

15.7) (10.6%; 95% CI, 8.0–12.6), 26.9 (15.3%; 95% CI, 13.3–17.5), 9.3 (2.7%; 95% CI, 1.8–18.9).

**Conclusions:** Lack of access to running water in the home was associated with increased prevalence of middle ear disease in this rural, Alaska Native population, particularly among younger children (aged 3 to 6 years). There was little evidence in this study that cigarette smoke, wood-burning stoves, and greater numbers of persons in the household were associated with infection-mediated hearing loss or middle ear disease. Future research with larger sample sizes and more sensitive measures of environmental exposure is necessary to further evaluate these relationships. Children who live in homes without access to running water may benefit from earlier and more frequent hearing health visits.

**Key words:** Alaska, Childhood hearing loss, Environmental risk factors, Household crowding, Infection-related hearing loss, Middle ear disease, Running water, Rural healthcare, Smoke exposure, Water wash infection.

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1 N (0.85; 95% CI, 0.73–1.00), 17.4% (1.32), 1.53; 95% CI, 1.03–2.27).

### INTRODUCTION

(1998; 2004; 2006). (60% (2016)).

(1.38; 95% CI, 0.80–2.09) (2016). A N A N (1967; 2018).

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$OR = 1.38; 95\% CI (0.80, 2.39)$ ,  
 $OR = 1.01; 95\% CI (0.48, 2.38)$ ,  
 $OR = 0.85; 95\% CI (0.55, 1.32)$ .  
 $OR = 1.11; 95\% CI (0.86, 1.44)$ .  
 A- ... ( ... 1  
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**Associations With Middle Ear Disease**

( ... 3)  
 $OR = 1.53; 95\% CI (1.03, 2.27)$   
 ... 53%

**Heterogeneity**

3 6  
 AN / 48; ... 3 4  
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Missing Data

A # 65 (3.98%)  
( A- # ), 96 (5.9%)  
A- # 34 (2.08%)  
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DISCUSSION

A #  
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3 6 ( #  
= 12.2%; 95% , 9.3 15.7; # = 22.7%;  
95% , 18.9 26.9) # 7  
( # = 10.6%; 95% , 8.9 12.6;  
= 15.3%; 95% , 13.3 17.5). A  
# 17%  
= 1.17; 95% , 1.05 1.31) # 11%  
1.03 (1.21) # 3 6

TABLE 2. Regression estimated prevalence ratios and prevalence differences for environmental associations with hearing loss\*

Variable	Sample prevalence	Number of observations used†	Prevalence ratio‡ (95% CI)	Prevalence difference§ (95% CI)
How many people currently live in the household?		1533	1.06 (0.97 to 1.16)	0.7 (-0.5 to 1.9)
Do you have running (plumbed) water in your house?		1533		
Water in house	9.7 (8.0, 11.6)		(ref)	(ref)
No water in house	13.5 (10.6, 16.9)		1.38 (0.80 to 2.39)	3.7 (-2.7 to 10.1)
Do you use a wood-burning stove or replace to cook or help heat the house?		1526		
No	11.6 (9.6, 13.8)		(ref)	(ref)
Yes	9.9 (7.6, 12.7)		0.85 (0.55 to 1.32)	-1.7 (-6.5 to 3.0)
Number of smokers in the house?		1532		
None	11.3 (8.7, 14.3)		(ref)	(ref)
1-2 Smokers	10.4 (8.4, 12.7)		0.92 (0.53 to 1.58)	-0.9 (-7.0 to 5.2)
3 or more smokers	12.1 (8.0, 17.4)		1.07 (0.48 to 2.38)	0.8 (-8.5 to 10.1)
Count of risk factors¶		1525	1.11 (0.86 to 1.44)	1.2 (-1.6 to 3.9)
Overall prevalence of Hearing Loss	11.1 (9.6, 12.7)			



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