/justice-and-prison-reform/Nelson_Mandela_Rules-E-ebook.pdf (accessed Nov 12, 2024).

148 Brinkley-Rubinstein L, McKenzie M, Macmadu A, et al. A randomized, open label trial of methadone continuation versus forced withdrawal in a combined US prison and jail: findings at 12 months post-release. *Drug Alcohol Depend* 2018; **184:** 57–63.

149 Martin MS, Colman I, Simpson AI, McKenzie K. Mental health screening tools in correctional institutions: a systematic review. *BMC Psychiatry* 2013; **13:** 275.

150 Yoon IA, Slade K, Fazel S. Outcomes of psychological therapies for prisoners with mental health problems: a systematic review and meta-analysis. *J Consult Clin Psychol* 2017; **85:** 783–802.

151 Favril L, Rich JD, Hard J, Fazel S. Mental and physical health morbidity among people in prisons: an umbrella review. *Lancet Public Health* 2024; **9:** e250–60.

152 Livingston JD. Contact between police and people with mental disorders: a review of rates. *Psychiatr Serv* 2016; **67:** 850–57.

153 Hoch JS, Hartford K, Heslop L, Stitt L. Mental illness and police interactions in a mid-sized Canadian city: what the data do and do not say. *Can J Commun Ment Health* 2009; **28:** 49–66.

154 Brown P, Bakolis I, Appiah-Kusi E, Hallett N, Hotopf M, Blackwood N. Prevalence of mental disorders in defendants at criminal court. *BJPsych Open* 2022; **8:** e92.

155 Chaplin E, McCarthy J, Ali S, et al. Severe mental illness, common mental disorders, and neurodevelopmental conditions amongst 9088 lower court attendees in London, UK. *BMC Psychiatry* 2022; **22:** 551.

156 Borschmann R, the Mortality After Release from Incarceration Consortium (MARIC) collaborators, Kinner SA. Rates and causes of death after release from incarceration among 1471526 people in eight high-income and middle-income countries: an individual participant data meta-analysis. *Lancet* 2024; **403:** 1779–88.

157 Yukhnenko D, Blackwood N, Lichtenstein P, Fazel S. Psychiatric disorders and reoffending risk in individuals with community sentences in Sweden: a national cohort study. *Lancet Public Health* 2023; **8:** e119–29.

158 Stewart AC, Cossar RD, Wilkinson AL, et al. The Prison and Transition Health (PATH) cohort study: prevalence of health, social, and crime characteristics after release from prison for men reporting a history of injecting drug use in Victoria, Australia. *Drug Alcohol Depend* 2021; **227:** 108970.