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Real world community-based HIV Rapid Start Antiretroviral with B/F/TAF versus prior models of antiretroviral therapy start – the RoCHaCHa study, a pilot study

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Abstract

Background The rapid start of antiretroviral therapy (RSA) model initiates antiretroviral therapy (ART) as soon as possible after a new or preliminary diagnosis of HIV, in advance of HIV-1 RNA and other baseline laboratory testing. This observational study aims to determine if RSA with a single tablet regimen of bictegravir, emtricitabine, and tenofovir alafenamide (B/F/TAF) is an e□ective regimen for achieving viral suppression and accepted by patients at the time of diagnosis.

Methods Adults newly or preliminarily diagnosed with HIV were enrolled from October 2018 through September 2021. Real world advantage, measured in days between clinical milestones and time to virologic suppression, associated with B/F/TAF RSA was compared to historical controls.

Results All Study RSA participants ($n = 45$) accepted treatment at their □rst visit and 43(95.6%) achieved virologic suppression by week 48. Study RSA participants had a signi□cantly shorter time (median 32 days) from diagnosis to ART initiation and virologic suppression, in comparison to historical controls (median 181 days) ($n = 42$). Qualitative feedback from study RSA participants showed high acceptance positive response to RSA.

Conclusions RSA is feasible and well accepted by patients in a real-world community-based clinic setting. Promoting RSA in community-based clinics is an important tool in ending the HIV epidemic.

Keywords HIV, ART, Rapid start ART, Community-based health care, HIV viral load suppression

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Background

Trillium Health (Trillium) is a community health center in Rochester, NY with a more than 30-year legacy of HIV prevention and treatment. Trillium serves about 850 people living with HIV and maintains several robust programs as part of New York State's initiative to End the

Baseline characteristics were compared between the study and control groups to assess equivalence.

Treatment adherence and retention in care were assessed in the study group only. Treatment adherence was measured as proportion of days covered based on pharmacy dispense data [20]. Retention in care was measured as the number of patients still on study at 48 weeks.

Statistical analysis

Statistical analysis was completed using R programming [21]. All continuous variables were analyzed using Kruskal-Wallis or Wilcox rank test. e Fisher exact test was used to analyze categorical variables. A minimum study population size of 26 participants was deemed su cient for a single-center pilot study, based on the number of treatment naïve PLWH who presented to Trillium in the preceding years; powered at 0.8 [22]. e population size was later expanded to 45 as a reflection of the increase in new diagnoses being seen at Trillium. e historical control population size was made to be similar to the study size by reviewing how many newly diagnosed patients presented each month prior to RSA initiation at Trillium and selecting the date range that met our population size needs.

Care team

A multidisciplinary team of providers, care managers, pharmacists, STI testing and prevention specialists, and clinical laboratory services collaborated to create a consistent approach to RSA for all patients. Initial rapid point-of-care HIV testing was performed by Trillium's STI testing specialists. ese testing specialists complete thorough training and annual formal observations to ensure they are proficient at performing point-of-care HIV testing and are prepared to deliver results to patients.

e standard of care at Trillium includes care managers performing a comprehensive needs assessment during a new patient's first visit to identify and address barriers to care and adherence. Care managers also connect patients with internal and community supportive services to address identified barriers. Internal supportive services available at Trillium include insurance enrollment and navigation, transportation assistance, food pantry access, housing support, and medication-assisted treatment (MAT). Community resources include legal aid services, employment services, and domestic violence programs.

An in-house pharmacy at Trillium provides same-day pick up, couriered, and mail delivered prescription medications. e pharmacists also monitor records of patients taking ART to ensure they have valid prescriptions for refills and have obtained their medications, providing another layer of adherence monitoring and support.

Having a clinical laboratory service which includes a phlebotomy center adjacent to Trillium's main clinic allows convenient access for patients.

Clinical and laboratory evaluations

Participants underwent clinical and laboratory evaluations at the time of enrollment and at subsequent follow-up visits according to the protocol in Appendix A, utilizing commercially available and validated assays. e rapid point-of-care HIV tests used are fourth generation (Determine™ HIV–1/2 Ag/Ab Combo immunoassay, Alere Inc.). e laboratory completes HIV-1 viral load quantification (COBAS 8800 system, Roche Diagnostics) and combined drug resistance and genotyping (GenoSure PRIme assay, Monogram Biosciences).

Study oversight

e study protocol was reviewed and approved by an

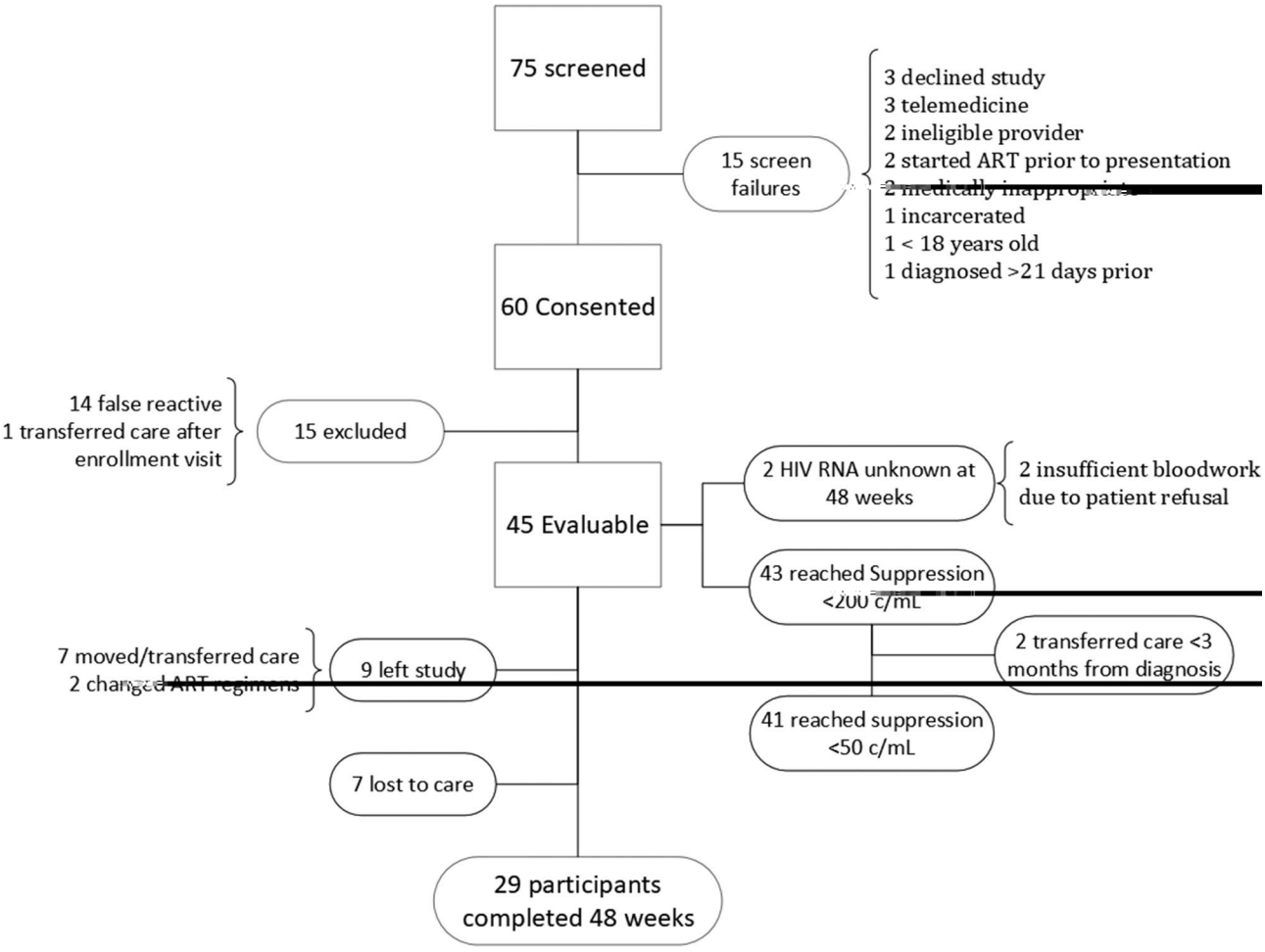

Fig. 1 Screening, enrollment, and retention owchart

department visit or hospital admission (5), the local Department of Health STI Clinic (4), a local university's health center (2), or an over the counter at-home HIV test (1).

ere were no statistically significant di erences in baseline characteristics between the study RSA and historical control groups (Table 1).

False reactive tests

Fourteen of the 60 (23.3%) consented participants who had reactive point-of-care tests were determined to be HIV-negative upon confirmatory testing. All fourteen participants discontinued B/F/TAF, and three (21.4%) patients initiated oral PrEP within seven days of receiving their confirmatory negative HIV-1 RNA test results. No adverse events were reported while these patients were on B/F/TAF in absence of an HIV infection.

Treatment initiation

e median number of days between HIV diagnosis and clinic presentation in the RSA group was significantly lower than that of the historical control group (Table 2).

is same truncation was seen in time from clinic presentation to ART initiation. Commensurate with the preceding, time from diagnosis to ART initiations was significantly shorter in the study RSA group than in the non-RSA control group. In the study RSA group, 33 (76%) participants initiated ART within 3 days of their diagnosis.

All study RSA participants were on B/F/TAF for the entirety of their time on study. e non-RSA historical control patients were on a variety of regimens, with the largest proportion (45.2%) being on a single tablet regimen of elvitegravir, cobicistat, emtricitabine, and tenofovir (TDF or TAF; Appendix B).

Virologic outcomes

ere were no virologic failures noted through 48 weeks for those on B/F/TAF. Genotype testing was successfully completed for 39 (86.6%) participants during their time on study. e median time from diagnosis to receiving genotype laboratory results was 23 days (IQR 20–31

Table 1 Baseline characteristics of study RSA and historical non-RSA control

Baseline characteristics	Study RSA ($n=45$)	Non-RSA control ($n=42$)	*P* value
Age at diagnosis, mean (SD)	31.7 (9.4)	37.7 (14.0)	0.093
Sex at birth = male, n (%)	43 (95.6%)	36 (85.7%)	0.148
Gender identity = male, n (%)	35 (77.8%)	33 (78.6%)	1.000
Sexual orientation = gay, n (%)	26 (57.8%)	20 (47.6%)	0.394
HIV viral load prior to ART initiation, median (IQR), $\log_{10}$ copies/mL	4.4 (3.8–5.1)	4.5 (4.1–5.1)	0.865
HIV viral load prior to ART initiation, median (IQR), copies/mL	49,158 (5,949 – 140,000)	31,500 (13,925 – 118,250)	0.865
Patients with HIV viral load prior to ART initiation ≥ 100,000 copies/mL, n (%)	13 (28.9%)	12 (28.6%)	1.000
Race, n (%)			
Race = white	25 (55.6%)	20 (47.6%)	0.523
Race = black	17 (37.8%)	18 (42.9%)	0.667
Race = other	1 (2.2%)	4 (9.5%)	0.154
Ethnicity, n (%)			
Ethnicity = Non-Hispanic/Latinx	31 (68.9%)	36 (85.7%)	0.077
Ethnicity = Hispanic/Latinx	11 (24.4%)	6 (14.3%)	0.285
Ethnicity = unreported	3 (6.7%)	0 (0.0%)	0.242
CD4 cells/mm^3 prior to ART initiation, median (IQR)	458 (285–652)	381 (289–552)	0.290
CD4 < 200 cells/mm^3 prior to ART initiation, n (%)	3 (6.7%)	5 (11.9%)	0.475

Table 2 Clinic presentation and ART initiation of study RSA and historical non-RSA control

Outcomes	Study RSA $n=45$	Non-RSA Control $n=42$	*P* value
Diagnosis to clinic presentation, median (IQR)	0.0 (0.0–3.0) days	10.0 (5.0–34.75) days	< 0.001
Clinic presentation to ART, median (IQR)	0.0 (0.0–0.0) days	42.0 (28.25–64.75) days	< 0.001
Diagnosis to ART initiation, median (IQR)	0.0 (0.0–3.0) days	53.0 (42.25–95.25) days	< 0.001

Table 3 Time to virologic suppression in study RSA and historical non-RSA control

Outcomes	Study RSA $n=43$	Non-RSA Control $n=42$	*P* value
Diagnosis to viral load < 200 copies/mL, median (IQR)	21.0 (11.0–31.0) days	112 (81.5–196.0) days	< 0.001
ART to viral load < 200 copies/mL, median (IQR)	16.0 (9.0–29.0) days	34.5 (30.25–73.50) days	< 0.001
Diagnosis to viral load < 50 copies/mL, median (IQR)	32.0 (19.0–56.0) days*	181.0 (110.5–279.8) days	< 0.001
ART to viral load < 50 copies/mL, median (IQR)	28.0 (13.0–56.0) days*	62.0 (34.0–173.5) days	< 0.001

*$n=41$

days). Among the 39 patients, transmitted drug resistance mutations were present in 10 (25.6%), 8 (20.5%) of which included a major NNRTI mutation. No participants had transmitted INSTI resistance. One participant had genotype results showing a resistance mutation (M184V) against emtricitabine after reaching viral suppression on B/F/TAF. No participants switched regimens due to genotype results. Two participants voluntarily changed regimens after reaching viral suppression, one for gastrointestinal side e ects and the other because of a preference for a long-acting injectable.

Forty-three (95.6%) study participants had a documented viral load of <200 copies/mL by week 48. e remaining 2 participants had an unknown viral load because of patient refusal of laboratory tests. Forty-one (91.1%) reached<50 copies/mL while on study; the additional 2 participants who did not reach<50 copies/mL ended study participation less than 3 months after diagnosis.

We compared the viral suppression outcomes of a historical non-RSA population ($n=42$) to those of our study population. We found the durations from HIV diagnosis to viral suppression<200 copies/mL and <50 copies/mL were shorter in RSA patients than in non-RSA patients ($p<0.001$; Table 3).

Furthermore, the times from ART initiation to viral suppression to <200 copies/mL and to <50 copies/mL were shorter in RSA patients than in non-RSA patients ($p<0.001$). In the study group, 36 (80.0%) participants achieved virologic suppression in 30 days or less from ART initiation. All participants who achieved virologic suppression while on study did so in less than 6 months (maximum 163 days) from ART initiation.

Retention in care and treatment adherence

Twenty-nine (64.4%) participants were still engaged in study at 48 weeks. Nine participants left the study before 48 weeks because they transferred care (7) or changed regimens (2). Seven (15.5%) participants were considered lost to care at 48 weeks because they did not present for the final study visit. e median treatment adherence was 93.4% (interquartile range 76.5 −99.4%), based on pharmacy dispense data.

Patient acceptance of RSA

All enrolled participants started ART the same day as their first appointment. Twenty-seven participants completed the end of study questionnaire. Participant responses regarding how they felt starting ART immediately after their diagnosis were reviewed and several common themes were identified. e first and most common theme was general positivity, defined by feeling happy, good, supported, or relieved at starting ART. e second theme was an expressed readiness to start or not wanting to "waste time" before starting medication. e third theme was a sense of responsibility, which was often defined by the participant feeling ART initiation was the right thing to do for their health. Lastly, some participants expressed being overwhelmed by the diagnosis, but trusted the provider's advice to start medication.

When asked how we could improve the rapid start process, the majority (21) of participants had no suggestions. ree participants suggested we have fewer team members at the first appointment.

Real-world considerations

Of the 27 participants who completed the end of study questionnaire, 17 (62.9%) identified at least one barrier to care they experienced over the course of the study. e median number of barriers identified was 2 per participant. e most common barrier to care was lack of stable transportation (Table 4).

In March 2020, the COVID-19 pandemic significantly changed operations at the clinical site. e study protocol was amended to allow for virtual visits and delayed laboratory results. Study appointments transitioned from clinic visits to a majority telemedicine appointments, and participants without phones were given a phone through our Care Management program to complete their appointments. Participants were initially encouraged to delay completing bloodwork due to risk of exposure to COVID-19, but were able to complete STI testing via at home test kits that included self-swabs and a prepaid return envelope. Trillium provided free pharmacy delivery to the patients' homes or location of their choosing. Patients who were homeless or unstably housed could pick up their medication "curbside," with no direct contact.

Table 4 Barriers to care in study RSA participants

Barrier to Care Identi□ed	Study RSA Completed Questionnaire, *n* = 27
Unreliable source of transportation, n (%)	11 (40.7%)
Unstable housing, n (%)	10 (37.0%)
Food insecurity, n (%)	7 (25.9%)
Lack of insurance or underinsurance, n (%)	6 (22.2%)
Behavioral health concerns, n (%)	5 (18.5%)
Substance use, n (%)	5 (18.5%)

Discussion

is study shows that RSA is an e ective model of care in a community health center setting and supports its role in ending the HIV epidemic. A daily single tablet regimen of B/F/TAF was e ective for 95.6% participants to reach undetectable viral load in less than 6 months of ART initiation, despite variation in regimen adherence. Consistent with the literature [3–12], our study demonstrates that RSA shortens the amount of time from an initial HIV diagnosis to the ART initiation, consequently shortening the time from diagnosis to viral suppression. More rapid and sustained virologic suppression decreases opportunity for transmission. Some previous studies have not seen significant changes in time from ART initiation to viral suppression [8, 11] however, our study did show a shorter time from ART initiation to viral suppression.

e success of any treatment model depends on patients' acceptance. Participants in this study were very agreeable to RSA. All study participants o ered ART at their first visit accepted it. e standard questionnaire given at study completion showed participants were comfortable with the RSA process. Demonstrating patient acceptance in the diverse population from a community health center is important to getting other community providers to feel comfortable o ering RSA to their patients.

Over the course of the study, we noted fourteen false reactive rapid point-of-care tests. Further analysis showed that these false reactive tests account for less than 0.2% of the tests performed at Trillium during the study time frame, which is within the published specificity rate [23]. Since the testing specialists are most often the patients' first point of contact, it is important they are proficient in their testing role and promote confidence in the care team.

As a multidisciplinary community health center, Trillium was well positioned to take on this pilot study given its 30-year legacy in HIV prevention and treatment, and long-standing culture of early HIV intervention. Experience combined with evaluation of our programs supports our ability to navigate changing healthcare landscapes.

In the wake of the COVID-19 crisis, Trillium had to create and implement new ways to care for PLWH. ough challenging, care was minimally interrupted, and study participants who were virally suppressed before the pandemic remained suppressed throughout. However, in various clinical settings, implementation and maintenance of RSA can present challenges. Provider availability can make it di cult to accommodate a new patient appointment on the same day. On-demand insurance navigation and enrollment services are necessary to provide HIV drug treatment at little to no cost for patients, which may not be available in all states. RSA requires the harmonized collaboration of service providers from

Data availability
The datasets generated and analyzed during this study are not publicly available due to patient privacy and the sensitive nature of data related to HIV status. De-identi□ed or limited data sets are available from the corresponding author (shilliard@trilliumhealth.org) on reasonable request.

Declarations

Ethics approval and consent to participate
This study protocol and informed consent forms were reviewed and approved by WCG IRB (Puyallup, WA). All participants provided written informed consent at their □rst visit before being enrolled on study.

Consent for publication
Not applicable.

Competing interests
During the study, author M.M. was on the speaker bureau for ViiV Healthcare and author W.V. was a speaker for Gilead Sciences. Author R.C. was a medical scientist who represented Gilead Sciences in this collaborative study. Authors J.S., A.Z., and M.M. were a□liated with Trillium Health at study initiation and during data collection, but not at time of publication. Author J.S. is currently a□liated with CHEMED, 1771 Madison Ave, Lakewood, NJ 08701. Author A.Z. is currently a□liated with US Medical A□airs, Merck Research Laboratories, Kenilworth, NJ 07033, United States. Author M.M. is currently a□liated with Rochester Regional Health, Rochester, NY, United States.

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References

1. New York State Department of Health. Ending the AIDS Epidemic in New York State. https://www.health.ny.gov/diseases/aids/ending_the_epidemic/ (2023). Accessed September 8, 2023.
2. O□ce of Infectious Disease and, Policy HIVAIDS. HHS: HIV.gov, Overview. https://www.hiv.gov/federal-response/ending-the-hiv-epidemic/overview (2023). Accessed September 8, 2023.
3. INSIGHT START Study Group, Lundgren JD, Babiker AG, et al. Initiation of antiretroviral therapy in early asymptomatic HIV infection. N Engl J Med. 2015;373(9):795–807. https://doi.org/10.1056/NEJMoa1506816.
4. Koenig SP, Dorvil N, Dévieux JG, et al. Same-day HIV testing with initiation of antiretroviral therapy versus standard care for persons living with HIV: a randomized unblinded trial. PLoS Med. 2017;14(7):e1002357.