

Healthcare Resource Use in Commercially- and Medicaid-Insured Infants, Toddlers, and Children Diagnosed with Invasive Meningococcal Disease in the United States

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Background

- Invasive meningococcal disease (IMD) is an uncommon but catastrophic disease, with a high case fatality rate and serious long-term sequelae.¹
- In the United States (US), IMD incidence is highest in infants (aged <1 year) and toddlers (aged 1–4 years).²
- However, vaccination against meningococcal serogroups A, C, W, and Y (MenACWY) is recommended for infants aged ≥2 months only when they are at increased risk for IMD, and currently, there is no vaccine against meningococcal serogroup B (MenB) approved for children aged <10 years.³

Objective

To describe all-cause healthcare resource utilization (HCRU) among infants (aged <1 year), toddlers (aged 1–4 years), and children (aged 5–10 years) diagnosed with IMD in the US.

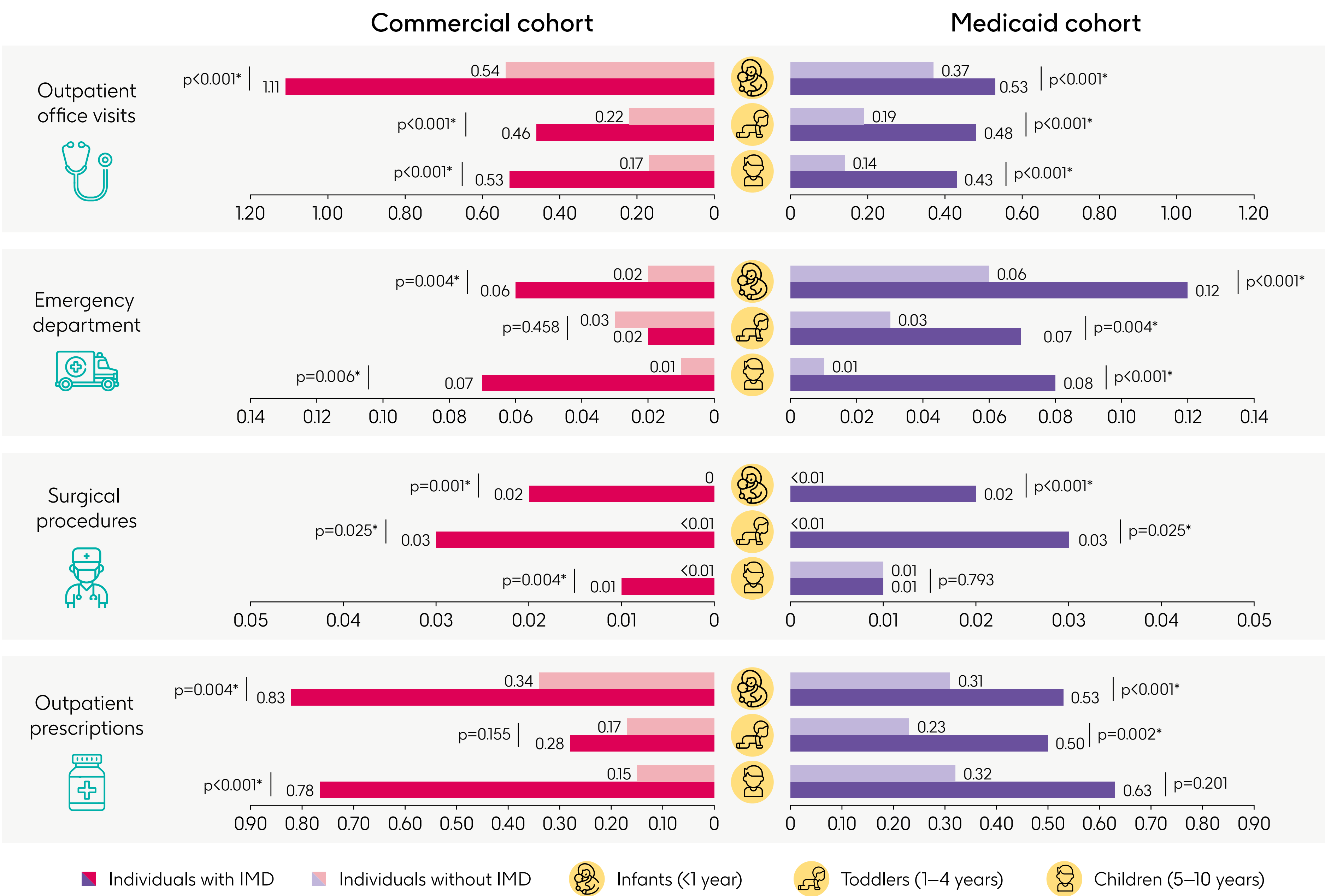
Methods

- This retrospective study analyzed claims data of commercially- and Medicaid-insured individuals from January 1, 2005 to December 31, 2022.
- Individuals with IMD were identified through inpatient admissions with a primary IMD diagnosis and matched 1:5 with individuals without IMD, by birth year and index date (year and month).
 - Toddlers (aged 1–4 years) and children (aged 5–10 years) were required to have six months of continuous enrollment prior to index.
- A variable follow-up period was used to assess all-cause HCRU.
 - Individuals were followed until study/enrollment end, age 11 years reached, or death.
 - HCRU was determined using diagnosis/procedure codes and reported in per-patient-per-month (PPPM) format (mean [standard deviation]).

Results

- Among commercially-insured individuals (N=7.2 million infants; N=13.6 million toddlers; N=18.5 million children), **21 infants, 19 toddlers, and 21 children** diagnosed with IMD were included.
- Among Medicaid-insured individuals (N=7.4 million infants; N=10.7 million toddlers; N=9.6 million children), **115 infants, 35 toddlers, and 13 children** diagnosed with IMD were included.
- Demographic characteristics of the included individuals are presented in the Supplemental Data (scan QR code).
- Median follow-up length (across insurance cohort, age group, and IMD status) ranged from 244–1,161 days.
- Mean HCRU was significantly higher for individuals with IMD than individuals without IMD across most of the HCRU types assessed (**Figure 1**).

Figure 1: PPPM mean number of all-cause HCRU events during the variable-length follow-up period



*Statistically significant.



Children aged ≤10 years diagnosed with IMD have substantial all-cause HCRU, with a particular burden in infants. Early childhood prevention of IMD may help to reduce HCRU and ease financial burdens on families and healthcare systems.

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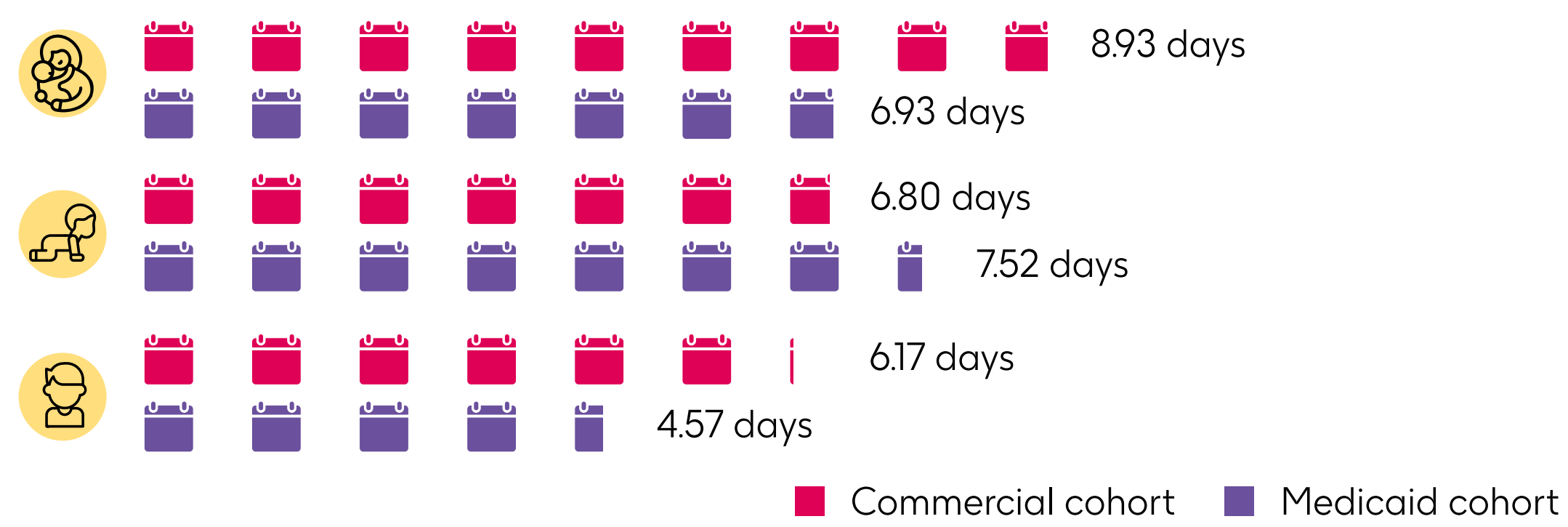
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Supplemental Data



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- Among individuals with IMD, mean length of stay during the acute phase of IMD ranged from 4.57 days (Medicaid-insured children) to 8.93 days (commercially-insured infants; **Figure 2**)

Figure 2: PPPM mean length of stay for initial IMD inpatient admission



Across insurance cohorts and HCRU types, **infants with IMD** were most often the subgroup with the **highest PPPM mean number of all-cause HCRU events**.

Among individuals with IMD, **higher PPPM mean numbers of emergency department visits** were identified in the **Medicaid cohort** than the commercial cohort, whereas, for infants and children, **higher PPPM mean numbers of outpatient prescriptions** were seen in the **commercial cohort** than the Medicaid cohort.

Conclusions



Infants, toddlers, and children with IMD incurred considerable all-cause HCRU burden following hospitalization, relative to matched controls without IMD.



Preventing IMD in early childhood may help to reduce HCRU and ease financial burdens on families and healthcare systems.

Narrated
summary



SCAN ME

Abbreviations

HCRU, healthcare resource utilization; IMD, invasive meningococcal disease; MenACWY, meningococcal serogroups A, C, W, and Y; MenB, meningococcal serogroup B; PPPM, per-patient-per-month; US, United States.

References

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Disclosures

OHR, EK, TO, LL, and AGA are GSK employees and hold financial equities in GSK. EP and MR are employees of Merative, which was paid by GSK for conducting the study.

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Supplement

Supplementary Table 1: Demographic characteristics among included infants (<1 year of age)

Demographic characteristic	Commercial cohort		Medicaid cohort	
	Patients with IMD (n=21)	Patients without IMD (n=105)	Patients with IMD (n=114)	Patients without IMD (n=570)
Age, in days (mean [SD])	158 (98)	147 (99)	140 (97)	126 (97)
Age category (n [%])				
0–3 months	7 (33.3)	34 (32.4)	45 (39.1)	259 (45.0)
4–6 months	7 (33.3)	36 (34.3)	35 (30.4)	156 (27.1)
7–9 months	3 (14.3)	19 (18.1)	19 (16.5)	84 (14.6)
10–12 months	4 (19.0)	16 (15.2)	16 (13.9)	76 (13.2)
Sex (n [%])				
Male	11 (52.4)	51 (48.6)	69 (60.0)	296 (51.5)
Female	10 (47.6)	54 (51.4)	46 (40.0)	279 (48.5)
Race (n [%])				
White	–	–	78 (67.8)	212 (36.9)
Black	–	–	12 (10.4)	116 (20.2)
American Indian or Alaska Native	–	–	1 (0.9)	2 (0.3)
Hispanic	–	–	9 (7.8)	96 (16.7)
Asian or Pacific Islands	–	–	2 (1.7)	10 (1.7)
Other	–	–	13 (11.3)	139 (24.2)
Length of follow-up, in days (mean [SD])	1,062 (1,276)	1,140 (1,184)	1,300 (1,232)	809 (952)
Length of follow-up category (n [%])				
<6 months	6 (28.6)	20 (19.0)	19 (16.5)	139 (24.2)
6–12 months	3 (14.3)	15 (14.3)	15 (13.0)	110 (19.1)
12–24 months	3 (14.3)	18 (17.1)	22 (19.1)	117 (20.3)
24–36 months	3 (14.3)	13 (12.4)	10 (8.7)	71 (12.3)
36–48 months	2 (9.5)	10 (9.5)	10 (8.7)	43 (7.5)
48–60 months	0 (0.0)	4 (3.8)	5 (4.3)	15 (2.6)
≥60 months	4 (19.0)	25 (23.8)	34 (29.6)	80 (13.9)

Abbreviations

IMD, invasive meningococcal disease; SD, standard deviation.

Supplementary Table 2: Demographic characteristics among included toddlers (1–4 years of age)

Demographic characteristic	Commercial cohort		Medicaid cohort	
	Patients with IMD (n=19)	Patients without IMD (n=95)	Patients with IMD (n=35)	Patients without IMD (n=175)
Age, in days (mean [SD])	1,069 (357)	1,074 (351)	981 (379)	993 (376)
Age category (n [%])				
1–<2 years	3 (15.8)	16 (16.8)	13 (37.1)	65 (37.1)
2–<3 years	8 (42.1)	39 (41.1)	9 (25.7)	40 (22.9)
3–<4 years	4 (21.1)	20 (21.1)	7 (20.0)	40 (22.9)
4–<5 years	4 (21.1)	20 (21.1)	6 (17.1)	30 (17.1)
Sex (n [%])				
Male	11 (57.9)	46 (48.4)	20 (57.1)	109 (62.3)
Female	8 (42.1)	49 (51.6)	15 (42.9)	66 (37.7)
Race (n [%])				
White	–	–	27 (77.1)	75 (42.9)
Black	–	–	3 (8.6)	37 (21.1)
American Indian or Alaska Native	–	–	0 (0.0)	1 (0.6)
Hispanic	–	–	1 (2.9)	22 (12.6)
Asian or Pacific Islands	–	–	0 (0.0)	6 (3.4)
Other	–	–	4 (11.4)	34 (19.4)
Length of follow-up, in days (mean [SD])	822.3 (825.7)	961.7 (884.6)	1,565.3 (1,290.6)	639.4 (812.0)
Length of follow-up category (n [%])				
<6 months	3 (15.8)	18 (18.9)	4 (11.4)	66 (37.7)
6–12 months	3 (15.8)	17 (17.9)	5 (14.3)	32 (18.3)
12–24 months	5 (26.3)	10 (10.5)	5 (14.3)	28 (16.0)
24–36 months	3 (15.8)	14 (14.7)	3 (8.6)	4 (2.3)
36–48 months	1 (5.3)	14 (14.7)	3 (8.6)	13 (7.4)
48–60 months	1 (5.3)	3 (3.2)	1 (2.9)	12 (6.9)
≥60 months	3 (15.8)	19 (20.0)	14 (40.0)	20 (11.4)

Supplementary Table 3: Demographic characteristics among included children (5–10 years of age)

Demographic characteristic	Commercial cohort		Medicaid cohort	
	Patients with IMD (n=21)	Patients without IMD (n=105)	Patients with IMD (n=13)	Patients without IMD (n=65)
Age, in days (mean [SD])	2,978 (622)	2,986 (607)	2,817 (492)	2,835 (476)
Age category (n [%])				
5–<6 years	3 (14.3)	15 (14.3)	2 (15.4)	10 (15.4)
6–<7 years	1 (4.8)	6 (5.7)	2 (15.4)	10 (15.4)
7–<8 years	7 (33.3)	34 (32.4)	4 (30.8)	20 (30.8)
8–<9 years	3 (14.3)	15 (14.3)	2 (15.4)	10 (15.4)
9–<10 years	3 (14.3)	15 (14.3)	3 (23.1)	15 (23.1)
10–<11 years	4 (19.0)	20 (19.0)	0 (0.0)	0 (0.0)
Sex (n [%])				
Male	8 (38.1)	57 (54.3)	7 (53.8)	33 (50.8)
Female	13 (61.9)	48 (45.7)	6 (46.2)	32 (49.2)
Race (n [%])				
White	–	–	8 (61.5)	24 (36.9)
Black	–	–	4 (30.8)	16 (24.6)
American Indian or Alaska Native	–	–	0 (0.0)	0 (0.0)
Hispanic	–	–	0 (0.0)	8 (12.3)
Asian or Pacific Islands	–	–	0 (0.0)	2 (3.1)
Other	–	–	1 (7.7)	15 (23.1)
Length of follow-up, in days (mean [SD])	614.8 (490.0)	521.8 (500.7)	607.5 (573.0)	385.9 (451.1)
Length of follow-up category (n [%])				
<6 months	7 (33.3)	38 (36.2)	3 (23.1)	29 (44.6)
6–12 months	1 (4.8)	17 (16.2)	1 (7.7)	11 (16.9)
12–24 months	6 (28.6)	20 (19.0)	5 (38.5)	14 (21.5)
24–36 months	2 (9.5)	11 (10.5)	1 (7.7)	6 (9.2)
36–48 months	3 (14.3)	14 (13.3)	2 (15.4)	3 (4.6)
48–60 months	2 (9.5)	2 (1.9)	1 (7.7)	0 (0.0)
≥60 months	0 (0.0)	3 (2.9)	0 (0.0)	2 (3.1)