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Identifying Children in Need for Early Intervention Services in Washington State

An Application of Washington State All Payer Claims Database in Education Research

ERDC
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ABOUT THE ERDC

The research presented here uses data from the Education Research and Data Center, located in the Washington Office of Financial Management. ERDC works with partner agencies to conduct powerful analyses of learning that can help inform the decisionmaking of Washington legislators, parents, and education providers. ERDC's data system is a statewide longitudinal data system that includes de-identified data about people's preschool, educational and workforce experiences.

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Introduction

Birth to three are critical years for children's physical, language, and social emotional development.[1] The provision of early intervention services to vulnerable children and their families is of particular economic and social importance.[2] Washington State Early Support for Infants and Toddlers (ESIT) program[3] provides individualized and quality early intervention services to children birth to three who have disabilities or developmental delays, in accordance with the federal Individuals with Disabilities Education Act (IDEA), Part C[4]. The goal of this paper is to examine the value of combining ESIT data with medical claims information to identify the magnitude and demographics of the population underserved by ESIT.

Background

The two datasets used for this analysis are ESIT administrative data and the Washington State All Payer Claims Database (APCD). ESIT collects information for the purposes of finding eligible children through screening, tracking, monitoring, and referral services for at risk children in order to provide early intervention services (including developmental and therapeutic services for children who are identified as developmentally delayed or have an established condition for delay). APCD is a large-scale database[5] that collects health care claims data from payer sources including Medicaid, private insurers, and Medicare plans.

The timing of this report is crucially important given the lifecycles of the databases being analyzed. ESIT was established in 1986 making it a mature and stable program while APCD reached full operation in 2018. Being a relatively new database, APCD has never before been compared to ESIT thus making this analysis a unique opportunity for policy makers to obtain utilization information of medical services received by the Washington State population and to better understand the potential scope of interventions ESIT could provide and quantify the size of the population as yet unserved by the program.

1 International Perspectives on Early Intervention: A Search for Common Ground; Michael Guralnick; Journal of Early Intervention 2008, 30(2): 90-101

2 Skill Formation and the Economics of Investing in Disadvantaged Children; James Heckman; Science 2006, 312: 1900-1902

3 https://www.dcyf.wa.gov/services/child-development-supports/esit

4 Early Intervention Program for Infants and Toddlers with Disabilities, U.S. Department of Education https://www2.ed.gov/programs/osepeip/index.html

5 https://www.wahealthcarecompare.com/washingtons-apcd

Purpose

Early intervention for children with disabilities is one of the fields Washington's Education Research & Data Center (ERDC) is charged with analyzing. ERDC integrates early learning, K-12, post-secondary and workforce data, and conducts longitudinal education and cross-sectional research. This study contributes to ERDC's mission by exploring the application of APCD medical claims data in education research for the purpose of identifying children underserved by ESIT. By identifying the magnitude and demographics of an at-risk population in Washington State who are potentially eligible for early intervention services, ERDC hopes to identify a treatment and control group for future research. This research could help improve our understanding of how these medical conditions might impact the education outcomes of early learners.

Profiling the Data

Both ESIT and APCD databases contain individual identifiers which may be used to directly observe individuals occurring in either database. Eligibility for the ESIT program is determined through evaluations in physical, cognitive, social emotional, communication, and adaptive areas. From 2011 to 2017, 14,508 children have diagnosed medical conditions documented[6]. The ESIT program records 50 diagnosed conditions related to developmental delay and disability, such as Autism, Blood Disorder, Congenital Anomaly, Diabetes, Down syndrome, and Severe Injury. Table A1 in the Appendix shows the counts of all the children documented with selected diagnosed medical conditions in ESIT data, from 2011 to 2017. Table A1 also reports counts of children in APCD data during the corresponding period.

In Table A5, we listed the International Classification of Diseases (ICD) diagnosis codes for these medical conditions. We mapped these ICD codes to APCD data and extracted medical claims with such diagnosis as the primary diagnosis or one of the first ten diagnoses of the claim, as shown in Table A2. We restricted our data extract to focus on children zero to 36 months old at claim first service time in the APCD claims data and summarized counts of children by year and demographic characteristics including gender, age, insurance coverage type and county of address in Table A3. In Table A4, we examined claims with interested medical conditions as primary diagnosis. The total costs paid by insurance and out of pocket were computed. We then calculated time durations between first service date and last service date of each claim and summarized maximum and average statistics.

6 We have access to 2007-2018 ESIT database where total 96,713 children were referred to the system and 65,411 children enrolled.

With a steady yet slight increasing trend over reported years from 2014 to 2017, results show that 59% of all children having the selected medical conditions reported by APCD were boys, and over 83% of all children had Medicaid coverages[7].

Identifying Underserved Populations

APCD data has great potential to enhance our understanding of ESIT program outcomes, as well as other education programs. These two data systems have never yet been connected in this way before, and already we are seeing tremendous policy insights that serve as the starting point for further analysis.

When we number of children identified in APCD having the selected medical conditions with number of children served by ESIT (with the selected diagnosed condition in records), as shown in Table 1, we see disparities. The possible reasons are 1) some children having these conditions were considered not severe enough for referral; 2) some were not eligible based on evaluation results; or 3) some families refused services. In addition, significant number of all at-risk children are not identified by/referred to early intervention services. Recognizing these disparities would help program planning and outreach to serve children and families in need.

Table 1: Comparing ESIT referrals and APCD database

Selected Diagnosed Conditions	Ratio of the children with ESIT documented diagnosis and children in APCD
Autism	51%
Cerebral Palsy	33%
Down Syndrome	86%
Epilepsy	7%
Fetal Alcohol Syndrome	16%
Hearing Loss	19%
Microcephaly	12%
Muscular Dystrophy	46%
Myelomeningocele	11%
Neurofibromatosis	19%
Nutritional Deficiency	0%
Spinal Bifida	36%
Visual Impairment	41%

7 Currently, APCD does not include claims carried by self-insured employers, such as Boeing, Microsoft.

For example, we can see that children in ESIT programs who were treated for epilepsy, microcephaly, hearing loss and other conditions are substantially outnumbered by the total children treated as documented in the APCD. This indicates that many children may be eligible for treatment under ESIT who are not participants of the program, an insight yielded only by comparing the two databases. On the other hand, medical conditions such as autism has high ratio of the children with ESIT documented diagnosis and children in APCD, which indicates concerns in children's development from behavior disorder in young age. Thirdly, comparing the referral rates in different locations could provide insight into the efficiency of program outreach in each location. Examples like these highlight the tremendous value of connecting these two databases.

Future Research

In the future, early learning research would further benefit from linking early intervention services administrative data from ESIT with medical claims data from APCD. The linking results would provide a powerful platform to evaluate the individualized effectiveness of early intervention services to children with different physical, cognitive or behavioral conditions. We would be able to calibrate duration of early intervention service, transition out age, reason and eligibility for subsequent programs. It would be also possible to track a child's health history together with his education outcomes especially for the at-risk population. In addition to established medical conditions, APCD also provides an opportunity to study the effectiveness of health awareness and decision making in early age using vaccination or safety requirement as a vehicle. We would also be able to identify medical condition specified sub-population and how these conditions might affect children's education outcomes. Altogether, application of APCD in education research provides a unique opportunity aligning and coordinating early childhood health and early learning systems to establish a solid foundation for school-readiness as well as long- term health for all children especially at-risk groups.[8]

8 https://www.acf.hhs.gov/sites/default/files/ecd/health_early_learning_statement.pdf

Appendix A: Data

Table A1. Total count of children in ESIT administrative data with selected diagnosed medical conditions, from 2011 to 2017, comparing with count of Children in APCD

Selected Diagnosed Conditions	Number of Children with ESIT Documented Diagnosis	Number of Children in APCD
Autism	847	1,647
Cerebral Palsy	186	570
Down Syndrome	832	971
Epilepsy	115	1,674
Fetal Alcohol Syndrome	24	149
Hearing Loss	910	4,788
Microcephaly	95	796
Muscular Dystrophy	17	37
Myelomeningocele	25	238
Neurofibromatosis	20	104
Nutritional Deficiency	13	3,585
Spinal Bifida	89	245
Visual Impairment	219	536

Table A2. Number of children (0-36 months old at claim first service date) reported in APCD with medical diagnoses in interested conditions.

	As Primary Diagnosis				One of First 10 Diagnoses			
Diagnosed Conditions	2014	2015	2016	2017	2014	2015	2016	2017
Autism	294	420	391	484	411	568	527	619
Cerebral Palsy	195	276	316	271	277	401	434	389
Down Syndrome	290	376	292	310	356	523	376	383
Epilepsy	575	775	725	694	808	1,127	1,016	974
Fetal Alcohol Syndrome	19	27	19	15	50	55	38	29
Hearing Loss	1,168	1,204	1,004	1,039	1,771	1,948	1,720	1,791
Microcephaly	105	107	103	121	234	304	293	291
Muscular Dystrophy	*	15	23	14	*	16	28	16
Myelomeningocele	170	222	161	145	205	274	202	177
Neurofibromatosis	32	35	34	24	41	54	42	35
Nutritional Deficiency	459	299	317	287	1,018	867	999	913
Spinal Bifida	105	145	129	115	128	185	169	162
Visual Impairment	39	44	44	35	242	256	236	290

*Specific counts are not reported in these cells according to Cell Suppression Guideline of WA-APCD.

Table A3. Gender, age, insurance type and county of all children (0-36 months old at claim first service date) reported in APCD with medical diagnoses in interested conditions.

		2014	2015	2016	2017
Gender	F	1,848	1,618	1,773	1,840
	M	2,545	2,329	2,560	2,632
	Total	4,393	3,947	4,333	4,472
Age Group (in months)	0-6	682	706	709	629
	7-12	510	532	560	595
	13-18	819	920	988	1,018
	19-24	832	928	1,033	1,064
	25-30	976	1,040	1,199	1,204
	31-36	995	1,065	1,228	1,351
	Total	4,814	5,191	5,717	5,861
Insurance Type	Commercial	747	659	716	689
	Medicaid	3,691	3,321	3,674	3,838
	Total	4,438	3,980	4,390	4,527
County*	Adams	25	25	28	13
	Benton	190	146	151	144
	Chelan	48	44	53	53
	Clallam	37	34	29	49
	Clark	111	110	260	305
	Cowlitz	67	68	81	120
	Douglas	30	23	25	23
	Franklin	153	107	107	102
	Grant	58	64	84	78
	Grays Harbor	31	52	40	76
	Island	48	25	21	37
	King	948	913	1,006	1,039
	Kitsap	111	105	116	128
	Kittitas	23	26	19	33
	Klickitat	14	14	17	12
	Lewis	52	50	39	46
	Mason	50	36	39	53
	Okanogan	27	24	33	33
	Pierce	451	495	600	597
	Skagit	97	61	70	100
	Snohomish	666	418	434	404
	Spokane	451	471	470	456
	Stevens	28	15	17	18
	Thurston	153	136	157	152
	Walla Walla	44	53	32	43
	Whatcom	119	88	127	128
	Whitman	22	22	23	13
	Yakima	335	291	221	202
	Total	4,434	3,972	4,362	4,526

*The following counties have reported less than 11 children with interested medical conditions reported by APCD, including Asotin, Columbia, Ferry, Garfield, Jefferson, Lincoln, Pacific, Pend Oreille, San Juan, Skamania, and Wahkiakum. Specific counts are not reported in this table according to Cell Suppression Guideline of WA-APCD.

Table A4. Cost and length of service of claims from children (0-36 months old at claim first service date) reported in APCD with ***primary*** medical diagnoses in interested conditions.

Disease	Total Amount Paid by Insurance and Out of pocket ($)		Days Between First Service Date and Last Service Date of Claim	
	Maximum	Average	Maximum	Average
Autism	17,235	222	35	0
Central Nervous System Deficit	29,631	382	4	0
Cerebral Palsy	12,183	300	30	0
Down Syndrome	93,697	139	41	1
Epilepsy	694,941	505	89	0
Fetal Alcohol Syndrome	32,293	295	29	2
Hearing Loss	152,487	301	22	0
Microcephaly	4,777	136	30	0
Muscular Dystrophy	170,263	549	66	2
Myelomeningocele	177,220	3,358	46	1
Neurofibromatosis	1,108	104	0	0
Nutritional Deficiency	18,792	148	30	0
Spinal Bifida	63,376	381	14	0
Visual Impairment	3,332	108	0	0

Table A5. ICD-9 diagnosis codes (effective before 10/01/2015) and ICD-10 diagnosis codes (effective from 10/01/2015) of interested medical conditions

Disease	ICD-10	ICD-9
Autism	F84.0	299.00, 299.01
Central Nervous System Deficit	C72	192.0, 192.2
Cerebral Palsy	G80.0, G80.1, G80.2, G80.3, G80.4, G80.8, G80.9	333.71, 343.1, 343.3, 343.4, 343.8, 343.9, 343.0
Cystic Fibrosis	E84	277.09, 277.00, 277.01, 277.02, 277.03
Down Syndrome	Q90	758.0
Epilepsy	G40.001, G40.009, G40.011, G40.019, G40.109, G40.111, G40.119,G40.301, G40.309,G40.801, G40.802,G40.803, G40.804, G40.821, G40.822, G40.823, G40.824, G40.901, G40.909 ,G40.911, G40.919, G40.A11, G40.A19, G40.B01, G40.B09, G40.B11, G40.B19	345.01, 345.10, 345.2, 345.3, 345.50, 345.51, 345.60, 345.61, 345.70, 345.71, 345.80, 345.81, 345.90, 345.91
Fetal Alcohol Syndrome	Q86.0	760.71
Hearing Loss	H90.0, H90.2, H90.3, H90.5, H90.11, H90.12, H90.41, H90.42, H91.01, H91.02, H91.03, H91.09, H91.8X1, H91.8X2, H91.8X3, H91.8X9	388.11, 389.00, 389.01, 389.02, 389.03, 389.04, 389.05, 389.06, 389.08, 389.10, 389.11, 389.12, 389.13, 389.14, 389.15, 389.16, 389.17, 389.18, 389.8
Microcephaly	Q02	742.1
Muscular Dystrophy	G71.0, G71.11	359.21
Myelomeningocele	Q05.1, Q05.2, Q05.6, Q05.7, Q05.8, Q05.9	741.00, 741.02, 741.03, 741.90, 741.92, 741.93
Neurofibromatosis	Q85.01, Q85.09	237.71, 237.79
Nutritional Deficiency	E50, E51, E52, E53, E54, E55, E56, E58, E59,E60, E61, E63, E64	269.8, 263.9, 264.0, 264.2, 264.3, 264.4, 264.5, 264.6, 264.7, 264.8, 264.9, 265.0, 265.1, 265.2, 266.0, 266.1, 266.2, 266.9, 267, 268.1, 268.9, 269.0, 269.1, 269.2, 269.3, 269.9
Spinal Bifida	Q05.8, Q05.9, Q07.00, Q07.01, Q07.03	741.00, 741.90
Visual Impairment	H54	369.15, 369.00, 369.01, 369.03, 369.04, 369.06, 369.07, 369.11

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