

Treatment Foster Care Oregon for Delinquent Adolescents: A Systematic Review and Meta-Analysis

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Abstract

Purpose: To examine the effects of Treatment Foster Care on youth with serious behavior problems. **Method:** Included studies are controlled trials with high or medium quality, published between 1990 and September 2017. The control group consists of youth with serious behavior problems in group care, and the follow-up time was at least 12 months. The review also examines ethical and economic aspects. **Results:** A total of eight controlled studies were included, consisting of 633 young people and 55 effect sizes. All studies examined the same model, Treatment Foster Care Oregon (TFCO). There is moderate certainty of evidence that TFCO reduces the risk of future criminal behavior and the number of days in locked settings. Furthermore, there is low certainty of evidence that TFCO reduces the risk of delinquent peer associations, drug use, and depression. **Discussion:** TFCO is to be preferred to group care for youth with serious behavior problems. Ethical and economic implications are discussed.

Keywords

Treatment Foster Care, delinquency, adolescents, group care, institutional care, out-of-home placement

Adolescents with serious behavior problems (e.g., aggressiveness, delinquency, and substance abuse) have significantly more mental, physical, and dental health-care problems than children in national populations (e.g., Vinnerljung & Hjerm, 2018).

Research repeatedly proves that group care for adolescents with serious behavior problems has scant treatment success and a large proportion continue with a delinquent and destructive lifestyle (e.g., De Swart et al., 2012; Strijbosch et al., 2015). Neither is foster care an appropriate alternative due to a high rate of placement breakdowns (Konijn et al., 2019; Olsson, Egelund, & Holst, 2012; Sallnäs, Vinnerljung, & Kyhle Westermarck, 2004) that increase the risk of various negative outcomes. This review will synthesize research on one alternative to both group care and traditional foster care.

Treatment Foster Care (TFC)

The TFC model was created during the 1950s as an intervention to facilitate the transition between placement in institutional care and returning to the family of origin (Reddy & Pfeiffer, 1997). Today, it is an alternative to group care developed to meet the needs of adolescents with serious behavioral problems including serious and repeated criminality (McMillen et al., 2015). Several specific TFC models have developed over the years and can be described as time-framed interventions where specifically trained foster parents offer treatment as well

as care normally provided in traditional foster care settings (Boyd, 2013; Curtis, Alexander, & Lunghofer, 2001; Dorsey et al., 2008; Hahn et al., 2005).

One manualized and well-researched TFC model is Treatment Foster Care Oregon (TFCO), formerly Multidimensional TFC. The treatment is delivered by a professional team, and the specific features of TFCO are that only one juvenile delinquent at the time is placed in the foster home and that the treatment includes family therapy for the adolescent's family of origin. The goal of TFCO is reunification with the family of origin within a year (Chamberlain & Mihalic, 1998). The different professionals in the team, coordinated by a team leader, are responsible for different areas: for example, the adolescent's

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own therapist will both act as a spokesperson for the adolescent and as an individual therapist, the family therapist will meet the adolescent and his or her family of origin once a week, and a skills trainer will support the adolescent in a pro-social manner in daily activities, while the team leader will assume responsibility for both contact with foster family and for coordinating the team's work.

The foster care family, in cooperation with the team, is responsible for part of the treatment although a large part takes place outside of the foster home, reflecting normal adolescent development in which young people gradually spend more and more time away from their families while hopefully retaining them as safe base (Chamberlain & Mihalic, 1998).

During the whole placement, the adolescent is expected to go to an ordinary school, and attendance is initially monitored daily. The foster family will be given structured support and supervision regularly by a foster family trainer and have the possibility to get support from the team 24/7 whatever needed. A checklist is used to monitor the adolescent's progress administered via daily phone call to the foster parents (Chamberlain & Mihalic, 1998).

Previous Reviews of the Efficacy of TFC Interventions

There are several literature reviews describing TFC. Because of methodological constraints, it is difficult to assess the results of these reviews. Some use broad inclusion criteria, where, for example, the comparison group has been children who still reside in their original homes (Dishion, Forgatch, Chamberlain, & Pelham, 2016; Leve, Chamberlain, & Kim, 2015) or include other types of family support in addition to TFC (Osei, Gorey, & Hernandez Jozefowicz, 2016; Turner & Macdonald, 2011). Some reviews lack assessment of risk of bias or mix controlled with noncontrolled studies (Hahn et al., 2005; Reddy & Pfeifer, 1997). One review includes studies only from the United States (Lee, Bright, Svoboda, Fakunmoju, & Barth, 2011), thus risking a low statistical power and the possibility to identify significant effects.

Aim of the Present Study

This systematic review aims to synthesize the effectiveness of TFC for adolescents with serious behavior problems compared with group care by addressing the following questions:

1. Does TFC reduce the risk of future crime and other relevant outcomes?
2. What is the relationship between costs and effects for TFC?
3. What ethical issues require consideration concerning both TFC and group treatment?

Method

Inclusion and Exclusion Criteria

Studies were included if they (1) included an experimental and a control group, (2) utilized a pre-post design, (3) provided follow-up scores of at least 12 months, and (4) were published from 1990 to September 2017. Both peer-reviewed and unreviewed publications were accepted.

Population. Adolescents between the ages of 12 and 17 who were in out-of-home care because of serious behavior problems (e.g., aggressiveness, offending, and substance abuse).

Interventions. TFC.

Control groups. Group care (e.g., group homes, residential care, residential home, custody, group care, institutional care).

Outcome. Primary outcomes are reoffending and secure detainment. Outcomes of a more distal character were also included, such as alcohol and drug abuse, delinquent peers, mental health, employment, physical and dental health, quality of life, school adjustment, sexual risk behavior, and teenage pregnancy.

Studies were excluded if either the experimental or the control group included more than 30% of children younger than 12 or older than 17 years or if more than 30% of the control group received other services (e.g., foster care).

Literature Search and Procedure

Five search methods were used to identify relevant studies. Firstly, 14 databases were searched for articles: Academic Search Elite, Campbell library, CENTRAL, Cochrane Database of Systematic Reviews, CINAHL, DARE, ERIC, Health Technology Assessment (HTA), PsycINFO, PubMed, SocIndex, Sociological Abstracts, Social Service Abstracts, and Social Care Online. Search terms were modified according to the databases' thesaurus/subject terms by both a specialist librarian and the authors (Supplemental Appendix S1). Secondly, we searched for relevant articles in local databases in Swedish University libraries and Scandinavian governmental agencies (Supplemental Appendix S2). Thirdly, we searched in the reference lists of all previously published reviews and eligible studies. Fourth, known experts from the Scandinavian countries, Ireland, United Kingdom, Germany, and the United States were contacted to identify additional or unpublished data. Fifthly, all principal investigators of the identified studies were also contacted for additional research.

Search results (title and abstract) were screened by two authors independently. Discrepancies were resolved by consensus after further detailed analysis and reading. Rayyan, a web and mobile app for systematic reviews, was administered for review screening (Ouzzani, Hammady, Fedorowicz, & Elmagarmid, 2016). The full-text assessment was made by two

authors independently; differences were resolved by all of the authors of this article in consensus discussions.

Risk of Bias Assessment and Data Extraction

Risk of bias was assessed according to the Swedish Agency for Health Technology Assessment and Assessment of Social Services standardized checklists for determining the extent to which studies meet basic quality criteria (Swedish Agency for Health Technology Assessment and Assessment of Social Services, 2019). The criteria assess risk of selection bias, performance bias, detection bias, attrition bias, reporting bias, and conflict of interest bias. The checklist is similar to the Cochrane checklist (Higgins et al., 2011). The quality of included studies was rated as possessing a high, moderate, or low risk of bias. Only studies with low or moderate risk of bias were considered for grading of scientific evidence and conclusions. Any disagreements on quality rating of individual studies were resolved within the group of reviewers by consensus. Thereafter, data were extracted from the included publications. All recorded extracted data were checked by the authors in pairs and included first after consensus was reached. All decisions were documented.

Grading of Evidence

The quality of the evidence for outcome measures was assessed according to the Grading of Recommendations Assessment, Development and Evaluation system (Alonso-Coello et al., 2016; Guyatt et al., 2008) with “high certainty of evidence” (⊕⊕⊕⊕), “moderately certainty of evidence” (⊕⊕⊕○), “low certainty of evidence” (⊕⊕○○), and “very low certainty of evidence” (⊕○○○).

The included studies were all first preliminary assumed to have the highest possible quality of evidence (⊕⊕⊕⊕). Thereafter when assessing the studies according to the criteria (risk of bias, imprecision, inconsistency, indirectness, and publication bias) for rating their quality, one or two points can be deducted for failure to meet the demands contained within each criterion.

Statistical Procedures

Data related to effect size were entered into Comprehensive Meta-Analysis Version 3.0 (Borenstein, Hedges, Higgins, & Rothstein, 2014). Standardized mean difference (SMD; also known as Cohen’s d) was calculated by taking the difference in pre- to follow-up measure means for each group and dividing these by their pooled standard deviations (Higgins & Green, 2008). When studies did not provide one of these values, Cohen’s d was computed according to Lipsey and Wilson (2000) and the Practical Meta-Analysis Effect Size Calculator (Wilson, 2001). Following the somewhat perfunctory criteria of Cohen (1988), an effect size of $d = 0.20$ was considered small, an effect size of $d = 0.50$ was considered medium, and an effect size of $d = 0.80$ was considered large. Since a

systematic review has found that group care has a negative impact (Strijbosch et al., 2015), we considered all positive effects, independent of size, as significant.

Publication Bias

Studies reporting strong significant associations are more likely to be accepted for publication in a journal (Ioannidis, 2005). This implies that studies that report nonsignificant results are generally more difficult to find and may be published only in so-called grey literature (e.g., agency reports, working papers). If this is the case, conclusions may be incomplete. As there were comparatively few studies on each outcome measure, our plans for funnel plots and related methods were not feasible.

Economic Analysis

The economic analysis includes a systematic literature review of economic publications and Swedish costs for TFCO compared to group care. The economic systematic literature review used the same inclusion criteria as the overall project with an addition of quality of life, welfare, and short-/long-term costs as relevant outcome measures. We searched for articles presenting economic analyses (e.g., cost analyses, cost-effectiveness analyses, cost-benefit analyses) and descriptive articles on resource use, costs, and quality of life/welfare. The literature search was performed using health economic search filters and search strings. Searches were performed in following databases: CINAHL, HTA database, NHS Economic Evaluation Database, ERIC, PsycINFO, Medline, SocIndex, and Sociological Abstracts.

The cost analysis presents the cost per day in care and the average number of days in care for a youth in TFCO compared to group care. In Sweden, group care is either residential care or residential homes. These treatments differ in cost and are presented separately in the Results. The information on costs and days in care was obtained from (a) the main provider of TFCO in Sweden (Humana; personal communication, October–November 2017), (b) a Swedish practice study (Swedish Agency for Health Technology Assessment and Assessment of Social Services, 2018), (c) an annual report on Swedish residential care (Swedish National Board of Institutional Care, 2015), and (d) an evaluation of an intervention used in residential care (National Board of Health and Welfare, 2017).

A meaningful economic analysis of TFCO and residential care/homes must also consider the effects on relevant outcomes. The meta-analysis presents the effect as SMD, which cannot be used to calculate cost effectiveness in a meaningful way. However, to show the cost saving potential of TFCO compared to residential care/homes, we present a cost analysis derived from a Swedish trial. The analysis is based on a calculation of the costs saved for reducing the number of days in a locked, institutional setting with TFCO. Information on the number of days in locked settings for a youth placed in TFCO versus residential care/homes is taken from one of the studies included in the meta-analysis (Bergström & Højman, 2015).

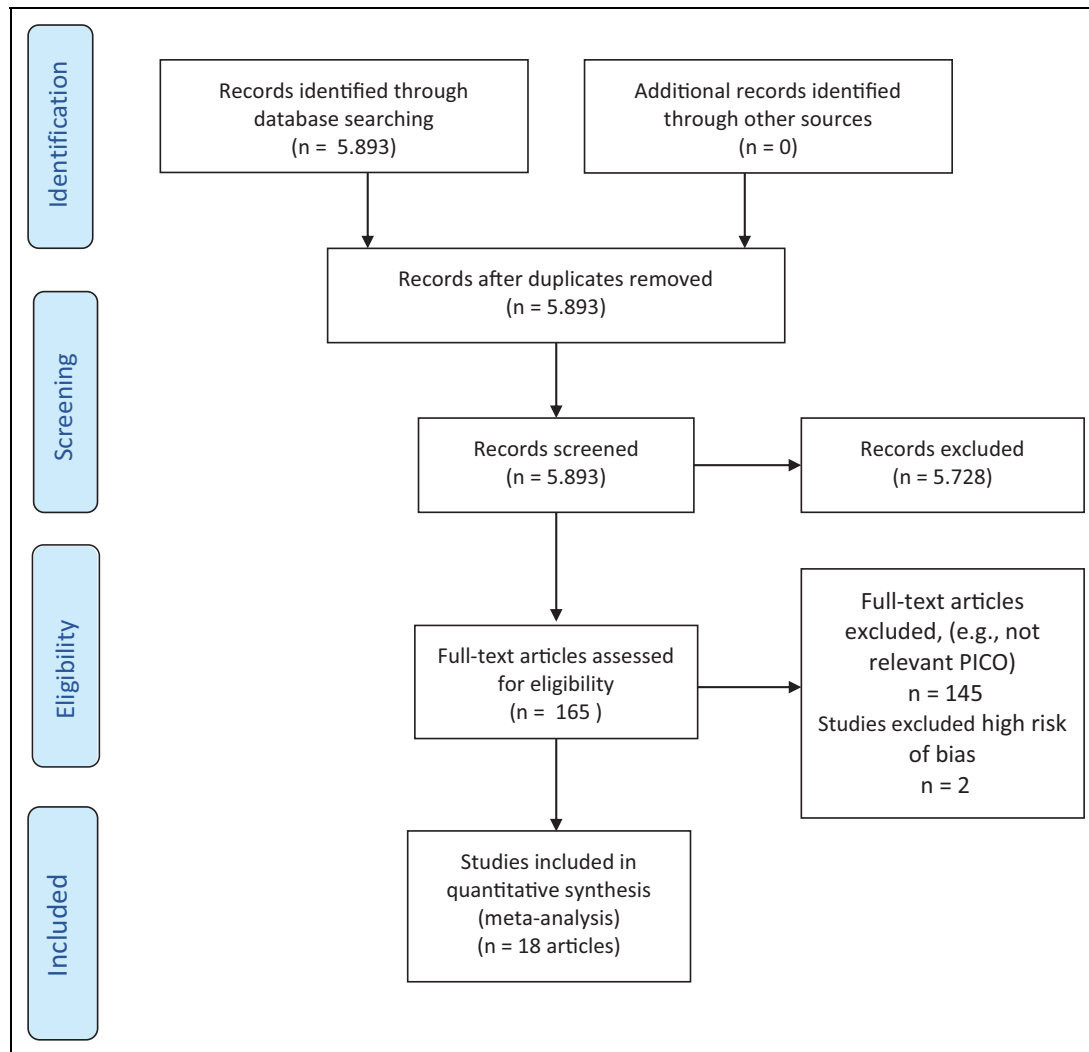


Figure 1. Literature review flowchart.

All costs presented in this article are, if not stated otherwise, recalculated from Swedish krona (SEK) to USD (year 2016) using the method recommended by the Cochrane and Campbell Economic Methods Group, that is, with purchasing power parities (PPPs) via The CCEMG–EPPI-Centre Cost Converter (v.1.5 last update: April 29, 2016) [http://eppi.ioe.ac.uk/costcon version/](http://eppi.ioe.ac.uk/costcon/version/) (IMF-PPP).

Ethical Analysis

The ethical analysis used a structured checklist for inclusion of ethical aspects in health technology assessment (Heintz et al., 2015). The checklist is modified for and based on general ethical considerations in social services as well as specific Swedish context (Banks, 2012; Munthe, Sandman, & Nykänen, 2015). A basic premise underlying the analysis is that when society assumes the caring role for adolescents, especially when this is done using legal force, it then assumes a distinct and demanding moral responsibility to promote the interests of these adolescents as they are understood and described in the

literature concerning the ethical status of children (Archard, 2011; Miller, 2003). The checklist focuses on the responsibilities of the social services regarding decisions and choice of methods in different stages of care in relation to the well-being, long-term development, and decision-making capacities of the adolescent in care.

Results

The search resulted in 5,893 possibly eligible citations. No article was found via hand-pending or reference lists. After excluding nonrelevant articles and those with high risk of bias, our final sample consists of 18 publications from eight studies, based on 633 youth between the ages 12 and 17 years and including 55 effect sizes (Figure 1). All studies examined the same version: TFCO.

Five of the eight studies included were conducted in the United States, two in United Kingdom, and one in Sweden. Of the eight studies, six were randomized control trials and two were concurrent prospective studies with nonequivalent

comparison groups. One study included only boys, two only girls, and five contained both boys and girls.

The eight studies are characterized by methodological similarity (Table 1). In all of the studies, the control condition was group care. Attrition was nonexistent or small. The same or similar outcome measures was used, and in most cases, the follow-up period was 12 or 24 months.

Six of the eight studies reported several outcomes (Table 1). The primary outcome reoffending was measured using official data (six studies) or self-reports (three studies). In addition, reoffending was measured with the indirect outcome of secure detainment, based on the logic that a high risk of reoffending induces a locked setting (six studies). Secondary outcomes are drug use (three studies), depression (three studies), delinquent peers (two studies), and alcohol use, psychotic symptoms, sexual risk behavior, teenage pregnancy, and poor school attachment (one study). No study assessed effects of care on physical and dental health, quality of life, future employment, or possibly iatrogenic effect.

Effects of TFCO on Delinquency and Other Outcomes

The meta-analysis report all the primary outcomes to be statistically significant with effect sizes (SMD) in the range from small (criminal referrals according to self-reports) to moderate (criminal referrals according to register data and days in locked settings; Table 2). If this is translated to numbers needed to treat (NNT), the average number of adolescents that need to receive the intervention for one to be successful were 13, 8 respective 5. There is moderate certainty of evidence (⊕⊕⊕○) that placing youth with serious behavior problems in TFCO reduces the risk for future criminal behavior, both according to police or court records and self-reports. TFCO also lowered the number of days in locked settings compared to when adolescents are placed in group care (Figures 2–4).

Furthermore, the meta-analysis produced moderate effects on the number of delinquent peers and drug use and small effects on psychological health. This corresponds to an NNT of 8, 7 respective 10, indicating a low certainty of evidence that TFCO reduces the risk of delinquent peer associations and drug use while improving the individuals' mental health compared to individuals receiving group care (⊕⊕○○; Figures 5–7).

The certainty of evidence was considered very low when it comes to the effect on alcohol use, psychotic symptoms, sexual risk behavior, teenage pregnancies, and school attendance (⊕○○○; Table 2). Table 2 includes motives for the grading of quality of evidence.

Economic Aspects of TFCO

The systematic literature review of economic publications identified 314 abstracts, of which 32 were judged relevant and were read in full text. Five articles were identified through hand search. A total of four publications met the project criteria and

were assessed using a checklist for assessing the quality of health economic studies (Swedish Agency for Health Technology Assessment and Assessment of Social Services, 2017). Only one Danish report was judged to have moderate study quality regarding the economic aspects (Rambøll, 2012). The Danish report presented model-based cost–benefit analysis of TFCO compared to treatment as usual. The analysis results in a positive net present value of US\$100,000 for a youth placed in TFCO compared to treatment as usual (recalculated from DKK, year 2009, to USD, year 2016).

The cost analysis, made to investigate the costs in a present Swedish context, shows that the cost per day in care for one youth is on average US\$450 for residential homes, US\$510 for TFCO, and US\$920 for residential care. For all three-treatment alternatives, the average time in care for a youth with severe behavioral problems is 10 months. In total, a placement for one youth is US\$136,800 for residential homes, US\$155,040 for TFCO, and US\$279,680 for residential care. Thus, only taking the direct costs into consideration shows that having a youth placed in TFCO is slightly more expensive than the corresponding time in a residential home, but less expensive than residential care.

The study chosen to exemplify the relation between costs and effects of the treatments (Bergström & Højman, 2015) shows that youths assigned to TFCO in Sweden are placed 64 days less in locked settings compared to residential care and residential homes (23 days compared to 87 days). The cost for 1 day in a locked setting is assumed equivalent to 1 day in secure residential care (i.e., US\$920). In this example, TFCO is cost saving compared to both residential care (saving US\$183,520) and residential homes (saving US\$40,640).

Ethical Aspects on Services for Youth with Serious Behavior Problems

Residential placement of youth with serious behavior problems requires balancing the protection of others from the adolescent's delinquent behavior while avoiding aggravation of the adolescent's problems, something which may occur as a result of negative peer influence, abuse, and counterproductive restrictions of personal autonomy. Four ethical issues are actualized in relation to this (Bergström et al., 2019; Molin & Palmer, 2005; Munthe & Hartvigsson, 2015).

The first involves the significant risks that group care may involve (e.g., increased risk of antisocial training; Dodge, Dishion, & Lansford, 2006; Strijbosch et al., 2015). Acute risk of violence among incarcerated youth or serious criminal recidivism may still mandate temporary secure detainment, but this intervention must be balanced against the risk of further deteriorating outcomes in the long run.

A second and related issue deals with the interventions used in any specific group care. As reported elsewhere (Swedish Agency for Health Technology Assessment and Assessment of Social Services, 2018), in Sweden, a total of 33 different interventions are used in group care, and it is hardly likely that all are equally effective. As there are some interventions that

Table 1. Characteristics of Included Studies.

Author (Year)	Country	Design	Control	Follow-Up (Months)	Youths' Age and Gender	N	Attrition	Outcomes
Biehal, Ellison, and Sinclair (2011)	UK	CT	Custody (in four cases, sentenced to an Intensive Supervision and Surveillance Programme)	12, 21	10–16 years, 83% male	47	0% (except 9% for Incarc at 21 months)	CrimeR, Incarc
Chamberlain (1990)	USA	Matched CT	Residential care	24	13–18 years, male = 63%	32	0%	Incarc
Chamberlain and Reid (1998), Eddy, Whaley, and Chamberlain (2004), Smith, Chamberlain, and Eddy (2010)	USA	RCT	Group care (e.g., therapeutic group work, individual therapy, and family therapy)	12, 18, 24	12–17 years, 100% male	79	0% (except 13% SubstSR at 18 months)	CrimeR, CrimeS, Incarc, Drug, and Alc
Chamberlain, Leve, and DeGarmo (2007) and Leve and Chamberlain (2007)	USA	RCT	Group care (behavioral, eclectic, or family style programs)	12, 24	13–17 years, 0% male	81	0%	CrimeR, CrimeS, Incarc, and Educ
Green et al. (2014)	UK	RCT	Residential care (70%) and foster care (30%)	12	11–16 years, 56% male	34	15%	CrimeR, Depr
Hansson and Olsson (2012) and Bergström & Højman (2015)	Sweden	RCT	Institutional care (to some extent manual-based treatment)	24, 36	12–17 years, 61% male	46	0%	CrimeR, Incarc, Drug, and Depr
van Ryzin and Leve (2012), Kerr, DeGarmo, Leve, and Chamberlain, (2014), Poulton et al. (2014); Leve, Kerr, and Harold (2013), Rhoades, Leve, Harold, Kim, and Chamberlain, (2014), Leve, Van Ryzin, and Chamberlain (2015)	USA	RCT	Group care (behavioral or multiperspective programs, weekly therapeutic services)	12, 24, 88, 108	13–17 years, 0% male	166	0%	CrimeR, CrimeS, Incarc, DelincP, Depr, Psychot, Pregn, Drug, and Sexrisk
Leve and Chamberlain (2005)	USA	RCT	Group care (on-site schooling, individual and group therapy)	24	12–17 years, 47% male	153	0%	DelincP

Note. RCT = randomized control trial; CT = controlled trial; Alc = alcohol use; CrimeR = criminal offenses (register data); CrimeS = criminal offenses (self-reported data); DelincP = delinquent peers; Depr = depression; Drug = drug use; Educ = educational accomplishment; Incarc = incarcerated; Pregn = teenage pregnancy; Psychot = psychotic symptoms; Sexrisk = sexual risk behavior; SubstSR = substance use (incl. alcohol and drugs).

Table 2. The Effect of Treatment Foster Care Oregon on Outcome Measures.

Outcome (Study)	Measure	No of Participants (Studies)	Follow-Up (Months)	Effect (Standard Mean Difference and 95% CI)	Confidence in Effect Estimate	Comment
Criminal referrals according to register data Eddy, Whaley, and Chamberlain (2004), Chamberlain, Leve, and DeGarmo (2007), Van Ryzin and Leve (2012), Biehal, Ellison, and Sinclair (2011), Green et al. (2014), and Bergström et al. (2015)	Official data (e.g., police records, circuit court data, case records)	419 (5)	24 and 36	0.394 [0.193, 0.595]	Moderate (⊕⊕⊕○)	-1 Risk of bias ^a
Criminal referrals according to self-reports Eddy, Whaley, and Chamberlain (2004), Chamberlain, Leve, and DeGarmo (2007), and Van Ryzin and Leve (2012)	Elliott behavior checklist	326 (3)	24	0.242 [0.024, 0.461]	Moderate (⊕⊕⊕○)	-1 Risk of bias ^a
Days in locked settings Chamberlain (1990), Chamberlain and Reid (1998), Chamberlain et al. (2007), Van Ryzin and Leve (2012), Biehal, Ellison, and Sinclair (2011), Bergström et al. (2015)	Official data (e.g., police records, circuit court data)	372 (5)	24 and 36	0.663 [0.323, 1.003]	Moderate (⊕⊕⊕○)	-1 Risk of bias ^a
Delinquent peers Leve and Chamberlain (2005) and Van Ryzin and Leve (2012)	Describing Friends Questionnaire	319 (2)	12 and 24	0.415 [0.193, 0.637]	Low (⊕⊕○○)	-2 Risk of bias ^b
Drug use Smith, Chamberlain, and Eddy (2010), Rhoades, Leve, Harold, Kim, and Chamberlain (2014), and Bergström et al. (2015)	Youth self-report, urine samples to test for drugs, administrative register	291 (3)	18, 36 and 88	0.472 [0.228, 0.716]	Low (⊕⊕○○)	-1 Risk of bias ^a -1 Indirectness ^c
Psychological health Poulton et al. (2014), Green et al. (2014), and Hansson and Olsson (2012)	Brief Symptom Inventory, Center for Epidemiologic Studies-Depression, and Child Behavior Checklist	212 (2)	24	0.320 [0.039, 0.601]	Low (⊕⊕○○)	-2 Risk of bias ^d
Psychotic symptoms Poulton et al. (2014)	Brief Symptom Inventory, Diagnostic Interview Schedule for Children-IV	152 (1)	24	0.201 [-0.024, 0.426]	Very low (⊕○○○)	-2 Risk of bias ^e -1 Imprecision ^f
Alcohol use Chamberlain and Reid (1998)	Youth self-report	79 (1)	18	0.054 [-0.388, 0.496]	Very low (⊕○○○)	-1 Risk of bias ^a -1 Indirectness ^c
Sexual risk behavior Leve et al. (2013)	Self-report from youth	166 (1)	88	0.290 [-0.030, 0.610]	Very low (⊕○○○)	-1 Imprecision ^f -1 Risk of bias ^a -1 Indirectness ^c
School attendance and homework completion Chamberlain et al. (2007)	Girls' and parent's report	166 (1)	12	0.664 [0.215, 1.113]	Very low (⊕○○○)	-1 Imprecision ^f -2 Risk of bias ^g -1 Indirectness ^c
Teen pregnancy Leve et al. (2013)	Girls' and parent's report	166 (1)	24	0.523 [0.212 till 0.835]	Very low (⊕○○○)	-2 Risk of bias ^a -1 Indirectness ^g

^aNo information on randomizing, blinding and the content of the control treatment. ^bNo information on randomizing, blinding and the content of the control treatment and unknown reliability of the outcome measure (Describing Friends Questionnaire). ^cVariations in the setting can be expedited to influence the outcome. ^dNo information on randomizing, blinding and the content of the control treatment and because three different outcome measures were used. ^eNo information on randomizing, blinding and the content of the control treatment and because two different outcome measures were used. ^fThe confidence interval is not significantly differed from the criteria of a clinically important effect (standardized mean difference of 0.00). ^gNo information on randomizing, blinding and the content of the control treatment and because the population is small.

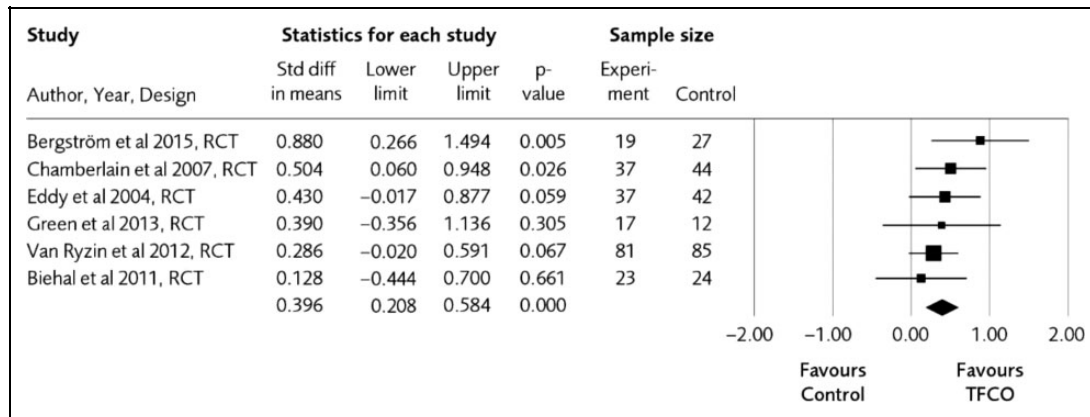


Figure 2. Effect sizes (Cohen's *d*) of studies assessing reoffending (register data).

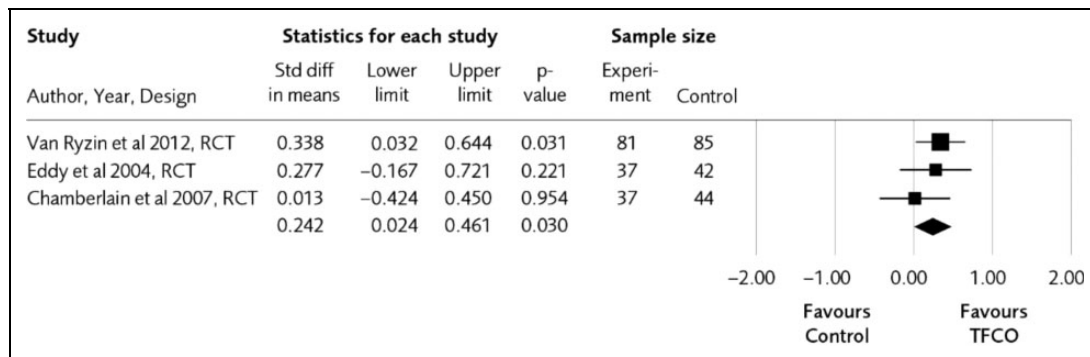


Figure 3. Effect sizes (Cohen's *d*) of studies assessing reoffending (self-report data).

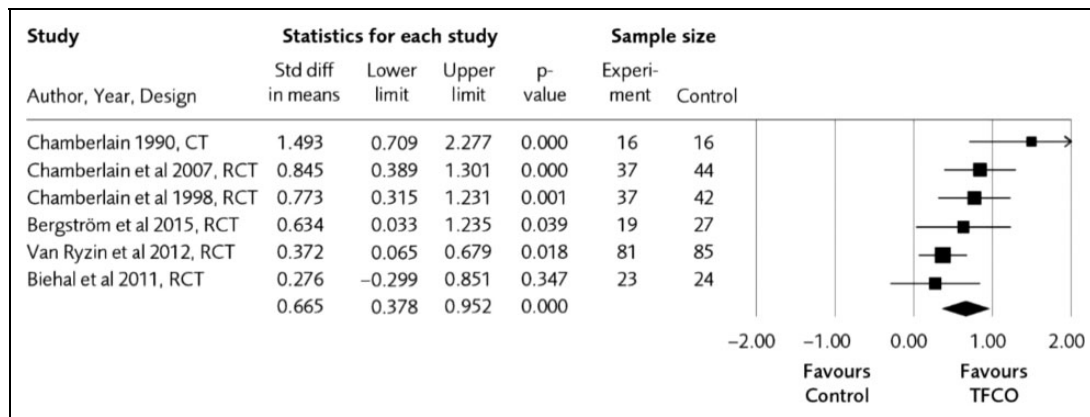


Figure 4. Effect sizes (Cohen's *d*) of studies assessing secure detention.

have limited evidence of efficacy, it becomes an ethical challenge when such interventions are not used and instead interventions without any evidence of efficacy are selected (Banks, 2012; Bergström et al., 2019; Jackson, 1998).

A third issue is whether out-of-home care offers children in general equal health services as children not in care. Today, there is ample evidence that children in out-of-home care receive far less physical, mental, and dental health care compared to other children (Vinnerljung, & Hjern, 2018). This also constitutes a violation of basic equal treatment standards,

making out-of-home care problematic also from the standpoint of basic justice.

A last issue regard a moral and legal right of young people to take part in and influence decisions regarding their own care. This right of young people to influence care decisions is constrained by law and by practicalities such as vacancies at residential facilities. Denying a young person to execute his or her autonomous decision capacity may impede the development and future empowerment to take responsibility for own decisions.

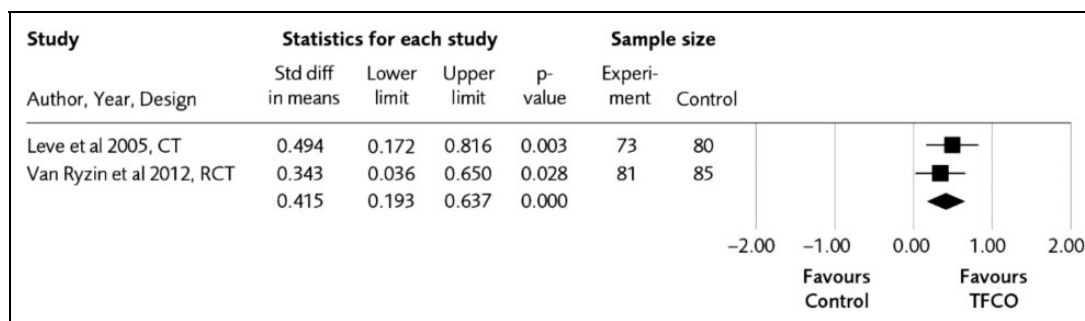


Figure 5. Effect sizes (Cohen's *d*) of studies assessing delinquent peers.

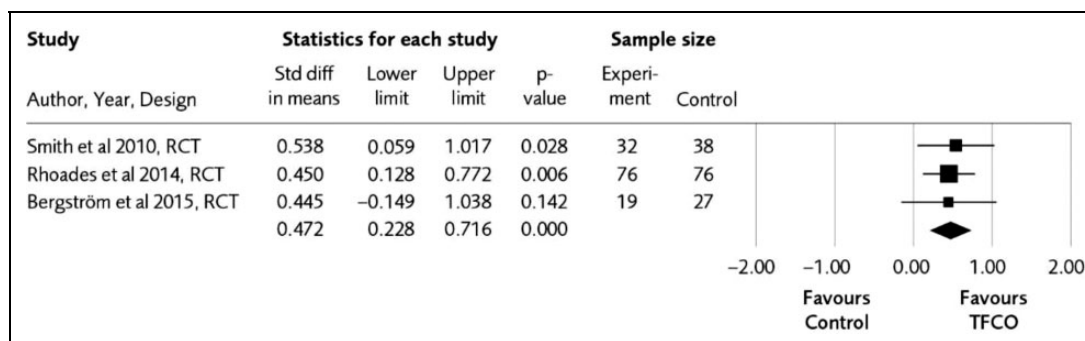


Figure 6. Effect sizes (Cohen's *d*) of studies assessing drug use.

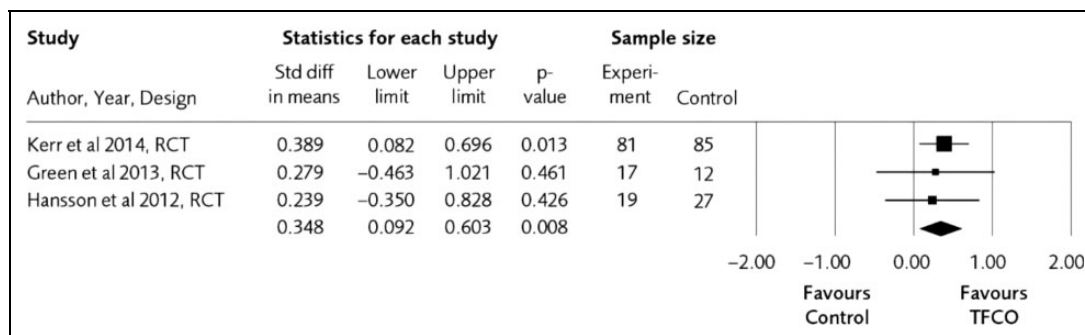


Figure 7. Effect sizes (Cohen's *d*) of studies assessing mental health.

Discussion and Applications to Practice

Research has repeatedly shown that group care for youth with serious behavior problems has poor rehabilitation success and can lead to detrimental effects (e.g., Strijbosch et al., 2015). This systematic review compared an alternative intervention for youth with serious behavior problems, TFC. All retrieved studies examined the same version, TFCO. Compared to earlier reviews including TFC, the present systematic review includes a homogenous target group (adolescents with serious behavior problems), excludes trials with a high risk of bias (e.g., noncontrolled trials) to reduce residual variance, and includes an extensive range of databases with research from all over the world to minimize the risk of missing relevant trials.

As for the first research question, there is moderate certainty that TFCO reduces future criminality according to police or court records, self-report, and days in locked settings compared to when adolescents are placed in group care (⊕⊕⊕○). It is low certainty of evidence that TFCO increases mental health and decreases delinquent peer associations and drug use (⊕⊕○○). All effect sizes were small to moderate. NNT (the average number of children that needed to receive the intervention for one to be successful) for these outcomes varied between 5 and 13 young people. The evidence was considered of very low certainty for of alcohol use, psychotic symptoms, sexual risk behavior, and teenage pregnancies (⊕○○○). No studies were identified that included measures on physical and dental health, quality of life, occupational employment, or possible harmful or unwanted effects of the care received.

The second research question deals with economic aspects of TFCO. The cost analysis shows that TFCO is likely to be cost saving compared to group care, given that it is more effective regarding important outcomes such as reducing the number of days that a youth is placed in a locked setting. This is confirmed by the results from the Danish cost–benefit analysis found in the economic systematic literature review. Thus, there is evidence that TFCO is worth investing in from a societal point of view. However, more studies, in various contexts, linking costs and effects of TFCO compared to group care would be needed.

The third research question concerns the ethical implications of the results. One such implication is that deciding on residential placement for youth with serious behavior problems brings risks and uncertainties for long-term development and well-being, as well as for violations of the basic justice and personal autonomy of the young person. At the same time, this systematic review demonstrates the benefits of TFCO for the target group. Not to use TFCO, or other evidence-based interventions, constitutes a violation of the basic responsibility of society to care for the child’s interests.

In sum, TFCO is supported by effects obtained from both primary and secondary outcomes, by a comparison of associated costs and by ethical considerations. Given these positive results, one would expect TFCO to be a frequently used treatment. However, in Sweden, approximately 2,000 youth with serious behavior problem are annually placed in group care (Swedish Agency for Health Technology Assessment and Assessment of Social Services, 2018). Although TFCO has been available in Sweden since the beginning of the new millenia, because of poor demand for this service only 30–40 young people annually receive TFCO. The low number is an ethical challenge. There is no available information on the use of TFCO worldwide.

Although this review informs us that TFCO is the favorable alternative, it does not inform us on what components of TFCO produce the effects. With increased knowledge of core components (also known as common elements) that drive change, professionals would have a tool for selecting among promising interventions without evaluation. A successful dismantling of the effective components from those less effective of TFCO would generate important knowledge for the field of treatment of young offenders.

This review demonstrates the strength of a systematic review. Of the eight identified studies, four included less than 50 adolescents, resulting in poor statistical power. With several trials of the same intervention, the total study population increases, and a meta-analysis may produce a more precise estimate than one single study. Compared to many other areas in social intervention research, the trials on TFCO are characterized by a high degree of homogeneity in measures, participant characteristics, and comparison alternative. This facilitates meaningful comparisons and enabled a meta-analysis, producing a more exact estimate (Higgins et al., 2011).

This review also includes limitations. One is the possibility of publication bias. Although we included 14 databases,

consulted experts from Denmark, Norway, Ireland, United Kingdom, United States, and Germany, and contacted researchers involved in developing and evaluating TFCO, it is still possible that there exist additional and unpublished trials of TFCO. Another limitation is that important outcomes are absent. None of the eight studies assessed interventions targeting outcomes as physical and dental health, quality of life, future employment, and possible side effects. A third limitation is that the content of the treatment in the control conditions is at best only briefly described, thus obscuring guidelines on when an intervention may be dismissed and a new implemented. A fourth limitation concerns the economic analysis. The costs used in this report are drawn from a Scandinavian context. In most economic analysis, the costs are context-dependent, making generalization to other context obscure. A last limitation is that few trials include a measure of fidelity of TFCO. However, this might be of less importance given that the TFCO teams had frequent supervision and a manual to ensure high treatment fidelity.

Authors’ Note

The origin of this project is a systematic review carried out by the Swedish Agency for Health Technology Assessment and Assessment of Social Services (2018). This systematic review is a part of project by the Swedish Agency for Health Technology Assessment and Assessment of Social Services. Supplemental data for this article can be accessed on SBU’s website: search terms (Appendix S1 and S2) <https://www.sbu.se/sv/publikationer/SBU-utvarderar/excluded-articles> (Appendix S3).

Martin Bergström is co-author of one of the included studies. He did not participate in the risk of bias assessment or data extraction of his own study.


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References

- References marked with an asterisk are included in the meta-analysis.
- Alonso-Coello, P., Oxman, A. D., Moberg, J., Brignardello-Petersen, R., Akl, E. A., & Davoli, M. . . . the GRADE Working Group (2016). GRADE evidence to decision (EtD) frameworks: A systematic and transparent approach to making well informed health-care choices. 2: Clinical practice guidelines. *British Medical Journal (Online)*, 353. doi:10.1136/bmj.i2089
- Archard, D. (2011). Children’s rights. In N. Z. Edward (Ed.), *The Stanford encyclopedia of philosophy* (Summer 2011 Edition). Stanford, CA: Stanford University.

- Banks, S. (2012). *Ethics and values in social work* (4th ed.). Hampshire, England: Palgrave Macmillan.
- Bergström, M., Cederblad, M., Håkansson, K., Jonsson, A. K., Munthe, M., Vinnerljung, B., . . . Sundell, K. (2019, February 28). Interventions in foster family care: A systematic review. *Research on Social Work Practice*. doi:10.1177/1049731519832101
- *Bergström, M., & Höjman, L. (2015). Is multi-dimensional treatment foster care (MTFC) more effective than treatment as usual in a three-year follow-up? Results from MTFC in a Swedish setting. *European Journal of Social Work*, *19*, 219–235.
- *Biehal, N., Ellison, S., & Sinclair, I. (2011). Intensive fostering: An independent evaluation of MTFC in an English setting. *Children and Youth Services Review*, *33*, 2043–2049.
- Borenstein, M., Hedges, L., Higgins, J., & Rothstein, H. (2014). *Comprehensive meta-analysis (Version 3.0)*. Englewood, NJ: Biostat.
- Boyd, L. (2013). *Therapeutic foster care: Exceptional care for complex, trauma-impacted youth in foster care*. Washington, DC: State Policy Advocacy and Reform Center.
- *Chamberlain, P. (1990). Comparative evaluation of specialized foster care for seriously delinquent youths. A first step. Community alternatives. *International Journal of Family Care*, *2*, 21–36.
- *Chamberlain, P., Leve, L. D., & DeGarmo, D. S. (2007). Multidimensional treatment foster care for girls in the juvenile justice system: 2-year follow-up of a randomized clinical trial. *Journal of Consulting and Clinical Psychology*, *75*, 187–193.
- Chamberlain, P., & Mihalic, S. F. (1998). *Blueprints for violence prevention, multidimensional treatment foster care*. Boulder, CO: Center for the Study and Prevention of Violence. Retrieved from <https://www.ncjrs.gov/pdffiles1/ojdp/204274.pdf>2017-01-15
- *Chamberlain, P., & Reid, J. B. (1998). Comparison of two community alternatives to incarceration for chronic juvenile offenders. *Journal of Consulting and Clinical Psychology*, *66*, 624–633.
- Cohen, J. (1988). *Statistical power analysis for the behavioral sciences* (2nd ed.). Hillsdale, NJ: Erlbaum.
- Curtis, P. A., Alexander, G., & Lunghofer, L. A. (2001). A literature review comparing the outcomes of group care and therapeutic foster care. *Child and Adolescent Social Work Journal*, *18*, 377–392.
- De Swart, J. J. W., Van den Broek, H., Stams, G. J. J. M., Asscher, J. J., Van der Laan, P. H., Holsbrink-Engels, G. A., & Van den Helm, G. H. P. (2012). The effectiveness of institutional youth care over the past three decades: A meta-analysis. *Children and Youth Services Review*, *34*, 1818–1824.
- Dishion, T., Forgatch, M., Chamberlain, P., & Pelham, W. E. (2016). The Oregon model of behavior family therapy: From intervention design to promoting large-scale system change. *Behavior Therapy*, *47*, 812–837.
- Dodge, K. A., Dishion, T. J., & Lansford, J. E. (2006). *Deviant peer influences in programs for youth: Problems and solutions*. New York, NY: The Guilford Press.
- Dorsey, S., Farmer, E. M. Z., Barth, R. P., Greene, K. M., Reid, J., & Landsverk, J. (2008). Current status and evidence base of training for foster and treatment foster parents. *Children and Youth Services Review*, *30*, 1403–1416.
- *Eddy, J. M., Whaley, R. B., & Chamberlain, P. (2004). The prevention of violent behavior by chronic and serious male juvenile offenders: A 2-year follow-up of a randomized clinical trial. *Journal of Emotional and Behavioral Disorders*, *12*, 2–8.
- *Green, J. M., Biehal, N., Roberts, C., Dixon, J., Kay, C., Parry, E., . . . Sinclair, I. (2014). Multidimensional treatment foster care for adolescents in English care: Randomised trial and observational cohort evaluation. *British Journal of Psychiatry*, *204*, 204–214.
- Guyatt, G. H., Oxman, A. D., Vist, G. E., Kunz, R., Falck-Ytter, Y., Alonso-Coello, P., . . . Schünemann, H. J. (2008). GRADE: An emerging consensus on rating quality of evidence and strength of recommendations. *British Medical Journal*, *336*, 924–926.
- Hahn, R. A., Bilukha, O., Lowy, J., Crosby, A., Fullilove, M. T., Liberman, A., . . . Schofield, A. (2005). The effectiveness of therapeutic foster care for the prevention of violence: A systematic review. *American Journal of Preventive Medicine*, *28*, 72–90.
- *Hansson, K., & Olsson, M. (2012). Effects of multidimensional treatment foster care (MTFC): Results from a RCT study in Sweden. *Children and Youth Services Review*, *34*, 1929–1936.
- Heintz, E., Lintamo, L., Hultcrantz, M., Jacobson, S., Levi, R., Munthe, C., . . . Sandman, L. (2015). Framework for systematic identification of ethical aspects of health care technologies—The SBU approach. *International Journal of Technology Assessment in Health Care*, *31*, 124–130.
- Higgins, J. P. T., Altman, D. G., Gøtzsche, P. C., Jüni, P., Moher, D., & Oxman, A. D. . . . Cochrane Bias Methods Group Cochrane Statistical Methods. (2011). The Cochrane collaboration's tool for assessing risk of bias in randomised trials. *British Medical Journal*, *343*. doi:10.1136/bmj.d5928
- Higgins, J., & Green, S. (2008). *Cochrane handbook for systematic reviews of interventions*. Hoboken, NJ: A co-publication between The Cochrane Collaboration and John Wiley & Sons.
- Ioannidis, J. (2005). Why most published research findings are false. *PLoS Medicine*, *2*, e124. doi:10.1371/journal.pmed.0020124
- Jackson, S. (1998). Educational success for looked-after children: The social worker's responsibility. *Practice: Social Work in Action*, *10*, 47–56.
- *Kerr, D. C. R., DeGarmo, D. S., Leve, L. D., & Chamberlain, P. (2014). Juvenile justice girls' depressive symptoms and suicidal ideation 9 years after multidimensional treatment foster care. *Journal of Consulting and Clinical Psychology*, *82*, 684–693.
- Konijn, C., Admiraal, S., Baart, J., van Rooij, F., Stams, G. J., Colonnesi, C., . . . Assink, M. (2019). Foster care placement instability: A meta-analytic review. *Children and Youth Services Review*, *96*, 483–499.
- Lee, B. R., Bright, C. L., Svoboda, D. V., Fakanmoju, S., & Barth, R. P. (2011). Outcomes of group care for youth: A review of comparative studies. *Research on Social Work Practice*, *21*, 177–189.
- *Leve, L. D., & Chamberlain, P. (2005). Association with delinquent peers: Intervention effects for youth in the juvenile justice system. *Journal of Abnormal Child Psychology*, *33*, 339.
- *Leve, L. D., & Chamberlain, P. (2007). A randomized evaluation of multidimensional treatment foster care: Effects on school attendance and homework completion in juvenile justice girls. *Research on Social Work Practice*, *17*, 657–663.

- Leve, L. D., Chamberlain, P., & Kim, H. K. (2015). Risks, outcomes, and evidence-based interventions for girls in the US juvenile justice system. *Clinical Child and Family Psychology Review, 18*, 252–279.
- *Leve, L. D., Kerr, D. C. R., & Harold, G. T. (2013). Young adult outcomes associated with teen pregnancy among high-risk girls and in an RCT of multidimensional treatment foster care. *Journal of Child & Adolescent Substance Abuse, 22*, 421–434.
- *Leve, L. D., Van Ryzin, M. J., & Chamberlain, P. (2015). Sexual risk behavior and STI contraction among young women with prior juvenile justice involvement. *Journal of HIV/AIDS & Social Services, 14*, 171–187.
- Lipsey, M. W., & Wilson, D. (2000). *Practical meta-analysis (applied social research methods)*. Thousand Oaks, CA: Sage.
- McMillen, J. C., Narendorf, S. C., Robinson, D., Havlicek, J., Fedoravicius, N., Bertram, J., & McNelly, D. (2015). Development and piloting of a treatment foster care program for older youth with psychiatric problems. *Child and Adolescent Psychiatry and Mental Health, 9*, 1–13.
- Miller, R. B. (2003). *Children, ethics and modern medicine*. Bloomington: Indiana University Press.
- Molin, R., & Palmer, S. (2005). Consent and participation: Ethical issues in the treatment of children in out-of-home care. *American Journal of Orthopsychiatry, 75*, 152–157.
- Munthe, C., & Hartvigsson, T. (2015). *Etiska aspekter på att lyssna på barn i familjehem – mål, komplikationer och konflikter* [Ethical aspects of listening to children in foster care homes—Goals, complications and conflicts]. Stockholm, Sweden: National Board of Health and Welfare. Retrieved from <https://www.socialstyrelsen.se/globalassets/sharepoint-dokument/artikelkatalog/ovrigt/2015-1-15.pdf>
- Munthe, C., Sandman, L., & Nykänen, P. (2015). *Delat beslutsfattande och evidensbaserad praktik inom socialtjänsten: Mål, begrepp och etik för utformning och implementering* [Shared decision-making and evidence-based practice in social services: Goals, concepts and ethics for design and implementation]. University of Gothenburg. Retrieved from http://flov.gu.se/digitalAssets/1544/1544813_slutversionpubliceradfinalmedomslag.pdf
- National Board of Health and Welfare. (2017). *MultifunC institutions-behandling för ungdomar med svåra beteendeproblem. Resultat efter två år* [MultifunC residential care for young people with severe behavioral problems. Results after two years]. Stockholm, Sweden: National Board of Health and Welfare. Retrieved from <https://www.socialstyrelsen.se/globalassets/sharepoint-dokument/artikelkatalog/ovrigt/2017-1-12.pdf>
- Olsson, M., Egelund, T., & Host, A. (2012). Breakdown of teenage placement in Danish out-of-home care. *Child and Family Social Work, 17*, 13–22.
- Osei, G. K., Gorey, K. M., & Hernandez Jozefowicz, D. M. (2016). Delinquency and crime prevention: Overview of research comparing treatment foster care and group care. *Children and Youth Care Forum, 45*, 33–46.
- Ouzzani, M., Hammady, H., Fedorowicz, Z., & Elmagarmid, A. (2016). Rayyan-a web and mobile app for systematic reviews. *Systematic Reviews, 5*, 210–210.
- *Poulton, R., Van Ryzin, M. J., Harold, G. T., Chamberlain, P., Fowler, D., Cannon, M., . . . Leve, L. D. (2014). Effects on multidimensional treatment foster care on psychotic symptoms in girls. *Journal of the American Academy of Child & Adolescent Psychiatry, 53*, 1279–1287.
- *Rambøll. (2012). *Afrapportering – analyse af de økonomiske konsekvenser på området for udsatte børn og unge* [Analysis of economic consensus in the area of vulnerable children and young people]. Retrieved from <https://dk.ramboll.com/medier/rm/2012-cost-benefit-analyse-paa-socialomraadet>
- Reddy, L. A., & Pfeiffer, S. I. (1997). Effectiveness of treatment foster care with children and adolescents: A review of outcome studies. *Journal of the American Academy of Child & Adolescent Psychiatry, 36*, 581–588.
- Rhoades, K. A., Leve, L. D., Harold, G. T., Kim, H. K., & Chamberlain, P. (2014). Drug use trajectories after a randomised controlled trial of MTFC: Associations with partner drug use. *Journal of Research on Adolescents, 24*, 40–54.
- Sallnäs, M., Vinnerljung, B., & Kyhle Westermark, P. (2004). Breakdown of teenage placements in Swedish foster and residential care. *Child and Family Social Work, 9*, 141–152.
- *Smith, D. K., Chamberlain, P., & Eddy, J. M. (2010). Preliminary support for multidimensional treatment foster care in reducing substance use in delinquent boys. *Journal of Child & Adolescent Substance Abuse, 19*, 343–358.
- Strijbosch, E. L. L., Huijs, J. A. M., Stams, G. J. J. M., Wissink, I. B., van der Helm, G. H. P., de Swart, J. W., & van der Veen, Z. (2015). The outcome of institutional youth care compared to non-institutional youth care for children of primary school age and early adolescence: A multi-level meta-analysis. *Children and Youth Services Review, 58*, 208–218.
- Swedish Agency for Health Technology Assessment and Assessment of Social Services. (2017). Checklist for assessing the quality of health economic modelling studies. [Version 2017:1]. Retrieved from https://www.sbu.se/globalassets/ebm/metodbok/checklist_modelbased-economic-study.pdf
- Swedish Agency for Health Technology Assessment and Assessment of Social Services (2018). *Behandlingsfamiljer för ungdomar med allvarliga beteendeproblem. Treatment foster care oregon. En systematisk översikt och utvärdering inklusive ekonomiska och etiska aspekter* [Treatment foster care Oregon for youth with serious behavior problems. A systematic review and assessment including economic and ethical aspects]. Stockholm, Sweden: Swedish Agency for Health Technology Assessment and Assessment of Social services. Retrieved from <https://www.sbu.se/sv/publikationer/SBU-utvarderar/behandlingsfamiljer-for-ungdomar-med-allvarliga-beteendeproblem/>
- Swedish Agency for Health Technology Assessment and Assessment of Social Services (2019). *Utvärdering av metoder i hälso- och sjukvården. En handbok, 2 uppl.* [Assessment of methods in health care—A handbook]. Stockholm, Sweden: Swedish Agency for Health Technology Assessment and Assessment of Social services. Retrieved from https://www.sbu.se/contentassets/76adf07e270c48efaf67e3b560b7c59c/eng_metodboken.pdf
- Swedish National Board of Institutional Care. (2015). *Annual report, 2016* [Statens institutionsstyrels årsredovisning 2016].

- Stockholm, Sweden: The Swedish National Board of Institutional Care. Retrieved from [https://www.stat-inst.se/globalassets/arsredo visningar/sis-arsredovisning-2016.pdf](https://www.stat-inst.se/globalassets/arsredo%20visningar/sis-arsredovisning-2016.pdf)
- Turner, W., & Macdonald, G. (2011). Treatment foster care for improving outcomes in children and young people: A systematic review. *Research on Social Work Practice, 21*, 501–527.
- *Van Ryzin, M. J., & Leve, L. D. (2012). Affiliation with delinquent peers as a mediator of the effects of multidimensional treatment foster care for delinquent girls. *Journal of Consulting and Clinical Psychology, 80*, 588–596.
- Vinnerljung, B., & Hjern, A. (2018). *Health care in Europe for children in societal out-of-home care*. London: MOCHA/Imperial College. Retrieved from MOCHA—Models of Child Health Appraised: <http://www.childhealthservicemodels.eu/wp-content/uploads/Mocha-report-Children-in-OHC-May-2018.pdf>
- Wilson, D. (2001). *Practical meta-analysis effect size calculator*. Retrieved from Campbell Collaboration: <https://campbellcollaboration.org/escalc/html/EffectSizeCalculator-Home.php>