Interventions to Reduce Compulsory Psychiatric Admissions
A Systematic Review and Meta-analysis

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IMPORTANCE Compulsory admissions, defined as admissions against the will of the patient (according to local judicial procedures), have a strong effect on psychiatric patients. In several Western countries, the rate of such admissions is tending to rise. Its reduction is urgently needed.

OBJECTIVE To establish which interventions effectively reduce compulsory admissions in adult psychiatric patients in outpatient settings.

DATA SOURCES A systematic computerized literature search was performed using EMBASE, MEDLINE, Web of Science, PsycINFO, CINAHL, PubMed (not yet indexed for MEDLINE), Cochrane Central, and Google Scholar. Every database was searched from its inception until April 30, 2015.

STUDY SELECTION Randomized clinical trials (RCTs) that studied any kind of intervention designed to reduce compulsory admission rates in adult psychiatric patients (age range, 18-65 years) in outpatient settings were eligible. Eligibility was independently assessed by 2 of us.

DATA EXTRACTION AND SYNTHESIS Two of us independently extracted relevant data. The Cochrane Collaboration's tool was used for assessing risk of bias. Overall risk reduction (random-effects estimate) was calculated in the following 4 subgroups of interventions: advance statements, community treatment orders, compliance enhancement, and integrated treatment.

MAIN OUTCOMES AND MEASURES Relative risk (RR) was calculated on the basis of the number of patients who had been compulsorily admitted.

RESULTS Our meta-analyses included 13 RCTs comprising 2970 psychiatric patients. The meta-analysis of the RCTs on advance statements showed a significant 23% (RR, 0.77; 95% CI, 0.60-0.98; I² = 2.2%) (n = 1102) risk reduction in compulsory admissions. In contrast, the RCTs on community treatment orders (RR, 0.95; 95% CI, 0.81-1.10; I² = 0.0%) (n = 742), compliance enhancement (RR, 0.52; 95% CI, 0.11-2.37; I² = 55.7%) (n = 250), and integrated treatment (RR, 0.71; 95% CI, 0.49-1.02; I² = 49.0%) (n = 876) showed no significant risk reduction in compulsory admissions.

CONCLUSIONS AND RELEVANCE The meta-analysis of the RCTs on advance statements showed a statistically significant and clinically relevant 23% reduction in compulsory admissions in adult psychiatric patients, whereas the meta-analyses of the RCTs on community treatment orders, compliance enhancement, and integrated treatment showed no evidence of such a reduction. To date, only 13 RCTs have used compulsory admissions as their primary or secondary outcome measure. This demonstrates the need for more research in this field.

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For various reasons, compulsory admissions of psychiatric patients should be prevented as far as possible. Being compulsorily admitted has a strong effect on patients and their relatives and can be traumatic. A European multicenter study showed that 30% to 50% of patients who have been compulsorily admitted undergo coercive interventions, such as enforced medication, seclusion, and restraint. Although the exact definition of compulsory admission might differ from country to country depending on the judicial context, a compulsory admission is always an admission against the will of the patient (according to local judicial procedures). Compulsory admission also conflicts with principles of autonomy, shared decision making, and recovery-focused care. Fear of coercion may keep patients away from treatment. However, the consequences of compulsory admissions are not exclusively negative: they have also been associated with improvements in psychosocial functioning and better motivation for treatment. In cases of severe danger to self or others caused by a psychiatric condition, compulsory admission is commonly seen as justified and required.

Rates of compulsory admissions across the European Union range from only 6 per 100 000 in Portugal to just above 200 per 100 000 in Finland, but it is important to realize that differences in laws, regulations, and mental health care services make a direct comparison between the countries difficult. Although recent numbers for most countries are not available, rates in several European countries are tending to rise, albeit for reasons that are largely unknown. In England—where, as in many other countries, many patients have been moved from large institutions into the community—the reduction in the number of mental illness beds has been accompanied by a rise in compulsory admissions.

In Western societies, tolerance of deviant behavior by psychiatric patients in the community seems to be decreasing, parallel to an increasing emphasis on autonomy and rights of patients and to strictly defined and regulated coercive measures. Recently, the United Nations Convention on the Rights of Persons With Disabilities stated that “the existence of a disability shall in no case justify a deprivation of liberty,” and it has been argued that involuntary treatment, regardless of whether patients have a mental or physical illness, would be allowed only if a person’s decision-making capability for a specific treatment decision is impaired. Interventions that prevent patients from being compulsorily admitted are urgently needed.

**Objectives**

This investigation was a systematic review and meta-analysis. We aimed to establish which interventions effectively reduce compulsory admissions in adult psychiatric patients in outpatient (ie, all noninpatient) settings.

**Methods**

**Eligibility Criteria**

Studies were eligible if they were randomized clinical trials (RCTs) investigating interventions of any kind that were designed to reduce compulsory admission rates in adult psychiatric patients (age range, 18-65 years) in outpatient settings. Any kind of noninpatient services were considered outpatient settings. A study was considered to be eligible only if it included compulsory admission, defined as stated above, as a primary or secondary outcome measure. We chose to include all articles with clear statements of compulsory admission (or related terms) as outcome measures. Articles studying compulsory admission as an intervention or any intervention during hospitalization were not eligible. Literature was searched from the inception of the databases until April 30, 2015.

**Information Sources**

A computerized literature search was designed and performed by 2 of us (M.H.J. and biomedical information specialist W.B.). The search was last updated on April 30, 2015. The following databases were searched: EMBASE (via embase.com), MEDLINE (via Ovid), Web of Science, PsycINFO (via OvidSP), CINAHL (via EBSCOhost), and Cochrane Central (via Wiley). Additional articles were retrieved from PubMed by selecting only those articles that had not yet been indexed by MEDLINE and on the basis of the first 300 references from Google Scholar. In addition to words in the title and abstract for EMBASE, MEDLINE, PsycINFO, and CINAHL, we used thesaurus terms when available. By scanning reference lists of key articles and review articles related to our subject, we also checked for records that might be missing.

**Search**

The search strategy involved the following 2 key elements: (1) compulsory admission and related terms (such as involuntary hospitalization, etc) and (2) the outcomes measured, such as reduction, prevention, rate, or duration. The full search strategies for all databases are available in the eAppendix in the Supplement.

**Study Selection**

A software package (EndNote, version X6; Thomson Reuters) was used for record management. After deduplication and exclusion of records without abstracts, one of us (M.H.J.) screened the remaining records for eligibility on the basis of...
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the title and abstract. Independently, 2 of us (M.H.J. and M.O.) then assessed the full texts of the remaining records for eligibility. After discussion, the panel of all authors made final decisions on disagreements between these independent authors.

Data Collection Process
Data collection and reporting adhered to the Preferred Reporting Items for Systematic Reviews and Meta-analyses guidelines. Using a data extraction form, 2 of us (M.H.J. and A.M.K.) independently extracted data. Differences in extracted data were discussed by the panel of all authors. Due to inconclusive information, we contacted the authors of 4 articles to verify whether the reported admissions were actually compulsory. Other authors were contacted because several articles had been published on a single study. We also retrieved additional data from the database of one RCT accessible to 2 of us (A.M.K. and C.L.M.), by whom the RCT in question had been performed and published.

Data Items
All the trial articles included were investigated and checked for the following: country of origin, inclusion criteria, type of intervention and control condition, risk of bias, and length of follow-up. As outcome measures, we extracted the number of patients who had been compulsorily admitted as well as the sample size in the intervention and control groups directly after randomization. Similarly, we extracted data on the number of compulsory admissions and on the number of patients as reported by the authors.

Risk of Bias in Individual Studies
On the basis of the Cochrane Collaboration’s tool for assessing risk of bias, two of us (M.H.J. and A.M.K.) independently assessed risk of bias in all eligible studies. The following 6 quality criteria were assessed: (1) random sequence generation, (2) allocation sequence concealment, (3) masking of participants and personnel, (4) masking of outcome assessment, (5) incomplete outcome data, and (6) selective reporting.

Summary Measures
The RCTs we included described various types of interventions, which we divided into 4 subgroups, each consisting of comparable interventions. On these groups, we performed meta-analyses, computing relative risk (RR) to estimate the effect of the intervention. Because the number of admissions could have been biased by various outliers (eg, patients with many admissions during the follow-up period [the so-called revolving-door phenomenon]), RR was calculated on the basis of the number of patients who had been compulsorily admitted (nominator) and of the sample size directly after randomization (denominator). In this way, we estimated the effect sizes of the studies on a strict intent-to-treat basis.

Synthesis of the Results
With regard to the main analysis, we used random-effects estimation and a 95% CI to calculate the overall effect for all 4 subgroups of interventions. A Cochrane Q test was used to examine whether heterogeneity over the pooled studies was greater than would have been expected by chance. We used random-effects analysis because, if there is substantial heterogeneity, such analysis produces a more reliable estimate of the overall admission rate than does fixed-effects analysis.

With regard to sensitivity analyses, associations with categorical characteristics were assessed using random-effects estimation to calculate overall outcomes per category. Fixed-effects estimation was used to compare differences over categories. Cochran Q values, F statistics, and significance levels are reported. Statistical analyses were performed using a software package (metan in Stata, release 13; StataCorp LP).

Risk of Bias Across Studies
A funnel plot was used to assess visually for publication bias, and the Harbord test was used to assess formally whether the effect size decreased in proportion to increasing sample size. Plots with a symmetrical funnel shape are considered to occur only if there is little or no publication bias. An asymmetrical plot may suggest that studies with small sample sizes and nonsignificant results have been omitted.

Sensitivity Analyses
We used Cochran Q and F statistics to quantify heterogeneity across studies. Heterogeneity was further explored by conducting sensitivity analyses. Therefore, we calculated the overall effect using both fixed-effects and random-effects modeling and evaluated the effect of the modeling procedure on the overall effect per subgroup of interventions. Next, we evaluated the effect of outcome data used in the meta-analysis. Therefore, we repeated our analysis using the data as reported by the authors and the number of compulsory admissions (in contrast to the number of compulsorily admitted patients) as outcome data. Furthermore, we compared the overall effects based on the study quality criteria regarding random sequence generation, allocation sequence concealment, and masking of outcome assessment. Also, we compared the overall effects based on whether compulsory admissions were reported as primary or secondary outcomes. In addition, we compared the overall effects based on the country of origin because the judicial context might affect the prevalence of compulsory admissions. Finally, analyses were repeated with exclusion of studies with outlying results. F statistics were interpreted as follows: 0% to 40% is not important, 30% to 60% is moderate, 50% to 90% is substantial, and 75% to 100% is considerable heterogeneity.

Results

Study Selection
The database searches produced 14 020 records (Figure 1). After deduplication, 7107 unique records were reviewed on the basis of the title and abstract, 93 of which appeared to be of potential interest. Records were excluded for not being on topic or for not meeting the eligibility criteria applicable to participants, outcome measures, or study design. Thirteen of 93 rec-
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Figure 1. Flowchart Showing the Study Selection Process

A systematic computerized literature search was performed using EMBASE, MEDLINE, Web of Science, PsycINFO, CINAHL, PubMed (not yet indexed for MEDLINE), Cochrane Central, and Google Scholar. Every database was searched from its inception until April 30, 2015.

Records met full eligibility criteria. The main reasons for further exclusions were that the study was not randomized on second view, that an article was a study protocol rather than a study outcome article, or that different outcome measures had been used. The interrater reliability was high, with a raw interrater agreement of 96.8% (k statistic, 0.88; 95% CI, 0.74-0.99).

Study Characteristics
These 13 studies involved a total of 2970 participants, 1541 in the intervention groups and 1429 in the control groups. While follow-up ranged in length from 6 months to 12 years, in 10 studies it was between 11 and 18 months. Study characteristics are listed in the Table. Four studies investigated advance statements (including advance directives22 and joint crisis plans23-25), 3 studies26-28 investigated community treatment orders, and 2 studies investigated different types of compliance enhancement (including treatment adherence therapy29 and financial incentives for improving adherence to antipsychotic treatment30). Finally, we included 4 studies in which the common characteristic of the interventions consisted of augmentation of standard care (integrated treatment), including 1 study31 on crisis resolution teams, 2 studies32,33 on integrated treatment in first-episode schizophrenia, and 1 study34 on psychoeducation combined with focused monitoring.

All studies were 2-arm RCTs except the study by Ruchlewska et al,25 which consisted of 3 arms. In that case, we pooled 2 intervention arms together into one.

Risk of Bias Within the Studies
The eTable in the Supplement lists the results of the Cochrane Collaboration’s tool for assessing risk of bias. Only 5 studies22,24,28,30,33 had low risk of bias in the 2 items regarding the randomization process (random sequence genera-

tion and allocation sequence concealment). All other studies had unclear risk of bias in one or both items, whereas 1 study29 had high risk of bias in the item of allocation sequence concealment. All studies scored unclear risk of bias with regard to masking of participants and personnel. In this research field, it is impossible to mask participants and health care professionals for the intervention condition, but it remains unclear whether or not this awareness led to bias. The included studies mainly scored low risk and incidentally unclear risk of bias with regard to masking of outcome assessment, incomplete outcome data, and selective reporting.

Findings of Individual Studies
A forest plot presents the results of the individual RCTs with regard to patients who had been compulsorily admitted. This result is shown in Figure 2.

Synthesis of the Findings
The meta-analysis of the pooled RCTs studying advance statements showed that the risk of compulsory admission had been reduced significantly by 23% (RR, 0.77; 95% CI, 0.60-0.98; F² = 2.2%). The meta-analysis of the pooled RCTs studying community treatment orders (RR, 0.95; 95% CI, 0.81-1.10; F² = 0.0%), the meta-analysis of the pooled RCTs studying compliance enhancement (RR, 0.52; 95% CI, 0.11-2.37; F² = 55.7%), and the meta-analysis of the pooled RCTs studying integrated treatment (RR, 0.71; 95% CI, 0.49-1.02; F² = 49.0%) showed no evidence that the risk of compulsory admission had been reduced. In the meta-analyses regarding compliance enhancement and integrated treatment, we found indications for moderate to substantial heterogeneity (I² = 55.7% and F² = 49.0%, respectively).

Risk of Bias Across Studies
The funnel plot (Figure 3) is asymmetrical and shows 1 small study with a large positive effect size (ie, the study by Staring et al29). The corresponding Harbord test shows the significant presence of the small-study effect (intercept, −2.09; 95% CI, −4.06 to −0.11; P = .04). When the study by Staring et al29 was excluded, the effect was no longer significant (intercept, −1.86; 95% CI, −4.40 to 0.69; P = .14). The result of the study by Lay et al34 is on the margin of the 95% pseudoconfidence area.

Sensitivity Analyses
Modeling Procedure
Bias and potential sources of heterogeneity were tested in sensitivity analyses, which showed that neither modeling procedure had an effect in the following 3 cases: (1) advance statements (RR, 0.77; 95% CI, 0.60-0.98 for both fixed and random), (2) community treatment orders (RR, 0.95; 95% CI, 0.81-1.11 for both fixed and random), and (3) integrated treatment (RR, 0.72; 95% CI, 0.56-0.93 for fixed and RR, 0.71; 95% CI, 0.49-1.02 for random). However, with regard to compliance enhancement, the modeling procedures had a considerable effect (RR, 0.67; 95% CI, 0.37-1.23 for fixed and RR, 0.52; 95% CI, 0.11-2.37 for random).
Intent-to-Treat Analysis vs the Findings as Reported

The effect sizes calculated on the basis of the results reported by the authors produced RRs that were similar to those produced by strict intent-to-treat analysis. Relative risks were 0.78 (95% CI, 0.60-1.01) (I² = 11.9%) for advance statements, 0.95 (95% CI, 0.81-1.10) (I² = 0.0%) for community treatment orders, 0.48 (95% CI, 0.10-2.30) (I² = 54.9%) for compliance enhancement, and 0.74 (95% CI, 0.54-1.01) (I² = 35.2%) for integrated treatment.

Outcome Measures

Pooling of the only 4 studies24,26,30,34 that also reported the total number of compulsory admissions (in contrast to the number of compulsorily admitted patients) produced a non-significant RR of 0.76 (95% CI, 0.54-1.06). Heterogeneity in this subgroup of 4 studies was considerable (I² = 87.6%).

Subgroup Analyses

Potential sources of heterogeneity were further assessed in subgroup analyses. No significant difference in the overall effect was shown based on the study quality criteria regarding random sequence generation and allocation sequence concealment (Q = 0.06, P = .80), masking of assessors (Q = 0.55, P = .46), or reporting of the outcome as primary vs secondary outcome (Q = 2.11, P = .15). Evaluation of the country of origin (judicial context) resulted in no difference in the overall effect (Q = 6.81, P = .15). Finally, exclusion of the study by Staring et al.28 which had shown an outlying finding for the effect of compliance enhancement, resulted in an overall intervention effect RR of 0.84 (95% CI, 0.73-0.96; I² = 19.3%). This value was similar to the overall intervention effect calculated for the full set of inclusions (RR, 0.83; 95% CI, 0.72-0.96; I² = 25.9%).

Discussion

Summary of Evidence

We found only 13 RCTs in which intent to reduce compulsory admission was the first or secondary outcome measure. Because compulsory admissions have an effect on patients and their relatives and compromise the human right to freedom, this number is both small and disappointing.

Table. Characteristics of All Included Studies

<table>
<thead>
<tr>
<th>Source</th>
<th>Main Inclusion Criteria</th>
<th>Intervention</th>
<th>Control</th>
<th>Follow-up</th>
</tr>
</thead>
<tbody>
<tr>
<td>Papageorgiou et al.22,23 2002 (United Kingdom)</td>
<td>Inpatient compulsory treatment</td>
<td>Advance directive (n = 80)</td>
<td>Standard multidisciplinary community care (n = 81)</td>
<td>12 mo</td>
</tr>
<tr>
<td>Henderson et al.22,23 2004 (United Kingdom)</td>
<td>SMI and ≥1 admission in last 2 y</td>
<td>Joint crisis plan (n = 80)</td>
<td>Local community mental health team (n = 80)</td>
<td>15 mo</td>
</tr>
<tr>
<td>Thornicroft et al.24,25 2013 (United Kingdom)</td>
<td>Relapsing psychotic disorder, ≥1 admission in last 2 y</td>
<td>Joint crisis plan (n = 285)</td>
<td>Standard multidisciplinary care (n = 284)</td>
<td>18 mo</td>
</tr>
<tr>
<td>Ruchlewski et al.26,27 2014 (the Netherlands)</td>
<td>Outpatient, psychotic/bipolar disorder, ≥1 crisis admission in last 2 y</td>
<td>Crisis plan (2 arms) (n = 139)</td>
<td>Flexible assertive community treatment (n = 73)</td>
<td>18 mo</td>
</tr>
</tbody>
</table>

Community treatment orders

<table>
<thead>
<tr>
<th>Source</th>
<th>Main Inclusion Criteria</th>
<th>Intervention</th>
<th>Control</th>
<th>Follow-up</th>
</tr>
</thead>
<tbody>
<tr>
<td>Swartz et al.28 1999 (United States)</td>
<td>SMI &gt;1 y, decreasing GAF score, intensive treatment for 2 y</td>
<td>Community treatment order (n = 129)</td>
<td>Case management, without community treatment order (n = 135)</td>
<td>12 mo</td>
</tr>
<tr>
<td>Steadman et al.29 2001 (United States)</td>
<td>Referral to outpatient commitment program</td>
<td>Community treatment order (n = 78)</td>
<td>Standard care, without community treatment order (n = 64)</td>
<td>11 mo</td>
</tr>
<tr>
<td>Burns et al.30 2013 (United Kingdom)</td>
<td>Currently detained with psychosis</td>
<td>Community treatment order (n = 167)</td>
<td>Standard outpatient care, without community treatment order (n = 169)</td>
<td>12 mo</td>
</tr>
</tbody>
</table>

Compliance enhancement

<table>
<thead>
<tr>
<th>Source</th>
<th>Main Inclusion Criteria</th>
<th>Intervention</th>
<th>Control</th>
<th>Follow-up</th>
</tr>
</thead>
<tbody>
<tr>
<td>Staring et al.31 2010 (the Netherlands)</td>
<td>Outpatient, SMI, problems with service engagement</td>
<td>Treatment adherence therapy (n = 54)</td>
<td>Standard community mental health care (n = 55)</td>
<td>12 mo</td>
</tr>
<tr>
<td>Priebe et al.32 2013 (United Kingdom)</td>
<td>SMI, receiving ≤75% of prescribed depot</td>
<td>Financial incentives (n = 78)</td>
<td>Community mental health care (n = 63)</td>
<td>12 mo</td>
</tr>
</tbody>
</table>

Integrated treatment

<table>
<thead>
<tr>
<th>Source</th>
<th>Main Inclusion Criteria</th>
<th>Intervention</th>
<th>Control</th>
<th>Follow-up</th>
</tr>
</thead>
<tbody>
<tr>
<td>Johnson et al.33 2005 (United Kingdom)</td>
<td>Crisis severe enough to consider admission</td>
<td>Crisis resolution teams (n = 135)</td>
<td>Standard crisis care (n = 125)</td>
<td>6 mo</td>
</tr>
<tr>
<td>Ohlenschlaeger et al.34 2008 (Denmark)</td>
<td>First-episode schizophrenia spectrum disorder</td>
<td>Integrated care (n = 167)</td>
<td>Standard community mental health care (n = 161)</td>
<td>12 mo</td>
</tr>
<tr>
<td>Sigrúnarson et al.35 2013 (Norway)</td>
<td>Recent-onset psychosis (symptoms ≤2 y)</td>
<td>Integrated treatment (n = 30)</td>
<td>Case management (n = 20)</td>
<td>12 y</td>
</tr>
<tr>
<td>Lay et al.36 2015 (Switzerland)</td>
<td>≥1 Compulsory admission in last 2 y</td>
<td>Psychoeducation plus focused monitoring (n = 119)</td>
<td>Standard community mental health care (n = 119)</td>
<td>12 mo</td>
</tr>
</tbody>
</table>

Abbreviations: GAF, Global Assessment of Functioning; SMI, severe mental illness.
Figure 2. Relative Risk of Compulsory Admission per Subgroup of Intervention

<table>
<thead>
<tr>
<th>Source</th>
<th>Intervention</th>
<th>Control</th>
</tr>
</thead>
<tbody>
<tr>
<td>Advance Statements</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Papageorgiou et al,22 2002</td>
<td>0.95 (0.50-1.79)</td>
<td>16/81</td>
</tr>
<tr>
<td>Henderson et al,23 2004</td>
<td>0.48 (0.24-0.95)</td>
<td>10/80</td>
</tr>
<tr>
<td>Thornicroft et al,24 2013</td>
<td>0.87 (0.62-1.23)</td>
<td>96/284</td>
</tr>
<tr>
<td>Ruchlewka et al,25 2014</td>
<td>0.68 (0.41-1.11)</td>
<td>27/139</td>
</tr>
<tr>
<td>subtotal</td>
<td>0.77 (0.60-0.98)</td>
<td>101/584</td>
</tr>
<tr>
<td>Community Treatment Orders</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Swartz et al,26 1999</td>
<td>0.90 (0.69-1.17)</td>
<td>56/129</td>
</tr>
<tr>
<td>Steadman et al,27 2001</td>
<td>0.96 (0.75-1.22)</td>
<td>49/78</td>
</tr>
<tr>
<td>Burns et al,28 2013</td>
<td>1.00 (0.75-1.33)</td>
<td>59/167</td>
</tr>
<tr>
<td>subtotal</td>
<td>0.95 (0.81-1.10)</td>
<td>164/374</td>
</tr>
<tr>
<td>Compliance Enhancement</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Staring et al,29 2010</td>
<td>0.17 (0.02-1.36)</td>
<td>1/54</td>
</tr>
<tr>
<td>Priebe et al,30 2013</td>
<td>0.87 (0.45-1.65)</td>
<td>15/78</td>
</tr>
<tr>
<td>subtotal</td>
<td>0.52 (0.11-2.37)</td>
<td>16/132</td>
</tr>
<tr>
<td>Integrated Treatment</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Johnson et al,31 2005</td>
<td>0.69 (0.43-1.11)</td>
<td>24/135</td>
</tr>
<tr>
<td>Ohlenschlaeger et al,32 2008</td>
<td>1.17 (0.71-1.95)</td>
<td>28/167</td>
</tr>
<tr>
<td>Sigúrnarsdóttir et al,33 2013</td>
<td>0.61 (0.34-1.01)</td>
<td>11/30</td>
</tr>
<tr>
<td>Lay et al,34 2015</td>
<td>0.50 (0.30-0.83)</td>
<td>18/119</td>
</tr>
<tr>
<td>subtotal</td>
<td>0.71 (0.49-1.02)</td>
<td>81/451</td>
</tr>
</tbody>
</table>

The lack of effect of 3 out of 4 subgroups of interventions is remarkable, especially because the primary or secondary aim of the interventions is to reduce compulsory admissions. Although there was no statistically significant risk reduction in the subgroup of integrated treatment (with moderate heterogeneity), it showed a potentially clinically relevant risk reduction of 29%. This subgroup of interventions might be most promising for further research and development. None of these findings were affected by sensitivity analyses.

Figure 3. Visual Assessment of Risk of Bias Across Studies

The 95% pseudoconfidence areas are shown.

With regard to the subgroups of interventions, studies on advance statements showed a statistically significant reduction (23%) in the risk of compulsory admission (with unimportant heterogeneity). In light of human rights and the effect that compulsory admissions have on psychiatric patients, we consider this figure of 23% as clinically relevant. This result highlights the fact that, by advocating patients’ desires and preferences regarding a future crisis and by involving family and friends, advance treatment planning is an important and helpful process for psychiatric patients.
tients, who are at most risk of being compulsorily admitted. To address the methodological problem of potential selection bias, we may need to add new elements into the standard RCT design (eg, the RCT design by Zelen,37,38 in which patients are randomized to either the treatment or the control group before giving informed consent).

A decision with regard to a compulsory admission is the result of a complex set of patient-related, environmental, and health care determinants.39 Interventions such as advance statements and integrated treatment that target the health care process as a whole are probably more effective than those such as community treatment orders and compliance enhancement, which target one specific element of the health care process. Because this result is consistent with our findings, we should be encouraged to invest in research that combines several specific interventions and thereby provides the most vulnerable patients with integrated treatment.

Limitations

Although more studies may provide data on compulsory admissions—not as a primary or secondary outcome measure but possibly as an adverse effect of the intervention being researched—our objective was to focus on studies in which titles or abstracts identified compulsory admission as their outcome measure. Despite this intent, we are unlikely to have missed a complete subgroup of interventions. Although meta-analysis is a method to increase power, some subgroups of interventions might be underpowered to provide significant evidence of smaller treatment effects.

The types of interventions included in our meta-analysis varied considerably. Although we were able to pool the interventions into 4 meaningful subgroups consisting of similar interventions, the integrated treatment subgroup was heterogeneous with regard not only to interventions (crisis resolution, integrated care, and psychoeducation with focused monitoring) but also to patient inclusion criteria (crisis severe enough to consider admission, recent-onset psychosis, and earlier compulsory admission). Such clinical and statistical heterogeneity means that the effect of these interventions on reducing compulsory admissions should be interpreted with caution.

In this review, we have also focused specifically on compulsory admissions, thereby excluding voluntary admissions. Although voluntary admission is an important outcome measure, the human rights issues and the rise in compulsory admissions in several Western countries led us to view compulsory admissions as those that most urgently need to be prevented.

It might be argued that, as an outcome measure, compulsory admission is not necessarily determined by the intervention we have researched because admissions also depend on clinical decision making. While this situation is indeed the case, it does not invalidate positive and negative results with regard to compulsory admissions, especially in randomized studies, in which all circumstances but the intervention are supposed to be the same. It is also important to realize that, in itself, the outcome measure of compulsory admission is just a matter of counting and cannot be biased by interpretation.

In the meta-analyses, the most reliable basis for calculating the outcome measure of compulsory admission was the number of patients who have been compulsorily admitted at least once. This choice might have led the effect to be underestimated, at least in patients with many admissions during the follow-up period. However, sensitivity analysis of the effects on the number of admissions did not significantly change the results.

Conclusions

The meta-analysis of the RCTs on advance statements showed a statistically significant and clinically relevant 23% reduction in compulsory admissions in adult psychiatric patients. In contrast, the meta-analyses of the RCTs on community treatment orders, compliance enhancement, and integrated treatment showed no evidence of such a reduction. However, there was substantial heterogeneity among the subgroups of intervention studies.

To date, only 13 RCTs have used compulsory admission as their primary or secondary outcome measure when investigating this issue. This small number demonstrates the urgent need for developing interventions based on knowledge of risk factors for compulsory admission (advance statements are most promising) and using modified RCT designs (eg, in which informed consent is requested after randomization).
19. StataCorp LP. Stata [computer program]. Release 13. College Station, TX: StataCorp LP; 2013.