24-Month Outcomes of Cabotegravir Plus Rilpivirine Long-Acting Every 2 Months in a Real-World Setting: Effectiveness, Adherence to Injections, and Patient-Reported Outcomes From People With HIV-1 in the German CARLOS Study

TUPEB035

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Key Takeaways

- We present the Month 24 outcomes for CARLOS, a non-interventional, 3-year, multicenter, prospective study evaluating outcomes for PWH receiving daily oral ART who switched to CAB + RPV LA Q2M in routine clinical care in Germany.
- CAB + RPV LA Q2M demonstrated high rates of virologic suppression, with low rates (2%) of virologic failure in the first 24 months following switch from daily oral ART.
- The majority of participants were adherent to injections in routine clinical practice, with 94% of injections administered within the dosing window or earlier.
- Switching to CAB + RPV LA Q2M was well tolerated and improved treatment satisfaction over 24 months, with most (99%) participants preferring LA therapy, primarily due to convenience and alleviations of adherence concerns.

Background

- Cabotegravir plus rilpivirine (CAB + RPV) is recommended by treatment guidelines for the maintenance of HIV-1 virologic suppression in people living with HIV (PWH) as the first complete long-acting (LA) regimen.[1–3]
- CAB + RPV LA offers less frequent dosing than daily oral antiretroviral therapy (ART) and is recognized by international treatment guidelines for its potential to improve individual quality of life.[1]
- The noninferior efficacy of CAB + RPV LA has been established in five large Phase 3/3b randomized noninferiority trials;[4–8] however, real-world data help to better understand utilization and clinical outcomes among broader groups of PWH.
- CARLOS is a non-interventional, 3-year, multicenter, prospective study in PWH on suppressive daily oral ART who switched to CAB + RPV LA dosed every 2 months (Q2M) via gluteal intramuscular injections in routine clinical care in Germany.
  - In CARLOS, CAB + RPV LA maintained high levels of effectiveness and was well tolerated in the first 12 months following switch from daily oral therapy to CAB + RPV LA.[9]
- Here, we present outcomes at Month 24 of the CARLOS study.

Methods

- In line with the European label, eligible participants had documented HIV-1 infection and were virologically suppressed (HIV-1 RNA <50 c/mL) on a stable ART regimen.[10,11] Participants were excluded if they had present or past evidence of viral resistance to, or prior treatment failure with, non-nucleoside reverse transcriptase inhibitors (NNRTIs) or integrase strand transfer inhibitors (INSTIs).[10,11]
- The intention-to-treat analysis population included participants who reached the Month 24 window, as well as those who discontinued treatment but would have reached Month 24 at the time of data cut-off (November 4, 2024).
- Participant demographic data were collected from medical records during routine clinical care, and patient-reported outcomes were assessed via questionnaires.
- Endpoints assessed at Month 24 included:
  - Proportion of participants with virologic suppression (HIV-1 RNA <50 c/mL).
  - Proportion of participants with virologic non-response (HIV-1 RNA ≥50 c/mL).
  - Incidence of protocol-defined virologic failure (PDVF; two consecutive HIV-1 RNA ≥200 c/mL or a single HIV-1 RNA ≥200 c/mL followed by discontinuation for any reason).
  - Adherence to injection schedule.
  - Tolerability.
  - Patient-reported outcomes:
    - Reasons for switch, treatment satisfaction (12-item HIV Treatment Satisfaction Questionnaire status version [HIVTSQs]) and treatment preference (preference questionnaire [single question]).
- A *post hoc* analysis using a Wilcoxon signed-rank test was performed to determine the change in total treatment satisfaction (HIVTSQs) from baseline to Month 24 for participants who completed the survey at both timepoints.
- For exploratory questions, the number of participants included in the analysis reflects the number of participants who completed the survey at the timepoint of interest.

Results

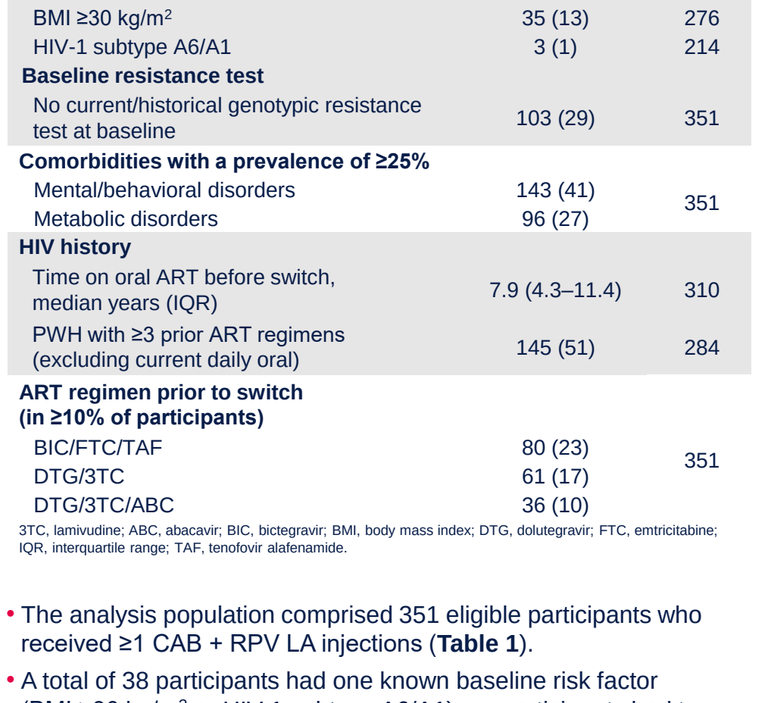
Table 1. Baseline Characteristics

n (%) unless stated otherwise	CAB + RPV LA Q2M	n
Age		
Median years (IQR)	42 (35–50)	351
<50 years	260 (74)	
50–65 years	88 (25)	
>65 years	3 (<1)	
Sex at birth		
Male	332 (95)	351
Baseline risk factors		
BMI ≥30 kg/m^2	35 (13)	276
HIV-1 subtype A6/A1	3 (1)	214
Baseline resistance test		
No current/historical genotypic resistance test at baseline	103 (29)	351
Comorbidities with a prevalence of ≥25%		
Mental/behavioral disorders	143 (41)	351
Metabolic disorders	96 (27)	
HIV history		
Time on oral ART before switch, median years (IQR)	7.9 (4.3–11.4)	310
PWH with ≥3 prior ART regimens (excluding current daily oral)	145 (51)	284
ART regimen prior to switch (in ≥10% of participants)		
BIC/FTC/TAF	80 (23)	351
DTG/3TC	61 (17)	
DTG/3TC/ABC	36 (10)	

3TC, lamivudine; ABC, abacavir; BIC, bictegravir; BMI, body mass index; DTG, dolutegravir; FTC, emtricitabine; IQR, interquartile range; TAF, tenofovir alafenamide.

- The analysis population comprised 351 eligible participants who received ≥1 CAB + RPV LA injections (**Table 1**).
- A total of 38 participants had one known baseline risk factor (BMI ≥30 kg/m^2 or HIV-1 subtype A6/A1); no participants had two known risk factors.[12]
  - Additionally, a resistance test was not available for nine of these participants at baseline.

Figure 1. Virologic Outcomes at Month 24



- At Month 24, 77.5% (n=272/351) of participants maintained virologic suppression and 19.9% (n=70/351) discontinued or had no data in window with last available viral load <50 c/mL (LOCF; **Figure 1A**).
- When examining the last known viral load at Month 24 or at discontinuation (LOCF), 97.7% (n=343/351) of participants maintained virologic suppression (**Figure 1B**).

*Preferred oral ART, n=16; appointment compliance concerns, n=3; found more frequent visits inconvenient, n=2; other reason, n=9; withdrawal of consent, n=3; death, n=1. †Includes one participant who met PDVF and resuppressed on CAB + RPV LA at subsequent visits.
ISR, injection site reaction; LOCF, last observation carried forward; LTFU, lost to follow-up.

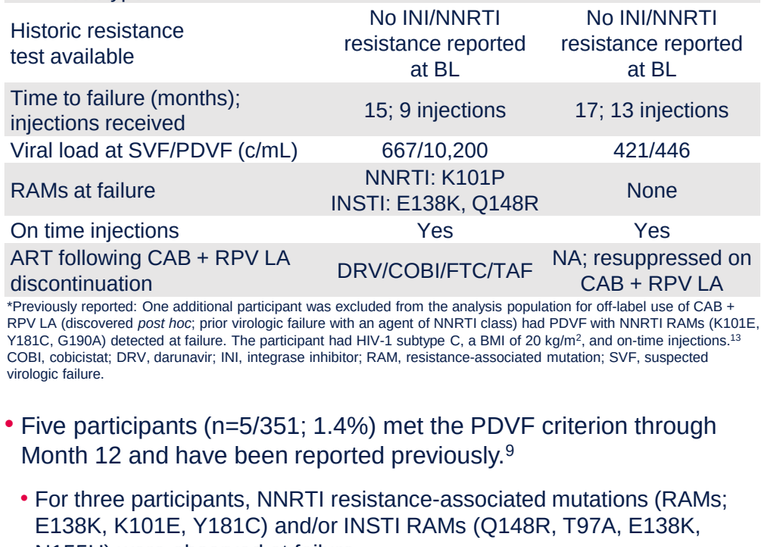
Table 2. Summary of Participants With PDVF from Month 12 to 24*

	Participant 1	Participant 2
Sex at birth, age (year)	Male, 43	Male, 37
Baseline BMI (kg/m^2)	20	24
HIV-1 subtype	B	B
Historic resistance test available	No INI/NNRTI resistance reported at BL	No INI/NNRTI resistance reported at BL
Time to failure (months); injections received	15; 9 injections	17; 13 injections
Viral load at SVF/PDVF (c/mL)	667/10,200	421/446
RAMs at failure	NNRTI: K101P INSTI: E138K, Q148R	None
On time injections	Yes	Yes
ART following CAB + RPV LA discontinuation	DRV/COBI/FTC/TAF	NA; resuppressed on CAB + RPV LA

*Previously reported: One additional participant was excluded from the analysis population for off-label use of CAB + RPV LA (discovered *post hoc*; prior virologic failure with an agent of NNRTI class) had PDVF with NNRTI RAMs (K101E, Y181C, G190A) detected at failure. The participant had HIV-1 subtype C, a BMI of 20 kg/m^2, and on-time injections.[13]
COBI, cobicistat; DRV, darunavir; INI, integrase inhibitor; RAM, resistance-associated mutation; SVF, suspected virologic failure.

- Five participants (n=5/351; 1.4%) met the PDVF criterion through Month 12 and have been reported previously.[9]
  - For three participants, NNRTI resistance-associated mutations (RAMs; E138K, K101E, Y181C) and/or INSTI RAMs (Q148R, T97A, E138K, N155H) were observed at failure.
- Two additional participants met the PDVF criterion between Month 12 and Month 24 (**Table 2**).
  - For one participant, PDVF classification was based upon two viral load measurements ≥200 c/mL taken 2 days apart at injection 10. The participant then resuppressed on CAB + RPV LA at subsequent visits (with all 3 viral load measurements <20 c/mL) and successfully completed the study at injection 19.
  - The other participant had NNRTI resistance-associated mutations (RAMs; K101P) and INSTI RAMs (E138K, Q148R) at failure.

Figure 2. Adherence to ±7-day Dosing Window (Injections 2–13)



- 94% (n=3464/3676) of CAB + RPV LA maintenance injections were administered within the dosing window (88%,n=3231/3676) or earlier (6%, n=233/3676); 6% (n=212/3676) occurred late (**Figure 2**).
- The most common reasons for injection deviations were missed appointments (n=113) and other reasons (n=77).
- Oral therapy was administered on 22 occasions to cover delayed/missed doses for a median (IQR) duration of 3.1 weeks (1.4–4.9).
  - The most frequently used oral therapy regimens were CAB + RPV (n=6), BIC/FTC/TAF (n=4), and DTG/3TC (n=3).
- Ten participants received new loading doses due to delayed injections.

Table 3. Drug-related AEs and ISRs Through Month 24

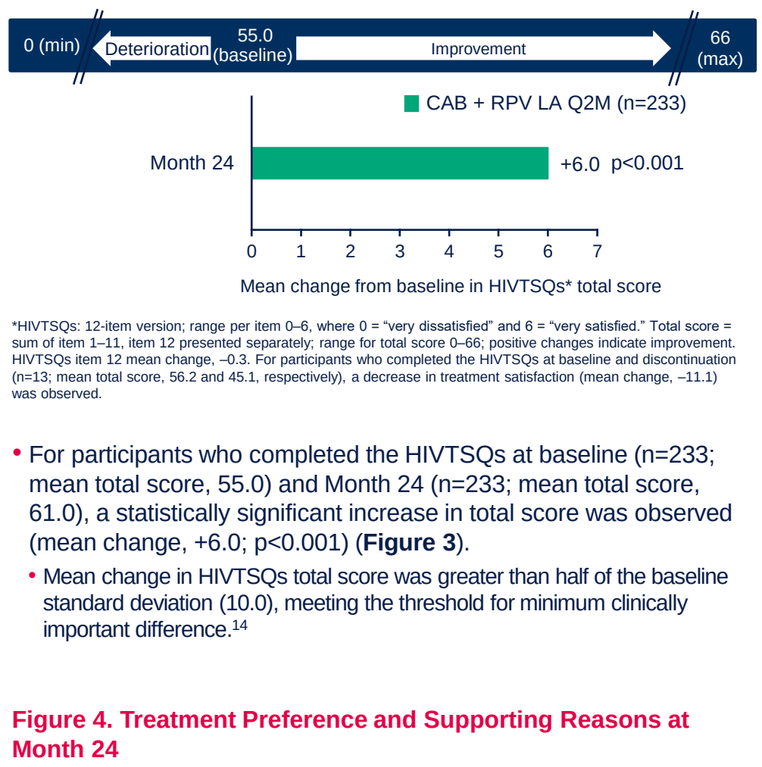
Drug-related AEs (excluding ISRs)	CAB + RPV LA Q2M n=351
Drug-related AEs, n	54
Grade 1–2 events	52
Grade 3 events	2
Serious drug-related AEs, n	1*
Discontinuation due to drug-related AEs, n (%)	6†

ISRs	CAB + RPV LA Q2M (M0–M12) n=351	CAB + RPV LA Q2M (M12–M24) n=351
Number of injections, n	2294	1733
ISR events, n	268	102
Pain, n (% of injections)‡	233 (10)	81 (5)
Nodule, n (% of injections)‡	13 (<1)	2 (<1)
Swelling, n (% of injection)‡	11 (<1)	0
Grade 3 events, n (% of ISR events)	4 (1)	0
Median duration (IQR), days	3 (2–6)	3 (2–6)
Discontinuation due to ISRs, n (%)	13 (4)§	3 (<1)¶

*Anxiety disorder, n=1. †Headache (Grade 2, n=1), syncope (Grade 2, n=1), anxiety disorder (Grade 3, n=1), pyrexia (Grade 2, n=2), and joint swelling/arthralgia (Grade 3, n=1). ‡Top 3 most commonly reported ISRs listed. Participants may have multiple ISR events following a single injection. §Includes 10 participants who withdrew with the primary reasons as no longer tolerating injection pain/ISRs. Three additional participants withdrew citing injection-related reasons/ISRs as a secondary reason (patient prefers oral ART, n=1; safety/tolerability concerns other than ISRs, n=1; withdrawal of consent, n=1). ¶All three participants withdrew due to no longer tolerating injection pain/ISR.
AE, adverse event; M, month.

- The most common (≥3 events) non-serious drug-related adverse events, excluding injection site reactions (ISRs), were pyrexia (n=20), pain (n=10), nausea (n=5), pain in extremity (n=4), fatigue (n=3), headache (n=3), and sleep disorder (n=3).
- Most ISRs were Grade 1–2 (n=366/370; 99%).
  - Pain was the most common ISR reported, with few participants (5%) discontinuing due to injection-related reasons (**Table 3**).

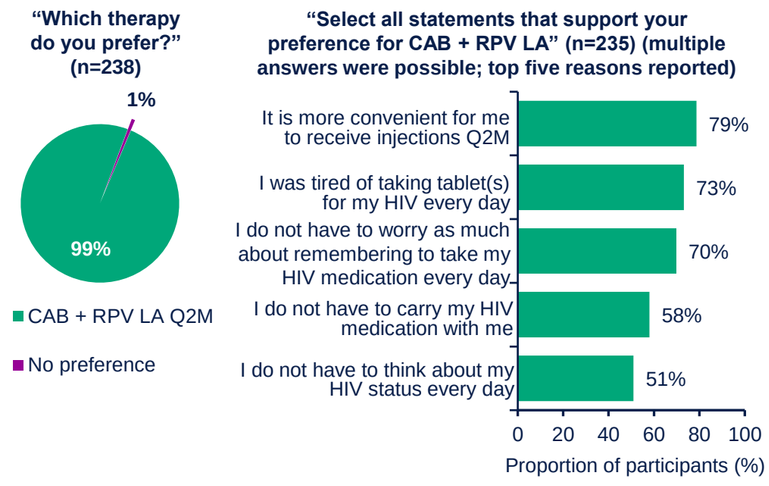
Figure 3. Change in Total Treatment Satisfaction (HIVTSQs) at Month 24



*HIVTSQs: 12-item version; range per item 0–6, where 0 = "very dissatisfied" and 6 = "very satisfied." Total score = sum of item 1–11, item 12 presented separately; range for total score 0–66; positive changes indicate improvement. HIVTSQs item 12 mean change, –0.3. For participants who completed the HIVTSQs at baseline and discontinuation (n=13; mean total score, 56.2 and 45.1, respectively), a decrease in treatment satisfaction (mean change, –11.1) was observed.

- For participants who completed the HIVTSQs at baseline (n=233; mean total score, 55.0) and Month 24 (n=233; mean total score, 61.0), a statistically significant increase in total score was observed (mean change, +6.0; p<0.001) (**Figure 3**).
  - Mean change in HIVTSQs total score was greater than half of the baseline standard deviation (10.0), meeting the threshold for minimum clinically important difference.[14]

Figure 4. Treatment Preference and Supporting Reasons at Month 24



- At Month 24, CAB + RPV LA was preferred by 99% (n=235/238) of participants responding to the preference questionnaire; 1% (n=3/238) reported no preference (**Figure 4**).
- Supporting reasons for LA treatment preference included convenience (n=185/235 [79%]), being tired of taking tablet(s) every day (n=172/235 [73%]), and not having to worry about remembering to take HIV medicine (n=164/235 [70%]).
- For the 13 participants who responded to the preference questionnaire at treatment discontinuation, 69% (n=9/13) indicated a preference for daily oral HIV medication with the remaining participants preferring CAB + RPV LA (31% [n=4/13]); supporting reasons for daily oral therapy preference included aversion to injection (78% [n=7/9]).

Conclusions

- In the real-world CARLOS study, CAB + RPV LA was highly effective and was well tolerated 2 years following switch from daily oral therapy, consistent with data collected in Phase 3/3b clinical trials.[15,16]
  - Virologic failure was infrequent.
  - Participants demonstrated high rates of adherence to injection visits.
  - Most ISRs were mild to moderate in severity and infrequently led to withdrawal.
- Most participants preferred CAB + RPV LA at Month 24, primarily due to the higher convenience of Q2M injections vs. oral therapy and having fewer concerns about adherence.
- Additionally, the increase in treatment satisfaction for participants remaining on CAB + RPV LA was deemed to be clinically important.

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References: 1. U.S. Department of Health and Human Services. Guidelines for the Use of Antiretroviral Agents in Adults and Adolescents with HIV. 2024. Available from: https://clinicalinfo.hiv.gov/sites/default/files/guidelines/documents/adult-adolescent-arv/guidelines-adult-adolescent-arv.pdf. Accessed May 2025. **2.** European AIDS Clinical Society. Guidelines Version 12.1. 2024. Available from: https://eacs.sanfordguide.com. Accessed May 2025. **3.** Rajesh T, et al. *JAMA*. 2025;333(7):609–628. **4.** Orkin C, et al. *N Engl J Med*. 2020;382(12):1124–1135. **5.** Overton ET, et al. *Lancet*. 2021;96(10267):1994–2005. **6.** Swindells S, et al. *N Engl J Med*. 2020;382(12):1112–1123. **7.** Ramgopal MN, et al. *Lancet HIV*. 2023;10(9):e566–e577. **8.** Kityo C, et al. *Lancet Infect Dis*. 2024;24(10):1083–1092. **9.** Jonsson-Oldenbüttel C, et al. IAS 2024; Poster TUPEB095. **10.** European Medicines Agency. Vocabria Product Information. 2025. Available from: https://www.ema.europa.eu/en/documents/product-information/vocabria-epar-product-information_en.pdf. Accessed May 2025. **11.** European Medicines Agency. Rekambys Product Information. 2025. Available from: https://www.ema.europa.eu/en/documents/product-information/rekambys-epar-product-information_en.pdf. Accessed May 2025. **12.** Cutrell AG, et al. *AIDS*. 2021;35(9):1333–1342. **13.** Borch J, et al. HIV Glasgow 2022 (Presentation O43). **14.** Sedaghat AR. *Otolaryngol Head Neck Surg*. 2019;161(4):551–560. **15.** Orkin C, et al. *Lancet HIV*. 2021;8(4):e185–e196. **16.** Jaeger H, et al. *Lancet HIV*. 2021;8(11):e679–e689.

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