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The incidence and prevalence of hepatitis C in prisons and other closed settings: Results of a systematic review and meta-analysis

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Abstract

People detained in prisons and other closed settings are at elevated risk of infection with hepatitis C virus (HCV). We undertook a systematic review and meta-analysis with the aim of determining the rate of incident HCV infection and the prevalence of anti-HCV among detainees of closed settings. We systematically searched databases of peer-reviewed literature and widely distributed a call for unpublished data. We calculated summary estimates of incidence and prevalence among general population detainees and detainees with a history of injecting drug use (IDU), and explored heterogeneity through stratification and meta-regression. The summary prevalence estimates were used to estimate the number of anti-HCV positive prisoners globally. HCV incidence among general detainees was 1·4 per 100 person-years (py; 95% CI: 0·1, 2·7; k=4), and 16·4 per 100py (95% CI: 0·8, 32·1; k=3) among detainees with a history of IDU. The summary prevalence estimate of anti-HCV in general detainees was 26% (95% CI: 23%, 29%; k=93), and in detainees with a history of IDU, 64% (95% CI: 58%, 70%; k=51). The regions of highest prevalence were Central Asia (38%; 95% CI 32%, 43%; k=1) and Australasia (35%; 95% CI: 28%, 43%; k=9). We estimate that 2·2 million (range: 1·4 million – 2·9 million) detainees globally are anti-HCV positive, with the largest populations in North America (668,500; range: 553,500–784,000) and East and Southeast Asia (638,000; range: 332,000–970,000).

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Conclusion—HCV is a significant concern in detained populations, with one in four detainees anti-HCV positive. Epidemiological data on the extent of HCV infection in detained populations is lacking in many countries. Greater attention towards prevention, diagnosis and treatment of HCV infection among detained populations is urgently required.

Keywords

epidemiology; people who inject drugs; prisoners; injecting drug use; viral hepatitis

An estimated 2–3% of people are infected with the hepatitis C virus (HCV) globally (1, 2). The primary routes of transmission are injecting drug use (IDU) and, in developing countries, medical procedures using non-sterile syringes and needles (3). Perhaps two-thirds of the approximately 16 million people who inject drugs are HCV antibody (anti-HCV) positive (4, 5).

Prisons and other closed settings (i.e. prisons, jails, juvenile detention facilities, pre-trial detention centres and extra-judicial detention centres for people who use drugs (6); psychiatric institutions and immigration detention are not included in this definition for our purposes) are of particular importance in understanding the HCV epidemic due to the high prevalence of risk behaviours in the detainee population. A history of IDU is common among detainees (7) and injecting may continue while detained (8–10), with attendant disease transmission risks. Tattooing in closed settings may also be a risk factor for HCV transmission (11, 12). Finally, there is increasing evidence of a significant risk of HCV transmission among HIV-infected men who have sex with men (13); given the often high background prevalence of both infections and the lack of condom access in closed settings, this is potentially a serious concern.

Despite the evidence of risk, there have been limited efforts to examine the global extent of this problem. A clearer understanding of the epidemiology of HCV in closed settings is essential for determining the scale of the problem, providing a basis for public advocacy efforts and the development of prevention and treatment interventions. This is particularly so in light of recent advances in HCV therapies and the promise of all-oral, interferon-free treatment in the near future (14, 15). We undertook a systematic review and meta-analysis with the aim of determining the rate of incident HCV infection and the prevalence of anti-HCV among detainees of closed settings.

Methods

This study is reported in line with the PRISMA checklist (16). Throughout this paper, we use the term ‘detainees’ to refer to the population of people detained in closed settings. This term was selected as it is inclusive of people who are incarcerated in prisons and jails, as well as those held in less common and less well-known types of closed settings.

We used multiple search strategies to identify relevant literature. Four databases of peer-reviewed literature (Medline, Embase, Criminal Justice Abstracts and the National Criminal Justice Reference Service) were searched in July 2012. Search strings were developed in consultation with a librarian at the National Drug and Alcohol Research Centre, University of New South Wales. Search strings for Medline and Embase were adapted from Nelson et al. (5) (see supplementary materials for additional details). Additionally, reference lists of prior reviews on this topic (17–19) were examined and the literature database of the HCV Synthesis Project (20) was searched for citations potentially relevant to closed settings.

Grey literature, defined as publications and communications that are not formally published by commercial publishers or peer-reviewed journals, was identified through searches of

websites of relevant organizations (e.g. European Monitoring Centre for Drugs and Drug Addiction), regional literature databases (e.g. Latin American and Caribbean Health Sciences), online conference archives (e.g. International AIDS Society conferences) and country-specific government departments (21).

Finally, an email was sent to relevant contacts of all authors, requesting data that may not have been identified in our search. The email was redistributed by the initial recipients as they saw appropriate. Data collection ceased in September 2012.

Study selection

Initial literature search results were catalogued using Endnote X5. Titles and abstracts were screened by SL, HK and a research intern to produce a shortlist of potentially relevant sources. Sources that were clearly outside the remit of the review (e.g. editorial in nature; did not contain primary data) were excluded. Full-text versions of shortlisted sources were retrieved and read in full to determine eligibility for inclusion in the review. For sources in languages other than English, determination of eligibility was based on information available in published English translations of abstracts.

Sources were eligible for inclusion if they: reported data from a closed setting (defined as a prison, jail, juvenile detention facility, pre-trial detention centre or extra-judicial detention centre for people who use drugs (6, 22)); conducted serological or saliva testing for anti-HCV; and presented an estimate of anti-HCV prevalence or HCV incidence (defined as HCV antibody seroconversion) among either general population detainees or detainees with a history of IDU. General population samples were those that included any detainee of a closed setting without selection by history of drug use or offence type. Incidence sources were restricted to those in which seroconversion was known to have occurred while detained; that is, the source sample included only persons who were continuously detained from baseline to follow-up, and measures were taken to exclude the possibility of seroconversion prior to incarceration. There were no restrictions on year or language of publication, or the age of the sampled population.

Sources were ineligible if they: were based on secondary data, self-reported HCV status or notifications of HCV infections (e.g. to infectious diseases databases); reported the results of HCV RNA testing without results of anti-HCV testing; or reported HCV incidence in case studies or cohorts of people who were not continuously detained throughout study follow-up. Sources with sample sizes of less than 40 or with no information regarding sample size were also ineligible (5). Several repeated surveys (i.e. re-sampling of the same closed settings using the same sampling strategy over time) were identified during the literature search. In these cases, only the most recent data were included in meta-analyses. The list of included sources was circulated to the authors in September 2012 for final approval.

Data extraction

Data from all sources were extracted by SL and checked for accuracy by HK, with discrepancies resolved through discussion and referral to LD as necessary. For each source, sample characteristics were extracted, including ‘types’ of detainees sampled (e.g. general population, detainees with a history of IDU), age (adult or juvenile sample, median and/or mean age) and sex.

Data were extracted for all detainee ‘types’ within each sample; for example, a source presenting data on a general population sample with a sub-sample of detainees with a history of IDU would have data extracted for both the general population sample and the sub-sample. For mixed-sex samples, data were extracted for the total sample and also

disaggregated by sex, if possible. If disaggregation by detainee type or sex resulted in a sample size of less than 40, that sub-sample was excluded.

For sources reporting incidence data, the sample size, number of incident HCV cases, person-years of observation and incidence rate were extracted. For prevalence sources, the sample size, number of anti-HCV positive participants and prevalence were extracted. Some sources did not report all incidence or prevalence variables; in these cases, missing variables were calculated from other reported values (i.e. numerator calculated from reported denominator and prevalence).Study design and sampling variables (geographical region; type of closed setting; prospectively or retrospectively defined cohort; random or convenience sampling; restriction of recruitment to serving inmates or new entrants; year/s of data collection; percentage of sample male and percentage injecting) were extracted in order to explore heterogeneity in reported HCV incidence and prevalence. Geographical regions were defined consistent with other recent global epidemiological reviews (4, 5).

Data analysis

Data analyses were conducted in Stata version 12 (StataCorp LP, Texas USA) using the *metan* (23) and *metareg* (24) commands. Given the expected heterogeneity between studies, all meta-analyses were performed using random effects models, which account for inter-study variation. Meta-analyses of HCV incidence were undertaken for sources reporting on general population detainees and detainees with a history of injecting drug use. Heterogeneity was assessed using the I^2 statistic, which describes the percentage of variation between studies that is due to heterogeneity rather than chance (25). Interpretation of I^2 was as in Higgins *et al.* (25). The small number of sources of incidence data prevented further stratification or meta-regression.

Meta-analyses of anti-HCV prevalence were conducted for general population detainees and detainees with a history of IDU, stratified by geographical region. Heterogeneity was assessed using the I^2 statistic, as above, and also explored through meta-regression. Variables used in meta-regressions were cohort ascertainment (prospective vs. retrospective); sampling (random vs. convenience); detainee status at the time of recruitment (current detainees or current detainees and new entrants vs. new entrants only); type of HCV antibody test undertaken (blood/sera vs. saliva); mean or median age of the sample; percentage of the sample that was male; percentage of the sample with a history of IDU; and year of completion of data collection. For sources where this latter variable was not reported, it was assumed that data collection ceased two years prior to year of publication (26). Sex-specific summary prevalence estimates were calculated using sources that reported on male- or female-only samples. We had planned to determine summary prevalence estimates for detainees of extra-judicial detention centres for people who use drugs; however, there were very few relevant data sources. Results for these sources are instead presented descriptively.

A meta-analysis was undertaken to determine the summary anti-HCV prevalence estimate in juvenile detainees, with heterogeneity examined via meta-regression using the same independent variables as for adult samples. There were few data sources reporting on juvenile detainees with a history of IDU; results from these sources are presented descriptively.

To estimate the number of anti-HCV positive detainees globally, we obtained data on regional prisoner populations from the World Prison Brief of the International Centre for Prison Studies (http://www.prisonstudies.org). The World Prison Brief does not include detainees of extra-judicial detention centres for people who use drugs; thus this estimate relates only to the prisoner population. We applied our regional prevalence estimates for

general population detainees (who, by definition, are not detainees of extra-judicial detention centres) to the number of prisoners in each region. For regions without prevalence data, the global general population prevalence estimate was applied to the number of prisoners in the region.

Results

Searches of the peer-reviewed literature returned 2,314 data sources potentially relevant to the review. A further 37 data sources were identified from the grey literature or via emails from key experts. Following removal of duplicates, there were 2,008 data sources; of these, 1,784 were excluded on the basis of the abstract, leaving 224 sources which were assessed in full. Ninety-three sources were excluded, for reasons shown in Figure 1, leaving 128 eligible sources: five reported on HCV incidence in continuously detained persons, and 126 reported on anti-HCV prevalence among detainees of prisons and other closed settings (i.e. three sources reported on both incidence and prevalence) (Figure 1). Sources reported data for 39 countries (see supplementary materials); 21 sources were in languages other than English. Fifteen of the included sources were obtained from the grey literature; they included reports of government agencies, conference abstracts, academic reports and personal communications. Half the sources were published from 2004 onwards (see supplementary materials). Details of studies included in each meta-analysis described below are available in the supplementary materials.

HCV incidence

Four sources provided data on HCV incidence in general detainee samples, and three provided data from samples of inmates who inject drugs. Incidence among general detainees ranged from 0·04 per 100 person-years (py) to 4·5 per 100py. The summary incidence estimate was 1·4 per 100py (95% CI: 0·1, 2·7), with moderate heterogeneity (I^2=62%, 95% CI: 0%, 87%) (Figure 2). Incidence among detainees with a history of IDU ranged from 5·5 per 100py to 34·2 per 100py. The summary incidence estimate was 16·4 per 100py (95% CI: 0·8, 32·1), with moderate heterogeneity (I^2=67%, 95% CI: 0%, 90%) (Figure 2).

HCV antibody prevalence

There were 93 sources of data for anti-HCV prevalence among general detainee samples. The summary anti-HCV prevalence estimate among general population detainees was 26% (95% CI: 23%, 29%), with high heterogeneity (I^2=100%, 95% CI: 100%, 100%) (Figure 3). A sub-analysis by geographical region revealed wide variations in prevalence. The lowest estimated regional prevalence was 3% (95% CI: 2%, 5%) in the Middle East and North Africa; however, this was based on only one source (27). The highest estimated regional prevalence was 38% (95% CI: 32%, 43%) in Central Asia; again, this was based on only one source (personal communication, S. Karymbaeva, September 15 2012). The most important source of heterogeneity was the proportion of the sample with a history of injecting drug use (meta-regression coefficient=0·005, p<·0001, adjusted R^2=49·23%) (Table 1); year of data collection was also a significant source of heterogeneity, with more recent sources having lower anti-HCV prevalence (meta-regression coefficient=&0·009, p=0·001, adjusted R^2=12·57%). Prevalence was also lower in sources with data derived from random samples compared to convenience samples (18% vs 28%, meta-regression coefficient 0·096, p=0·042, adjusted R^2=3·92%).

Among general detainee data sources, 62 contributed data for male-only samples, with a summary prevalence estimate of 24% (95% CI: 21%, 27%; I^2=99%,95% CI: 99%, 99%). There were 37 female-only samples, and estimated summary prevalence was 32% (95% CI: 26%, 38%; I^2=98%, 95% CI: 98%, 99%).

Fifty-one sources contributed data on anti-HCV prevalence among detainees with a history of IDU. History of IDU was determined through self-report in 49 sources, and physician examination in two sources. The estimated summary anti-HCV prevalence was 64% (95% CI: 58%, 70%), with high heterogeneity I^2=99%, 95% CI: 99%, 99%) (Figure 4). Regional prevalence estimates ranged from 23% (95% CI: 16%, 31%) in Latin America to 73% (95% CI: 64%, 81%) in Western Europe. Prevalence was lower in more recent sources (meta-regression coefficient=−0·139, p=0·007, R^2=12·67%) (Table 1). The summary prevalence estimate in men with history of IDU (26 sources) was 67% (95% CI: 58%, 75%; I^2=99%, 95% CI: 99%, 99%); among women with a history of IDU (seven sources), it was 64% (95% CI: 52%, 77%; I^2=94%, 95% CI: 90%, 96%).

Only two eligible data sources reported anti-HCV prevalence in extra-judicial detention centres for people who use drugs. In Chu et al. (28), anti-HCV prevalence among 753 male detainees of a Taiwanese centre was 31% (95% CI: 27%, 34%); among detainees with a history of IDU (n=192), it was 90% (95% CI: 84%, 94%). In an Iranian centre for male injecting drug users, anti-HCV prevalence was 80% (363/454; 95% CI: 76%, 84%)(29).

Among juvenile detainee samples (n=18), estimated summary prevalence was 4% (95% CI: 3%, 6%) with high heterogeneity (I^2=92%, 95% CI: 88%–94%). The only significant variable in meta-regressions was the proportion with IDU history (meta-regression co-efficient 0·004, p=0·032, adjusted R^2=52·3%). Among juvenile detainees with a history of IDU (two sources) prevalence was 66% (45/68; 95% CI: 54%, 77%) in a mixed-sex sample in Bulgaria (30) and 36% (19/53; 95% CI: 24%, 49%) in a male sample from Australia (31).

Table 2 shows the regional coverage of our data sources and prevalence of anti-HCV among detainees. Extrapolating our findings to the global prisoner population, we estimate that 2·2 million prison detainees are anti-HCV positive (range 1·4 million–2·9 million) (Table 3). The largest populations of anti-HCV positive prisoners are in North America (668,500 persons, range 553,500–784,000) and East and South-East Asia (638,000 persons, range 332,000–970,000).

Additional analyses of anti-HCV prevalence among detainees who have injected drugs or obtained tattoos while detained are provided in the supplementary materials.

Discussion

Hepatitis C virus infection is an extensive problem among detainees of prisons and other closed settings globally. One in four detainees overall, and two in three detainees with a history of drug injection, are anti-HCV positive. With at least 10 million people detained in prisons or other closed settings at any point in time (32), this translates to 2·2 million prisoners being anti-HCV positive; several times that number pass through a closed setting each year, making transmission both in and outside of detention a serious concern.

HCV incidence

We found consistent evidence that incident HCV infection occurs in closed settings, particularly among detainees who inject drugs. Widespread implementation of preventive measures is urgently needed to address HCV transmission in prisons and other closed settings. Multi-component interventions that combine evidence-based drug dependence treatment and access to sterile needles and syringes are most effective in reducing HCV seroconversion among people who inject drugs (33, 34). These interventions can be provided safely in closed settings and have the additional benefit of reducing HIV transmission risk (35, 36), but have rarely been implemented (37, 38). Although there is

value in providing risk reduction education and counselling to detainees, this approach alone is not considered sufficient to prevent HCV transmission (34).

Anti-HCV prevalence

In addition to their role in HCV prevention, our findings suggest that closed settings are important sites for the diagnosis and treatment of prevalent infection. Voluntary HCV testing of detainees has the potential to vastly increase the number of people who are aware of their infection, enabling them to take steps to address their personal risks for disease progression (e.g. alcohol use) and to prevent onward transmission, both in closed settings and following their return to the community. HCV testing is warranted at entry to a closed setting, and persons who are anti-HCV negative should be offered testing periodically or if clinically indicated in order to identify incident infection. Detainees screening positive for anti-HCV should be offered vaccination against hepatitis A and B; and information regarding risks for disease progression and onward transmission. If identified, acute HCV infection should be treated, as sustained virological response rates are higher than observed in the treatment of chronic infection (39).

Treatment for chronic HCV infection can be provided in closed settings with sustained virological response rates comparable to those in community settings (40, 41). Providing treatment in closed settings would not only aid detainees but also generate substantial public health benefits, including reducing the pool of infection (thereby reducing the likelihood of exposure among people engaging in risk behaviours) and reducing the burden of disease associated with chronic HCV infection. There are, however, substantial barriers to widespread implementation of treatment. HCV treatment remains costly and places significant financial burdens on the healthcare budgets of closed settings. Additionally, aspects of life in detention such as high detainee turnover, unpredictable access to healthcare workers, lockdowns, and inadequate nutrition may interfere with demanding treatment regimens that require medication to be taken at regular intervals and careful monitoring of side effects. Meeting these challenges will be crucial as we enter a new era of HCV therapy (14), as widespread treatment in closed settings has the potential to dramatically reduce the burden of HCV-related disease and should be a public health priority.

Extra-judicial detention centres for people who use drugs

Only two sources presented data on anti-HCV prevalence among detainees of extra-judicial detention centres for people who use drugs. In these two studies, prevalence was 80% and 90%-higher than the overall summary estimate of anti-HCV prevalence among detainees with a history of injecting drug use. There are few data enumerating the total population of these detention centres, which exist in China, Lao PDR, Vietnam, Iran, Taiwan and Thailand, among others (4, 22). In China alone, perhaps 300,000 people who use drugs are detained in these centres annually; in Vietnam, in excess of 60,000 people are detained at any one time (4). It is a matter of great concern that there were so few data sources relating to detainees of extra-judicial detention centres for people who use drugs, and that the two available data sources indicated extremely high anti-HCV prevalence. This finding supports the United Nations call for the closure of extra-judicial detention centres for people who use drugs and, pending closure, dramatic improvements in the health services provided to detainees (42).

Limitations

A limitation of this study is variation in the manner in which HCV incidence and prevalence data were collected and reported in primary sources. The majority of included sources employed convenience sampling, and so sampled detainees may not have been representative of the broader detainee population. Reinforcing this point, sources reporting

data from random samples of general population detainees had significantly lower anti-HCV prevalence than sources with convenience samples.

We used all identified data sources to estimate the summary prevalence of anti-HCV; however, older studies reported higher anti-HCV prevalence than more recent studies. As a result, our summary prevalence estimates may over-estimate the true anti-HCV burden. In evaluating our estimates, it is also important to note that very few data sources were located for some regions known to have high prevalence of anti-HCV among people who inject drugs, such as East and South-east Asia (5). Despite a broad-based search strategy, no data were located for several countries with large incarcerated populations, including Russia, which has the world's second largest prisoner population, and China, which, as noted above, operates a large network of extra-judicial detention centres for people who use drugs in addition to correctional facilities operating under the criminal justice system. No data could be located for countries of the Caribbean and the Pacific Islands. Even in well-represented regions, such as Western Europe and North America, data frequently related to single institutions or institutions within a defined geographical area. Systematic data collection at the country or jurisdictional level is urgently required to allow for accurate appraisal of the scale of this issue, and to inform policy and clinical responses.

Conclusion

The burden of hepatitis C virus in detained populations, particularly in areas where injecting drug use is highly prevalent among detainees, is a major public health concern. Despite this, epidemiologic data on the extent of HCV infection in detained populations is lacking in many countries. The global response to HCV in closed settings has been limited, with few countries implementing the necessary preventive interventions or providing treatment for HCV-infected detainees. Greater attention towards HCV prevention, diagnosis, and effective delivery of treatment to detained populations is urgently required.

Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

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Abbreviations

HCV	hepatitis C virus
IDU	injecting drug use
HIV	human immunodeficiency virus
PRISMA	Preferred Reporting Items for Systematic Reviews and Meta-analyses
py	person-years

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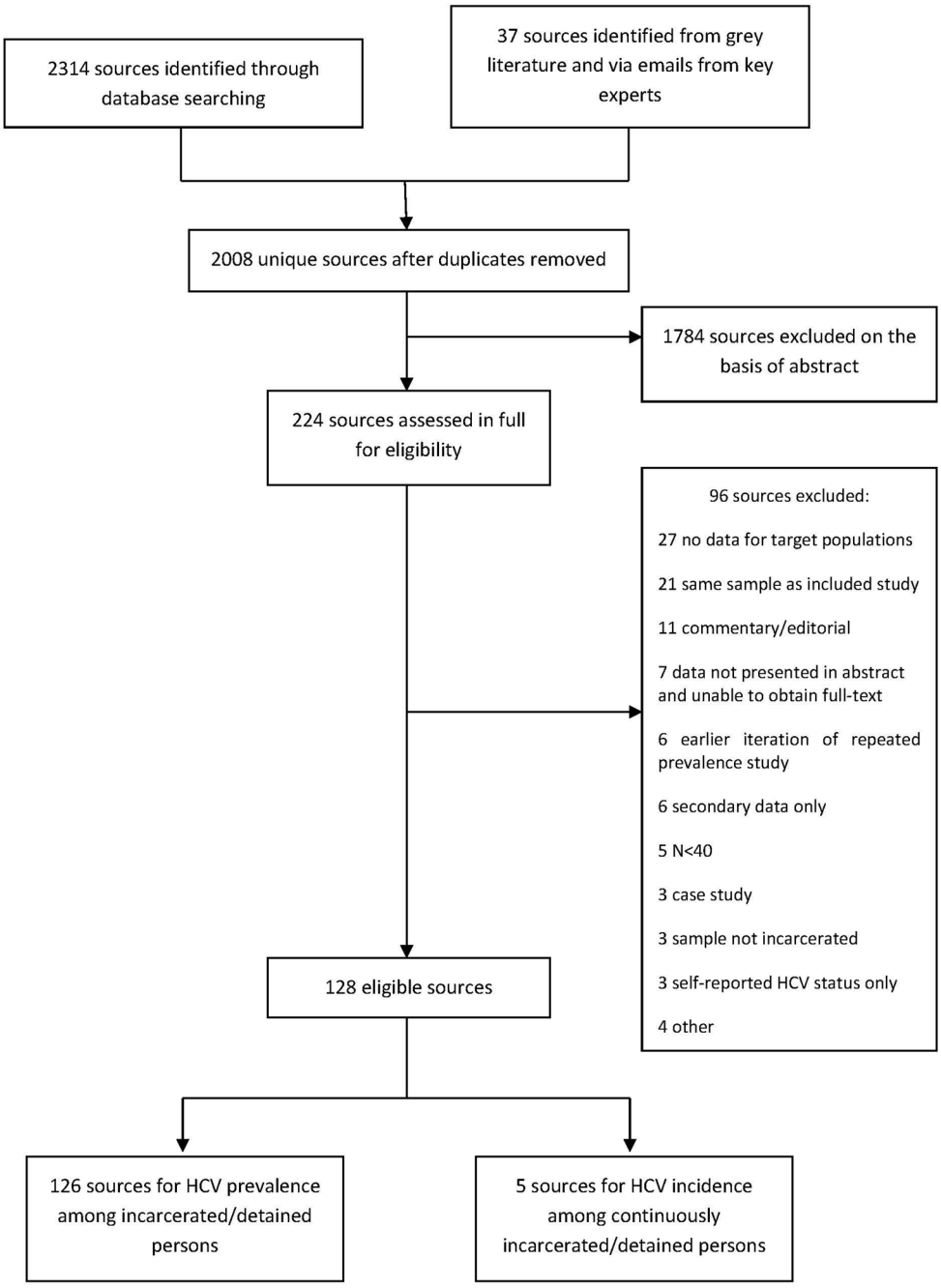

Figure 1.
Selection of studies for inclusion in systematic review of hepatitis C virus prevalence and incidence in prisons and other closed settings

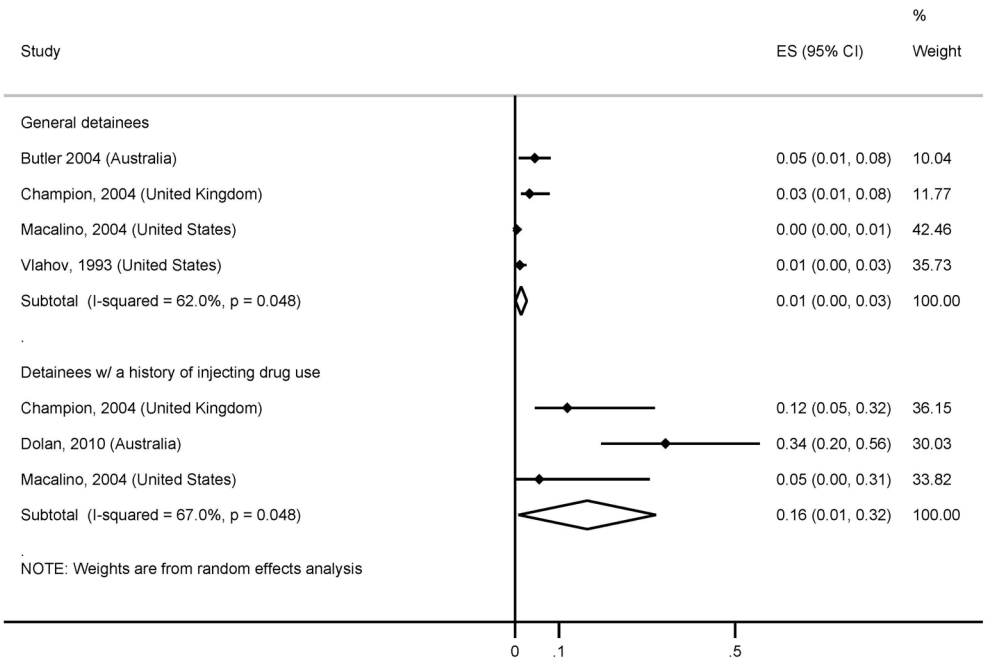

Figure 2. Hepatitis C virus antibody incidence in general population detainees and detainees with a history of injecting drug use

Notes: ES; effect size

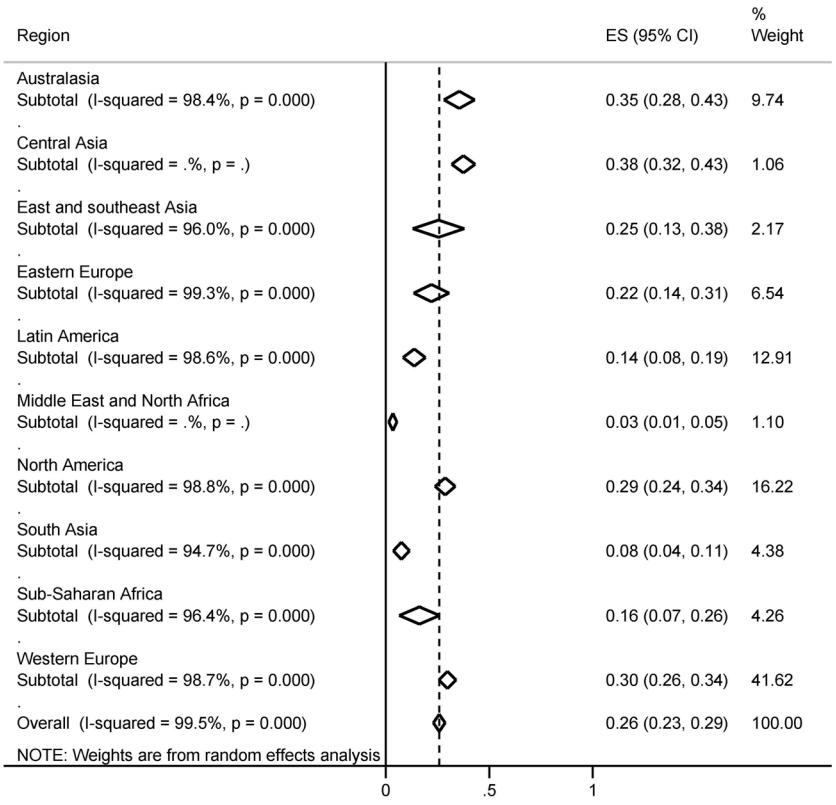

Figure 3. HCV antibody prevalence estimates for adult general population detainees, by region and in total

Notes: Based on 93 sources. No sources were identified for the Pacific Islands or the Caribbean. Details of included sources available in supplementary materials. ES; effect size

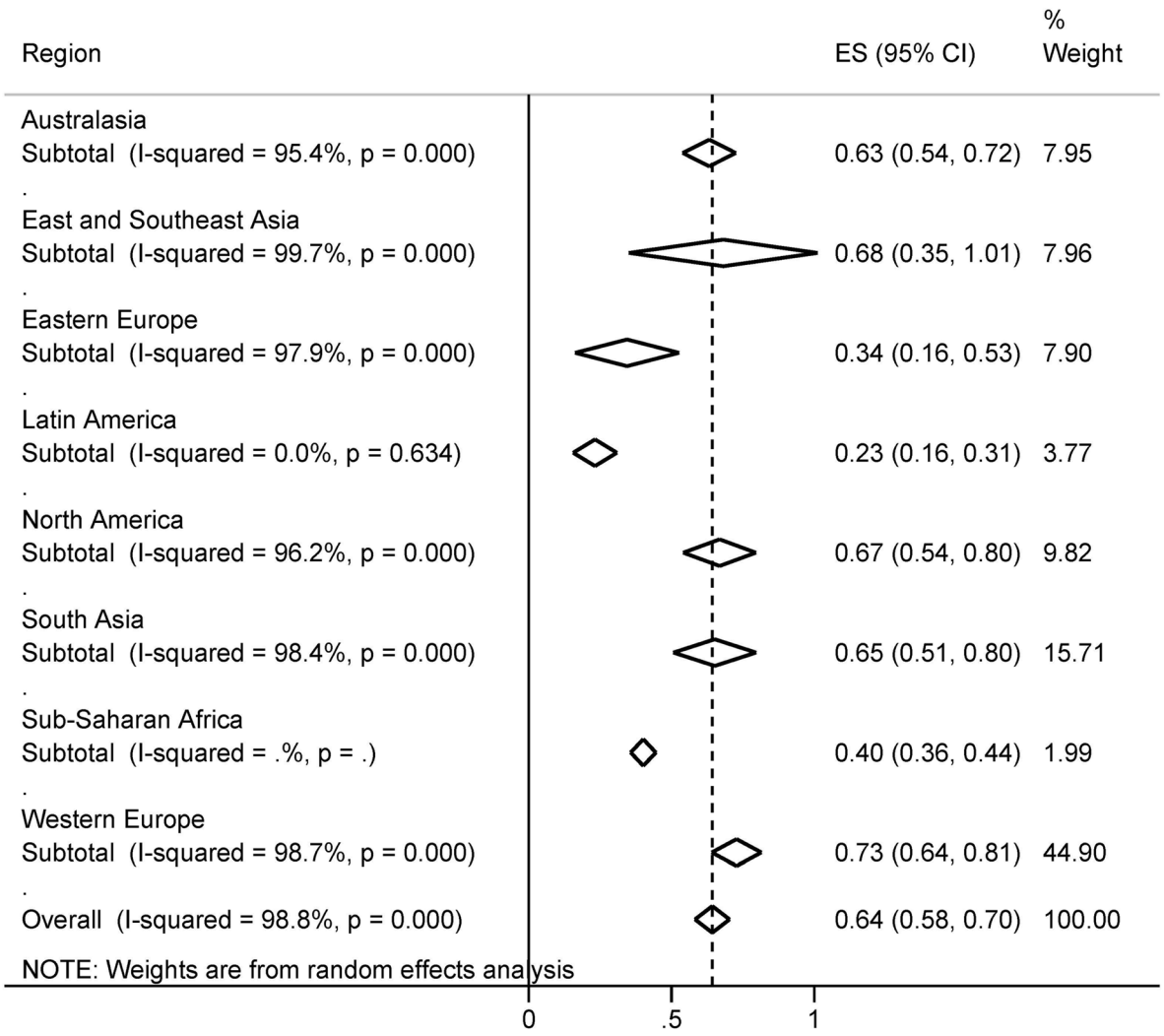

Figure 4. Pooled HCV antibody prevalence estimates for adult detainees with a history of injecting drug use, by region and in total

Notes: Based on 51 sources. No sources were identified for countries of Central Asia, the Middle East and North Africa, the Pacific Islands or the Caribbean. Details of included sources available in supplementary materials. ES; effect size

Table 1

Meta-regression for HCV antibody prevalence in adult general population detainees and adult detainees with a history of injecting drug use

	General population detainees					Detainees with a history of IDU				
	N sources	Anti-HCV prevalence % (95% CI)	Meta-regression coefficient	Adj. R^2	*p*	N sources	Anti-HCV prevalence % (95% CI)	Meta-regression coefficient	Adj. R^2	*p*
Retrospective cohort	11	31 (22, 40)				3	67 (43, 91)			
Prospective cohort	79	25 (22, 28)	−0·055	0·31%	0·267	46	65 (59, 72)	−0·016	−2·16%	0·900
Random sample	11	18 (10, 26)				4	67 (44, 90)			
Convenience sample	70	28 (24, 31)	0·096	3·92%	0·042	43	67 (61, 73)	−0·003	−2·25%	0·977
Blood/sera	69	24 (21, 27)				37	65 (58, 72)			
Saliva	8	20 (14, 26)	0·035	−0·80%	0·505	5	58 (38, 78)	0·074	−1·05%	0·457
Current only or mixed current/entrant	35	24 (19, 29)				14	63 (50, 76)			
New entrants only	23	30 (25, 34)	0·047	1·03%	0·206	16	76 (69, 82)	0·126	8·12%	0·073
Mean/median age	46	-	0·003	−1·97%	0·707	8	-	0·00003	−17·01%	0·999
Percentage male	79	-	−0·0008	1·61%	0·139	26	-	0·001	−1·04%	0·413
Percentage with history of IDU	50	-	0·005	49·23%	<·0001	-	-	-	-	-
Year of data collection completion *										
Pre-1995	16	38 (32, 45)				7	77 (65, 88)			
1995–1999	23	25 (19, 31)				13	68 (54, 82)			
2000–2004	21	27 (22, 32)				15	65 (55, 75)			
2005–2012	33	20 (17, 23)	−0·009	12·57%	<·0001	16	55 (44, 66)	−0·139	12·67%	0·007

N studies varies due to variable reporting in data sources. HCV, hepatitis C virus. IDU, injecting drug use.

* Meta-regressions conducted using year of data collection completion as a continuous variable. Year categories based on five-year increments except for 2005–2012. Year category prevalence estimates and confidence intervals determined via stratified meta-analysis.

Table 2

Estimated global and regional prevalence of hepatitis C virus antibodies among prison detainees

	N included sources	% of general detainee populations with HCV antibody prevalence data	Pooled HCV antibody prevalence (95% CI)	Prison detainee population	Estimated number of HCV antibody positive prison detainees		
					Low	Mid	High
Sub-Saharan Africa	4	8	16 (7, 26)	785,00	55,000	125,500	204,000
Western Europe	39	92	30 (26, 34)	478,500	124,500	143,500	162,500
Eastern Europe	6	16	22 (14, 31)	1,199,000	168,000	263,500	371,500
Latin America	12	68	14 (8, 19)	1,161,000	93,000	162,500	220,500
Australasia	9	78	35 (28, 43)	37,500	10,500	13,000	16,000
North America	14	100	29 (24, 34)	2,306,00	553,500	668,500	784,000
South Asia	4	56	8 (4, 11)	827,000	33,000	66,000	91,000
Middle East and North Africa	1	1	3 (1, 5)	491,500	5,000	14,500	24,500
East and Southeast Asia	2	8	25 (13, 38)	2,552,000	332,000	638,000	970,000
Central Asia	1	8	38 (32, 43)	123,500	39,500	47,000	53,000
Pacific Islands	-	0	-	8,500	-	-	-
Caribbean	-	0	-	34,000	-	-	-
Extrapolated global	**92**	**45**	**26 (23, 29)**	**10,004,000**	**1,423,000**	**2,154,500**	**2,910,000**

Note: ‘Prison’ includes all institutions for adults charged with, awaiting trial or sentenced for a criminal offence. It does not include compulsory detoxification centres. All figures rounded to the nearest 500 people. Extrapolated global figure totalled from regional estimates prior to rounding. “-“ indicates there were no data on HCV prevalence located in this region. These regions were included in the extrapolated global estimate by applying the total estimated HCV prevalence to the prison detainee population for these regions. Data on detainee populations obtained from the World Prison Brief of the International Centre for Prison Studies (http://www.prisonstudies.org/).