THE REPUBLIC OF UGANDA
MINISTRY OF HEALTH

hisp Uganda

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Operationalising Climate-Informed Malaria Early Warning through DHIS2-CHAP in Uganda

Ministry of Health in collaboration with HISP Uganda, and stakeholders, is implementing climate-informed malaria early warning through the DHIS2 Climate and Health Analytics Platform (CHAP). The work supports Uganda's Health National Adaptation Plan by strengthening climate-informed surveillance, early warning, preparedness, and response.



How it works

Climate + health data in DHIS2 → Predictive modelling in CHAP platform → Risk signals in DHIS2 → Surveillance verification & response

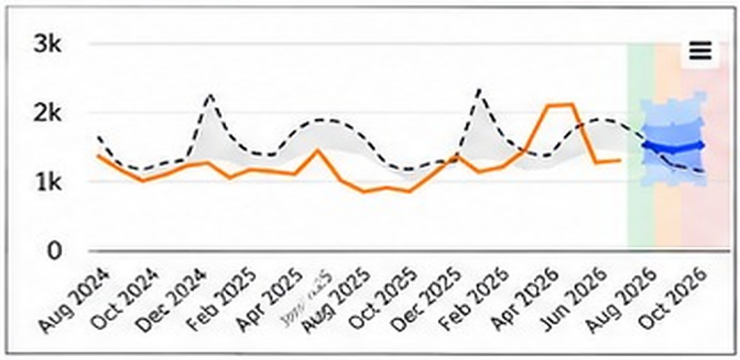
Implementation at a glance

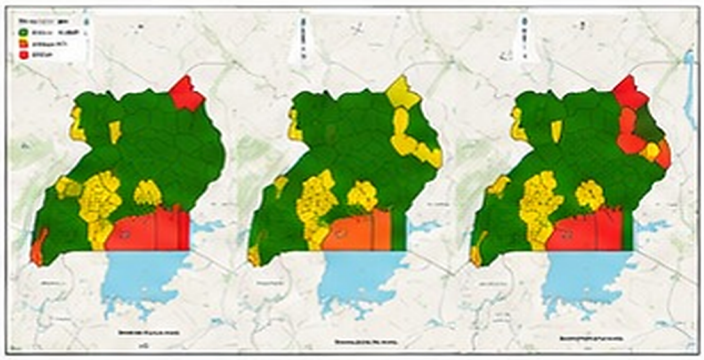
- **2 candidate models:** Statistical Bayesian model (EWARS) and Deep learning model (ARRN)
- **Training and testing malaria data:** Jan 2021–Jul 2026
- **Forecast horizons generated:** Aug–Oct 2026
- **Approach:** Workshop and field validation for 14 districts

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What it shows

Malaria cases with climate-informed forecast and uncertainty band, indicating the expected trend in the coming 3 months. Level of risk is graded as **high (red), moderate (yellow/orange)** and low (green).





Field validation of EWARS prediction against weekly surveillance

Model output	Elevated risk observed	No elevated risk observed
Predicted elevated risk	7 (true positives)	5 (false positives)
Predicted no elevated risk	0 (false negatives)	2 (true negatives)

Summary of evaluation: 100% sensitivity; 58.3% precision; 28.6% specificity and 64.3% overall accuracy.

Key lessons

- ✓ Clear, graded risk signals are essential for guiding surveillance and response.
- ✓ Consistent interpretation of endemic channels is needed to verify alerts.
- ✓ Localised forecasts and action guidance are critical for targeted response.
- ✓ Complete and timely surveillance data are essential for reliable early warning.

Next steps

- ✓ Additional round of field validation in November 2026 to cover more districts.
- ✓ Deploy DHIS2–CHAP infrastructure and prepare for operational use.
- ✓ Initiate routine forecasting for January–March 2027, alongside continued model refinement.

EWARS model alongside the ARRN models shows promise for malaria early warning, with continued validation and integration into routine surveillance paving the way for earlier, informed public health action.

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