#486

Climate Action and
Global Challenge

Background

Climate change disproportionately affects African urban populations through complex heat-health-socioeconomic interactions. Traditional approaches canno multi-dimensional relationships, limiting our ability to develop targeted interventions.

This study uses explainable AI to quantify predictive relationships between climate exposure, socioeconomic factors, and health outcomes in 2,134 p Johannesburg, South Africa.

Methods

2,134 participants
Johannesburg
9 cohort studies

Multi-Domain Data Integration
Climate, SES, Health
Comprehensive linkage

Machine Learning Pipelin
XGBoost + Random Fores
Cross-validation

Data Preprocessing
Standardization
Missing data handling

Temporal Pattern Mining
21-day climate windows
Seasonal analysis

Vulnerability Analysis
SHAP values
Subgroup analysis

61%
Female participants
Gender diversity

21-DAY
Temporal window
Heat exposure analysis

1,300+
Heat events analyzed
Comprehensive dataset

Study Population

Health Outcome	Best Model	R^2	95% CI	MAE	R
Glucose (standardized)	Random Forest	0.611	0.587-0.635	0.548	0
Diastolic BP (standardized)	XGBoost	0.141	0.118-0.164	0.821	0
Systolic BP (standardized)	Random Forest	0.115	0.093-0.137	0.838	0
Hemoglobin (standardized)	Gradient Boosting	0.089	0.067-0.111	0.856	0
Potassium (standardized)	Random Forest	0.071	0.049-0.093	0.869	0