Dovepress
HIV/AIDS: RESEARCH AND PALLIATIVE CARE
OPEN ACCESS

Taylor & Francis
Taylor & Francis Group

HIV/AIDS - Research and Palliative Care

ISSN: 1179-1373 (Online) Journal homepage: www.tandfonline.com/journals/dhiv20

Incidence and Predictors of Hyperglycemia Among Adults Receiving Dolutegravir-Based Antiretroviral Therapy at Mbarara Regional Referral Hospital HIV Clinic, Uganda: A Retrospective Cohort Study

Arinaitwe Medard, Mwesigwa Geoffrey, Asiimwe Derrick, Ikiriza Anthony, Muyindike Winnie & Stephen Asiimwe

To cite this article: Arinaitwe Medard, Mwesigwa Geoffrey, Asiimwe Derrick, Ikiriza Anthony, Muyindike Winnie & Stephen Asiimwe (2026) Incidence and Predictors of Hyperglycemia Among Adults Receiving Dolutegravir-Based Antiretroviral Therapy at Mbarara Regional Referral Hospital HIV Clinic, Uganda: A Retrospective Cohort Study, HIV/AIDS - Research and Palliative Care, , 637953, DOI: 10.2147/HIV.S637953

To link to this article: https://doi.org/10.2147/HIV.S637953

© 2026 Medard et al.

Published online: 01 Oct 2026.

Submit your article to this journal

Article views: 11

View related articles

View Crossmark data

Full Terms & Conditions of access and use can be found at
https://www.tandfonline.com/action/journalInformation?journalCode=dhiv20

HIV/AIDS - Research and Palliative Care

Dovepress
Taylor & Francis Group

Open Access Full Text Article

ORIGINAL RESEARCH

Incidence and Predictors of Hyperglycemia Among Adults Receiving Dolutegravir-Based Antiretroviral Therapy at Mbarara Regional Referral Hospital HIV Clinic, Uganda: A Retrospective Cohort Study

Arinaitwe Medard[1,2], Mwesigwa Geoffrey[2,3], Asiimwe Derrick[3], Ikiriza Anthony[4], Muyindike Winnie[2,5], Stephen Asiimwe[1]

[1]Department of Community Health, Faculty of Medicine, Mbarara University of Science and Technology, Mbarara, Uganda; [2]Immune Suppression Syndrome Clinic, Mbarara Regional Referral Hospital, Mbarara, Uganda; [3]Department of Physiology, Faculty of Medicine, Mbarara University of Science and Technology, Mbarara, Uganda; [4]Department of Public Health, Faculty of Health Sciences, Mountains of the Moon University, Fort Portal, Uganda; [5]Department of Internal Medicine, Faculty of Medicine, Mbarara University of Science and Technology, Mbarara, Uganda

Correspondence: Arinaitwe Medard, Immune Suppression Syndrome Clinic, Mbarara Regional Referral Hospital, P. O. Box 40, Mbarara, Uganda, Tel +256 702923293, Email medarinaitwe@gmail.com

Background: Dolutegravir (DTG)-based antiretroviral therapy is widely used in sub-Saharan Africa, but routine-care evidence on incident hyperglycemia after DTG initiation or substitution remains limited in southwestern Uganda.

Purpose: To determine the incidence and predictors of documented hyperglycemia among adults receiving DTG-based antiretroviral therapy at Mbarara Regional Referral Hospital.

Patients and Methods: We conducted a retrospective cohort study using routine clinical records of adults who initiated or switched to DTG-based ART between 1 January 2019 and 31 December 2023. Documented incident hyperglycemia was defined as fasting glucose ≥7.0 mmol/L or random glucose ≥11.1 mmol/L with documented classic symptoms. Cox proportional hazards regression estimated adjusted hazard ratios (aHRs); age was modeled per 10-year increase. The proportional-hazards assumption was assessed using Schoenfeld residuals.

Results: Of 8,859 adults in the descriptive cohort, 8,856 contributed positive follow-up time. Seventy-four documented hyperglycemia events occurred over 29,157.74 person-years, an incidence rate of 2.54 per 1,000 person-years (95% CI 1.99–3.19). The smoothed hazard increased after DTG initiation/substitution, peaked at approximately 1.1 years, and declined thereafter. Higher hazard was associated with older age (per 10 years: aHR 1.70, 95% CI 1.33–2.18), prior thymidine analogue NRTI exposure (aHR 3.27, 95% CI 1.20–8.89), and ≥15 years of ART before DTG (aHR 5.63, 95% CI 1.39–22.77). The global proportional-hazards test was not significant (p=0.70).

Conclusion: Documented hyperglycemia was uncommon but was associated with older age and markers of long-term ART exposure. Risk-stratified glucose monitoring should be considered, particularly during the first year after DTG initiation/substitution and among higher-risk patients.

Keywords: dolutegravir, hyperglycemia, HIV, antiretroviral therapy, incidence, predictors, cox regression, Uganda

Introduction

Antiretroviral therapy (ART) has transformed HIV infection into a manageable chronic condition and substantially improved survival among people living with HIV (PLWHIV). As life expectancy increases, non-communicable diseases, including diabetes and other cardiometabolic disorders, are becoming increasingly important contributors to morbidity in HIV care, particularly in sub-Saharan Africa.[1–5]

https://doi.org/10.2147/HIV.S637953
Received: 18 August 2026
Accepted: 30 September 2026
Published: 2 October 2026

© 2026 Medard et al. This work is published and licensed by Dove Medical Press Limited. The full terms of this license are available at https://www.dovepress.com/terms.php and incorporate the Creative Commons Attribution – Non Commercial (unported, v4.0) License (http://creativecommons.org/licenses/by-nc/4.0/). By accessing the work you hereby accept the Terms. Non-commercial uses of the work are permitted without any further permission from Dove Medical Press Limited, provided the work is properly attributed. For permission for commercial use of this work, please see paragraphs 4.2 and 5 of our Terms (https://www.dovepress.com/terms.php).

Dolutegravir (DTG), an integrase strand transfer inhibitor, is widely used in first-, second-, and third-line ART because of its potency, tolerability, convenient dosing, and high barrier to resistance.[6,7] Uganda adopted DTG-based regimens following World Health Organization and national guideline updates.[6,7]

Metabolic complications reported after DTG initiation or substitution include weight gain, insulin resistance, hyperglycemia, and diabetes.[8–12] Proposed explanations include weight gain, unmasking of pre-existing metabolic susceptibility, persistent HIV-related inflammation, aging, and residual metabolic effects of earlier ART such as thymidine analogue NRTIs and protease inhibitors.[13–16]Hyperglycemia may also compound infectious vulnerability in susceptible hosts; recent reviews have highlighted the broader public-health importance of pathogenic fungal disease in high-risk populations.[17]

Evidence linking DTG to dysglycemia remains mixed. Some reports describe rapid-onset hyperglycemia or diabetes after DTG initiation, whereas other cohort data show little deterioration in glucose metabolism with longer exposure.[9–11,18] Routine-care evidence from southwestern Uganda is particularly limited. This uncertainty, together with the growing burden of metabolic disease in long-term HIV care, provides the rationale for locally derived incidence and risk-factor estimates.

This study therefore determined the incidence of documented hyperglycemia and identified demographic and treatment-related predictors among adults receiving DTG-based ART at the Immune Suppression Syndrome (ISS) Clinic of Mbarara Regional Referral Hospital[19] between January 2019 and December 2023.

Materials and Methods

Study Design and Setting

This retrospective cohort study was conducted at the Immune Suppression Syndrome (ISS) Clinic of Mbarara Regional Referral Hospital,[19] a government-aided regional referral hospital in Mbarara City, southwestern Uganda. MRRH serves a wide catchment population in southwestern Uganda and neighboring areas. The ISS Clinic provides high-volume HIV care to more than 11,000 active clients.

Data were obtained from the Uganda Electronic Medical Records (UgandaEMR) system and corresponding paper patient charts. Clinical, pharmacy, and laboratory information used for the study was linked using clinic patient identifiers and de-identified for analysis.

Study Population, Eligibility and Sampling

A census approach was used. Adults aged ≥18 years who initiated or switched to a DTG-based regimen during the study period were eligible if records contained a DTG initiation/substitution date and sufficient information to establish follow-up and study outcome status. Patients with documented pre-existing diabetes or qualifying hyperglycemia before DTG, pregnancy, missing ART/DTG dates, or insufficient glucose documentation to establish baseline and follow-up outcome status were excluded during the original data abstraction process.

The archived de-identified analysis file contained 9,479 rows. Of these, 619 had unpopulated core study fields and the reason-specific original exclusion categories were not retained in the analysis file. Among 8,860 records with populated core study fields, one participant had a calculated age of 17.1 years at DTG transition and was excluded to preserve the adult eligibility criterion, leaving 8,859 adults for descriptive analysis. Three additional adult records had zero follow-up time and could not enter a time-to-event risk set, leaving 8,856 participants for the survival analyses (Figure 1).

Follow-up began at DTG initiation/substitution and ended at the earliest occurrence of documented incident hyperglycemia, death, transfer out, loss to follow-up, or 31 December 2023. Records with an outcome or censoring date equal to the DTG start date did not contribute positive post-exposure person-time and were excluded from the Cox risk set.

Outcome and Study Variables

The primary outcome was documented incident hyperglycemia after DTG initiation/substitution among participants without documented pre-existing diabetes or qualifying hyperglycemia in available pre-DTG records. The operational threshold was fasting plasma glucose ≥7.0 mmol/L, or random plasma glucose ≥11.1 mmol/L in the presence of documented classic symptoms such as polyuria, polydipsia, or unexplained weight loss.[20] A single qualifying record

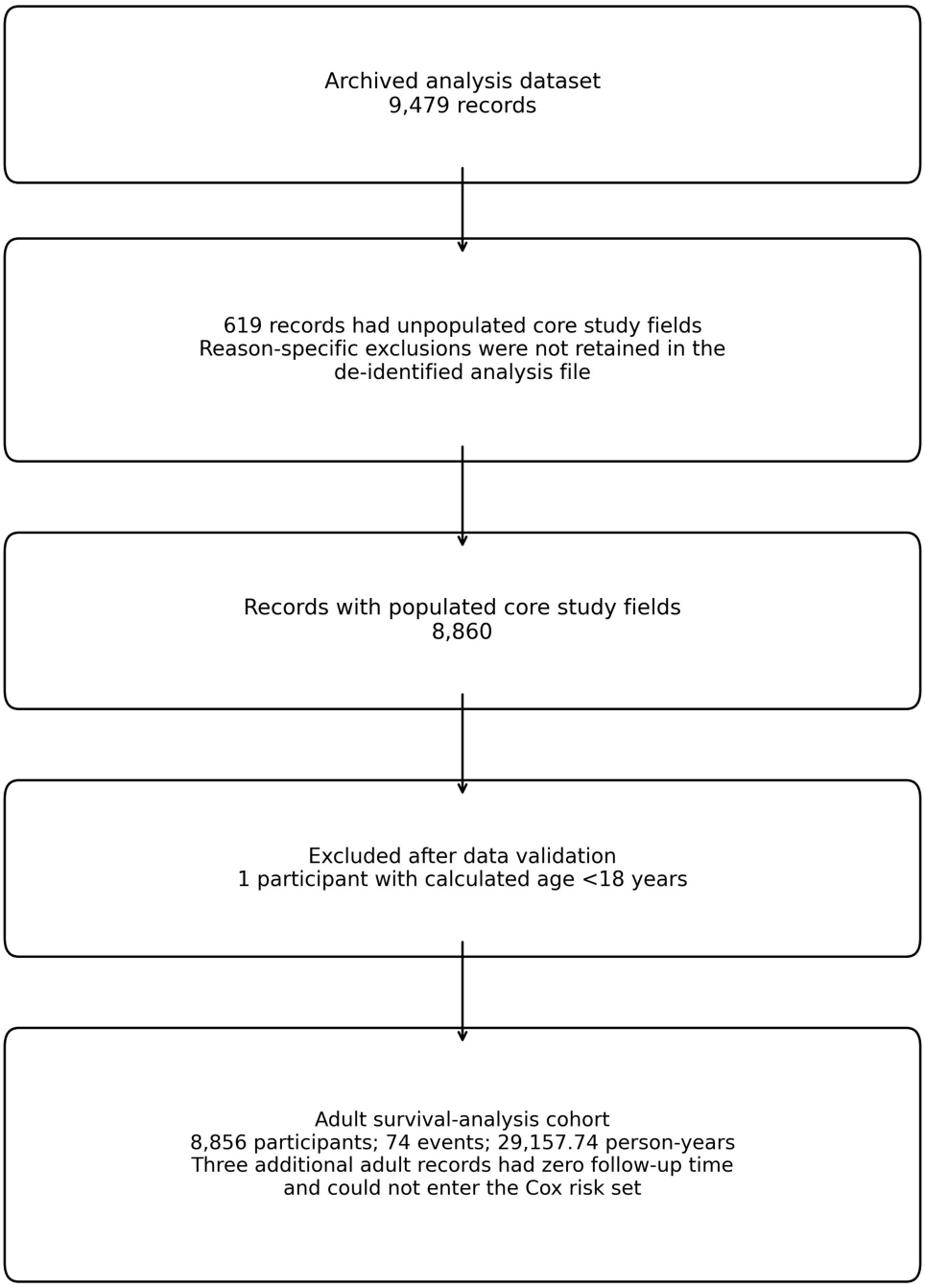


Figure 1 Participant flow based on the archived de-identified analysis dataset. The archived file contained 9,479 rows; 619 had unpopulated core study fields and did not retain reason-specific original exclusion categories. One record with calculated age <18 years and three adult records with zero follow-up time were excluded from the adult survival-analysis cohort.

was counted as a study event. This endpoint represents documented hyperglycemia and was not intended to establish a confirmed clinical diagnosis of diabetes, for which repeat confirmation is generally required in the absence of unequivocal hyperglycemia.[20] Symptoms were identified from clinician-recorded notes; symptom documentation was not protocolized.

Baseline variables included age at DTG initiation/substitution, sex, marital status, residence, prior thymidine analogue NRTI exposure, prior protease inhibitor exposure, and duration of ART before DTG. Prior thymidine analogue exposure represented documented previous use of stavudine- or zidovudine-containing regimens. Prior protease inhibitor exposure

represented documented previous use of a protease inhibitor-containing regimen, principally lopinavir/ritonavir- or atazanavir/ritonavir-containing regimens in the historical regimen fields. Duration of ART before DTG was calculated from the recorded ART start date to DTG initiation/substitution.

Data Management and Analysis

Data were extracted into Microsoft Excel, cleaned for completeness and consistency, and analyzed using Stata version 17 (StataCorp, College Station, TX, USA). The reviewer-driven re-analysis was independently reconstructed from the archived Stata dataset. Descriptive statistics were frequencies and percentages for categorical variables and mean with standard deviation for approximately normally distributed continuous variables.

Among the 8,859 adults in the descriptive cohort, age, sex, marital status, residence, thymidine analogue exposure, protease inhibitor exposure, ART-duration category, and core follow-up fields were complete. Weight was missing for 673 participants (7.6%); because the archived variable did not establish whether weight was measured at DTG baseline, it was not used as a baseline predictor. The archived file did not contain validated variables for BMI, HbA1c, change in weight, glucocorticoid or statin exposure, HIV viral load, CD4 count, or family history of diabetes. These factors therefore could not be incorporated into the multivariable model.

Person-time was calculated from DTG initiation/substitution to event or censoring and expressed in years using 365.25 days per year. The incidence rate was the number of events divided by total person-years and was expressed per 1,000 person-years with exact Poisson 95% confidence intervals. Because the archived analysis file did not contain repeated raw glucose-test records or assay-method fields, the frequency and method of glucose testing could not be quantified retrospectively from this file; this was treated as a potential source of detection bias.

For the revised temporal analysis, follow-up was split into 0–<1, 1–<2, 2–<3, 3–<4, and ≥4-year intervals and interval-specific incidence rates were calculated. Figure 2 was regenerated from the final event-time data by applying an Epanechnikov kernel to Nelson–Aalen hazard increments with a bandwidth of 1.0 year. This display was descriptive and was not used to define the Cox model.

Cox proportional hazards regression estimated crude and adjusted hazard ratios (HRs) with 95% confidence intervals. Age was modeled continuously per 10-year increase. The multivariable model included age, sex, marital status, residence, prior thymidine analogue NRTI exposure, and duration of ART before DTG. Prior protease inhibitor exposure

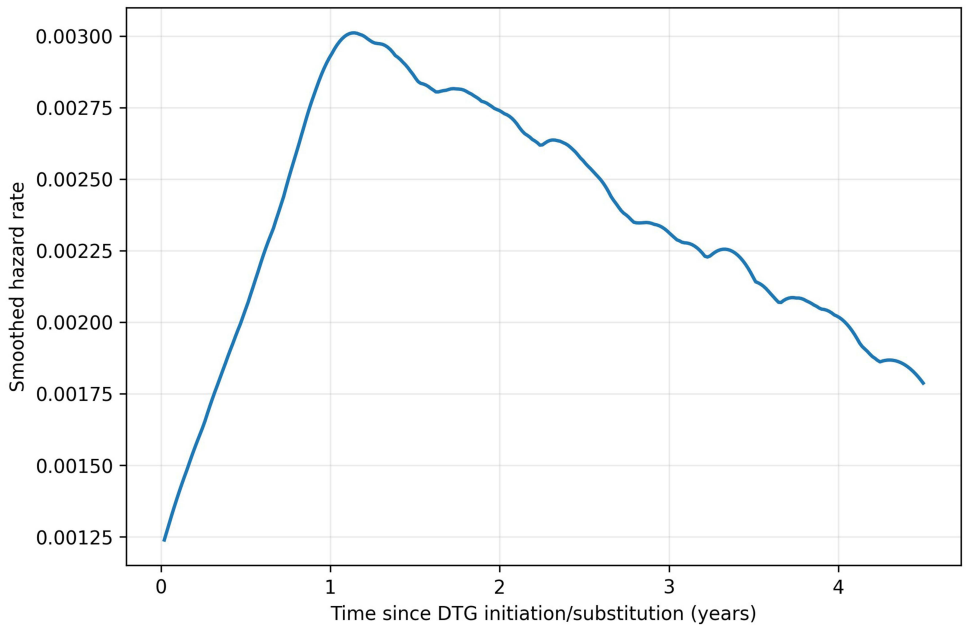


Figure 2 Smoothed hazard estimate for documented incident hyperglycemia after DTG initiation/substitution. The curve was regenerated from the final adult event-time data using an Epanechnikov kernel applied to Nelson–Aalen hazard increments with a bandwidth of 1.0 year. The x-axis is time since DTG initiation/substitution in years.

was not included in the adjusted model because no incident events occurred among exposed participants. Final duration on DTG was not modeled as a baseline predictor because it is determined during follow-up. The proportional-hazards assumption was assessed using Schoenfeld residuals and showed no evidence of global violation (χ^2[11]=8.13; p=0.70).

Only one adult participant had the same documented ART and DTG start date, with no hyperglycemia event, so a separate treatment-naive Cox stratum was not estimable. A sensitivity analysis restricted to ART-experienced regimen-switch participants yielded adjusted estimates unchanged to two decimal places. Statistical significance was set at p<0.05.

Ethical Considerations

The study was approved by the Department of Community Health, the Faculty of Medicine Research Committee, the Mbarara University of Science and Technology Research Ethics Committee (MUST-2024-1644), and the Uganda National Council for Science and Technology (UNCST/RC1/94818495). Administrative clearance was obtained from the Hospital Director of Mbarara Regional Referral Hospital. Confidentiality was maintained through coding and de-identification. The Research Ethics Committee approved a waiver of informed consent because this retrospective study involved minimal risk and obtaining individual consent was impractical. The study was conducted in accordance with the ethical principles of the Declaration of Helsinki.

Results

Characteristics of Study Participants

The final adult descriptive cohort included 8,859 participants. Mean age at DTG transition was 41.15 years (SD 10.47; range 18.31–95.44). Females comprised 5,846 (65.99%) participants, 5,007 (56.52%) were married, and 4,808 (54.27%) resided in rural areas. Prior exposure to thymidine analogue NRTIs was recorded in 4,165 (47.01%) participants and prior protease inhibitor exposure in 736 (8.31%). Most participants had received ART for 5–9.99 years before DTG (38.55%) (Table 1).

Table 1 Sociodemographic and Treatment-Related Characteristics of the Adult Descriptive Cohort (N=8,859)

Characteristic	Category	Frequency (%)
Age at DTG transition, years (mean 41.15; SD 10.47)	18–29.9 30–39.9 40–49.9 ≥50	1,368 (15.44) 2,956 (33.37) 2,747 (31.01) 1,788 (20.18)
Sex	Male Female	3,013 (34.01) 5,846 (65.99)
Marital status	Divorced/separated Single Married Widowed	1,584 (17.88) 1,202 (13.57) 5,007 (56.52) 1,066 (12.03)
Residence	Rural Semi-urban Urban	4,808 (54.27) 313 (3.53) 3,738 (42.19)
Prior exposure to thymidine analogue NRTIs	No Yes	4,694 (52.99) 4,165 (47.01)
Prior exposure to protease inhibitors	No Yes	8,123 (91.69) 736 (8.31)

(*Continued*)

Table 1 (Continued).

Characteristic	Category	Frequency (%)
Duration of ART before DTG, years	<5	2,700 (30.48)
	5–9.99	3,415 (38.55)
	10–14.99	2,228 (25.15)
	≥15	516 (5.82)
Observed duration on DTG, years	0–1.99	1,379 (15.57)
	2–2.99	2,680 (30.25)
	3–3.99	1,496 (16.89)
	≥4	3,304 (37.30)

Abbreviations: ART, antiretroviral therapy; DTG, dolutegravir; NRTI, nucleoside reverse transcriptase inhibitor.

Predictors of Incident Hyperglycemia

In the multivariable Cox model, each 10-year increase in age was associated with a 70% higher hazard of documented hyperglycemia (aHR 1.70, 95% CI 1.33–2.18; p<0.001). Prior thymidine analogue NRTI exposure was associated with higher hazard (aHR 3.27, 95% CI 1.20–8.89; p=0.020). Participants with ≥15 years of ART before DTG had higher hazard than those with <5 years of ART exposure (aHR 5.63, 95% CI 1.39–22.77; p=0.015). Sex, marital status, residence, and shorter ART-duration categories were not independently associated with the outcome (Table 2).

No incident hyperglycemia events occurred among the 736 participants with prior protease inhibitor exposure; therefore, a conventional Cox HR for this exposure was not estimable and the variable was not included in the adjusted model. Restriction of the analysis to ART-experienced regimen-switch participants produced adjusted estimates unchanged to two decimal places. The Schoenfeld residual-based global test did not indicate violation of the proportional-hazards assumption (p=0.70).

Incidence and Temporal Pattern of Documented Hyperglycemia

Among 8,856 adults contributing positive follow-up time, 74 documented incident hyperglycemia events occurred over 29,157.74 person-years. The incidence rate was 2.54 per 1,000 person-years (95% CI 1.99–3.19), and the crude proportion with documented hyperglycemia was 0.84%.

The revised smoothed hazard estimate increased after DTG initiation/substitution, reached its maximum at approximately 1.1 years, and declined thereafter (Figure 2). Interval-specific incidence rates were 2.33, 3.37, 2.16, 1.65, and 3.04 per 1,000 person-years during 0–<1, 1–<2, 2–<3, 3–<4, and ≥4 years, respectively (Table 3). These interval estimates did not show a simple monotonic dose-response with longer DTG exposure.

Discussion

In this retrospective cohort of adults receiving DTG-based ART at the ISS Clinic of MRRH, 74 documented hyperglycemia events occurred over 29,157.74 person-years, corresponding to 2.54 cases per 1,000 person-years. The revised smoothed hazard rose after DTG initiation/substitution, peaked at approximately 1.1 years, and subsequently declined. Older age, prior thymidine analogue NRTI exposure, and long ART experience before DTG were independently associated with higher hazard.

The observed incidence is lower than some African and international reports of dysglycemia among people receiving integrase inhibitor-based ART.[9–11,21] Several factors may explain this difference. Glucose testing in this study occurred as part of routine clinical care rather than standardized study visits, so asymptomatic events may have been missed and participants with more frequent clinical contact may have had greater opportunity for detection. The endpoint also focused on documented fasting or symptomatic random hyperglycemia rather than HbA1c, prediabetes, or systematic oral glucose testing. Differences in age, adiposity, family history, HIV disease markers, ART history, and metabolic monitoring intensity may also have contributed.

Table 2 Cox Proportional Hazards Analysis of Predictors of Documented Incident Hyperglycemia (Survival-Analysis Cohort N=8,856; 74 Events)

Variable	Category	No Hyperglycemia n (%)	Hyperglycemia n (%)	cHR (95% CI)	P value	aHR (95% CI)	P value
Age at DTG start	Per 10-year increase	41.06 ± 10.45	51.74 ± 6.83	2.23 (1.86–2.68)	<0.001	1.70 (1.33–2.18)	<0.001
Sex	Male	2,982 (98.97)	31 (1.03)	Reference		Reference	
	Female	5,800 (99.26)	43 (0.74)	0.69 (0.44–1.10)	0.122	0.90 (0.54–1.52)	0.702
Marital status	Divorced/separated	1,577 (99.62)	6 (0.38)	Reference		Reference	
	Single	1,198 (99.67)	4 (0.33)	0.92 (0.26–3.25)	0.893	1.23 (0.34–4.45)	0.752
	Married	4,964 (99.16)	42 (0.84)	2.19 (0.93–5.15)	0.073	1.85 (0.77–4.45)	0.167
	Widowed	1,043 (97.93)	22 (2.07)	5.28 (2.14–13.02)	<0.001	2.38 (0.95–5.93)	0.063
Residence	Rural	4,762 (99.08)	44 (0.92)	Reference		Reference	
	Semi-urban	304 (97.12)	9 (2.88)	3.02 (1.48–6.19)	0.003	1.62 (0.78–3.39)	0.198
	Urban	3,716 (99.44)	21 (0.56)	0.65 (0.39–1.09)	0.103	0.97 (0.57–1.64)	0.904
Prior thymidine analogue NRTI exposure	No	4,687 (99.87)	6 (0.13)	Reference		Reference	
	Yes	4,095 (98.37)	68 (1.63)	11.11 (4.82–25.62)	<0.001	3.27 (1.20–8.89)	0.020
Prior protease inhibitor exposure	No	8,046 (99.09)	74 (0.91)	Reference		Not included	
	Yes	736 (100.00)	0 (0.00)	Not estimable	—	Not estimable	—
Duration of ART before DTG, years	<5	2,696 (99.89)	3 (0.11)	Reference		Reference	
	5–9.99	3,403 (99.68)	11 (0.32)	2.60 (0.73–9.33)	0.142	1.41 (0.38–5.29)	0.607
	10–14.99	2,185 (98.11)	42 (1.89)	14.60 (4.53–47.13)	<0.001	3.41 (0.90–12.96)	0.071
	≥15	498 (96.51)	18 (3.49)	32.69 (9.63–111.01)	<0.001	5.63 (1.39–22.77)	0.015

Notes: Age values in event-status columns are mean ± SD; categorical percentages are row percentages. cHR, crude hazard ratio; aHR, adjusted hazard ratio; CI, confidence interval. The multivariable model included age per 10 years, sex, marital status, residence, prior thymidine analogue NRTI exposure, and duration of ART before DTG. Prior protease inhibitor exposure was excluded from the adjusted model because there were no events among exposed participants. Final duration on DTG was not modeled as a baseline predictor. Schoenfeld global proportional-hazards test: χ^2 (11)=8.13, p=0.70.

https://doi.org/10.2147/HIV.S637953

Table 3 Interval-Specific Incidence of Documented Hyperglycemia by Time Since DTG Initiation/Substitution

Follow-Up Interval	Events	Person-Years	Incidence Rate Per 1,000 Person-Years (95% CI)
0–<1 year	20	8,597.74	2.33 (1.42–3.59)
1–<2 years	27	8,009.26	3.37 (2.22–4.90)
2–<3 years	15	6,929.40	2.16 (1.21–3.57)
3–<4 years	6	3,646.19	1.65 (0.60–3.58)
≥4 years	6	1,975.15	3.04 (1.11–6.61)

The temporal pattern is clinically notable The smoothed hazard peaked around 1.1 years, while interval-specific incidence rates did not show a monotonic increase with longer DTG exposure. This finding argues against interpreting final duration on DTG as an ordinary baseline predictor and supports attention to time since DTG initiation/substitution. Similar early-onset dysglycemia has been described in reports of DTG-associated hyperglycemia and diabetes.[9–11] These data support further evaluation of closer glucose surveillance during the first year, particularly in higher-risk patients, but they do not establish an optimal testing schedule.

Older age remained strongly associated with documented hyperglycemia when modeled continuously. This is consistent with age-related reductions in insulin sensitivity and pancreatic beta-cell reserve.[16] In PLWHIV, age-related metabolic vulnerability may coexist with chronic immune activation, long-term ART exposure, and a higher burden of cardiometabolic comorbidity.[13,15] The implication is not to alter DTG use solely on the basis of age, but to recognize older adults as a group in whom metabolic risk assessment may be particularly relevant.

Prior thymidine analogue NRTI exposure was associated with higher hazard of documented hyperglycemia. Stavudine and zidovudine have been linked to mitochondrial toxicity, lipodystrophy, altered fat distribution, and insulin resistance.[14] The association is biologically plausible, although residual confounding by historical treatment era, HIV duration, body composition, and comorbidity cannot be excluded.

Longer ART duration before DTG may represent cumulative ART exposure, longer HIV duration, advancing age, survivor effects, or unmeasured comorbidity rather than a direct causal effect of ART duration. Only one adult in the archived dataset could be identified as having the same ART and DTG start date; therefore, a treatment-naive subgroup model was not estimable. Importantly, restricting the analysis to ART-experienced regimen-switch participants did not materially change the adjusted estimates.

DTG remains a highly effective and preferred ART option, and these findings should not be interpreted as a reason to avoid DTG broadly. Rather, they support consideration of risk-stratified metabolic assessment in routine HIV care. Artificial-intelligence approaches are increasingly being studied for disease-risk prediction and glycemic management, but application to DTG-associated dysglycemia in resource-limited HIV programs would require purpose-built models, external validation, calibration assessment, and implementation evaluation before clinical use.[22,23]

Strengths and Limitations

This study used a large routine-care cohort with person-time estimation and survival analysis and provides evidence from southwestern Uganda. Several limitations are important. First, glucose testing was not protocolized, and the archived analysis file did not retain repeated glucose-test records or assay-method fields; testing frequency could therefore not be quantified, creating potential outcome under-ascertainment and detection bias. Second, retrospective symptom documentation may have been incomplete. Third, potentially important confounders including baseline BMI, change in weight, HbA1c, glucocorticoid or statin use, viral load, CD4 count, and family history of diabetes were not available as validated baseline variables. A weight variable was present but was missing in 7.6% and its timing relative to DTG initiation could not be established. Residual confounding may therefore have shifted hazard-ratio estimates in either direction. Fourth,

only 74 events occurred, limiting precision for some categories. Fifth, the de-identified archived analysis file did not retain reason-specific counts for the 619 records without populated core fields, limiting reconstruction of the original exclusion flow. Sixth, a separate treatment-naive subgroup could not be analyzed because only one adult had the same ART and DTG start date. Finally, the single-center design may limit generalizability.

Conclusion

Documented incident hyperglycemia occurred at a rate of 2.54 cases per 1,000 person-years among adults receiving DTG-based ART at MRRH. The smoothed hazard rose after DTG initiation/substitution and peaked at approximately 1.1 years. Older age, prior thymidine analogue NRTI exposure, and ≥15 years of ART before DTG were independently associated with higher hazard. Risk-stratified glucose monitoring should be considered, particularly during the first year and among older or ART-experienced patients, while recognizing that this observational study did not establish a specific monitoring schedule. Emerging AI-supported glycemic risk tools may ultimately contribute to individualized monitoring but require validation in the relevant HIV-care setting before routine use.[22]

Ethics Approval and Consent to Participate

Ethical approval was obtained from the Mbarara University of Science and Technology Research Ethics Committee (MUST-2024-1644) and the Uganda National Council for Science and Technology (UNCST/RC1/94818495). Administrative clearance was obtained from the Hospital Director of Mbarara Regional Referral Hospital. Patient identifiers were coded and de-identified during analysis. The Research Ethics Committee approved a waiver of informed consent because this retrospective study involved minimal risk and obtaining individual consent was impractical. The study was conducted in accordance with the Declaration of Helsinki.

Acknowledgments

The authors thank the Department of Community Health, Mbarara University of Science and Technology, the administration and staff of Mbarara Regional Referral Hospital, and the ISS Clinic team for supporting data access and study implementation.

Disclosure

The author(s) report no conflicts of interest in this work.

References

1. Coetzee L, Bogler L, De NJW, Bärnighausen T, Geldsetzer P, Vollmer S. HIV, antiretroviral therapy and non-communicable diseases in sub-Saharan Africa: empirical evidence from 44 countries over the period 2000 to 2016. *J Int AIDS Society*. 2019;22(7). doi:10.1002/jia2.25364
2. Commission UA. Status of the national HIV and AIDS response in Uganda as of december 2022. 2023.
3. Moyo-Chilufya M, Maluleke K, Kgarosi K, Muyoyeta M, Hongoro C, Musekiwa A. The burden of non-communicable diseases among people living with HIV in Sub-Saharan Africa: a systematic review and meta-analysis. *eClinicalMedicine*. 2023;65:102255. doi:10.1016/j.eclinm.2023.102255
4. MoH U. Uganda Population-based HIV Impact Assessment(UPHIA) 2020-2021. 2022.
5. UNAIDS. *Global HIV Statistics,Geneva: Joint United Nations Programme on HIV/AIDS*; 2023.
6. Organization WH. Policy brief: updates of recommendations on first and second-line antiretroviral regimens. 2019.
7. Consolidated guidelines for the prevention and treatment of HIV in Uganda. 2018.
8. Bailin SS, Koethe JR. Diabetes in HIV: the link to weight gain. *Current HIV/AIDS Reports*. 2022;20(1):9–18. doi:10.1007/s11904-022-00642-w
9. Lamorde M, Atwiine M, Owarwo NC, et al. Dolutegravir-associated hyperglycaemia in patients with HIV. *Lancet HIV*. 2020;7(7):e461–e462. doi:10.1016/s2352-3018(20)30042-4
10. Namara D, Schwartz JI, Tusubira AK, et al. The risk of hyperglycemia associated with use of dolutegravir among adults living with HIV in Kampala, Uganda: a case-control study. *Int J STD AIDS*. 2022;33(14):1158–1164. doi:10.1177/09564624221129410
11. O'Halloran JA, Sahrmann J, Parra-Rodriguez L, et al. Integrase strand transfer inhibitors are associated with incident diabetes mellitus in people with human immunodeficiency virus. *Clinl Infect Dis*. 2022;75(12):2060–2065. doi:10.1093/cid/ciac355
12. Shah S, Hindley L, Hill A. Are new antiretroviral treatments increasing the risk of weight gain? *Drugs*. 2021;81(3):299–315. doi:10.1007/s40265-020-01457-y
13. Noubissi EC, Katte J-C, Sobngwi E. Diabetes and HIV. *Curr Diabet Rep*. 2018;18(11). doi:10.1007/s11892-018-1076-3
14. Nzuza S, Zondi S, Hurchund R, Owira PMO. Highly active antiretroviral therapy-associated metabolic syndrome and lipodystrophy: pathophysiology and current therapeutic interventions. *J Endocrinol Metabol*. 2017;7(4):103–116. doi:10.14740/jem364w
15. Sarkar S, Brown TT. Diabetes in people with HIV. *Curr Diabet Rep*. 2021;21(5). doi:10.1007/s11892-021-01382-8

16. Lee PG, Halter JB. The pathophysiology of hyperglycemia in older adults: clinical considerations. *Diabetes Care*. 2017;40(4):444–452. doi:10.2337/dc16-1732
17. Beibei M, Jianing Y, Shu Z, Xiaonan G, Yuanyuan G, Jie G. Public health risks of pathogenic fungi in China. *iFungi*. 2026;1(1). doi:10.26599/iFungi.2026.9670003
18. Mulindwa F, Castelnuovo B, Brusselaers N, et al. Dolutegravir use over 48 weeks is not associated with worsening insulin resistance and pancreatic beta cell function in a cohort of HIV-infected Ugandan adults. *AIDS Res Ther*. 2023;20(1). doi:10.1186/s12981-023-00564-6
19. Laboratory M. Mbarara regional referral hospital records. 2023.
20. Committee ADAPP. 2. Diagnosis and classification of diabetes: standards of care in diabetes—2024. *Diabetes Care*. 2023;47(Suppl 1):S20.
21. Esber AL, Chang D, Iroezindu M, et al. Weight gain during the dolutegravir transition in the African Cohort Study. *J Int AIDS Society*. 2022;25(4). doi:10.1002/jia2.25899
22. Ying Z, Li X, Chen Y. Artificial intelligence in glycemic management for diabetes: applications, opportunities and challenges. *J Translat Internal Med*. 2025;13(4):314–317. doi:10.1515/jtim-2025-0039
23. Zhou J, Park S, Dong S, Tang X, Wei X. Artificial intelligence-driven transformative applications in disease diagnosis technology. *Medical Rev*. 2025;5(5):353–377. doi:10.1515/mr-2024-0097

HIV/AIDS - Research and Palliative Care

Dovepress
Taylor & Francis Group

Publish your work in this journal

HIV/AIDS - Research and Palliative Care is an international, peer-reviewed open-access journal focusing on advances in research in HIV, its clinical progression and management options including antiviral treatment, palliative care and public healthcare policies to control viral spread. The manuscript management system is completely online and includes a very quick and fair peer-review system, which is all easy to use. Visit http://www.dovepress.com/testimonials.php to read real quotes from published authors.

Submit your manuscript here: https://www.dovepress.com/hivaids—research-and-palliative-care-journal