

# Defining Episodes of Care in Children’s Mental Health Using Administrative Data

Graham Reid · Shannon L. Stewart · Gregory S. Zaric ·  
Jeffrey R. Carter · Richard W. J. Neufeld ·  
Juliana I. Tobon · Melanie Barwick · Evelyn R. Vingilis

Published online: 18 November 2014  
© Springer Science+Business Media New York 2014

**Abstract** Criteria to define an episode of care in children’s mental health services are needed. Various criteria were applied to 5 years of visit data from children 4–11 years ( $N = 5,206$ ) at their first visit to 1 of 3 children’s mental health agencies. A minimum of 3 visits with 180 days between episodes optimized agreement with other dates (e.g., telephone intake assessment) marking the start and end of an episode, and clinician-rated number of episodes. Grouping visits into episodes provides a clearer representation of how services are distributed over extended periods of time, facilitating research and enhancing accuracy in service planning.

---

Preliminary versions of these data were presented at The 26th Annual Children’s Mental Health Research and Policy Conference, March 3–6, 2013, Tampa, Florida.

---

G. Reid (✉) · R. W. J. Neufeld · J. I. Tobon  
Department of Psychology, University of Western Ontario,  
London, ON, Canada  
e-mail: greid@uwo.ca

G. Reid · E. R. Vingilis  
Department of Family Medicine, Schulich School of Medicine &  
Dentistry, University of Western Ontario, London, ON, Canada

G. Reid  
Department of Paediatrics, Schulich School of Medicine &  
Dentistry, University of Western Ontario, London, ON, Canada

G. Reid  
Children’s Health Research Institute, London, ON, Canada

G. Reid  
Lawson Health Research Institute, London, ON, Canada

S. L. Stewart  
Faculty of Education, University of Western Ontario, London,  
ON, Canada

**Keywords** Child and adolescent health · Health care organizations and systems · Mental health · Managed care techniques · Utilization review · Access/demand/utilization of services

## Introduction

Many childhood mental health (CMH) problems are either ongoing or likely to recur. For example, almost half of all children diagnosed with attention-deficit hyperactivity disorder (ADHD) during childhood will continue to have the disorder as adolescents (Bussing et al. 2010). Depression often recurs during childhood (Luby et al. 2009) or adolescence (Rohde et al. 2009). In community-based and clinical samples, over 70 % of youth with depression will

S. L. Stewart  
Division of Child and Adolescent Psychiatry, Department of  
Psychiatry, Schulich School of Medicine & Dentistry, University  
of Western Ontario, London, ON, Canada

G. S. Zaric  
Ivey Business School, University of Western Ontario, London,  
ON, Canada

J. R. Carter  
Vanier Children’s Services, London, ON, Canada

R. W. J. Neufeld  
Department of Psychiatry, Schulich School of Medicine &  
Dentistry, University of Western Ontario, London, ON, Canada

R. W. J. Neufeld  
Neuroscience Program, University of Western Ontario, London,  
ON, Canada

J. I. Tobon  
St. Joseph’s Healthcare Hamilton, Hamilton, ON, Canada

experience a recurrence within 5 years (Emslie et al. 1997; Lewinsohn et al. 1994; Rao et al. 1995; Rao et al. 2010; Burcusa and Iacono 2007). Anxiety disorders also tend to recur (Pine et al. 1998; Beesdo-Baum et al. 2012). Even after receiving an evidence-based treatment, recurrence amongst youth with depression is as high as 47 % (Birmaher et al. 2000; Curry et al. 2011). We would expect that the use of mental health services by children and youth (hereafter children) and their families might display patterns of use over time consistent with the natural history of CMH problems; in other words, that families would receive care in episodes.

### Conceptualizing an Episode of Care

The concept of an episode of care (EoC) has been applied to both medical—(Solon et al. 1967; Moscovice 1977) and mental health-care (Kessler et al. 1980; Kessler et al. 1982) for decades. An EoC differs from episodes of disease or illness, which are related more specifically to presence of pathology and an associated period of suffering (Hornbrook et al. 1985). Definitions of episodes of disease typically refer to the duration of specific, documented pathophysiology and its resolution (Hornbrook et al. 1985), making its application to mental health problems particularly problematic. An episode of an illness is defined by the period of time a patient is suffering from signs and/or symptoms perceived by the patient as illness-related (Hornbrook et al. 1985). The concept of an episode of illness is relevant to mental health, and important in understanding the process of seeking help. We know that there is a progression from when parents and others perceive a child to have a “problem” to seeking informal and formal/professional sources of help (Srebnik et al. 1996; Morrissey-Kane and Prinz 1999; Logan and King 2002). The point at which parents recognize/label a problem as being mental health related may occur before or after seeking help (Zwaanswijk et al. 2007; Sayal 2006; Pavuluri et al. 1996; Reid et al. 2011; Shanley et al. 2008). Ideally, children should be treated until symptoms resolve (Chorpita et al. 2011); however, multiple factors work against this, including high demand for services (Kowalewski et al.

2011; Reid and Brown 2008) and dropout (Harpaz-Rotem et al. 2004). Thus, applying episodes of illness to mental health service use can be problematic.

An EoC can be defined as a sequence or cluster of services associated with a condition (Wall et al. 2004). Episodes of care are often used to understand health- and mental health-care delivery (Foster and Xuan 2005; Wingert et al. 1995), rather than episodes of disease or illness. For CMH services, an EoC based on overall service use may be particularly appropriate, as children often present with undefined problems, and initial diagnoses may change over time, making it particularly difficult to define episodes of disease/illness (Foster and Xuan 2005). The National Quality Forum in the United States recently advocated for the use of episodes of care in examining the efficiency of health care delivery (National Quality Forum 2009). If CMH service use demonstrates patterns of use over time consistent with the natural history of psychopathology, then applying an EoC perspective to CMH is critical to understanding service use over extended periods of time. Episodes of illness are extremely hard to document. Yet, we assume that an episode of illness leads to an EoC and the recurrence of episodes of care leads to patterns of service use (Sytema et al. 1989).

From a health services perspective, three key elements define an EoC: a clear starting point, a free-period between episodes, and a minimum number of visits within an episode (Hornbrook et al. 1985; Rosen et al. 1998; Wall et al. 2004). First, the start of an episode is usually the initial encounter with a provider (Hornbrook et al. 1985). We used the first in-person visit, as opposed to the first contact, to avoid issues related to varying and lengthy waits for CMH services that often begin with a telephone intake (Kowalewski et al. 2011). Second, a “free-period” (Wall et al. 2004) needs to be established; this is the gap between the end of one EoC and the start of another, during which no visits occur (Foster and Xuan 2005). Studies have rarely stated the rationale for the choice of a free-period, or provided a general rationale without stating why a specific period was chosen; often, the rationale was to capture all possible episodes, without including events such as scheduled breaks in treatment or vacations, etc. (Cohen et al. 2006). Finally, a minimum number of visits must be defined (Wall et al. 2004).

### Episodes of Care in Children’s Mental Health Services

Although studies of CMH services have used the EoC concept, definitions have varied and no study has combined both a minimum number of visits and a free period. When using the free period to define an EoC, periods of 60 (Harpaz-Rotem et al. 2004), 90 (Warren et al. 2010; Cohen et al. 2006) and 180 days (Garland et al. 2007) have been used. Some studies examining dose–response effects in treatment used a minimum number of visits including 1–2 (Angold

M. Barwick  
Community Health Systems Research Group, Psychiatry, The  
Hospital for Sick Children, Toronto, ON, Canada

M. Barwick  
Department of Psychiatry and Dalla Lana School of Public  
Health, University of Toronto, Toronto, ON, Canada

E. R. Vingilis  
Department of Epidemiology and Biostatistics, Schulich School  
of Medicine & Dentistry, University of Western Ontario,  
London, ON, Canada

et al. 2000), 3 (Platz et al. 2006), 4, 5–6, 7 (Lavigne et al. 2008), 3–8 (Angold et al. 2000) or 6–8 visits (Andrade et al. 2000; Weersing et al. 2006). Defining an EoC using only the free period or number of visits may be appropriate for questions such as examining dose response effects, but a definition incorporating both parameters is needed to describe use of CMH services in the population. A recent study examining access and use of health- and mental health-services used only a minimum period of 12 weeks without treatment before a visit to define the start of an episode, without considering a free-period or a minimum number of visits (Saloner et al. 2014); this study reported the number of visits per episode, and percentage of cases having episodes defined by more than 3 visits for psychotropic medication, and more than 7 visits without medication.

Service use reflects issues beyond episodes of illness/psychopathology and includes demand on agencies and the system, system resources, and various client factors (e.g., transiency). Within publicly-funded CMH agencies, telephone contact and triage/screening is often the first contact with an agency (Kowalewski et al. 2011); the recent addition of walk-in clinic appointments to CMH services is an exception to telephone as the first contact (Barwick et al. 2013). Families are typically waitlisted for extended periods of time prior to receiving services (Schraeder and Reid 2014b; Reid et al. 2011; Kowalewski et al. 2011; Sherman et al. 2009; Isojoki et al. 2008). Too frequently, families fail to attend their first scheduled appointment (Benway et al. 2003). As such, families are often offered treatment groups (e.g., parenting) as a first option (Remschmidt et al. 2004; Beeson et al. 2006), and may continue to wait for individual assessment and/or treatment (Reid et al. 2011). Once families/children do start treatment, regrettably, dropout is an all-too-common problem (Johnson et al. 2008; Hawley and Weisz 2005; Garcia and Weisz 2002). During the course of treatment, breaks of weeks or even months may occur due to scheduling difficulties or planned breaks (e.g., vacations). For families/children that do complete treatment as recommended, they may have a session(s) some months following the end of treatment, although scheduled “booster” treatments are not a routine part of most CMH agencies’ routine care (Kolko and Lindhiem 2014; Tolan 2014). Given the multiple factors that impact on the retention in care and timing of treatment sessions in CMH care, defining an EoC based on the pattern of visits over time has challenges. Ideally, the definition of an EoC should capture clusters of visits that would be viewed by the clinician/agency as beginning when a client presents with a new problem(s) and continuing until services are completed, or the family ends care.

### Present Study

In light of the challenges discussed, the current study sought to establish criteria for an EoC in CMH based on a

minimum number of visits and the free-period between episodes. Criteria that are independent of illness characteristics, patient outcomes, or other information not routinely available in administrative datasets (e.g., end of care due to premature termination or family moved) should allow for wide application of the definition. Standardized criteria would: (a) provide consistency in analyses across research studies facilitating comparisons between studies; (b) help clinicians to think about how to provide care over time, rather than as isolated treatment of acute problems; and (c) assist administrators and policy makers by enhancing the accuracy needed for service planning based on events relevant to clients (when visits occurred) rather than to clinicians (e.g., when a discharge report is written).

We chose to compare 2, 3, 5, 7 and 9 visits as the minimum number of visits per episode; previous research suggests 3 and 9 visits have a dose–response relationship with improvements in outcomes for CMH services (Angold et al. 2000). Free-periods examined were 90, 120, 150, or 180 days. Time periods less than 90 days were not considered, to avoid including visits that might best be seen as booster sessions (i.e., one or more sessions offered after the end of acute treatment) counted as the start of a new EoC. Figure 1 presents how hypothetical visit data were categorized into episodes based on these criteria.

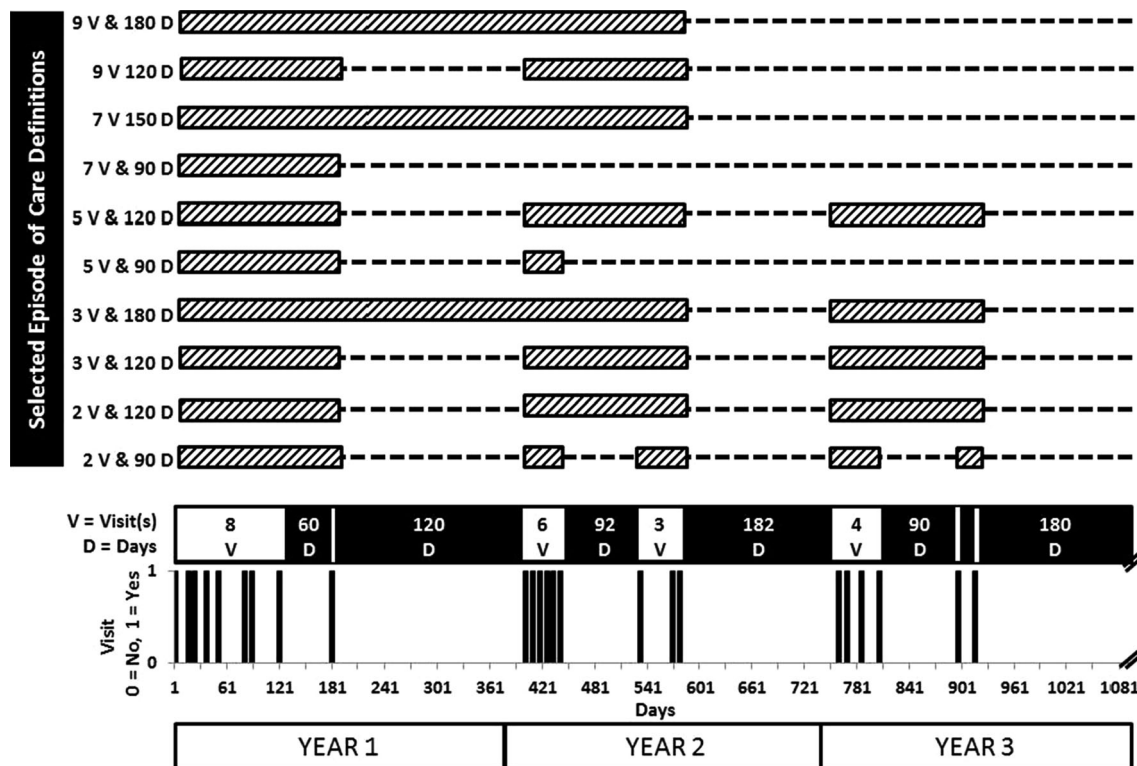
Operational definitions were tested against other dates that might be recorded in an administrative dataset: (a) clinician-rated dates of “admission” (i.e., first clinical contact) and “discharge”, and (b) when standardized intake measures were completed. We aimed to select an operational definition of an EoC based solely on the pattern of service use that most closely matched the dates for these other events, which could indicate the start and end of an EoC.

### Method

We analyzed administrative data from three CMH agencies located in the province of Ontario, Canada, over a 7-year period. These agencies provided services for children with a full range of psychological problems, for infants through to age 18 years; this ensured that it was possible for children within the target age range to receive services up to 5 years after an initial visit, as opposed to having to be transferred elsewhere when they age-out of care (i.e., 18 years and older). To allow sufficient time for episodes of care to occur, 5 years of data were analyzed for each child.

### Participants

Inclusion criteria for children were: (a) a first face-to-face visit between 2000 and 2002, and (b) age 4 to 11 years at their first visit. Children diagnosed with, or who received



**Fig. 1** Hypothetical visit data categorized into episodes based on variations in operational definitions. Three years of hypothetical visit data are shown. In the *bottom portion* of the figure, the *x* axis shows 3 years in days and the *y* axis indicates when visits occurred. The *bar* above the graph shows groups of visits and the period in between groups of visits; the number of visits ( $V =$  visits) and number of days between groups of visits ( $D =$  days) is indicated. The *hatched bars*

represent how groups of visits would be categorized into episodes of care depending on the parameters used for the minimum number of visits (2, 3, 5, 7, 9) and free period (90, 120, 150, 180 days) in each operational definition (not all combinations of the visits and free periods are shown). For example, the *first set of hatched bars* shows that using an operational definition with a 2 visit minimum and 90 free period, results in 5 episodes of care

treatment in a program for a developmental disorder (e.g., Autism, Down syndrome), were excluded. Ethics approval was received from the University of Western Ontario Research Ethics Board.

#### Design and Procedure

Agency data included: (a) demographics (i.e., child date of birth, sex); and (b) information on each child/family contact—date, type of contact (e.g., telephone, in-person, in-home visit), and type of service (e.g., individual visit, group treatment). When included as part of the database, we obtained dates recorded by clinicians as “admission” (i.e., first clinical contact) and “discharge.” Some agencies in Ontario use standardized measures at intake, most commonly the Brief Child and Family Phone Interview (BCFPI Cunningham et al. 2009; Boyle et al. 2009). We analyzed data from one such agency, and obtained dates when the BCFPI was completed.

Only face-to-face visits (i.e., out-patient, day treatment, in-patient/residential) were included. Telephone contacts were excluded, as these contacts might have been for

rescheduling an appointment rather than treatment. Non-direct contacts were also excluded (e.g., report writing, consultations between professionals only). The date of the child/family’s first face-to-face contact was set as day “1” for each child.

#### Data Analyses

Using SAS (Version 9.1), visit data (in days) were categorized into episodes using variations in (a) the minimum number of visits and (b) the length of the free-period. As each definition resulted in different subgroups of children from the total sample, statistical comparisons could not be computed. Confidence intervals are reported.

Various methods were used to determine an optimal definition amongst possible operational definitions examined. (1) In two agencies, clinicians recorded the start and end of an EoC. (a) The date of first contact was compared to clinician-defined start of an episode (absolute value in days). (b) When clinicians identified the end of an episode (i.e., case closed due completion of treatment, dropout, no further contact, etc.), the date difference (absolute value in

**Table 1** Intraclass correlations showing agreement in the total number of episodes of care over a maximum of 5 years per patient, and based on clinician ratings as defined in the electronic record, and variations in operational definitions

Minimum number of visits	Free period (days)			
	90	120	150	180
2	0.66	0.71	0.73	0.73
3	0.66	0.69	0.69	0.69
5	0.60	0.61	0.61	0.60
7	0.49	0.50	0.50	0.49
9	0.43	0.43	0.43	0.43

days) between the end date of each EoC definition and clinician-defined end date of each episode was computed. Analyses focused on the second or third EoC, as almost all children had at least one EoC across operational definitions. (c) Agreement in the total number of episodes as defined by clinicians, versus the various operational definitions, were examined using intraclass correlation coefficients (ICC). (2) We computed the date difference (absolute value in days) between the start date of EoC definition and the date when an intake assessment (i.e., BCFPI administration) was completed.

## Results

### Sample

The final sample included 5,206 children; 65.5 % were boys, and 35.6 % were 4–7 years old at the time of their first visit. For analyses examining the agreement between

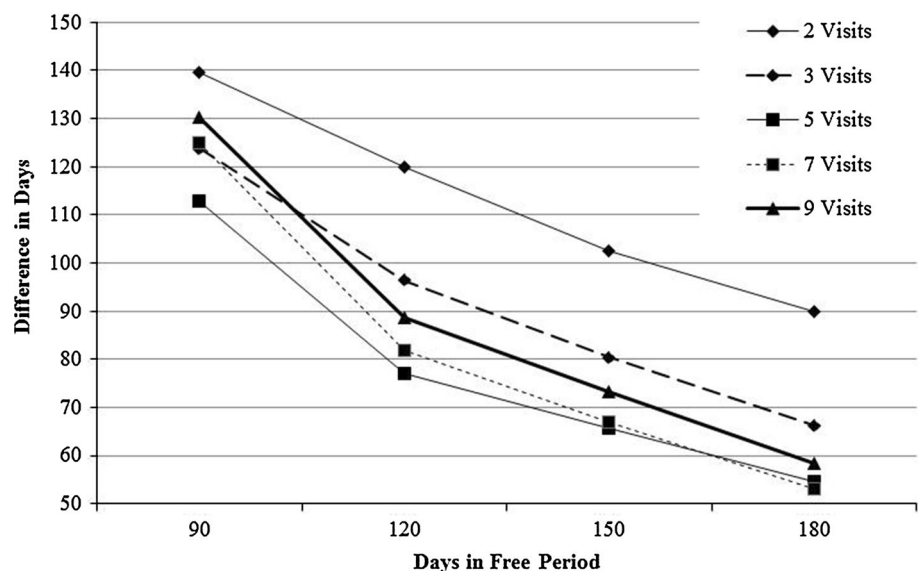
clinicians and various operational definition of the total number of episodes,  $N = 5,206$ . For analyses using dates, two factors affected the sample size. First, only children whose visits met the criteria for a give operational definition of an EoC were included. Second, children meeting a definition also had to have clinician-defined start or end of episode dates. For analyses of episode start dates versus intake dates, sample size varied because not all children were administered a BCFPI.

### Comparing Clinician-Defined and Operational Definitions of Episodes of Care

Table 1 shows that as the number of visits per episode increased, agreement with the number of clinician-defined episodes decreased. Variations in the free-period had minimal effect on agreement. The highest agreement was for 2 visits and free-periods of 150 or 180 days.

Figure 2 and Table 2 show the date difference between clinician-defined episode dates and variations in operational definitions for the second EoC. As the free-period increased, the date difference decreased and the variability (SDs) narrowed somewhat. Changing the number of visits had a less substantial effect on the date difference; however, the average difference for the 2 visits minimum definition was much larger (e.g., for the 180 free-period, 2 visits average was 27 % larger than for 3 visits) than for the other definitions for both start and end of an EoC. Results were similar for the first (see Table 4 in Appendix) and third (see Fig. 4 in Appendix) episodes. From these analyses, use of 180-day free-period appears to be optimal, while a 2-visit minimum would not be recommended.

**Fig. 2** Number of days difference between the start of an episode of care as defined by clinicians in the electronic record, and the start of an episode defined by different operational definitions of an episode. Number of visits per episode is a minimum. Data are for the second episode of care. Sample sizes range from 1,668 to 1714

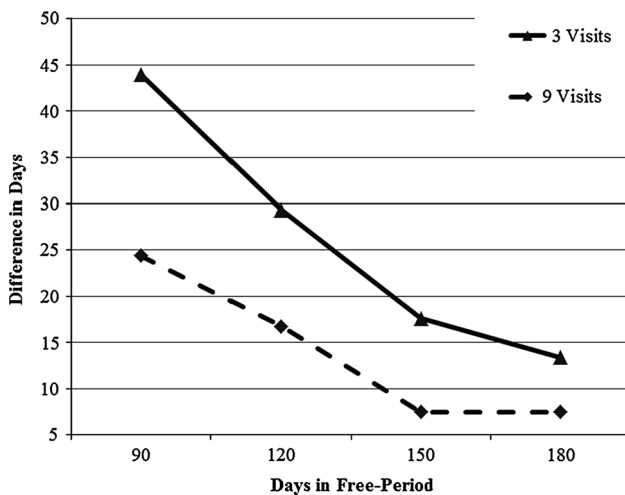




**Table 2** Number of days between clinician defined start, and end, of an episode and operational definitions, for the second episode of care

	Minimum number of visits		Free period (number of days)							
			90		120		150		180	
	M (±CI)	SD	M (±CI)	SD	M (±CI)	SD	M (±CI)	SD		
Episode start										
2	140 (±11)	228	120 (±12)	236	103 (±13)	238	90 (±13)	233		
3	124 (±12)	228	96 (±12)	222	80 (±13)	218	66 (±12)	207		
5	113 (±15)	232	77 (±14)	206	66 (±14)	200	54 (±13)	185		
7	125 (±19)	253	82 (±17)	220	67 (±17)	211	53 (±16)	190		
9	130 (±23)	265	89 (±21)	233	73 (±21)	222	58 (±19)	198		
Episode end										
2	105 (±9)	201	98 (±10)	197	96 (±11)	201	96 (±11)	204		
3	95 (±10)	191	90 (±11)	192	84 (±11)	190	83 (±11)	191		
5	90 (±12)	197	85 (±13)	198	82 (±14)	204	82 (±15)	206		
7	105 (±16)	220	95 (±17)	214	91 (±18)	221	91 (±19)	224		
9	116 (±20)	233	104 (±21)	224	100 (±22)	234	100 (±23)	236		

Results are for the second episode of care. M = mean; CI = 95 % confidence interval. N varies from 412 to 1,769 for start of episode; 412 to 1,767 for end of episode



**Fig. 3** Number of days difference between when an intake screening assessment was completed and the start of an episode defined by different operational definitions of an episode of care. Number of visits per episode is a minimum. Data are for the second episode of care. Sample size varies from 55 to 188

Comparing Intake Screening Measure Completion Dates with Operational Definitions

Given the findings above, only the definitions using a minimum of 3 or 9 visits were considered when examining completion dates for intake assessments. Figure 3 shows differences between the start of an EoC and the intake date. As the free-period between episodes increased, the date difference decreased supporting a 180-day free-period.

An Operational Definition of an EoC

Examining results across analyses, criteria of a minimum of 3 visits with a 180 day free-period appears to be the best

**Table 3** Descriptive statistics for episodes of care based on a definition of 3 visits minimum and 180 days between episodes

	Descriptive statistics			
	M (±95 % CI)	SD	Minimum	Maximum
Total visits				
Episode 1	25.8 (±1.2)	40.9	3	977
Episode 2	21.2 (±1.7)	30.7	3	255
Episode 3	18.0 (±3.8)	26.7	3	237
Episode duration (days)				
Episode 1	292.4 (±8.8)	309.3	3	1,828
Episode 2	213.5 (±13.3)	235.0	3	1,504
Episode 3	178.1 (±23.9)	169.4	8	902
Inter-episode duration (days)				
Inter-episode 1–2	638.8 (±21.4)	377.6	181	1,778
Inter-episode 2–3	416.2 (±30.6)	217.2	182	1,115

M = mean; 95 % CI = 95 % confidence interval. For episode 1, n = 4,682; for episode 2 and inter-episode 1–2, n = 1,191; for episode 3 and inter-episode 2–3, n = 194

definition of an EoC. This definition yielded low average differences between the start or end of an EoC and dates defined by clinicians, and completion of an intake assessment. It also demonstrated high agreement with the total number of episodes of care as defined by clinician ratings.

Using this definition of an EoC, over a 5-year period, visits for 10.1 % of children did not meet criteria for an EoC; 67.1 % had one EoC, 19.2 % had two, 3.4 % had three and 0.3 % had four episodes of care. Descriptive statistics for the first three episodes of care are presented in Table 3. The average inter-episode duration and number of visits were considerably greater than the minimum 3 visits

and 180 days; there was, however, considerable variability as evidenced by the large standard deviations and maximums.

## Discussion

We recommend that a minimum of 3 visits with 180 days free-period between episodes be used as an operational definition of an EoC in CMH when conducting analyses of administrative data. Definitions using free-periods less than 180 days were associated with increasingly greater discrepancies in time, compared to the start of an EoC marked by when intake screening was completed, and both the start and end of an EoC as defined by clinicians. We speculate that use of shorter free-periods resulted in allocating visits which may have been booster sessions and/or visits which occurred with a lower frequency during the last stages of an episode, to a new EoC. Agreement with clinician-ratings on the total number of episodes of care was highest for a minimum of 2 or 3 visits, with poor agreement for definitions using 7 or 9 visits. This suggests that clinicians view an EoC as consisting of even a few visits. An EoC with a minimum of 3 visits is also consistent with brief intervention models (McGarry et al. 2008).

However, the criteria with 2 visits had a large discrepancy in time with clinician's ratings of both the start and end of an episode. Two visits at the start of an episode may reflect an initial assessment prior to the start of treatment, while two visits at the end of an episode could be "booster sessions" (Kolko and Lindhiem 2014); if so, such visits should not be a separate EoC.

In terms of the number of visits, our proposed criteria align with data by Angold et al. (2000), who found that children who received less than 3 visits had poorer outcomes than other groups of children who received mental health care. However, other studies on dose-response effects in CMH have been mixed, with a number of studies having found no relationship between the number of sessions and outcomes (Weersing and Weisz 2002; Andrade et al. 2000). There are numerous reasons why clients may be seen for less than 3 visits including advice seeking, problems of a minor/transient nature, being referred elsewhere for services, dissatisfaction with services offered, wait for services or dissatisfaction with other aspects of the agency, etc. Research needs to continue to identify reasons for, and solutions to, poor engagement with CMH services (Ingoldsby 2010). The relationship between our proposed operational criteria of an EoC and the relationship between "dose" of sessions and outcomes needs to be tested.

There are limitations to the current study. First, we excluded telephone contacts, some of which may have been treatment sessions. As such, our data could underestimate the number and duration of episodes. Second, an ideal definition of an EoC might use symptom resolution as the criterion (Chorpita et al. 2011); however, in many administrative databases, standardized outcome data are often not available (Horn 2001). For example, in one study of publicly-funded CMH services in the United States, only 28 % of children had two assessments during their care and could be included in analyses examining treatment outcomes (Warren et al. 2010). In the present study, we used dates on which standardized intake questionnaires (BCPFI) were completed, but intake data were only available for some children at one of the agencies. The lack of consistency in the use of the BCFPI at intake across the three CMH agencies and over time resulted in a small sample size for these analyses. Third, our analyses are based on data from three CMH agencies in the province of Ontario, Canada. Replication in other jurisdictions is warranted. Different criteria may be needed when defining an EoC with primary health care, the only source of mental health care for many children and youth (Ford et al. 2005; Brugman et al. 2001), and also for pharmacological treatment (Saloner et al. 2014; Carson et al. 2011), as opposed to psychosocial treatments. Finally, we examined only visits within a CMH agency. Thus, our data do not capture MH-related visits in other sectors (e.g., health) which are common in this population (Garland et al. 2001; Hazen et al. 2004; Vostanis et al. 2003; Ungar et al. 2013).

Including both a minimum number of visits and a free-period is consistent with the methods used in defining an EoC in adult mental health services (Baldwin et al. 2009). In studies with adults, the EoC concept has been used to examine issues such as: how people utilize health care services (Kessler et al. 1980), predicting future health care costs (Averill et al. 2009), efficiency of health care services (Salkever et al. 1982), length of treatment (Cross et al. 1990), and patterns of comorbidity (Laux et al. 2008). Applying the proposed EoC definition would allow us to answer these and other questions for CMH care, and refine our studies of service use in CMH. For example, some studies select samples from administrative data using calendar year to form an inception cohort; to handle problems of capturing children in the midst of an episode, a solution such as removing all left censored observations can be employed (Cohen et al. 2006). In contrast, applying the proposed definition of an EoC would result in a more accurate and client-centered picture of service use. Given the variation in the natural history of different types of psychopathology, it would also be of interest to determine if an EoC varies as a function of diagnosis/problem along

with parent/child perspective of an episode of illness (Hornbrook et al. 1985). An examination of the relationship between episodes of an illness and EoC over time could enhance our understanding of patterns of care over time (Sytema et al. 1989). If our systems of care are functioning well and the treatments provided maintain their benefits, we would hope that an EoC is shorter than the average duration of illness for a given problem, and that the duration of time between episodes of care is longer than the typical time to relapse; increasing lapses of times between episodes of care might even be considered as a new definition of improved outcomes for conditions with an episodic course. The need to provide care over extended periods of time and/or in episodes is beginning to be discussed (Curry 2014; Turgay et al. 2012; Schraeder and Reid 2014a). Finally, having a standardized, integrated mental health information system across provinces, states or similar jurisdictions would assist with service system integration. This would provide the service sectors much needed information to understand episodes of care, while also supporting outcome measurement and quality assurance efforts (National Quality Forum 2009).

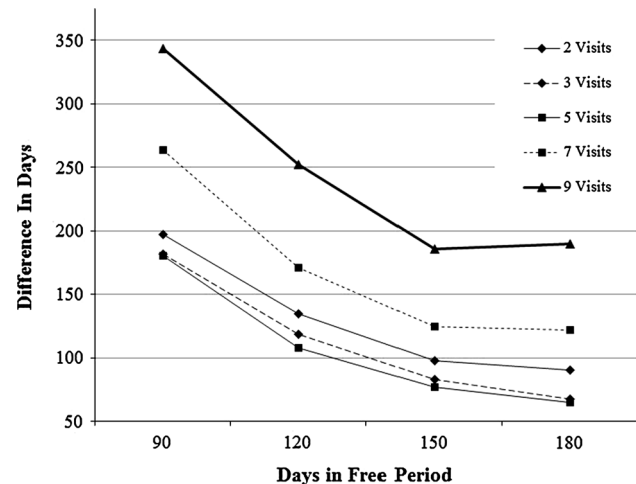
**Acknowledgments** We greatly appreciate the time and effort of the administrative and clinical staff at the agencies who participated in this study.

**Funding** This project was supported by a grant from The Provincial Centre of Excellence for Child and Youth Mental Health at CHEO (#RG-665). G. Reid is supported by the Children's Health

Foundation. G. Zaric is supported by the Canada Research Chairs Program.

## Appendix

See Table 4 and Fig. 4.



**Fig. 4** Number of days difference between the start of an episode of care as defined by clinicians in the electronic record, and the start of an episode defined by various operational definitions of an episode. Number of visits per episode is a minimum. Data are for the third episode

**Table 4** Number of days between clinician defined start and end of an episode and operational definitions, for the first episode of care

Minimum number of visits	Free period (number of days)							
	90		120		150		180	
	M (±CI)	SD	M(±CI)	SD	M(±CI)	SD	M(±CI)	SD
<b>Episode start</b>								
2	23 (±2)	82	16 (±2)	77	14 (±2)	74	12 (±2)	72
3	28 (±3)	92	20 (±3)	84	16 (±2)	81	14 (±2)	79
5	29 (±3)	82	19 (±3)	74	13 (±2)	68	11 (±2)	64
7	30 (±3)	85	19 (±3)	75	14 (±3)	70	12 (±2)	68
9	34 (±3)	89	22 (±3)	78	16 (±3)	72	13 (±3)	69
<b>Episode end</b>								
2	92 (±6)	187	70 (±5)	161	61 (±4)	145	58 (±4)	137
3	80 (±6)	178	63 (±5)	155	57 (±4)	143	55 (±4)	136
5	70 (±6)	165	56 (±5)	140	53 (±5)	133	52 (±4)	129
7	69 (±6)	164	55 (±5)	140	53 (±5)	133	51 (±5)	129
9	71 (±6)	166	58 (±5)	146	56 (±5)	140	55 (±5)	136

M = mean; CI = 95 % confidence interval. N varies from 2,728 to 4,319 for Start of Episode; 2,677 to 4,312 for End of Episode



## References

- Andrade, A. R., Lambert, E. W., & Bickman, L. (2000). Dose effect in child psychotherapy: Outcomes associated with negligible treatment. *Journal of the American Academy of Child and Adolescent Psychiatry*, 39(2), 161–168.
- Angold, A., Costello, E. J., Burns, B. J., Erkanli, A., & Farmer, E. M. (2000). Effectiveness of nonresidential specialty mental health services for children and adolescents in the “real world”. *Journal of the American Academy of Child and Adolescent Psychiatry*, 39(2), 154–160.
- Averill, R. F., Goldfield, N. I., Hughes, J. S., Eisenhandler, J., & Vertrees, J. C. (2009). Developing a prospective payment system based on episodes of care. *The Journal of Ambulatory Care Management*, 32(3), 241–251.
- Baldwin, S. A., Berkelson, A., Atkins, D. C., Olsen, J. A., & Nielsen, S. L. (2009). Rates of change in naturalistic psychotherapy: Contrasting dose-effect and good-enough level models of change. *Journal of Consulting and Clinical Psychology*, 77(2), 203–211.
- Barwick, M., Uranjnik, D. J., Sumner, L., Cohen, S., Reid, G. J., Engel, K., et al. (2013). Profiles and service utilization for children accessing a mental health walk-in clinic versus usual care. *Journal of Evidenced-Based Social Work*, 10(4), 338–352.
- Beesdo-Baum, K., Knappe, S., Fehm, L., Hofler, M., Lieb, R., Hofmann, S. G., et al. (2012). The natural course of social anxiety disorder among adolescents and young adults. *Acta Psychiatrica Scandinavica*, 126(6), 411–425.
- Beeson, M., Davison, I., Vstanis, P., & Window, S. (2006). Parenting programmes for behavioural problems: Where do tertiary units fit in a comprehensive service? *Clinical Child Psychology and Psychiatry*, 11(3), 335–348.
- Benway, C. B., Hamrin, V., & McMahon, T. J. (2003). Initial appointment nonattendance in child and family mental health clinics. *American Journal of Orthopsychiatry*, 73(4), 419–428.
- Birmaher, B., Brent, D. A., Kolko, D., Baugher, M., Bridge, J., Holder, D., et al. (2000). Clinical outcome after short-term psychotherapy for adolescents with major depressive disorder. *Archives of General Psychiatry*, 57, 29–36.
- Boyle, M. H., Cunningham, C. E., Georgiades, K., Cullen, J., Racine, Y., & Pettingill, P. (2009). The Brief Child and Family Phone Interview (BCFPI): 2. Usefulness in screening for child and adolescent psychopathology. *Journal of Child Psychology and Psychiatry*, 50(4), 424–431.
- Brugman, E., Reijneveld, S. A., Verhulst, F. C., & Verloove-Vanhorick, S. P. (2001). Identification and management of psychosocial problems by preventive child health care. *Archives of Pediatric and Adolescent Medicine*, 155(4), 462–469.
- Burcusa, S. L., & Iacono, W. G. (2007). Risk for recurrence in depression. *Clinical Psychology Review*, 27(8), 959–985. doi:10.1016/j.cpr.2007.02.005.
- Bussing, R., Mason, D. M., Bell, L., Porter, P., & Garvan, C. (2010). Adolescent outcomes of childhood attention-deficit/hyperactivity disorder in a diverse community sample. *Journal of the American Academy of Child and Adolescent Psychiatry*, 49(6), 595–605.
- Carson, N. J., Stewart, M., Lin, J. Y., & Alegria, M. (2011). Use and quality of mental health services for Haitian youth. *Ethnicity and Health*, 16(6), 567–582.
- Chorpita, B. F., Daleiden, E. L., Ebesutani, C., Young, J., Becker, K. D., Nakamura, B. J., et al. (2011). Evidence-based treatments for children and adolescents: An updated review of indicators of efficacy and effectiveness. *Clinical Psychology: Science and Practice*, 18(2), 154–172.
- Cohen, E., Snowden, L., Libby, A., & Ma, Y. (2006). The effects of capitation on outpatient mental health episodes of children. *Journal of Child and Family Studies*, 15(1), 13–26.
- Cross, J. G., Knesper, D. J., & De Rooij, J. P. (1990). An econometric model of an episode of mental health care for patients with mild conditions: Implications for caregiver substitution. *Socio-economic Planning Sciences*, 24(3), 173–185.
- Cunningham, C. E., Boyle, M. H., Hong, S., Pettingill, P., & Bohaychuk, D. (2009). The Brief Child and Family Phone Interview (BCFPI): 1. Rationale, development, and description of a computerized children’s mental health intake and outcome assessment tool. *Journal of Child Psychology and Psychiatry*, 50(4), 416–423.
- Curry, J. F. (2014). Future directions in research on psychotherapy for adolescent depression. *Journal of Clinical Child and Adolescent Psychology*, 43(3), 510–526.
- Curry, J., Silva, S., Rohde, P., Ginsburg, G., Kratochvil, C., Simons, A., et al. (2011). Recovery and recurrence following treatment for adolescent major depression. *Archives of General Psychiatry*, 68(3), 263–269.
- Emslie, G. J., Rush, A. J., Weinberg, W. A., Gullion, C. M., Rintelmann, J., & Hughes, C. W. (1997). Recurrence of major depressive disorder in hospitalized children and adolescents. *Journal of the American Academy of Child and Adolescent Psychiatry*, 36(6), 785–792. doi:10.1097/00004583-199706000-00015.
- Ford, T., Hamilton, H., Goodman, R., & Meltzer, H. (2005). Service contacts among the children participating in the British child and adolescent mental health surveys. *Child and Adolescent Mental Health*, 10(1), 37–51.
- Foster, E. M., & Xuan, F. (2005). An episode-based framework for analyzing health care expenditures: An application of reward renewal models. *Health Services Research*, 40(6 Pt 1), 1953–1971.
- Garcia, J. A., & Weisz, J. R. (2002). When youth mental health care stops: Therapeutic relationship problems and other reasons for ending youth outpatient treatment. *Journal of Consulting and Clinical Psychology*, 70(2), 439–443.
- Garland, A. F., Haine, R. A., & Boxmeyer, C. L. (2007). Determinates of youth and parent satisfaction in usual care psychotherapy. *Evaluation and Program Planning*, 30(1), 45–54.
- Garland, A. F., Hough, R. L., McCabe, K. M., Yeh, M., Wood, P. A., & Aarons, G. A. (2001). Prevalence of psychiatric disorders in youths across five sectors of care. *Journal of the American Academy of Child and Adolescent Psychiatry*, 40(4), 409–418.
- Harpaz-Rotem, I., Leslie, D., & Rosenheck, R. A. (2004). Treatment retention among children entering a new episode of mental health care. *Psychiatric Services*, 55(9), 1022–1028.
- Hawley, K. M., & Weisz, J. R. (2005). Youth versus parent working alliance in usual clinical care: Distinctive associations with retention, satisfaction, and treatment outcome. *Journal of Clinical Child and Adolescent Psychology*, 34(1), 117–128.
- Hazen, A. L., Hough, R. L., Landsverk, J. A., & Wood, P. A. (2004). Use of mental health services by youths in public sectors of care. *Mental Health Services Research*, 6(4), 213–226.
- Horn, S. D. (2001). Quality, clinical practice improvement, and the episode of care. *Managed Care Quarterly*, 9(3), 10–24.
- Hornbrook, M. C., Hurtado, A. V., & Johnson, R. E. (1985). Health care episodes: Definition, measurement and use. *Medical Care Review*, 42(2), 163–218.
- Ingoldsby, E. M. (2010). Review of interventions to improve family engagement and retention in parent and child mental health programs. *Journal of Child and Family Studies*, 19(5), 629–645.
- Isojoki, I., Frojd, S., Rantanen, P., Laukkanen, E., Narhi, P., & Kaltiala-Heino, R. (2008). Priority criteria tool for elective specialist level adolescent psychiatric care predicts treatment received. *European Child and Adolescent Psychiatry*, 17(7), 397–405.

- Johnson, E., Mellor, D., & Brann, P. (2008). Differences in dropout between diagnoses in child and adolescent mental health services. *Clinical Child Psychology and Psychiatry*, 13(4), 515–530.
- Kessler, L. G., Steinwachs, D. M., & Hankin, J. R. (1980). Episodes of psychiatric utilization. *Medical Care*, 18(12), 1219–1227.
- Kessler, L. G., Steinwachs, D. M., & Hankin, J. R. (1982). Episodes of psychiatric care and medical utilization. *Medical Care*, 20(12), 1209–1221.
- Kolko, D. J., & Lindhiem, O. (2014). Introduction to the special series on booster sessions and long-term maintenance of treatment gains. *Journal of Abnormal Child Psychology*, 42(3), 339–342. doi:10.1007/s10802-013-9849-2.
- Kowalewski, K., McLennan, J. D., & McGrath, P. J. (2011). A preliminary investigation of wait times for child and adolescent mental health services in Canada. *Journal of the Canadian Academy of Child and Adolescent Psychiatry*, 20(2), 112–119.
- Laux, G., Kuehlein, T., Rosemann, T., & Szecsenyi, J. (2008). Co- and multimorbidity patterns in primary care based on episodes of care: Results from the German CONTENT project. *BMC Health Services Research*, 8, 14.
- Lavigne, J. V., Lebaillly, S. A., Gouze, K. R., Cicchetti, C., Pochyly, J., Arend, R., et al. (2008). Treating oppositional defiant disorder in primary care: A comparison of three models. *Journal of Pediatric Psychology*, 33(5), 449–461.
- Lewinsohn, P. M., Clarke, G. N., Seeley, J. R., & Rohde, P. (1994). Major depression in community adolescents: Age at onset, episode duration, and time to recurrence. *Journal of the American Academy of Child and Adolescent Psychiatry*, 33(6), 809–818.
- Logan, D. E., & King, C. A. (2002). Parental facilitation of adolescent mental health service utilization: A conceptual and empirical review. *Clinical Psychology: Science and Practice*, 8, 319–333.
- Luby, J. L., Si, X., Belden, A. C., Tandon, M., & Spitznagel, E. (2009). Preschool depression: Homotypic continuity and course over 24 months. *Archives of General Psychiatry*, 66(8), 897–905.
- McGarry, J., McNicholas, F., Buckley, H., Kelly, B. D., Atkin, L., & Ross, N. (2008). The clinical effectiveness of a brief consultation and advisory approach compared to treatment as usual in child and adolescent mental health services. *Clinical Child Psychology and Psychiatry*, 13(3), 365–376.
- Morrissey-Kane, E., & Prinz, R. J. (1999). Engagement in child and adolescent treatment: The role of parental cognitions and attributions. *Clinical Child and Family Psychology Review*, 2(3), 183–198.
- Moscovice, I. (1977). A method for analyzing resource use in ambulatory care settings. *Medical Care*, 15(12), 1024–1044.
- National Quality Forum. (2009). *National Quality Forum (NQF). Measurement framework: Evaluating efficiency across patient-focused episodes of care* Washington, DC: National Quality Forum. Retrieved from: [http://www.qualityforum.org/Publications/2010/01/Measurement\\_Framework\\_Evaluating\\_Efficiency\\_Across\\_Patient-Focused\\_Episodes\\_of\\_Care.aspx](http://www.qualityforum.org/Publications/2010/01/Measurement_Framework_Evaluating_Efficiency_Across_Patient-Focused_Episodes_of_Care.aspx).
- Pavuluri, M. N., Luk, S. L., & McGee, R. (1996). Help-seeking for behavior problems by parents of preschool children: A community study. *Journal of the American Academy of Child and Adolescent Psychiatry*, 35, 215–222.
- Pine, D. S., Cohen, P., Gurley, D., Brook, J., & Ma, Y. (1998). The risk for early-adulthood anxiety and depressive disorders in adolescents with anxiety and depressive disorders. *Archives of General Psychiatry*, 55(1), 56–64.
- Platz, C., Umbricht, D. S., Cattapan-Ludewig, K., Dvorsky, D., Arbach, D., Brenner, H. D., et al. (2006). Help-seeking pathways in early psychosis. *Social Psychiatry and Psychiatric Epidemiology*, 41(12), 967–974.
- Rao, U., Hammen, C. L., & Poland, R. E. (2010). Longitudinal course of adolescent depression: Neuroendocrine and psychosocial predictors. *Journal of the American Academy of Child and Adolescent Psychiatry*, 49(2), 141–151.
- Rao, U., Ryan, N. D., Birmaher, B., Dahl, R. E., Williamson, D. E., Kaufman, J., et al. (1995). Unipolar depression in adolescents: Clinical outcome in adulthood. *Journal of the American Academy of Child and Adolescent Psychiatry*, 34(5), 566–578.
- Reid, G. J., & Brown, J. B. (2008). Money, case complexity and wait lists: Perspectives on problems and solutions at children's mental health centers in Ontario. *Journal of Behavioral Health Services and Research*, 35(3), 334–346.
- Reid, G. J., Cunningham, C. E., Evans, B., Stewart, M., Brown, J. B., Lent, B., et al. (2011). Help-seeking for children with mental health problems: Parents' efforts and experiences. *Administration and Policy in Mental Health*, 38(5), 384–397.
- Remschmidt, H., Belfer, M. L., & Goodyear, I. (2004). *Facilitating pathways: Care, treatment and prevention in child and adolescent mental health*. New York: Springer.
- Rohde, P., Beevers, C. G., Stice, E., & O'Neil, K. (2009). Major and minor depression in female adolescents: Onset, course, symptom presentation, and demographic associations. *Journal of Clinical Psychology*, 65(12), 1339–1349.
- Rosen, A. K., Houchens, R. L., Gibson, T. B., & Mayer-Oakes, A. (1998). Developing episodes of care for adult asthma patients: A cautionary tale. *American Journal of Medical Quality*, 13(1), 25–35.
- Salkever, D. S., Skinner, E. A., Steinwachs, D. M., & Katz, H. (1982). Episode-based efficiency comparisons for physicians and nurse practitioners. *Medical Care*, 20(2), 143–153.
- Saloner, B., Carson, N., & LeCook, B. (2014). Episodes of mental health treatment among a nationally representative sample of children and adolescents. *Medical Care Research and Review*, 71(3), 261–279.
- Sayal, K. (2006). Annotation: Pathways to care for children with mental health problems. *Journal of Child Psychology and Psychiatry*, 47(7), 649–659.
- Schraeder, K. E., & Reid, G. J. (2014a). Who needs to transition? Defining a target population of youth that will require a transfer of care from child to adult mental health services. (Manuscript submitted for publication).
- Schraeder, K. E., & Reid, G. J. (2014b). Why wait? The effects of waiting time on subsequent help-seeking among families looking for children's mental health services. *Journal of Abnormal Child Psychology*. doi:10.1007/s10802-014-9928-z.
- Shanley, D. C., Reid, G. J., & Evans, B. (2008). How parents seek help for children with mental health problems. *Administration in Policy and Mental Health and Mental Health Services Research*, 35(3), 135–146.
- Sherman, M. L., Barnum, D. D., Buhman-Wiggs, A., & Nyberg, E. (2009). Clinical intake of child and adolescent consumers in a rural community mental health center: Does wait-time predict attendance? *Community Mental Health Journal*, 45(1), 78–84.
- Solon, J. A., Feeney, J. J., Jones, S. H., Rigg, R. D., & Sheps, C. G. (1967). Delineating episodes of care. *American Journal of Public Health and the Nations Health*, 57(3), 401–408.
- Srebnik, D., Cauce, A. M., & Baydar, N. (1996). Help-seeking pathways for children and adolescents. *Journal of Emotional and Behavioral Disorders*, 4(4), 210–220.
- Sytema, S., Giel, R., & Ten Horn, G. H. M. M. (1989). Patterns of care in the field of mental health: Conceptual definition and research methods. *Acta Psychiatrica Scandinavica*, 79(1), 1–10.
- Tolan, P. H. (2014). More than afterthoughts and details: Maintenance and booster effects as critical elements of intervention research. *Journal of Abnormal Child Psychology*, 42(3), 399–402. doi:10.1007/s10802-013-9839-4.

- Turgay, A., Goodman, D. W., Asherson, P., Lasser, R. A., Babcock, T. F., Pucci, M. L., et al. (2012). Lifespan persistence of ADHD: The life transition model and its application. *Journal of Clinical Psychiatry*, 73(2), 192–201.
- Ungar, M., Liebenberg, L., Dudding, P., Armstrong, M., & van de Vijver, F. J. (2013). Patterns of service use, individual and contextual risk factors, and resilience among adolescents using multiple psychosocial services. *Child Abuse and Neglect*, 37(2–3), 150–159.
- Vostanis, P., Meltzer, H., Goodman, R., & Ford, T. (2003). Service utilisation by children with conduct disorders: Findings from the GB National Study. *European Child and Adolescent Psychiatry*, 12(5), 231–238.
- Wall, M. M., Stromberg, K. D., Pothoff, S., & Kane, R. L. (2004). Alcoholism treatment episodes validly defined using mental health care utilization records. *Journal of Clinical Epidemiology*, 57(4), 373–380.
- Warren, J. S., Nelson, P. L., Mondragon, S. A., Baldwin, S. A., & Burlingame, G. M. (2010). Youth psychotherapy change trajectories and outcomes in usual care: Community mental health versus managed care settings. *Journal of Consulting and Clinical Psychology*, 78(2), 144–155.
- Weersing, V. R., Iyengar, S., Kolko, D. J., Birmaher, B., & Brent, D. A. (2006). Effectiveness of cognitive-behavioral therapy for adolescent depression: A benchmarking investigation. *Behavior Therapy*, 37(1), 36–48.
- Weersing, V. R., & Weisz, J. R. (2002). Community clinic treatment of depressed youth: Benchmarking usual care against CBT clinical trials. *Journal of Consulting and Clinical Psychology*, 70(2), 299–310.
- Wingert, T. D., Kralewski, J. E., Lindquist, T. J., & Knutson, D. J. (1995). Constructing episodes of care from encounter and claims data: Some methodological issues. *Inquiry*, 32(4), 430–443.
- Zwaanswijk, M., Van der Ende, J., Verhaak, P. F., Bensing, J. M., & Verhulst, F. C. (2007). The different stages and actors involved in the process leading to the use of adolescent mental health services. *Clinical Child Psychology and Psychiatry*, 12(4), 567–582.