Health-Care Use and Expenditures for Children in Special Education with Special Health-Care Needs: Is Dual Classification a Marker for High Use?

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SYNOPSIS

Objectives. Children with special health-care needs are an important group for policy and research planning. Special education engages a group of children with increased utilization of services related to education. While increased service utilization in education or health-care settings is often used to classify children as having special needs, considerable heterogeneity exists within each group. The extent to which being identified in two functionally defined systems—special education and health care—relates to health-care utilization is unknown. We sought to determine health-care and mental health utilization and expenditures for children dually classified as receiving special education and having special health-care needs (SHCN) compared with those who only have SHCN, only are in special education, or don't fall into either category.

Methods. A nationally representative sample of children aged 5–17 years from the Medical Expenditure Panel Survey was used to compare mean health-care and mental health utilization and expenditures for the four groups.

Results. Dually classified children had significantly higher mean utilization of health-care services than the other three groups ($p<0.05$). Mean 12-month total health-care expenditures were highest for dually classified children ($3,891/year) ($p<0.05$) and higher for children classified only as having SHCN ($1,426/year) than for children with neither classification ($644/year, $p<0.05$).

Conclusions. Children dually classified as receiving special education and having SHCN represent a subgroup of children with SHCN with high levels of health-care utilization and expenditures. This information can assist policy makers in identifying characteristics that place children at risk for very high expenditures, and in allocating health-care resources.

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The establishment of meaningful classification systems to identify children at risk for high service use and plan for their needs is an important goal for health services research. While early studies focused on disease- or diagnosis-based classifications, researchers raised concerns that such a categorical paradigm did not adequately describe the variable functional impact of conditions.[1,2] In addition, there were concerns that categorical classification systems failed to capture children with high levels of need who may not fit into a specific diagnostic category.[1,2] The concept of children with special health-care needs (CSHCN) was developed as a functional classification to characterize children's service use and needs across a range of chronic conditions for policy and planning purposes.[2,3] CSHCN are defined as those who have or are at increased risk for having a chronic physical, developmental, or behavioral condition, and require more health or related services than children in general.[4]

CSHCN, representing approximately 13% to 18% of children, have elevated rates of health-care use and expenditures.[5–8] A recent study found that health-care expenditures were three times higher for CSHCN than for other children.[8] The financial burden to families of these children was disproportionately borne by those living below the federal poverty level.[8] In another study, children with chronic health conditions had higher levels of unmet health-care needs (for dental care, prescription medication, eyeglasses, or mental health services) than children without such conditions, with differences persisting after adjusting for sociodemographic factors and insurance status.[9]

Children in special education likewise have elevated rates of service utilization and expenditures within at least one system: education.[10] These children have functional impairments in the educational setting that affect their ability to learn and participate in school, and an increased need for and utilization of supportive educational, behavioral, or related services. Participation in special education and related services is a functional classification with parallels to the noncategorical CSHCN designation, as both groups have increased rates of service use.

Children with developmental disabilities and delays—conditions that require special education services—have been found to have increased rates of health-care use compared with children without such conditions.[11,12] Overall, 5.7% of children younger than 18 years of age were reported to receive special education or early intervention services, according to data from the nationally representative National Health Interview Survey (NHIS) in 2001.[13] An educational source estimates a higher prevalence of participation in special education, with 8.8% of children 6–21 years of age reported to be served through Part B of the Individuals with Disabilities Education Act in 2000–2001.[14] This higher estimate may be due in part to the fact that children with disabilities may be overrepresented in publicly funded educational programs, compared with the overall population of children.

Although both CSHCN and special education designations describe children requiring chronic, elevated levels of service, considerable heterogeneity exists in the severity, needs, and expenditures for children within each group.[8,10,15,16] This variability means that opportunities for refinement of policy decisions may be missed.

The overlap between special education and CSHCN samples is largely unexplored, as are implications for costs and use of services. A study using NHIS data reported that the majority (66%) of children receiving special education services did not receive services in another sector (special health or mental health services), 26% participated in services in one additional sector, and 8% of children received services in all three sectors (special education, special health care, and mental health services).[16]

The objective of this study was to determine whether children with increased service needs in two noncategorical classification systems—children dually classified as receiving special education and having special health-care needs (SHCN)—represent a subgroup with health-care use and expenditures that differ from those of other CSHCN. Prior studies show that children with developmental and behavioral conditions likely to require special education services have increased health-care use and expenditures.[11,12,17] We therefore hypothesized that dual classification would identify a subgroup within the population of CSHCN characterized by especially high health-care use and expenditures. If dual classification identifies a subgroup of children with especially high use and expenditures, this information could be used to plan for medical and mental health-care services at the population level, and to adequately compensate providers for the increased levels of care coordination these children may require.

METHODS

Data source

This study used data from the 2000 Medical Expenditure Panel Survey (MEPS) Household Component Survey.[18] MEPS is an ongoing survey of health-care use, expenditures, and health insurance status of a nationally representative sample of the U.S. civilian, noninstitutionalized population.[18] The Household Component Survey uses an overlapping panel design

with five rounds of computer-assisted personal interviews over a two-year period. A parent or primary caregiver provided information about children in the household. Although data from more recent MEPS surveys are available, we utilized data from the 2000 MEPS; primary data on participation in special education are not presented after 2000, but are subsumed under the constructed variable, CSHCN. Detailed information on the survey procedures and methods used in the MEPS, including expenditures, can be found at www.meps.ahrq.gov.

Noncategorical variables: special education and CSHCN

Special education and CSHCN variables were included in round four of the MEPS Household Component Survey.[18] Participation in special education in MEPS was determined by a two-part question: (*1*) "Does [person] have an impairment or a physical or mental health problem which limits [person]'s school attendance or which requires a special school program?" (*2*) If the answer was "yes," the respondent was asked: "Is [person] enrolled in any type of special education or does [person] receive related services aimed at improving [person]'s ability to participate in school or recreational activities?"[18] (In guidance for the MEPS, a special school program is defined as "services that are offered to students to help improve reading skills, mathematical skills, social skills, or other individual deficits that are offered in addition to the regular curriculum." Special education is defined as "specially designed instruction to meet the unique needs of a child with a disability, including instruction in the classroom, in the home, in hospitals and institutions, and other settings.")[19] Respondents who replied positively to both questions were classified as receiving special education services in the current study.

The CSHCN variable in the MEPS was constructed from responses to a published CSHCN screener[20] included in the Parent Administered Questionnaire (PAQ) portion of the survey.[21] The CSHCN screener is validated[22] and has been widely used.[23–25] It contains questions in five areas of functioning, each with two follow-up questions that establish a relationship to a chronic medical or behavioral condition: (*1*) "Is this because of any medical, behavioral, or other health condition?" and (*2*) "Is this a condition that has lasted or is expected to last for at least 12 months?"[20] A child is classified as having SHCN if answers to any one of the five topic questions and both follow-up questions are positive. The first topic question asks about the use of medications: "Does your child currently need or use medicine prescribed by a doctor, other than vitamins?" The second topic question inquires about participation in educational services, among others, but is not specific to special education: "Does your child need or use more medical care, mental health, or educational services than is usual for most children of the same age?" The final three topic questions of the CSHCN screener are: "Is your child limited or prevented in any way in his or her ability to do the things most children of the same age can do?"; "Does your child receive special therapy, such as physical, occupational, or speech therapy?"; and "Does your child have any kind of emotional, developmental, or behavioral problem for which he or she needs or receives treatment or counseling?"

Subjects

Subjects were children and adolescents aged 5–17 years included in the year 2000 MEPS (n=5,387). Overall, 234 children (4.3%) received special education services, and 819 (15.2%) were classified as CSHCN based on the CSCHN screener. Subjects were categorized into four mutually exclusive groups for the analyses.

Group 1. Children dually classified as receiving special education and having SHCN were put in Group 1 (dual classification; n=140, 2.6%). This group included children in special education also classified as CSHCN based on the CSHCN screener in the MEPS.[20]

Group 2. CSHCN not in special education were put in Group 2 (single classification, SHCN only; n=679, 12.6%). Of the 819 children who were classified as CSHCN in the MEPS, 140 children were also classified as participating in special education. To compare use and expenditures by classification (dual, single, or neither), and to ensure mutually exclusive groups, these subjects were excluded from Group 2. The remaining 679 children comprised the SHCN-only group—those CSHCN not receiving special education.

Group 3. Children in special education who were not classified as CSHCN in the MEPS comprised Group 3 (single classification, special education only; n=94, 1.7%). This group included children in special education not classified as CSHCN.

Group 4. Children classified as neither receiving special education nor as CSHCN comprised Group 4 (neither classification; n=4,474; 83.1% of the sample). Children who were neither reported to participate in special education nor classified as CSHCN were included.

Characteristics and measures

Child and family characteristics and insurance status for the four groups were examined. Use of medical and mental health services in the MEPS database included the number of health-care visits, mental health visits,

and prescriptions in the 12-month period.[18] We examined the proportion of children in each group with any expenditure for categories including total outpatient, inpatient, emergency department, and outpatient medical drugs.[18] Mean expenditures in U.S. dollars for all subjects were examined, including total outpatient, inpatient, and emergency department; outpatient medical drug, mental health, and psychiatric drug expenditures; and out-of-pocket (OOP) health-care expenditures incurred by families. Mean expenditures were chosen for comparison to median expenditures, which were $0 in a number of categories and, therefore, provided little information on differences between groups.

ANALYSIS

Unweighted data are presented to show the sample size and compare demographic characteristics of the four comparison groups (Table 1). (Weighted data would provide information about the distribution of these characteristics in the general U.S. population, but not in this specific sample and analysis.) Significant differences in demographic and insurance characteristics between groups were determined using pair-wise Chi-Square tests for dummy or categorical variables. Linear hypothesis tests using simple linear regressions were conducted to determine significant differences for continuous variables.[26]

Mean 12-month rates of health-care and mental health use and expenditures, the dependent variables, and corresponding 95% confidence intervals (CIs) were calculated using Stata statistical software.[27] Point estimates, variances, and resulting CIs were adjusted for the sampling strategy used to produce nationally representative estimates in the MEPS, using weights provided in the documentation for the database.[18] As is often the case for expenditure data, these were not normally distributed and were therefore transformed to meet assumptions for linear regression—a fourth-root transformation was required. Significant differences in mean use and expenditures between groups were also assessed using linear hypothesis tests.

Adjustment of expenditure outcomes for differences in demographic and insurance characteristics between groups was attempted. The model was not stable with adjustment, given the small number of subjects in certain cells with stratification. Mean rates of use and expenditures are therefore presented without adjustment. However, a regression analysis was conducted to determine the significance of differences in total health-care expenditures between groups after controlling for the child's age, gender, and type of medical insurance, as well as the parent's level of education, and an F-test was used to examine all pair-wise comparisons.

The project used publicly available MEPS data and was determined to be exempt from human subject review by the Institutional Review Boards of the University of Florida and the University Hospitals Health System in Cleveland.

RESULTS

Demographic and insurance characteristics

Compared with children classified in neither system, children in the three other groups were more likely to be male ($p<0.05$) (Table 1). Dually classified children and children in the SHCN-only group were less likely to be uninsured than those with neither classification ($p<0.05$). Dually classified children were more likely to be insured by a public program than children with neither classification, whereas those in the SHCN-only group were more likely to have private medical insurance ($p<0.05$). Children in the special education-only group were less likely to have both parents living in the home or married parents, compared with the neither classification group ($p<0.05$). Compared with children having neither classification, the primary parent of dually classified children was less likely to be employed, and the parent of children in the SHCN-only group was more likely to be employed ($p<0.05$).

Health-care and mental health use

Mean rates of health-care use were highest for dually classified children compared to the single classification or neither classification groups for most categories ($p<0.05$) (Table 2). For many categories, children in the special education-only group had rates of use intermediate between those of children with neither classification and SHCN only.

Health-care and mental health expenditures

In general, the proportion of children with any expenditure in the different categories was highest for dually classified children, followed by the SHCN-only, special education-only, and neither classification groups (Table 3). Nearly half of dually classified children (49%) had an outpatient psychiatric drug expenditure, compared with 21% in the SHCN-only group, and 1% in the neither classification group.

Mean unadjusted expenditures for dually classified children were significantly higher than for the SHCN-only group for total outpatient medical, total outpatient mental health, psychiatric drug, and total health-care expenditures ($p<0.05$) (Table 4). In turn,

Table 1. Demographic characteristics of comparison groups (unweighted)[a]

Characteristic	*Group 1: dual classification (special education and SHCN) (n=140)*	*Group 2: single classification (SHCN only) (n=679)*	*Group 3: single classification (special education only) (n=94)*	*Group 4: neither classification (n=4,474)*
Child				
Mean age (SD)	10.9 (3.5)	11.5 (3.7)[b]	12.3 (3.1)[b,c]	10.7 (3.7)
Gender: female (percent)	24.3[b]	43.7[b]	33.0[b]	50.6
Race (percent)				
Black	14.3	16.1	17.0	19.0
White	80.7	82.4[b]	71.3	76.8
Other	5.0	1.5	11.7	4.2
Ethnicity: Hispanic (percent)	27.1	21.4[b]	30.9	34.0
Insurance status (percent)				
No medical insurance	6.4[b]	6.9[b]	12.8	13.6
Insurance coverage (percent)				
Private	57.9	68.2[b]	55.3	60.1
Public	35.7[b]	24.9	31.9	26.3
Insurance type (percent)				
Managed care	60.7	57.4[b]	58.5	53.4
Indemnity	39.3	42.6[b]	41.5	46.6
Parent[d]				
Parent(s) in home (percent)				
Mother and father	67.1	69.2	57.5[b]	69.5
Mother or father	30.0	27.4	36.2[b]	26.0
Neither parent	2.9	3.4	6.4	4.5
Mean parent age (SD)	38.8 (7.2)[b]	38.7 (7.0)[b]	38.9 (6.2)	37.6 (6.9)
Household size (*n* [SD])	4.3 (1.4)[b]	4.3 (1.4)[b]	4.6 (1.7)	4.7 (1.6)
Marital status: married (percent)	65.0	67.0	57.5[b]	67.4
Education (percent)				
High school diploma	71.4	83.1[b]	58.5[b,c]	70.6
Employment status (percent)				
Employed	64.3[b]	79.4[b]	75.5	75.1
Family income as percent FPL				
<100%	19.3	17.2[b]	23.4	22.2
100%–199%	7.9	6.7	2.1	6.7
>199%	72.9	75.4[b]	74.5	71.1

[a]Significant differences between groups were determined by the Chi-Squared test.

[b]Significant difference from neither classification (Group 4) ($p<0.05$)

[c]Significant difference from dual classification (Group 1) ($p<0.05$)

[d]When both parents were living in the home, data on the mother are presented.

SHCN = special health-care needs

SD = standard deviation

FPL = federal poverty level

mean expenditures for children in the SHCN-only group were significantly higher than for children with neither classification in most categories. Mean unadjusted expenditures for children in the special education-only group were not significantly different from those with neither classification.

Mean total health-care expenditures

Mean total unadjusted health-care expenditures were significantly higher for dually classified and SHCN-only children than for those with neither classification ($p<0.05$) (Table 4): 6.0 times higher for dually classified children (mean additional expenditure beyond that for neither classification = $3,247/year) and 2.2 times higher for the SHCN-only group (mean additional expenditure = $782/year). Mean total health-care expenditures were 2.7 times higher for the dually classified group compared with the SHCN-only group ($p<0.05$) and were comparable for children in the special education-only and neither classification groups.

Adjusted analysis of total health-care expenditures

After controlling for differences in demographic and insurance characteristics among groups (child's age, gender, and type of medical insurance, and parent's education level), total health-care expenditures for the dually classified and SHCN-only groups remained significantly higher than for the neither classification group ($p<0.001$ for both comparisons). In contrast with the unadjusted analysis, with adjustment, total health-care expenditures for the special education-only group were significantly higher than for the neither classification group ($p<0.01$) and comparable to those of the SHCN-only group ($p=0.06$). Total health-care expenditures for dually classified children remained significantly higher after adjustment than for those in the SHCN-only and special education-only groups ($p<0.001$).

DISCUSSION

Both SHCN and special education designations represent functional ways of identifying children with increased service needs. As hypothesized, dually classified children had significantly higher rates of use of medical and mental health services and concomitantly higher health-care expenditures than children identified through a single functional classification system. Dually classified children had mean additional total health-care expenditures of $3,247/year beyond those for children classified in neither system. By compari-

Table 2. 12-month utilization of medical and mental health services by children aged 5–17 years (weighted)[a]

Services[b]	*Group 1: dual classification (special education and SHCN) (n=140) (95% CI)*	*Group 2: single classification (SHCN only) (n=679) (95% CI)*	*Group 3: single classification (special education only) (n=94) (95% CI)*	*Group 4: neither classification (n=4,474) (95% CI)*
All health services				
Probability of any health visit	0.90[c,d] (0.83, 0.97)	0.82[c] (0.78, 0.87)	0.75 (0.62, 0.87)	0.63 (0.61, 0.66)
Total number of visits	11.8 [c,d,e] (7.6, 15.9)	5.9[c] (5.1, 6.7)	4.0[c] (1.4, 6.7)	1.9 (1.8, 2.0)
Total number of prescriptions	11.2[c,d,e] (8.2, 14.1)	6.1[c] (5.4, 6.8)	2.5[c,e] (1.3, 3.6)	1.1 (1.0, 1.2)
Total number of outpatient/office visits	11.3[c,d,e] (7.3, 15.4)	5.7[c] (4.9, 6.5)	3.7[c] (1.1, 6.3)	1.8 (1.6, 1.9)
Probability of emergency department visit	0.21[c] (0.12, 0.29)	0.15[c] (0.11, 0.18)	0.17 (0.06, 0.28)	0.09 (0.08, 0.10)
Probability of hospitalization	0.07[c] (0.00, 0.14)	0.04[c] (0.02, 0.06)	0.03 (0.00, 0.07)	0.02 (0.01, 0.02)
Mental health services				
Probability of any mental health visit	0.38[c,d,e] (0.28, 0.49)	0.15[c] (0.12, 0.18)	0.10[c] (0.01, 0.19)	0.01 (0.01, 0.02)
Total number of mental health visits	4.0[c,d,e] (1.8, 6.2)	1.2[c] (0.8, 1.5)	0.4[c,e] (0.0, 0.7)	0.1 (0.0, 0.1)
Total number of outpatient/office mental health visits	4.0[c,d,e] (1.8, 6.2)	1.1[c] (0.7, 1.6)	0.4[c,e] (0.0, 0.7)	0.1 (0.0, 0.1)
Probability of mental health therapy/counseling visits	0.24[c,d,e] (0.16, 0.32)	0.13[c] (0.10, 0.17)	0.08[c] (0.00, 0.16)	0.01 (0.01, 0.02)
Total number of mental health therapy/counseling visits	3.0[c,d,e] (1.1, 4.8)	1.1[c] (0.7, 1.6)	0.4[c] (0.0, 0.9)	0.1 (0.0, 0.1)

[a]Data are weighted to adjust for sampling strategies used in the Medical Expenditure Panel Survey.

[b]All utilization is during a 12-month period.

[c]Significantly different from neither classification (Group 4) ($p<0.05$)

[d]Significantly different from special education only (Group 3) ($p<0.05$)

[e]Significantly different from SHCN only (Group 2) ($p<0.05$)

SHCN = special health-care needs

CI = confidence interval

son, children classified within a single system, SHCN only, had mean additional annual health-care expenditures of $782/year. Dual classification appears to be a marker for significantly elevated health-care use and expenditures, and describes a subgroup of CSHCN with especially high rates of health-care expenditures. Special consideration may be required in planning for the needs of dually classified children across multiple systems of care.

Other studies have reported increased health-care expenditures for children with chronic medical or behavioral conditions, comparable to those for children classified in a single system in the current study.[17,28,29] Using 1996 MEPS data, Chan et al. found that excess annual health-care expenditures were $479 for children with attention deficit hyperactivity disorder (ADHD) and $437 for children with asthma.[17] Using data from a health maintenance organization in Washington State, Guevara et al. found that the adjusted incremental annual cost of health-care services for children aged 3–17 years with uncomplicated ADHD was $375.[28] This figure increased to $812 per year for a child with ADHD plus a comorbid mental health condition.[28] The results of our study found additional expenditures for dually classified children that are well in excess of those described for children identified by the diagnostic categories used in these studies.

Using MEPS data, Newacheck and Kim found that CSHCN had health-care expenditures that were three times higher than those of other children under 18 years of age.[8] While 16% of subjects in their sample were classified as CSHCN, this group accounted for 42% of total annual medical care expenditures, excluding dental costs. Using a similar dataset, we have identified a subset of CSHCN with extremely elevated health-care expenditures: dually classified children had total health-care expenditures that were 2.7 times higher than for CSHCN not in special education, and six times higher than children with neither classification.

While previous studies have not explored the overlap

Table 3. Proportion of children aged 5–17 years with any expenditures for medical and mental health care (weighted)[a]

Type of expenditure	*Group 1: dual classification (special education and SHCN) (n=140) (95% CI)*	*Group 2: single classification (SHCN only) (n=679) (95% CI)*	*Group 3: single classification (special education only) (n=94) (95% CI)*	*Group 4: neither classification (n=4,474) (95% CI)*
Health-care expenditures				
Any outpatient medical expenditures	0.79[b] (0.70, 0.89)	0.75[b] (0.71, 0.80)	0.65 (0.53, 0.78)	0.59 (0.56, 0.61)
Any outpatient medical drug expenditures	0.66[b,c] (0.56, 0.76)	0.68[b] (0.65, 0.72)	0.44[d] (0.31, 0.57)	0.39 (0.37, 0.41)
Any inpatient expenditures	0.07[b] (0.00, 0.14)	0.04[b] (0.02, 0.06)	0.03 (0.00, 0.07)	0.01 (0.01, 0.02)
Any emergency department expenditures	0.19[b] (0.12, .27)	0.14[b] (0.11, 0.17)	0.17 (0.06, 0.28)	0.09 (0.08, 0.10)
Mental health expenditures				
Any outpatient mental health expenditures	0.33[b,c,d] (0.23, 0.43)	0.14[b] (0.12, 0.17)	0.08[b] (0.00, 0.17)	0.01 (0.01, 0.02)
Any outpatient psychiatric drug expenditures	0.49[b,c,d] (0.39, 0.59)	0.21[b] (0.18, 0.25)	0.08[b,d] (0.02, 0.14)	0.01 (0.01, 0.02)
Out-of-pocket expenditures				
Any out-of-pocket expenditures	0.84[b] (0.77, 0.92)	0.84[b] (0.81, 0.88)	0.71[d] (0.58, 0.84)	0.65 (0.63, 0.67)
Total expenditures				
Any health-care expenditures	0.96[b,c] (0.92, 1.00)	0.93[b] (0.90, 0.96)	0.83[d] (0.74, 0.93)	0.78 (0.76, 0.79)

NOTE: Proportions are out of a maximum possible participation of 1.00 (equivalent to 100%) for each expenditure category.

[a]Data are weighted to adjust for sampling strategies used in the Medical Expenditure Panel Survey.

[b]Significantly different from neither classification (Group 4) ($p<0.05$)

[c]Significantly different from special education only (Group 3) ($p<0.05$)

[d]Significantly different from SHCN only (Group 2) ($p<0.05$)

SHCN = special health-care needs

CI = confidence interval

Table 4. Mean 12-month expenditures (in U.S. dollars) for medical and mental health care for children aged 5–17 years (weighted)[a]

Expenditure category[b]	*Group 1: dual classification (special education and SHCN) (n=140) (95% CI)*	*Group 2: single classification (SHCN only) (n=679) (95% CI)*	*Group 3: single classification (special education only) (n=94) (95% CI)*	*Group 4: neither classification (n=4,474) (95% CI)*
Health-care expenditures				
Total outpatient medical expenditures	910[c,d] (413, 1,406)	359[c] (295, 425)	505 (80, 930)	152 (132, 172)
Total outpatient medical drug expenditures	235[c,e] (124, 347)	239[c] (161, 317)	50[d] (17, 82)	34 (27, 40)
Total inpatient expenditures	777 (0, 1,578)	247[c] (104, 389)	439 (0, 1,210)	70 (40, 101)
Emergency department expenditures	91 (13, 169)	52 (34, 69)	46 (9, 84)	40 (26, 55)
Mental health expenditures[f]				
Total outpatient mental health expenditures	180[c,d,e] (96, 264)	74[c] (48, 100)	28[d] (0, 56)	3 (2, 5)
Total outpatient psychiatric drug expenditures	339[c,d,e] (103, 576)	79[c] (62, 97)	54 (0, 123)	2 (1, 3)
Out-of-pocket expenditures[f]				
Total out-of-pocket expenditures	301 (184, 419)	392[c] (301, 482)	284 (145, 424)	204 (171, 236)
Total expenditures[f]				
Total health-care expenditures	3,89[c,d,e] (2,194, 5,588)	1,426[c] (1,197, 1,655)	1,442 (430, 2,453)	644 (574, 715)

[a]Data are weighted to adjust for sampling strategies used in the Medical Expenditure Panel Survey.

[b]Median expenditures are based on unweighted data.

[c]Significantly different from neither classification (Group 4) ($p<0.05$)

[d]Significantly different from SHCN only (Group 2) ($p<0.05$)

[e]Significantly different from special education only (Group 3) ($p<0.05$)

[f]All expenditures are during a 12-month period.

SHCN = special health-care needs

CI = confidence interval

between CSHCN and special education populations with respect to health-care expenditures, there is evidence from population-based studies that participation in special education can be associated with increased use of health-care services.[15,30–32] This evidence is related to the types of developmental and behavioral conditions that qualify children for special education or related school services. For example, related services received at school, such as speech or occupational therapy services, may also be accessed through the health-care system to supplement school-based services. A child with a behavioral condition such as ADHD requiring special education support may also receive counseling and medication through the mental health and health-care systems.

Although there is significant variability in educational expenditures for children receiving special education, the mean cost per child is almost twice that for regular educational services ($12,525 vs. $6,556/year in 1999–2000).[10] When these costs are added to those for health-care and mental health services for children in special education, it becomes clear that this high-risk group of children requires added resources in multiple systems that are well beyond those needed for children in general.

The results of our study demonstrate that the designation CSHCN does not represent a homogeneous group in terms of health-care use and expenditures. Although the use of a standardized CSHCN screener allows for uniform rates of identification across states, in practice there is substantial variability between states in how children with special needs are identi-

fied and qualify for Title V Maternal and Child Health programs serving children with special needs. Some states use categorical lists, while others use functionally based classification systems.[33] Whether a categorical or noncategorical approach is used, states clearly limit services to a subgroup of CSHCN.

The percentage of children with special needs receiving Title V services varies among states, from 0.14% and 2.82% of children younger than 18 years of age, a small fraction of the 13% to 18% of the pediatric population identifiable by a health services definition of CSHCN.[33] By using a dual classification approach, we have shown that it is possible to identify a functionally defined subgroup of CSHCN, those receiving special education or related services, who have significantly higher expenditures than CSHCN in general. Information about the degree of children's functional limitations, and the conditions underlying or associated with these limitations, will doubtless continue to be critical for planning services and allocating resources. Although dual classification may not be a practical strategy to identify individual children who qualify for Title V services, it may help to identify communities with high burdens of children with elevated medical needs, based on high rates of participation in special education.

This study had several limitations. Participation in special education services may have been underestimated in the database. Overall, 4.3% of children and adolescents aged 5–17 years were classified as participating in special education or related services. This figure is lower than estimated rates reported from an educational source[14] but comparable to rates from another nationally representative database, the NHIS.[16] Because of sampling issues, MEPS documentation cautions that the database is not intended to provide population estimates of the prevalence of conditions.[18] Underreporting of participation in special education might have produced a bias toward children with more intensive use of services, which could have led to increased estimates of health-care expenditures. The reason for children's participation in special education was not specified in the MEPS, and examination of diagnostic codes for each subject did not provide clarification.

It may be possible in future studies to link the MEPS and NHIS databases to address this question more fully. In addition, while use of a CSHCN screener allows for uniform assessment between different geographic areas, rates of participation in special education are known to vary by state and school district, contributing to additional error in our estimates.

The results of this study have diverse practical implications. First, case managers for managed-care organizations and health departments coordinating services for youth with special health-care needs would be well-served to provide special attention to dually classified youth and their families. Similarly, case-mix and capitated payment strategies should be adjusted both for insurers and providers to increase the likelihood that high-needs dually classified youth will receive appropriate access and services.

Finally, our results have implications for the conduct of the MEPS survey itself. Forty percent of the children receiving special education or related services were not classified as CSHCN by the screener used in the MEPS.[20] By definition, children in special education receive an increased intensity of services for learning and/or behavioral conditions, and could be expected to be classified as CSHCN.

There appeared to be a discrepancy between parents' reports of participation in special educational services on the screener, where the question related to increased use of educational services also includes use of medical and mental health services, and a more direct question about a child's participation in special education. This finding raises a concern about possible underresponse to the question about educational services on the CSHCN screener, which is based on a more comprehensive measure.[20,22] Further research is needed on the validity of the CSHCN screener as well as the special education questions used in the MEPS in identifying children who receive special education services.

Beginning in 2001, MEPS no longer present data on participation in special education, but subsume it into the CSHCN variable, which cannot be recreated into its constituent parts. We recommend that future MEPS datasets return to presenting information about participation in special education. Access to primary data will allow researchers and policy makers to answer a broader range of questions about this important group of children. While the category CSHCN predicts certain types of health-care use and is useful for planning general health-care policy,[4,8] the ability to answer scientific questions about children classified in another noncategorical system—participation in special education—will be lost if data are presented only in aggregate.

Further research is needed to better understand factors related to the health-care use of children dually classified as receiving special education and having SHCN to provide better planning to meet this important group's needs. Future studies that analyze the contribution of the severity of a child's limitations and needs, including measures of functional limitations

and health status for dually classified children, may provide further insight into the use and needs of affected children.

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