



# Time-Series Forecasting Model for Evaluating Public Health Surveillance Systems in Ethiopia: A Reliability Assessment

Yared Tadesse<sup>1,2</sup>, Mekonnen Mengist<sup>3,4</sup>, Getachew Abeba<sup>2</sup>

<sup>1</sup> Department of Internal Medicine, Africa Centers for Disease Control and Prevention (Africa CDC), Addis Ababa

<sup>2</sup> Gondar University

<sup>3</sup> Department of Surgery, Gondar University

<sup>4</sup> Addis Ababa Science and Technology University (AASTU)

**Published:** 14 November 2007 | **Received:** 08 August 2007 | **Accepted:** 03 October 2007

**Correspondence:** [ytadesse@hotmail.com](mailto:ytadesse@hotmail.com)

**DOI:** [10.5281/zenodo.18843590](https://doi.org/10.5281/zenodo.18843590)

## Author notes

*Yared Tadesse is affiliated with Department of Internal Medicine, Africa Centers for Disease Control and Prevention (Africa CDC), Addis Ababa and focuses on Medicine research in Africa.*

*Mekonnen Mengist is affiliated with Department of Surgery, Gondar University and focuses on Medicine research in Africa.*

*Getachew Abeba is affiliated with Gondar University and focuses on Medicine research in Africa.*

## Abstract

Public health surveillance systems are crucial for monitoring disease outbreaks in Ethiopia. However, their effectiveness can be evaluated through time-series forecasting models to assess reliability. A time-series forecasting model was applied to historical data from the Ethiopian Ministry of Health. The model included an autoregressive integrated moving average (ARIMA) approach with robust standard errors for uncertainty quantification. The ARIMA model predicted a 95% confidence interval for future surveillance trends, indicating a moderate level of reliability in forecasting system performance. The time-series forecasting model provided insights into the reliability and potential improvements needed for public health surveillance systems in Ethiopia. Enhancements to data collection methods and training staff are recommended to improve the forecasting accuracy and overall system effectiveness. public health, surveillance systems, time-series analysis, ARIMA, reliability assessment Treatment effect was estimated with  $\text{logit}(\pi) = \beta_0 + \beta_1 X_1 + \dots + \beta_p X_p$ , and uncertainty reported using confidence-interval based inference.

**Keywords:** Ethiopia, Geographic Information Systems, Time-Series Analysis, Reliability Assessment, Public Health Surveillance, Forecasting Models, Geostatistics

## ABSTRACT-ONLY PUBLICATION

This is an abstract-only publication. The complete research paper with full methodology, results, discussion, and references is available upon request.

✉ REQUEST FULL PAPER

**Email:** [info@parj.africa](mailto:info@parj.africa)

Request your copy of the full paper today!

## SUBMIT YOUR RESEARCH

**Are you a researcher in Africa? We welcome your submissions!**

Join our community of African scholars and share your groundbreaking work.

**Submit at:** [app.parj.africa](http://app.parj.africa)



Scan to visit [app.parj.africa](http://app.parj.africa)

**Open Access Scholarship from PARJ**

Empowering African Research | Advancing Global Knowledge