Caregivers' preferences for home-based vs clinic-based pediatric HIV testing in Kenya

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Abstract

Caregivers' preferences for home-based vs clinic-based pediatric HIV testing in Kenya

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Background: Home-based HIV testing offers a convenient complement to clinic-based HIV testing. While sociodemographic predictors that drive adult choice of testing location are well-characterized, little is known about predictors that drive the choice of testing location for children of HIV positive parents.

Methods: Adults living with HIV and in care were offered a choice of home- (HBT) or clinic-based testing (CBT) for any of their children (age 0-12 years) of unknown HIV status. Excluding caregivers who tested accompanying children at the visit, multilevel generalized linear models were used to identify factors associated with choosing HBT or CBT for children. Factors considered included caregiver demographics, relationship status, caregiver and partner's HIV history, social support, cost; and child demographics and HIV prevention history.

Results: We included 244 caregivers living with HIV and their children of unknown HIV status. Most (72%) of caregivers tested children using CBT. In univariate analyses, female caregivers (RR: 0.54, 95% CI 0.34 – 0.86) were less likely to choose HBT than male, and single caregivers (RR: 0.39, 95% CI 0.17 – 0.89) were less likely to choose HBT than those having unsupportive

partners, while caregivers having more test-eligible children (RR: 1.24, 95% CI 1.05 – 1.46) were more likely to test at home than those having fewer test-eligible children. In multivariate analysis, associations with female caregivers (aRR: 0.50, 95% CI 0.32 – 0.78) and greater number of test-eligible children (aRR: 1.20, 95% CI 1.03 – 1.41) remained significant. Additionally, caregivers with HIV-negative partners (aRR: 1.94, 1.16 – 3.24) were more likely to choose HBT than those having HIV-positive partners. Supportive partners (RR: 1.64, 95% CI 1.10 – 2.45) and home-based testing (RR: 1.53, 95% CI 1.12 – 2.07) were associated with testing for all children versus some children.

Conclusion: Caregiver-level factors were more influential than child-level factors in caregiver choice of location for pediatric HIV testing. Home-based testing may be preferable to families with higher child care needs and may encourage pediatric HIV testing if offered as an alternative to clinic testing.

Title: Caregivers' preferences for home-based vs clinic-based pediatric HIV testing in Kenya

Introduction

Globally, there are an estimated of 1.8 million children living with HIV, and over 90% of these children reside in sub-Saharan Africa [1,2]. Prevention of mother-to-child transmission of HIV (PMTCT) programs, which began scaling up in the early 2000s, have reduced the number of new infant HIV infections and include routine testing for early infant diagnosis (EID). However, in 2018, only 63% of HIV-exposed infants in East and Southern Africa and 20% of infants in West and Central Africa were tested through EID within 8 weeks of life as recommended [2]. Low HIV testing coverage for children contributes to low coverage of antiretroviral therapy treatment (ART) for children, at 43% compared to 60% for adults [2].

While Kenyan national guidelines recommend provider-initiated testing (PITC) for all children when they present to a clinic, barriers and gaps in testing coverage persist [3]. Untreated children living with HIV have high morbidity and mortality [4–6], and delayed diagnosis and treatment until children are critically ill is associated with substantially higher mortality [7]. Thus, identifying children living with HIV early and linking them to treatment before they are symptomatic and hospitalized is critical to improve health outcomes.

Compared with community-based door-to-door testing or outreach testing, index case testing -- testing children who have HIV-positive siblings or parents -- is more efficient in identifying those children who are HIV-infected before they become symptomatic [3,8]. In a meta-analysis of this index case testing strategy, pooled HIV prevalence was 8.4%, but uptake of testing was suboptimal at 52% [3]. Understanding caregivers' decision-making processes may increase uptake of index case testing and accelerate the identification of undiagnosed children.

Home-based testing (HBT) has been offered to adults extensively and shows potential to reach missed populations, such as first-time testers and index case testing of family members [9–12]. Among adults, gender, age, relationship status, and HIV history are cofactors of choosing HBT, though the effect direction is mixed [12–14]. However, testing children for HIV is complicated by issues of consent, autonomy, delivery of results, and caregiver disclosure issues [15], and little is known about cofactors of choosing HBT for index case pediatric testing. Thus, evidence is needed to inform targeted HIV testing program decisions for children.

We aimed to determine caregiver- and child-level cofactors associated with pediatric HIV testing at home versus at clinic (Aim 1), to determine caregiver-level factor associated with complete testing for all eligible children (Aim 2), and to determine child-level factors associated with which child gets tested (Aim 3).

Methods

Study Design

This study used secondary cohort data collected from CATCH study in Kenya from 2013 – 2015 This study was approved by the University of Washington Institutional Review Board and the Kenyatta national Hospital/ University of Nairobi Ethics and Research Committee. Study design, recruitment, and enrollment have been described in detail previously [16]. Briefly, HIV-positive adults seeking HIV care were systematically screened to identify those with any children of unknown HIV status and were offered enrollment into the study. All adults provided written

informed consent for enrollment, completed an enrollment questionnaire that collected baseline demographic, HIV testing and care history, prevention of mother-to-child transmission of HIV (PMTCT) history, and cost data. At the end of the enrollment visit, caregivers were given a choice of whether to test their children at home or to bring their children to the clinic for HIV testing, either on the same day or at a later date. Caregivers who chose to test their children on the same day at the clinic were excluded from this analysis.

Study Participants

Caregivers were recruited from 3 public hospitals and 4 health centers in Nairobi and Kisumu, Kenya. Nairobi and Kisumu are primarily urban environments, but the recruitment clinics attracted patients from more outlying, rural regions as well. In 2018, the HIV prevalence in Nairobi and Kisumu adults were 6.1% and 16.3% respectively [17]. In 2012, when CATCH started, a national survey in Kenya revealed that only 41% of the children living with HIV 18 months to 14 years were diagnosed with HIV, leaving almost 60% undiagnosed [18].

Theoretical Model and Statistical Analysis

We identified a range of hypothesized caregiver-level and child-level factors associated with caregiver's pediatric HIV testing preferences using an adapted Andersen's model for health services utilization specifically adapted for pediatric HIV testing [19]. We considered the following caregiver-level cofactors: caregiver demographics, relationship status, caregiver and partner's HIV history, social support, and economic factors; and the following child-level cofactors: child demographics, place of birth (home or clinic), HIV exposure and prevention history (Figure 1).

We utilized multilevel generalized linear regression models (GLM) for univariate cofactor analysis for each aim. We calculated the relative risks (RR) for each cofactor using GLM with a log link and binomial family, adjusted for sites, and accounting for clustering at the family level for analyses with child-level variables. We checked collinearity between variables using cox fitting model. We conducted multivariate analysis using the same modeling techniques, including only those cofactors that had a p-value <0.1 in univariate analyses and excluded those had a collinearity over 10%. All analyses were conducted using Stata 14 (StataCorp, College Statin, TX).

Results

Of 493 caregivers approached, 492 agreed to test their eligible children, of whom 103 (20.9%) had the child with them at clinic and tested the child at that visit (Figure 2). Of the remaining 389 caregivers, 145 (37.2%) never tested child/ren, 176 (45.2%) brought child/ren back to clinic for CBT, and 69 (17.7%) had child/ren tested using HBT. Among the 244 caregivers who tested children, 72% used CBT.

A majority of the 244 caregivers included in this analysis were female, the median age was 34, and had completed primary education, were fairly recently diagnosed with HIV, and were currently receiving ART (Table 1). Among caregivers who had a partner, 55.1% of their partners were HIV-infected. More than half of the caregivers had more than one child of unknown status and 5% of the caregivers reported having known HIV-positive children.

Aim 1: Caregiver- and child-level cofactors for home-based testing vs clinic-based testing

A total of 374 children were tested; 252 (67%) were tested at clinic and 122 (33%) were tested at home. Caregiver demographics were associated with testing location (Table 2). Female caregivers (RR 0.54, 95% CI 0.34 - 0.09) were less likely to choose HBT than male caregivers. Single caregivers (RR 0.39, 95% CI 0.17 – 0.89) also had a lower likelihood than those with unsupportive partners to choose HBT. Caregivers having more children of unknown HIV status

(RR 1.24, 95%CI 1.05 – 1.46) had a higher likelihood of choosing HBT than those with less children. Caregiver and partner's HIV history, stigma, economic factors, and child-level factors were not found to be associated with testing location.

In multivariate models including cofactors that had a p-value <0.1 in univariate analyses and were not collinear, being a female caregiver (RR 0.50, 95% CI 0.32 – 0.78), having more young children (RR: 1.20, 95% CI 1.03 – 1.41) and having HIV negative partners (RR: 1.94, 95% CI 1.16 – 3.24) remained significant (Table 3).

Aim 2: Caregiver-level factors for testing all versus not all children

A total of 321 children were from 124 families who had more than one child. Among these 124 families, 51 did not test all of their children and 73 tested all of their children. Caregiver demographics and HIV history were influential in caregivers' decisions to complete testing for all children, but caregiver's social support, stigma, and economic factors were not (Table 4). Caregivers who had more eligible children (RR: 0.55, 95% CI 0.44 – 0.69) were less likely to test all of their children than with less children. Caregivers currently receiving ART were also less likely to test all of their children (RR: 0.68, 95% CI 0.46 – 0.99) than those who are not receiving care.

In multivariate models including cofactors that had a p-value <0.1 and were not collinear, having more young children (RR: 0.54, 95% CI 0.43 – 0.67), and receiving ART (RR 0.65, 95% CI 0.46 – 0.91) remained significant. Additionally, caregivers having supportive partners (RR 1.64, 95% CI 1.10 – 2.45) were also associated with a higher likelihood to test all of their children compared with having unsupportive partners, and caregivers who tested children at home (RR 1.53, 95% CI 1.12 – 2.07) in our study were more likely to test all children than those tested at clinic (Table 5).

Aim 3: Child-level factors associated with being tested

To determine whether child characteristics determined which child was tested, we assessed 153 children from 51 caregivers who had more than one child. Among these children, 67 were not tested and 86 were tested. The number of children in each family ranged from 2 to 6. None of the child demographics, birth place, HIV exposure and prevention history factors were found to be associated with the caregivers' decision of whether or not to test a child (Table 6).

Discussion

In this study, caregiver demographics, relationship status, caregiver's HIV history and social support factors, but not child-level factors were associated with decisions about where to test children and which children to test. Female caregivers were less likely to test their children at home than male caregivers, while caregivers having more young children were more likely to test children at home. Caregivers with known HIV negative partners were more likely to test children at home than caregivers with HIV-positive partners. Additionally, caregivers having more children of unknown HIV-status were less likely to complete testing for all children, and caregivers on ART were less likely to test all children than those not on ART. Caregivers with a supportive partner were more likely to complete testing for all children than having unsupportive partners and those who tested children at home were more likely to test all children than those tested at clinic.

Our findings suggest that home-based testing may appeal to certain groups, while clinic-based testing appeals to others. We found caregivers having more young children were more likely to test them at home, indicating HBT's potential to accommodate child care needs and reduced transportation time and efforts, which has been identified as barriers for pediatric HIV testing

[16,20]. We also found caregivers having HIV-negative partners were twice likely to test children at home compared with having HIV-positive partners. Given that over 90% of caregivers included in this study disclosed their status to partners, this may be due to concerns surrounding HIV stigma if the community members saw that the child was taken to an HIV clinic. Multiple qualitative studies have found that fear of stigma towards children associated with both accessing test and a positive diagnosis [16,20–25] were expressed as barriers to test children and adolescents. HBT has the potential to be a low-stigma choice for caregivers, though we need more evidence to understand the dynamics and hierarchy of HIV-stigma and its impact on testing behaviors. This study also found that female caregivers were half as likely to test at home compared with male caregivers after adjusting for other cofactors. This may be because males faced more barriers to take children to test at clinic, or that females were taking children to test at clinic to avoid family-decision negotiations at home. A study in Zambia found that social norms assigning more power to males within a household was a barrier for women to access healthcare for their children [24]. Further studies are needed to gain deeper understanding of the intertwined relationship of stigma, decision power, gender inequality, social norms, and disclosure to effectively support the decision and access of pediatric HIV testing for both female and male caregivers.

HBT may have the potential to test more children. Our study found that having more children of unknown HIV-status was associated with a lower likelihood to test all children in the family, suggesting that child care needs and competing priorities might be barriers for caregivers to test their children. We also found that caregivers tested children at home had a 50% more likelihood to test all of their children than those tested at clinic, advocating providing HBT as an alternative to potentially capture these children due to reduced effort level for caregivers. Additionally, caregivers who had supportive partners towards their HIV status, compared with having unsupportive partners, were more likely to test all children. The study findings advocate for integrated approaches to support caregivers to test their children, such as providing HBT to accommodate caregivers' child care needs, incorporate stigma-reduction and supportive relationship building skills into partner services, etc. We also found that caregivers who were on ART were less likely to test all their children. This was counterintuitive to our hypothesis that caregivers on ART would be more likely to want their children tested for HIV than untreated caregivers. It is unclear what explains this association.

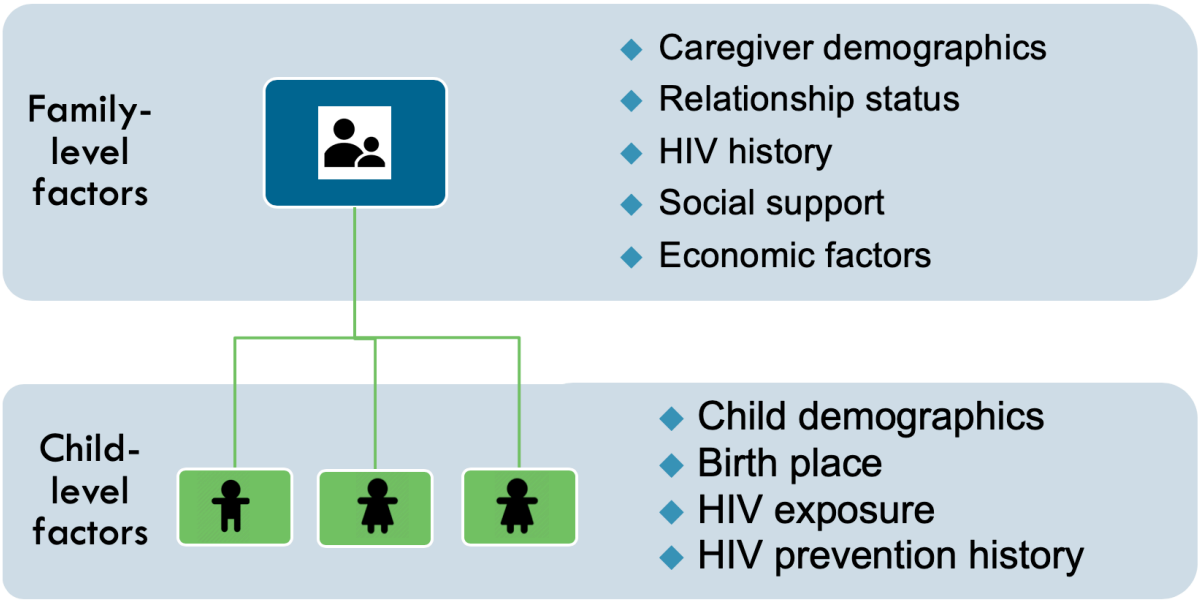
Caregiver level factors were more influential than child-level factors in pediatric HIV testing decisions. Our study revealed that caregiver demographics, relationship status, caregiver's HIV history and social support factors were the most decisive factors in testing location preferences and testing uptake behaviors. These findings align with evidence from Uganda and Mozambique that compared with facility or community factors, caregiver-level factors were found to be the most critical drivers in uptake of child HIV testing, including knowledge about HIV and its prevention, fear of stigma, and social support [25,26]. Though we did not identify child-level factors associated with caregivers' testing decisions in our study, we found children whose mother were known positive and had a negative early infant diagnosis (EID) were less likely to be tested than those whose mother tested negative during the pregnancy based on point estimates. To our knowledge, there are no other studies looking at child-level factors influencing pediatric HIV testing behaviors. Future studies should explore the influence of child's HIV exposure and prevention history along with other child-level factors on caregivers' testing decisions.

Our study had limitations. We sampled 7 facilities in Kenya, which may limit generalizability. Cofactors not found statistically significant, such as stigma, economic cost, and child characteristics, might be limited by the sample size. The point estimates of these cofactors aligned with our hypothesized directions. Finally, the caregivers included in this study were mostly female and the male caregivers had more missing data reported. Thus, this study's findings were

weighted towards female caregivers' voices and may not fully reflecting on male caregivers' true preferences.

In conclusion, caregiver-level factors were more influential than child-level factors in pediatric HIV testing decisions. Home-based testing appears to be preferable to families with higher child care needs and may be a lower stigma choice to encourage pediatric HIV testing uptake if offered as an alternative to clinic testing. The study findings call for integrated approaches in providing pediatric HIV testing services, such as incorporating and strengthening stigma-reduction and supportive relationship building skills in existing partner services, emphasizing the risk of HIV transmission to children and benefit of testing children in routine HIV care, and providing HBT to accommodate diverse needs.

Fig 1. Hypothesized caregiver- and child-level cofactors influencing pediatric HIV testing decision



Adapted from Andersen's behavioral model

Fig. 2 Flow chart of study participants' recruitment, enrollment and testing processes

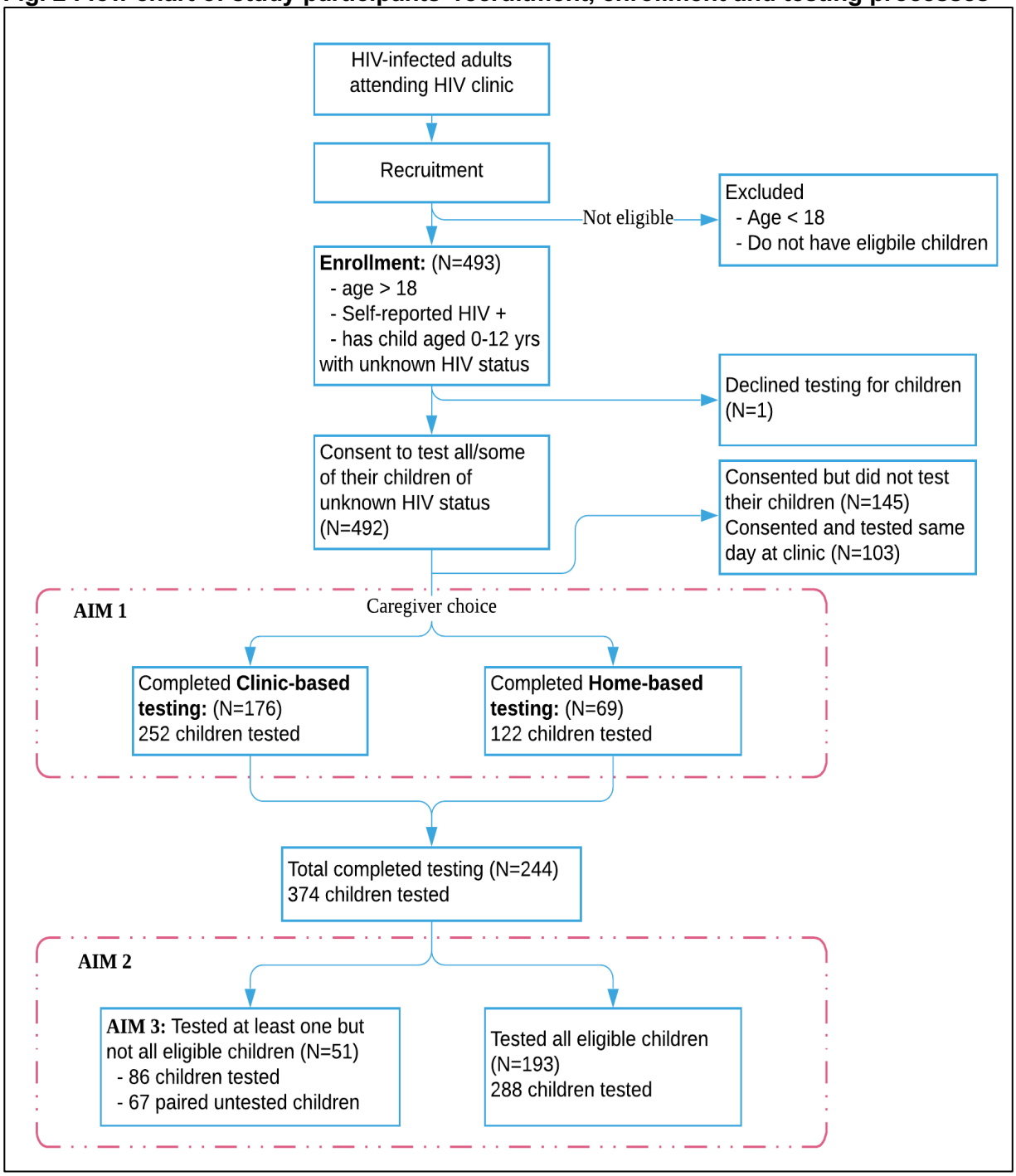


Table 1. Baseline characteristics of caregivers living with HIV

	N	n (%) or median (IQR)
Site	244	
KNH (Kenyatta National Hospital)		67 (27.5)
KEDH (Kisumu County Hospital)		44 (18.0)
Mbagathi County Hospital		28 (11.5)
Kariobangi North Health Center		43 (17.6)
Dandora II Health Center		23 (9.4)
Baba Dogo Health Center		26 (10.7)
Mathare North Health Center		13 (5.3)
Female	244	206 (84.4)
Age	244	34 (28 - 39)
Years of education	244	9 (8 - 12)
Marital status	244	
Singe (never married)		19 (7.8)
Divorced/separated		41 (16.8)
Widowed		27 (11.1)
Married monogamous		136 (55.7)
Married polygamous		18 (7.4)
Steady boyfriend		2 (0.8)
Other		1 (0.4)
HIV history	244	
Years since diagnosis		2 (0 - 5)
On ART		182 (75.2)
Has partner	156	
Partner known HIV positive		86 (55.1)
Partner known HIV negative		22 (14.1)
Partner HIV status unknown		48 (30.8)
Family characteristics	244	
Families with known HIV positive living children		12 (4.9)
Families with deceased children		43 (17.6)
Total number of children per family ages 0-12 years old		2 (1 - 3)
Untested children per family ages 0-12 years old		2 (1 - 2)

Table 2. Family- and child-level cofactors associated with home-based testing

Cofactors	Children tested by CBT (N = 252)		Children tested by HBT (N = 122)		RR	95% CI	p-value
	N	n (%) or median (IQR)	N	n (%) or median (IQR)			
Caregiver Demographics							
Female	252	219 (86.9)	122	86 (70.5)	0.54	0.34 - 0.86	0.009
Age (years)	252	33 (29 - 38)	122	34.5 (29 - 39)	1.01	0.98 - 1.04	0.438
Number of children of unknown HIV status aged 0-12 y/o	252	2 (1 – 3)	122	2 (2 – 3)	1.24	1.05 - 1.46	0.010
Has deceased children	252	47 (18.7)	122	25 (20.5)	1.15	0.68 - 1.93	0.610
Relationship status	252		122				
No partner		57 (22.6)		8 (6.6)	0.39	0.17 – 0.89	0.026
Supportive partner		134 (53.2)		87 (71.3)	1.28	0.79 – 2.06	0.311
Unsupportive partner		61 (24.4)		27 (22.1)	REF	REF	REF
Caregiver and Partner's History with HIV							
Years since caregiver diagnosed	252	1 (0 - 5)	122	2 (0 - 4)	1.00	0.94 - 1.06	0.961
Caregiver on ART	252	182 (72.2)	122	96 (78.7)	1.34	0.81 - 2.20	0.255
Partner HIV status	163		101				
Known HIV positive		93 (57.1)		56 (55.4)	REF	REF	REF
Known HIV negative		14 (8.6)		22 (21.8)	1.62	0.90 - 2.89	0.106
Unknown		56 (34.4)		23 (22.8)	0.76	0.44 - 1.30	0.310
Caregiver's Social Support							
Disclosure to partner	160	142 (88.8)	101	97 (95.1)	2.25	0.79 – 6.48	0.131
Concerns for inadvertent disclosure of caregiver HIV status	252	108 (42.9)	121	58 (47.9)	1.03	0.67 - 1.57	0.903
Need partner permission to test child	163	26 (16.0)	101	15 (14.9)	0.85	0.45 - 1.60	0.606
Perceived stigma at school or community for child	252	111 (44.0)	122	79 (64.8)	1.50	0.95 - 2.34	0.081
Concerns for child find out being positive	252	134 (53.2)	122	76 (62.3)	1.04	0.66 - 1.63	0.873
Child perceived not being sick	171	35 (20.5)	75	33 (44.0)	1.28	0.71 – 2.33	0.408
Economic Factors							
Has income	252	177 (70.2)	122	86 (70.5)	1.08	0.68 - 1.71	0.735
Monthly income (per 10 USD)	177	$71 ($48 - $119)	86	$95 ($60 - $251)	1.00	0.99 - 1.00	0.212
Owns home	252	21 (8.3)	122	7 (5.7)	1.14	0.83 - 0.99	0.772
Monthly rent (per 10 USD)	231	$30 ($14 - $48)	115	$30 ($18 - $71)	1.00	0.99 - 1.00	0.237
Time to travel to clinic (minutes)	252	35 (20 - 60)	121	45 (25 - 60)	0.99	0.99 - 1.00	0.658
Caregiver has cost to travel to clinic	252	157 (62.3)	122	94 (77.7)	1.39	0.86 - 2.25	0.175
Caregiver travel fare (USD)	157	$0.85 ($0.59-$1.80)	94	$1.19 ($0.59-$1.80)	0.99	0.99 - 1.00	0.966
Children has travel cost to clinic	252	166 (65.9)	122	88 (72.1)	1.21	0.77 – 1.89	0.412
Travel cost if bring all children to clinic (USD)	166	$1.91 ($1.07-$2.87)	88	$2.39 ($1.19-$4.66)	1.00	0.99 - 1.00	0.186
Miss work to test child	252	100 (39.7)	122	59 (48.4)	1.25	0.82 - 1.89	0.295
Has NHIF* card	252	82 (32.5)	122	53 (43.4)	1.24	0.81 - 1.89	0.324
Child Demographics and Clinical History							
Female	252	138 (54.8)	122	78 (63.9)	1.32	0.90 - 1.96	0.161
Age (years)	252	7 (5 - 10)	122	7 (5 - 9)	0.99	0.93 - 1.05	0.738
Months breastfed	250	13.5 (8 -24)	117	12 (8 - 20)	0.99	0.97 - 1.01	0.412
Child PMTCT**	219		86				

Mother tested negative or not tested		149 (68.0)		62 (72.1)	REF	REF	REF
Mother HIV positive and no EID testing		19 (8.7)		4 (4.7)	0.63	0.22 - 1.80	0.388
Mother HIV positive and child EID tested		18 (8.2)		12 (14.0)	1.04	0.52 - 2.06	0.918
Has been hospitalized	174	12 (6.9)	67	0 (0)	0.00	0.00 - .	0.986

*NHIF card: National Health Insurance Fund card in Kenya
** Unknown testing behaviors and status (13.4%) were not included for univariate analysis. Responses from male caregivers are excluded due to missing data
† Variable collected after a certain date; missing data is likely at random
†† Data collected in 2014, all monetary values are inflated to 2019 US dollar values
††† RR adjusted for sites and clustered on family

Table 3. Multivariate cofactors of caregivers' preference for home- or clinic-based HIV testing

	Tested at clinic	Tested at home		
		aRR	95% CI	p-value
Caregiver and partner characteristics				
Female	REF	0.50	0.32 - 0.78	0.002
Number of children of unknown status aged 0-12 y/o		1.20	1.03 - 1.41	0.022
Partner HIV status				
Known HIV positive		REF	REF	REF
Known HIV negative		1.94	1.16 - 3.24	0.012
Unknown		1.17	0.67 - 2.05	0.588
Caregiver social support and economics				
Disclosure to partner		1.63	0.57 - 4.69	0.361
Need partner permission to test child		0.85	0.45 - 1.64	0.634
Perceived stigma at school or community for child	REF	1.54	0.97 - 2.45	0.070

Table 4. Caregiver-level cofactors for testing all or not all children

Cofactors	Children from families where not all children were tested (N = 153)		Children from families where all children were tested (N = 168)		RR	95% CI	p-value
	N	n (%) or median (IQR)	N	n (%) or median (IQR)			
Caregiver demographics							
Female	153	113 (73.9)	168	129 (76.8)	1.06	0.70 - 1.62	0.773
Age (years)	153	32 (28 - 39)	168	33 (30 - 39)	1.01	0.99- 1.04	0.382
Number of children of unknown status aged 0-12 y/o	153	3 (3 - 4)	168	2 (2 - 3)	0.55	0.44 - 0.69	<0.001
Has deceased children	153	29 (19.0)	168	37 (22.0)	1.12	0.72 - 1.73	0.611
Relationship status	153		168				
No partner		21 (13.7)		16 (9.5)	0.99	0.50 - 1.97	0.978
Supportive partner		89 (58.2)		121 (72.0)	1.38	0.88 - 2.16	0.164
Unsupportive partner		43 (28.1)		31 (18.5)	REF	REF	REF
Caregiver and partner's history with HIV							
Years since caregiver diagnosed	153	2 (0 - 5)	168	0 (0 - 4)	0.99	0.94 - 1.04	0.578
Caregiver on ART	153	132 (86.3)	168	117 (69.9)	0.68	0.46 - 0.99	0.049
Partner HIV status	121		134				
Known HIV positive		75 (62.0)		66 (49.3)	REF	REF	REF
Known HIV negative		11 (9.1)		23 (17.2)	1.41	0.80 - 2.51	0.236
Unknown		35 (28.9)		45 (33.6)	1.16	0.74 - 1.82	0.516
Caregiver's Social Support							
Disclosure to partner	121	115 (95.0)	131	119 (90.8)	0.76	0.37 - 1.56	0.450
Concerns for inadvertent disclosure of caregiver HIV status	153	80 (52.3)	168	70 (41.7)	0.77	0.53 - 1.11	0.165
Need partner permission to test child	121	19 (15.7)	134	28 (20.9)	1.12	0.68 - 1.87	0.653
Perceived stigma at school or community for child	153	93 (60.8)	168	82 (48.8)	0.72	0.49 - 1.06	0.100
Concerns for child finding out being positive	153	98 (64.1)	168	93 (55.4)	0.78	0.52 - 1.15	0.210
Child perceived not being sick†	84	26 (31.0)	112	31 (27.7)	0.83	0.48 - 1.42	0.491
Economic Factors							
Has income	153	94 (61.4)	168	119 (70.8)	1.25	0.85 - 1.85	0.257
Monthly income (per 10 USD)	94	$79 ($60 - $215)	119	$71 ($60 - $180)	0.99	0.99 - 1.00	0.206
Owns home	153	9 (5.9)	168	11 (6.5)	1.16	0.53 - 1.06	0.717
Monthly rent (per 10 USD)	144	$30 ($18 - $42)	157	$30 ($18 - $71)	1.00	0.99 - 1.00	0.232
Time to travel to clinic (Minutes)	153	30 (20 - 60)	168	45 (30 - 60)	1.00	0.99 - 1.00	0.806
Caregiver has cost to travel to clinic	153	98 (64.1)	168	102 (60.7)	0.91	0.63 - 1.31	0.605
Caregiver travel fare (USD)	98	$0.59 ($0.59 - $1.19)	102	$1.19 ($0.59 - $1.80)	0.99	0.99 - 1.00	0.357
Children has travel cost to clinic	153	105 (68.6)	168	113 (67.3)	0.96	0.66 - 1.41	0.849
Travel cost if bring all children to clinic (USD)	105	$1.43 ($0.67 - $2.51)	113	$2.63 ($1.19 - $4.65)	1.00	0.99 - 1.00	0.076
Miss work to test child	152	59 (38.8)	168	73 (43.5)	1.09	0.76 - 1.57	0.625
Has NHIF* card	153	45 (29.9)	168	67 (39.9)	1.26	0.87 - 1.83	0.224
Tested children at home (vs at clinic)	153	47 (30.7)	168	79 (47.0)	1.39	0.97 - 1.99	0.070

*NHIF card: National Health Insurance Fund card in Kenya

† Variable collected after a certain date; missing data is likely at random

†† Data collected in 2014, all monetary values are inflated to 2019 dollar values

††† RR adjusted for sites and clustered on family

Table 5. Multivariate cofactors associated with caregiver's decision of whether or not to test all eligible child in a family

	Not tested all	Tested all children		
		aRR	95% CI	p-value
Caregiver and partner characteristics				
Female	REF	1.05	0.73 - 1.52	0.790
Number of HIV status unknown children aged 0-12 y/o		0.54	0.43 - 0.67	<0.001
Caregiver on ART		0.65	0.46 - 0.91	0.012
Relationship status				
No partner		0.99	0.53 - 1.82	0.967
Supportive partner		1.64	1.10 - 2.45	0.015
Unsupportive partner		REF	REF	REF
Caregiver social support and economics				
Perceived stigma at school or community for child	REF	0.77	0.55 - 1.08	0.125
Tested children at home (vs at clinic)		1.53	1.12 - 2.07	0.007

Table 6. Child-level cofactors associated with caregiver's decision of whether or not to test a child in a family

Cofactors	Not tested (N=67)		Tested (N=86)		Mean diff. or RR	95% CI	p-value
	N	n (%) or median (IQR)	N	n (%) or median (IQR)			
Child Demographics							
Female	67	36 (53.7)	86	50 (58.1)	1.10	0.71 - 1.69	0.678
Age (years)	67	7 (1 - 11)	86	7 (4 - 10)	1.02	0.97 - 1.08	0.473
Birth order (mean)	67	2.09	86	2.19	1.03	0.86 - 1.25	0.732
Born at a facility (vs at home) †	38	34 (89.5)	48	36 (75.0)	0.68	0.35 - 1.30	0.248
Child's Clinical History							
Months breastfed	66	12 (6 - 24)	83	12 (9 - 20)	1.00	0.98 - 1.03	0.710
Child PMTCT*	45		65				
Mother tested negative or not tested		21 (46.7)		42 (64.6)	REF	REF	REF
Mother HIV positive and no EID testing		3 (6.7)		6 (9.2)	0.75	0.23 - 2.42	0.632
Mother HIV positive and child EID tested		15 (33.3)		8 (12.3)	0.52	0.24 - 1.10	0.086
Has been hospitalized	50	3 (6.0)	65	1 (1.5)	0.44	0.61 – 3.24	0.424

* Unknown testing behaviors and status (13.4%) were not included for univariate analysis. Responses from male caregivers are excluded due to missing data
† Variable collected after a certain date; missing data is likely at random
†† RR adjusted for sites and clustered on family

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