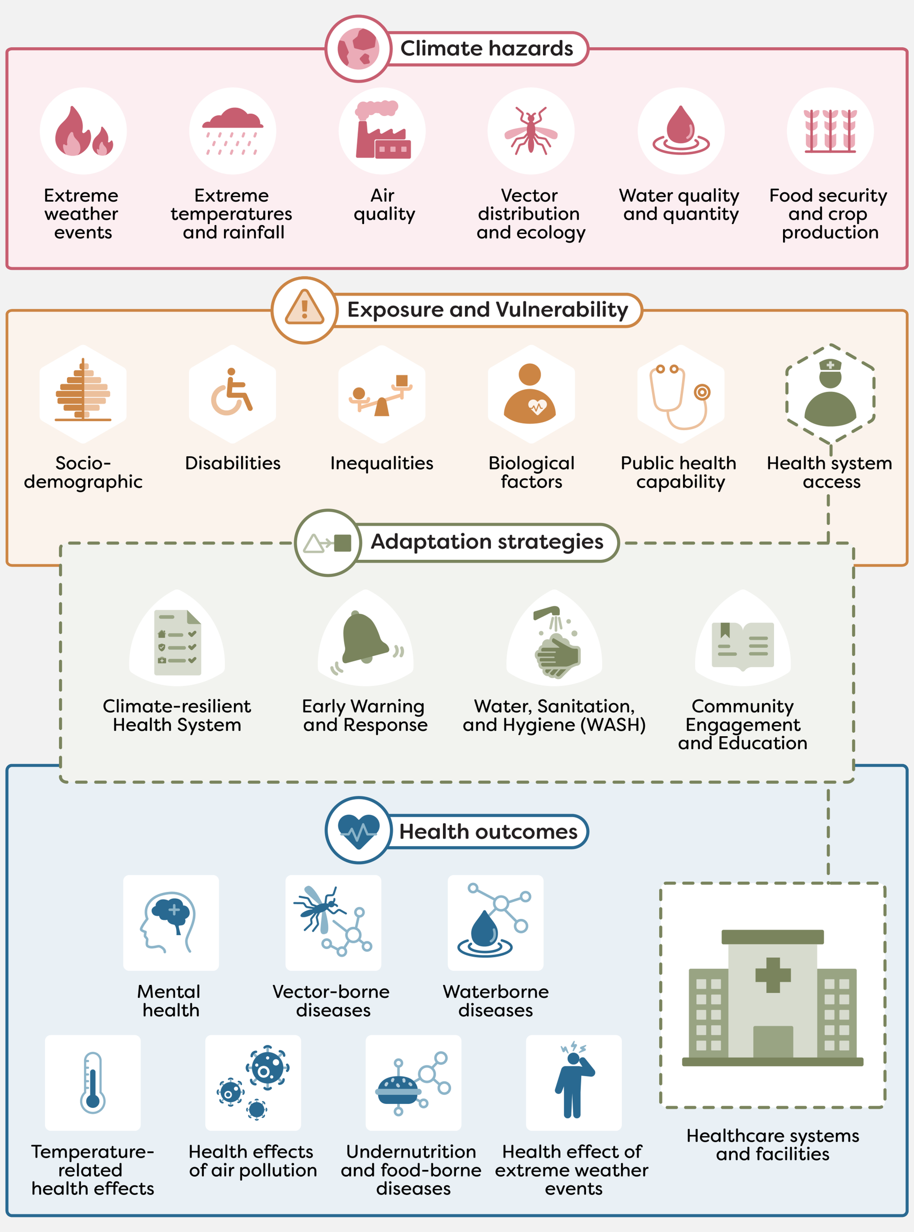
Integrating Climate and Health Statistics

SOSCHI
Standards for Official Statistics on Climate-Health Interactions

Background and Motivation

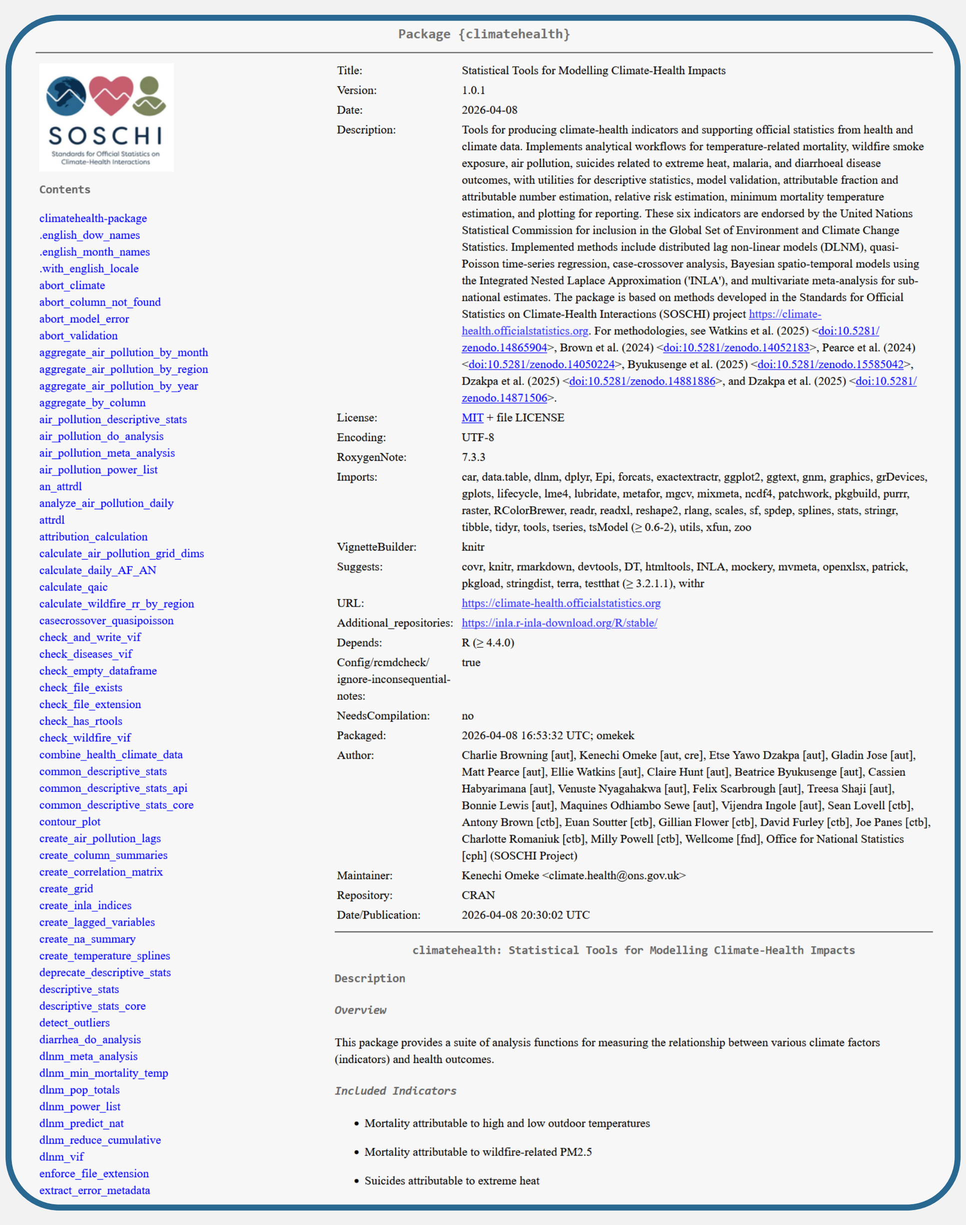
- Climate change represents the most significant global health challenge of the 21st century, profoundly and disproportionately affecting populations across the world.
- Despite a robust evidence base, the absence of standardised statistical measures hinders the consistent tracking and comparison of health impacts.
- This challenge is compounded by limited data availability and a shortage of specialised resources, particularly in low- and middle-income countries.
- Effective adaptation and mitigation strategies depend on policymakers having access to comparable, reliable, and timely data.
- To address this gap, the Standards for Official Statistics on Climate–Health Interactions (SOSCHI) project has been established as a global initiative. SOSCHI aims to develop a generalisable, evidence-based statistical framework that can be implemented by governments and health organisations to support consistent monitoring and reporting of climate-related health impacts.

Conceptual framework for monitoring climate-health interactions



Challenges/Methods

- The SOSCHI framework was developed through a phased, consultative approach, combining global evidence reviews with extensive stakeholder engagement, expert input, and pilot topic development to ensure methodological robustness, policy relevance, and feasibility for implementation within official statistical systems.
- Topic and indicator selection: Indicators were prioritised based on policy relevance, feasibility, and data availability, with robust methods, metadata, and validated code developed through expert review, national consultation, and cross-setting testing to support consistent implementation.
- SOSCHI resources: Includes an open platform, CRAN R package, and methodological documentation providing standardised methods, metadata, and tools for consistent climate–health measurement.



Package {climatehealth}

Contents

climatehealth-package, .english_dow_names, .english_month_names, .with_english_locale, abort_climate, abort_column_not_found, abort_model_error, abort_validation, aggregate_air_pollution_by_month, aggregate_air_pollution_by_region, aggregate_air_pollution_by_year, aggregate_by_column, air_pollution_descriptive_stats, air_pollution_do_analysis, air_pollution_meta_analysis, air_pollution_power_list, an_attrdl, analyze_air_pollution_daily, attrdl, attribution_calculation, calculate_air_pollution_grid_dims, calculate_daily_AF_AN, calculate_qaic, calculate_wildfire_rr_by_region, casecrossover_quasipoisson, check_and_write_vif, check_diseases_vif, check_empty_dataframe, check_file_exists, check_file_extension, check_has_rtools, check_wildfire_vif, combine_health_climate_data, common_descriptive_stats, common_descriptive_stats_api, common_descriptive_stats_core, contour_plot, create_air_pollution_lags, create_column_summaries, create_correlation_matrix, create_grid, create_inla_indices, create_lagged_variables, create_na_summary, create_temperature_splines, deprecate_descriptive_stats, descriptive_stats, descriptive_stats_core, detect_outliers, diarrhea_do_analysis, dlnm_meta_analysis, dlnm_min_mortality_temp, dlnm_pop_totals, dlnm_power_list, dlnm_predict_nat, dlnm_reduce_cumulative, dlnm_vif, enforce_file_extension, extract_error_metadata

Title:	Statistical Tools for Modelling Climate-Health Impacts
Version:	1.0.1
Date:	2026-04-08
Description:	Tools for producing climate-health indicators and supporting official statistics from health and climate data. Implements analytical workflows for temperature-related mortality, wildfire smoke exposure, air pollution, suicides related to extreme heat, malaria, and diarrhoeal disease outcomes, with utilities for descriptive statistics, model validation, attributable fraction and attributable number estimation, relative risk estimation, minimum mortality temperature estimation, and plotting for reporting. These six indicators are endorsed by the United Nations Statistical Commission for inclusion in the Global Set of Environment and Climate Change Statistics. Implemented methods include distributed lag non-linear models (DLNM), quasi-Poisson time-series regression, case-crossover analysis, Bayesian spatio-temporal models using the Integrated Nested Laplace Approximation ('INLA'), and multivariate meta-analysis for sub-national estimates. The package is based on methods developed in the Standards for Official Statistics on Climate-Health Interactions (SOSCHI) project https://climate-health.officialstatistics.org. For methodologies, see Watkins et al. (2025) <doi:10.5281/zenodo.14865904>, Brown et al. (2024) <doi:10.5281/zenodo.14052183>, Pearce et al. (2024) <doi:10.5281/zenodo.14050224>, Byukusenge et al. (2025) <doi:10.5281/zenodo.15585042>, Dzakpa et al. (2025) <doi:10.5281/zenodo.14881886>, and Dzakpa et al. (2025) <doi:10.5281/zenodo.14871506>.
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VignetteBuilder:	knitr
Suggests:	covr, knitr, rmarkdown, devtools, DT, htmltools, INLA, mockery, mvmeta, openxlsx, patrick, pkgload, stringdist, terra, testthat (≥ 3.2.1.1), withr
URL:	https://climate-health.officialstatistics.org
Additional_repositories:	https://inla.r-inla-download.org/R/stable/
Depends:	R (≥ 4.4.0)
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climatehealth: Statistical Tools for Modelling Climate-Health Impacts

Description

Overview

This package provides a suite of analysis functions for measuring the relationship between various climate factors (indicators) and health outcomes.

Included Indicators

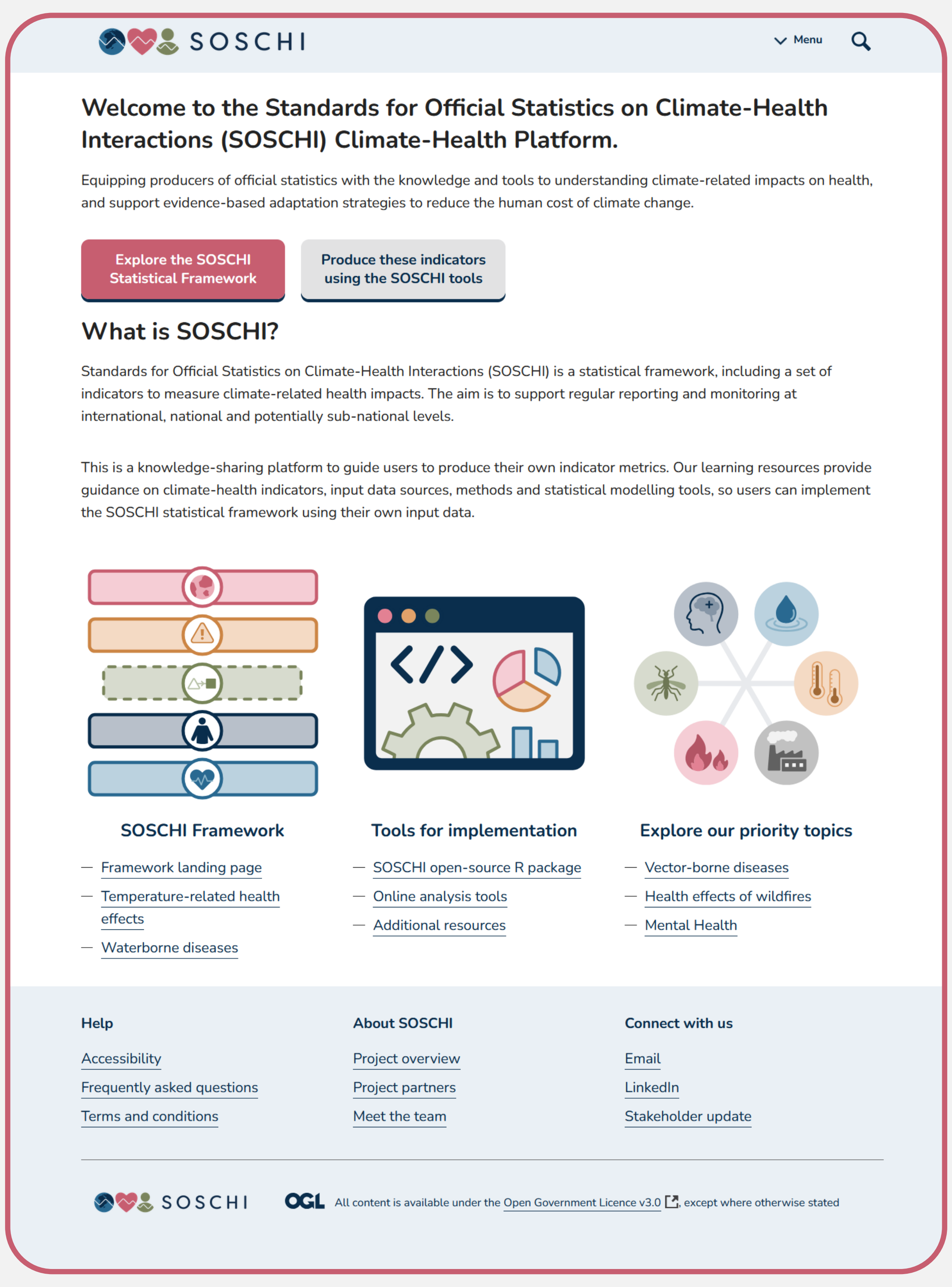
- Mortality attributable to high and low outdoor temperatures
- Mortality attributable to wildfire-related PM2.5
- Suicides attributable to extreme heat

Table 1: Health impact topics and headline SOSCHI outcome indicators

Topic	Headline outcome indicator statistics	UN Global set indicator
Waterborne diseases (diarrhea)	Diarrhea cases per 100,000 population attributable to extreme temperatures. Diarrhea cases per 100,000 population attributable to extreme rainfall.	Indicator 44: Incidence of cases of climate-related diseases.
Vector-borne diseases (malaria)	Malaria cases per 100,000 population attributable to extreme temperatures. Malaria cases per 100,000 population attributable to extreme rainfall.	Indicator 44: Incidence of cases of climate-related diseases.
Temperature-related health effects (including non-communicable diseases)	Mortality rate from all causes per 100,000 population attributable to high and low temperatures.	Indicator 45: Incidence of heat- and cold-related illnesses or excess mortality.
Mental health	Suicide rate per 100,000 population attributable to extreme heat.	Indicator 45: Incidence of heat- and cold-related illnesses or excess mortality.
Health effects of air pollution	Mortality rate from all causes per 100,000 population attributable to ambient PM2.5 exposure.	Indicator 46: Climate induced air pollution.
Health effects of extreme weather events (wildfires)	Mortality rate from all causes per 100,000 population attributable to wildfire-related PM2.5.	Indicator 46: Climate induced air pollution.

Solution/Results

- Global framework: Transparent, generalisable system for climate–health statistics.
- Evidence-based methods: Standardised methods using real-world data for policy insights.
- Broad coverage: Addresses key climate-sensitive health risks (infectious diseases, heat, air pollution, extremes, weather events).
- Priority indicators: Six key indicators endorsed by the UN and included in the 2026 global indicators set (table 1).
- Implementation tools: Platform, guidance, metadata, and open-source code to support national implementation.
- System integration: Designed for easy integration into DHIS2 pipelines and existing health data systems.
- Capacity building: Strengthens national statistical systems and production capability.
- Data-driven action: Supports adoption, better data use, and informed health adaptation decisions.



SOSCHI Menu

Welcome to the Standards for Official Statistics on Climate-Health Interactions (SOSCHI) Climate-Health Platform.

Equipping producers of official statistics with the knowledge and tools to understanding climate-related impacts on health, and support evidence-based adaptation strategies to reduce the human cost of climate change.

Explore the SOSCHI Statistical Framework | Produce these indicators using the SOSCHI tools

What is SOSCHI?

Standards for Official Statistics on Climate-Health Interactions (SOSCHI) is a statistical framework, including a set of indicators to measure climate-related health impacts. The aim is to support regular reporting and monitoring at international, national and potentially sub-national levels.

This is a knowledge-sharing platform to guide users to produce their own indicator metrics. Our learning resources provide guidance on climate-health indicators, input data sources, methods and statistical modelling tools, so users can implement the SOSCHI statistical framework using their own input data.

SOSCHI Framework
- Framework landing page
- Temperature-related health effects
- Waterborne diseases

Tools for implementation
- SOSCHI open-source R package
- Online analysis tools
- Additional resources

Explore our priority topics
- Vector-borne diseases
- Health effects of wildfires
- Mental Health

Help
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About SOSCHI
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Get involved

Scan the QR code for our platform, framework documentation, and project feedback form or email us at **climate.health@ons.gov.uk**

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