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Benefits following community treatment orders have an inverse relationship with rates of use: meta-analysis and meta-regression

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Background

Community treatment order (CTO) use in Australia and New Zealand ranges from less than 40 per 100 000 population in Western Australia and Canterbury to over 100 per 100 000 in Victoria, South Australia and Waitemata. Recent publications on CTO use now permit a meta-regression to investigate whether differences in CTO use by jurisdiction affect either the possible predictors or outcomes of CTOs.

Aims

To assess whether factors associated with CTO placement or subsequent outcomes vary by rates of use.

Method

A systematic search of PubMed/Medline, Embase, CINAHL, the Cochrane Central Register of Controlled Trials and PsycINFO for any Australian or New Zealand study comparing CTO cases with controls receiving voluntary psychiatric treatment. This study was prospectively registered with PROSPERO (protocol registration number: CRD42022351500).

Results

There were 35 articles from 16 studies identified in the search, plus unpublished data from a further study. Of these, 29 publications were included in meta-analyses. Two were from New Zealand. People who were male, single and not engaged in work, study or home duties were significantly more likely to be on CTOs. In addition, those from migrant backgrounds were 47% more likely to be on an order. On meta-regression, cases in jurisdictions with higher CTO rates had higher proportions of females or individuals with diagnoses other than non-affective psychoses. High-use jurisdictions were also less likely to show reductions in readmission rates or bed-days.

Conclusions

There are marked differences in the possible predictors and outcomes of CTO placement between high- and low-use jurisdictions in Australia and New Zealand. These findings may have implications elsewhere and indicate that better-targeted CTO placement might improve outcomes.

Keywords

Community treatment orders; out-patient commitment; compulsory community treatment; ethnic minority; Indigenous Australian.

Australia and New Zealand have some of the highest rates of community treatment orders (CTOs) worldwide, despite the mixed evidence for the efficacy of these orders.[1,2] In an earlier meta-analysis of the predictors and outcomes of CTOs in both countries,[3] people who were male, single and not engaged in work, study or home duties were significantly more likely to be subject to a CTO. In addition, those from a migrant or culturally and linguistically diverse (CALD) background were nearly 40% more likely to be on an order. However, Indigenous status was not associated with CTO use in Australia, although there were no New Zealand data. CTOs did not reduce readmission rates or bed-days at 12-month follow-up. However, this is a rapidly expanding area, and in the 2.5 years since our last search we are aware of a number of new studies of the predictors and outcomes of CTOs in Australia and New Zealand.

Although rates of CTO use in Australia and New Zealand are generally high by world standards, there are also considerable variations within both countries.[1,2] For instance, Australian rates range from 41 per 100 000 population in Western Australia to 108.4 per 100 000 in Victoria and 112.5 per 100 000 in South Australia.[1] Similarly, the national average in New Zealand of 84 per 100 000 encompasses a low of 33 per 100 000 in Canterbury and a high of 151 per 100 000 in the Waitemata.[2] This is despite the criteria of involuntary treatment being broadly similar across all Australian and New Zealand jurisdictions.[4] Unfortunately, our previous systematic review had insufficient studies for a meta-regression to investigate whether differences in CTO use by jurisdiction affected either the predictors or outcomes of CTOs.[3]

We therefore undertook a further systematic review and meta-analysis on both the predictors and outcomes of CTO placement in Australia and New Zealand compared with non-CTO subjects. We also investigated whether differences in CTO rates of use by jurisdiction had an influence on either the predictors or outcomes of CTOs through a meta-regression. For instance, higher rates of CTO use might be justified if they resulted in better outcomes. We restricted the scope to these two countries, as opposed to other jurisdictions with clinician-initiated orders such as Canada or the UK. This is because mental health acts (MHAs) across Australia and New Zealand are very similar and, unlike in these other jurisdictions, they are not influenced by entrenched human rights instruments that potentially constrain MHA powers.[5–7] The central features of CTOs in Australia and New Zealand are the duty on patients to accept psychiatric treatment and clinician appointments, as well as directions on their type of accommodation in some cases.[6] The legislation also gives powers to provide treatment without consent and to enter someone's accommodation or recall them to hospital (with or without police assistance).[6] Unlike

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Table 1 Search terms

Database	Search term
PubMed	(((((((Australia* OR New Zealand OR Queensland* OR Western Australia* OR Tasmania OR Victoria OR 'New South Wales' OR South Australia* OR 'Northern Territory')))) AND (('Psychiatry' AND 'Commitment of Mentally Ill'[Mesh] OR 'Forensic Psychiatry'[Mesh] OR 'Mandatory Programs'[Mesh] OR 'community treatment order' OR 'community treatment orders' OR 'involuntar* outpatient treatment' OR 'involuntar* outpatient commitment' OR 'extended leave' OR 'extended release' OR 'compulsory community treatment' OR 'treatment authority' OR 'supervis* discharg*' OR 'conditional release' OR 'extended outpatient civil commitment')))))
PubMed	(('Commitment of Mentally Ill'[Mesh] OR 'Forensic Psychiatry'[Mesh] OR 'Mandatory Programs'[Mesh] OR (community[tiab] AND treatment[tiab] AND order*[tiab]) OR (involuntar*[tiab] AND outpatient*[tiab]) OR (extend*[tiab] AND leave[tiab]) OR (supervis*[tiab] AND discharg*[tiab]) OR (extended release[tiab]) OR (compulsory[tiab] AND community[tiab] AND treatment[tiab]) OR (treatment[tiab] AND authorit*))) AND (Australia* OR New Zealand OR Queensland* OR Western Australia* OR Victoria OR 'New South Wales' OR South Australia* OR 'Northern Territory' OR Tasmania)
Embase	australia* OR 'new zealand' OR queensland OR 'western australia*' OR victoria OR 'south australia*' OR 'northern territory' OR 'new south wales' OR tasmania AND ('community treatment orders' OR 'involuntary outpatient treatment' OR 'in-voluntary outpatient commitment' OR 'extended leave' OR 'extended release' OR 'compulsory community treatment' OR 'treatment authority' OR 'supervised discharge' OR 'conditional release' OR 'extended outpatient civil commitment' OR 'forensic psychiatry'/exp OR 'mandatory program'/exp OR 'involuntary commitment'/exp)
Embase	australia* OR 'new zealand' OR queensland OR 'western australia*' OR victoria OR 'south australia*' OR 'northern territory' OR 'new south wales' OR tasmania AND 'forensic psychiatry'/exp OR 'mandatory program'/exp OR 'involuntary commitment'/exp OR (community:ab,ti AND treatment:ab,ti AND order*:ab,ti) OR (involuntar*:ab,ti AND outpatient:ab,ti AND treatment:ab,ti) OR (involuntar*:ab,ti AND outpatient:ab,ti AND commitment:ab,ti) OR (extend*:ab,ti AND leave:ab,ti) OR (extend* release:ti,ab) OR (compulsory:ab,ti AND community:ab,ti AND treatment:ab,ti) OR (treatment:ab,ti AND authorit*:ab,ti) OR (supervis*:ab,ti AND discharg*:ab,ti) OR (treatment:ti,ab AND authority:ti,ab)
PsycINFO	((Any Field: (Australia*) OR Any Field: (New Zealand) OR Any Field: (Queensland*) OR Any Field: (Western Australia*) OR Any Field: (Victoria) OR Any Field: (New South Wales) OR Any Field: (South Australia*) OR Any Field: (Northern Territory))) AND ((Any Field: (conditional release) OR Any Field: (extended outpatient civil commitment) OR Any Field: (Commitment of Mentally Ill) OR Any Field: (Forensic Psychiatry) OR Any Field: (Mandatory Programs) OR Any Field: (community treatment order) OR Any Field: (community treatment orders) OR Any Field: (involuntary outpatient treatment) OR Any Field: (involuntary outpatient commitment) OR Any Field: (extended leave) OR Any Field: (extended release) OR Any Field: (compulsory community treatment) OR Any Field: (treatment authority) OR Any Field: (supervised discharge)) OR (IndexTermsFilt: ('Commitment (Psychiatric)') OR IndexTermsFilt: ('Involuntary Treatment')) OR (IndexTermsFilt: ('Forensic Psychiatry')))
CINAHL	(MH 'forensic psychiatry' OR MH 'involuntary commitment' OR mandatory programs OR community treatment order OR involuntary outpatient treatment OR involuntary outpatient commitment OR supervised discharge OR compulsory community treatment OR involuntary treatment order OR treatment authority OR conditional release OR extended outpatient civil commitment) AND (Australia* OR New Zealand OR Queensland* OR Western Australia* OR Victoria OR New South Wales OR South Australia* OR Northern Territory)
Cochrane	MeSH descriptor: [Commitment of Mentally Ill] explode all trees OR MeSH descriptor: [Commitment of Mentally Ill] explode all trees OR MeSH descriptor: [Forensic Psychiatry] explode all trees OR MeSH descriptor: [Mandatory Programs] explode all trees OR ('community* treatment* order*' OR 'involuntar* outpatient treatment' OR 'involuntar* outpatient commitment' OR 'extend* leave*' OR 'extend* release*' OR 'compulsory community treatment' OR 'treatment* authorit*' OR 'supervis* discharg*'):ti,ab,kw AND 'Australia*' OR 'New Zealand*' OR 'Queensland' OR 'Western Australia*' OR 'Victoria*' OR 'South Australia*' OR 'Northern Territory' OR 'New South Wales' OR 'Tasmania'

elsewhere, prior involuntary admission to a psychiatric unit is not required.[7,8]

Method

Search strategy

We registered the protocol for this systematic review with PROSPERO (CRD42022351500) and followed guidelines from the Preferred Reporting Items for Systematic Reviews and Meta-Analyses.[9] The following databases were searched from January 2020 (the date of the last search) to the latest available using identical terms to those used in our previous systematic review: PubMed/Medline, Embase, CINAHL, the Cochrane Central Register of Controlled Trials and PsycINFO.[3] There were no language restrictions. Table 1 shows the search terms. Ethical approval was not required as all data had previously been published, with one exception. This was for the use of unpublished data from an extension of an included study (see below), for which clearance was given by the Metro South Health Human Research Ethics Committee (LNR/2021/QMS/74836). Individual patient consent was not required as this was an analysis of anonymised administrative data.

As in our earlier review, two authors independently screened records and abstracts. Where there was a lack of consensus, the third reviewer was consulted. Consensus was achieved in all cases. The reference lists of selected retrieved papers were screened to identify additional studies that met inclusion criteria.

Inclusion criteria

We included any of the following study designs conducted in Australia or New Zealand that compared people on CTOs for severe mental illness with controls receiving voluntary psychiatric treatment: randomised controlled trials, cohort, case–control and cross-sectional studies.

Exclusion criteria

We excluded studies of compulsory treatment in the community for drug or alcohol dependence, and those that did not include controls from the same jurisdiction receiving voluntary psychiatric treatment.

Possible predictors and outcomes of CTO placement

We investigated whether the following sociodemographic variables were associated with CTO use: age, sex, marital or employment

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status, and being from an Indigenous or CALD background. We also assessed any associations with clinical features, comorbid substance use, health service or depot medication use, and criminal justice contacts.

Our primary outcomes were hospital admissions, bed-days and community contacts in the 12 months following CTO placement. In the case of admissions, we combined the outcomes of any readmission, the presence of a significant change in admissions and the standardised mean difference (SMD) of the number of admissions. We focused on outcomes at 1 year as this is the most common endpoint in the literature and the impact of an intervention on health services beyond 1 year is difficult to ascertain.[10] Where data for this time frame were unavailable, we used those from other follow-up periods. Secondary outcomes included the following over the same time frames: psychiatric symptoms as measured by a standardised psychiatric instrument, concordance with psychiatric treatment, employment, and contacts with the criminal justice system. Data extraction was independently conducted by co-authors working in pairs, with disagreements settled by consensus with or without the assistance of a third reviewer.

Study quality

All studies identified for inclusion were cohort and cross-sectional studies and were independently assessed for quality using the Joanna Briggs Institute (JBI) tool for non-randomised studies. This covers the three following areas: selection of the study groups in terms of case definition, representativeness and source of controls; comparability of the groups, such as the use of matching or multivariate techniques; and measurement of exposure and outcomes in a valid and reliable way. The version for cross-sectional studies has eight items and the one for longitudinal designs has eleven. As in other work, a score of seven and above is considered to be an indicator of study quality.[11,12]

Analysis

Where data were available for two or more studies, they were combined in a meta-analysis, giving preference to adjusted data when considering outcomes. We used the following freeware packages: RevMan 5.2, Win-Pepi and OpenMeta[Analyst].[13–15] For dichotomous predictors and outcomes of CTO placement, such as gender or readmission, we combined data using the odds ratio (OR). We used the mean difference for continuous data such as the number of bed-days, assessing for publication bias where there were at least ten studies. To maximise statistical power, we combined the SMD of the number of admissions with either the occurrence of readmission or any change in in-patient bed use to create a single dichotomous outcome of ever having been admitted. This is because SMDs can be converted to ORs.[16] We used an I^2 statistic value of greater than 50% as an indicator of significant heterogeneity. We explored any heterogeneity further through sensitivity analyses of the effects of omitting each study in turn.

We used meta-regression to study whether rates of CTO use had any effects on either the possible predictors or the outcomes of CTOs. We used the number of people per 100 000 on CTOs for the relevant Australian jurisdiction or New Zealand Health Board closest to the time of each study.[1,17–19]

A random effects model was used for all the analyses because we could not definitively exclude between-study variation even in the absence of statistical heterogeneity. Although there is no universally accepted minimum number of studies for a meta-regression, the Agency for Healthcare Research and Quality in the US recommends that there should be at least six studies.[20]

There were several sensitivity analyses. If there was the possibility of an overlap in participants between studies, we either used data from the larger study or studied the effects of using one study or the other. Similarly, although we gave preference to outcomes at 12-month follow-up, we included data from other timeframes but assessed the effects of excluding them from the meta-analyses. Last, we explored the effects on heterogeneity of omitting each study in turn.

Results

We found 1437 citations of interest in the updated search. Of these, 26 full-text papers were potentially relevant and were assessed for eligibility (Fig. 1). Five articles from four studies met inclusion criteria.[21–25] Reasons for exclusion were that articles were conference abstracts or editorials, or that they did not contain primary data, relevant outcomes or suitable controls (Fig. 1). Adding these studies to the previous search meant that there were 35 articles from 16 studies in total (Fig. 1 and Table 2). One of the present review's authors (S.K.) also had unpublished updated data from a previous study on possible CTO predictors, giving a total of 17 studies.[26] In another study that used Tobit regression models, the first author kindly provided estimates of effect sizes that were compatible with the other papers.[21] Of all these articles, 29 could therefore be included in a meta-analysis. Allowing for overlap among the papers, there were approximately 56 541 subjects and 170 156 controls.

Of the 17 included studies that contributed to the 29 articles, five were from Victoria,[27–31] four from Queensland,[21,22,26,32] three from New South Wales (NSW)[33–35] and two each from Western Australia[36,37] and New Zealand.[24,38] The final study included in this systematic review used data from the second Survey of High Impact Psychosis (SHIP) in seven mental health services across five Australian states.[23] Research covered more than 30 years from 1990 to 2021.

There was little overlap in participants apart from three instances. In the first, there was a high possibility of overlap between two studies that used Victorian administrative data from the 1990s.[27,39–44] We therefore used the study with the larger number of participants. In the second situation, participants from a small Western Australian study were included in larger subsequent work that extended over a decade.[36,45] However, the smaller study included criminal justice data that were absent from the later study.[45] We therefore used these data to investigate forensic predictors of CTO placement, while using those from the larger study for all the other comparisons. Finally, four Queensland studies included people from overlapping periods.[21–23,32] However, in the case of two studies, samples came from different health services in Queensland.[22,23] A third Queensland-wide study could potentially have included subjects from the other two studies, but it was limited to people under the age of 24 years, whereas the mean ages in the other two studies were in the mid to upper 30s.[21] Nevertheless, we undertook sensitivity analyses of the effects of excluding the Queensland-wide study. The two studies with samples from individual health services in Queensland[22,23] also overlapped with another Queensland-wide study, but this was limited to one of 15 relevant years.[32] Study quality was good, with all but one scoring seven or above on the JBI tool for non-randomised studies (Table 2).

Factors associated with CTO placement

Figure 2 presents forest plots of the factors associated with CTO placement. The diamond at the bottom of each subsection represents the aggregate results and associated 95% confidence intervals from all the studies in the meta-analysis. The result is significant if the points of the diamond do not cross the vertical line. If the

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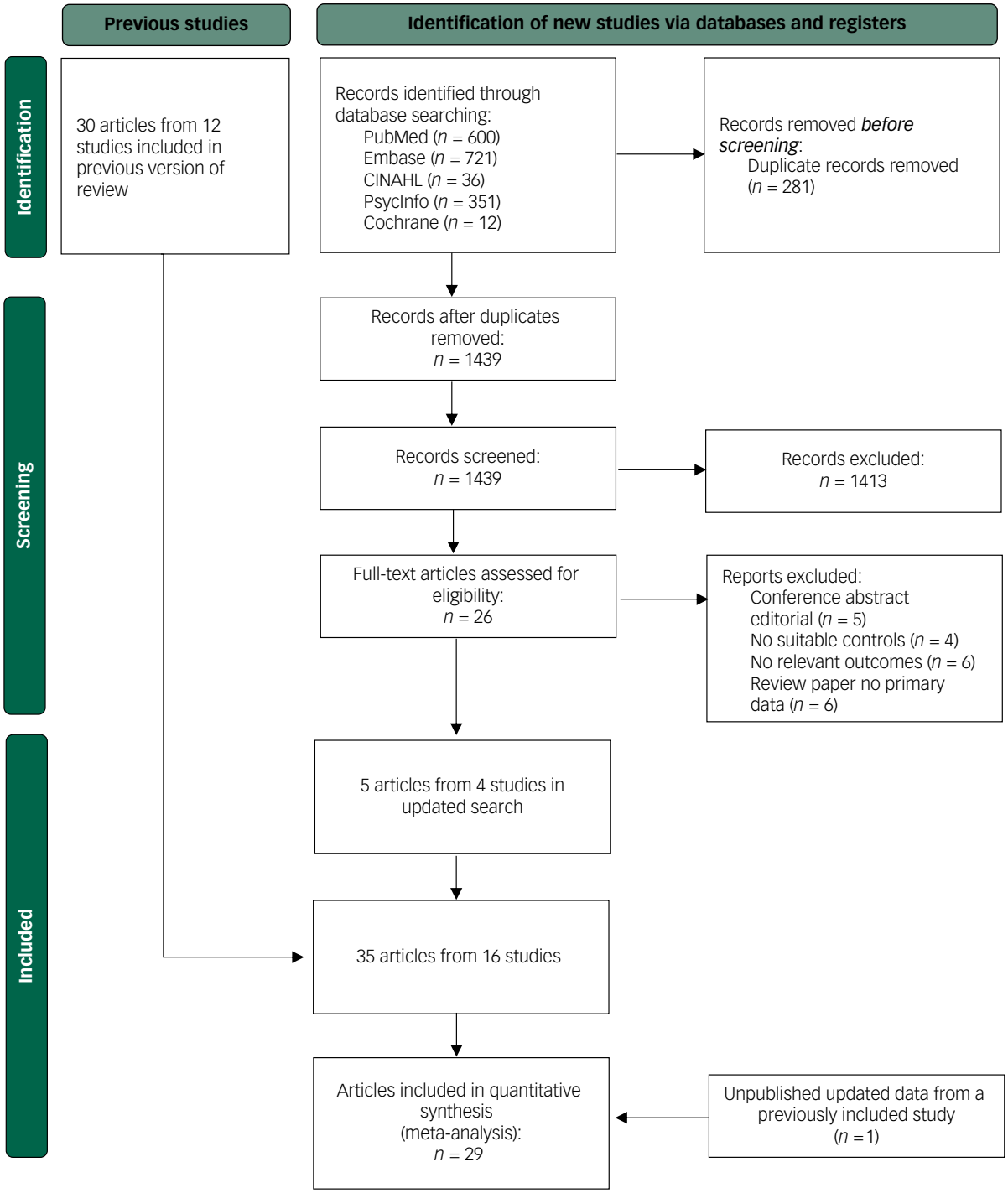

Fig. 1 PRISMA flow diagram.

diamond is to the right of the line, this indicates that CTO cases are significantly more likely to have that characteristic. For instance, people who were male, single and not engaged in work, study or home duties were significantly more likely to be subject to a CTO (Fig. 2). Heterogeneity was high for all these analyses, with I^2 values greater than 90%. In addition, those from a CALD or migrant background were more likely to be on an order (nine studies, OR = 1.47; 95% CI = 1.37–1.57; $P < 0.0001$; $I^2 = 31\%$) (Fig. 2). By contrast, Indigenous status was not associated with being on a CTO (seven studies, OR = 1.09; 95% CI = 0.97–1.24; $P = 0.15$; $I^2 = 50\%$) (Fig. 2).

Other factors associated with CTO placement were comorbid substance use disorders (five studies, OR = 1.93; 95% CI = 1.55–2.41; $P < 0.0001$; $I^2 = 0\%$)[21,23,25,29,31] and prior contacts with the criminal justice system in terms of imprisonment or serious offences (six studies, OR = 1.91; 95% CI = 1.43–2.55; $P < 0.0001$; $I^2 = 52\%$).[21,23,25,28,31,45] In terms of diagnosis, patients with schizophrenia or non-affective psychosis were significantly more likely to be on a CTO (nine studies, OR = 2.41; 95% CI = 1.54–3.78; $P = 0.0001$; $I^2 = 99\%$).[21–23,25,27–29,32,46] CTO cases were also more likely to have limited insight into the nature of their illness (three studies, OR = 3.26; 95% CI = 2.32–4.58; $P < 0.0001$; $I^2 = 44\%$).[23,31,38]

Table 3 shows the results of comparisons where there were sufficient studies for a meta-regression ($k \geq 6$). We were unable to include the SHIP study as the data came from five different Australian states with markedly different rates of CTO use.[23]

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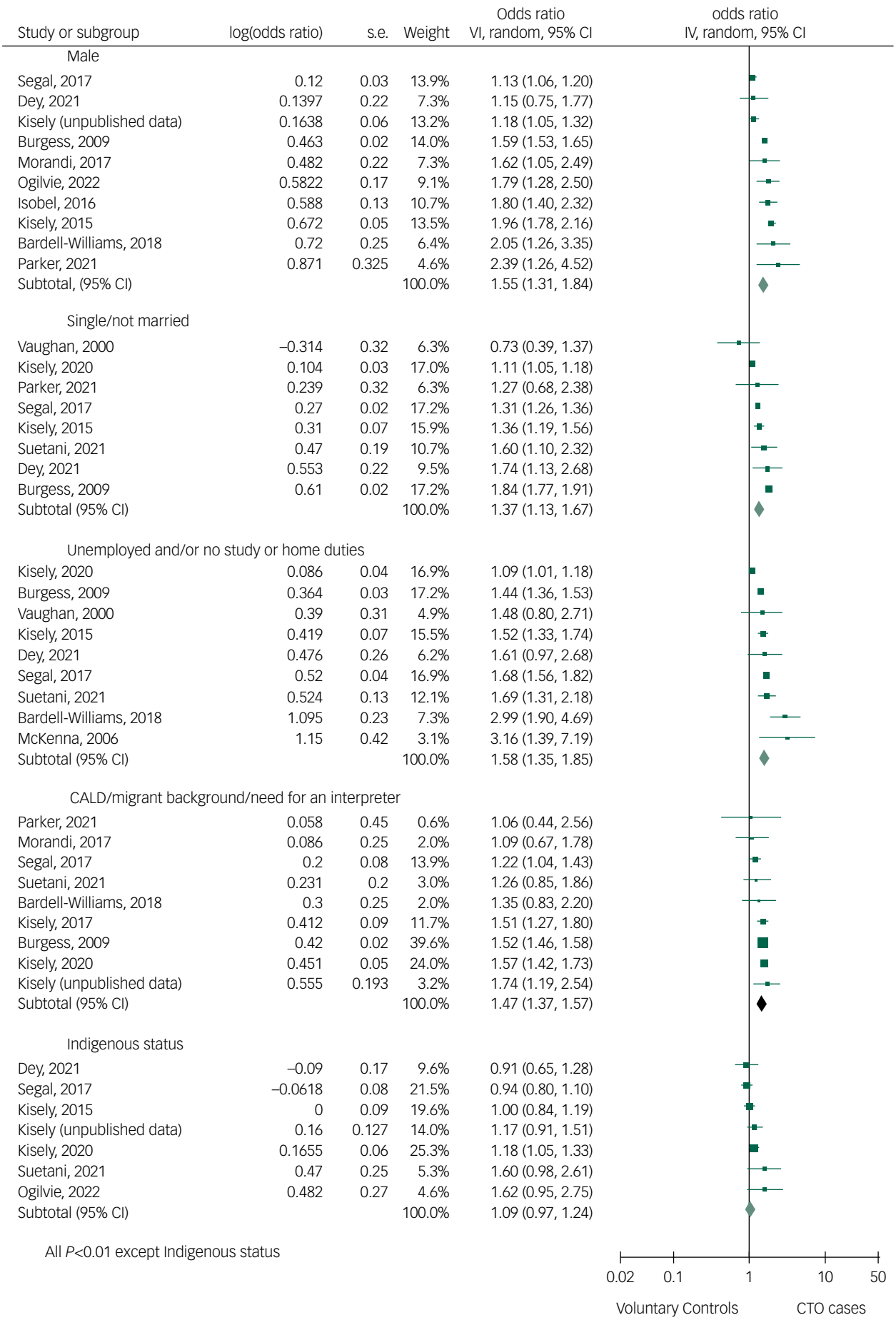

Fig. 2 Factors associated with CTO placement.

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Table 2 Included studies

First author	Number of papers	Settings and data source	Period of study	Number of cases	Number of controls	Quality (JBI score)
Segal	7	State-wide Victoria	1990–2000	8879	16 094	11
Burgess	1	State-wide Victoria	1992–2000	16 216	112 211	11
Vaughan	1	Hornsby Ku-Ring-Gai, New South Wales	1994–1998	123	123	10
Kisely	6	State-wide Western Australia	1997–2008	2958	2958	11
Preston, Kisely, Xiao, Segal	4	State-wide Western Australia	1997–1998	265	489	11
Morandi	1	North West Melbourne	1998–2000	127	533	11
McKenna	1	Auckland, New Zealand	2000–2002	69	69	8
Segal	4	State-wide Victoria	2000–2010	11 424	16 161	11
Harris	1	State-wide New South Wales	2004–2009	5548	5548	11
Ogilvie[a]	1	Queensland-wide cohort born in 1990 (<24 years old)	2005–2014	211	413	11
Parker[a]	1	Metro South, Queensland (mean age: 36 years)	2005–2014	248	63	9
Suetani[a]	1	Australia-wide survey	2010–2011	342	1270	8
Bardell-Williams	1	Early-episode psychosis service, Melbourne	2011–2013	93	544	8
Dey[a]	2	Waikato, New Zealand ICD-10 codes F20-29 only[b]	2013–2014	177	149	11
Kisely	1	State-wide Queensland	2013–2017	7432	7432	11
Isobel	1	Inner-city Sydney	2014	301	2967	5
Kisely Unpublished updated data from previous study[a]	1	Metro South, Queensland	2017–2021	2128	3132	8

a. Studies from updated search/data.
b. ICD-10 codes for schizophrenia and related disorders.

Higher rates of CTO use were associated with significantly lower proportions of males (Fig. 3(a) and Table 3) and diagnoses of non-affective psychoses (Fig. 3(b) and Table 3). Results for the other comparisons were non-significant (Table 3).

It was not possible to combine in a meta-analysis several other possible predictors of CTO use that were frequently mentioned. These included greater use of health services use prior to placement[27,28,30–32,35,46] and the prescription of depot psychotropics.[23,25,33] There was no clear pattern for age. For instance, in some studies younger age was associated with CTO placement, especially in unadjusted analyses,[23,27,28,30,46] whereas in another the association was for people who were between 30 and 50 years old.[33] In two studies there were no significant differences.[22,25] In three studies it was impossible to tell as the controls were matched on age,[32,34,35] and in another three the participants were limited to specific age groups.[21,29,31] One study specifically considered the willingness to have treatment, as opposed to insight in general, and found that this was reduced in CTO cases.[38]

Effect of CTOs on in-patient outcomes

It was possible to combine results from nine studies. Six presented data for outcomes at 12-month follow-up, and one at 24-month follow-up. In the remaining two studies, the authors did not specify when the outcome occurred with respect to CTO placement. All nine studies considered the influence of potential confounders through the use of matching or multivariate analyses. Depending on the study, these included sociodemographic factors, clinical features, health service use and criminal justice contacts. However, in the case of one study, matching was not entirely successful, with evidence that the CTO cases had more severe illness.[34] None of the studies in the meta-analysis adjusted for insight or willingness to have treatment. As before, when the diamond is to the right of the line, CTO cases are significantly more likely to have that characteristic. There were no significant differences between CTO cases and controls in the mean number of bed-days (Fig. 4(a)), but the risk of admission was significantly higher in people on an order (Fig. 4(b)).

Two studies reported on the mean number of bed-days per admission.[27,28] In both cases, this was less for the CTO group than for the controls over the decade of the study (two studies; mean difference = −5.79; 95% CI = −9.18 to −2.40; $P = 0.0008$; $I^2 = 42\%$). Again, this was without specific reference to the timing of CTO placement. As reported in our earlier meta-analysis,[3] two studies also evaluated the longer-term effects of CTOs, one from Victoria and one from NSW.[30,35] In the former, although the risk of admission increased following an initial CTO placement, there was a lower readmission risk from the fifth CTO onwards. The risk also declined over the 8 years of the study period.[30] Similarly, the NSW study found that the greatest reduction in admissions and bed-days compared with controls was in those who had been on CTOs for more than 24 months.[35] This study also reported that CTOs delayed readmission compared with controls over the same period.[35]

In the meta-regression, CTO cases in jurisdictions with higher rates of CTO use had significantly worse outcomes than voluntary controls in terms of both a greater number of mean bed-days (coefficient = 0.35; 95% CI = 0.64–0.14; $P = 0.014$) (Fig. 5(a)) and the likelihood of readmission (coefficient = 0.021; 95% CI = 0.012–0.030; $P < 0.001$) (Fig. 5(b)) compared to the differences between cases and controls in jurisdictions with lower CTO use.

Effect of CTOs on out-patient and/or community outcomes

At 1-year follow-up, CTOs significantly increased the overall number of community contacts (Fig. 4(c)) but not the contacts per month (two studies; mean difference = 1.21 days; 95% CI = −0.14 to 2.57; $P = 0.08$; $I^2 = 84\%$). In a further study that presented the data as a categorical variable, CTO cases had significantly more community contacts at 2-year follow-up.[24] There were insufficient studies for a meta-regression for any of these outcomes.

Secondary outcomes

Two papers reported that there were no significant differences in mean scores from the Health of the Nation Outcome Scales between CTO cases and controls at 12-month follow-up.[22,47]

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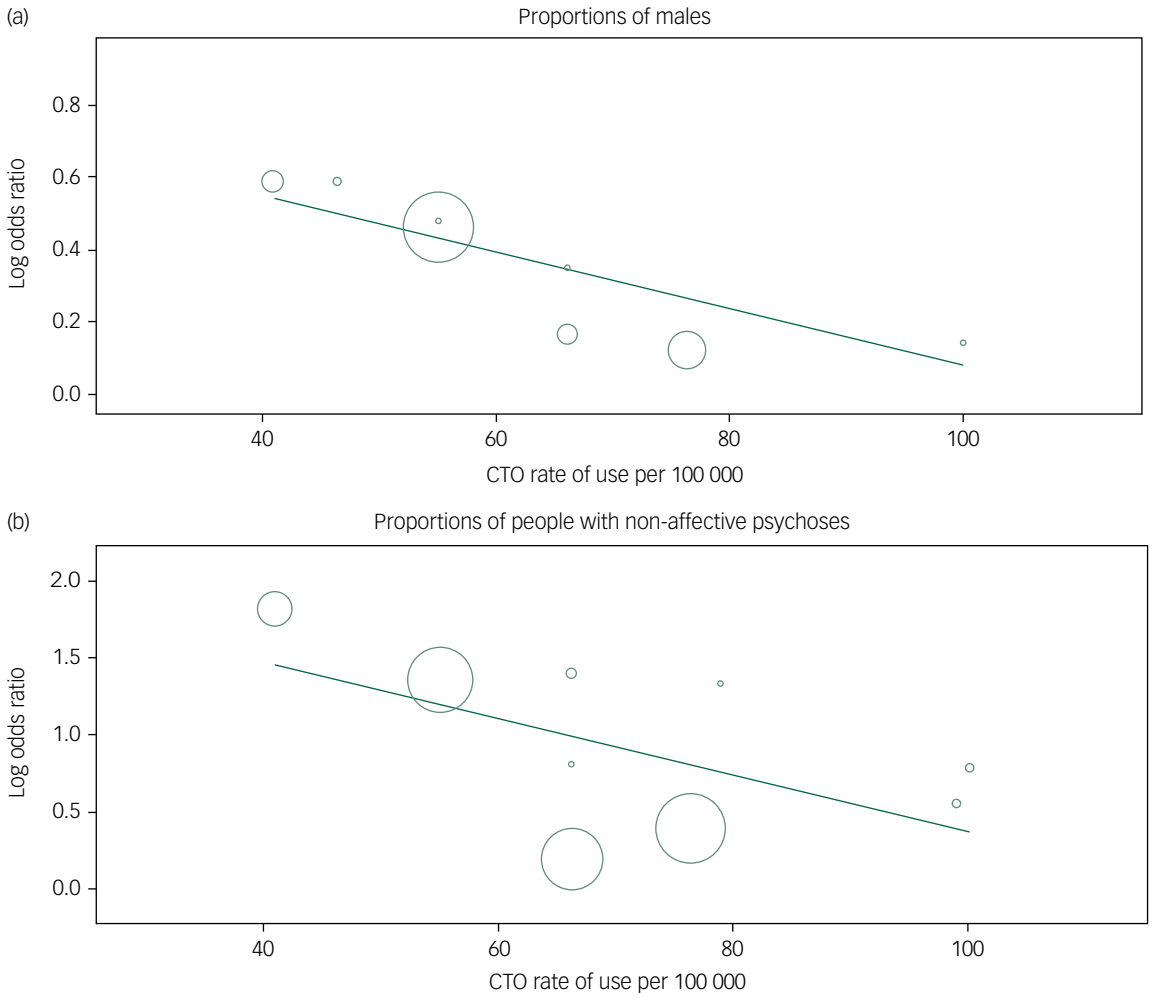

Fig. 3 Meta-regression of males (a) and diagnoses of non-affective psychoses (b).

However, in the case of one paper, this was not adjusted for baseline characteristics.[22] The latter paper also reported no significant differences between the two groups in unadjusted scores from the Life Skills Profile-16.[22] Similarly, a further study reported that CTOs were not associated with fewer subsequent court appearances compared with controls in analyses that controlled for a wide range of sociodemographic, clinical and criminal justice variables.[21]

Sensitivity analyses, heterogeneity and publication bias

Sensitivity analyses of the effects of omitting the Queensland paper[21] where there might have been an overlap in subjects with two other studies did not alter the results,[22,23] and neither did omitting the one study with unpublished data. Similarly, changing the level of adjustment for findings in one study or excluding the two that reported on outcomes other than at 12-month follow-up had little effect. The one exception was the meta-regression of bed-days, which was no longer statistically significant on either sensitivity analysis. Finally, omitting each study in turn in every analysis did not alter significant heterogeneity when it was present.

We were only able to analyse for the effects of publication bias in the comparison of CTO placement by sex, as none of the other analyses had ten or more studies (Fig. 6). The lack of funnel plot asymmetry suggested the absence of publication bias (Fig. 6), and this was confirmed by the non-significant results of both Egger's regression asymmetry (0.35; 90% CI = −2.28 to 2.98; $P = 0.857$) and adjusted rank correlation tests (Kendall's tau = 0.02; $P = 0.929$).

Table 3 Meta-regressions of predictors of CTO placement

Variable	Coefficient	Lower	Upper	*P*-value
Male	−0.008	−0.014	−0.002	0.011
Single	0.003	−0.007	0.013	0.525
No work	0.004	−0.002	0.011	0.187
Indigenous status	−0.002	−0.014	0.009	0.683
CALD	−0.006	−0.021	0.010	0.459
Non-affective psychosis	−0.018	−0.035	−0.002	0.029

Discussion

This is an update of the first systematic review and meta-analysis of possible predictors and outcomes of compulsory community treatment in Australia and New Zealand.[3] All but one study was of good quality according to the JBI tool for non-randomised studies. The large number of studies enabled the use of meta-regression to explore the effects of rates of CTO placement on both the possible predictors and the outcomes of these orders. The findings may have relevance for other jurisdictions such as Scotland or England and Wales that have similar clinician-initiated orders.

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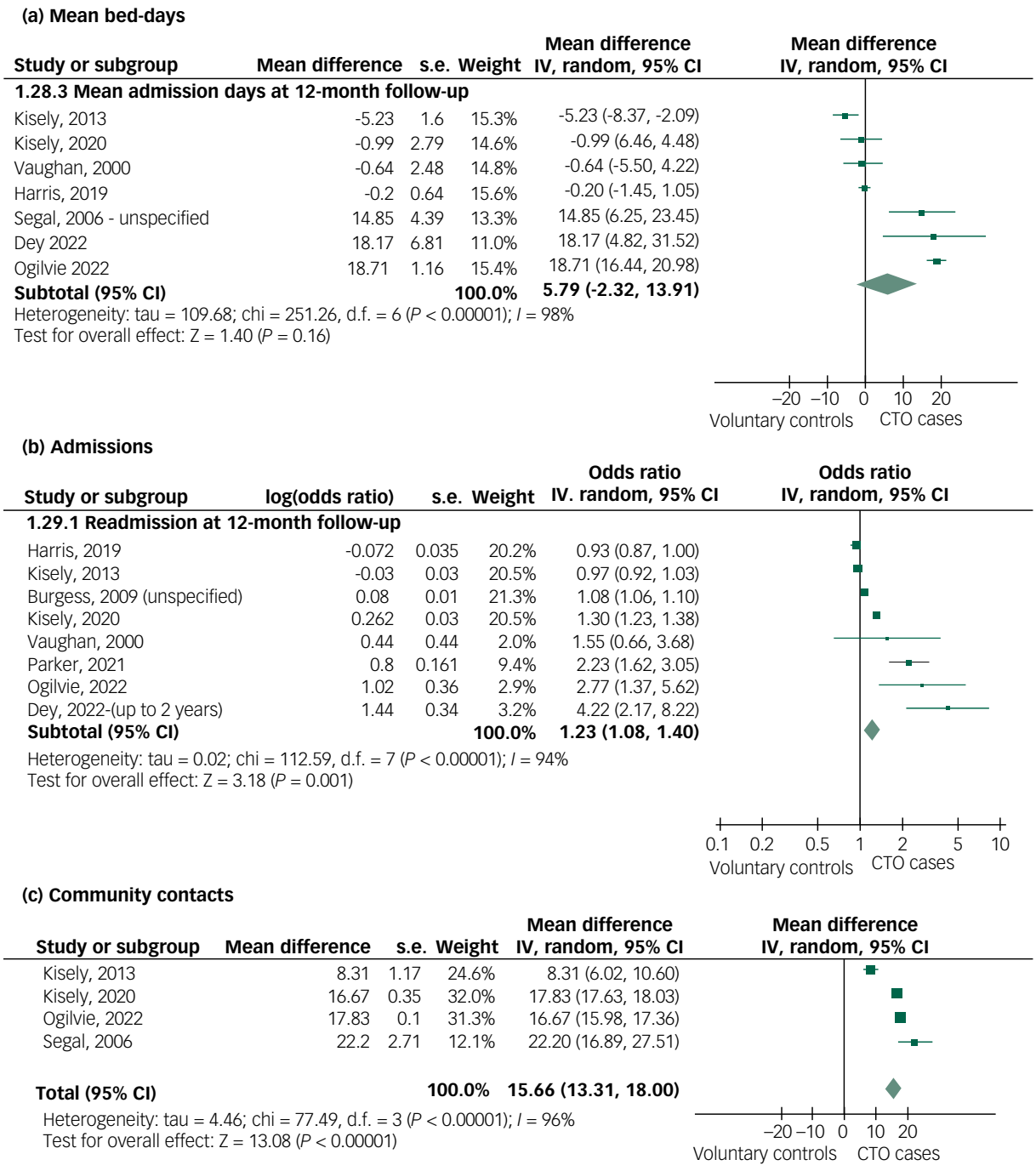

Fig. 4 Meta-analyses of bed-days (a), admissions (b) and community contacts (c) over 12 months.

We found that Australians from CALD backgrounds were significantly more likely to be subject to an order, mirroring two studies from the UK.[48,49] Possible explanations include variations in underlying psychiatric morbidity, poor staff attitudes and communication, unfamiliar forms of care and the absence of families, as well as overall system inflexibility.[50,51] The need for an interpreter may create further barriers to communication and increase the time required to undertake an assessment. Wider societal factors include perceived discrimination, social isolation, unemployment and lower socioeconomic status.[52]

In terms of outcomes, CTOs did not reduce bed-days or admissions in the 12 months following placement, in keeping with most non-randomised studies from other countries.[53] However, CTOs may show greater benefit over the longer term, although we were unable to include the data in a meta-analysis. For instance, the study from NSW reported that CTOs had no effect on subsequent bed-days unless patients had been on them for more than 2 years.[35] Two Victorian studies found that CTO cases had fewer bed-days per admission over a decade.[27,28] However, in the case of one of these studies, the reduction in the days per admission was associated with an overall mean increase of 15 bed-days.[27] It is therefore possible that this could represent greater 'revolving door' care, whereby individuals have more admissions of shorter duration but spend greater overall time in hospital.[54] There is therefore little evidence that CTOs address the issue of the 'revolving door', at least in the short term, even though this was one of the main justifications for supervised community treatment in England and Wales.[54]

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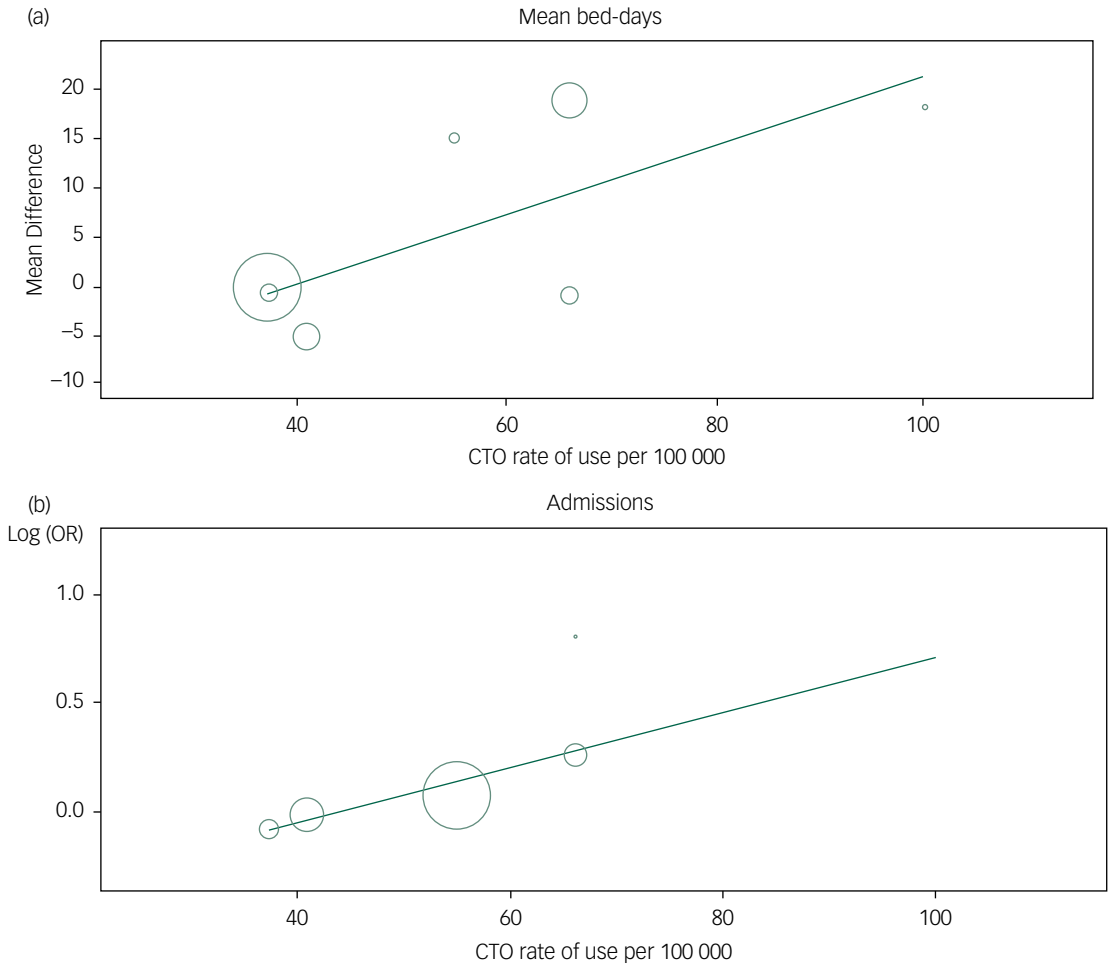

Fig. 5 Meta-regression of bed-days (a) and admissions (b) over 12 months.

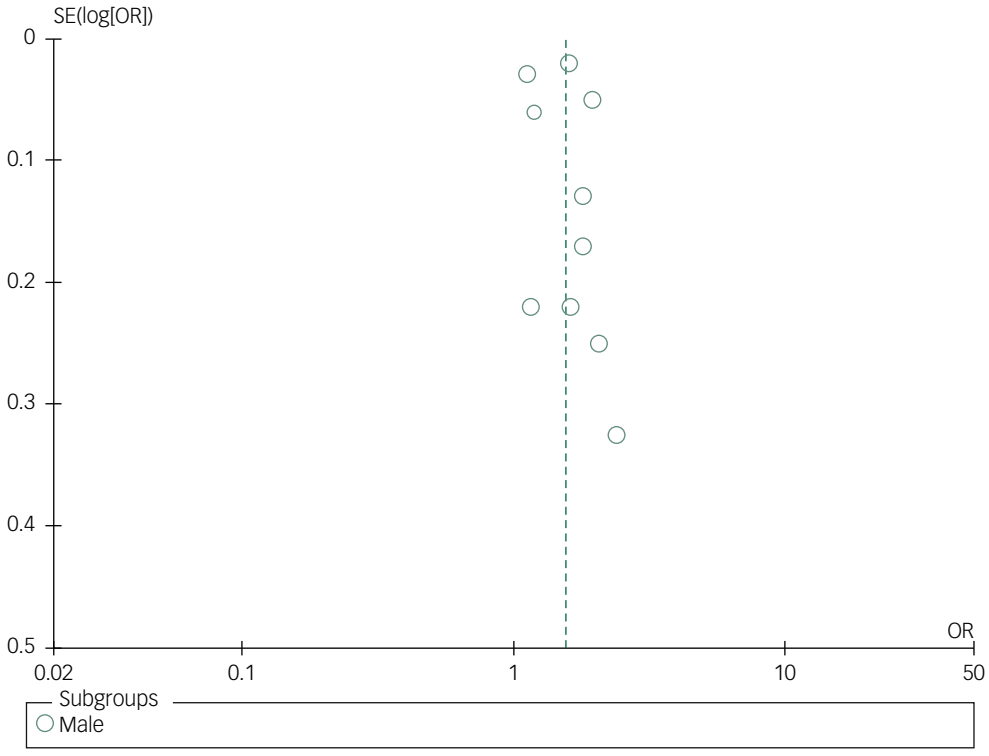

Fig. 6 Funnel plot of studies assessing sex as a predictor of CTO placement. OR, odds ratio.

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Despite the limited evidence, the use of CTOs is likely to continue in Australia and New Zealand and elsewhere. This being the case, it is important to investigate whether there are any situations where CTOs may be useful. The meta-regression results suggested that lower rates of use may lead to more targeted and improved subsequent outcomes. For instance, in jurisdictions where use was lower, people who were male or who presented with non-affective psychoses were more likely to be on CTOs, the characteristic or target profile of those on orders.[55] By contrast, there were higher proportions of females and people with diagnoses other than non-affective psychoses in jurisdictions with higher CTO rates. These were also the jurisdictions less likely to show reductions in readmission rates or bed-days at follow-up. Although the study could not be included in the present systematic review because of a lack of controls, these results are consistent with before-and-after work from New Zealand where reductions in health service use following CTOs were limited to people with schizophrenia.[56,57]

The mode of discharge from an order may also affect outcome.[58] In an analysis of Victoria-wide administrative health data, people whose CTOs were discontinued by their treating service were less likely to be placed on a subsequent order than those who were discharged by the Mental Health Review board or those where the order was allowed to expire. Although this was an observational study, the authors adjusted for obvious confounders such as sociodemographic characteristics, CTO duration and diagnosis.[59] The authors suggested that unplanned or abrupt discharge arising from expiry or discharge by the review board may therefore be associated with worse outcomes, indicating the need for better engagement by treatment services with people who experience severe mental illness.[58]

A decade ago, Light and colleagues highlighted the 'invisibility' of CTOs and the lack of clarity as to where they fit into mental health policy frameworks, as well as what contribution CTOs make, or should make, to the care of people with mental illness.[60] This remains the case despite subsequent reforms of mental health legislation Australia-wide and raises questions about both the transparency and the accountability of the mental health system, and whether this silence leads to greater marginalisation and discrimination towards people with mental illness. At the very least, there should be further enquiry into how CTOs may be better used to improve outcomes. This could include more focused use, greater consideration of the appropriate diagnosis and better engagement by treatment services for those on an order.

There are several limitations to this systematic review. All the included studies were observational, and many used administrative health data. These may be subject to recording bias and lack information on social disability. We were also only able to investigate the effects of broad diagnostic categories such as non-affective psychoses because of variations in how diagnoses were described. Cases and controls may have differed in ways for which it was not possible to match or adjust, such as insight, and studies used proxy indicators of CALD status including place of birth and preferred language. We have also only demonstrated significant associations, not causality. For instance, the current study could not determine whether differences in outcomes between high- and low-use jurisdictions were due to variations in the severity of symptoms or a lower threshold for the use of compulsion in general.

The results of our meta-analyses showed a high degree of heterogeneity. We explored this further by excluding each study in turn, but this made little difference. Although we accommodated heterogeneity by using a random effects model, our findings should be viewed with caution. In addition, we were only able to conduct meta-regression for a limited number of possible predictors and outcomes. The results of the meta-regression for bed-days were no longer statistically significant on sensitivity analyses. However, the results of the other meta-regressions were unaffected, including those for readmission. We were also only able to investigate the effects of differences in rates of use by jurisdiction and could not consider differences in other factors that may influence CTO placement or outcomes. These factors might include the following: the effects of human rights instruments; recovery-oriented policies; environmental factors, including demographics; the availability of in-patient beds and clinical community-based resources; and peer or service culture.[1] We restricted the current review to Australia and New Zealand to reduce possible differences. However, the influence of these variables requires further study. Finally, we were only able to test for publication bias in one comparison, as none of the others had ten or more studies.

In conclusion, there are marked differences in the possible predictors and outcomes of CTO placement between high- and low-use jurisdictions. These findings cast further doubts on how CTOs are used, as well as their ultimate effectiveness, and warrant further investigation to establish whether better targeted placement might improve outcomes. This is of concern in both Australia and New Zealand, as well as in other jurisdictions such as England, Scotland and Canada that have similar although less extensive clinician-initiated orders.

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Data availability

Data availability is not applicable to this article as no new data were created or analysed in this study.

Author contributions

S.K. had the original idea for the paper. Study selection and data extraction were carried out by the three authors working in pairs (S.K., L.M. and D.S.) with any disagreements resolved by consensus or the third author. S.K. wrote the first draft, which was then revised critically for important intellectual content by all other authors.

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Declaration of interest

S.K. and D.S. are members of the international editorial board of the *BJPsych*, and S.K. is also on the editorial board of *BJPsych International*.

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