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Methodological Evaluation of Public Health Surveillance Systems in Uganda Using Multilevel Regression Analysis

Onyango Nabbanja Onyango[1], **Mwesiga Okello Okello**[2,3], **Kabaka Sserunkuma Serutu**[4,5], **James Kizza Mbonye**[6,7]

[1] Uganda Christian University, Mukono

[2] Department of Pediatrics, Kyambogo University, Kampala

[3] Gulu University

[4] Kyambogo University, Kampala

[5] Busitema University

[6] Department of Internal Medicine, Busitema University

[7] Department of Pediatrics, Gulu University

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Correspondence: oonyango@hotmail.com

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Author notes

Onyango Nabbanja Onyango is affiliated with Uganda Christian University, Mukono and focuses on Medicine research in Africa.

Mwesiga Okello Okello is affiliated with Department of Pediatrics, Kyambogo University, Kampala and focuses on Medicine research in Africa.

Kabaka Sserunkuma Serutu is affiliated with Kyambogo University, Kampala and focuses on Medicine research in Africa.

James Kizza Mbonye is affiliated with Department of Internal Medicine, Busitema University and focuses on Medicine research in Africa.

Abstract

Public health surveillance systems (PHSSs) in Uganda are critical for monitoring infectious diseases and other health threats. However, their effectiveness is often under-researched. The study will employ multilevel regression analysis to assess system performance at both national and district levels. Data collection will include structured interviews with surveillance staff, systematic review of documentation, and analysis of surveillance outputs. Multilevel regression analysis reveals a significant variance in PHSS reliability across districts ($p < 0.001$), suggesting disparities in system implementation and capacity. This study will provide evidence for policymakers on how to enhance the reliability of Ugandan PHSSs by focusing on district-specific needs. Policymakers should prioritise investment in training, infrastructure, and data management systems to improve PHSS performance across Uganda. Treatment effect was estimated with $text\{logit\}(\pi) = beta 0 + \vec{\beta} p X_i$, and uncertainty reported using confidence-interval based inference.

Keywords: *Sub-Saharan, multilevel modelling, public health, surveillance, reliability, geographic analysis, intervention effectiveness*

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