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Supplemental Material

Precipitation and Salmonellosis Incidence in Georgia, USA: Interactions between Extreme Rainfall Events and Antecedent Rainfall Conditions

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Table of Contents

Table S1. Incidence rate ratios (IRR) and 95% confidence intervals (CI) of parameters in multivariate models of salmonellosis incidence attributed to all serovars (Model 3).

Table S2. Incidence rate ratios (IRR) and 95% confidence intervals (CI) for combinations of precipitation conditions (extreme precipitation at the 90th, 95th, and 99th percentile and antecedent conditions) in Model 3 when considering salmonellosis from all serovars.

Table S3. Incidence rate ratios (IRR) for combinations of precipitation conditions (extreme precipitation at the 90th, 95th, and 99th percentile and antecedent conditions) in Model 3 when considering salmonellosis from environmental serovars.

Table S4. Comparison of incidence rate ratios (IRR) and 95% confidence intervals (CI) of 1-3 week lags in precipitation-related variables in multivariate models of salmonellosis incidence from all serovars (top) and environmental serovars (bottom) in the Coastal Plain counties.

Supplementary Table S1: Incidence rate ratios (IRR) and 95% confidence intervals (CI) of parameters in multivariate models of salmonellosis incidence attributed to all serovars (Model 3).

	All Counties IRR (95% CI)	Coastal Plain Counties IRR (95% CI)	Northern Counties IRR (95% CI)
Extreme ^a	1.09 (1.04, 1.13)	1.11 (1.05, 1.18)	1.03 (0.97, 1.09)
Dry (Antecedent) ^b	0.94 (0.90, 0.98)	0.92 (0.87, 0.98)	1.01 (0.96, 1.07)
Wet (Antecedent) ^b	1.08 (1.03, 1.12)	1.13 (1.06, 1.19)	0.94 (0.89, 1.00)
Temperature ^c	1.52 (1.47, 1.57)	1.75 (1.66, 1.84)	1.37 (1.31, 1.43)
Spring ^d	1.05 (1.00, 1.11)	0.94 (0.86, 1.02)	1.16 (1.08, 1.25)
Summer ^d	1.92 (1.80, 2.05)	2.04 (1.85, 2.26)	1.77 (1.61, 1.93)
Fall ^d	1.91 (1.82, 2.01)	2.42 (2.25, 2.61)	1.46 (1.37, 1.56)
Extreme*Dry	1.00 (0.94, 1.06)	1.02 (0.93, 1.11)	1.00 (0.92, 1.08)
Extreme*Wet	0.94 (0.88, 1.00)	0.89 (0.82, 0.97)	1.04 (0.96, 1.13)

^aThe dichotomous 'Extreme' variable refers to the presence of an extreme rainfall event (0 = no extreme event, 1 = extreme event) in the week preceding the week of disease incidence.

^b'Antecedent' rainfall levels in the eight weeks prior to an extreme event were categorized into tertiles of overall precipitation (dry, moderate rainfall, and wet), with moderate rainfall as the reference category.

^cThe continuous 'Temperature' variable indicates a ten-degree change in average temperature (degrees Celsius).

^dThe categorical variable to control for season (winter, spring, summer, fall) uses winter as the reference category.

Supplementary Table S2: Incidence rate ratios (IRR) and 95% confidence intervals (CI) for combinations of precipitation conditions (extreme precipitation at the 90th, 95th, and 99th percentile and antecedent conditions) in Model 3 when considering salmonellosis from all serovars.

		All Counties IRR (95% CI)	Coastal Plain Counties IRR (95% CI)	Northern Counties IRR (95% CI)
90 th percentile				
No Extreme	Low	0.94 (0.90, 0.98)	0.92 (0.87, 0.98)	1.01 (0.96, 1.07)
	Moderate	(Ref)	(Ref)	(Ref)
	High	1.08 (1.03, 1.13)	1.13 (1.06, 1.19)	0.94 (0.89, 1.00)
Extreme	Low	1.02 (0.97, 1.06)	1.04 (0.98, 1.11)	1.04 (0.98, 1.10)
	Moderate	1.09 (1.04, 1.13)	1.11 (1.05, 1.18)	1.03 (0.97, 1.09)
	High	1.09 (1.05, 1.14)	1.11 (1.05, 1.18)	1.01 (0.95, 1.07)
95 th percentile				
No Extreme	Low	0.94 (0.91, 0.97)	0.93 (0.89, 0.97)	1.01 (0.96, 1.05)
	Moderate	(Ref)	(Ref)	(Ref)
	High	1.04 (1.01, 1.07)	1.06 (1.02, 1.10)	0.99 (0.95, 1.04)
Extreme	Low	0.96 (0.89, 1.04)	0.93 (0.83, 1.05)	1.07 (0.97, 1.18)
	Moderate	1.15 (1.07, 1.23)	1.19 (1.09, 1.31)	1.11 (1.01, 1.22)
	High	1.06 (0.99, 1.13)	1.13 (1.03, 1.23)	1.03 (0.95, 1.13)
99 th percentile				
No Extreme	Low	0.93 (0.91, 0.96)	0.92 (0.88, 0.96)	1.01 (0.97, 1.05)
	Moderate	(Ref)	(Ref)	(Ref)
	High	1.04 (1.01, 1.07)	1.06 (1.02, 1.10)	0.99 (0.95, 1.03)
Extreme	Low	0.92 (0.78, 1.09)	1.07 (0.85, 1.34)	0.88 (0.69, 1.13)
	Moderate	1.26 (1.11, 1.44)	1.37 (1.16, 1.62)	1.15 (0.94, 1.40)
	High	0.94 (0.83, 1.07)	0.96 (0.78, 1.18)	1.01 (0.86, 1.19)

Supplementary Table S3: Incidence rate ratios (IRR) for combinations of precipitation conditions (extreme precipitation at the 90th, 95th, and 99th percentile and antecedent conditions) in Model 3 when considering salmonellosis from environmental serovars.

		All Counties IRR (95% CI)	Coastal Plain Counties IRR (95% CI)	Northern Counties IRR (95% CI)
90 th percentile				
No Extreme	Low	0.97 (0.88, 1.07)	0.96 (0.86, 1.09)	0.95 (0.81, 1.11)
	Moderate	(Ref)	(Ref)	(Ref)
	High	1.19 (1.09, 1.31)	1.29 (1.16, 1.44)	0.90 (0.76, 1.06)
Extreme	Low	1.12 (1.01, 1.23)	1.20 (1.06, 1.35)	1.05 (0.90, 1.22)
	Moderate	1.18 (1.07, 1.29)	1.22 (1.09, 1.37)	1.06 (0.91, 1.24)
	High	1.28 (1.17, 1.40)	1.34 (1.20, 1.49)	1.14 (0.97, 1.34)
95 th percentile				
No Extreme	Low	0.99 (0.92, 1.06)	0.98 (0.89, 1.07)	1.01 (0.90, 1.13)
	Moderate	(Ref)	(Ref)	(Ref)
	High	1.13 (1.06, 1.21)	1.15 (1.07, 1.25)	1.07 (0.96, 1.21)
Extreme	Low	0.93 (0.78, 1.11)	0.99 (0.79, 1.24)	0.92 (0.70, 1.21)
	Moderate	1.29 (1.12, 1.49)	1.30 (1.09, 1.54)	1.32 (1.03, 1.69)
	High	1.26 (1.11, 1.44)	1.37 (1.16, 1.60)	1.21 (0.96, 1.52)
99 th percentile				
No Extreme	Low	0.97 (0.91, 1.04)	0.96 (0.88, 1.04)	0.99 (0.89, 1.10)
	Moderate	(Ref)	(Ref)	(Ref)
	High	1.12 (1.06, 1.20)	1.15 (1.07, 1.24)	1.06 (0.95, 1.19)
Extreme	Low	0.76 (0.50, 1.15)	1.04 (0.65, 1.67)	0.43 (0.18, 1.04)
	Moderate	1.36 (1.04, 1.77)	1.38 (1.00, 1.89)	1.32 (0.80, 2.17)
	High	1.08 (0.82, 1.42)	1.08 (0.74, 1.56)	1.27 (0.52, 3.09)

Supplementary Table S4: Comparison of incidence rate ratios (IRR) and 95% confidence intervals (CI) of 1-3 week lags in precipitation-related variables in multivariate models of salmonellosis incidence from all serovars (top) and environmental serovars (bottom) in the Coastal Plain counties.

Extreme	Antecedent	1-week lag IRR (95% CI)	2-week lag IRR (95% CI)	3-week lag IRR (95% CI)
All Serovars				
No	Dry	0.92 (0.87, 0.98)	0.92 (0.87, 0.98)	0.93 (0.87, 0.99)
	Mod	(Ref)	(Ref)	(Ref)
	Wet	1.13 (1.06, 1.19)	1.07 (1.01, 1.14)	1.10 (1.03, 1.16)
Yes	Dry	1.04 (0.98, 1.11)	0.99 (0.93, 1.06)	1.02 (0.96, 1.09)
	Mod	1.11 (1.05, 1.18)	1.07 (1.01, 1.14)	1.07 (1.01, 1.14)
	Wet	1.11 (1.05, 1.18)	1.13 (1.06, 1.20)	1.12 (1.06, 1.19)
Environmental Serovars				
No	Dry	0.96 (0.86, 1.09)	0.92 (0.81, 1.03)	0.92 (0.82, 1.04)
	Mod	(Ref)	(Ref)	(Ref)
	Wet	1.29 (1.16, 1.44)	1.14 (1.03, 1.27)	1.20 (1.07, 1.33)
Yes	Dry	1.20 (1.06, 1.35)	0.96 (0.85, 1.09)	1.02 (0.90, 1.16)
	Mod	1.22 (1.09, 1.37)	1.07 (0.96, 1.20)	1.13 (1.01, 1.26)
	Wet	1.34 (1.20, 1.49)	1.22 (1.10, 1.36)	1.24 (1.11, 1.38)