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POLICY BRIEF

Climate, One Health & Planetary Resilience

Bridging Science, Policy and Society in a Climate-Changing World

Based on the ONE-Bridge in Health Conference — Day 3 Proceedings
June 2026

Executive Summary

Day 3 of the ONE-Bridge in Health Conference brought together an exceptionally diverse group of scientists, clinicians, public health authorities, WHO representatives, and policymakers to examine the nexus of climate change, migration, environmental health, and the One Health framework. The day's presentations spanned migration epidemiology, chemical pollution, fungal diseases, vector-borne illnesses, maternal health, nutrition security, and the political economy of planetary resilience.

A unifying theme emerged with striking consistency: the boundaries between human health, animal health, and environmental integrity are not merely blurred — they have effectively dissolved. Climate change acts as a universal threat multiplier, intensifying each of these domains simultaneously. The conference also delivered an urgent political message: scientific evidence is abundant, but implementation of evidence-based policy remains the critical bottleneck.

3.5°C+ Projected Mediterranean warming above global average by 2100	**250,000** Additional deaths/year by 2050 from climate-driven disease	**2B** People affected by micronutrient deficiency globally today	**100M+** People displaced by climate-related events 2006–2016

1. Migration, Climate Change & Health Equity

1.1 The Climate-Migration Nexus: A New Health Priority

The opening keynote framed migration not as a problem to be solved, but as a reality to be managed — and increasingly, as an adaptive response to climate change. With global health financing at a 13-year low and mounting anti-migrant rhetoric in political discourse, the conference issued a clear call: migration health must be elevated as a core public health priority.

The Lancet Commission on Migration and Health, alongside the new Lancet Commission on Climate Change, Migration and Health (currently in development, with a report expected by end of 2026), frames the intersection of these two 'wicked problems' as Europe's most pressing — and most neglected — health equity challenge. Europe is the fastest-warming continent in the world, while migrant health inequalities remain a systemic blind spot in policy.

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- 70% of migrants in Europe are intra-European migrants, not arrivals from outside the continent — challenging widespread political narratives
- Climate change is a threat multiplier for existing socioeconomic vulnerabilities, not a standalone driver
- Migration patterns are changing in frequency, intensity, and duration due to climate-driven extreme events, competition for scarce resources, and altered agricultural conditions
- Climate-related displacement is often internal or short-distance — those displaced rarely migrate to other European countries, but their health needs require national-level adaptation
- Migrant-inclusive health systems tend to remain theoretical rather than operational — a structural failure that must be corrected

1.2 One Health as a Cross-Cutting Framework for Migration Health

The conference heard directly that One Health must not become another silo. Its value lies in being horizontal and cross-cutting — not vertical and disease-specific. Incorporating migration health into One Health frameworks requires upstream governance action (data collection, intersectoral coordination, climate-responsive health system design) in addition to downstream clinical access improvements.

KEY INSIGHT	*The Lancet Commission analysis found that governments and multilateral organisations must move from disease-focused programming to holistic, place-based approaches. Climate change, migration, and health are not three separate issues — they are three facets of the same challenge.*

2. Hidden Pollution: Chemical Contamination, Disasters & One Health

2.1 The Scale of the Problem

Research presented from the University of Athens revealed a fundamental truth about modern pollution: the known contaminants represent only the tip of the iceberg. Using wide-scope mass spectrometry and non-targeted screening, researchers have identified more than 3,200 target substances and developed suspect screening libraries covering tens of thousands of additional compounds. In practical terms, this means that conventional regulatory frameworks — built on monitoring a small, fixed list of priority pollutants — are systematically blind to the majority of chemically-mediated health risks.

- More than 300 pollutants have been identified in the Black Sea, with over 100 exceeding ecotoxicological risk thresholds
- PFAS ('forever chemicals') are now detectable in Antarctica, in remote mountain rivers, and in human placentas and breast milk — global contamination is universal
- Biomagnification of industrial chemicals, pesticides, and pharmaceuticals in apex predators (wolves, dolphins, otters) demonstrates systemic ecosystem contamination with poorly understood long-term consequences

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- Antibiotic transformation products (metabolites and degradation products) retain biological activity and can drive resistance selection in environmental microbial communities — a regulatory blind spot highlighted across multiple sessions

2.2 Disasters as Acute Chemical Contamination Events

Two recent European disasters — the Kakhovka Dam destruction in Ukraine (2023) and Storm Daniel in northeastern Greece (2023) — demonstrated how climate-driven extreme events rapidly transform diffuse background pollution into acute contamination crises. In the Pagasitikos Gulf (Volos/Thessaly area) following Storm Daniel, researchers found:

- Over 2,230 substances detected in seawater post-disaster, including pharmaceuticals, pesticides, industrial chemicals, illicit drugs, and personal care products
- 18 out of 24 EU-regulated polycyclic aromatic hydrocarbons (PAHs) exceeded environmental quality standards
- Veterinary drug contamination from livestock deaths and destroyed livestock units
- Groundwater contamination with antihypertensives and psychiatric medication metabolites — indicating wastewater infrastructure collapse
- One year post-disaster, dead fish appeared in the Volos city gulf due to anoxic conditions triggered by the initial chemical shock

POLICY ALERT	*Existing regulatory frameworks are not designed to handle post-disaster chemical contamination events. Each disaster effectively creates an unplanned chemical release experiment affecting entire ecosystems. Emergency environmental monitoring protocols and pre-disaster baseline data are urgently needed across all Mediterranean member states.*

2.3 PFAS: The Forever Chemical Challenge

Research from Italy's Veneto region — site of one of the largest known PFAS contamination events globally — demonstrated severe bioaccumulation in freshwater fish at concentrations among the highest ever published. Key findings: PFAS accumulates primarily in liver tissue due to its protein-binding properties; it triggers oxidative stress and hepatic steatosis; it disrupts cortisol production and therefore reproductive function; and critically, it cannot be effectively removed from water systems at scale once present. Two species of fish showed markedly different physiological responses, underscoring that ecological impacts are species-specific and poorly predictable.

3. Fungal Diseases: The Neglected Climate-Sensitive Threat

One of the most compelling presentations of the day addressed a systematically overlooked dimension of climate-driven health risk: the emergence and spread of fungal pathogens. While bacteria and viruses dominate infectious disease policy, fungi represent an expanding threat that intersects climate change, biodiversity loss, population displacement, and immunocompromise.

- Cryptococcus gattii — previously unknown in Europe — has been detected in Greek trees, soil, and patients, with genomic analysis showing similarity to Canadian and Brazilian epidemic strains, demonstrating transatlantic pathogen dissemination

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- A case in Greece of corneal infection (keratitis) caused by Yamadazyma mexicana — a rare yeast endemic to tropical regions — illustrates how climate warming enables exotic pathogens to colonise previously unsuitable environments
- Paraconiothyrium fuckelii, a marine polyethylene-degrading fungus, was found year-round in Salamis Island beach sand — a concerning finding given its capacity to cause encephalitis and bloodstream infections in immunocompromised individuals
- Trichophyton indotineae — a new, highly infectious dermatophyte originating in South Asia — has spread globally at alarming speed, is transmitted person-to-person and sexually, and shows resistance to first-line antifungal drugs; a recent Egyptian study documented transmission to dogs
- Mucormycosis (caused by Mucor species) appeared in disaster victims following fires near Patras and floods in Central Greece — soil-contaminated wounds causing rapidly progressing necrotic infections
- Flood and fire victims in Greece have presented with devastating fungal wound infections from Zygomycetes, requiring emergency tissue debridement and extensive plastic surgery

URGENT GAP	*The WHO published its first Fungal Priority Pathogens List only in 2022 — decades after comparable lists for bacteria and viruses. Fungal surveillance in both human and animal clinical settings is severely underdeveloped. Climate change is accelerating geographic range expansion of fungal pathogens faster than regulatory or clinical responses can adapt.*

4. Vector-Borne Diseases: Climate, Prediction & Preparedness

4.1 West Nile Virus as a One Health Model

A research team from the University of Patras presented a world-first early warning system for West Nile Virus (WNV) human cases, applying ensemble weather prediction methodologies — analogous to numerical weather forecasting — to epidemiological modelling. The system integrates climate data, mosquito ecology, bird host dynamics, and human case surveillance across seven European regions.

- WNV has been present in Greece since 2010, with approximately 150 municipalities having recorded human cases — half of all Greek municipalities
- Central Macedonia and Thessaly (rice fields, irrigated land, wetlands) are the highest-risk hotspots due to ideal mosquito breeding conditions
- May and summer temperatures are the dominant climatic predictors of seasonal WNV severity — consistent across both statistical and mechanistic modelling approaches
- The model demonstrated predictive skill comparable to or exceeding surveillance-based forecasting when evaluated against 2022–2025 data, and is operationally generating monthly risk maps distributed to local authorities in seven European regions
- A 1°C temperature increase corresponds to approximately 25% more infected human cases, with an earlier seasonal peak by approximately one week

The model explicitly acknowledges its limitations: population immunity is poorly quantified, vertical transmission in mosquitoes is not included, and high-quality long-term vector and disease surveillance datasets remain scarce. Critically, the feedback loop between model forecasts and

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actual public health interventions is not yet routinely measured — a gap that undermines adaptive management.

4.2 Climate Stress and Pregnancy Outcomes

A retrospective analysis of 2.3 million births in Greece (1999–2021) — one of the largest climate-health datasets assembled in Europe — provided robust evidence that heat exposure is significantly associated with adverse birth outcomes. The study linked individual birth certificates to ERA5 climate reanalysis data at municipal level.

- Preterm birth rates show a consistent seasonal pattern, rising sharply from May through July, correlating strongly with temperature surges during spring — not simply absolute heat levels
- The third trimester of pregnancy is the most vulnerable exposure window, with statistically significant associations with preterm birth, stillbirth, low birth weight, small for gestational age, and large for gestational age outcomes
- Minimum daily (night-time) temperature appears more important than maximum temperature, suggesting that absence of thermal recovery is a key biological mechanism
- Risk has been increasing steadily from 2000 to 2021 as temperatures have risen, with no evidence of adaptation over this period
- Results are consistent across four European countries (Greece, Sweden, Belgium, Italy), with pooled analyses showing approximately 10% increased odds per unit temperature increase
- Higher NDVI (vegetation index) reduces risk — reinforcing the importance of urban greening as a health intervention

5. Nutrition Security Under Climate Stress

A presentation from the Agricultural University of Athens reframed climate change as a nutritional crisis — not merely a food availability crisis. The concept of 'hidden hunger' (micronutrient deficiency despite adequate caloric intake) is being actively worsened by climate-driven changes in crop physiology.

5.1 The CO_2 Paradox and Nutrient Dilution

Elevated atmospheric CO_2 drives increased photosynthesis and carbohydrate production in plants, but simultaneously reduces the concentration of critical micronutrients:

- Protein content in staple crops declines by 6–14% depending on CO_2 levels and crop species
- Zinc concentration falls by 3–10% — a significant concern given that 17% of the global population already lacks adequate zinc (essential for immunity, fertility, and insulin function)
- Iron declines by 5–8%
- By 2050, CO_2-driven nutrient dilution is projected to render an additional 175 million people zinc-deficient and 122 million protein-deficient

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The Mediterranean region is a frontline for this 'great nutrient collapse.' As the climate hotspot of Europe, with a 20% faster warming rate than the global average (2.2°C increase vs. 1.3°C globally), the Mediterranean diet — widely recognised as one of the world's healthiest — is under direct threat. Key indicators: olive oil production variability of ±40% year-to-year; Mediterranean diet adherence declining by 25%; fresh vegetable consumption down 15%.

Climate change also intensifies mycotoxin (aflatoxin) contamination in staple crops. At current temperatures, a baseline risk of 38.2 ppb doubles with 2°C additional warming and continues to rise non-linearly. This affects both food safety and nutritional value simultaneously — crops may be calorie-dense but micronutrient-poor and toxin-contaminated.

6. Climate Emergency in Practice: The Patras Wildfire (August 2025)

The day's most grounded and operational session came from the Deputy Regional Governor of Western Greece, who presented a detailed post-event analysis of the August 2025 mega-wildfire that struck Patras — the first time a fire of this magnitude threatened a major Greek urban centre. The fire burned more than 3,000 hectares, damaged over 90 homes, destroyed olive groves, livestock units, and critical infrastructure, and created a complex multi-hazard emergency.

6.1 What Worked

- High-resolution climate data and real-time meteorological forecasting enabled rapid decision-making and timely evacuations
- Hospitals located within the fire zone remained operational throughout the event, demonstrating health system resilience
- Within hours of the fire, public health guidance was issued on water safety, air quality, and toxic ash management — guidance that saved lives by preventing contamination-related disease
- A regional spirometry screening programme identified that 35.6% of affected residents showed deterioration of small airway function, enabling early therapeutic intervention
- Inter-departmental collaboration (environmental, veterinary, agricultural, public health) successfully mapped deposition risk areas covering livestock units, boreholes, and cultivated land

6.2 Critical Gaps Revealed

- The simultaneous occurrence of multiple arson ignition points stretched response capacity beyond design parameters — multi-point concurrent events require revised emergency planning
- Public health expertise was not automatically positioned at the front line of crisis management — it required active advocacy by the Deputy Governor
- No pre-existing action plan existed for post-wildfire toxic waste management; removal of 550 burned vehicles from a customs warehouse (creating an exceptional complex emission scenario) took two months
- Environmental monitoring for dioxins, furans, and persistent toxic chemicals requires ongoing investment — projected to continue for 1–2 years, with 'forever chemicals' (PFAS) requiring 10–12 years of monitoring

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- Regional risk assessment protocols tailored to specific hazard profiles do not systematically exist across Greek regions — a critical gap given that climate emergencies are now annual events

REAL-WORLD ONE HEALTH	*The Patras wildfire simultaneously affected water safety, air quality, food security, livestock health, wildlife displacement, mental health, and chronic disease — a One Health emergency in every sense. The photo of a firefighter rescuing a dog amid the flames became one of the Associated Press's defining images of 2025 — symbolising the human-animal-environment crisis at the heart of One Health.*

7. Policy Architecture: WHO, JPA, and the Climate-Health Agenda

WHO representatives and the closing policy panel provided essential governance context. Key developments shaping the global and European One Health policy landscape include:

- The WHO/FAO/UNEP/WOAH Joint Plan of Action on One Health (JPA) includes a dedicated Track 6 on integrating environmental integrity into One Health — recognising that the environment was the systematically neglected third pillar
- The Budapest Declaration and Road Map (2023) — signed by health and environment ministers from 53 WHO European member states — formally committed to addressing the triple planetary crisis (climate change, biodiversity loss, pollution) through integrated One Health governance
- The WHO second European Programme of Work (2026–2030) identifies One Health as cutting across all priority areas: AMR, emerging infectious diseases, non-communicable diseases, climate resilience, and data systems
- Greece's National Strategy for Quality of Care and Patient Safety (2025–2030) includes a specific action mandating a national infection prevention and antimicrobial stewardship plan following a One Health approach — co-created through seven regional consultation workshops
- The WHO regional office is developing a GIS database platform capable of integrating human health, animal health, environmental, climate, and sociodemographic layers as an operational One Health surveillance tool

A major limitation identified across the policy discussion: most countries still operate in institutional silos. Sectors hold separate mandates, separate budgets, and separate data systems. Professional training remains siloed. Communities are often brought in too late. This fragmentation slows recognition of combined risks and reduces effectiveness of responses to extreme events.

8. Policy Recommendations

8.1 Climate, Migration & Health Equity

1. **REC 1:** Establish migration health as a formal One Health priority

Integrate migration health indicators into national One Health surveillance systems and national action plans. The Lancet Commission on Climate Change, Migration and Health should be closely

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followed and its recommendations (expected 2026) fast-tracked into EU and WHO European region policy.

2. **REC 2:** Fund upstream determinants — not only downstream services

Shift from disease-specific migrant health programmes to place-based, climate-adaptive systems. Invest in intersectoral governance, data collection on displaced populations, and emergency health preparedness aligned with projected climate displacement scenarios.

3. **REC 3:** Change the narrative: migration as adaptation

Engage civil society and scientific communities to reframe climate-driven migration as a legitimate adaptive strategy rather than a political burden. Policy discourse that treats migration as inherently negative undermines both humanitarian obligations and evidence-based policymaking.

8.2 Chemical Pollution & Environmental Monitoring

4. **REC 4:** Mandate pre-disaster chemical baseline monitoring across the Mediterranean

Every member state should establish and maintain baseline chemical monitoring data for water bodies, soil, and coastal environments, enabling rapid post-disaster comparison. Specifically, pharmaceutical metabolites, PFAS, PAHs, pesticides, and emerging contaminants should be systematically included in monitoring programmes funded through the EU Water Framework Directive.

5. **REC 5:** Regulate antibiotic transformation products

Update environmental risk assessment frameworks to include transformation products of antibiotics and other pharmaceuticals. Evidence presented confirms these degradation products retain biological activity, select for antimicrobial resistance, and are often more persistent than their parent compounds. EU pharmaceutical environmental risk assessment guidelines should be amended accordingly.

6. **REC 6:** Accelerate PFAS regulation and phase-out

Extend and strengthen PFAS restrictions beyond current EU scope. Invest in research on bioaccessibility, species-specific toxicity, and long-term human health impacts. Prioritise source control over remediation — once PFAS enters water systems, removal is not feasible at scale.

8.3 Fungal Diseases & Climate-Sensitive Pathogens

7. **REC 7:** Include fungal pathogens in One Health surveillance systems

Current human and animal surveillance systems are largely blind to fungal pathogens. WHO's Fungal Priority Pathogens List (2022) must be operationalised: all member states should establish systematic clinical surveillance for priority fungal species, including Cryptococcus, Mucor, and emerging dermatophytes such as Trichophyton indotineae.

8. **REC 8:** Invest in antifungal drug development and diagnostics

The antifungal pipeline is critically underdeveloped relative to the growing burden. Novel antifungals with improved safety profiles and activity against resistant strains are urgently needed. Rapid molecular diagnostics for rare and emerging fungi should be available in tertiary care centres across the EU.

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9. **REC 9:** Establish a Mediterranean climate-sensitive pathogen monitoring network

Create a regional network to systematically monitor the emergence of climate-sensitive pathogens — fungal, viral, bacterial, and parasitic — in beaches, soils, trees, water bodies, and companion animals, with linked human and veterinary clinical data. Greece, given its documented emergence of novel pathogens, should be central to this initiative.

8.4 Vector-Borne Disease Preparedness

10. **REC 10:** Operationalise early warning systems for vector-borne diseases across Europe

The West Nile Virus prediction system developed at the University of Patras — awarded the European Innovation Council's first prize for epidemic early warning — should be scaled to national and European level and integrated with ECDC surveillance infrastructure. Feedback loops between model predictions and public health interventions must be formally established.

11. **REC 11:** Invest in long-term, open-access vector and epidemiological datasets

Predictive modelling quality is fundamentally limited by data availability. Member states should commit to systematic, open publication of mosquito abundance, infection rate, and human case data with standardised methodologies. Data sharing agreements should be a condition of ECDC membership.

8.5 Nutrition, Food Systems & Agriculture

12. **REC 12:** Integrate climate-nutrition linkages into European food policy

The European Green Deal and Farm-to-Fork Strategy should explicitly incorporate projections of CO_2-driven nutrient dilution in staple crops. Biofortification programmes, heat-tolerant crop variety development, and mycotoxin monitoring should be prioritised under the EU's agricultural adaptation strategy.

13. **REC 13:** Develop early warning systems linking climate indicators to nutritional outcomes

Nutritionists and agricultural scientists must become climate advocates. Early warning systems that directly couple climate anomalies (drought, heat stress, flood events) with nutritional outcome monitoring should be established at EU level, with particular focus on the Mediterranean region as a vulnerability hotspot.

8.6 Climate Emergency Preparedness & One Health Governance

14. **REC 14:** Mandate regional climate emergency action plans with public health at the front line

Based on the Patras wildfire experience, every EU region should develop and regularly test multi-hazard climate emergency plans that explicitly position public health expertise at the decision-making core. Plans should include: post-disaster water and air quality protocols, toxic waste management chains, health surveillance activation triggers, spirometry and other screening programmes, and community training in evacuation and basic hazard response.

15. **REC 15:** Establish a European Climate-Health Knowledge Hub

Create a permanent European platform for sharing best practices, emergency protocols, surveillance data, and research findings related to climate-health nexus events. The Patras

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wildfire generated experience that no other European city or region had — this institutional knowledge should not remain local.

16. **REC 16:** Make One Health operational, not aspirational

WHO, the European Commission, and member states must commit to One Health as a measurable governance framework — not a rhetorical concept. This requires: joint risk assessments across human, animal, and environmental sectors; shared data platforms; co-funded surveillance; and mandatory representation of all three sectors in climate emergency planning bodies. The WH Budapest Declaration road map should be implemented on schedule.

9. Conclusion

Day 3 of the ONE-Bridge Conference delivered a powerful and multi-dimensional message: climate change is not a future threat. It is already reshaping the epidemiology of infectious diseases, the geography of fungal pathogens, the chemical safety of our water and food, the nutritional quality of our crops, the birth outcomes of our children, and the mental health of communities confronted with escalating disasters.

CLOSING MESSAGE	*There is no human health without planetary health. The science is not in doubt. The frameworks — One Health, the Joint Plan of Action, the Budapest Declaration, the Farm-to-Fork Strategy — are not in doubt. What is in doubt is political will and implementation speed. This conference proved that when scientists, clinicians, public health authorities, and policymakers share the same room, common language, and common purpose, progress is possible. One Bridge can become many bridges — but bridges must be walked across, not only built.*

The Patras wildfire of 2025 — and the man, the dog, and the flames captured in an award-winning photograph — is not a metaphor. It is the present reality of One Health in a climate-changing world. Our response must match the scale of that reality.

Sources & Acknowledgements

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