NIH Public Access
Author Manuscript
Child Youth Serv Rev. Author manuscript; available in PMC 2011 April 1.

Published in final edited form as:
Child Youth Serv Rev. 2010 April 1; 32(4): 626–634. doi:10.1016/j.childyouth.2009.12.010.

Prevalence and Timing of Diagnosable Mental Health, Alcohol, and Substance Use Problems among Older Adolescents in the Child Welfare System

Thomas E. Keller,
Portland State University, School of Social Work, P.O. Box 751, Portland, OR 97210

Amy M. Salazar, and
Portland State University, School of Social Work, P.O. Box 751, Portland, OR 97210

Mark E. Courtney
University of Washington, School of Social Work, 4101 15th Ave NE, Seattle WA, 98145

Abstract

This study reports the prevalence of PTSD, major depression, alcohol abuse/dependence and substance abuse/dependence diagnoses assessed with a structured clinical interview protocol in a population-based, multi-state, age cohort of older adolescents about to exit child welfare systems. PTSD was the most common diagnosis and was observed at rates above those seen in the general population. Rates of specific diagnoses varied according to gender, race, type of child welfare placement, and state of residence. In general, African American youth and those in kinship family foster care were less likely to have mental health and substance use problems. Analysis of the timing of onset relative to entry into care revealed that Caucasian youth were more likely to have diagnoses prior to entry into state custody, and race differentials were less pronounced for diagnosis after placement in foster care. Observed state-to-state differences suggest that age of entry into care and the likelihood of pre-existing mental health and substance use conditions could be attributable to child welfare policies regarding screening and placement.

Older adolescents emancipating from the child welfare system often face the transition to independent adulthood abruptly and without guarantees of continuing support (Collins, 2001; Geenen & Powers, 2007; McCoy, McMillen, & Spitznagel, 2008; Stein, 2006). The transition from adolescence to adulthood typically provides new freedoms and opportunities, but it also poses many challenges that can test coping skills, exacerbate pre-existing difficulties, and derail developmental trajectories (Maughan & Champion, 1990; Schulenberg, Sameroff, & Cicchetti, 2004). In general, adolescents who enter this developmental period with psychiatric disorders or heavy substance use are more likely than others to experience negative outcomes in adulthood (Davis & Vander Stoep, 1997; Schulenberg & Maggs, 2002; Vander Stoep et al., 2000). Mental health and substance use problems are among the many factors that can jeopardize the prospects of youth exiting the foster care system (Anctil, McCubbin, O'Brien, Pecora, & Anderson-Harumi, 2007). Because they commonly are exposed to multiple adverse familial and environmental conditions associated with the development of psychopathology, youth leaving state custody are likely to have elevated risk for various forms

Publisher's Disclaimer: This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting proof before it is published in its final citable form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.

NIH-PA Author Manuscript
NIH-PA Author Manuscript
NIH-PA Author Manuscript

NIH-PA Author Manuscript

NIH-PA Author Manuscript

NIH-PA Author Manuscript

of psychiatric disorder (Pecora, White, Jackson, & Wiggins, 2009; Pilowsky, 1995). Understanding the nature, severity, and prevalence of mental health and substance use problems among older foster youth has important implications for policies and practices designed to facilitate successful transitions for this population (Collins, 2001; Leathers & Testa, 2006; Lopez & Allen, 2007; Massinga & Pecora, 2004; Mendes & Moslehuddin, 2006).

Several studies have documented relatively high rates of emotional and behavioral disturbance among youth in the child welfare system. Much of the evidence comes from research demonstrating that samples of youth in care score higher relative to general population norms on standardized problem behavior checklists as reported by parents or teachers (Burns et al., 2004; Clausen, Landsverk, Ganger, Chadwick, & Litrownik, 1998; Heflinger, Simpkins, & Combs-Orme, 2000; Hulsey & White, 1989; Keller et al., 2001; McIntyre & Keesler, 1986). Other research indicates greater use of mental health services by youth in foster care than observed in the general population (dosReis, Zito, Safer, & Soeken, 2001; Farmer et al., 2001; Garland, Landsverk, Hough, & Ellis-Macleod, 1996; Halfon, Berkowitz, & Klee, 1992; Harman, Childs, & Kelleher, 2000; Zima, Bussing, Yang, & Belin, 2000). In a study of children and youth in five sectors of public care (e.g., child welfare, juvenile justice, mental health, SED) in San Diego County, approximately 42% of youth in the child welfare sample met criteria for a psychiatric diagnosis in the past year according to caregiver or child report, though this prevalence rate was the lowest of the sectors studied (Garland et al., 2001). A recent study based on a large, nationally representative survey found that youth who were ever in foster care reported higher levels of psychiatric symptoms and substance use disorders than youth without any lifetime history of foster care (Pilowsky & Wu, 2006). The majority of findings noted above are based on samples combining children and adolescents, sometimes with ages ranging from 3–18 years. However, two studies focusing on older adolescents in care similarly found that they scored above norms on self-report mental health inventories, and approximately half had received some form of mental health service in the preceding year (Courtney, Piliavin, Grogan-Kaylor, & Nesmith, 2001; Shin, 2005).

Although higher rates of emotional and behavioral problems among youth in the child welfare system seem well substantiated, very few studies have directly assessed the mental health of youth in care with structured, clinical interviews capable of yielding a diagnostic classification (see Garland et al, 2001, for exception). An extensive search of the literature discovered only two reports providing data regarding rates of specific mental health disorders among older adolescents in foster care. A research team in England assessed adolescents (13–17 yrs.) in the Oxfordshire care authority and a matched comparison group using the Kiddie Schedule for Affective Disorders and Schizophrenia (K-SADS). The 78 youth in care (58% response rate) demonstrated higher prevalence than the comparison group for almost every type of psychiatric disorder, with the most common diagnoses for foster youth being conduct disorder (28%), overanxious disorder (26%), and major depressive disorder (23%) (McCann, James, Wilson, & Dunn, 1996). The most informative study to date, conducted by McMillen and colleagues, administered the Diagnostic Interview Schedule for DSM-IV with a sample of 373 17-year-old youths in custody of the child welfare system in eight counties of Missouri (McMillen et al., 2005). In this sample, lifetime prevalence was highest for conduct disorder (47%), followed by major depression (27%), ADHD (20%), PTSD (14%), and mania (6%). Other reports based on this sample indicate high rates of mental health service usage, including 15% of the sample receiving inpatient psychiatric care in the previous year and 37% of the sample taking psychotropic medications at the time of the interview (McMillen et al., 2004; Raghavan & McMillen, 2008).

The extent to which older adolescents in the child welfare system have serious problems associated with the use of alcohol or other substances has received little investigation. A study of 320 youth in out-of-home care, who were between 15–18 years age and participating in a

NIH-PA Author Manuscript

NIH-PA Author Manuscript

NIH-PA Author Manuscript

life-skills intervention, found that 40% had used alcohol and 36% had used marijuana in the preceding 6 months (Thompson & Auslander, 2007). For the 464 youth between the ages of 12–17 years who had ever been in foster care in the national survey analyzed by Pilowsky and Wu (2006), the percentages meeting diagnostic criteria for past year alcohol abuse (5.9%), alcohol dependence (6.5%), drug abuse (7.1%), and drug dependence (9.8%) exceeded the rates of the comparison group. In the San Diego study described earlier, the sample of youth in the child welfare sector was limited to the 190 youth between the ages of 13–18 years in reporting the lifetime prevalence of substance use disorders for alcohol (16.6%), cannabis (8.3%), and amphetamines (3.7%) (Aarons, Brown, Hough, Garland, & Wood, 2001). The Missouri study of 17-year-old adolescents in care gives the proportion reporting whether a particular substance was ever used rather than the proportion meeting diagnostic criteria for abuse or dependence, with the most commonly indicated being marijuana (46%), amphetamines (16%), hallucinogens (12%), sedatives (10%) (Vaughn, Ollie, McMillen, Scott, & Munson, 2007).

Because the population of youth in the child welfare system is heterogeneous, it is informative to investigate how the prevalence of particular mental health and substance use problems may vary by personal and contextual factors. For example, gender differences in the manifestation of mental health and substance use have been observed among adolescents in the general population (Wade, Cairney, & Pevalin, 2002), but potential distinctions between males and females have not been reported regularly in studies of foster youth. In assessing the child welfare population, the possibility of racial differences in prevalence also warrants attention. Previous research suggests that, in comparison to their Caucasian counterparts, African American youth in foster care tend to exhibit fewer problem behaviors (Keller et al., 2001), take different pathways into the mental health system (Garland & Besinger, 1997), and receive fewer mental health services (Garland, Landsverk, & Lau, 2003).

Disparities in the rate of mental health and substance use disorder also are likely to be associated with the particular type of out-of-home placement, such as kinship foster care, non-relative foster care, group care, or supported independent living arrangements. Many features, including type of caregiver and level of restrictiveness, differentiate the nature of these settings, and numerous factors distinguish the youth in particular placements (Beeman, Kim, & Bullerdick, 2000; Berrick, Barth, & Needell, 1994). In addition, rates of mental health and substance use problems may vary by state of residence because in the absence of national child welfare policies each state establishes its own criteria for screening and placement decisions (Gelles & Spigner, 2008). Previous research has not been able to make state-to-state comparisons in the prevalence of mental health and substance use disorders in child welfare. Although some previous research on the child welfare population has suggested differing rates of mental health problems according to factors like gender, race, and placement type, the studies have rarely given any indication of whether the disparities originated while the youth were in the child welfare system or whether the respective groups differed upon entry into state care.

The present study reports the prevalence of mental health and substance use disorders among a large, representative sample of youth approaching the age of emancipation from the child welfare systems of three Midwestern states. Mental health and substance use disorders were assessed using a structured clinical interview with an algorithm for generating a DSM-IV diagnostic classification. The study investigates how youth who differ by gender, race, type of out-of-home placement, and state of residence vary in the rates meeting diagnostic criteria. Furthermore, it examines how the onset of diagnosable conditions either before or after entry into state custody differs according to these same factors.

NIH-PA Author Manuscript

NIH-PA Author Manuscript

NIH-PA Author Manuscript

Method

Sample

The data are from the baseline interview of a longitudinal panel study tracking a cohort of youth exiting the public child welfare systems of three Midwestern states (Illinois, Iowa, Wisconsin) to determine how well these adolescents are prepared for the transition to independent living (Courtney & Dworsky, 2006; Courtney et al., 2005; Courtney, Terao, & Bost, 2004). It is the largest prospective study of youth leaving care undertaken to date. The population of interest consisted of adolescents who: a) were in out-of-home care supervised by the public child welfare agencies of the three states; b) were 17 years or older; and c) had been in out-of-home care for at least one year. Exclusion criteria were developmental disability, in-patient psychiatric institutionalization, or incarceration.

A representative sample was obtained using a systematic sampling procedure (Henry, 1990). During the period from April 2002 to June 2002, the public child welfare agencies in the three states identified all cases from their active caseloads that met the inclusion criteria. The sampling frame included all eligible youth in Iowa and Wisconsin and a random selection of 67% of eligible youth in Illinois, the most populous state. The foster care providers of the identified youth were informed of the study through a letter and through verbal communication with the child's caseworker. Youth participants were sent letters informing them of the study and then were contacted for in-person interviews at which time written informed consent was obtained. All recruitment and data collection activities followed IRB-approved protocols.

As described, potential participants were identified from state child welfare records. The referrals from child welfare agencies were not intended to include adjudicated delinquents, but agency records sometimes were out of date. In some cases, the initial contact with potential subjects revealed that they were ineligible. Of the 880 adolescents identified for recruitment into the study, 110 of those contacted were discovered to be ineligible and were excluded for the following reasons: physically or mentally incapable (n=33); incarcerated or in a lock-down facility (e.g., psychiatric hospital) (n=40); runaway or missing from assigned home prior to start of field period (n=16); out of state prior to start of field period (n=13); or ineligible for other reasons (e.g., adopted) (n=8). Of the remaining 770 cases, 732 consented to participate and completed an in-person baseline interview, for a response rate of 95%.

The sample was evenly divided among males (48.5%) and females (51.5%). The mean age at time of the interview was 17.4 years (SD=.50). Most respondents were 17 years of age (59.0%), and the rest were 18 years old (41.0%). The mean age at which respondents entered the child welfare system was 10.8 years (SD= 4.0). A majority of the sample was African American (57.3%), followed by Caucasian (31.0%), mixed race (9.8%), American Indian/Native Alaskan (1.4%) and Asian/Pacific Islander (0.5%). Of those identifying Hispanic ethnicity (8.6%), most were of mixed race (50.8%), Caucasian (23.8%), or African American (19%) heritage. At the time of the baseline interview, 30.5% were in kinship foster homes (with relatives), 35.8% in foster homes with non-relatives, 18.1% in group care or residential treatment facilities, 8.6% in an independent living arrangement, 0.7% in an adoptive home (pre-finalization), and 6.3% in some other setting.

Measures

Demographic and Placement Factors—Variables for gender and race were based on standard interview questions for obtaining demographic information. Given the racial distribution of the sample as reported above, race was dichotomized to reflect African American or Caucasian heritage, and analyses focusing on race did not include respondents in the racial categories with low frequencies. Similarly, the categorical variable reflecting type

NIH-PA Author Manuscript

NIH-PA Author Manuscript

NIH-PA Author Manuscript

of out-of-home placement at the time of the interview was restricted to the four most clearly defined and frequently endorsed categories for analyses with this factor: kinship foster care, non-relative foster care, group care, and independent living.

Mental health, alcohol, and substance use disorders—Lifetime diagnoses of mental health disorders were derived using the Composite International Diagnostic Interview, CIDI (WHO, 1997). The CIDI is a highly structured interview that renders diagnoses according to definitions and criteria of the Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition (DSM-IV). The CIDI obtains not only information about the pattern of symptoms but also the functional impairments and collateral factors necessary to substantiate the severity of the condition. The validity and reliability of the CIDI psychiatric and substance abuse modules have been established through extensive research (Cottler & Compton, 1993; Wittchen, 1994), and the CIDI has been used in major studies of psychiatric epidemiology such as the National Comorbidity Study (Kessler et al., 1994). For cases in which a diagnosis is indicated, information is obtained regarding the recency, severity, and onset of the symptoms or conditions. The assessment modules used for this study were: major depression, social phobia, generalized anxiety disorder, post-traumatic stress disorder, alcohol abuse, alcohol dependence, and various types of substance abuse and dependence.

The CIDI is designed for use by nonclinicians trained as research interviewers. In this study, interviewers used programmed laptop computers to administer the interview protocol and enter responses. Due to programming errors by the contracted survey research service, skip routines for question sequences generating diagnostic assessments for major depression and substance abuse were incorrect. Participants who indicated initial symptoms on these sections of the interview were not asked follow-up questions necessary to determine a diagnosis. An attempt was made to re-interview each participant who should have continued with the CIDI routines for depression (n=330) and/or substance abuse (n=338). Callback interviews were successfully completed with 78% of cases for major depression and 70% of cases for substance abuse. For both diagnostic categories, there were no statistically significant differences between individuals who did and did not complete the attempted callback interviews on other variables used in the analysis, including gender, race, placement type or diagnosis of PTSD and alcohol use disorders.

Results

Overall prevalence rates for major diagnostic categories and for particular subtypes are displayed in Table 1. Post-traumatic stress disorder (PTSD) was the most commonly indicated diagnosis, with 15.1% of the sample meeting lifetime criteria. Alcohol-related disorders also were reported frequently, with 14.1% of the sample meeting lifetime criteria for either abuse or dependence. The prevalence of major depression was estimated at 10.5%, while abuse or dependence of any type of illicit substance was estimated for 7.0% of the sample. Cannabis was the most frequently misused substance. Note that the values for depression and substance abuse were imputed under the assumption that rates of diagnosis for those who did not complete the callback interview would be roughly equivalent to those who did. Each imputed estimate was derived by assigning the set of missing cases the same rate of diagnosis as observed in callback group (e.g., 23.3% for depression) and accounting for those who definitely had no diagnosis based on the original interview (and needed no callback). Thus, in the case of depression, the estimated rate of 10.5% is a weighted combination of 402 cases with no diagnosis and 330 cases with a diagnosis rate of 23.3%. For these diagnostic categories, Table 1 provides conservative lower and upper bounds for the estimates by computing the percentage if none of the missing cases had the diagnosis (i.e., lower bound=only known diagnoses out of total sample, equivalent to listwise deletion) or if all of the missing cases had the diagnosis (i.e., upper bound=known diagnoses plus all missing cases out of total sample). In addition,

NIH-PA Author Manuscript

NIH-PA Author Manuscript

NIH-PA Author Manuscript

inferential statistics based on imputed values were derived based on the number of cases with valid data. For interpretation of Table 1, it also is worth noting that, for a given substance, classification of dependence excludes simultaneous diagnosis of abuse; multiple diagnoses are possible across substances, although each individual is counted only once in the composite category for a diagnosis of one or more substances. The percentages of respondents meeting diagnostic criteria for less common diagnostic conditions such as dysthymia, social phobia, and generalized anxiety disorder were low (less than 1.5%), so these categories were not included in the remainder of the analyses focusing on major diagnostic headings.

Prevalence by gender, race, placement type, and state

Rates of youth in the child welfare system meeting lifetime criteria for certain diagnoses differed by demographic factors such as gender and race. As presented in Table 2, females had higher risk relative to males for both PTSD (Risk Ratio=2.8, CI=1.9–4.2) and major depression (Risk Ratio=2.0, CI=1.3–3.3). Racial differences were observed in the prevalence of each major diagnostic category other than PTSD, with Caucasian youth having a substantially higher likelihood than African American youth of meeting diagnostic criteria for alcohol use disorders (Risk Ratio=2.7, CI=1.8–4.0), major depression (Risk Ratio=2.9, CI=1.8–4.7), and substance use disorders (Risk Ratio=8.0, CI=3.4–19.1).

Type of out-of-home placement was associated with differential rates of alcohol use disorders, major depression, and substance use disorders, but PTSD did not show meaningful variation across placement type. Across each diagnostic category, youth in kinship foster care were the least likely to meet diagnostic criteria, and analysis of adjusted standardized residuals revealed their rates of major depression (6.0%) and substance use disorders (1.3%) were significantly lower than expected relative to base rates for the sample. Although youth in group care/residential treatment typically demonstrated the highest rates for diagnosable problems, the rate of alcohol use disorder for youth with independent living arrangements (25.4%) was higher than for any other group and significantly exceeded the level expected relative to the base rate.

Because youth in group care/residential treatment and independent living represent selected populations with different needs, circumstances, and services, a follow-up analysis focused exclusively on comparisons between the two types of family foster care placement. Statistically significant differences were noted between kinship foster care and non-relative foster care, with youth in kinship care less likely to meet diagnostic criteria for major depression and substance use disorders.

Statistically significant differences in the prevalence of each diagnosable condition were observed according to state of residence, with the rates reported in Iowa being substantially higher than those in Illinois and Wisconsin.

Timing of Onset

Analyses of the onset of mental health and substance use problems distinguished between the period before initial entry into the child welfare system and the period while in state care. Although exact age at initial entry into care was available from administrative records, the onset of problems was known with less accuracy because youth simply reported this age in years. Results reported in Table 3 do not include cases in which the age of onset was the same as the age (in years) when the youth initially entered care. Also, post-entry percentages are based on the pool of youth still at risk of developing the diagnosis at that point, i.e. excluding those with a diagnosis prior to or at time of entry into care. Of all youth meeting lifetime criteria for PTSD, roughly equivalent proportions developed the condition before and after entering the child welfare system (48.6% before, 43.1% after). However, substantially greater proportions of those meeting lifetime criteria for the other diagnoses reported onset after entry

NIH-PA Author Manuscript

NIH-PA Author Manuscript

NIH-PA Author Manuscript

into foster care. For example, approximately two thirds of all alcohol-related diagnoses (68.7%) had onset after entry into child welfare, whereas only about one fifth (19.2%) had onset prior to entry into child welfare. In this regard, it is notable that the mean age of onset was considerably earlier for PTSD (11.1 yrs, SD=4.2) than for alcohol use diagnoses (14.6 yrs, SD=2.3), major depression (14.0 yrs, SD=3.4), and substance use diagnoses (14.2 yrs, SD=1.9).

More detailed investigations regarding the onset of diagnosable conditions relative to entry into the child welfare system were conducted to provide insights into the differences in prevalence by gender, race, state, and placement type reported above. Given low frequencies in some cells, reported results are based on Fisher's exact probability. As shown in Table 3, statistically significant gender differences were apparent in patterns of pre-entry and post-entry onset for the diagnoses. Females were much more likely than males to enter foster care with a pre-existing diagnosis of PTSD, and females also were more likely to be diagnosed with PTSD once in care. Although females also were more likely to have an alcohol misuse diagnosis prior to care, males were more likely than females to receive a diagnosis after entry into care. Males and females did not differ significantly on rates of pre-entry diagnosis for depression or substance misuse. After entry into care, however, females were more likely than males to meet criteria for depression, whereas males were more likely than females to have a substance use disorder.

Racial differences in the timing of onset relative to initial placement were dramatic. For each diagnostic category, Caucasian youth were much more likely than African American youth to enter the child welfare system with a pre-existing diagnosis. Diagnosis prior to care was practically non-existent for African American youth in each category other than PTSD. Rates of onset of PTSD after entry into care were higher for African American than for Caucasian youth. Rates of onset after entry into care in the other three categories were higher for Caucasian youth, but only for substance use disorders was the difference with African American youth statistically significant. For context, the mean age of entry into the child welfare system was much younger for African American youth (M=9.6 yrs, SD=4.1) than Caucasian youth (M=12.3 yrs, SD=3.5).

Type of placement at time of interview distinguished rates of post-entry diagnoses in a few instances, but no statistically significant differences were observed in rates of pre-entry diagnosis according to placement. Onset of an alcohol-related disorder after entry into care was substantially more likely for youth in independent living arrangements than expected by chance, whereas youth in non-relative foster care had a particularly low likelihood. Youth in kinship foster care had considerably lower rates than other groups for post-entry onset of depression and substance use disorders. Given a strong correspondence between race and type of placement (i.e., 44% of African American youth vs. 15% of Caucasian youth in kinship care), further analyses examined the rates for subgroups defined by both race and placement type (results not shown). Most findings for particularly high or low rates could be inferred from the combination of the single factor results in Table 3. For pre-entry onset of PTSD, Caucasian youth in non-relative and kinship foster care had especially high rates, while African American youth in these same types of foster family placements had especially low rates. An intriguing finding, however, was that African American youth in non-relative foster care had the highest rate of post-entry onset of PTSD (13.5%, p=.004).

Analysis of the timing of onset by state of residence revealed a consistent pattern. For each of the diagnostic categories, the rate of onset prior to care was much higher for Iowa than for the other states, with the observed count of cases in Iowa for the respective diagnoses being between 3–7 times higher than the expected count under an assumption of statistical independence. The rates of pre-care onset of depression and substance use problems were lower than would have been expected in Illinois. For context, statistically significant differences

NIH-PA Author Manuscript

NIH-PA Author Manuscript

NIH-PA Author Manuscript

existed between all states on mean age of entry into the system, with youth being taken into state custody at older ages in Iowa (M=14.1 yrs., SD=1.60) than Wisconsin (M=12.3 yrs., SD=3.25) and Illinois (M=9.6 yrs., SD=4.10). With respect to onset after entry into care, no statistically significant differences between states were noted.

Follow-up analyses

The pattern of results suggested that the overall differences in the prevalence of mental health and substance use conditions for African American and Caucasian youth were at least partially attributable to discrepancies in the rates of diagnosis prior to entry into care. Further, it was noted that one state with a predominantly Caucasian population, Iowa, had particularly high rates of pre-entry diagnosis and tended to admit youth into the system at older ages. Follow-up analyses were conducted to explore whether these factors explained the observed differences by race. Logistic regressions found that Caucasian youth had greater odds of pre-entry diagnosis for PTSD (OR=2.5, p=.013) and alcohol use disorders (OR=12.3, p=.001) and depressive disorders (OR=6.9, p=.024) even after controlling for state of residence, which itself was a statistically significant predictor except in the case of alcohol diagnoses. Not surprisingly, inclusion of age of entry into care in the regression equations showed that it was strongly associated with pre-entry rates of diagnosis and rendered the race and state effects non-significant except in the case of alcohol use disorders, which still showed Caucasian youth had a higher likelihood of pre-entry diagnosis (OR=7.45, p=.010). These analyses were not performed for substance use disorders because no African American youth had a pre-entry diagnosis.

Discussion

The child welfare system has been described as a de facto public behavioral health care system because such a large proportion of youth in state care exhibit clinically significant emotional and behavioral problems (Lyons & Rogers, 2004). The present study provides detailed insights into the prevalence of more severe manifestations of mental health and substance use disorders for a select segment of this population—youth preparing to exit the system. Special attention to older adolescents approaching the transition to independent living is warranted because their access to essential needs (e.g. housing), to basic supports (e.g., education), and to mental health and substance abuse treatment services declines drastically after emancipation from the system of state care (Courtney et al., 2001). Limited research on the prevalence of diagnosable mental health and substance use disorders among older youth in the child welfare system provides few points of reference for interpreting the results of this study. Furthermore, there is little indication in the existing literature about how these problematic conditions may be distributed across the population of older youth in the child welfare system. The present study not only examined differences in rates of diagnosis across important demographic factors but also investigated the timing of onset for diagnoses relative to initial placement in the child welfare system. Contrasting rates of onset prior to care could suggest a selection effect, with pre-existing differences in subpopulations that are placed in out-of-home care. Contrasting rates of onset after entry into care could suggest the experience of foster care differs somewhat systematically according to these factors, although firm conclusions on this point cannot be supported with the data in this study.

The lifetime prevalence of PTSD observed in this sample (15%) corresponds very closely to the rate reported by McMillen and colleagues (2005) in their similar study of youth about to exit foster care (14%). This rate among youth about to exit care is substantially higher than the levels of PTSD detected in community samples of older adolescents, which typically range from less than 1% to 6% (Copeland, Keeler, Angold, & Costello, 2007; Cuffe et al., 1998; Giaconia et al., 1995). The elevated rates of PTSD experienced by youth before exiting foster

NIH-PA Author Manuscript

NIH-PA Author Manuscript

NIH-PA Author Manuscript

care could portend problems that persist into adulthood, as a study of adult foster care alumni found that one quarter met criteria for a past-year diagnosis of PTSD (Pecora et al., 2003). The gender difference in the prevalence of PTSD observed in this sample reflects the differential rates found in a recent meta-analysis, which reported adolescent females were on average 2.3 times more likely than males to develop PTSD (Tolin & Foa, 2006). The greater likelihood of PTSD for females held for cases with onset prior to care as well as cases with onset after entry into the system. It is noteworthy that PTSD differed from the other diagnostic categories in several respects. For instance, in comparison to depression and substance misuse disorders known to become more common with age during adolescence, PTSD had the earliest average age of onset and the widest variation in age of onset. In addition, PTSD was the exception in that lifetime rates did not vary by race or by placement type. Although consistent with the pattern of Caucasian youth demonstrating a higher rate of the diagnosis prior to placement, African American youth had a greater rate of onset after placement, particularly those in non-relative homes. As a result, PTSD was not only the most common ailment for this sample but also the most generally dispersed across different demographic factors such as age, race, and placement type.

The estimated proportion of youth meeting criteria for lifetime diagnosis of major depression was notably lower in this sample (10.5%) than in the two comparable studies of adolescents in foster care, which reported rates of 27–29% (McCann et al., 1996; McMillen et al., 2005). Although the rate for major depression reported in this study was imputed, the estimate still would be lower than found in the previous research on youth in foster care even if all missing cases had resulted in a diagnosis (i.e., upper estimate=18%). In fact, the rate for major depression reported in the current study was closer to the lifetime prevalence observed for the 17–18 year age range in the general population (13.5%) when the CIDI was used in the National Comorbidity Study (Kessler & Walters, 1998). The gender difference noted in the rate of depression dovetails with extensive research documenting that, starting in mid-adolescence, females are more likely than males to develop depressive symptoms (Hankin & Abramson, 2003; Nolen-Hoeksema & Girgus, 1994). Furthermore, it is consistent with existing research that the significant differential in rates of onset for females and males occurs at a later age, i.e. after rather than before entry into the child welfare system. Interestingly, however, the differential rates of depression for Caucasian and African American youth appeared in cases with onset before entry into the child welfare system. Caucasian youth in this sample are almost three times as likely to have a lifetime diagnosis of depression, which is at least partially attributable to their coming into the system with a much higher rate of depression. This racial disparity for depression is somewhat at odds with the study by McMillen and colleagues (2005), which found essentially no differences by race in past-year depression. However, when controlling for state of residence to make the analysis more comparable to the single-state McMillen study, the race difference for rate of diagnosis on depression prior to care was still apparent. Other research has found lower levels of internalizing behaviors among African American youth in foster care compared to their Caucasian counterparts (Keller et al., 2001). Although McMillen et al. found that rates of past year depression did vary with type of placement, with the lowest prevalence for kinship foster care, the distinction between kinship and non-relative foster care in their study was not statistically significant. In comparison, the current study found that youth in kinship care had not only the lowest rate overall but also a rate significantly lower than youth in non-relative foster care. Again, previous research has indicated lower levels of internalizing behaviors for kinship care in direct comparison to non-relative care (Keller et al., 2001).

Rates of youth in this sample meeting lifetime criteria for alcohol use disorders were comparable to those found in the San Diego study of adolescents in child welfare by Aarons and colleagues as well as in the national sample used by Pilowsky and Wu. Nevertheless, the rates in this sample were near the upper ranges for alcohol abuse (0.4–9.6%) and alcohol

NIH-PA Author Manuscript

NIH-PA Author Manuscript

NIH-PA Author Manuscript

dependence (0.6–4.3%) reported for several community samples of adolescents roughly 12–19 years of age (Chung, Martin, Armstrong, & Labouvie, 2002). In this sample, rates were somewhat lower for abuse or dependence involving illicit substances compared to the other two adolescent child welfare samples, although marijuana was the most commonly used substance in each study. Comparable estimates for the general population could not be located. Although gender was not a distinguishing factor in lifetime rates of alcohol and substance use diagnoses, females were more likely than males to have onset of alcohol-related problems prior to entry into care, whereas males were more likely to demonstrate onset of both alcohol and substance use disorders after entry into care. More substantial and consistent differences based on race were observed on these outcomes. Caucasian youth were significantly more likely than African American youth to meet lifetime criteria for alcohol and substance use disorders. The analysis of onset revealed that Caucasian youth entered the child welfare system with considerably higher rates of serious alcohol and substance misuse, even controlling for state of residence. Differences also were apparent across type of placement, with alcohol abuse and dependence particularly prevalent among youth in independent living settings. A possible explanation is that lower levels of supervision in these settings permit initiation or escalation of alcohol use. In this regard, youth who ended up in independent living arrangements did not differ on rates of alcohol-related disorders prior to entry into care, but they had a significantly higher rate of onset than any other group once in care. In addition, an independent living situation was one of the few variables found to predict greater problems with recent alcohol and substance use in the Missouri sample of older youth in care (Vaughn et al., 2007). On the other hand, youth in kinship foster care were less likely than others to have a lifetime diagnosis of a substance use disorder, and they were the group least likely to develop onset of substance use disorders once placed in care. Furthermore, apart from the special circumstances of group care/residential treatment and independent living, youth in kinship foster care exhibit lower rates of substance use disorders than youth in non-relative foster family settings.

These findings regarding the mental health and substance use problems of older foster youth present a complex picture, but a few central themes emerge. First, the observed prevalence of mental health and substance use disorders was not notably higher for the older foster youth in this study than typically seen in the general population, with the exception of higher rates for the diagnosis of PTSD. Further, the proportions of individuals with particular diagnoses in the current sample did not always match the elevated rates reported in the few other studies of older youth in the child welfare system. However, cross-study comparisons of epidemiological rates must be interpreted with great care because differences may be attributable to expected variation among samples as well as use of different instruments, informants, and timeframes in the assessment of diagnoses across studies. Second, the results suggest that African American youth in care are less likely to exhibit mental health and substance misuse problems than their Caucasian peers, and this conclusion accords with other studies that have found differential rates by race. The timing of onset for disorders indicates that the racial differences in prevalence precede entry into care, with Caucasian youth more likely to enter the child welfare system with a pre-existing condition. In this regard, Caucasian youth tend to enter care at older ages, making them more likely to exhibit a diagnosis on these age-related conditions prior to foster care. Third, the prevalence of mental health and substance use disorders varies with type of out-of-home placement, with the lowest rates among youth in kinship care. Interestingly, the rates among youth in group care and residential treatment settings are not notably higher than for youth in other placements, but alcohol problems are much more common among youth in independent living arrangements. On this point, it should be noted this study does not include diagnoses for conduct order or other externalizing behavior problems that may be a reason for placement in group care. Fourth, although PTSD proves an exception, the onset of the common diagnosable disorders among this population generally occurs after placement in the child welfare system. Onset of major depression and substance use problems is age-related, with prevalence typically increasing from middle through late

NIH-PA Author Manuscript

NIH-PA Author Manuscript

NIH-PA Author Manuscript

adolescence. As youth mature in the child welfare system, their substitute caregivers assume a role in preventing or addressing these conditions. Finally, the prevalence of diagnosable conditions existing prior to entry into care varies considerably from state to state, suggesting that different criteria and thresholds may be employed in placement decisions. One plausible explanation for the difference in state-by-state prevalence is the finding that average age of entry into care varies substantially between the states. This study is one of the first to examine systematic differences among youth in state custody based on residence or jurisdiction. The discrepancies discovered suggest that the reporting of results from national studies may obscure substantial differences found in populations across particular states and communities.

Even in the present study, the foregoing observations and conclusions are based on findings reported in the aggregate. The specific circumstances of any individual or group of individuals in the sample may reflect a certain combination of demographic and diagnostic factors. For example, previous research on adolescents about to exit the child welfare system identifies particular patterns of problematic behaviors that cluster together (Keller, Cusick, & Courtney, 2007; Vaughn, Shook, & McMillen, 2008). The set of findings in this study suggests there may be distinctive subpopulations that reflect different pathways through the child welfare system. In this sample, for example, African American youth tend to enter the child welfare system at earlier ages than Caucasian youth, are more likely to be placed in kinship family foster homes, and are less likely to meet criteria for a mental health or substance use diagnosis. In contrast, Caucasian youth are more likely to have a diagnosis prior to entry into care, but they enter at older ages. If these general trends hold more widely, they may indicate different criteria are operative for placement into the child welfare system for certain subpopulations of youth. By implication, experiences in the child welfare system also could be very different based on age of entry, type of placement, mental health status, and need for services.

Limitations

The findings and conclusions reported in this study should be interpreted with acknowledgement of certain limitations of the research. First, although the study employed a well established diagnostic interview protocol, confidence regarding actual rates of diagnosis for major depression and substance abuse (but not substance dependence) is greatly diminished by missing data resulting from computer programming errors. The reported diagnoses for these categories are based on information collected in a special follow-up interview conducted some months after the original baseline interview. Furthermore, due to the inability to complete all attempted follow-up interviews, the estimates for these categories are imputed values based on rates observed among respondents who were re-interviewed. It should be noted that for comparative analyses involving these diagnoses the imputed values for each subgroup were based on observed rates within the same subgroup (i.e., rate for females, rate for males). Although this approach for handling missing data is not ideal, the fact that all variables in the analysis and on the CIDI were categorical made use of multiple imputation methods impractical. The approach selected was considered preferable to listwise deletion of missing data because missingness was contingent on initial symptom disclosure, meaning the missing cases had a much higher risk of diagnosis. To be conservative in deriving inferential statistics based on the imputations, confidence intervals and group comparison tests were computed using only the number of cases with valid data. Second, the ability of the present study to present a comprehensive profile of the mental health status of older foster youth was limited by the lack of assessments for disruptive behavior diagnostic categories previously found to be common in the child welfare population, such as conduct problems and attention deficit hyperactivity disorder. Third, retrospective assessment of lifetime prevalence is subject to errors of memory, and age of onset also may be recalled imperfectly, although these risks are generally greater with older respondents (Simon & Von Korff, 1995). Fourth, the study reports findings from a large, tri-state sample derived with an epidemiologically-oriented, population-

NIH-PA Author Manuscript

NIH-PA Author Manuscript

NIH-PA Author Manuscript

based sampling approach. However, the sample is not entirely representative of youth in the child welfare system due to the exclusion criteria employed. Of particular note, the reported findings may underestimate the prevalence of psychiatric and substance use disorders given the omission of youth in inpatient psychiatric wards, runaway youth, and youth with developmental disabilities. Nevertheless, relative to previous studies of youth exiting the child welfare system, this current study is likely more representative of the overall population due to its larger sample, broader sampling frame and higher response rate for sample enrollment.

Conclusion

Older adolescents who emancipate from the child welfare system face many challenges and adjustments as they transition to independent adulthood, and young adults formerly in foster care have relatively low levels of educational and occupational attainment and relatively high rates of homelessness, victimization, and incarceration (Collins, 2001; Courtney et al., 2001; McMillen & Tucker, 1999). Because major mental health and substance use disorders in adolescence can contribute to impairments in functioning during early adulthood (Giaconia, Reinherz, Paradis, Hauf, & Stashwick, 2001), practitioners and policy-makers have a significant interest in the mental health status of adolescents exiting the child welfare system. The present study indicates youth about to leave foster care have an elevated risk to meet criteria for a diagnosis of PTSD and are at the upper ranges of general population estimates for rates of other serious mental health and substance use problems. Systematic differences in rates of PTSD and major depression reflect familiar gender-related patterns. However, systematic differences on rates of several diagnoses according to race and type of placement potentially reflect policy and practice in the child welfare system. Although future research may elucidate more clearly the reasons for the differential rates, the current results help to identify subpopulations that may warrant greater assessment and treatment resources to support preparation for successful transitions out of the child welfare system.

Acknowledgments

Role of the funding source

This study is based on a collaborative research effort with cooperation and funding from the Illinois Department of Children and Family Services, the Wisconsin Department of Health and Family Services, and the Iowa Department of Human Services. Preparation of this manuscript was supported by a grant from the National Institute of Mental Health (R03 MH070525).

References

Aarons GA, Brown S, Hough RL, Garland AF, Wood PA. Prevalence of adolescent substance use disorders across five sectors of care. Journal of the American Academy of Child & Adolescent Psychiatry 2001;40(4):419–426. [PubMed: 11314567]

Anctil TM, McCubbin LD, O'Brien K, Pecora P, Anderson-Harumi CA. Predictors of adult quality of life for foster care alumni with physical and/or psychiatric disabilities. Child Abuse & Neglect 2007;31 (10):1087–1100. [PubMed: 17996299]

Beeman SK, Kim H, Bullerdick SK. Factors affecting placement of children in kinship and nonkinship foster care. Children and Youth Services Review 2000;22(1):37–54.

Berrick JD, Barth RP, Needell B. A comparison of kinship foster homes and foster family homes: Implications for kinship foster care as family preservation. Children and Youth Services Review 1994;16(1–2):33–63.

Burns BJ, Phillips SD, Wagner HR, Barth RP, Kolko DJ, Campbell Y, Landsverk JL. Mental health needs and access to mental health services by youths involved with child welfare: A national survey. Journal of the American Academy of Child & Adolescent Psychiatry 2004;43(8):960–970. [PubMed: 15266190]

NIH-PA Author Manuscript

NIH-PA Author Manuscript

NIH-PA Author Manuscript

Chung T, Martin CS, Armstrong TD, Labouvie EW. Prevalence of DSM-IV alcohol diagnoses and symptoms in adolescent community and clinical samples. Journal of the American Academy of Child & Adolescent Psychiatry 2002;41(5):546–554. [PubMed: 12014787]

Clausen JM, Landsverk J, Ganger W, Chadwick D, Litrownik A. Mental health problems of children in foster care. Journal of Child and Family Studies 1998;7(3):283–296.

Collins ME. Transition to adulthood for vulnerable youths: A review of research and implications for policy. Social Service Review 2001;75(2):271–291.

Copeland WE, Keeler G, Angold A, Costello EJ. Traumatic events and posstraumatic stress in childhood. Archives of General Psychiatry 2007;64(5):577–584. [PubMed: 17485609]

Cottler LB, Compton WM. Advantages of the CIDI family of instruments in epidemiological research of substance use disorders. International Journal of Methods in Psychiatric Research 1993;3:109–119.

Courtney ME, Dworsky A. Early outcomes for young adults transitioning from out-of-home care in the U.S.A. Child and Family Social Work 2006;11:209–219.

Courtney, ME.; Dworsky, A.; Ruth, G.; Keller, T.; Havlicek, J.; Bost, NS. Midwest evaluation of the adult functioning of former foster youth: Outcomes at age 19. Chicago: Chapin Hall Center for Children; 2005.

Courtney ME, Piliavin I, Grogan-Kaylor A, Nesmith A. Foster youth transitions to adulthood: A longitudinal view of youth leaving care. Child Welfare 2001;80(6):685–717. [PubMed: 11817658]

Courtney, ME.; Terao, S.; Bost, NS. Midwest evaluation of the adult functioning of former foster youth: Conditions of youth preparing to leave state care. Chicago: Chapin Hall Center for Children; 2004.

Cuffe SP, Addy CL, Garrison CZ, Waller JL, Jackson KL, McKeown RE, Chilappagari S. Prevalence of PTSD in a community sample of older adolescents. Journal of the American Academy of Child & Adolescent Psychiatry 1998;37(2):147–154. [PubMed: 9473910]

Davis M, Vander Stoep A. The transition to adulthood for youth who have serious emotional disturbance: Developmental transition and young adult outcomes. Journal of Mental Health Administration 1997;24:400–427. [PubMed: 9364110]

dosReis S, Zito JM, Safer DJ, Soeken KL. Mental health services for youths in foster care and disable youths. American Journal of Public Health 2001;91(7):1094–1099. [PubMed: 11441737]

Farmer EMZ, Burns BJ, Chapman MV, Phillips SD, Angold A, Costello EJ. Use of mental health services by youth in contact with social services. Social Service Review 2001;75(4):605–624.

Garland AF, Besinger BA. Racial/ethnic differences in court referred pathways to mental health services for children in foster care. Children and Youth Services Review 1997;19(8):651–666.

Garland AF, Hough RL, Mccabe KM, Yeh M, Wood PA, Aarons GA. Prevalence of psychiatric disorders in youths across five sectors of care. Journal of the American Academy of Child & Adolescent Psychiatry 2001;40(4):409–418. [PubMed: 11314566]

Garland AF, Landsverk JL, Hough RL, Ellis-Macleod E. Type of maltreatment as a predictor of mental health service use for children in foster care. Child Abuse & Neglect 1996;20(8):675–688. [PubMed: 8866114]

Garland AF, Landsverk JL, Lau AS. Racial/ethnic disparities in mental health service use among children in foster care. Children and Youth Services Review 2003;25(56):491–507.

Geenen S, Powers LE. “Tomorrow is another problem” The experiences of youth in foster care during their transition into adulthood. Children and Youth Services Review 2007;29:1085–1101.

Gelles, RJ.; Spigner, CW. Child welfare policy. In: Colby, IC.; Sowers, KM.; Dulmus, CN., editors. Comprehensive handbook of social work and social welfare, volume 4: Social policy and policy practice. Hoboken, N.J.: John Wiley & Sons; 2008. p. 295-317.

Giaconia RM, Reinherz HZ, Paradis AD, Hauf AMC, Stashwick CK. Major depression and drug disorders in adolescence: General and specific impairments in early adulthood. Journal of the American Academy of Child & Adolescent Psychiatry 2001;40(12):1426–1433. [PubMed: 11765288]

Giaconia RM, Reinherz HZ, Silverman AB, Pakiz B, Frost AK, Cohen E. Traumas and posttraumatic stress disorder in a community population of older adolescents. Journal of the American Academy of Child & Adolescent Psychiatry 1995;34(10):1369–1380. [PubMed: 7592275]

Halfon N, Berkowitz G, Klee L. Mental health service utilization by children in foster care in california. Pediatrics 1992;89(6):1238–1244. [PubMed: 1594382]

NIH-PA Author Manuscript

NIH-PA Author Manuscript

NIH-PA Author Manuscript

Hankin BL, Abramson LY. Development of gender differences in depression: An elaborated Cognitive Vulnerability-Transactional Stress Theory. Psychological Bulletin 2003;127(6):773–796. [PubMed: 11726071]

Harman JS, Childs GE, Kelleher KJ. Mental health care utilization and expenditures by children in foster care. Archives of Pediatric and Adolescent Medicine 2000;154(11):1114–1117.

Heflinger CA, Simpkins CG, Combs-Orme T. Using the CBCL to determine the clinical status of children in state custody. Children and Youth Services Review 2000;22(1):55–73.

Henry, GT. Practical sampling. Vol. 21. Newbury Park, CA: Sage Publications; 1990.

Hulsey TC, White R. Family characteristics and measures of behavior in foster and nonfoster children. American Journal of Orthopsychiatry 1989;59(4):502–509. [PubMed: 2817088]

Keller TE, Cusick GR, Courtney ME. Approaching the transition to adulthood: Distinctive profiles of adolescents aging out of the child welfare system. Social Service Review 2007;81(3):453–484. [PubMed: 20057913]

Keller TE, Wetherbee K, Le Prohn NS, Payne V, Sim K, Lamont ER. Competencies and problem behaviors of children in family foster care: Variations by kinship placement status and race. Children and Youth Services Review 2001;23(12):915–940.

Kessler RC, McGonagle KA, Zhao S, Nelson CB, Hughes M, Eshleman S, Wittchen HU, Kendler KS. Lifetime and 12-month prevalence of DSM-IIIR Psychiatric disorders in the United States: Results from the National Comorbidity Study. Archives of General Psychiatry 1994;51(1):8–19. [PubMed: 8279933]

Kessler RC, Walters EE. Epidemiology of DSM-III-R major depresssion and minor depression among adolescents and young adults in the National Comorbidity Study. Depression and Anxiety 1998;7:3–14. [PubMed: 9592628]

Leathers SJ, Testa MF. Foster youth emancipating from care: Caseworkers' reports on needs and services. Child Welfare 2006;85(3):463–498. [PubMed: 16999382]

Lopez P, Allen PJ. Adressing the health needs of adolescents transitioning out of foster care. Pediatric Nursing 2007;33(4):345–355. [PubMed: 17907736]

Lyons JS, Rogers L. The U.S. child welfare system: A de facto public behavioral health care system. Journal of the American Academy of Child & Adolescent Psychiatry 2004;43(8):971–973. [PubMed: 15266191]

Massinga R, Pecora PJ. Providing better opportunities for older children in the child welfare system. The Future of Children 2004;14(1):151–173.

Maughan, B.; Champion, L. Risk and protective factors in the transition to young adulthood. In: Baltes, PB.; Baltes, MM., editors. Successful aging: Perspectives from the behavioral sciences. New York: Cambridge University Press; 1990. p. 296-331.

McCann JB, James A, Wilson S, Dunn G. Prevalence of psychiatric disorders in young people in the care system. British Medical Journal 1996;313:1529–1530. [PubMed: 8978231]

McCoy H, McMillen JC, Spitznagel EL. Older youth leaving the foster care system: Who, what, when, where, and why? Children and Youth Services Review 2008;30:735–745. [PubMed: 19122759]

McIntyre A, Keesler TY. Psychological disorders among foster children. Journal of Clinical Child Psychology 1986;15(4):297–303.

McMillen JC, Scott LD, Zima BT, Ollie MT, Munson MR, Spitznagel EL. Use of mental health services among older youths in foster care. Psychiatric Services 2004;55(7):811–817. [PubMed: 15232022]

McMillen JC, Tucker J. The status of older adolescents at exit from out-of-home care. Child Welfare 1999;78(3):339–360. [PubMed: 10335595]

McMillen JC, Zima BT, Scott LD, Auslander WF, Munson MR, Ollie MT, Spitznagel EL. Prevalence of psychiatric disorders among older youths in the foster care system. Journal of the American Academy of Child & Adolescent Psychiatry 2005;44(1):88–95. [PubMed: 15608548]

Mendes P, Moslehuddin B. From dependence to interdependence: Towards better outcomes for young people leaving care. Child Abuse Review 2006;15:110–126.

Nolen-Hoeksema S, Girgus JS. The emergence of gender differences in depression during adolescence. Psychological Bulletin 1994;115(3):424–443. [PubMed: 8016286]

NIH-PA Author Manuscript

NIH-PA Author Manuscript

NIH-PA Author Manuscript

Pecora PJ, White CR, Jackson LJ, Wiggins T. Mental health of current and former recipients of foster care: A review of recent studies in the USA. Child and Family Social Work 2009;14(2):132–146.

Pecora, PJ.; Williams, J.; Kessler, RC.; Downs, AC.; O'Brien, K.; Hiripi, E.; Morello, S. Assessing the effects of foster care: Early results from the Casey National Alumni Study. Seattle, WA: Casey Family Programs; 2003.

Pilowsky DJ. Psychopathology among children placed in family foster care. Psychiatric Services 1995;46 (9):906–910. [PubMed: 7583500]

Pilowsky DJ, Wu LT. Psychiatric symptoms and substance use disorders in a nationally representative sample of American adolescents involved with foster care. Journal of Adolescent Health 2006;38:351–358. [PubMed: 16549295]

Raghavan R, McMillen JC. Use of multiple psychotropic medications among adolescents aging out of foster care. Psychiatric Services 2008;59(9):1052–1055. [PubMed: 18757601]

Schulenberg JE, Maggs JL. A developmental perspective on alcohol use and heavy drinking during adolescence and the transition to young adulthood. Journal of Studies on Alcohol 2002;14 (Supplement):54–70.

Schulenberg JE, Sameroff AJ, Cicchetti D. The transition to adulthood as a critical juncture in the course of psychopathology and mental health. Development & Psychopathology 2004;16:799–806. [PubMed: 15704815]

Shin SH. Need for and actual use of mental health service by adolescents in the child welfare system. Children and Youth Services Review 2005;27:1071–1083.

Simon GE, Von Korff M. Recall of psychiatric history in cross-sectional surveys: Implications for epidemiological research. Epidemiologic Reviews 1995;17(1):221–227. [PubMed: 8521941]

Stein M. Research review: Young people leaving care. Child and Family Social Work 2006;11(3):273–279.

Thompson RG, Auslander WF. Risk factors for alcohol and marijuana use among adolescents in foster care. Journal of Substance Abuse Treatment 2007;32:61–69. [PubMed: 17175399]

Tolin DF, Foa EB. Sex differences in trauma and posttraumatic stress disorder: A quantitative review of 25 years of research. Psychological Bulletin 2006;132(6):959–992. [PubMed: 17073529]

Vander Stoep A, Beresford SA, Weiss NS, McKnight B, Cauce AM, Cohen P. Community-based study of the transition to adulthood for adolescents with psychiatric disorder. American Journal of Epidemiology 2000;152(4):352–362. [PubMed: 10968380]

Vaughn MG, Ollie MT, McMillen JC, Scott LD, Munson M. Substance use and abuse among older youth in foster care. Addictive Behaviors 2007;32:1929–1935. [PubMed: 17239547]

Vaughn MG, Shook JJ, McMillen JC. Aging out of foster care and legal involvement: Toward a typology of risk. Social Service Review 2008;82(3):419–446.

Wade TJ, Cairney J, Pevalin DJ. Emergence of gender differences in depression during adolescence: National panel results from three countries. Journal of the American Academy of Child & Adolescent Psychiatry 2002;41(2):190–198. [PubMed: 11837409]

WHO. Composite International Diagnostic Interview (CIDI Core): Version 2.1. Geneva: World Health Organization; 1997.

Wittchen HU. Reliability and validity studies of the WHO-Composite International Diagnostic Interview (CIDI): A critical review. Journal of Psychiatric Research 1994;28(1):57–84. [PubMed: 8064641]

Zima BT, Bussing R, Yang X, Belin TR. Help-seeking steps and service use for children in foster care. Journal of Behavioral Health Services & Research 2000;27(3):271–285. [PubMed: 10932441]

NIH-PA Author Manuscript
NIH-PA Author Manuscript
NIH-PA Author Manuscript

Table 1

Prevalence of specific lifetime diagnoses for full sample (n=732)

	Actual[1,4]		Imputed[2,4]		Upper bound[3,4]	
	%	(95% CI)	%	(95% CI)	%	(95% CI)
Posttraumatic Stress Disorder (PTSD)	15.1	(12.5–17.7)				
Any Alcohol Abuse or Dependence	14.1	(11.6–16.6)				
Alcohol Abuse	9.8	(7.6–12.0)				
Alcohol Dependence	4.2	(2.7–5.7)				
Any Major Depression	8.2	(6.1–10.3)	10.5	(8.2–12.8)	18.0	(15.1–20.9)
Single Episode - Mild	1.8	(0.8–2.8)	2.3	(1.2–3.4)	11.6	(9.2–14.0)
Single Episode - Moderate	1.6	(0.6–2.6)	2.0	(0.9–3.1)	11.5	(9.1–13.9)
Single Episode - Severe	2.2	(1.1–3.3)	2.9	(1.6–4.2)	12.0	(9.5–14.5)
Recurring Episode - Mild	1.1	(0.3–1.9)	1.4	(0.5–2.3)	10.9	(8.5–13.3)
Recurring Episode - Moderate	0.8	(0.1–1.5)	1.1	(0.3–1.9)	10.7	(8.3–13.1)
Recurring Episode - Severe	0.7	(0.1–1.3)	0.8	(0.1–1.5)	10.5	(8.2–12.8)
Any Substance Abuse or Dependence	6.3	(4.4–8.2)	7.0	(5.0–9.0)	20.2	(17.1–23.3)
Only Substance Abuse (No Dependence)[5]	1.5	(0.6–2.4)	2.2	(1.1–3.3)	15.4	(12.6–18.2)
Opioid	0.5	(0–1.1)	0.8	(0.1–1.5)	1.1	(0.3–1.9)
Cannabis	0.8	(0.1–1.5)	1.2	(0.4–2.0)	14.8	(12.0–17.6)
Sedative	0.4	(0–0.9)	0.5	(0–1.1)	1.0	(0.2–1.8)
Cocaine	0.3	(0–0.7)	0.4	(0–0.9)	1.1	(0.3–1.9)
Amphetamine	0.4	(0–0.9)	0.5	(0–1.1)	0.8	(0.1–1.5)
Hallucinogen	0.8	(0.1–1.5)	0.8	(0.1–1.5)	1.0	(0.2–1.8)
Inhalent	0.4	(0–0.9)	0.5	(0–1.1)	0.5	(0–1.1)
PCP	0.1	(0–0.3)	0.1	(0–0.3)	0.1	(0–0.3)
Other	0.1	(0–0.3)	0.1	(0–0.3)	0.3	(0–0.7)
Any Substance Dependence	4.8	(3.3–6.3)				
Opioid	0.3	(0–0.7)				
Cannabis	4.1	(2.7–5.5)				
Sedative	0.3	(0–0.7)				
Cocaine	0.8	(0.2–1.4)				
Amphetamine	0.3	(0–0.7)				

NIH-PA Author Manuscript
NIH-PA Author Manuscript
NIH-PA Author Manuscript

	Actual[1,4]		Imputed[2,4]		Upper bound[3,4]	
	%	(95% CI)	%	(95% CI)	%	(95% CI)
Hallucinogen	0.1	(0–0.3)				
Inhalent	0					
PCP	0.1	(0–0.3)				
Other	1.0	(0.3–1.7)				
Dysthymia	1.1	(0.3–1.9)				
Social Phobia	1.0	(0.3–1.7)				
Generalized Anxiety Disorder	1.4	(0.5–2.3)				

[1] Lower bound estimate is based on actual number of diagnosed cases out of N=732, under assumption no callback cases had diagnosis.

[2] Imputed estimate is weighted proportion with missing cases assigned same rate of diagnosis as observed in callback group.

[3] Upper bound estimate is based on assumption all missing callback cases had diagnosis.

[4] Due to missing data, 95% Confidence Intervals based on N=660 for depression diagnoses and N=631 for substance abuse diagnoses.

[5] The Only Substance Abuse group and Any Substance Dependence group are mutually exclusive.

NIH-PA Author Manuscript
NIH-PA Author Manuscript
NIH-PA Author Manuscript

Table 2

Lifetime diagnoses by gender, race, placement type, and state.

		Gender			Race			Placement Type						State			
	Total (N=732)	Male (N=355)	Female (N=377)		Caucasian (N=226)	African American (N=417)		Non-kin Family (N=262)	Kinship Family (N=223)	Group Care Res. Tx (N=132)	Indep.Living (N=63)		Kin vs. Non-Kin	IL (N=474)	IA (N=63)	WI (N=195)	
	%	%	%	t	%	%	t	%	%	%	%	X^2	t	%	%	%	X^2
Diagnoses																	
PTSD	15.1	7.9	21.9	5.43***	16.1	13.3	0.97	16.1	12.1	19.1	16.1	3.35	1.26	15.7	26.2	10.3	9.58**
Any alcohol abuse/dependence	14.1	15.2	13.0	0.86	22.1	8.2	4.54***	11.5	8.5	15.9	25.4^^	14.32**	1.08	12.2	31.7^^	12.8	17.85***
Any major depression[1]	10.5	6.8	13.9	3.00**	17.8	6.2	3.88***	12.4	6.0^^	14.4	11.5	7.99*	2.38*	9.1	27.0^^	8.9	17.79***
Any substance abuse/dependence[1]	7.0	8.7	5.4	1.60	13.6	1.7	4.72***	7.3	1.3^^	10.0	9.7	11.05*	3.13**	5.8	18.4^^	6.0	12.11**

[1] Imputed values based on callback proportions within each subgroup. Inferential tests based on numbers of cases with actual data.

* p<.05;

** p<.01;

*** p<.001;

^^ Adjusted Standardized Residual >| 2.58|

NIH-PA Author Manuscript NIH-PA Author Manuscript NIH-PA Author Manuscript

Table 3

Percentages with onset of diagnosis before or after entry into care.

	PTSD				Alcohol-Related Disorder				Major Depression				Substance-Related Disorder			
	Pre-Entry Onset		Post-Entry Onset		Pre-Entry Onset		Post-Entry Onset		Pre-Entry Onset		Post-Entry Onset		Pre-Entry Onset		Post-Entry Onset	
	%	p	%	p	%	p	%	p	%	p	%	p	%	p	%	p
Base rate	7.3		7.1		3.2		9.1		2.0		6.4		2.1		3.8	
Gender																
Male	3.4	p<.001	4.4	p=.006	1.7	p=.034	11.7	p=.024	1.5	p=.578	2.9	p=<.001	1.7	p=.587	5.6	p=.032
Female	11.0		9.9		4.5		6.6		2.4		9.8		2.4		2.2	
Race																
Caucasian	12.5	p<.001	2.6	p=.007	7.6	p<.001	10.2	p=.268	5.5	p<.001	8.2	p=.126	5.6	p<.001	5.6	p=.036
African American	4.1		8.4		0.5		7.3		0.5		4.8		0.0		2.0	
Placement																
Non-relative foster care	7.3	p=.547	8.8	p=.178	3.1	p=.305	4.5	p=.005	2.1	p=.438	8.2	p=.188	1.7	p=.611	3.6	p=.483
Kinship foster care	5.4	p=.123	5.8	p=.212	1.3	p=.134	7.3	p=.327	0.5	p=.072	3.9	p=.064	0.5	p=.114	1.1	p=.023
Residential treatment	9.2	p=.213	8.6	p=.336	3.0	p=.432	11.9	p=.069	3.4	p=.133	8.9	p=.212	3.5	p=.106	5.6	p=.132
Independent living	9.7	p=.288	3.7	p=.22	3.2	p=.473	19.0	p=.005	1.8	p=.644	7.4	p=.511	2.0	p=.6	6.1	p=.219
State																
Illinois	6.6	p=.198	7.9	p=.174	1.7	p=.003	9.2	p=.527	1.2	p=.040	6.1	p=.402	0.7	p=.002	4.2	p=.296
Iowa	23.0	p<.001	4.3	p=.336	12.9	p<.001	12.2	p=.282	12.0	p<.001	11.6	p=.131	13.0	p<.001	2.3	p=.492
Wisconsin	4.1	p=.028	5.9	p=.295	3.6	p=.416	8.1	p=.350	1.1	p=.278	5.8	p=.428	1.8	p=.541	3.1	p=.407

p=exact probability of observed cell frequency being greater or less than expected frequency.