



Department of Health  
Heidi Hedberg, Commissioner  
Robert Lawrence, MD, MA, CMO

3601 C Street, Suite 540  
Anchorage, Alaska 99503

Division of Public Health  
Lindsey Kato, MPH, Director  
<https://health.alaska.gov/dph/Epi>  
24 Hour Emergency (800) 478-0084  
Local (907) 269-8000

Editors:  
Joe McLaughlin, MD, MPH  
Louisa Castrodale, DVM, MPH

Bulletin No. 25  
December 16, 2025

Trends in Invasive *Haemophilus influenzae* Disease — Alaska, 2015–2024

Background

Invasive *Haemophilus influenzae* (Hi) disease occurs when *H. influenzae* infects a normally sterile site, such as blood or cerebrospinal fluid. The bacteria can be unencapsulated (nontypeable) or encapsulated with antigenically distinct polysaccharides (genotypes a–f).<sup>1</sup> We used statewide laboratory-based surveillance data to evaluate trends in invasive Hi disease in Alaska during 2015–2024 and identify differences in genotype distribution and incidence by subpopulation.

Methods

A case of invasive Hi was defined as an Alaska resident with *H. influenzae* isolated from, or Hi-specific DNA detected in, a normally sterile body site. Overall average annual age-specific and age-standardized rates per 100,000 persons were calculated using the 2020 U.S. Census as a standard population.<sup>2</sup> Rate ratios (RRs) were calculated using Poisson regression. Comparisons were made using Pearson’s chi-squared test.

Results

During 2015–2024, 256 invasive Hi cases were reported in Alaska (3.4 cases per 100,000 persons). Of these, 107 (42%; 5.9 cases per 100,000 persons) were in children aged <18 years and 149 (58%; 2.7 cases per 100,000 persons) were in adults aged ≥18 years (RR 2.2, 95% CI: 1.7–2.8) (Table).

Rates among children were highest in rural areas (16.9 cases per 100,000 children). Rates by race were highest in Alaska Native/American Indian (AN/AI) children (17.3 cases per 100,000). Compared with adults, children were at higher risk for genotype a (Hia) (RR: 17.7, 95% CI: 9.5–35.8) and genotype b (Hib) (RR: 2.8, 95% CI: 1.3–6.3), and lower risk for nontypeable Hi (NTHi) (RR: 0.5, 95% CI: 0.3–0.8) (Figure).

Among children, the overall Hi rate declined during 2020–2024 compared with 2015–2019 (RR 0.6, 95% CI: 0.4–0.9). Among adults, the overall Hi rate was stable; however, Hib rates increased during 2020–2024 compared with 2015–2019 (RR: 6.4, 95% CI: 1.4–28.3).

Clinical presentation differed by age: children more often had meningitis ( $p<0.01$ ) or cellulitis ( $p=0.02$ ), while adults more commonly had pneumonia ( $p<0.01$ ). Underlying conditions were more prevalent in adults (smoking: 37%, cancer: 24%, alcohol abuse: 23%, chronic lung disease: 23%, diabetes: 18%, homelessness: 17%) than in children (preceding trauma: 10%, prematurity: 7%). Most patients (~90%) were hospitalized; case-fatality rates were 10% in children and 17% in adults.

More than 98% of Hi isolates were susceptible to ceftriaxone, meropenem, and rifampin; 72% were susceptible to ampicillin, with a difference noted by genotype (98% for types a and f combined, compared with 54% for b, e, and NTHi;  $p<0.01$ ).

Discussion

During 2015–2024, the burden of invasive Hi disease was highest among children living in rural regions, driven primarily by Hia, particularly during a cluster in 2018.<sup>3</sup> In adults, NTHi predominated, but Hib incidence increased in urban areas starting in 2019.<sup>4</sup>

Routine Hib vaccination remains essential for all children,<sup>5</sup> and prophylaxis may be warranted in certain situations.<sup>6</sup> Ongoing surveillance is critical to detect changes in trends and inform timely public health responses. Clinicians should maintain high awareness for invasive Hi disease among children in rural areas, AN/AI people, and adults with underlying health conditions or social risk factors.

Table. Invasive *H. influenzae* Cases — Alaska, 2015–2024

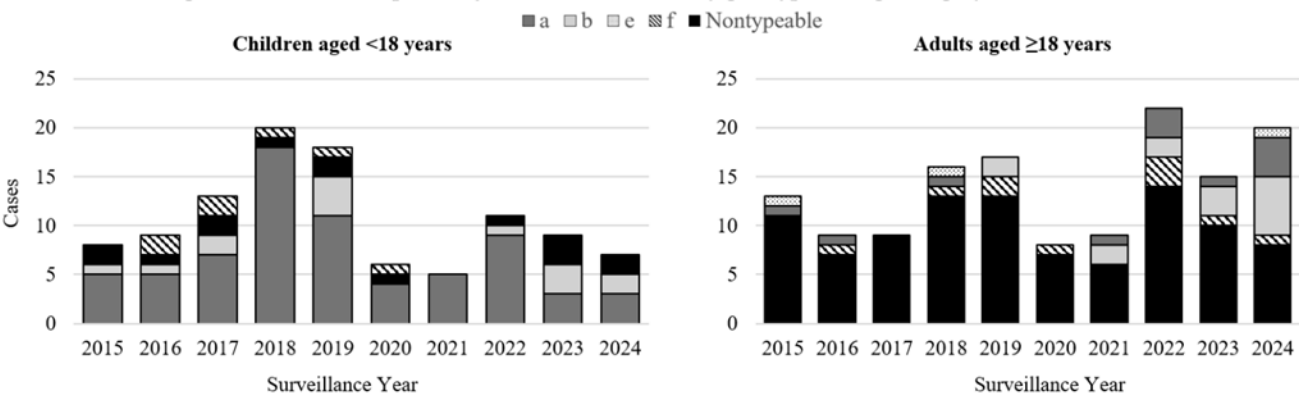
Characteristic	Aged <18 years [N=107]	Aged ≥ 18 years [N=149]
	No. (Rate*)	No. (Rate*)
All cases	107 (5.9)	149 (2.70)
Locality		
Urban**	18 (1.4)	109 (2.7)
Rural**	88 (16.9)	39 (2.5)
Race		
Alaska Native/American Indian**	89 (17.3)	64 (6.5)
White**	9 (0.7)	62 (1.5)
Asian	1 (0.5)	4 (0.9)
Pacific Islander/Hawaiian	0 (0.0)	4 (4.2)
Black/African American	0 (0.0)	7 (2.7)
Genotype		
a**	70 (3.8)	12 (0.2)
b**	14 (0.8)	15 (0.3)
e	0 (0.0)	3 (0.1)
f	7 (0.4)	10 (0.2)
Nontypeable**	15 (0.8)	98 (1.8)
Time Period		
2015–2019**	68 (7.3)	68 (2.5)
2020–2024**	39 (4.4)	81 (2.9)
Characteristic	No. (%)	No. (%)
Clinical syndromes		
Meningitis**	36 (34)	10 (7)
Pneumonia**	29 (27)	85 (57)
Bacteremia without focus	12 (11)	30 (20)
Cellulitis**	10 (9)	4 (3)
Outcome		
Hospitalized	99 (93)	134 (90)
Died	11 (10)	25 (17)

\*Per 100,000 persons; \*\* $p<0.05$

References

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- SOE Bulletin. [Updated Guidelines for Hib Vaccination of AI/AN Children](#)
- Public Health Investigation Quicksheet: [Invasive \*Haemophilus influenzae\*](#)

Figure. Invasive *Haemophilus influenzae* Disease Cases by Genotype and Age Category — Alaska, 2015–2024



(Contributed by: Tori L. Burket, Laurie Orell, Carolynn DeByle, Sara Bressler, CDC Arctic Investigations Program; Kristen Moore, Alaska Department of Health.)