

Childhood Speech Development Delays Increasing Since the Start of the Pandemic

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Key Findings:

- Children who have turned two years old since the start of the pandemic are more likely to have a speech delay diagnosis compared to those who turned two in earlier years.
- Speech delay diagnoses have increased from an average of 9.0% of children in 2018 to 11.8% in the last quarter of 2021 and 16.9% in the first quarter of 2023.
- We did not observe an increased rate of motor, scholastic, or cognitive delay diagnoses related to the pandemic.

The COVID-19 pandemic has had widespread effects on various aspects of life, including the social and speech development of young children.^{1,2} We studied whether there has been an increase in childhood speech, motor, and cognitive development delays since the pandemic began. We first evaluated the rate of speech delay diagnosis by age two in 1,667,926 children.

We found that children who turned two years old between September 2020 and March 2023 were more likely to experience speech delays than those that turned two in earlier years. Compared to children who turned two years old in 2018, children who turned two in the last quarter of 2021 were 31.5% more likely to have a speech delay diagnosis, and those who turned two in first quarter of 2023 were 87.8% more likely. The increase in speech delays was observed in both urban and rural areas. The difference in speech delay diagnoses remained even after controlling for sex, premature birth status, and years of patient care documentation.

Speech Delay Diagnosis Rate by Age Two

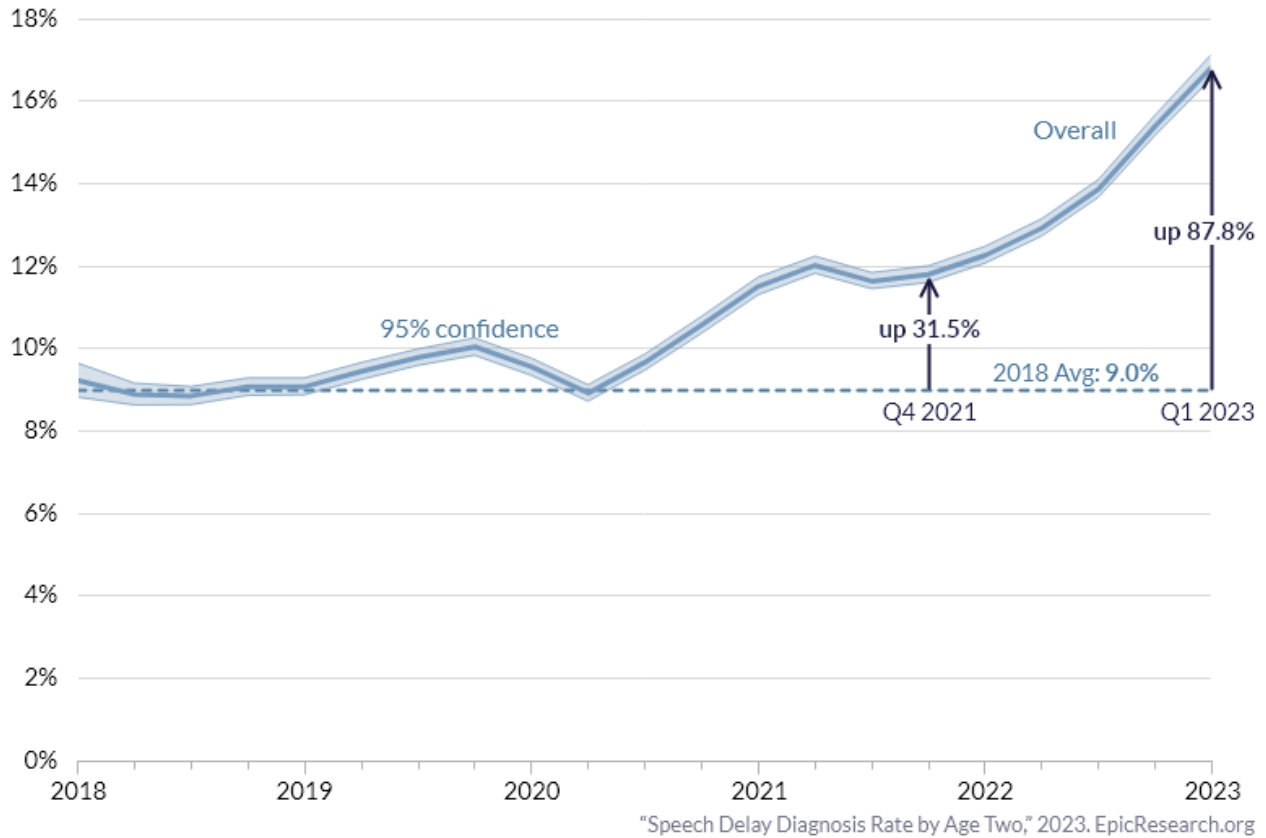


Figure 1. Rate of speech delay diagnoses by quarter the patient turned two years of age compared to the average rate of diagnoses in patients who turned two in 2018.

We also evaluated the diagnosis rates for motor delay by age two, cognitive delay by age four, and scholastic delay by age eight. We selected these ages for the analysis based on the likelihood that assessments for these conditions would have been conducted according to the American Academy of Pediatrics' Bright Futures recommendations.³ We did not find a significant change in the rates of these diagnoses after the start of the pandemic. However, because scholastic and cognitive delays are typically diagnosed in school-age children, additional impact related to the pandemic may remain to be seen among younger children.

These data come from Cosmos, a HIPAA-defined Limited Data Set of more than 193 million patients from 208 Epic organizations including 1,187 hospitals and more than 25,400 clinics, serving patients in all 50 states and Lebanon. This study was completed by two teams that worked independently, each composed of a clinician and research scientists. The two teams came to similar conclusions.

References

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2. Jones K. The initial impacts of COVID-19 on children and youth (birth to 24 years): Literature review in brief. The Assistant Secretary for Planning and Evaluation. <https://aspe.hhs.gov/sites/default/files/documents/188979bb1b0d0bf669db0188cc4c94b0/impact-of-covid-19-on-children-and-youth.pdf>. Accessed May 2, 2023.

3. Bright Futures/American Academy of Pediatrics. Recommendations for Preventive Pediatric Health Care. https://downloads.aap.org/AAP/PDF/periodicity_schedule.pdf. Accessed on July 7, 2023.

Data Definitions

Term	Definition
Study period	Patients turned two between 1/1/2018 and 3/31/2023.
Study population	Patients who received outpatient face-to-face care since Jan. 1, 2019, while between 2 and 6 years old. Patients with a pervasive developmental diagnosis at any time are excluded. Patients with a hearing loss diagnosis prior to their most recent encounter prior to turning 7 are excluded.
Speech delay diagnosis	Diagnosis with ICD-10-CM codes F80* except F80.4*.
Pervasive developmental diagnosis	Diagnoses with ICD-10-CM code F84* or Q90*.
Hearing loss diagnosis	Diagnosis with ICD-10-CM code F80.4*, H90*, H91*, P09.6, Z46.1, or Z01.110.
Motor delay diagnosis	Diagnoses with ICD-10-CM code F82*.
Cognitive delay diagnosis	Diagnoses with ICD-10-CM code F88 or F89.
Scholastic delay diagnosis	Diagnoses with ICD-10-CM code F81*.
Rural area	Rural-Urban Commuting Area (RUCA) score of 7-10 based on the patient's most recent postal code.
Urban area	RUCA score of 1-6 based on the patient's most recent postal code.

Table 1a: Speech Delay Diagnosis Rates by Quarter Turned Two

Quarter Turned Two	Patients with Speech Delay	Total Patients	Delayed (%)	Lower CI	Upper CI
1/1/2018	1,744	18,899	9.2%	8.8%	9.6%
4/1/2018	3,895	43,804	8.9%	8.6%	9.2%
7/1/2018	5,621	63,476	8.9%	8.6%	9.1%
10/1/2018	6,378	70,288	9.1%	8.9%	9.3%
1/1/2019	6,906	76,043	9.1%	8.9%	9.3%
4/1/2019	7,419	78,462	9.5%	9.3%	9.7%
7/1/2019	8,240	84,181	9.8%	9.6%	10.0%
10/1/2019	7,968	79,307	10.0%	9.8%	10.3%
1/1/2020	7,111	74,403	9.6%	9.3%	9.8%
4/1/2020	7,014	78,592	8.9%	8.7%	9.1%
7/1/2020	8,449	87,339	9.7%	9.5%	9.9%
10/1/2020	9,114	86,159	10.6%	10.4%	10.8%
1/1/2021	9,843	85,417	11.5%	11.3%	11.7%
4/1/2021	11,109	92,325	12.0%	11.8%	12.2%
7/1/2021	11,952	102,594	11.6%	11.5%	11.8%
10/1/2021	11,567	97,953	11.8%	11.6%	12.0%
1/1/2022	11,920	97,082	12.3%	12.1%	12.5%
4/1/2022	12,701	98,118	12.9%	12.7%	13.2%

7/1/2022	13,899	100,071	13.9%	13.7%	14.1%
10/1/2022	12,920	83,757	15.4%	15.2%	15.7%
1/1/2023	10,623	62,999	16.9%	16.6%	17.2%

Table 1b: Speech Delay Diagnosis Rates by RUCA Score – Rural

Quarter Turned Two	Patients with Speech Delay	Total Patients	Delayed (%)	Lower CI	Upper CI
1/1/2018	98	1,262	7.8%	6.4%	9.4%
4/1/2018	173	2,846	6.1%	5.3%	7.0%
7/1/2018	256	4,200	6.1%	5.4%	6.9%
10/1/2018	324	4,674	6.9%	6.2%	7.7%
1/1/2019	315	5,248	6.0%	5.4%	6.7%
4/1/2019	353	5,303	6.7%	6.0%	7.4%
7/1/2019	410	5,685	7.2%	6.6%	7.9%
10/1/2019	389	5,269	7.4%	6.7%	8.1%
1/1/2020	349	4,993	7.0%	6.3%	7.7%
4/1/2020	366	5,321	6.9%	6.2%	7.6%
7/1/2020	408	5,719	7.1%	6.5%	7.8%
10/1/2020	395	5,751	6.9%	6.2%	7.6%
1/1/2021	466	5,530	8.4%	7.7%	9.2%
4/1/2021	509	6,217	8.2%	7.5%	8.9%
7/1/2021	577	6,820	8.5%	7.8%	9.1%
10/1/2021	545	6,393	8.5%	7.9%	9.2%
1/1/2022	596	6,314	9.4%	8.7%	10.2%
4/1/2022	622	6,471	9.6%	8.9%	10.4%
7/1/2022	647	6,675	9.7%	9.0%	10.4%
10/1/2022	611	5,558	11.0%	10.2%	11.8%
1/1/2023	535	4,309	12.4%	11.5%	13.4%

Table 1c: Speech Delay Diagnosis Rates by RUCA Score – Urban

Quarter Turned Two	Patients with Speech Delay	Total Patients	Delayed (%)	Lower CI	Upper CI
1/1/2018	1,643	17,506	9.4%	9.0%	9.8%
4/1/2018	3,715	40,610	9.1%	8.9%	9.4%
7/1/2018	5,356	58,644	9.1%	8.9%	9.4%
10/1/2018	6,043	64,868	9.3%	9.1%	9.5%
1/1/2019	6,581	69,935	9.4%	9.2%	9.6%
4/1/2019	7,048	72,173	9.8%	9.6%	10.0%
7/1/2019	7,810	77,417	10.1%	9.9%	10.3%
10/1/2019	7,559	72,952	10.4%	10.1%	10.6%
1/1/2020	6,744	68,130	9.9%	9.7%	10.1%

4/1/2020	6,641	72,085	9.2%	9.0%	9.4%
7/1/2020	8,026	80,600	10.0%	9.8%	10.2%
10/1/2020	8,703	79,359	11.0%	10.8%	11.2%
1/1/2021	9,363	78,958	11.9%	11.6%	12.1%
4/1/2021	10,584	84,996	12.5%	12.2%	12.7%
7/1/2021	11,359	94,627	12.0%	11.8%	12.2%
10/1/2021	11,005	90,547	12.2%	11.9%	12.4%
1/1/2022	11,311	89,809	12.6%	12.4%	12.8%
4/1/2022	12,066	90,720	13.3%	13.1%	13.5%
7/1/2022	13,235	92,507	14.3%	14.1%	14.5%
10/1/2022	12,290	77,580	15.8%	15.6%	16.1%
1/1/2023	10,065	58,292	17.3%	17.0%	17.6%