

BUSITEMA UNIVERSITY
FACULTY OF HEALTH SCIENCE
DEPARTMENT OF COMMUNITY AND PUBLIC HEALTH

FINAL YEAR DISSERTATION

**INCIDENCE, TIME TO AND PREDICTORS OF HIV-
SEROCONVERSION AMONG HIV EXPOSED INFANTS
AFTER THE FIRST PCR: A RETROSPECTIVE ANALYSIS
OF THE NATIONAL EID DATA OF 2019-2024**

By

MAKOKO BRIAN TONNY

**This Dissertation is submitted to the Faculty of Health Sciences,
Department of Community and Public Health in partial fulfillment for the
award of Master of Public Health Degree of Busitema University**

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ABSTRACT

Background: HIV seroconversion among HIV-exposed infants (HEIs) remains a major public health concern, particularly in settings with high maternal HIV prevalence. Despite remarkable progress in the prevention of mother-to-child transmission (PMTCT), some infants who initially test negative after birth later acquire HIV during breastfeeding. Understanding the incidence, timing, and predictors of HIV seroconversion is vital to guide interventions that strengthen Uganda's Early Infant Diagnosis (EID) program and improve infant health outcomes.

Methods: A retrospective cohort study was employed to follow-up HEI who initially tested HIV-negative on their first PCR enrolled in the national EID program. Data was obtained from the Central Public Health Laboratory (CPHL) database from 2019 to 2024. Data was cleaned and analysed using Stata version 18. The incidence rate of HIV seroconversion was computed as the number of new HIV infections per 1,000 person-months of follow-up. Time to seroconversion was estimated using Kaplan–Meier survival analysis, with the log-rank test used to compare survival distributions across subgroups. Cox proportional hazards regression was employed to identify independent predictors of HIV seroconversion

Results: In this study, 59,471 HIV-exposed infants who initially tested HIV-negative at the first PCR were followed for 24 months retrospectively with 1,368 (2.3%) seroconverting during the follow-up period, yielding an overall incidence rate of 1.18 per 1,000 person-months (95% CI: 1.12–1.24). The mean time to HIV seroconversion was 10.8 months (95% CI: 10.1–11.6), with most infections occurring within the first year of life. Multivariable Cox regression identified three significant predictors of HIV seroconversion: infant age 13–24 months [aHR: 3.1; 95% CI: 2.012–4.858; $p < 0.001$], poor maternal ART adherence (<85%) [aHR: 3.2; 95% CI: 2.122–4.872; $p < 0.001$], and unsuppressed maternal viral load [aHR: 2.4; 95% CI: 1.644–3.539; $p < 0.001$].

Conclusion: The study found that while the incidence of HIV seroconversion among infants after a negative first PCR test remains low, new infections still occur primarily within the first year of life, largely attributable to inadequate maternal ART adherence and lack of viral load suppression. The findings highlight the need to reinforce maternal adherence counselling, routine viral load monitoring, and early weaning strategies aligned with PMTCT guidelines. Strengthening follow-up within the EID continuum and integrating maternal–infant pair management approaches could further reduce postnatal HIV transmission and accelerate progress toward the elimination of mother-to-child HIV transmission in Uganda.

Keywords: HIV seroconversion, HIV-exposed infants, Early Infant Diagnosis, incidence rate, time to seroconversion, Uganda, PMTCT.

DECLARATION

I, **Makoko Brian Tonny** declare that this research proposal titled “***Incidence, time to and predictors of HIV-seroconversion among HIV exposed infants after the first PCR: a retrospective analysis of the national EID data of 2019-2024***” is my own original work and that it has not been presented to Busitema University for a similar or any other degree award.

Signature: _____ Date: _____

APPROVAL

This is to certify that this research dissertation entitled “*“Incidence, time to and predictors of HIV-seroconversion among HIV exposed infants after the first PCR: a retrospective analysis of the national EID data of 2019-2024”*” has been written under my supervision and I am satisfied with the contents therein up to this stage

1. Assoc. Prof. Joseph KB Matovu: (MHS, PhD)

Signature: _____

Date: 15th November, 2025

2. Dr. Nekaka Rebecca (MBChB, MPH)

Signature: _____

Date: _____

DEDICATION

This research dissertation is dedicated to the pillars of my life whose unwavering support, love, and encouragement have been instrumental in my academic journey.

To my beloved parents, especially my mother, Madam Margaret Natozo, whose sacrifices, prayers, and guidance have shaped the person I am today. Your unwavering belief in my potential has been my greatest motivation.

To my dear fiancée, Ms. Ephian Nandudu, whose love, patience, and encouragement have given me the strength to push forward even in challenging times. Your unwavering support means the world to me.

And to my unborn child, a precious gift and a source of inspiration for the future. May this work serve as a testament to the importance of dedication, resilience, and the pursuit of knowledge.

With heartfelt gratitude, I dedicate this work to you all.

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ABBREVIATIONS/ACRONYMS

Abbreviation/Acronym Meaning

ART	Antiretroviral Therapy
CPHL	Central Public Health Laboratory
DNA	Deoxyribonucleic Acid
EID	Early Infant Diagnosis
EF	Exclusive Feeding
EGPAF	Elizabeth Glaser Paediatric AIDS Foundation
eMTCT	Elimination of Mother-to-Child Transmission
HEI	HIV-Exposed Infant
HIV	Human Immunodeficiency Virus
LTFU	Lost to Follow-Up
MF	Mixed Feeding
MOH	Ministry of Health
MTCT	Mother-to-Child Transmission
PCR	Polymerase Chain Reaction
PLHIV	People Living with HIV
PMTCT	Prevention of Mother-to-Child Transmission
RMNCH	Reproductive, Maternal, Newborn, and Child Health
UNAIDS	Joint United Nations Programme on HIV/AIDS
WHO	World Health Organization

OPERATIONAL DEFINITIONS

Early Infant Diagnosis (EID) Program: The enrolment of any infant in Uganda's national EID database, where they undergo HIV testing using PCR technology for early detection and followed for 24 months.

Healthcare Facility Type: Classified into three categories: public health facilities, private health facilities, and community-based or lower-level health facilities such as Health Centre III and IV.

HIV-Exposed Infant (HEI): An infant documented in the Early Infant Diagnosis (EID) program whose mother has a confirmed HIV-positive status, regardless of the infant's own HIV status at birth.

HIV-Seroconversion: The occurrence of an HIV-exposed infant who initially tests negative on a PCR test but later tests positive on a confirmatory PCR test recorded in the EID database.

Incidence of HIV-Seroconversion: Determined by the number of infants who experience seroconversion, defined as an initial negative PCR test followed by a positive PCR test, divided by the total person-time at risk, measured in person-months or person-years.

Infant Feeding Practices: Categorized into three types: exclusive breastfeeding (EBF), where the infant receives only breast milk without any other foods or liquids; mixed feeding (MF), which involves breastfeeding along with other foods or liquids; and exclusive formula feeding (EFF), where the infant is provided with only formula milk and no breastfeeding.

Infant Prophylaxis: The administration of antiretroviral (ARV) medication to prevent HIV transmission, categorized based on infant risk level. Low-risk infants (born to mothers with suppressed viral load and consistent ART use) receive single-drug prophylaxis (e.g., Nevirapine alone). High-risk infants (born to mothers with unsuppressed viral load, late ART initiation, or other risk factors) receive combination prophylaxis (e.g., Nevirapine combined with Zidovudine). Additionally, some infants may receive no prophylaxis if ARVs are not administered at birth.

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