

METHODS

Quantitative bias assessment

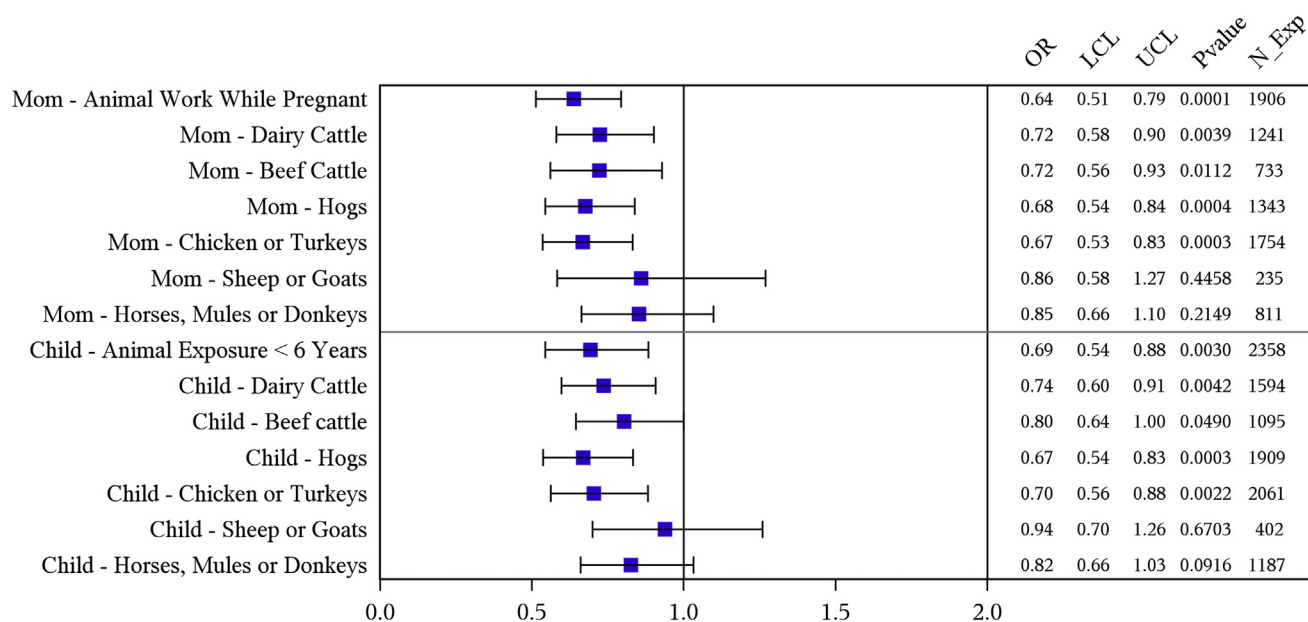
The response rate among subjects targeted for the current study was about 50%. Although the comparable response rates between asthma cases and noncases provide some reassurance, selection bias could have occurred if nonresponse was jointly conditional on both early-life farm exposure and asthma or atopic status. Because we have some surrogate data on both the exposure and outcomes among the entire target population of 44,301 cohort members who completed the second follow-up interview, we were able to perform quantitative selection bias analyses.^{E1} As a surrogate for early-life farm exposure, we had the question: "As a child, how much time did you spend around farm animals (for example, cattle, pigs, or chickens)?" Though not identical to our early-life questions, when dichotomized into categories of monthly or more frequently versus never or less than once per month, this surrogate was strongly correlated with the early-life farm exposure variables most associated with atopy in our study (tetrachoric correlations, 0.73-0.84; $P < .0001$ for all correlations).

When we analyzed the surrogate variable for farm animal contact before age 18 in the entire target population, the OR for asthma was 0.93, which is identical to that for the subjects enrolled in our study. For atopy, IgE measurements were only made in participants in our substudy so we used the following surrogate atopy end point available on all 44,301 cohort members: self-report of diagnosis of hay fever, seasonal allergies, or allergic rhinitis. When we examined the association between our surrogate early-life farm animal exposure variable and surrogate atopy end point in the entire target population, we observed reduced odds of atopy (OR, 0.86; 95% CI, 0.81-0.96). Among our study participants, the corresponding OR is nearly identical at 0.89 with a wider CI (0.72-1.10), reflecting the much smaller sample size. Thus, our quantitative bias assessment reassuringly indicates a lack of selection bias for the evaluation of the association of early-life farm exposure with asthma and atopy.

REFERENCE

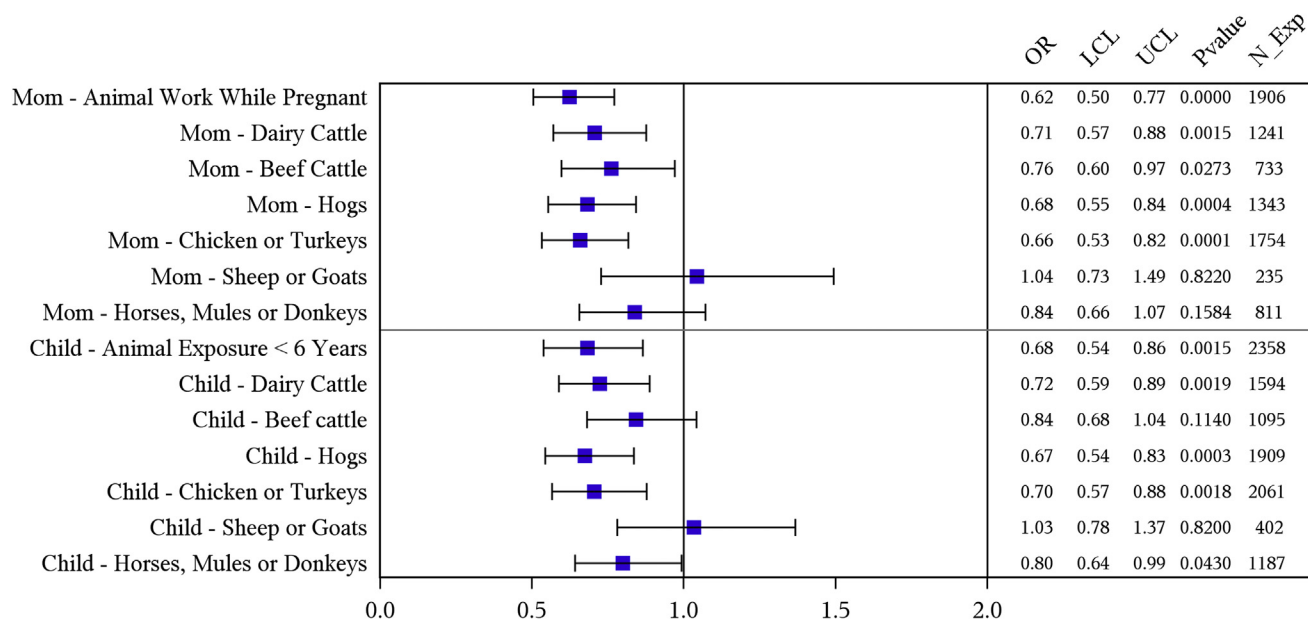
- E1. Lash TL, Fox MP, Fink AK. Applying quantitative bias analysis to epidemiologic data. New York, NY: Springer; 2009.

Associations Between Early Life Animal Exposures and Atopy to Inhaled Allergens in the Agricultural Lung Health Study



Inhaled Atopy Defined as IgE > 0.70 IU/mL For 1 or More Seasonal and Perennial Allergens

Associations Between Early Life Animal Exposures and Any Atopy in the Agricultural Lung Health Study



Any Atopy Defined as IgE > 0.70 IU/mL For 1 or More Allergens

FIG E1. Associations between exposure to specific farm animals and adult atopy in the ALHS. Results are adjusted for age, sex, race, state, pack years, and asthma case-control status. *LCL/UCL*, Lower/upper confidence limit (95%); *N_Exp*, count of exposed individuals.

TABLE E1. Questions from the ALHS early life questionnaire analyzed for association with asthma or atopy

Question	Possible responses
Did your mother live on a farm while she was pregnant with you?	Yes, no, don't know
Did your mother perform any farm activities while she was pregnant with you?	Yes, no, don't know
Did your mother work with or around farm animals such as cattle, horses, hogs, poultry, sheep or goats while pregnant with you?	Yes, no, don't know
If yes, which of the following types of animals did your mother work with or around?	Yes, no, don't know
Dairy cattle	Yes, no, don't know
Beef cattle	Yes, no, don't know
Hogs	Yes, no, don't know
Chickens or turkeys	Yes, no, don't know
Sheep or goats	Yes, no, don't know
Horses, mules, or donkeys	Yes, no, don't know
Was your family living on a farm when you were born, regardless of whether they were doing farm work?	Yes, no, don't know
At any time before you were age 3, did you spend time around farm animals, such as cattle, horses, hogs, poultry, sheep or goats at least weekly or for months at a time?	Yes, no, don't know
At any time between age 3 and your sixth birthday, did you spend time around farm animals at least weekly or for months at a time?	Yes, no, don't know
Up until your sixth birthday, which of the following types of farm animals did you spend time around?	
Dairy cattle	Yes, no, don't know
Beef cattle	Yes, no, don't know
Hogs	Yes, no, don't know
Chickens or turkeys	Yes, no, don't know
Sheep or goats	Yes, no, don't know
Horses, mules, or donkeys	Yes, no, don't know
Were you ever breastfed as an infant?	Yes, no, don't know
When you were a child, what was the main type of milk served in your home?	Raw milk, pasteurized/store-bought milk, no milk was served at home, don't know
Have you ever drunk raw milk?	Yes, no, don't know
If yes, how old were you when you first drank raw milk? If you are not sure of your answer, please provide your best guess.	Less than 1 year, 1 year old, 2 years old, 3 years old, 4 years old, 5 years old, 6 or older
How old were you when you last drank raw milk? If less than 1 year old, write "00." If you still drink raw milk, write your current age. If you are not sure, please provide your best guess.	Open response
At any time before you were age 6, did you have any dogs, cats, other furry pets such as hamsters, or birds living inside your home?	Yes, no, don't know
Did your mother smoke cigarettes when she was pregnant with you?	Yes, no, don't know
At any time before you were age 6, did anyone living in your home smoke cigarettes?	Yes, no, don't know
If yes, at any time before you were age 6, did your mother smoke cigarettes?	Yes, no, don't know
If yes, at any time before you were age 6, did your father smoke cigarettes?	Yes, no, don't know

TABLE E2. Sensitivity analysis of associations between early-life farm exposures and current asthma in the ALHS

Early-life exposures*	Noncases n	Excluding asthma cases with COPD overlap		Excluding asthma cases with COPD overlap and likely undiagnosed asthma cases	
		Cases n	OR (95% CI)†	Cases n	OR (95% CI)†
Total	2031	1161		860	
Mother lived on farm while pregnant					
No	476	321	Ref	253	Ref
Yes	1534	822	0.88 (0.73-1.04)	594	0.81 (0.67-0.98)
Missing	21	18		13	
Mother performed farm activities while pregnant					
No	604	367	Ref	283	Ref
Yes	1332	728	1.01 (0.86-1.20)	535	0.96 (0.80-1.15)
Missing	95	66		42	
Mother worked with farm animals while pregnant					
No	624	364	Ref	275	Ref
Yes	1257	696	1.09 (0.92-1.29)	512	1.05 (0.87-1.27)
Missing	150	101		73	
Family lived on farm when born					
No	472	320	Ref	250	Ref
Yes	1537	826	0.88 (0.74-1.05)	596	0.81 (0.67-0.98)
Missing	22	15		14	
Farm animal exposure before age 3					
No	540	308	Ref	233	Ref
Yes	1313	739	1.10 (0.93-1.32)	542	1.08 (0.89-1.32)
Missing	178	114		85	
Farm animal exposure before age 6					
No	409	232	Ref	185	Ref
Yes	1538	887	1.18 (0.97-1.43)	643	1.08 (0.88-1.33)
Missing	84	42		32	
Breast-fed					
No	684	398	Ref	290	Ref
Yes	961	549	1.16 (0.97-1.39)	409	1.16 (0.96-1.42)
Missing	386	214		161	
Raw milk					
No	422	235	Ref	181	Ref
Yes	1498	856	1.23 (1.01-1.50)	629	1.14 (0.92-1.41)
Missing	111	70		50	
Indoor furry pets before age 6					
No	1480	810	Ref	584	Ref
Yes	507	332	1.15 (0.98-1.36)	263	1.26 (1.05-1.50)
Missing	44	19		13	
Mother smoked cigarettes when pregnant					
No	1764	991	Ref	723	Ref
Yes	169	113	1.12 (0.87-1.45)	94	1.27 (0.96-1.67)
Missing	98	57		43	
Parents smoked cigarettes in house before age 6					
No	936	485	Ref	338	Ref
Yes	1043	637	1.18 (1.02-1.38)	492	1.27 (1.08-1.51)
Missing	52	39		30	

*Exposures are modeled individually, one at a time.

†Logistic regression used to estimate ORs adjusted for age, sex, race, state, and pack years.

TABLE E3. Associations between early-life exposures to farm animals and current asthma in the ALHS

	Mother worked with farm animals while pregnant*				Farm animals before age 6*			
	Cases	Noncases	OR (95% CI)†	P value	Cases	Noncases	OR (95% CI)†	P value
Any farm animals								
No	371	624	Ref		238	409	Ref	
Yes	722	1257	1.10 (0.93-1.30)	.28	913	1538	1.18 (0.97-1.42)	.10
Missing	105	150			47	84		
Dairy cattle								
No	575	1002	Ref		511	842	Ref	
Yes	473	814	1.14 (0.97-1.34)	.11	612	1049	1.1 (0.94-1.29)	.24
Missing	150	215			75	140		
Beef cattle								
No	739	1263	Ref		662	1113	Ref	
Yes	272	498	0.97 (0.81-1.17)	.78	422	722	1.03 (0.87-1.21)	.73
Missing	187	270			114	196		
Hogs								
No	526	887	Ref		382	614	Ref	
Yes	490	902	1.03 (0.87-1.21)	.75	722	1260	1.04 (0.87-1.22)	.69
Missing	182	242			94	157		
Chickens or turkeys								
No	423	701	Ref		336	562	Ref	
Yes	659	1160	1.08 (0.91-1.27)	.39	788	1354	1.11 (0.93-1.32)	.23
Missing	116	170			74	115		
Sheep or goats								
No	950	1617	Ref		942	1572	Ref	
Yes	83	161	0.95 (0.71-1.25)	.70	155	265	1.05 (0.84-1.3)	.69
Missing	165	253			101	194		
Horses, mules, or donkeys								
No	735	1241	Ref		659	1092	Ref	
Yes	308	542	1.13 (0.94-1.36)	.20	459	773	1.14 (0.96-1.35)	.14
Missing	155	248			80	166		

*Exposures are modeled individually.

†Logistic regression used to estimate ORs adjusted for age, sex, race, state, and pack years.

TABLE E4. Associations between raw milk consumption and current asthma in the ALHS

Raw milk exposure*	Cases	Noncases	OR (95% CI)†	P value
Ever drank raw milk				
No	239	422	Ref	
Yes	889	1498	1.23 (1.01-1.49)	.04
Missing	70	111		
Raw milk before or after age 6				
Never	239	422	Ref	
Start after age 6	147	211	1.30 (1.00-1.70)	.05
Start before age 6	729	1278	1.19 (0.97-1.45)	.10
Missing	83	120		
Main milk was raw milk				
No	451	742	Ref	
Yes	698	1218	1.11 (0.93-1.32)	.25
Missing	49	71		
Ever raw milk, main milk				
Never raw milk	233	404	Ref	
Ever raw milk, main milk not raw	170	265	1.17 (0.91-1.51)	.23
Ever raw milk, main milk raw	692	1203	1.20 (0.97-1.47)	.10
Missing	103	159		

*Twenty-four participants (12 cases and 12 noncases) who reported not drinking any type of milk in childhood were included in the referent categories of these analyses (eg, never drank raw milk and main milk not raw). Excluding these individuals did not materially change estimates.

†Logistic regression used to estimate ORs adjusted for age, sex, race, state, and pack years.

TABLE E5. Associations between early-life exposures and adult atopy by allergen type in the ALHS

Early-life exposures*	No exposure		Exposure		OR (95% CI)‡	P value
	Atopic†	Nonatopic	Atopic	Nonatopic		
Mother lived on farm when pregnant						
Atopy to any allergen	174	588	394	1901	0.68 (0.55-0.85)	.001
Atopy to inhaled allergen	165	597	368	1927	0.69 (0.55-0.87)	.001
Atopy to perennial allergen	121	641	277	2018	0.74 (0.57-0.95)	.02
Atopy to seasonal allergen	75	687	171	2124	0.72 (0.53-0.99)	.04
Atopy to food allergen	27	735	76	2219	0.79 (0.49-1.27)	.33
Mother performed farm activities when pregnant						
Atopy to any allergen	217	711	326	1683	0.60 (0.48-0.74)	<.001
Atopy to inhaled allergen	205	723	305	1704	0.61 (0.49-0.75)	<.001
Atopy to perennial allergen	154	774	228	1781	0.63 (0.50-0.80)	<.001
Atopy to seasonal allergen	93	835	144	1865	0.65 (0.48-0.87)	.004
Atopy to food allergen	36	892	64	1945	0.67 (0.44-1.05)	.08
Mother worked with farm animals when pregnant						
Atopy to any allergen	217	734	305	1601	0.62 (0.50-0.77)	<.001
Atopy to inhaled allergen	204	747	286	1620	0.64 (0.51-0.79)	<.001
Atopy to perennial allergen	150	801	216	1690	0.68 (0.53-0.87)	.002
Atopy to seasonal allergen	95	856	131	1775	0.66 (0.49-0.89)	.006
Atopy to food allergen	39	912	58	1848	0.61 (0.39-0.94)	.03
Family lived on farm when born						
Atopy to any allergen	175	582	395	1911	0.67 (0.54-0.84)	<.001
Atopy to inhaled allergen	165	592	370	1936	0.68 (0.55-0.86)	.001
Atopy to perennial allergen	122	635	277	2029	0.72 (0.56-0.93)	.01
Atopy to seasonal allergen	76	681	171	2135	0.71 (0.52-0.96)	.03
Atopy to food allergen	32	725	71	2235	0.60 (0.38-0.94)	.03
Farm animal exposure before age 3						
Atopy to any allergen	182	638	337	1656	0.68 (0.54-0.84)	<.001
Atopy to inhaled allergen	173	647	315	1678	0.67 (0.54-0.84)	<.001
Atopy to perennial allergen	127	693	235	1758	0.70 (0.55-0.90)	.006
Atopy to seasonal allergen	80	740	148	1845	0.70 (0.52-0.95)	.02
Atopy to food allergen	26	794	71	1922	1.00 (0.62-1.60)	.99
Farm animal exposure before age 6						
Atopy to any allergen	141	476	419	1939	0.68 (0.54-0.86)	.002
Atopy to inhaled allergen	133	484	393	1965	0.69 (0.54-0.88)	.003
Atopy to perennial allergen	95	522	297	2061	0.76 (0.58-1.00)	.05
Atopy to seasonal allergen	63	554	182	2176	0.70 (0.50-0.97)	.03
Atopy to food allergen	19	598	84	2274	0.99 (0.58-1.69)	.97

*Exposures are modeled individually.

†Atopy cut point defined as 1 or more allergen-specific IgEs > 0.70 IU/mL in that group.

‡Logistic regression used to estimate ORs adjusted for age, sex, race, state, pack years, and asthma case-control status.

TABLE E6. Associations between early-life exposures and adult atopy by cut point in the ALHS

Early-life exposures*	No exposure		Exposure		OR (95% CI)‡	P value
	Atopic†	Nonatopic	Atopic	Nonatopic		
Mother lived on farm when pregnant						
0.35 IU/mL	353	409	954	1341	0.82 (0.69-0.98)	.03
0.70 IU/mL	174	588	394	1901	0.69 (0.55-0.85)	.001
3.50 IU/mL	65	697	146	2149	0.73 (0.52-1.01)	.06
Mother performed farm activities when pregnant						
0.35 IU/mL	438	490	816	1193	0.76 (0.64-0.90)	.001
0.70 IU/mL	217	711	326	1683	0.60 (0.49-0.74)	<.001
3.50 IU/mL	88	840	119	1890	0.56 (0.41-0.77)	<.001
Mother worked with farm animals when pregnant						
0.35 IU/mL	449	502	770	1136	0.76 (0.64-0.89)	.001
0.70 IU/mL	217	734	305	1601	0.62 (0.50-0.77)	<.001
3.50 IU/mL	88	863	110	1796	0.57 (0.42-0.79)	.001
Family lived on farm when born						
0.35 IU/mL	354	403	957	1349	0.81 (0.68-0.96)	.02
0.70 IU/mL	175	582	395	1911	0.67 (0.54-0.84)	<.001
3.50 IU/mL	66	691	146	2160	0.70 (0.50-0.98)	.04
Farm animal exposure before age 3						
0.35 IU/mL	385	435	820	1173	0.79 (0.67-0.94)	.009
0.70 IU/mL	182	638	337	1656	0.68 (0.54-0.84)	<.001
3.50 IU/mL	69	751	122	1871	0.67 (0.48-0.93)	.02
Farm animal exposure before age 6						
0.35 IU/mL	281	336	998	1360	0.88 (0.72-1.06)	.17
0.70 IU/mL	141	476	419	1939	0.68 (0.54-0.86)	.002
3.50 IU/mL	60	557	150	2208	0.57 (0.40-0.80)	.001

*Exposures are modeled individually.

†Atopy cut point defined as 1 or more allergen-specific IgEs > 0.70 IU/mL in that group.

‡Logistic regression used to estimate ORs adjusted for age, sex, race, state, pack years, and asthma case-control status.

TABLE E7. Associations between the number of types of farm animals to which subjects were exposed *in utero* or early life and adult atopy in the ALHS

	Atopic*	Nonatopic	OR (95% CI)†	P value
No. of farm animal types exposed to <i>in utero</i>				
None	218	740	Ref	
1 vs 0	42	228	0.62 (0.43-0.91)	.02
2 vs 0	53	262	0.66 (0.47-0.93)	.02
3 vs 0	81	379	0.68 (0.51-0.92)	.01
4 vs 0	75	436	0.55 (0.41-0.75)	<.001
5 or more vs 0	53	288	0.61 (0.43-0.87)	.007
No. of farm animal types exposed to before age 6				
None	142	481	Ref	
1 vs 0	33	145	0.73 (0.47-1.13)	.16
2 vs 0	83	245	1.01 (0.73-1.40)	.95
3 vs 0	104	492	0.64 (0.47-0.86)	.003
4 vs 0	110	617	0.54 (0.40-0.74)	<.001
5 or more vs 0	87	429	0.64 (0.46-0.88)	.007

*Atopy cut point defined as 1 or more allergen-specific IgEs > 0.70 IU/mL.

†Logistic regression used to estimate ORs adjusted for age, sex, race, state, pack years, and asthma case-control status.

TABLE E8. Tetrachoric correlations between early life farming exposures in the ALHS

	Mother lived on farm while pregnant	Mother performed farm activities while pregnant	Mother worked with farm animals while pregnant	Family lived on farm when born	Farm animal exposure before age 3	Farm animal exposure before age 6	Breast-fed	Raw milk
Mother performed farm activities while pregnant	0.95	—	—	—	—	—	—	—
Mother worked with farm animals while pregnant	0.94	0.9997	—	—	—	—	—	—
Family lived on farm when born	0.996	0.94	0.93	—	—	—	—	—
Farm animal exposure before age 3	0.84	0.85	0.86	0.84	—	—	—	—
Farm animal exposure before age 6	0.85	0.85	0.87	0.84	0.999	—	—	—
Breast-fed	0.23	0.31	0.33	0.23	0.24	0.24	—	—
Raw milk	0.48	0.52	0.54	0.48	0.47	0.55	0.48	—
Main milk raw milk	0.62	0.64	0.64	0.63	0.62	0.69	0.45	0.999

Tetrachoric correlation values presented in this table are based on early SAS 9.4 proc corr. Depending on the pair of exposure variables in question, n values ranged from 2421 (mom worked with farm animals while pregnant vs breast-fed) to 3173 (mom lived on farm while pregnant vs family lived on farm when born). Limiting analysis to individuals with atopy data changed results by < 0.02 for all data points. $P < .0001$ for all correlations.

TABLE E9. Associations between early-life exposures and adult allergic symptoms in the ALHS

Early-life exposures*	Current allergic disease† (%)	No current allergic disease (%)	OR (95% CI)‡
Total	1920	1292	
Mother lived on farm while pregnant			
No	540 (28.1)	263 (20.4)	Ref
Yes	1353 (70.5)	1016 (78.6)	0.80 (0.66-0.97)
Missing	27 (1.4)	13 (1.0)	
Mother performed farm activities while pregnant			
No	629 (32.8)	348 (26.9)	Ref
Yes	1187 (61.8)	884 (68.4)	0.86 (0.72-1.03)
Missing	104 (5.4)	60 (4.6)	
Mother worked with farm animals while pregnant			
No	641 (33.4)	352 (27.2)	Ref
Yes	1124 (58.5)	840 (65.0)	0.86 (0.72-1.03)
Missing	155 (8.1)	100 (7.7)	
Family lived on farm when born			
No	544 (28.3)	254 (19.7)	Ref
Yes	1353 (70.5)	1024 (79.3)	0.75 (0.62-0.91)
Missing	23 (1.2)	14 (1.1)	
Farm animal exposure before age 3			
No	546 (28.4)	307 (23.8)	Ref
Yes	1194 (62.2)	869 (67.3)	0.91 (0.75-1.09)
Missing	180 (9.4)	116 (9.0)	
Farm animal exposure before age 6			
No	418 (21.8)	228 (17.7)	Ref
Yes	1430 (74.5)	1005 (77.8)	0.95 (0.77-1.16)
Missing	72 (3.8)	59 (4.6)	
Breast-fed			
No	683 (35.6)	408 (31.6)	Ref
Yes	908 (47.3)	611 (47.3)	1.02 (0.85-1.24)
Missing	329 (17.1)	273 (21.1)	
Indoor furry pets before age 6			
No	1336 (69.6)	970 (75.1)	Ref
Yes	543 (28.3)	300 (23.2)	1.16 (0.97-1.39)
Missing	41 (2.1)	22 (1.7)	
Mother smoked cigarettes while pregnant			
No	1633 (85.1)	1136 (87.9)	Ref
Yes	192 (10.0)	94 (7.3)	1.15 (0.87-1.53)
Missing	95 (4.9)	62 (4.8)	
Parents smoked cigarettes in house before age 6			
No	820 (42.7)	606 (46.9)	Ref
Yes	1044 (54.4)	650 (50.3)	1.01 (0.86-1.19)
Missing	56 (2.9)	36 (2.8)	

*Exposures are modeled individually.

†Respondents who answered yes to current eczema or atopic dermatitis in past 12 months and yes to itching/other eczema symptoms in past 12 months or answered yes to any of the following concerning the past 12 months: allergy symptoms, medication use to treat allergy symptoms, nasal problems without cold/flu, itchy/watery eyes with problems, and medication use for nasal problems (n = 149 for current eczema; n = 1899 for current allergies).

‡Logistic regression used to estimate ORs adjusted for age, sex, race, state, asthma case-control status, and pack years.

TABLE E10. Associations between early-life exposures and adult atopy and asthma using multinomial regression in the ALHS excluding asthma cases with COPD overlap and likely undiagnosed asthma cases

Early-life exposures*	No exposure	Exposure	OR (95% CI)†	P value
Mother lived on farm when pregnant				
Asthma = no, atopy = no	372	1298	Ref	
Asthma = no, atopy = yes	75	180	0.63 (0.46-0.86)	.004
Asthma = yes, atopy = no	161	396	0.80 (0.63-1.00)	.05
Asthma = yes, atopy = yes	80	172	0.64 (0.47-0.88)	.006
Mother performed farm activities when pregnant				
Asthma = no, atopy = no	477	1132	Ref	
Asthma = no, atopy = yes	93	153	0.64 (0.47-0.85)	.003
Asthma = yes, atopy = no	170	369	1.05 (0.84-1.31)	.68
Asthma = yes, atopy = yes	100	141	0.62 (0.47-0.84)	.002
Mother worked with farm animals when pregnant				
Asthma = no, atopy = no	500	1070	Ref	
Asthma = no, atopy = yes	96	141	0.66 (0.49-0.88)	.006
Asthma = yes, atopy = no	165	357	1.17 (0.94-1.47)	.17
Asthma = yes, atopy = yes	97	133	0.72 (0.53-0.97)	.03
Family lived on farm when born				
Asthma = no, atopy = no	368	1302	Ref	
Asthma = no, atopy = yes	75	181	0.63 (0.46-0.86)	.004
Asthma = yes, atopy = no	159	400	0.81 (0.64-1.02)	.07
Asthma = yes, atopy = yes	80	170	0.62 (0.46-0.85)	.003
Farm animal exposure before age 6				
Asthma = no, atopy = no	321	1298	Ref	
Asthma = no, atopy = yes	65	183	0.64 (0.46-0.90)	.009
Asthma = yes, atopy = no	117	428	1.08 (0.84-1.39)	.53
Asthma = yes, atopy = yes	62	187	0.80 (0.58-1.12)	.20
Indoor furry pets before age 6				
Asthma = no, atopy = no	1243	410	Ref	
Asthma = no, atopy = yes	175	74	1.33 (0.99-1.80)	.06
Asthma = yes, atopy = no	387	173	1.28 (1.04-1.59)	.02
Asthma = yes, atopy = yes	173	78	1.33 (0.99-1.79)	.06
Parents smoked in house before age 6				
Asthma = no, atopy = no	770	872	Ref	
Asthma = no, atopy = yes	121	130	0.94 (0.71-1.23)	.64
Asthma = yes, atopy = no	225	322	1.22 (1.00-1.49)	.05
Asthma = yes, atopy = yes	94	153	1.42 (1.07-1.89)	.01
Breast-fed as infant				
Asthma = no, atopy = no	565	805	Ref	
Asthma = no, atopy = yes	91	114	0.96 (0.69-1.32)	.78
Asthma = yes, atopy = no	184	280	1.23 (0.97-1.56)	.09
Asthma = yes, atopy = yes	98	110	1.00 (0.72-1.37)	.98
Ever drank raw milk				
Asthma = no, atopy = no	337	1271	Ref	
Asthma = no, atopy = yes	62	173	0.76 (0.54-1.07)	.12
Asthma = yes, atopy = no	116	417	1.09 (0.84-1.41)	.52
Asthma = yes, atopy = yes	59	182	1.03 (0.73-1.46)	.85
Raw milk was main milk				
Asthma = no, atopy = no (ref)	593	1034	Ref	
Asthma = no, atopy = yes	109	140	0.74 (0.54-1.01)	.06
Asthma = yes, atopy = no	213	329	1.01 (0.80-1.27)	.95
Asthma = yes, atopy = yes	112	129	0.79 (0.57-1.08)	.13

Atopy cut point defined as 1 or more allergen-specific IgEs > 0.70 IU/mL in that group. Asthma cases restricted to those who responded “yes” to ever have or still have asthma and “no” to ever diagnosed with COPD or emphysema.

*Exposures are modeled individually.

†Logistic regression used to estimate ORs adjusted for age, sex, race, state, and pack years.

TABLE E11. Associations between farm animal exposure across life span and current asthma in the ALHS

Farm animal exposure	Cases	Noncases	OR (95% CI)*	P value
<i>In utero</i> , childhood				
<i>In utero</i> = no, childhood = no	208	339	Ref	
<i>In utero</i> = yes, childhood = no	17	48	0.63 (0.35-1.13)	.12
<i>In utero</i> = no, childhood = yes	159	260	1.09 (0.83-1.42)	.54
<i>In utero</i> = yes, childhood = yes	679	1177	1.12 (0.91-1.39)	.29
Missing	135	207		
Childhood, adulthood				
Childhood = no, adulthood = no	162	295	Ref	
Childhood = yes, adulthood = no	486	798	1.26 (1.00-1.58)	.05
Childhood = no, adulthood = yes	73	109	1.19 (0.83-1.70)	.34
Childhood = yes, adulthood = yes	410	731	1.17 (0.91-1.49)	.22
Missing	67	98		

*Logistic regression used to estimate ORs adjusted for age, sex, race, state, and pack years.

TABLE E12. Associations between farm animal exposure across life span and adult atopy in the ALHS

Farm animal exposure	Atopic*	Nonatopic	OR (95% CI)†	P value
<i>In utero</i> , childhood prior to age 6				
<i>In utero</i> = no, childhood = no	119	401	Ref	
<i>In utero</i> = yes, childhood = no	11	54	0.75 (0.37-1.53)	.43
<i>In utero</i> = no, childhood = yes	93	311	0.94 (0.68-1.29)	.69
<i>In utero</i> = yes, childhood = yes	289	1499	0.61 (0.47-0.80)	<.001
Missing	66	261		
Childhood prior to age 6, adulthood				
Childhood = no, adulthood = no	99	343	Ref	
Childhood = yes, adulthood = no	227	1029	0.73 (0.55-0.97)	.03
Childhood = no, adulthood = yes	41	132	0.96 (0.62-1.48)	.85
Childhood = yes, adulthood = yes	191	906	0.61 (0.45-0.83)	.002
Missing	20	116		

*Atopy cut point defined as 1 or more allergen-specific IgEs > 0.70 IU/mL.

†Logistic regression used to estimate ORs adjusted for age, sex, race, state, pack years, and asthma case-control status.