African Population and Health Research Center

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When the Ground Truth Goes Dark

The value and biases of AI for demographic data in the absence of DHS

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DHS Program became our demographic ground truth

450+

surveys funded by the DHS Program since 1984

90+

countries covered, most in sub-Saharan Africa and Asia

30+

SDG indicators use DHS as a primary input

When US funding stopped in 2025, surveys were underway or ready in **23 countries**, ten of them with fieldwork already finished.

Source: Global health data precarity, Scientific Data (2025).

2025 - A stress test for global population data

EARLY 2025

US funding halted; $236.8m DHS contract, due to run to 2029, terminated

MARCH 2025

IUSSP warns that access to 300+ national surveys has been cut off

JULY 2025

USAID formally closes

JANUARY 2026

DHS continues with Gates Foundation support: leaner, smaller budget, more technology

The DHS is back, but thinner. The real question is what fills the gaps between surveys, and what happens next time.

Sources: Devex (2026); IUSSP, Duthé, Simo Fotso and Väisänen (2025); Data Rescue Project (2026).

What AI now offers demographers



Earth observation

Satellite imagery plus machine learning to map wealth, settlements and population



Digital traces

Mobile phone metadata and social media audience counts as population signals



Language models on text

Coding verbal autopsy narratives, open text and interview transcripts



Synthetic respondents

Large language models that simulate how people would answer a survey

Where AI earns its place

70%

of village wealth variation predicted from satellites in African countries the model never saw

Yeh et al. 2020, 23 countries

0.56

R^2 for wealth micro-estimates across all low- and middle-income countries, under strict spatial validation

Chi et al. 2022

77%

cause-specific mortality fraction accuracy for GPT-5 assisted verbal autopsy, vs 71% for a Bayesian latent class model

Chen et al. 2025, adults, PHMRC data

Cheap, fast and granular. Real value for small areas and cause of death.



AI learned demography from the DHS

Take the survey away, and the model has nothing new to learn from.

The circularity problem

DHS clusters

Household wealth, births, deaths

AI model

Learns to mimic the survey

Maps and estimates

Used where no survey exists

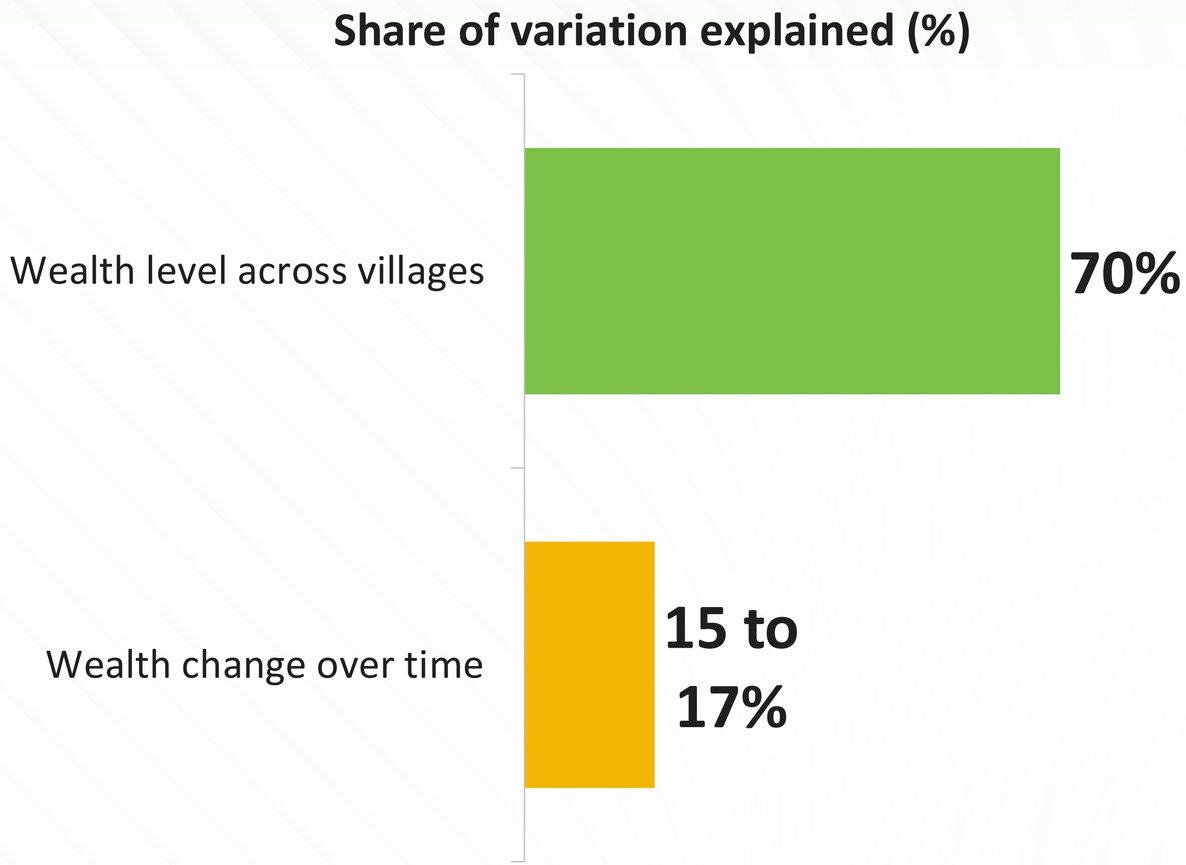
Yeh et al. 2020: 43 DHS surveys, 500,000+ households

Chi et al. 2022: DHS in 56 countries, 1.46 million households

Without fresh surveys, models extrapolate from an ageing snapshot, and their errors become invisible.

AI does not replace the survey. It amplifies the last one.

Bias 1: AI sees levels far better than change



Monitoring is about change.

Is child mortality falling? Is fertility shifting? Did the programme work?

Models are weakest here.

Village-level asset wealth, held-out African countries. Source: Yeh et al., Nature Communications (2020).

Bias 2: The people AI cannot see

26%

less likely: women vs men using mobile internet in sub-Saharan Africa. Gap 2 to 3 times wider in rural areas.

GSMA 2026

53 to 84%

rural population undercount in five global gridded population datasets (a finding the producers dispute)

Láng-Ritter et al. 2025

0.006

agreement between ChatGPT-simulated and real public opinion in South Africa, vs 0.239 in the US (kappa)

Qu and Wang 2024

The biases stack on the same people: **rural, female, poor, non-English speaking.** The very people the DHS was built to reach.

Bias 3: Prediction is not measurement

99.8%

of 6,000 attention checks passed by an autonomous AI survey-taker, at about US$0.05 per completed survey.

Cheap online replacements for household surveys are now open to synthetic respondents.

Westwood, PNAS (2025)

Naive use biases

Treating AI-predicted causes of death as if they were observed biases cause-specific mortality fractions, even with GPT-4.

A small, high-quality labelled sample restores valid inference.

Fan et al. (2024), prediction-powered inference

A way forward: Anchor, Amplify, Audit, Own

ANCHOR

Keep small, high-quality ground truth running: HDSS, CRVS, lean probability surveys

AMPLIFY

Use AI to extend the anchors in space and time, with calibration and valid inference

AUDIT

Report bias like sampling error: by sex, residence, wealth and language

OWN

African institutions govern the data, the models and the validation

Africa already has anchors

Health and demographic surveillance sites follow whole populations over time: births, deaths, migration

Verbal autopsy gives cause of death where civil registration is weak

The INSPIRE network harmonises longitudinal HDSS data to a common data model (OMOP)

NUHDSS covers Nairobi's urban informal settlements, hard terrain for satellite and phone data

The proposal

Treat surveillance sites as calibration and validation sites for AI demographic estimates.

Every AI map should be able to say how well it did where we know the truth.

Three asks of our community

1. **Fund the anchors, not only the algorithms**
2. **Make bias audits a reporting standard for AI-derived demographic estimates**
3. **Build and validate these tools in Africa, under African data governance**

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