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A Profile of Care Coordination, Missed School Days, and Unmet Needs among Oregon Children with Special Health Care Needs with Behavioral and Mental Health Conditions

Olivia J. Lindly, Ph.D., M.P.H.,

Department of Health Sciences, Northern Arizona University, 1100 S. Beaver Street, Room 488, Flagstaff, AZ 86011

Alison J. Martin, Ph.D., M.A.,

Oregon Center for Children and Youth with Special Health Needs, Institute on Development & Disability, Oregon Health & Science University, Oregon Health & Science University-Portland State University Joint School of Public Health, 707 SW Gaines Street, CDRC, Portland, OR 97239

Kathryn Lally, L.M.S.W., M.P.H. [Social Work Fellow]

Yale Child Study Center, 230 S. Frontage Road, New Haven, CT 06519

Abstract

To inform Oregon's Title V needs assessment activities, we aimed to (1) characterize the state's subpopulation of children with special health care needs (CSHCN) with behavioral and mental health conditions (B/MHC) and (2) determine associations of care coordination with missed school days and unmet needs for this subpopulation. We analyzed 2009–2010 National Survey of Children with Special Health Care Needs data on 736 Oregon CSHCN <18 years, including 418 CSHCN with B/MHC. Among Oregon CSHCN with B/MHC: 48.9% missed 4 school days, 25% had 1 unmet health services need, and 14.8% had 1 unmet family support services need. Care coordination was associated with lower adjusted odds of 1 unmet health services need but was not significantly associated with missed school days or unmet family support services need. The approach to identify Oregon CSHCN with B/MHC may be adopted by other states endeavoring to improve health for this vulnerable subpopulation.

Keywords

children with special health care needs; care coordination; behavioral health; mental health; school attendance; unmet needs

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Corresponding Author Information: Olivia J. Lindly, Ph.D., M.P.H., Department of Health Sciences, Northern Arizona University, 1100 S. Beaver Street, Room 488, Flagstaff, AZ 86011, 928.523.5155, olivia.lindly@nau.edu.

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Introduction

The enactment of the Social Security Act in 1935 was momentous for many reasons, not the least of which was the establishment of Title V. This Title pledged support from the federal government to states to collectively improve maternal and child health nationwide (U.S. Department of Health and Human Services, Health Resources and Services Administration, Maternal and Child Health Bureau, 2015). Although the grant program's structure has changed (e.g., moving from a discretionary to block grant in 1981), it has maintained a focus on assuring access to high quality healthcare for maternal and child health populations including children with special health care needs (CSHCN). Legislatively, the block grant requires each state to conduct a needs assessment every five years. Needs assessment results inform the selection of state priorities and strategies to address these priorities. The National Survey of Children with Special Health Care Needs (NS-CSHCN), which was first conducted in 2001 and has now been integrated with the National Survey of Children's Health (NSCH), has been an essential data source for states in determining priorities and strategies to address the needs of their CSHCN population.

CSHCN are those “who have or are at increased risk for chronic physical, developmental, behavioral, or emotional conditions and who also require health care-related services of a type or amount beyond that required by children generally” (p.138) (McPherson et al., 1998). In the NS-CSHCN and the NSCH, the CSHCN Screener has been used to identify CSHCN using a non-condition specific approach that does not explicitly assess the “increased risk” component of the definition by McPherson and colleagues (Bethell et al., 2002). The most recent 2017 and 2018 NSCH shows that 18.5% of U.S. children aged <18 years are CSHCN (Child and Adolescent Health Measurement Initiative, 2020). While the CSHCN Screener does not identify CSHCN based on specific health conditions (e.g., asthma), children with chronic health conditions including behavioral and mental health conditions (B/MHC) comprise the CSHCN population. Indeed, ~32% of U.S. CSHCN were found to have emotional, behavioral, or developmental conditions that required treatment or counseling (U.S. Department of Health and Human Services, Health Resources and Services Administration, Maternal and Child Health Bureau, 2013). Because not all CSHCN with B/MHC require treatment or counseling but may instead use specialized health services or prescription medication in addition to experiencing functional impairment, the prevalence of CSHCN with B/MHC may be higher. For example, more than half (~59%) of U.S. CSHCN have difficulty with 1 emotional or behavioral factors (e.g., anxiety, depression) (Lollar et al., 2012).

Understanding healthcare needs for CSHCN with B/MHC is important for state public health agencies because this subpopulation is prone to experience disparities related to health such as greater odds of adverse family financial or employment impacts relative to other CSHCN (Kogan et al., 2008; Zuckerman et al., 2014). Children with specific B/MHC (e.g., autism spectrum disorder [ASD], attention deficit/hyperactivity disorder [ADHD]) are also more likely than other children to experience comorbidity and functional limitations (Boulet et al., 2009; Schieve et al., 2012). Among school-aged children, those with B/MHC are additionally more likely to miss 11 school days annually, repeat at least one grade, and have repeated calls home from their school about problems (Bethell et al., 2012).

Access to high quality healthcare may help CSHCN with B/MHC to achieve optimal health across the lifespan. Yet, many CSHCN with B/MHC have difficulty accessing needed healthcare (Lindly et al., 2016). Care coordination is a core component of the patient-centered medical home model, which was originally developed for CSHCN, and care coordination can help CSHCN access needed health services (American Academy of Pediatrics, Council on Children with Disabilities, 2005; Association of Maternal and Child Health Programs and the National Association for State Health Policy, 2017). Care coordination is also associated with greater satisfaction with care, ease of obtaining referrals, reduced family financial burden, and fewer school absences (Litt & McCormick, 2015; Palfry et al., 2004; Turchi et al., 2009). Still, many CSHCN including those with B/MHC who need care coordination do not receive it (Brown et al., 2014)

Oregon's 2010 and 2015 Title V Block Grant five-year needs assessments identified accessing mental health services as a persistent challenge for CSHCN (Martin et al., 2015). Among the parents of CSHCN surveyed, 24% reported a mental or behavioral health service was one of three things their family needed most but had a hard time obtaining (Martin et al., 2015). Similarly, a majority of parents reported difficulty accessing ASD-specific therapies and behavioral or mental health services (Martin et al., 2015). Health professionals, including care coordinators, serving CSHCN further reported a shortage of behavioral health professionals and services across the state. Together, these findings suggest Oregon CSHCN with B/MHC are likely to experience disparities in accessing needed healthcare.

Care coordination is associated with improved healthcare access and other health-related outcomes for CSHCN broadly, and it is currently an overarching strategy being used to promote health equity in Oregon through coordinated care organizations for the Medicaid population (McConnell, 2016). For these reasons, this study extends Oregon's 2015 Title V needs assessment by further examining care coordination in relationship to missed school days and unmet needs among Oregon CSHCN with B/MHC. We specifically aimed to (1) describe the subpopulation of Oregon CSHCN with B/MHC; and (2) determine associations of care coordination with missed school days and unmet needs among Oregon CSHCN with B/MHC.

Methods

Data Source and Sample

We analyzed secondary data from the 2009–10 NS-CSHCN, because it is the most current dataset that provides a sufficiently large sample of Oregon CSHCN with B/MHC and includes detailed information on unmet needs including family support needs. The 2009–10 NS-CSHCN was a cross-sectional survey of a nationally representative sample of the civilian and non-institutionalized population of CSHCN. The survey methodology has been previously detailed elsewhere (National Center for Health Statistics, 2014). The study sample included 736 Oregon CSHCN aged <18 years, for which data were reported by a parent. This study was approved by the second author's Institutional Review Board.

Measures

Behavioral and mental health condition status—To identify Oregon CSHCN with B/MHC, we used two criteria. The first criterion was based on prior studies that have used the non-condition specific CSHCN Screener items about whether the child has an ongoing emotional, behavioral, or developmental condition requiring treatment or counseling (Bethell et al., 2012; Kogan et al., 2008). The second criterion was based on past studies that have assessed developmental disabilities (Boulet et al., 2009; Boyle et al., 2011; Schieve et al., 2012) or mental health issues (Kemper, Gardiner, & Birdee, 2013; Nageswaran, Parish, Rose, & Grady, 2011) using items about whether parents were told by a doctor or other healthcare provider that their child had one or more of seven B/MHC including ADHD, depression, anxiety problems, behavioral or conduct problems, ASD, developmental delay, or intellectual disability. To be considered as having B/MHC, CSHCN needed to have met one criterion or both criteria. Using this approach, we identified 418 Oregon CSHCN with B/MHC.

Sociodemographic factors—In line with previous research on CSHCN with B/MHC, we assessed the following sociodemographic characteristics: child's age, race and ethnicity, primary household language, sex, household income level relative to the federal poverty level (FPL), highest parent education level, family structure, and health insurance coverage (Boulet et al., 2009; Kemper et al., 2013; Lindly et al., 2016; Schieve et al., 2012). We also assessed functional limitations status using the CSHCN Screener item: "Is [your child] limited or prevented in any way in [his/her] ability to do things children of the same age can do?" We used the functional limitations criterion because it is related to greater services use, poorer health, and more adverse family impacts among CSHCN (Bramlett, Read, Bethell, & Blumberg, 2009).

Care coordination—For CSHCN and their families to have been considered to have had effective care coordination all three of the following conditions needed to have been met: (1) child's family received some type of help with care coordination (needed extra help with care coordination versus did not need care coordination); (2) child's family was very satisfied with communication among child's doctors and other health care providers if the child visited a specialist doctor, used mental health services, received therapy services (e.g., physical therapy), got substance abuse treatment, or used home healthcare services (very satisfied when needed versus less than very satisfied); and (3) when such interactions were needed, the family was very satisfied with how the child's doctors communicated with school, day care, or other programs (very satisfied when needed versus less than very satisfied) (Child and Adolescent Health Measurement Initiative, 2012).

Missed school days—Missed school days was only assessed for CSHCN aged 5–17 years. For these CSHCN, parents were asked the following question: "During the past 12 months, that is since [one year ago], about how many days did [child] miss school because of illness or injury?" There were four response options including 0–3, 4–6, 7–10, or 11 missed school days. Given the variable's right skewed distribution, we dichotomized at 4.

Unmet needs—Two types of unmet needs were assessed including unmet health services need for the child and unmet family support services need. Unmet health services need was determined if the child had 1 unmet service need for 14 specific health services and equipment including preventive medical care, specialty care, preventive dental care, other dental care, prescription medication, therapy services (i.e., physical, occupational, or speech/language therapy), mental health services, substance use services, home healthcare, vision care, hearing care, mobility care, communication services, and durable medical equipment. Unmet family support services need was determined if the family had 1 unmet need for three support services including respite care, family mental healthcare, and genetic counseling.

Analysis

We first computed descriptive statistics to determine the estimated number and proportion of Oregon CSHCN by B/MHC status, and then computed descriptive statistics and chi-square tests to examine all variables of interest among Oregon CSHCN by B/MHC status. We also computed relative frequencies for each type of unmet health services need and unmet family support service need. Next, we computed bivariate statistics only among Oregon CSHCN with B/MHC including relative frequencies, odds ratios with 95% confidence intervals, and *p*-values to determine the distribution of each dependent variable (i.e., missed school days, unmet needs) by each independent variable. Last, we fit three multiple logistic regression models to determine the adjusted odds of each dependent variable among Oregon CSHCN with B/MHC. We used a purposeful variable selection process in fitting these models by initially including independent variables that had a bivariate association with the given dependent variable at a *p*-value <.20 (Bursac, Gauss, Williams, & Hosmer, 2008). We subsequently removed independent variables from each model if they did not maintain an association with a *p*-value <.10. For each model, the variance inflation factor was <2 indicating estimates were not substantially biased by multicollinearity. All “don’t know” or “refused” responses for variables of interest were treated as missing, and all analyses were weighted per guidance from the National Center for Health Statistics (National Center for Health Statistics, 2014) and performed in Stata 15.0 (StataCorp, 2017).

Results

Population Characteristics

In Oregon, 56.6% (95% confidence interval [CI]: 52.1%–60.9%) or an estimated 29,704 CSHCN had B/MHC. Among Oregon CSHCN, those with B/MHC were more likely than those without B/MHC to be male, have a household income level <400% FPL, have parents with a high school diploma or less education, live in a single mother or other family structure household, have public insurance only or be uninsured, or have functional limitations (Table 1). No other differences were statistically significant among Oregon CSHCN by B/MHC status.

Missed School Days and Unmet Needs

Slightly more than half of Oregon CSHCN, regardless of B/MHC status, missed 0–3 school days (Table 1). Among Oregon CSHCN, 16.6% with B/MHC versus 13.5% without B/MHC

missed 11 school days. Oregon CSHCN with B/MHC were also significantly more likely than those without B/MHC to have 1 unmet health services need (25% versus 10%). Among Oregon CSHCN with B/MHC, individual unmet health services needs were as follows: therapy services (8.3%), mental health services (7.3%), preventive dental (6.8%), specialty care (4.4%), other dental (3.4%), prescription medication (2.6%), communication services (1.2%), home healthcare (1.0%), vision care (0.7%), mobility services (0.6%), preventive medical care (0.4%), durable medical equipment (0.3%), hearing care (0.2%), and substance use (0). Unmet family support services need was considerably higher for OR CSHCN with B/MHC compared to those without (14.8% versus 0.7%); however, sample size constraints did not permit a chi-square test to determine statistical significance. Among Oregon CSHCN with B/MHC, the most common unmet family support services need was for respite care (9.5%) followed by family therapy (6.5%) and genetic counseling (2.0%).

Bivariate Associations

To examine associations of sociodemographic characteristics and care coordination with missed school days and unmet needs, we only focused on Oregon CSHCN with B/MHC. Bivariate analysis results showed that the odds of 4 missed school days were lower for Oregon CSHCN with B/MHC whose parent had more than a high school education or who were publicly insured or uninsured. Odds of 1 unmet health services need were higher for Oregon CSHCN with B/MHC who had functional limitations or who were publicly or uninsured. Odds of 1 unmet health services need were lower for those who were older (aged 12–17 years), had a household income 400% of the FPL, or received care coordination. Among Oregon CSHCN with B/MHC, odds of 1 unmet family support services need were higher for those who had public insurance or were uninsured. Odds of 1 unmet family support services need were lower for those who were older (aged 5–17 years) or had higher household income levels (> 99% of the FPL). All other bivariate associations are shown in Table 2.

Multivariable Associations

Multivariable model results showed that only highest parent education level and functional limitations status remained significantly associated with 4 missed school days among Oregon CSHCN with B/MHC (Table 3). Among Oregon CSHCN with B/MHC, those whose parents had some college or more education versus high school or less had significantly lower adjusted odds of 4 missed school days. Functional limitations status was significantly associated with higher adjusted odds of 4 missed school days among Oregon CSHCN with B/MHC.

Older age (12–17 years), higher household income level (< 400% FPL), and care coordination remained significantly associated with lower adjusted odds of 1 unmet health services need among Oregon CSHCN with B/MHC (Table 3). Functional limitations also remained significantly associated with higher adjusted odds of 1 unmet health services need among Oregon CSHCN with B/MHC. Only older (5–11 years and 12–17 years) versus younger child age and higher (< 400% FPL) versus lower household income level remained significantly associated with lower adjusted odds of 1 unmet family support services need among Oregon CSHCN with B/MHC according to multivariable model results.

Discussion

This study sought to extend Oregon's 2015 Title V needs assessment by providing new knowledge on key issues for the state including behavioral and mental health condition status, care coordination, missed school days, and unmet needs among CSHCN. Importantly, this study's results showed care coordination was associated with decreased odds of unmet health services need among Oregon CSHCN with B/MHC. This finding is consistent with past research on broader child and CSHCN populations showing care coordination, as a core patient-centered medical home component, is linked to improved healthcare access and quality (Litt & McCormick, 2015; Palfry et al., 2004; Turchi et al., 2009). Results from Oregon's 2015 needs assessment reinforce this finding, insofar as key stakeholders commonly expressed the importance of care coordination among educators and mental and physical health providers for CSHCN (Martin et al., 2015).

Oregon's Title V Block Grant shared plan of care strategy may support ongoing associations between care coordination and access to needed health services for CSHCN with B/MHC. A shared plan of care generally describes the joint development of a care plan for the child between their family, medical home provider, and other health professionals (McAllister, 2014). In Oregon, the shared plan of care strategy requires the participation of a behavioral or mental health provider when serving CSHCN with B/MHC. This strategy is currently being jointly implemented and evaluated by the state's Title V program and local public health authorities (Oregon Center for Children and Youth with Special Health Needs, 2017).

It was unexpected that care coordination was not significantly associated with missed school days or unmet family support services need for Oregon CSHCN with B/MHC in this study. The former result may be explained, in part, by the measurement of care coordination. That is, parents may be satisfied with communication among their healthcare providers and between their healthcare providers and educators; however, the communication may not translate into integrated care strategies such that the healthcare provider, educator, and family collaborate to develop strategies to manage the child's healthcare needs in the school setting. The latter also may be explained by the measurement of care coordination in this study, because the items focused on coordination of the child's healthcare rather than the family's needs related to the child's health more holistically.

This study's results also showed that Oregon CSHCN with B/MHC were more likely to miss 4 school days if they had functional limitations. These findings are consistent with past research showing CSHCN with functional limitations or emotional, behavioral, or developmental conditions miss more school days than other CSHCN (Forrest, Bevans, Riley, Crespo, & Louis, 2013). School attendance is predictive of overall school success (Finn, 1989), which in turn is predictive of one's health and productivity as an adult (Case & Paxson, 2006; Fiscella & Kitzman, 2009). Healthcare providers are trained to address the functional limitations related to a child's diagnosis (Lollar et al., 2012). To the extent that functional limitations contribute to school absences, healthcare providers may help families and school staff develop strategies to minimize the effect of functional limitations on attendance, thereby promoting health for CSHCN with B/MHC. Going forward, Oregon's Title V program will collaborate with families and school stakeholders (e.g., school nurses,

special education teachers, administrators) to attempt to learn why CSHCN with B/MHC who also have functional limitations miss more days of school than those without functional limitations along with their suggested solutions for this issue.

Because the NS-CSHCN measure of effective care coordination focused heavily on care coordination emanating from and occurring among healthcare providers, such a measure may not be comprehensive enough for older children who interact less with primary care providers or the medical care system more broadly. In these circumstances, care coordination that occurs in the broader community context through school-based health centers, school nurses, and/or local public health agencies may better connect CSHCN to resources supporting their health into adulthood. With this in mind, use of more comprehensive care coordination measures in Title V needs assessment activities, such as the Parent-Reported Experience Measure of Integrated Care (Ziniel, Rosenberg, Bach, Singer, & Antonelli, 2016), may better capture care coordination occurring across various settings and provide a more complete picture of care coordination as part of integrated care initiatives across the state.

This study has several main limitations. First, we recognize that the NS-CSHCN data were collected nine to ten years ago, and changes in the population of interest with respect to sociodemographic characteristics, care coordination, missed school days, and/or unmet needs may have occurred since then. Nevertheless, we chose to use this data source because it provided a sufficiently large and representative sample of Oregon CSHCN to address the study's aims. Other more recent data sources like the 2016–17 NSCH, have much smaller samples of CSHCN per state (e.g., Oregon CSHCN $N=235$) that would not have been large enough to permit analyses addressing the study's aims specific to Oregon CSHCN with B/MCH and do not include items about unmet family support needs. In addition, the 2009–10 NS-CSHCN data were collected prior to the implementation of the Patient Protection and Affordable Care Act and Oregon's Patient-Center Primary Care Home (patient-centered medical home) Program. Once additional waves of data from the integrated NSCH become available, it will be informative to replicate these analyses to examine relationships of care coordination with school attendance and unmet needs for Oregon CSHCN with B/MHC within the context of healthcare transformation. Relatedly, our study only provides a cross-sectional view of CSHCN with B/MHC in Oregon with respect to care coordination, missed school days, and unmet healthcare need. Future research linking relevant health data sources over time for children, such as data from Oregon's early intervention program, Medicaid claims data, and data from school-based health centers, may provide greater insights into the causal nature of relationships between healthcare access and quality with more distal health outcomes for CSHCN with B/MHC. In addition, future research on these topics will need to account for the state specific nature of care coordination programs and other related programs such as accountable care organizations that have taken effect since the Affordable Care Act.

Conclusions

We undertook this study to extend Oregon's 2015 Title V needs assessment and to help inform related strategies for improvement areas identified for CSHCN. Our study's results

corroborate the needs assessment findings that CSHCN with B/MHC are a substantial child population with considerable unmet needs. These findings have implications for ensuring behavioral and mental health providers are included as key partners in the delivery of care for CSHCN statewide. Our study findings additionally showed care coordination receipt is linked to reduced unmet health services need for Oregon CSHCN with B/MHC, suggesting that state strategies such as shared plans of care may be helpful to increasing healthcare access for this population. Further research and cross-systems strategies are needed to improve school attendance and access to family support services for CSHCN with B/MHC in Oregon. The use of national data sources, like the NS-CSHCN and NSCH, may be helpful to other states undertaking similar initiatives.

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Table 1.Characteristics of Oregon CSHCN, by Behavioral and Mental Health Condition Status ($N=736$)

	Behavioral or Mental Health Condition 56.6% ($n=418$)	No Behavioral or Mental Health Condition 43.4% ($n=318$)	<i>p</i> -value
<u>Sociodemographic Characteristics</u>			
Age, years			.11
0–4 ($n=77$)	8.9%	14.9%	
5–11 ($n=295$)	38.1%	38.4%	
12–17 ($n=364$)	53.1%	46.8%	
Race and ethnicity			.53
White, non-Hispanic ($n=648$)	87.1%	84.7%	
Other ($n=88$)	12.9%	15.4%	
Primary household language			.86
English ($n=710$)	96.1%	95.7%	
Other ($n=26$)	3.9%	4.3%	
Sex			<.001
Male ($n=428$)	65.9%	49.4%	
Female ($n=308$)	34.1%	50.6%	
Household income level			.017
0–99% FPL ($n=56$)	15.1%	7%	
100–199% FPL ($n=120$)	23.2%	17.6%	
200–399% FPL ($n=257$)	33.1%	34.0%	
400% FPL ($n=303$)	28.7%	41.5%	
Highest parent education level			.003
High school diploma or less ($n=119$)	30.5%	16.6%	
Some college or more ($n=617$)	69.5%	83.4%	
Family structure			.006
Two-parent, biological or adoptive ($n=501$)	56.8%	71.5%	
Single mother ($n=114$)	24.3%	19.0%	
Other family structure ($n=115$)	19.0%	9.5%	
Insurance type coverage			<.001
Any private insurance ($n=522$)	57.2%	77.3%	
Public only or uninsured ($n=198$)	42.8%	22.7%	
Functional limitations			<.001
No limitations ($n=575$)	71.9%	89.0%	
Has functional limitations ($n=161$)	28.2%	11.1%	
<u>Care Coordination</u>			.43
Did not receive care coordination ($n=381$)	55.9%	52.3%	
Received effective care coordination ($n=349$)	44.1%	47.7%	
<u>Missed School Days and Unmet Needs</u> Missed school days			.54
0–3 days ($n=331$)	51.1%	51.3%	
4–6 days ($n=131$)	17.7%	22.6%	

	Behavioral or Mental Health Condition 56.6% (n=418)	No Behavioral or Mental Health Condition 43.4% (n=318)	p-value
7–10 days (n=93)	14.5%	12.6%	
11 days (n=91)	16.6%	13.5%	
Unmet health services need			<.001
None (n=609)	75.0%	90.0%	
1 (n=118)	25.0%	10.0%	
Unmet family support services need			--
None (n=686)	85.2%	99.3%	
1 (n=50)	14.8%	0.7%	

Note. Weighted Pearson χ^2 tests compare the distributions of each factor between Oregon CSHCN with behavioral or mental health conditions and those without behavioral and mental health conditions. Not all row frequencies sum to 736 because of missing data. Bolded values indicate statistically significant differences ($p < .05$). Missed school days were only assessed for CSHCN aged 5–17 years. Abbreviations: CSHCN, children with special health care needs; FPL, federal poverty level.

--Indicates it was not possible to compute a p -value due to small cell size.

Data source: 2009–10 National Survey of Children with Special Health Care Needs

Table 2.

Missed School Days and Unmet Needs Among Oregon CSHCN with B/MHC, by Sociodemographic Characteristics and Care Coordination

	4 Missed School Days 48.9		1 Unmet Health Services Need		1 Unmet Family Support Services Need	
Overall % (95% CI)	(42.7–55.1)		25.0 (20.0–30.9)		14.8 (10.6–20.6)	
	%	OR (95% CI)	%	OR (95% CI)	%	OR (95% CI)
<u>Sociodemographic Characteristics</u>						
Age, years						
0–4	--	--	46.3	1.00	39.8	1.00
5–11	43.8	1.00	30.2	0.50 (0.19–1.36)	16.2	0.29 (0.10–0.90)
12–17	52.5	1.41 (0.86–2.33)	17.8	0.25 (0.09–0.68)	9.6	0.16 (0.05–0.49)
	<i>p</i> = .17		<i>p</i> = .007		<i>p</i> = .002	
Sex						
Male	48.0	1.00	23.5	1.00	15.5	1.00
Female	50.6	1.11 (0.67–1.84)	28.0	1.27 (0.70–2.30)	13.4	0.84 (0.34–1.96)
	<i>p</i> = .69		<i>p</i> = .44		<i>p</i> = .69	
Race and ethnicity						
White, non-Hispanic	49.1	1.00	24.8	1.00	14.9	1.00
Other	47.2	0.92 (0.41–2.66)	26.7	1.11 (0.46–3.26)	14.2	0.95 (0.29–3.13)
	<i>p</i> = .85		<i>p</i> = .36		<i>p</i> = .93	
Primary household language						
English	37.6	1.00	18.6	1.00	26.1	1.00
Other	49.3	1.62 (0.39–6.76)	25.3	1.49 (0.30–7.25)	14.3	0.47 (0.07–3.06)
	<i>p</i> = .51		<i>p</i> = .62		<i>p</i> = .42	
Household income level						
0–99% FPL	32.5	1.00	40.5	1.00	26.2	1.00
100–199% FPL	50.6	2.13 (0.78–5.81)	26.0	0.52 (0.19–1.44)	22.1	0.75 (0.25–2.23)
200–399% FPL	52.1	2.26 (0.90–5.67)	27.6	0.56 (0.22–1.41)	12.8	0.31 (0.10–0.92)
400% FPL	51.5	2.21 (0.88–5.54)	13.1	0.22 (0.09–0.57)	5.2	0.12 (0.04–0.35)
	<i>p</i> = .26		<i>p</i> = .019		<i>p</i> = .014	
Parent education level						
High school diploma or less	56.9	1.00	21.8	1.00	12.3	1.00
Some college or more	30.0	0.32 (0.18–0.60)	32.5	1.73 (0.88–3.40)	20.5	1.85 (0.80–4.28)
	<i>p</i> = .002		<i>p</i> = .109		<i>p</i> = .15	
Family structure						
2 parent biological or adoptive	53.9	1.00	24.5	1.00	14.5	1.00
Single mother	37.0	0.50 (0.26–0.97)	30.2	1.33 (0.63–2.81)	18.1	1.30 (0.51–3.33)
Other family structure	49.8	0.85 (0.46–1.55)	20.1	0.78 (0.37–1.64)	11.9	0.79 (0.79–2.09)
	<i>p</i> = .09		<i>p</i> = .49		<i>p</i> = .69	
Insurance status and type						
Any private insurance	53.9	1.00	19.6	1.00	10.2	1.00

	4 Missed School Days 48.9		1 Unmet Health Services Need		1 Unmet Family Support Services Need	
Overall % (95% CI)	(42.7–55.1)		25.0 (20.0–30.9)		14.8 (10.6–20.6)	
	%	OR (95% CI)	%	OR (95% CI)	%	OR (95% CI)
Public only or uninsured	40.2	0.57 (0.34–0.97)	32.3	1.96 (1.09–3.52)	21.4	2.39 (1.12–5.09)
	<i>p</i> = .036		<i>p</i> = .023		<i>p</i> = .024	
Functional limitations status						
No functional limitations	46.0	1.00	20.3	1.00	12.3	1.00
Functional limitations	57.1	1.56 (0.89–2.73)	36.6	2.26 (1.26–4.06)	21.2	1.92 (0.93–3.98)
	<i>p</i> = .12		<i>p</i> = .006		<i>p</i> = .076	
<u>Care Coordination</u>						
No care coordination	49.8	1.00	33.8	1.00	18.4	1.00
Received care coordination	47.8	0.92 (0.56–1.53)	14.06	0.32 (0.17–0.61)	10.5	0.52 (0.23–1.18)
	<i>p</i> = .75		<i>p</i> < .001		<i>p</i> = .12	

Note. All analyses were weighted and due to use of subpopulation commands F statistic degrees of freedom are based in part on the total number of Oregon CSHCN. Bolded values indicate statistically significant associations ($p < .05$). Abbreviations: aOR, adjusted odds ratio; B/MHC, behavioral and mental health conditions; CI, confidence interval; CSHCN, children with special health care needs; FPL, federal poverty level. -- Indicates that the variable was removed from the model using a purposeful model selection process using an alpha level of .10.

Table 3.

Multivariable Logistic Regression Model Results: Associations of Sociodemographic Characteristics and Care Coordination with Missed School Days and Unmet Needs Among Oregon CSHCN with B/MHC

	4 Missed School Days (n=370)		1 Unmet Health Services Need (n=411)		1 Unmet Family Support Services Need (n=418)	
	aOR (95% CI)	p-value	aOR (95% CI)	p-value	aOR (95% CI)	p-value
<u>Sociodemographic Characteristics</u>						
Age, years						
0–4	--		1.00		1.00	
5–11	1.00		0.60	.29	0.27	.020
			(0.23–1.54)		(0.09–0.81)	
12–17	1.61	.058	0.29	.011	0.17	.002
	(0.98–2.62)		(0.11–0.75)		(0.06–0.52)	
Sex						
Male	--		--		--	
Female	--	--	--	--	--	--
Race and ethnicity						
White, non-Hispanic	--		--		--	
Other	--	--	--	--	--	--
Household income level						
0–99% FPL	--		1.00		1.00	
100–199% FPL	--	--	0.54	.24	0.86	.78
			(0.19–1.49)		(0.29–2.54)	
200–399% FPL	--	--	0.64	.33	0.49	.19
			(0.27–1.56)		(0.17–1.41)	
400% FPL	--	--	0.25	.002	0.16	.001
			(0.10–0.60)		(0.05–0.49)	
Parent education level						
High school diploma or less	1.00		--		--	
More than high school	0.32	.001	--	--	--	--
	(0.17–0.61)					
Family structure						
2 parent biological/adopted	1.00		--		--	
Single mother	0.61	.12	--	--	--	--
	(0.32–1.13)					
Other family structure	1.06	.86	--	--	--	--
	(0.55–2.06)					
Insurance status and type						
Any private insurance	--		--		--	
Public only or uninsured	--	--	--	--	--	--
Functional limitations status						
No functional limitations	1.00		1.00		1.00	

	4 Missed School Days (<i>n</i> =370)		1 Unmet Health Services Need (<i>n</i> =411)		1 Unmet Family Support Services Need (<i>n</i> =418)	
	aOR (95% CI)	<i>p</i> -value	aOR (95% CI)	<i>p</i> -value	aOR (95% CI)	<i>p</i> -value
Functional limitations	1.84 (1.05–3.21)	.032	2.02 (1.11–3.68)	.022	1.74 (0.83–3.62)	.14
<u>Care Coordination</u>						
No care coordination	--		1.00		--	--
Received care coordination	--	--	0.35 (0.18–0.69)	.003	--	--
	F(6, 681) = 4.16	< .001	F(7, 721) = 5.46	< .001	F(6, 729) = 5.14	< .001

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Note. All analyses were weighted and due to use of subpopulation commands F statistic degrees of freedom are based in part on the total number of Oregon CSHCN. Bolded values indicate statistically significant associations ($p < .05$). Abbreviations: aOR, adjusted odds ratio; B/MHC, behavioral and mental health conditions; CI, confidence interval; CSHCN, children with special health care needs; FPL, federal poverty level. -- Indicates that the variable was removed from the model using a purposeful model selection process using an alpha level of .10.

Data source: 2009–10 National Survey of Children with Special Health Care Needs