

creased (aPR, 0.96; 95% CI, 0.93-0.99) whereas any ingesting increased (aPR, 1.28; 95% CI, 1.11-1.48).

Discussion | The modes of marijuana consumption among Colorado high school students who used marijuana in the past month shifted significantly between 2015 and 2017. The reduction in smoking marijuana could indicate that adolescents are choosing not to smoke or using nonsmoking modes because of the associated health risks of smoking, which is consistent with data showing that adolescents perceive cigarette smoking to be harmful.⁶ Adolescents may also be more likely to ingest and/or dab. These modes are important to monitor because of their unique psychoactive associations, and potential harms, including unintentional overconsumption with edibles and an increased physiological tolerance and withdrawal associated with the high tetrahydrocannabinol levels of cannabis concentrates used for dabbing.³

Despite the potential limitations associated with self-report and the inability to assess frequency of mode use and details of the “other” category, Colorado is one of few states that collects statewide data on modes of marijuana consumption among adolescents. As we continue to learn about the availability and potential harms of these products to youth, particularly with high-potency products, understanding how adolescents use marijuana is essential to developing prevention programs and campaigns to reduce risky marijuana-use behaviors.

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Identification of Children With High-Intensity Neurological Impairment

Children with neurological impairment frequently experience unmet health care needs, high-severity acute illnesses, coexisting condition exacerbations, adverse medical events, and disproportionately high health care utilization and spending.^{1,2} Our clinical experience within the clinical spectrum of neurological impairment has suggested that children with high-intensity neurological impairment have increased severity of health problems, needs, and care. Best practices for managing the acute and chronic health care needs of children with high-intensity neurological impairment are underdeveloped, partly owing to the limited methods of distinguishing these patients.

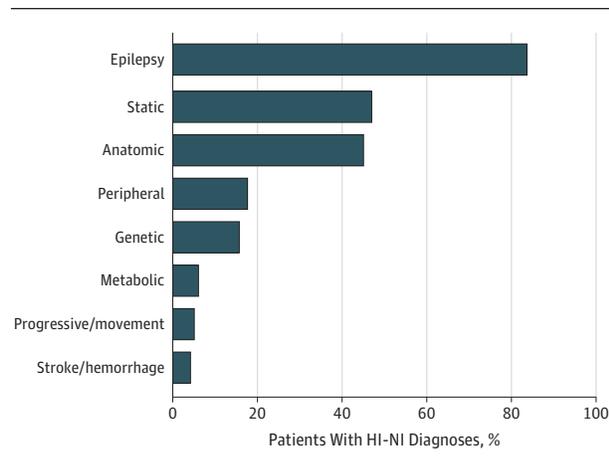
Existing pediatric classification systems for identifying complex neurological conditions (eg, cerebral palsy) in administrative data sets do not include disorders with neurological impairment originating from genetic, metabolic, and other organ systems (eg, trisomy 18, glutaric acidemia).^{3,4} Current classification systems that focus on neurological impairment include heterogeneous arrays of conditions with varied severity levels, which make studying patients with these conditions as 1 cohort challenging (eg, a child with mild intellectual disability and no functional limitations vs a nonverbal child with profound hypotonia and respiratory failure from Pompe disease).¹

In the present study, we aimed to improve the method of distinguishing children with high-intensity neurological im-

pairment by refining the classification of underlying neurological impairment diagnoses. We compared the high-intensity neurological impairment classification system's performance with that of an existing classification scheme to assess whether children with high-intensity neurological impairment had higher multimorbidity, polypharmacy, and health care utilization and spending.

Methods | This cross-sectional study involved children 1 to 18 years of age who had neurological impairment and were continuously enrolled in Medicaid in 2016 according to records from 10 states in the IBM MarketScan Medicaid Database. The institutional review board of Cincinnati Children's Hospital Medical Center exempted this study from review as it used deidentified data. Informed consent was also waived for this reason.

Figure. Frequencies of High-Intensity Neurological Impairment (HI-NI) Diagnostic Categories



The most common diagnosis within each HI-NI diagnostic category and the relative percentage of patients within that category are as follows. Epilepsy (29.7%), including unspecified, not intractable, and without status epilepticus; static (31.6%), including cerebral palsy and unspecified; anatomic (9.4%), including hydrocephalus and unspecified; peripheral (10.2%), including quadriplegia and unspecified; genetic (45.6%), including Down syndrome and unspecified; metabolic (19.9%), including lipoprotein deficiency; progressive or movement (22.8%), including cerebral infarction; and stroke or hemorrhage (15.4%), including extrapyramidal and movement disorder and unspecified.

We updated the most widely used neurological impairment coding system, *International Classification of Diseases, Ninth Revision, Clinical Modification*,¹ to *International Statistical Classification of Diseases and Related Health Problems, Tenth Revision*, diagnostic codes using General Equivalence Mappings, which was developed by the National Center for Health Statistics. Two of us (J.A.F. and J.E.T.) independently identified codes indicative of high-intensity neurological impairment, defined as a neurological diagnosis reasonably expected to last longer than 12 months and result in substantial functional impairments that require subspecialty medical care. Discrepancies were arbitrated by one of us (J.G.B.) and resolved by group consensus. High-intensity neurological impairment diagnoses and codes are available elsewhere (<https://www.childrenshospitals.org/Research-and-Data/Pediatric-Data-and-Trends/2019/High-Intensity-Neurologic-Impairment-Codes>).

We used χ^2 and Wilcoxon rank sum tests to compare demographic details, clinical information, and use of health services between children with high-intensity neurological impairment and children with lower-intensity neurological impairment diagnoses.

Results | Of the 302 383 children with neurological impairment, 120 121 (39.7%) were classified as having high-intensity neurological impairment. The most frequent high-intensity neurological impairment categories included epilepsy (100 357 [83.6%]), static (56 479 [47.0%]), and anatomic (54 004 [45.0%]) (Figure). Compared with children with lower-intensity neurological impairment, children with high-intensity neurological impairment were 4.8 times more likely to have 6 or more body systems with chronic condition indicators (17.2% vs 3.6%; $P < .001$) and 9.9 times more likely to have 3 or more organ systems with complex chronic conditions⁵ (10.9% vs 1.1%; $P < .001$). Children with high-intensity neurological impairment had 2 times the exposure to 15 or more unique medications annually (6.8% vs 3.1%; $P < .001$) and 1.6 times the exposure to 5 or more chronic medications⁶ (13.5% vs 8.4%; $P < .001$).

Children with high-intensity neurological impairment had higher use of health care services across all domains, with 2.0

Table. Health Care Spending and Utilization of Services for Children With Neurological Impairment

Variable	Neurological Impairment			P Value
	Overall (N = 302 383)	Low Intensity (n = 182 262)	High Intensity (n = 120 121)	
Total expense, \$	4 806 791 440	1 860 026 056	2 946 765 384	NA
PMPY expense, \$	15 896	10 205	24 532	NA
Utilization, No. (%)				
Inpatient	39 040 (12.9)	17 011 (9.3)	22 029 (18.3)	<.001
Primary care physician	250 300 (82.8)	146 403 (80.3)	103 897 (86.5)	<.001
Specialty	233 608 (77.3)	131 379 (72.1)	102 229 (85.1)	<.001
Emergency department	149 549 (49.5)	88 690 (48.7)	60 859 (50.7)	<.001
Home health	10 435 (3.5)	2446 (1.3)	7989 (6.7)	<.001
Therapy	107 608 (35.6)	50 329 (27.6)	57 279 (47.7)	<.001
Durable medical equipment	72 836 (24.1)	38 132 (20.9)	6 (28.9)	<.001

Abbreviations: NA, not applicable; PMPY, per member per year.

times more inpatient admissions (22 029 [18.3%] vs 17 011 [9.3%]; $P < .001$), 5.2 times more home health services (7989 [6.7%] vs 2446 [1.3%]; $P < .001$), and 1.7 times more therapy needs (57 279 [47.7%] vs 50 329 [27.6%]; $P < .001$) (Table). The 39.7% of children with high-intensity neurological impairment accounted for 61.3% (\$2 946 765 384) of total health care costs and had 2.4 times the per-member-per-year spending (\$24 532 vs \$10 205) of those with lower-severity neurological impairment (Table).

Discussion | Distinguishing children with high-intensity neurological impairment from those with lower-intensity neurological impairment is important, as evidenced by their greater multimorbidity, polypharmacy, and health care use and spending. Although inherent limitations exist when using diagnostic codes, the results of this study suggest that high-intensity neurological impairment codes may allow health care systems and payers such as Medicaid to efficiently identify these medically complex children with unique, higher-intensity needs. We believe the use of high-intensity neurological impairment codes could enable the prioritization of comparative effectiveness, health outcomes, and pharmaceutical research in this vulnerable population.

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Association of No Promotion of Homosexuality Laws and Electronic Cigarette Use Disparities for Sexual Minority Youth

Although US laws regarding sexual minorities have advanced in recent years, many state laws may still foster environments that can promote health disparities. As of March 2019, 7 US states (Texas, Arizona, South Carolina, Oklahoma, Louisiana, Alabama, and Mississippi) with nearly 9 million public school students¹ have laws explicitly prohibiting positive portrayals of sexual minority individuals or nonheterosexual activities in public school education (no promotion of homosexuality [NPH] laws). Recent school climate studies have demonstrated that the presence of NPH laws in a state is associated with a greater likelihood that students with sexual minority status will experience harassment or assault at school.¹ Thus, NPH laws may reflect and support school environments that exacerbate stress for these adolescents.²

Use of tobacco is a stress-driven health disparity for sexual minority individuals.³ Most research on tobacco use by members of sexual minority groups has focused on cigarette smoking, but use of e-cigarettes has increased rapidly in recent years, and in 2016, e-cigarettes became the most commonly used tobacco product among middle school and high school students.⁴ Adolescents believe that flavored e-liquids, which contain glycerin-based liquids not meant to be inhaled,⁵ are targeted toward them.⁶ We investigated the associations between current e-cigarette use and NPH laws by sexual orientation and sex.