

eLife's transparent reporting form

We encourage authors to provide detailed information *within their submission* to facilitate the interpretation and replication of experiments. If you have any questions, please contact us: editorial@elifesciences.org.

Sample-size estimation

You should state whether an appropriate sample size was computed when the study was being designed

You should state the statistical method of sample size computation and any required assumptions

If no explicit power analysis was used, you should describe how you decided what sample (replicate) size (number) to use

Please outline where this information can be found within the submission (e.g., page numbers or figure legends), or explain why this information doesn't apply to your submission:

In this study, no sample size was used.

Replicates

You should report how often each experiment was performed

You should include a definition of biological versus technical replication

The data obtained should be provided and sufficient information should be provided to indicate the number of independent biological and/or technical replicates

If you encountered any outliers, you should describe how these were handled

Criteria for exclusion/inclusion of data should be clearly stated

High-throughput sequence data should be uploaded before submission, with a private link for reviewers provided (these are available from both GEO and ArrayExpress)

Please outline where this information can be found within the submission (e.g., page numbers or figure legends), or explain why this information doesn't apply to your submission:

The computational experiments (replicates, methods, outputs) are exhaustively detailed in supplementary text and summarized in the main text. All simulated data presented in the main text is submitted, in its completion or sampled, as supplementary data files.



Statistical reporting

Statistical analysis methods should be described and justified

Raw data should be presented in figures whenever informative to do so (typically when N per group is less than 10)

For each experiment, you should identify the statistical tests used, exact values of N, definitions of center, methods of multiple test correction, and dispersion and precision measures (e.g., mean, median, SD, SEM, confidence intervals; and, for the major substantive results, a measure of effect size (e.g., Pearson's r , Cohen's d))

Report exact p-values wherever possible alongside the summary statistics and 95% confidence intervals. These should be reported for all key questions and not only when the p-value is less than 0.05.

Please outline where this information can be found within the submission (e.g., page numbers or figure legends), or explain why this information doesn't apply to your submission:

The statistical methods used in the computational experiments are well detailed in the supplementary and main text. All distributions used / obtained as part of results are reported with medians and 95% confidence intervals.

(For large datasets, or papers with a very large number of statistical tests, you may upload a single table file with tests, Ns, etc., with reference to page numbers in the manuscript.)

Additional data files (“source data”)

We encourage you to upload relevant additional data files, such as numerical data that are represented as a graph in a figure, or as a summary table

Where provided, these should be in the most useful format, and they can be uploaded as “Source data” files linked to a main figure or table

Include model definition files including the full list of parameters used

Include code used for data analysis (e.g., R, MatLab)

Avoid stating that data files are “available upon request”

Please indicate the figures or tables for which source data files have been provided:

All (empirical) data sources are submitted with the manuscript. This includes, epidemiological timeseries and climate timeseries. All simulated / generated outputs from our analyses are also included as data files.