ONE HEALTH & CLIMATE

RESTORING **LAND**

RESTORING **HEALTH**

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FOREWORD

Mongolia is one of the countries most exposed to the combined pressures of a warming, drying climate. Nearly 77 percent of our territory shows signs of desertification or land degradation, and the pace of warming across the Mongolian Plateau continues to outstrip the global average. These are not abstract statistics — they describe the air our children breathe, the water our herding families depend on, and the health of every community from the Gobi to Ulaanbaatar.

As host of the 17th Conference of the Parties to the United Nations Convention to Combat Desertification, Mongolia has an opportunity — and a responsibility — to place human health at the centre of the global land, drought and desertification agenda. Land degradation is a health issue. Dust storms are a health issue. The dzud is a health issue. This booklet was prepared to help stakeholders at COP17 see these connections clearly and to support evidence-based dialogue on solutions.

We invite delegates, scientists, civil society, herder representatives and development partners to use this booklet as a shared reference point as we work together toward a healthier, more resilient Mongolia and a more resilient planet.

PROGRESS TOWARD THE HEALTH-RELATED SDG

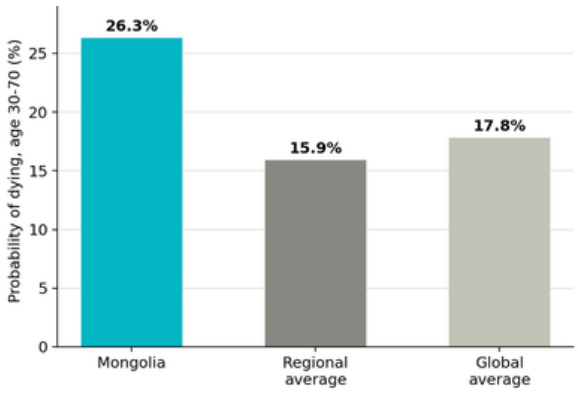
Mongolia ranks 100th globally with a Sustainable Development Goals (SDG) Index performance score of 66.75 out of 100. Overall, implementation of the health-related SDG targets in Mongolia is evaluated as moderate and improving.

SDG indicators 2025

SDG Code	Sustainable Development Goal Indicator	Global Average	Regional Average	WHO Estimates	Reference year	Status	Trend	Mongolia (2025)
3	Life Expectancy at Birth	71.4	77.4	70.1	2021	Yellow	Moderate Progress	72.1
3.1.1	Maternal Mortality Ratio (per 100,000 live births)	197	35.4	41	2023	Green	On Track	31.4
3.2.2	Neonatal Mortality Rate (per 1,000 live births)	17.3	5.6	7.4	2023	Green	On Track	8.5
3.2.1	Under-5 Mortality Rate (per 1,000 live births)	36.7	11	13.6	2023	Green	On Track	16.9
3.3.2	Tuberculosis incidence per 100,000 population	134	97	491	2023	Red	Decreas-ing	61.3
3.3.1	Number of new HIV infections per 1,000 uninfected population	0.17	0.07	0.01	2023	Green	On Track	0.005
3.4.1	Mortality rate attributed to cardiovascular disease, cancer, diabetes or chronic	17.8	15.9	26.3	2021	Red	Moderate Progress	42.5
3.4.2	Suicide Mortality Rate (per 100,000 population)	9.2	9.5	18.5	2021	Red	Decreas-ing	16.3
3.6.1	Death rate due to road traffic injuries	15	15.2	12.4	2021	Yellow	On Track	15.6
3.7.2	Adolescent birth rate (aged 15–19 years) per 1,000 women in that age	38.3	11.1	21.1	2023	Yellow	Improving (>50%)	14.9
3.1.2	Proportion of Births Attended by Skilled Health Personnel (%)	87	98	99.3	2023	Green	On Track	99.9
3.8.1	Universal health coverage (UHC) service coverage index	71	81	70	2023	Yellow	Moderate Progress	-

DISEASE BURDEN OVERVIEW

Mongolia has moved firmly into the "epidemiological transition" — non-communicable diseases (NCDs) now cause the vast majority of deaths.



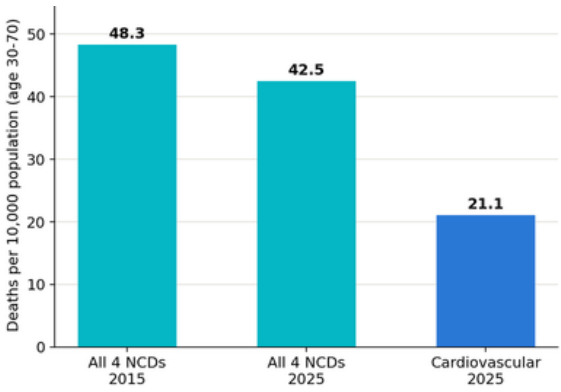
The probability of dying from the four major NCD's

MORTALITY

SDG 3.4.1 indicator — the probability of dying between ages 30 and 70 from the four major NCDs (cardiovascular disease, cancer, diabetes, chronic respiratory disease). Mongolia's 26.3% sits well above both comparison benchmarks.

CARDIOVASCULAR DISEASE

Cardiovascular disease is the single largest cause-specific contributor to Mongolia's overall NCD mortality rate — at 21.1 per 10,000, CVD alone accounts for close to half of the NCD mortality.



Cardiovascular disease mortality rate among 30-70 year olds

LIVER CANCER

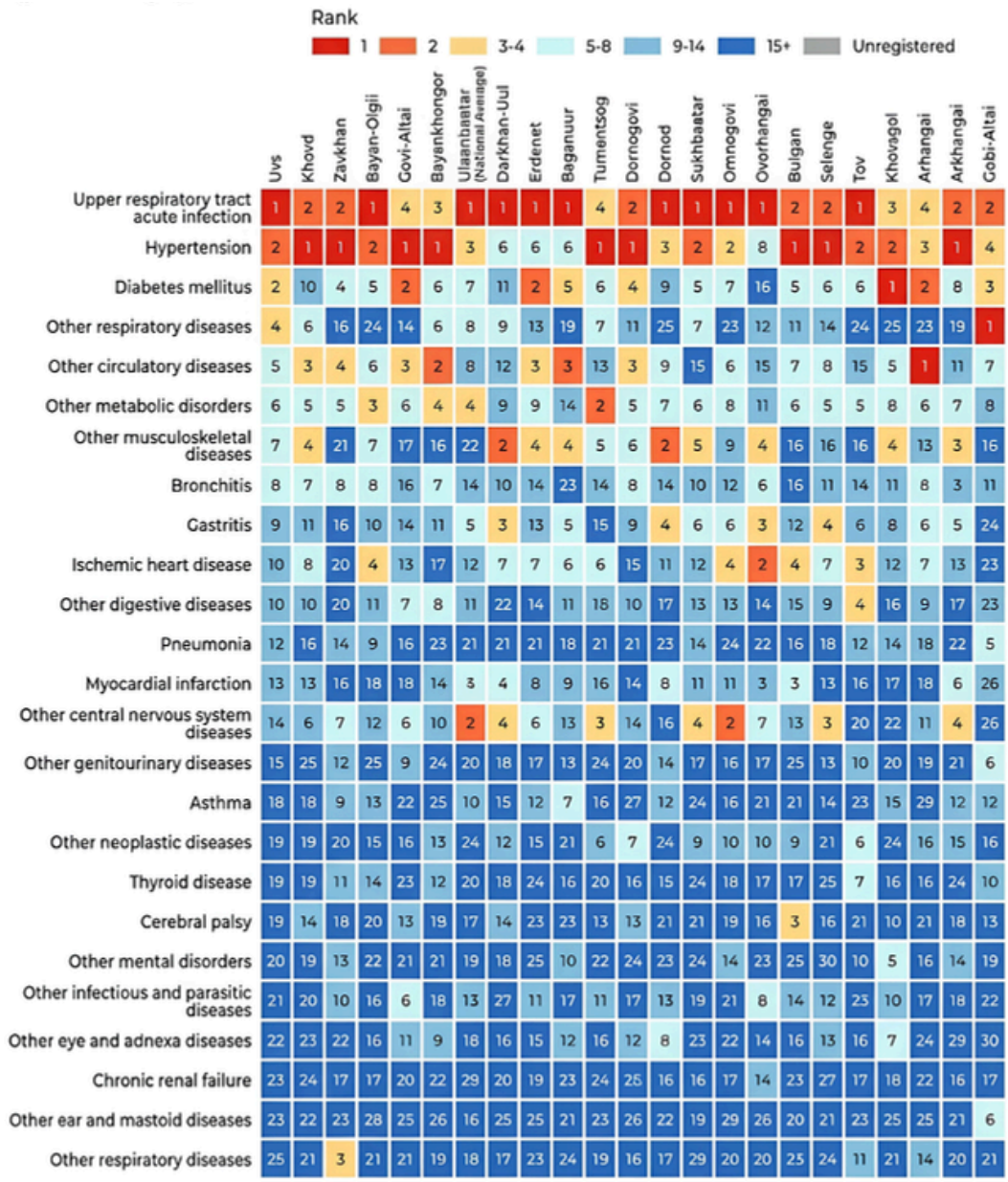
Liver cancer is a defining feature of Mongolia's disease burden, unmatched anywhere else in the world. Mongolia has the highest age-standardized rate of liver cancer globally, driven by a combination of chronic viral hepatitis (B, C, and D) and heavy alcohol consumption. Liver cancer alone accounts for roughly 9.5% of all deaths in the country — more than ten times the global average — and cancer overall is now the second leading cause of death, following closely behind cardiovascular disease.

NON-COMMUNICABLE DISEASES

Noncommunicable diseases (NCDs) — cardiovascular disease, cancer, diabetes and chronic respiratory disease — are the leading cause of premature death both globally and in Mongolia, and are closely linked to the same air-quality and environmental exposures.

Respiratory illness is Mongolia's single largest driver of outpatient care, and the pattern is closely tied to Ulaanbaatar's severe seasonal air pollution. During winter, air becomes thick with smog across most of Mongolia's urban and rural centers, since many residents nationwide rely on coal-burning stoves to stay warm through winters that last more than half the year.

Leading non-communicable diseases, by aimags, 2025

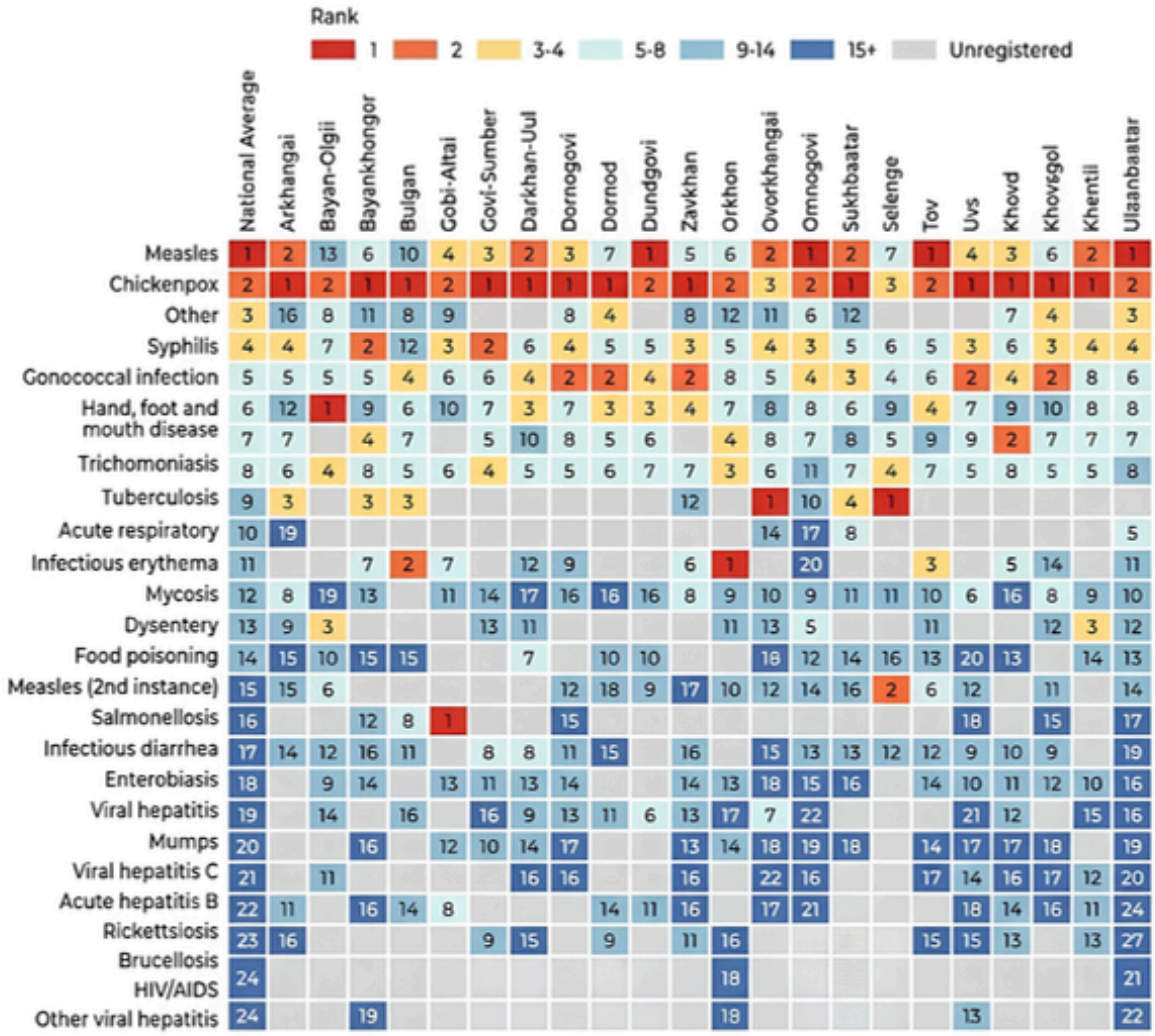


Source: Health Indicators 2025, Center for Health Development.

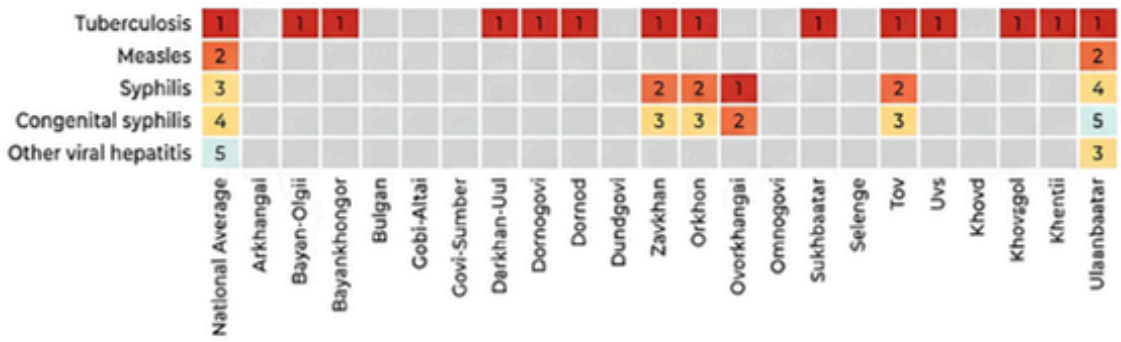
COMMUNICABLE DISEASES

Infectious disease in Mongolia follows a split pattern: high-volume, low-lethality childhood illnesses on one side, and a small number of low-volume, high-lethality diseases on the other.

Leading communicable diseases, by aimags, 2025



Infectious Disease Mortality

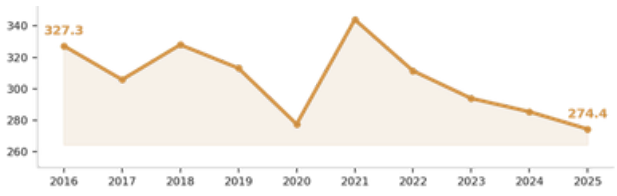


Source: Health Indicators 2025, Center for Health Development.

ENVIRONMENTAL HEALTH — THE LAND, WATER AND AIR NEXUS

Mongolia's arid and rapidly degrading environment shapes exposure to air pollution, water insecurity and unsafe sanitation. Despite these structural pressures, several environmental-health indicators show measurable improvement.

AIR POLLUTION

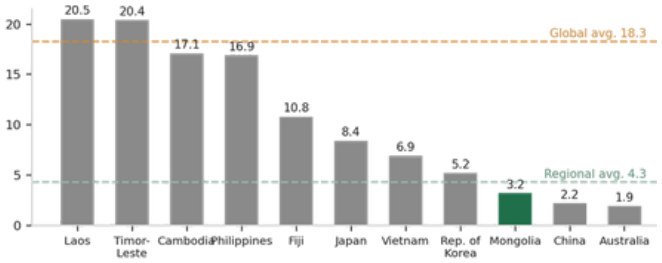


Air pollution attributable mortality, 2016-2025 (per 100,000 population, age 25+)

Ambient and household air pollution remain Mongolia's largest single environmental health burden — linked to an estimated 39% of stroke and ischemic heart disease deaths — but the cause-specific mortality rate has fallen for two consecutive years, and Ulaanbaatar's annual average PM2.5 concentration has more than halved over the past decade.

WATER, SANITATION AND HYGIENE (WASH)

Given Mongolia's exposure to water scarcity and desertification, WASH-attributable mortality performing well below both global and regional benchmarks is a notable achievement. The remaining gap is concentrated in rural, sum- and bagh-level facilities (49% basic service versus 71% in urban centers), pointing to where continued investment is most needed.



Mortality attributable to unsafe water, sanitation & hygiene (per 100,000 population, WHO estimates)

ACCIDENTAL POISONING

Poisoning mortality (SDG 3.9.3) 29.4 per 100,000 2025 1,011 recorded deaths; down 4.0 points from 2024.

Alcohol and other spirits account for the large majority (87.3%) of recorded poisoning deaths, followed by gas/vapor exposure (11.3%).

Source: Health Indicators 2025, Section 2.7–2.9; WHO World Health Statistics 2024/2025.

CLIMATE HEALTH RISKS

Air Pollution & Respiratory Health

- Winter PM2.5 in Ulaanbaatar runs 8–14× above the WHO guideline, peaking up to 80× during the coldest weeks, driven by coal-based heating.
- Respiratory infections per 10,000 population have risen 2.7-fold in Ulaanbaatar over the past decade; fetal deaths show a 3.5-fold winter-versus-summer increase.
- Air pollution is linked to 24% of COPD, 28% of ischemic heart disease, and 34% of lower respiratory infection deaths nationally.

The Dzud Cycle

- Summer drought followed by extreme winter cold, Mongolia's signature compound hazard, is projected to grow more frequent and severe.
- Linked to reduced child growth, livestock loss, and a documented doubling of livelihood damage from combined climate hazards over 20 years.
- Forces herders to migrate further for pasture, increasing distance from health services and exposure to extreme weather.

Dust & Sand Storms

- Desertification affecting 76.9% of Mongolia's territory is intensifying dust storms that carry particulate matter, pathogens and allergens across China, the Koreas and Japan.
- Reviews consistently link dust storms to elevated cardiovascular and respiratory hospitalisation and mortality.
- A shared regional exposure, well suited to cross-border early-warning cooperation under COP17's disaster-risk agenda.

Water, Food Security & Zoonotic Risk

- Drying water sources and degrading soils compound “hidden hunger” — reduced food quantity and nutritional quality alike.
- Reduced livestock productivity cuts household income and dietary diversity, particularly after dzud years.
- Longer herding migration distances raise contact with wild disease reservoirs, while dust storms add a poorly characterised pathogen-transport pathway.
- COP17's rangeland MRV systems offer a practical entry point for integrating disease surveillance into land-management data collection.

GEOGRAPHIC INFORMATION SYSTEMS

BUILDING A SPATIAL ARCHITECTURE FOR ONE HEALTH

Mongolia's climate and health dynamics are inherently spatial: severe seasonal air pollution traps within Ulaanbaatar's mountain-valley topography, spring dust storms follow distinct transmission corridors across the Gobi, and nomadic herder migrations adapt to shifting pasture degradation and water scarcity. Addressing these complex, intersecting challenges requires a robust, interoperable spatial framework capable of seamlessly integrating data across human, animal, and environmental domains.

Geographic Information Systems (GIS) provide the core structural foundation for this booklet's evidence base. While spatial surveillance in Mongolia is currently in its early stages of implementation, establishing a standardized GIS architecture is critical to unlocking multi-sectoral interoperability across government agencies. By transforming static tabular metrics into dynamic geospatial layers, GIS bridges raw disease surveillance with real-time environmental monitoring.

Adopting a unified GIS platform strengthens both public health planning and broader One Health outcomes:

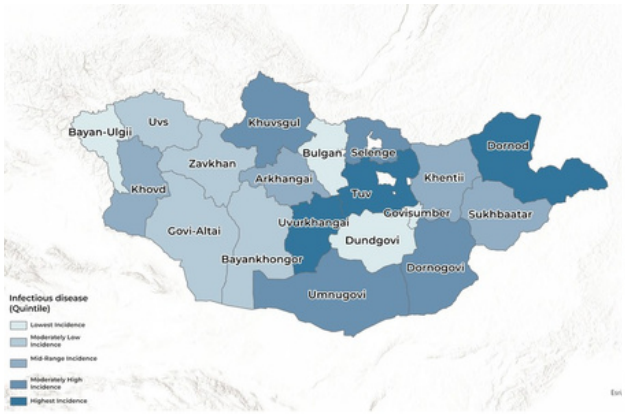
- Human Health Systems: Mapping health facility locations against dzud risk zones, PM2.5 hotspots, and mobile herder routes reveals critical service gaps and informs targeted clinical deployment.
- Animal & Zoonotic Health: Spatial overlays of livestock movements, wildlife habitats, and environmental drivers enable early detection of disease vectors and spillover risks before outbreaks occur.
- Environmental Health: Aligning land degradation and environmental mapping with health exposure data.

For COP17 stakeholders, developing this early-stage spatial infrastructure provides a practical operational bridge—converting land restoration and climate adaptation commitments into actionable, cross-sectoral protection.

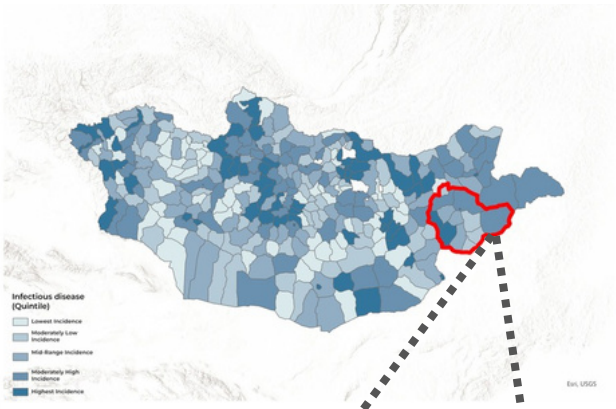
INFECTIOUS DISEASE (A00-B99)

ACROSS MONGOLIA

As of 2025, more than 52.8 thousand cases of over 30 types of communicable diseases were reported nationwide, corresponding to an incidence rate of 154.0 per 10,000 population. Of all reported communicable diseases, respiratory infections accounted for 57.9%, sexually transmitted infections for 19.7%, intestinal infections for 11.0%, zoonotic diseases for 0.3%, and other communicable diseases for 11.1%.

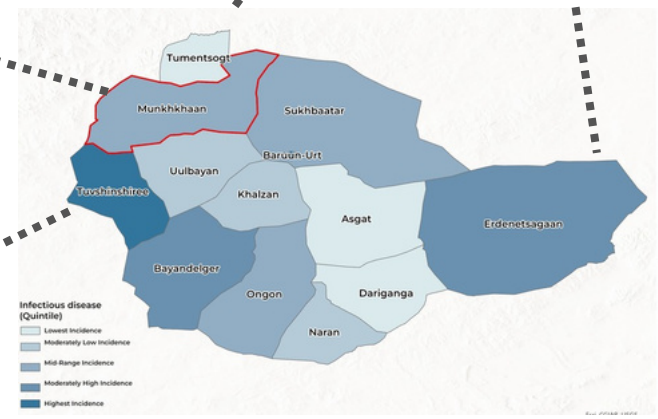


Infectious disease by aimag, Mongolia 2015-2025



Infectious disease by soum, Mongolia 2015-2025

Infectious disease in Munkhkhaan soum

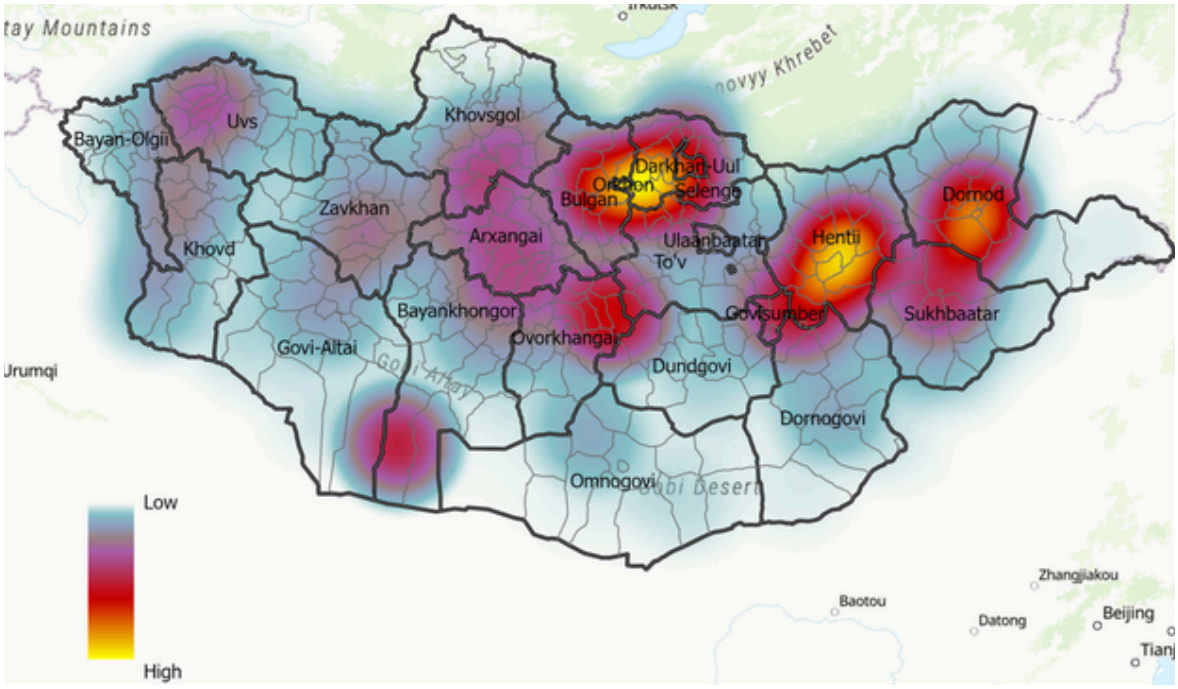


Infectious disease in Sukhbaatar aimag

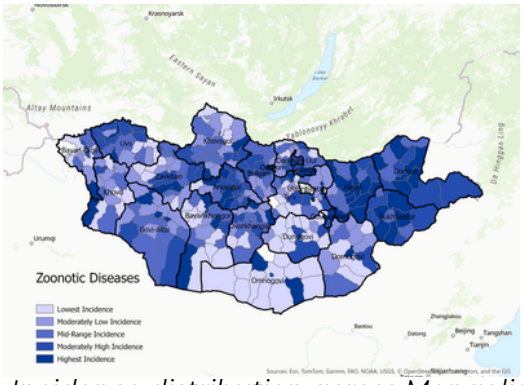
The map presents infectious disease incidence across Mongolia, progressively narrowing from the national distribution to aimag-level patterns, then to soum-level variation in Sukhbaatar Aimag, with Munkhkhaan Soum providing a more detailed local-scale view of the geographic distribution.

ZOONOTIC DISEASE VULNERABILITY

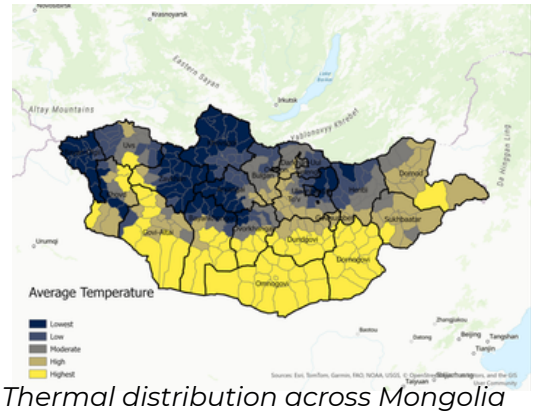
ACROSS MONGOLIA



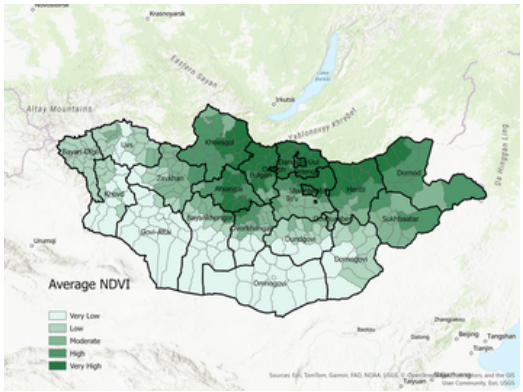
Zoonotic disease vulnerability across Mongolia



Incidence distribution across Mongolia



Thermal distribution across Mongolia



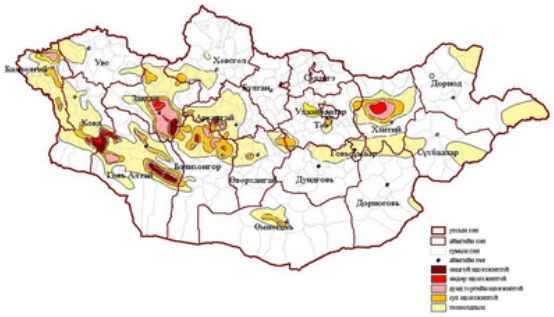
Vegetation density distribution across Mongolia

This atlas illustrates the spatial distribution of zoonotic disease incidence in Mongolia and the combined impact of environmental and climatic factors on zoonotic disease vulnerability across aimags and soums.

ZOONOTIC DISEASES SITUATION IN MONGOLIA

NATURAL PLAGUE FOCI

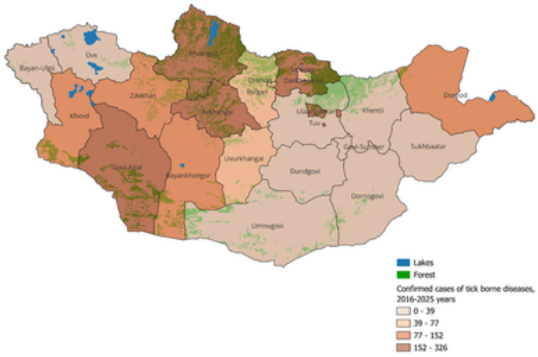
Natural plague foci cover 28.3% of Mongolia's total territory, encompassing 137 soums across 17 provinces and an area of approximately 443,300 km². In these natural foci, rodents and lagomorphs serve as the primary hosts and reservoirs of Yersinia pestis, while carnivores and birds of prey also play a role, particularly in the steppe regions. Among domestic animals, camels can occasionally become infected with plague.



Distribution of natural plague FOCI

TICK-BORNE DISEASES

Over the past 10 years, 2,218 confirmed cases of tick-borne diseases have been reported. Of these, 13.2% were tick-borne encephalitis, 9.7% were tick-borne borreliosis, and 76.9% were tick-borne rickettsiosis.



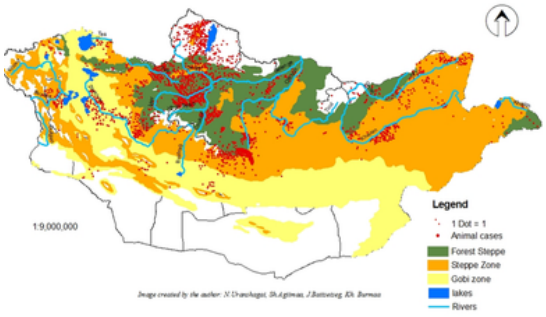
Confirmed cases of tick-borne diseases

ANTHRAXES

Human anthrax cases have been reported in 187 soums across 19 provinces and cities, as well as in 3 districts of Mongolia.

2016–2025: 12 human anthrax cases were reported, with no deaths. Cases were reported in Dornod (2), Khentii (1), Orkhon (1), Uvs (2), Ulaanbaatar (1), Tuv (2), Zavkhan(2), and Arkhangai (1).

The increase in human cases was associated with an increase in anthrax cases among livestock.



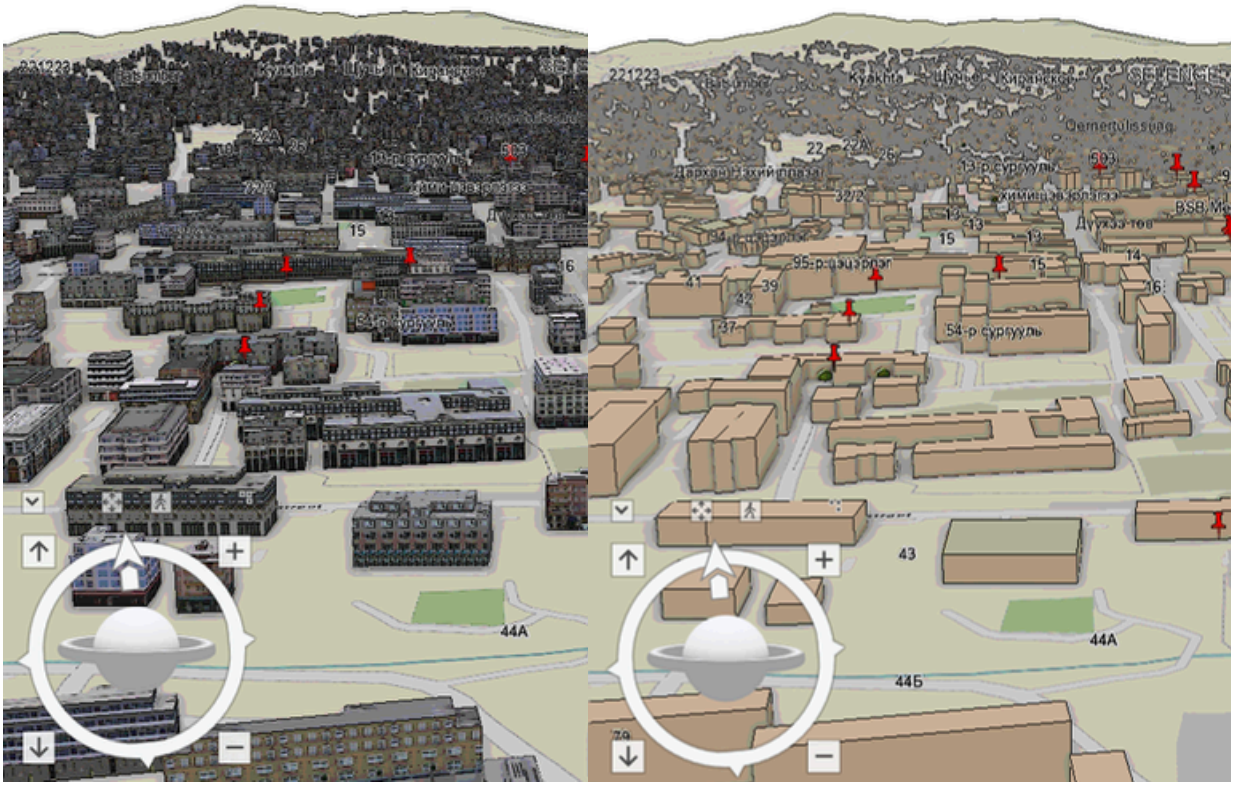
Confirmed animal anthraxes cases

DEVELOPMENT OF GEOCODING

PILOT APPLICATION

Geocoding is being developed to strengthen spatial health surveillance and evidence-based decision-making by transforming collected address information into geographic data. Integrating geocoded health records with population, environmental, infrastructure, and healthcare-access data will provide a stronger foundation for identifying vulnerable communities, investigating potential risk factors, and directing prevention and health resources to areas where they are most needed.

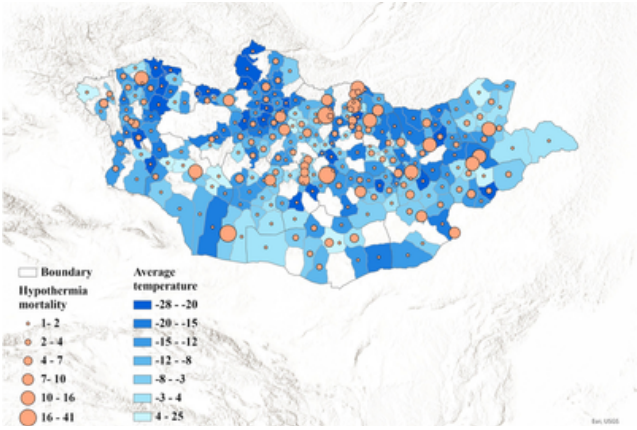
As a pilot example, tuberculosis case locations in a selected district of Ulaanbaatar were visualized in a 3D building. This example demonstrates how geocoded data can be integrated with buildings and other spatial information to better understand geographic patterns and support more detailed spatial analysis.



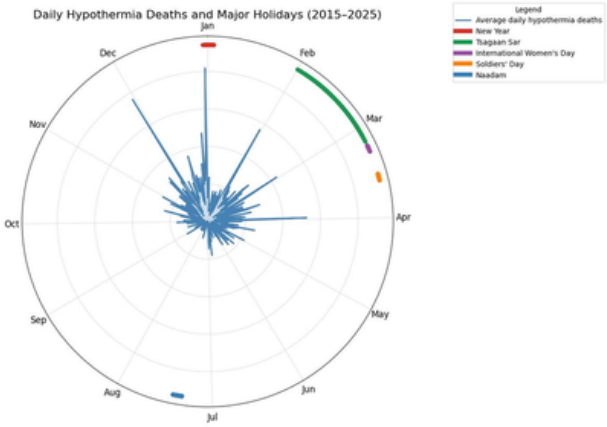
Pilot 3D visualization of geocoded TB case locations and buildings in a selected district of Ulaanbaatar.

HYPOTHERMIA MORTALITY AND TEMPERATURE PATTERNS IN MONGOLIA

Mongolia's extreme winter conditions create a substantial risk of cold-related mortality. The occurrence of hypothermia deaths varies geographically, reflecting differences in climatic conditions, population exposure, accessibility, and other local factors. Identifying areas with greater cold-related mortality can support more targeted prevention strategies and allocation of health and emergency services.



Spatial distribution of hypothermia mortality and average temperature across Mongolia, 2015–2025.



Daily Hypothermia Deaths and Major Holidays (2015-2025)

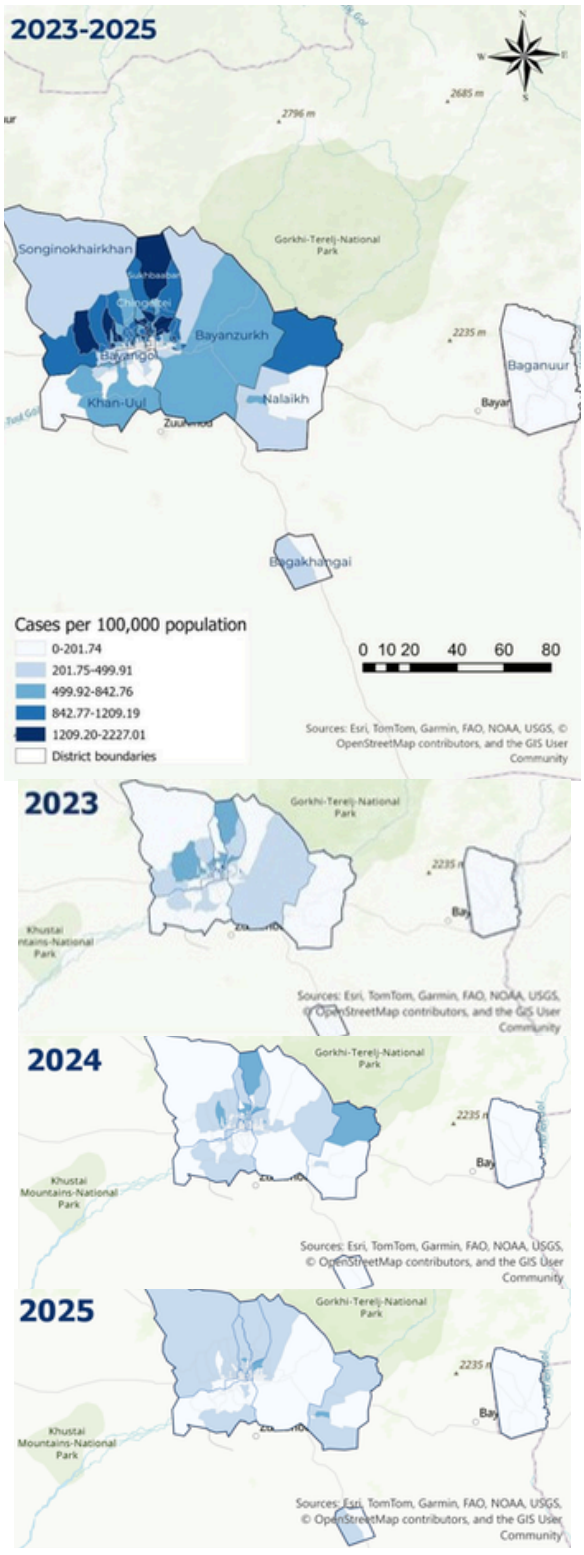
The risk of hypothermia is strongly seasonal, increasing during Mongolia's coldest months. Prolonged exposure to extremely low temperatures can become particularly dangerous during periods of travel, outdoor activity, and limited access to shelter or emergency care. Seasonal patterns can therefore help guide the timing of early warnings, public awareness campaigns, emergency preparedness, and targeted protection of vulnerable populations.

CARBON MONOXIDE (CO) POISONING

From 2023 to 2025, Ulaanbaatar reported a total of 7,882 carbon monoxide (CO) poisoning cases (including heating and fire-related incidents), corresponding to 472.9 cases per 100,000 population during this three year period.

Overall, the annual incidence rate declined steadily from 183.7 to 160.9 and 128.7 per 100,000, representing decreases of 12.41% from 2023 to 2024, 20.01% from 2024 to 2025, and 29.94% over three years. By 2025, differences in incidence between khoroos became less pronounced, indicating a more even spatial distribution of CO poisoning across the city. However, khoroos in the medium- and high-risk tiers (≥200 cases per 100,000) decreased only slightly, from 75 in 2023 to 69 in 2025.

Notably, 37 khoroos particularly those concentrated in Songinokhairkhan, Bayanzurkh, Chingeltei, and Sukhbaatar districts consistently exceeded this threshold across all three years. In addition, some khoroos of Nalaikh district which reported no cases in 2023, shifted to the highest incidence group recorded in 2025, emerging as a new priority area.



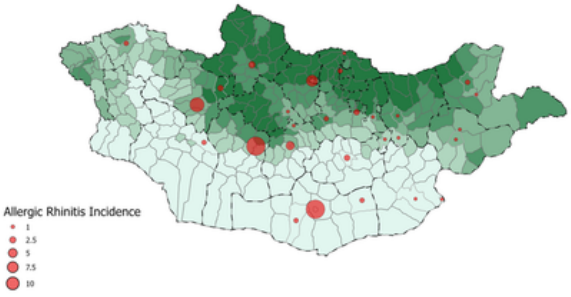
Carbon monoxide poisoning incidence (2023-2025)

ALLERGIC RHINITIS AND VEGETATION INDEX

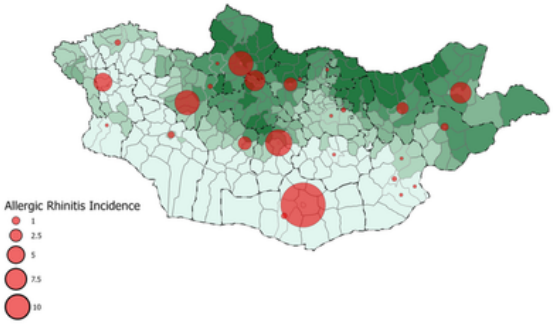
Allergic rhinitis has risen sharply and steadily across rural and provincial Mongolia over the past decade, it strikes boys in childhood and women in adulthood, and it follows a strongly seasonal, late-summer pattern that tracks national vegetation greenness month by month. The map comparison lends spatial support to a vegetation link — case counts are heaviest where NDVI is highest — while also flagging at least one clear outlier where incidence has grown despite low vegetation, a signal that local, non-vegetation drivers deserve closer study alongside the national pollen-season pattern.

Age- and Sex-Specific Distribution of Allergic Rhinitis Cases, Mongolia, 2015–2025 (%)

Mongolia
july, 2019



Mongolia
july, 2025



Average NDVI (green shading) overlaid with allergic rhinitis incidence (red circles, sized by incidence), July 2019 vs. July 2025.

INTEROPERABILITY STANDARDS FOR HEALTH DATA EXCHANGE

FHIR, ICD-11, SNOMED CT, LOINC

Mongolia's health system spans close to 5,000 facilities of widely varying type and ownership, from single-doctor soum health centers to specialized national hospitals.

Coordinated climate-health monitoring depends on this network being able to exchange comparable, structured data — both within Mongolia and with international partners engaging through COP17.

International standards make this possible. FHIR (Fast Healthcare Interoperability Resources) provides a common technical format for exchanging records between facilities and systems.

ICD-11 and SNOMED CT provide standardized clinical vocabularies so that a respiratory infection diagnosed in a Gobi soum health center is recorded the same way as one diagnosed in Ulaanbaatar.

LOINC standardizes laboratory and observation data, including the air-quality and environmental-health measurements increasingly relevant to climate-sensitive care.

Adopting these standards nationally would strengthen Mongolia's ability to track climate-sensitive disease trends — respiratory infections, zoonotic disease, heat- and cold-related illness — at the resolution needed to guide both domestic policy and the international cooperation COP17 aims to catalyse.

ICD-11

SNOMED CT
The global language of healthcare

LOINC®
from Regenstrief

HL7® FHIR®

MULTISECTORAL DATA INTEGRATION:

INDICES, ANALYTICS & MONITORING FRAMEWORKS

The indicators in this booklet currently live in separate systems: SDG health targets are tracked by the health sector; land degradation neutrality is tracked under the UNCCD; air-quality data sits with environmental authorities.

Multisectoral integration means bringing these into a shared analytical framework, supported by approaches such as an SDG indicator taxonomy and composite frameworks such as the One Health Index.

One Health recognises that human health is intrinsically connected to the health of animals, plants and ecosystems, and that many health risks emerge at the interface between these systems. Applying this lens would allow indicators across human health, environmental health, animal health, climate and ecosystems to be considered together, highlighting shared drivers, interdependencies and emerging risks that may be missed when each sector is assessed independently.

These frameworks could provide a common language and interoperability layer for connecting indicators across sectors, helping to reveal relationships that are difficult to detect within individual monitoring systems.

Rather than viewing each indicator in isolation, policymakers could examine patterns, co-occurring risks and geographic disparities across sectors, identifying cross-sectoral hotspots where environmental degradation, climate exposure and health-system vulnerabilities converge.

This could support risk stratification, hotspot mapping, early identification of emerging pressures, prioritisation of interventions and more targeted allocation of resources, helping decision-makers move from simply monitoring sectoral outcomes to understanding where risks intersect, why they matter, and where action may have the greatest impact.

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Note

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