



University of Kentucky
UKnowledge

Theses and Dissertations--Public Health (M.P.H.
& Dr.P.H.)

College of Public Health

2015

Demographic Disparities in Children with Behavioral or Conduct Disorders

Caitlin Dunworth
University of Kentucky

Follow this and additional works at: https://uknowledge.uky.edu/cph_etds



Part of the [Public Health Commons](#)

[Right click to open a feedback form in a new tab to let us know how this document benefits you.](#)

Recommended Citation

Dunworth, Caitlin, "Demographic Disparities in Children with Behavioral or Conduct Disorders" (2015).
Theses and Dissertations--Public Health (M.P.H. & Dr.P.H.). 40.
https://uknowledge.uky.edu/cph_etds/40

This Graduate Capstone Project is brought to you for free and open access by the College of Public Health at UKnowledge. It has been accepted for inclusion in Theses and Dissertations--Public Health (M.P.H. & Dr.P.H.) by an authorized administrator of UKnowledge. For more information, please contact UKnowledge@lsv.uky.edu.

STUDENT AGREEMENT:

I represent that my capstone and abstract are my original work. Proper attribution has been given to all outside sources. I understand that I am solely responsible for obtaining any needed copyright permissions. I have obtained needed written permission statement(s) from the owner(s) of each third-party copyrighted matter to be included in my work, allowing electronic distribution (if such use is not permitted by the fair use doctrine) which will be submitted to UKnowledge as Additional File.

I hereby grant to The University of Kentucky and its agents the irrevocable, non-exclusive, and royalty-free license to archive and make accessible my work in whole or in part in all forms of media, now or hereafter known. I agree that the document mentioned above may be made available immediately for worldwide access unless an embargo applies.

I retain all other ownership rights to the copyright of my work. I also retain the right to use in future works (such as articles or books) all or part of my work. I understand that I am free to register the copyright to my work.

REVIEW, APPROVAL AND ACCEPTANCE

The document mentioned above has been reviewed and accepted by the student's advisor, on behalf of the advisory committee, and by the Director of Graduate Studies (DGS), on behalf of the program; we verify that this is the final, approved version of the student's capstone including all changes required by the advisory committee. The undersigned agree to abide by the statements above.

Caitlin Dunworth, Student

Christina Studts, PhD, Committee Chair

Linda Alexander, EdD, Director of Graduate Studies

Demographic disparities in children with behavioral or conduct disorders

Caitlin Dunworth
B.S. Animal and Poultry Sciences, Virginia Tech
MPH Candidate, 2015
Health Behavior Department
College of Public Health
University of Kentucky

April 14, 2015

ABSTRACT

This study examines the demographic disparities in children with externalizing behavior disorders, such as oppositional defiant disorder and conduct disorder, utilizing secondary data from the 2011/2012 National Survey of Children's Health (NSCH). Current literature suggests that children with externalizing behavior disorders are more likely to be male, live in a low-income family, receive lower grades in school, and to develop later conditions such as depression. Chi square tests and logistic regression were used to examine the associations of presence of a current behavioral or conduct problems with age group, race/ethnicity, sex, household income level, and insurance type. Additionally, associations were assessed between mild versus moderate/severe behavioral or conduct problems with the same set of demographic variables. Approximately one in twenty children has a behavioral or conduct problem, and significant independent associations were observed with age, race/ethnicity, sex, poverty, and insurance type. This study's findings confirm the importance of early detection of behavioral or conduct problems, consistent insurance coverage that provides access to mental health care, and the need for refined tools to measure behavioral or conduct problem severity in large samples.

Externalizing behavior disorders, such as oppositional defiant disorder (ODD) and conduct problems, such as conduct disorder (CD), are disorders that begin in childhood and can lead to significant difficulties in the way children and adolescents interact with family and peers, also affecting their performance in school. Past studies have identified biological risk factors for children as young as 3 who have a behavioral problem based upon mothers' reporting¹. Such studies have determined that ODD, in particular, may result as biologically determined child characteristics are combined with familial stressors and parenting¹. Further environmental and genetic factors may explain the high comorbidity between attention-deficit hyperactivity disorder (ADHD) and ODD. This presents the possibility that genetic transmission for oppositional-defiance is linked with the transmission of hyperactivity.¹ Additionally, a family history of behavioral problems, particularly hyperactivity, conduct problems, and ODD symptoms, may be a prelude to later behavioral and/or conduct problems, particularly in children with comorbid hyperactivity and oppositional-defiance¹.

Child behavioral health problems are not only detrimental to families and communities, but they incur significant health care costs. According to the 2007 NHIS and 2008 MEPS Linked file, an average of \$2423 adjusted total health care expenditures per child were spent on children with an emotional, mental, or behavioral condition, compared to \$1477 of all children 2-17.² Adjusted total out-of-pocket health care expenditures for children with an emotional, mental, or behavioral condition per year are \$517, compared to \$326 for all children 2-17 years.² These expenses do not include those associated with parents' decreased work productivity, educational supports and services, or costs incurred by juvenile justice or related systems. The Centers for Disease Control

and Prevention estimates that in total, approximately \$247 billion is spent each year on childhood mental disorders.²

Parents of children with ODD report the use of harsh and inconsistent discipline practices, poor parent-child communication, and family dysfunction.^{3,4} When identification of ODD is based upon both parent and teacher report, there is an association between ODD and being a male child, as well as ODD and the child living in a low-income family.³ Furthermore, children with ODD receive lower grades in school and have higher odds of attending specialized schools.⁵ It has also been suggested that ODD may be an early precursor to CD and depression in preadolescent girls, and ODD symptoms may predict depressive symptoms in both adolescent and adulthood.⁶ When ODD is parent-identified, there is a relation between the ODD child and parental depression, as well as ODD and family dysfunction.³ Teacher-defined ODD is related to living in a single-parent family.³ These differences indicate variability in behavior in the home versus the school environment, as well as differences in rater identification of behavioral disorders. Importantly, diagnostic criteria of the Diagnostic and Statistical Manual of Mental Disorders (DSM) specify that behavioral or conduct disorder symptoms be present in at least two settings, such as home and school.⁵

According to the 2003 National Survey of Children's Health (NSCH) and 2009/2010 National Survey of Children with Special Health Care Needs, 5.3%-13.5% of U.S. children ages 2-17 had a behavioral or conduct problem at the time of that survey.⁷⁻⁹ However, significant disparities existed among children who were reported as currently having such a condition. Of all children with emotional, mental, or behavioral conditions, only 30.2% received mental health care and 23.9% received medical specialist care.¹⁰

Nearly 30% of children with emotional, mental, or behavioral conditions in 2003 had medical care access problems, including unmet needs or delay in medical care, compared to 17% of all children.¹⁰ Disparities also existed across race and ethnicity, with 4.4% of black, non-Hispanic children having emotional, mental, or behavioral conditions compared with 3.1% of white, non-Hispanic children.¹¹ Nearly 6% of children in the 0-99% Federal Poverty Level (FPL) income bracket were reported to have a behavioral disorder or conduct problem, compared to 1.3% of children at 400% FPL or higher. Higher proportions of children with these conditions received public insurance such as Medicaid or State Children's Health Insurance Program (SCHIP; 6.0%), compared to those with private health insurance (1.6%) or those who are uninsured (2.1%). Nationally, 11% of children have one or more emotional, behavioral, or developmental conditions. Of these, 15% are male and 8% are female⁸. The majority of children with emotional, behavioral, or developmental conditions live in impoverished households; 13-16% are in the lowest poverty levels (0-199% FPL), compared to 9% at 400% FPL or above. Nearly 18% of children with these conditions have public insurance (e.g. Medicaid), compared to 9% with private insurance. Oppositional defiant disorder in particular predominantly in lower socioeconomic (SES) groups, in boys, and in prepubertal youth, with the disorder tending to appear by the age of eight¹².

While adult studies have explored racial and ethnic differences behind risk factors for psychiatric disorders, fewer studies have examined these differences in children and adolescents.⁴ The majority of studies on behavioral disorders and conduct problems have controlled for SES and maternal education, instead of exploring the disparities based on such information. This leaves a gap in the literature regarding sociodemographic risk

factors that could guide practice and policy in targeting high risk and vulnerable groups for improved prevention, identification, and intervention efforts.

The present study seeks to examine the demographic disparities that exist in children with behavioral or conduct problems according to a recently released large national dataset, and to identify sociodemographic risk and protective factors for these problems. In addition, this study seeks to identify demographic characteristics that, in children with behavioral or conduct problems, are associated with lower or higher odds of having a moderate or severe form of the condition compared to a mild condition.

METHODS

Data Collection

This study utilized the 2011/2012 National Survey of Children's Health (NSCH), the most recent available version of this national, telephone-administered survey. Data are based on parent-report with variables related to physical and mental health status, access to health care, demographics, and information concerning the child's family and neighborhood. The survey operates on a successive, independent samples design, allowing for trend data. In the survey, households with non-institutionalized children ages 0-17 are randomly selected and families are interviewed once it is ascertained that a child within the selected age range resides in the household. If the household contains more than one child, the survey questions are asked for one randomly selected child. The 2011/2012 NSCH collected a total of 95,677 complete surveys, with between 1,811-2,200 surveys collected per state. Due to de-identified data available through the 2011/2012 NSCH, this study was exempt from IRB review, according to the University of Kentucky Office of Research Integrity.

Measures

The dependent variables are (a) the presence of a current behavioral or conduct problem in children age 2-17 years, and (b) parent-rated severity of current behavioral or conduct problems. Within the assessment of several mental health and developmental related conditions, the parent responded whether or not he or she had ever been told by a doctor that the child “behavioral or conduct problems, such as oppositional defiant disorder or conduct disorder.” In order to clarify the question, parents received a brief description of oppositional defiant disorder, “Oppositional defiant disorder is an ongoing pattern of defiant and hostile behavior that interferes with a child’s life and daily activities.” Parents were asked the age of the child when doctors or other health care providers first identified the condition and what type of doctor or other health care provider first reported the condition. Finally, parents rated the condition (if present) as mild, moderate, severe, or unknown. For analyses, the previous items were recoded to indicate whether a child did not have the condition (0) or currently had the condition (1). In children with current behavioral or conduct problems, severity of the behavioral or conduct problem was recoded into mild (0) or moderate/severe (1).

Independent variables include: child’s age group at time of interview (0-3 years old, 4-7 years old, 8-11 years old, 12-14 years old, 15-17 years old); race/ethnicity of the child (white/non-Hispanic, black/non-Hispanic, Hispanic, or multiracial/other/non-Hispanic); child’s sex (male or female); household income level (0-99% FPL, 100-199% FPL, 200-399% FPL, and 400% FPL or higher); and type of insurance held (public insurance such as Medicaid or SCHIP, private insurance, or uninsured). Poverty

guidelines are a simplified version of the federal poverty thresholds, and are used for administrative purposes such as determining financial eligibility.¹³

Analytic Plan

This study examined the association of several key demographic variables with parent-reported diagnoses of behavioral and conduct problems among U.S. children ages 2-17. To examine the relationship between reported behavioral or conduct problems and demographic variables, bivariate analyses were performed using chi-square tests.

Separate chi-square analyses were performed for the following categories: (1) current behavioral or conduct problem diagnosis and the child's age group at time of interview, (2) current behavioral or conduct problem diagnosis and the child's race/ethnicity, (3) current behavioral or conduct problem diagnosis and child's sex, (4) current behavioral or conduct problem diagnosis and the child's income level based upon federal poverty level group, (5) and current behavioral or conduct problem diagnosis and child's insurance type at the time of the survey. Gamma statistics were obtained for comparisons involving ordinal-level variables (i.e., age group and poverty level).

Next, to determine the relationships between key demographic variables and the reported severity of behavioral or conduct problems in children with current behavioral or conduct problems, additional chi-square tests were conducted. Separate analyses were performed for the following categories in children with current behavioral or conduct problems: (1) severity of behavioral or conduct problem and child's age group at time of interview, (2) severity of behavioral or conduct problem and child's race/ethnicity, (3) severity of behavioral or conduct problem and child's gender, (4) severity of behavioral or conduct problem and the child's income level based upon federal poverty level group,

and (5) severity of behavioral or conduct problem and type of insurance held at the time of the survey. Again, gamma statistics were computed for comparisons involving ordinal-level variables (i.e., age group and poverty level).

Finally, multiple logistic regression analyses were performed to determine which of the examined sociodemographic variables were independently associated with (a) parent-reported behavior or conduct problems, and (b) severity level of disorders, controlling for all other considered demographic variables. All statistical analyses were performed using SPSS version 21.0 with alpha set at .05.

Results

Of the overall sample of children included in the 2011/2012 NSCH, the average age was 8.85 years (SD=5.24), with approximately equal numbers of children in each age group. Over half of the sample were white (66%), half of the sample were male (51%), and over a third were either in the 0-199% FPL range (34%) or greater than 400% FPL (36%). Nearly all of those sampled (96%) were insured at time surveyed; over half held private health insurance (67%), and about a quarter (29%) had public insurance such as Medicaid or SCHIP. See Table 1 for detailed sample characteristics.

Of the sample of 95576 children, 2427 (3%) had a current behavioral or conduct problem. Of these, 31% of children had a mild form of the condition by parent report, while 69% had a moderate or severe behavioral or conduct problem.

In bivariate analyses, child's age group, race/ethnicity, sex, income level, and type of insurance were significantly associated with behavioral or conduct problems ($P < .05$; Table 2). Small but significant trends were seen in increasing occurrence of behavioral or conduct problems across age group. Of those children ages 0-3, 0.6% had a behavioral or

conduct problem compared to 3.7% of children ages 8-11, and 3.3% of children aged 15-17 (Table 2). Regarding race/ethnicity, of those children who were black, non-Hispanic, 4.3% had a behavioral or conduct problem, compared to 3% of children who were multi-racial/other, non-Hispanic, and 2.6% of those who were white, non-Hispanic. In male children, 3.8% had a behavioral or conduct problem, while only 1.8% of females had a behavioral or conduct problem. Approximately 6% of children in the 9-99% FPL group had a behavioral or conduct problem, compared to 1.4%-2.3% of children with a behavioral or conduct problem in the highest income levels. Of those children with public insurance such as Medicaid or SCHIP, 6.5% had a behavioral or conduct problem, compared to 1.3% of private insurance children with behavioral or conduct problems and 2.5% of uninsured children who had behavioral or conduct problems.

Full demographics of children with behavioral or conduct problems stratified by severity can be found in Table 3. For each of the five age groups, over half (61.8-70.7%) of children with a behavioral or conduct problem had a moderate or severe form of the condition, versus a mild form. Among children in the lowest income group (0-99% FPL), 73% had a moderate/severe condition compared to 65-67% of those with the highest income levels. Of those children with public insurance such as Medicaid or SCHIP, 73% had a moderate/severe behavioral or conduct problem, and 64% of children with private insurance had a moderate/severe condition. Sixty-two percent of uninsured children had a behavioral or conduct problem. Significant differences were found between mild and moderate/severe forms of the condition by income group ($X^2=10.65$; $df=3$; $P=0.014$) and insurance type ($X^2=22.40$; $df=2$; $P<0.001$). Race/ethnicity and sex were not significantly associated with severity of the behavioral or conduct problem.

Results of the first logistic regression model (see in Table 4) suggested that for each level increase in age group, the odds of having a behavior or conduct problem increased significantly. Compared with white, non-Hispanic children, Hispanic children had 0.66 times the odds of having a behavior problem. Males had 2.12 times the odds of having a behavior problem than females. Finally, compared to children with private insurance, those with public insurance such as Medicaid or SCHIP had 4.75 the odds of having a behavior problem. Uninsured children have 1.73 the odds of having a behavior problem compared to children with private insurance. For this model, the test of model fit ($X^2=2014$; $df=8$) indicates that the predictor demographic variables resulted in better fit than the null model with no predictors. This model explained a small but meaningful amount of the variance in presence of a current behavioral or conduct problem (Nagelkerke pseudo- $R^2=0.11$).

Results of the second regression model suggested that in children with current behavioral or conduct problems, for every unit increase in age group level, there are 1.01 times the odds of the child having a moderate or severe behavioral or conduct problem, compared to a mild form of the condition. Compared to white, non-Hispanic children, Hispanic children had 0.74 the odds of having a moderate/severe behavioral or conduct problem, and black, non-Hispanic children had 0.72 the odds of having a moderate/severe behavioral problem. Poverty level was not significant in this model. Compared to children with a behavioral or conduct problem with private insurance, those with public insurance had 1.44 the odds of having a moderate/severe behavioral or conduct problem. In this model, the test of model fit ($X^2=34.43$; $df=7$) indicated that the inclusion of the demographic variables significantly improved model fit compared to the null model with

no predictors. This model also explained a meaningful amount of the variance in severity level of behavioral or conduct problems (Nagelkerke $R^2=0.21$).

Discussion

Approximately one in twenty children has a behavioral or conduct problem, and significant associations are observed with age, race/ethnicity, sex, poverty, and insurance type. For each increase in age group, children have higher odds of having a behavioral or conduct problem, and for those with such a condition. Previous research has established that ODD disorders tend to appear by age eight.¹² Early behavioral or conduct problems can signal increased risk of patterns of further disruptive behavior, highlighting the importance of identifying in which age groups the problems tend to arise.¹⁴ ODD symptoms have been seen to predict later adolescent depression, as well as depression in adulthood.⁶ This study's finding of higher odds of having behavioral or conduct problems with increasing age group confirms the importance of early detection of behavioral or conduct problems, providing support for the implementation of earlier screenings and more timely interventions. Early detection and intervention strategies are also important in addressing parent-child communication and family dysfunction, which tend to be poor among families with ODD children.³

In this study, Hispanic children had significantly lower odds of having a behavior or conduct problem, as well as lower odds of having a moderate or severe form of the condition compared to white, non-Hispanic children. One interpretation of this finding is that Hispanic ethnicity is a protective factor against behavioral or conduct problems, as well as protective against having moderate or severe forms of these disorders when present. In accordance with these findings, previous studies have shown that Hispanics

have lower risk for ODD, which may result from protective factors originating in childhood, including ethnic identification and religious participation.⁴ Similarly, non-Hispanic Blacks have been identified as demonstrating a significantly lower risk for early-onset of behavior problems (i.e., before age 10), but not for late-onset impulse control disorders.⁴

However, there may be measurement problems related to the method in which information on behavioral or conduct problems were obtained. Previous studies suggest that Hispanic individuals may underreport health conditions and healthcare access problems, as well as experiencing language barriers that may contribute to a lack of understanding in regards to the question.^{4, 15} Cultural differences may lead to differences in survey responses regarding psychiatric history.⁴ Psychiatric disorders needing treatment may be misdiagnosed or mislabeled as a result of diagnostic criteria not being able to account for culturally patterned forms of distress and disorder.¹⁵ Among Hispanic Americans with mental disorders, fewer than 1 in 11 contact mental health care specialists, and this group is more likely to seek mental disorder treatment from general health care providers.¹⁵ A Puerto Rican study found rates of 49% of mental disorders in children previously identified as having behavioral problems when using the Diagnostic Interview Schedule for Children (DISC). Furthermore, clinical studies have reported increased anxiety-related problems, depressive symptoms and distress, and delinquency behavior problems among Hispanic adolescents compared to white, non-Hispanic youth.¹⁵ These studies offer contrasting findings to this study, which showed that Hispanic ethnicity in children may lead to decreased odds of having a behavioral or

conduct problem, as well as decreased odds of experiencing a moderate/severe behavioral or conduct problem compared to milder severity.

Compared to children with private insurance, those with public insurance or no health insurance had significantly increased odds of having a behavioral or conduct problem. Of those with behavioral or conduct problems, those with public insurance also had higher odds of having a moderate/severe form of the condition compared to those on private insurance. These differences may be explained by the fact that, regardless of poverty level, children with a moderate or severe behavioral or conduct problem may qualify for public health insurance as a result of their diagnosis. The 2010 Patient Protection and Affordable Care Act (ACA) may be especially important for this population of children, as it ensures coverage for children with special health care needs, including those with behavioral or conduct problems, and provides a range of preventive services.¹⁶ Increased health insurance coverage provided by the ACA and mental health service parity is paramount in providing children with no health insurance access to services.

Disparities in those children from families with lower SES are especially important when considering that, among children with special health care needs including behavioral or conduct problems, those from the lowest income groups have higher proportions of children with unmet mental health care service needs, compared to children whose mental health needs are met.¹⁷ Studies indicate that as severity of any special health care needs increase, the chances of receiving all needed care decreases.¹⁷ Black, non-Hispanic children in the lowest income group are less likely to receive needed mental health care compared to white children, but Hispanic children in this same income

group are more likely to receive needed mental health services compared to white, non-Hispanic children. Compared to children with private insurance, those with Medicaid and in the lowest income groups were more likely to receive all needed care.¹⁷ This may suggest that private income plans for families in lower SES households may only offer limited mental health benefits.¹⁷ In concordance with past literature, this study found that socioeconomic status plays a key role in addressing the needs of children with behavioral or conduct problems, highlighting the importance of consistent insurance coverage that provides access to mental health care.¹⁶

In the 2011/2012 NSCH, severity was measured by asking the parent if a child's behavioral or conduct problems were "mild, moderate, or severe." The accuracy of this parent assessment may be problematic. In assessing severity, teacher reports of behavioral symptoms are often used to supplement traditional parent data in clinical practice and research.³ In conducting ODD and CD research, it is generally recommended to have ratings from multiple sources and settings, particularly due to the DSM diagnostic criterion that problematic behaviors occur across at least two settings.³ Differences between parent and teacher reports of ODD behavior are typical and may be a result of the different behavior expressed in the home environment as opposed to the school environment.⁵ Studies suggest that maternal psychological problems and child school behaviors differentiate mother-defined ODD, yet teacher-defined ODD reports are differentiated by comorbid symptoms, mother-child interactions, and paternal alcohol use.³

Thus, a key limitation to the findings of this study results from survey methods utilized in the 2011/2012 NSCH. The conclusions presented in this paper are the

interpretations that can be made based on the measures available in this dataset. The 2011/2012 NSCH is a population-based dataset with good external validity that can be generalized to the entire United States population. However, the diagnosis of behavioral or conduct problems was dependent upon parent response to a single question. Parent responses may have resulted in diagnostic misclassification, and because this was not a clinical study, unreported cases of behavioral or conduct problems in selected children cannot be determined.¹⁸ Similarly, more refined measures of severity need to be used in order to more accurately examine sociodemographic disparities in the severity of child behavioral or conduct problems. Valid and reliable measurement tools to assess child behavior, such as the Achenbach Child Behavior Checklist and Eyberg Child Behavior Inventory, are available, and the 11-item Behavior Problem Index has been administered successfully to large samples previously.¹⁹⁻²¹ For this study, the determination of severity was based on parent report, in which parents may have considered their own child's condition to be moderate or severe, when in actuality the case may have been mild had a more refined measure assessed the condition. Interpretation of responses to the question, "Would you describe your child's condition as mild, moderate, or severe?" must consider the likelihood of parent/reporter bias. Recognizing that DSM diagnoses of behavioral or conduct disorders require symptoms to be present in at least two settings, such as school and home, reliance upon parent report alone may be problematic.⁵

Clinical implications of this study reiterate that policy should actively support preventive services designed to reach affected groups, including programs that are designed to implement early detection and intervention for emotional and behavioral problems among vulnerable populations of children.⁷ Pediatricians and primary care

professionals must be vigilant in screening for behavioral or conduct problems, and referring patients to appropriate community resources, where available. Furthermore, when targeting specific populations, programs need to address behavioral or conduct problems early, due to the fact that behavioral and conduct problems appear in early childhood but tend to be diagnosed at later stages. Adolescent conduct problem symptoms can predict delinquency, increasing the need for the earliest intervention.²² Intervention strategies designed for young children have demonstrated long-term improvements in reducing expenditures towards mental health services and juvenile delinquency programs.

Future studies should investigate the presence and severity of behavioral or conduct problems in relation to neighborhood characteristics, including neighborhood safety and support and adverse childhood experiences. Such environmental factors may contribute to the development and display of behavioral or conduct problems, particularly in those conditions that express a gene by environment interaction.²² Some studies have shown that children with a family history of hyperactivity who are raised in high-stress environments may go on to develop ODD, concurrent with a hyperactivity disorder.¹ In examining the multifaceted determinants of behavioral or conduct problems, quality of life for affected children and families can be enhanced through early intervention and support.

Finally, children with behavioral or conduct problems tend to perform worse in schools compared to their peers, and are more likely to attend specialized schools. Participation in everyday and social activities, including school, is crucial to childhood development, quality of life, and, potentially, to future life outcomes.⁷ Of further

importance to quality of life and future life outcomes is the ability to socially interact with peers.⁹ When treating children with behavioral or conduct problems, clinicians need to consider environmental factors, including peer victimization and isolation from peers, in developing appropriate treatment plans.²³ Support groups that increase social support for children with behavioral or conduct problems and their families may be one component of an effective treatment plan.

The strengths of this study include the use of a recent, large, nationally representative sample of children, which confirmed prior associations made between behavioral or conduct problems with age group, race/ethnicity, sex, household income, and insurance. This study examined key demographic variables among children with behavioral or conduct problems, and those same demographic variables in children with mild versus moderate/severe behavioral or conduct problems. Because this study identified groups vulnerable to having behavioral or conduct problems, these groups require increased efforts to identify and intervene at the earliest opportunity. Children with behavioral or conduct problems with public insurance and those in the lowest income groups would benefit from increased access to mental health care services and mental health benefits parity. More information must be found on risk among the Hispanic population of children. National surveys such as the 2011/2012 NSCH can benefit from, in the future, utilizing enhanced assessment and measurement tools in order to accurately assess condition presence and severity.

Table 1. Sample characteristics from the 2011/2012 National Survey of Children's Health (N=95677)	
Demographics	n (%)
Age	
0-3	19450 (20.3)
4-7	20661 (21.6)
8-11	20965 (21.9)
12-14	16157 (16.9)
15-17	18444 (19.3)
Race/ethnicity (n=93384)	
White	61381 (65.7)
Black/African American	8875 (9.5)
Hispanic or Latina	12682 (13.6)
Multi-racial/Other, non-Hispanic	10446 (11.2)
Sex of selected child (n=95568)	
Male	49219 (51.4)
Female	46349 (48.4)
Household poverty level (n=95677)	
0-99% FPL	14928 (15.6)
100-199% FPL	17183 (18.0)
200-399% FPL	28924 (30.2)
400% FPL or greater	34642 (36.2)
Insurance status (n=94500)	
Uninsured	4040 (4.3)
Public insurance	27381 (29.0)
Private health insurance	63079 (66.8)
Behavioral problem or conduct problems	
Behavioral or conduct problems (n=85536)	
Currently has condition	2427 (2.8)
Does not have condition	83109 (97.2)
Severity of behavioral or conduct problem (n=2420)	
Mild	744 (30.7)
Moderate or Severe	1676 (69.3)

Table 2. Demographic characteristics of children with and without current behavioral or conduct problems, 2011/2012 National Survey of Children's Health (N=85536)					
	No current behavioral or conduct disorder, n=81132	Current behavioral or conduct disorder, n=2368	Test statistic ^a	Degrees of freedom (df)	p-value
Demographics	n (%)				
Child's Age			0.187	3	<0.001
0-3 years old	9347 (99.4)	55 (0.6)			
4-7 years old	20183 (97.8)	456 (2.2)			
8-11 years old	20169 (96.3)	773 (3.7)			
12-14 years old	15597 (96.7)	538 (3.3)			
15-17 years old	17813 (96.7)	605 (3.3)			
Race/ethnicity (n=83500)					
White	53759 (97.4)	1410 (2.6)	86.12	3	<0.001
Black/African American	7675 (95.7)	348 (4.3)			
Hispanic or Latina	10814 (97.2)	315 (2.8)			
Multi-racial/Other, non-Hispanic	8884 (96.8)	295 (3.2)			
Sex of selected child (n=85434)					
Male	42445 (96.2)	1671 (3.8)	297.213	1	<0.001
Female	40563 (98.2)	755 (1.8)			
Household poverty level					
0-99% FPL	12106 (94.0)	771 (6.0)	-0.397	4	<0.001
100-199% FPL	14709 (96.0)	619 (4.0)			
200-399% FPL	25538 (97.7)	596 (2.3)			
400% FPL or greater	30756 (98.6)	441 (1.4)			
Insurance status (n=84522)					
Uninsured	3650 (97.5)	94 (2.5)	1603.80	2	<0.001
Public insurance, such as Medicaid or SCHIP	22202 (93.5)	1540 (6.5)			
Private health insurance	56267 (98.7)	769 (1.3)			

^a For nominal variables (race and ethnicity, sex, and insurance type) the test statistic presented is the X² value; for ordinal variables (age group and poverty level) the test statistic is the gamma statistic.

Table 3: Demographic characteristics of children with mild versus moderate or severe behavioral or conduct problems, 2011/2012 National Survey of Children's Health (N=2420)					
	Mild Behavioral or Conduct Problems, n=729	Moderate or Severe Behavioral or Conduct Problems, n=1632	Test statistic ^a	Degrees of Freedom (df)	P-value
Demographics	n (%)				
Child's Age			0.068	4	0.037
0-3 years old	21 (38.2)	34 (61.8)			
4-7 years old	151 (33.3)	302 (66.7)			
8-11 years old	246 (31.9)	524 (68.1)			
12-14 years old	149 (27.7)	389 (72.3)			
15-17 years old	177 (29.3)	427 (70.7)			
Race/ethnicity (n=2361)					
White	410 (29.2)	996 (70.8)	5.283	3	0.152
Black/African American	118 (33.9)	230 (66.1)			
Hispanic or Latina	108 (34.3)	207 (65.7)			
Multi-racial/Other, non-Hispanic	93 (31.8)	199 (68.2)			
Sex of selected child (n=2419)					
Male	508 (30.5)	1159 (69.5)	0.147	1	0.702
Female	235 (31.3)	517 (68.8)			
Household poverty level					
0-99% FPL	210 (27.3)	559 (72.7)	-0.096	3	0.003
100-199% FPL	181 (29.4)	435 (70.6)			
200-399% FPL	207 (34.8)	387 (65.2)			
400% FPL or greater	146 (33.1)	295 (66.9)			
Insurance status (n=2396)			22.405	2	<0.001
Uninsured	36 (38.3)	58 (61.7)			
Public insurance, such as Medicaid or SCHIP	421 (27.4)	1114 (72.6)			
Private health insurance	280 (36.5)	487 (63.5)			

^a For nominal variables (race and ethnicity, sex, and insurance type) the test statistic presented is the X² value; for ordinal variables (age group and poverty level) the test statistic is the gamma statistic.

Table 4. Multiple logistic regression: Independent association of demographic characteristics with parent reported current behavioral or conduct problems (N=82468)		P value	Odds Ratio	Lower 95% C.I.	Upper 95% C.I.
X ² =2014.03	R ² =0.11				
Child's Age	P<0.001	1.310	1.268	1.354	
Race/ethnicity					
White, non-Hispanic (REF)					
Black, non-Hispanic	0.655	0.972	0.857	1.102	
Hispanic or Latina	P<0.001	0.662	0.581	0.754	
Multi-racial/Other, non-Hispanic	0.587	1.037	0.909	1.183	
Sex of selected child					
Male	P<0.001	2.117	1.936	2.316	
Female (REF)					
Household poverty level					
	P<0.001	0.869	0.827	0.913	
Insurance status					
Uninsured	P<0.001	1.733	1.382	2.173	
Public insurance	P<0.001	4.752	4.230	5.339	
Private health insurance (REF)					

Table 5. Multiple logistic regression: Independent associations of demographic characteristics with parent-reported severity level of behavioral or conduct problem (N=2338)					
		P value	Odds Ratio	Lower 95% C.I.	Upper 95% C.I.
X ² =34.43	R ² =.021				
Child's Age		0.031	1.09	1.01	1.181
Race/ethnicity					
White, non-Hispanic (REF)		0.027			
Black, non-Hispanic		0.012	0.72	0.55	0.93
Hispanic or Latina		0.029	0.74	0.57	0.97
Multi-racial/Other, non-Hispanic		0.320	0.87	0.66	1.15
Household poverty level		0.112	0.93	0.84	1.02
Insurance status					
Uninsured		0.58	0.88	0.56	1.39
Public insurance		0.027	1.64	1.058	2.53
Private insurance (REF)		0.001			

REFERENCES

1. Harvey E, Friedman-Weieneth J, Goldstein L, Sherman A. Examining Subtypes of Behavior Problems Among 3-Year-Old Children, Part I: Investigating Validity of Subtypes and Biological Risk-Factors. *J Abnorm Child Psychol.* 2007; 35:97-110.
2. Perou R, Bitsko RH, Blumberg SJ, Pastor P, Ghandour RM, Gfroerer JC, et al. Mental Health Surveillance Among Children--United States, 2005-2011. *Morbidity and Mortality Weekly Report* 2013; 62:1-35.
3. Drabick DA, Gadow KD, Loney J. Source-Specific Oppositional Defiance Disorder: Comorbidity and Risk Factors in Referred Elementary Schoolboys. *J Am Acad Child Adolesc Psychiatry.* 2007; 46.
4. Breslau J, Aguilar-Gaxiola S, Kendler K, Su M, Williams D, Kessler R. Specifying race-ethnic differences in risk for psychiatric disorder in a USA national sample. *Psychol Med.* 2006; 36:57-68.
5. de Zeeuw E, van Beijsterveldt C, Lubke G, Glasner T, Boomsma D. Childhood ODD and ADHD Behavior: The Effect of Classroom Sharing, Gender, Teacher Gender and Their Interactions. *Behav Genet.* 2015.
6. Burke JD, Hipwell AE, Loeber R. Dimensions of Oppositional Defiant Disorder as Predictors of Depression and Conduct Disorder in Preadolescent Girls. *J Am Acad Child Adolesc Psychiatry.* 2010; 49:484-92.
7. Blanchard L, Gurka M, Blackman J. Emotional, Developmental, and Behavioral Health of American Children and Their Families: A Report From the 2003 National Survey of Children's Health. *Pediatrics.* 2006; 117:e1202-e12.
8. Child and Adolescent Health Measurement Initiative, Data Resource Center for Child & Adolescent Health website. National Mental and Emotional Well-Being Profile from the National Survey of Children's Health. 2007.
9. Fahim C, Fiori M, Evans A, Perusse D. The Relationship between Social Defiance, Vindictiveness, Anger, and Brain Morphology in Eight-year-old Boys and Girls. *Social Development.* 2012; 21.
10. Child and Adolescent Health Measurement Initiative, Data Resource Center for Child & Adolescent Health. National Profile of Complementary and Alternative Medicine (CAM) Use for Children with Emotional, Mental, or Behavioral Conditions or Problems (2-17 years). 2012.
11. Child and Adolescent Health Measurement Initiative, Data Resource Center for Child & Adolescent Health. Data Query of behavioral or conduct problems, National Survey of Children's Health. NSCH 2011/12. childhealthdata.org: CAHMI; 2015 [cited 2015 April 1, 2015]; Available from: <http://childhealthdata.org/browse/survey/results?q=2410&r=1>.
12. Steiner H, Rensing L, Arnold V, Beitchman J, Benson R, Bernet W, et al. Practice Parameter for the Assessment and Treatment of Children and Adolescents With Oppositional Defiant Disorder. *J Am Acad Child Adolesc Psychiatry.* 2007; 46:126-41.

13. US Department of Health & Human Services, Office of The Assistant Secretary for Planning and Evaluation. Poverty level. Frequently Asked Questions Related to the Poverty Guidelines and Poverty. 2015.
14. Olson SL, Sameroff AJ, Lansford JE, Sexton H, Davis-Kean P, Bates JE, et al. Deconstructing the externalizing spectrum: Growth patterns of overt aggression, covert aggression, oppositional behavior, impulsivity/inattention, and emotion dysregulation between school entry and early adolescence. *Dev Psychopathol* 2013; 25:817-42.
15. Office of the US Surgeon General, Center for Mental Health Services, National Institute of Mental Health. Mental Health: culture, race, and ethnicity: a supplement to mental health: a report of the surgeon general 2001.
16. Bethell CD, Kogan MD, Strickland BB, Schor EL, Robertson J, Newacheck PW. A National and State Profile of Leading Health Problems and Health Care Quality for US Children: Key Insurance Disparities and Across-State Variations. *Acad Pediatr*. 2010; 11.
17. Fulda KG, Lykens KK, Bae S, Singh KP. Unmet Mental Health Care Needs for Children with Special Health Care Needs Stratified by Socioeconomic Status. *Child and Adolescent Mental Health*. 2009; 14:10.
18. Lingineni R, Biswas S, Ahmad N, Jackson B, Bae S, Singh K. Factors associated with attention deficit/ hyperactivity disorder among US children: results from a national survey. *BMC Pediatr*. 2012; 12.
19. Achenbach TM, Ruffle TM. The Child Behavior Checklist and Related Forms for Assessing Behavioral/Emotional Problems and Comptencies. *Pediatr Rev*. 2000; 21:9.
20. Burns LG, Patterson DR. Normative Data on the Eyberg Child Behavior Inventory and Sutter-Eyberg Student Behavior Inventory: Parent and Teacher Rating Scales of Disruptive Behavior Problems in Children and Adolescents. *Child Fam Behav Ther*. 2001; 23:15-28.
21. Guerin D, Gottfried AW, Thomas CW. Difficult Temperament and Behaviour Problems: A Longitudinal Study from 1.5 to 12 Years. *International Journal of Behavioral Development*. 1997; 21:71-90.
22. Pardini D, Frick P, Moffitt T. Building an Evidence Base for DSM-5 Conceptualizations of Oppositional Defiant Disorder and Conduct Disorder: Introduction to the Special Sections. *J Abnorm Psychol*. 2010; 119:10.
23. Barker E, Salekin R. Irritable oppositional defiance and callous unemotional traits: is the association partially explained by peer victimization? *J Child Psychol Psychiatry*. 2012; 43:1167-75.

Acknowledgements:

The investigator would like to thank all those who have helped with this study, especially: Dr. Christina Studts, Dr. Corrine Williams, and Dr. Katherine Eddens. Your editing, advice, and guidance have made this paper possible.

Biographical sketch:

Caitlin Elizabeth Dunworth, CPH, is a MPH in Health Behavior Candidate 2015 from the University of Kentucky College of Public Health. She holds a Bachelors of Science degree in Animal and Poultry Sciences from Virginia Polytechnic Institute and State University (Virginia Tech). She is a Graduate Research Assistant under the guidance of Dr. Lorie Chesnut. In her work with the Kentucky Commission for Children with Special Health Care Needs, she contributed to the data collection portion of Kentucky's Title V Needs Assessment. She is a UK College of Public Health Student Ambassador, and was the 2014 Service Chair for the University of Kentucky Student Public Health Association. She can be reached at cdunworth@uky.edu, dunworth@vt.edu, and 423-483-4210.