

Reporting Summary

Nature Portfolio wishes to improve the reproducibility of the work that we publish. This form provides structure for consistency and transparency in reporting. For further information on Nature Portfolio policies, see our [Editorial Policies](#) and the [Editorial Policy Checklist](#).

Statistics

For all statistical analyses, confirm that the following items are present in the figure legend, table legend, main text, or Methods section.

n/a	Confirmed
☐	☒ The exact sample size (n) for each experimental group/condition, given as a discrete number and unit of measurement
☒	☐ A statement on whether measurements were taken from distinct samples or whether the same sample was measured repeatedly
☒	☐ The statistical test(s) used AND whether they are one- or two-sided <i>Only common tests should be described solely by name; describe more complex techniques in the Methods section.</i>
☐	☒ A description of all covariates tested
☒	☐ A description of any assumptions or corrections, such as tests of normality and adjustment for multiple comparisons
☐	☒ A full description of the statistical parameters including central tendency (e.g. means) or other basic estimates (e.g. regression coefficient) AND variation (e.g. standard deviation) or associated estimates of uncertainty (e.g. confidence intervals)
☒	☐ For null hypothesis testing, the test statistic (e.g. F , t , r) with confidence intervals, effect sizes, degrees of freedom and P value noted <i>Give P values as exact values whenever suitable.</i>
☐	☒ For Bayesian analysis, information on the choice of priors and Markov chain Monte Carlo settings
☒	☐ For hierarchical and complex designs, identification of the appropriate level for tests and full reporting of outcomes
☒	☐ Estimates of effect sizes (e.g. Cohen's d , Pearson's r), indicating how they were calculated

Our web collection on [statistics for biologists](#) contains articles on many of the points above.

Software and code

Policy information about [availability of computer code](#)

Data collection	No software was used for data collection.
Data analysis	Statistical analyses were conducted in R (version 3.6.3) using the R-INLA (version 23.9.9) and splines (version 4.3.1) packages. The R code for the statistical analysis is available on the SPARK Lab GitHub repo at https://github.com/sparklabnyc/usa_floods_mortality_2024 .

For manuscripts utilizing custom algorithms or software that are central to the research but not yet described in published literature, software must be made available to editors and reviewers. We strongly encourage code deposition in a community repository (e.g. GitHub). See the Nature Portfolio [guidelines for submitting code & software](#) for further information.

Data

Policy information about [availability of data](#)

All manuscripts must include a [data availability statement](#). This statement should provide the following information, where applicable:

- Accession codes, unique identifiers, or web links for publicly available datasets
- A description of any restrictions on data availability
- For clinical datasets or third party data, please ensure that the statement adheres to our [policy](#)

The Global Flood Database (GFD) flood event data and Global Human Settlement Layer (GHSL) population data can be downloaded from <https://global-flood-database.cloudtostreet.ai/>. Data for individual floods are available with no restrictions. Cause-specific mortality data with geographic information can be requested through the National Center for Health Statistics (NCHS) at <https://www.cdc.gov/nchs/nvss/nvss-restricted-data.htm>. Applicants must submit a project review form

(<https://www.cdc.gov/nchs/data/nvss/nchs-research-review-application.pdf>) to nvssrestricteddata@cdc.gov and allow four to six weeks for processing. Parameter-elevation Regression on Independent Slopes Model (PRISM) temperature data can be downloaded from <https://prism.oregonstate.edu/recent/> with no restrictions.

Research involving human participants, their data, or biological material

Policy information about studies with [human participants or human data](#). See also policy information about [sex, gender \(identity/presentation\), and sexual orientation](#) and [race, ethnicity and racism](#).

Reporting on sex and gender	In addition to the main analyses of cause-specific mortality and flood exposure, a stratified analysis evaluated whether effect estimates varied by sex (male or female). The stratified analysis used the same model as described in the Methods section.
Reporting on race, ethnicity, or other socially relevant groupings	N/A
Population characteristics	In addition to the main analysis of cause-specific mortality and flood exposure, a stratified analysis evaluated whether effect estimates varied by age category (<64 or ≥65 years old). The stratified analysis used the same model as described in the Methods section.
Recruitment	This study was an observational study so there was no study recruitment.
Ethics oversight	This study was reviewed and approved by the Columbia University Institutional Review Board and was classified non-human subjects research, and though not exempt from an ethics review (protocol IRB-AAAT9710).

Note that full information on the approval of the study protocol must also be provided in the manuscript.

Field-specific reporting

Please select the one below that is the best fit for your research. If you are not sure, read the appropriate sections before making your selection.

☒ Life sciences ☐ Behavioural & social sciences ☐ Ecological, evolutionary & environmental sciences

For a reference copy of the document with all sections, see nature.com/documents/nr-reporting-summary-flat.pdf

Life sciences study design

All studies must disclose on these points even when the disclosure is negative.

Sample size	All mortality records in the continental United States during 2001-2018 in counties that experienced at least one flood (n = 41,314,847 deaths).
Data exclusions	Death records that were not due to cancers, cardiovascular diseases, infectious and parasitic diseases, injuries, neuropsychiatric conditions, or respiratory diseases were excluded (13.8% of deaths in counties that experienced at least one flood were excluded).
Replication	The results can be reproduced with the code in our GitHub (https://github.com/sparklabnyc/usa_floods_mortality_2024) and the data described in the Data Availability statement.
Randomization	All data were used in this analysis. There were no experimental groups that required randomization.
Blinding	There were no experimental groups in this analysis and thus no blinding.

Reporting for specific materials, systems and methods

We require information from authors about some types of materials, experimental systems and methods used in many studies. Here, indicate whether each material, system or method listed is relevant to your study. If you are not sure if a list item applies to your research, read the appropriate section before selecting a response.

Materials & experimental systems

n/a	Involvement in the study
☒	☐ Antibodies
☒	☐ Eukaryotic cell lines
☒	☐ Palaeontology and archaeology
☒	☐ Animals and other organisms
☒	☐ Clinical data
☒	☐ Dual use research of concern
☒	☐ Plants

Methods

n/a	Involvement in the study
☒	☐ ChIP-seq
☒	☐ Flow cytometry
☒	☐ MRI-based neuroimaging

Plants

Seed stocks	N/A
Novel plant genotypes	N/A
Authentication	N/A