

Table S2. Quality assessment scale adapted from Dufault and Klar [1].

Evaluation criterion	Categories	Definition	Points (max=15)	
STUDY DESIGN (max=7)				
Sample size	< 11% units	Number of ecologic units included in the analysis as proportion of the total number of units	0	
	11-79% units		1	
	≥ 80% units		2	
Level of data aggregation	Other than below	Population to which the units refer to. “Other” may be province, county, district, city, group	1	
	Regional, State		2	
	National		3	
Level of inference	Individual or unclear	The results of analysis are used to draw inferences for individuals or groups (ecologic).	0	
	Ecologic		1	
Pre-specification of ecologic units	No	Ecologic units are selected to suit the hypothesis? (as opposed to selection motivated by convenience or necessity)	0	
	Yes		1	
STATISTICAL METHODOLOGY (max=5)				
Analytic methodology	Spearman’s rank correlation	All statistical methods are acceptable if they are used appropriately. The score was assigned based on the complexity and flexibility of the method.	1	
	Pearson correlation			
	Negative binomial			
	generalized linear model	1 = Spearman’s rank correlation, Pearson correlation, Negative binomial generalized linear model.	2	
	Linear regression analysis			
	Poisson regression			
Autoregressive integrated moving average (ARIMA)	K-nearest neighbor (KNN) regression	2 = Linear regression analysis, Poisson regression, Autoregressive integrated moving average (ARIMA), K-nearest neighbor (KNN) regression, Multilevel Distributed Lag Non-linear Model (MDLNM)		
Validity of statistical inferences	No	The minimum number of ecological unit are 10 units per covariate	0	
	Yes		1	
Use of covariates	No	Analysis adjusted for covariates (e.g. socio-economic, population growth)	0	
	Yes		1	
Proper adjustment for covariates		Are the outcomes standardized or adjusted for certain factors before model adjustment? For standardized or adjusted outcomes, the standardized or adjusted factors should be included in the adjustment model. If standardized/adjusted outcomes are not used, this criterion is considered to have been met.		
	No		0	
	Yes		1	
QUALITY OF REPORTING (max=3)				
Statement of study design	No	Key elements of study design are presented in the report	0	
	Yes		1	
Justification of study design	No	Justification of ecological analysis, the rational and the specific objectives presented in the report	0	
	Yes		1	

Discussion of cross-level bias and limitations	No	Readers are cautioned about the limitations of the ecological design, the ecologic fallacy and impracticality of extrapolating to a different level	0
	Yes		1

1. Dufault B, Klar N. The Quality of Modern Cross-Sectional Ecologic Studies: A Bibliometric Review. *American journal of epidemiology*. 2011;174:1101-7. doi: 10.1093/aje/kwr241.