Supplemental material

Supplementary webappendix

Text S1. Search history in PubMed	2
Text S2. Search history in Web of Science	4
Text S3. Search history in Google Scholar	5
Text S4. Search history in African Index Medicus	6
Text S5. Search history in PsycINFO	7
Text S6. Search history in AIDSInfo	8
Text S7. Search history in OTseeker	9
Text S8. Search history in CINHAL	10
Text S9. Search history in EconLit	11
Figure S1. PRISMA flow diagram	12
Figure S2. Conceptual framework underpinning the study	13
Table S1. Wealth and labour market outcomes	14
Table S2. Health and health care utilization	17
Table S3. Food security and nutrition	19
Table S4. Schooling outcomes	20
Table S5. Caregiving responsibilities	22
Table S6. Coresidence and relationships	23

Text S1. Search history in PubMed

PubMed: Searc	PubMed: Search terms (all years) Results				
https://pubmed.ncbi.nlm.nih.gov/ (Search date: 20.04.2022)					
Concept 1 (ART)	"Anti-Retroviral Agents/therapeutic use"[Mesh] OR "Anti-Retroviral Agents/economics"[Mesh] OR "Antiretroviral Therapy, Highly Active"[Mesh] OR "Anti-HIV Agents/therapeutic use"[Mesh] OR "Acquired Immunodeficiency Syndrome/therapy"[Mesh] OR "Antiretroviral therapy" OR "HIV treatment"	109,977			
Concept 2 (inter- generational)	"Child"[Mesh] OR "Adolescent"[Mesh] OR "Adult"[Mesh] OR11,112"Aged"[Mesh] OR Intergenerational OR Infant* OR Child* OR11,112				
Concept 3 (family, household)	"Family"[Mesh] OR "Family Characteristics"[Mesh] OR "Household Work"[Mesh] OR Family OR Household*	1,724,893			
Concept 4 (SSA)	"Africa South of the Sahara" [Mesh] OR "Sub Saharan Africa"	248,799			
#1 AND #2 AND #3 AND #4	((("Anti-Retroviral Agents/therapeutic use"[Mesh] OR "Anti-Retroviral Agents/economics"[Mesh] OR "Antiretroviral Therapy, Highly Active"[Mesh] OR "Anti-HIV Agents/therapeutic use"[Mesh] OR "Acquired Immunodeficiency Syndrome/therapy"[Mesh] OR "Antiretroviral therapy" OR "HIV treatment") AND ("Child"[Mesh] OR "Adolescent"[Mesh] OR "Adult"[Mesh] OR "Aged"[Mesh] OR Intergenerational OR Infant* OR Child* OR Adolescent* OR Youth OR Kids OR "Early childhood" OR "Under-five children" OR "Middle childhood" OR "Adult" OR "Old age" OR "Older age" OR Elderly OR Grandparent* OR "Great-grandparent*")) AND ("Family"[Mesh] OR "Family Characteristics"[Mesh] OR "Household Work"[Mesh] OR Family OR Household*)) AND ("Africa South of the Sahara"[Mesh] OR "Sub Saharan Africa")	2,042			

PubMed: Se	earch terms (last year)	Results
https://pubm	ed.ncbi.nlm.nih.gov/ (Search date: 20.04.2022)	
Concept 1	"Antiretroviral therapy" OR "HIV treatment"	59,623
(only		
keywords)		
Concept 2	Intergenerational OR Infant* OR Child* OR Adolescent* OR Youth OR Kids	11,112,406
(only	OR "Early childhood" OR "Under-five children" OR "Middle childhood" OR	
keywords)	"Adult" OR "Old age" OR "Older age" OR Elderly OR Grandparent* OR	
	"Great-grandparent*"	
Concept 3	Family OR Household*	1,721,781
Concept 4	"Sub Saharan Africa"	27,227
(only		
keywords)		
#1 AND	((("Antiretroviral therapy" OR "HIV treatment") AND (Intergenerational OR	22
#2 AND	Infant* OR Child* OR Adolescent* OR Youth OR Kids OR "Early	
#3 AND	childhood" OR "Under-five children" OR "Middle childhood" OR "Adult"	
#4	OR "Old age" OR "Older age" OR Elderly OR Grandparent* OR "Great-	
+ Filter	grandparent*")) AND (Family OR Household*)) AND ("Sub Saharan	
	Africa") Filters: in the last 1 year	

Notes: The last year was also searched using only keywords to include recently published studies that have not been indexed with MeSH terms.

Text S2. Search history in Web of Science

Web of Scie	Results	
https://www	.webofscience.com/wos/woscc/advanced-search (Search date: 15.03.22)	
Concept 1	"Antiretroviral therapy" OR "HIV treatment"	68,196
Concept 2	"Household" OR "Family" OR "Intergenerational" OR "Child" OR "Adult" OR "Older adult"	3,452,812
Concept 3	"Sub Saharan Africa"	41,076
#1 AND #2 AND #3 AND + Filters	"Antiretroviral therapy" OR "HIV treatment" (All Fields) and "Household" OR "Family" OR "Intergenerational" OR "Child" OR "Adult" OR "Older adult" (All Fields) and "Sub Saharan Africa" (All Fields)	1,657

Text S3. Search history in Google Scholar

Google Scholar	: Search terms	Results				
https://scholar.g	https://scholar.google.com/ (Advanced search, search date: 17.03.22)					
Concept 1	"Antiretroviral therapy" OR "HIV treatment"					
Concept 2	Household OR Family OR Intergenerational OR Child OR Adult OR "Older adult"	About 6.330.000				
Concept 3	"Sub Saharan Africa"	About 17.800				
Specific term Exact phrase Any of these terms (Any year, relevance ranking)	"Antiretroviral therapy" "Sub Saharan Africa" Household Family Intergenerational Child Adult ("Antiretroviral therapy" Household OR Family OR Intergenerational OR Child OR Adult "Sub Saharan Africa")	About 67.600 (first 200 reviewed)				
Simple search (Any year, relevance ranking)	Antiretroviral therapy and intergenerational spillover effects on co- residing family members	5				
Simple search (Any year, relevance ranking)	"Antiretroviral therapy" indirect impact on Household OR Family OR Intergenerational OR Child OR Adult in "Sub Saharan Africa"	About 24.600 (first 200 reviewed)				

Text S4. Search history in African Index Medicus

African Index Medicus: Search terms Results						
https://www.globalin	https://www.globalindexmedicus.net/biblioteca/aim/ (Search date: 21.03.22)					
Concept 1	ept 1 "Antiretroviral therapy" OR "HIV treatment"					
Concept 2	Household OR Family OR Intergenerational OR Child OR Adult 80 OR Older adult					
Concept 3	"Sub Saharan Africa"	444				
#1 AND #2 AND #3 (Limited to title, abstract, subject)	(tw:("Antiretroviral therapy" OR "HIV treatment")) AND (tw:(Household OR Family OR Intergenerational OR Child OR Adult OR Older adult)) AND (tw:("Sub Saharan Africa"))	5				
#1 (Limited to title, abstract, subject)	(tw:("Antiretroviral therapy" OR "HIV treatment"))	245				

Text S5. Search history in PsycINFO

PsycInfo: Search te	Results	
https://web.s.ebscoh		
5b37f9deac5b%40re	edis (Search date: 22.03.22)	
Concept 1	"Antiretroviral therapy" OR "HIV treatment"	7,542
Concept 2	Household OR Family OR Intergenerational OR Child OR Adult OR "Older adult"	1,936,822
Concept 3	"Sub Saharan Africa"	4,189
#1 AND #2 AND #3	("Antiretroviral therapy" OR "HIV treatment") AND (Household OR Family OR Intergenerational OR Child OR Adult OR "Older adult") AND (sub saharan africa or sub-saharan africa or sub sahara or sub-sahara)	275

Text S6. Search history in AIDSInfo

AIDSInfo: Search terms Resul			
https://hivinfo.nih.gov/home-page (Search date: 23.03.22)			
Concept 1	27		

Text S7. Search history in OTseeker

OTseeker: Search ter	Results	
http://www.otseeker.co		
Concept 1	80	
Concept 2	Household OR Family OR Intergenerational OR Child OR Adult	
	OR "Older adult"	
Concept 3	"Sub Saharan Africa"	
#1 AND	[Any Field] like "Antiretroviral therapy" OR "HIV treatment"	1
#2 AND	AND [Any Field] like 'Household OR Family OR Intergenerational	
#3	OR Child OR Adult OR "Older adult" AND [Any Field] like "Sub	
	Saharan Africa'''	
#1	[Any Field] like "Antiretroviral therapy" OR "HIV treatment"	80

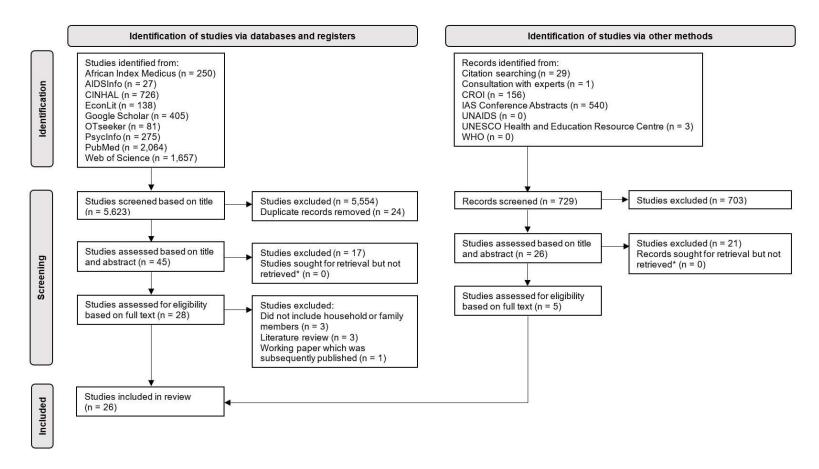
Text S8. Search history in CINHAL

CINHAL: Search terms Results https://web.p.ebscohost.com/ehost/search/advanced?vid=0&sid=be01f787-282b-4ffa-9f65- Image: Complexity of the second					
Concept 1	"Antiretroviral therapy" OR "HIV treatment"	29,872			
Concept 2	Household OR Family OR Intergenerational OR Child OR Adult OR Older adult	2,276,861			
Concept 3	sub saharan africa or sub-saharan africa or sub sahara or sub-sahara	8,696			
#1 AND #2 AND #3	 ("Antiretroviral therapy" OR "HIV treatment") AND (Household OR Family OR Intergenerational OR Child OR Adult OR Older adult) AND (sub saharan africa or sub-saharan africa or sub sahara or sub-sahara) Expanders - Apply related words; Also search within the full text of the articles; Apply equivalent subjects Search modes - Find all my search terms 	726			

Text S9. Search history in EconLit

EconLit: Search	Results					
https://web.p.ebscohost.com/ehost/search/advanced?vid=0&sid=36482e4e-d390-4798-90b5- f1f2d66b4ef6%40redis (Search date: 27.03.22)						
Concept 1						
Concept 2	Concept 2 Household OR Family OR Intergenerational OR Child OR Adult OR Older adult					
Concept 3	sub saharan africa or sub-saharan africa or sub sahara or sub-sahara	7,950				
#1 AND #2 AND #3	("Antiretroviral therapy" OR "HIV treatment") AND (Household OR Family OR Intergenerational OR Child OR Adult OR Older adult) AND (sub saharan africa or sub-saharan africa or sub sahara or sub-sahara)	10				
#1	"Antiretroviral therapy" OR "HIV treatment"	128				

Figure S1. PRISMA flow diagram



Notes: * Not retrieved is defined as reports which could not be located for different reasons. In this review, all records sought to include were able to be retrieved (so that n = 0). Sour ce: Page MJ, McKenzie JE, Bossuyt PM, Boutron I, Hoffmann TC, Mulrow CD, et al. The PRISMA 2020 statement: an updated guideline for reporting systematic reviews. *BMJ* 2021;372:n71. doi: 10.1136/bmj.n71.

Figure S2. Conceptual framework underpinning the study

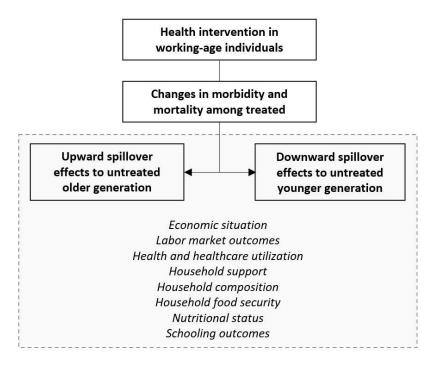


Table S1. Wealth and labour market outcomes

Reference	Country	Data source	Design	Sample	Direction of spillover	Key findings	Effect size
Baranov and Kohler, 2018	Malawi (rural)	Malawi Longitudinal Study of Families and Health survey	Quasi- experimental	Up to 4,000 individuals (mean age 36.8 years)	Not specified (all adults)	Increase in ART availability improved economic situation of household	Reduction of distance to ART facility by 5.8 km, could increase total saving by 50%
Bor et al. 2012	South Africa (rural)	Household survey of Africa Centre for Health and Population Studies	Longitudinal / cohort / quasi- experimental	Adults in >10,000 households (ages 18-59 years)	Not specified (all adults)	ART prevented asset loss in households affected by HIV and AIDS-related deaths ART and recovery of health led to household members formerly involved in caregiving to regain employment	Not in main text.
Baranov et al., 2015	Malawi (rural)	Malawi Longitudinal Study of Families and Health survey	Quasi- experimental	Up to 4,000 respondents (mean age 34.3 years),	Not specified (all adults)	ART availability increased labour participation	'Nearby' ART availability increases daily work time by 37 minutes, farming by 15 minutes and other economic activities by 12 minutes
Jakubowski et al., 2018	Multi- country (rural)	Sustainable East Africa Research in Community Health (SEARCH)	Cross- sectional	11,500 individuals (ages > 18 years)	Not specified (all adults)	Household members coresiding with HIV- infected individual with high CD4+ cell count, had same employment outcomes as household members in HIV-negative households	Equal probability of working for HIV-negative person in household with an HIV-positive person with CD4>500 compared to HIV-negative person without coresiding HIV- positive person
Kaler et al., 2010	Uganda (rural)	Interviews and surveys	Qualitative	110 coresident 'treatment	Not specified	ART and recovery of health led to	Not applicable

				partners' of ART patients (spouses, parents, children and siblings)		reallocation of household expenditures from HIV-infected individual to the general household ART did not substantially lead to regain of sold assets	
Thirumurthy et al., 2008	Kenya (rural)	Socio-economic household surveys	Longitudinal / cohort / quasi- experimental	200 households with at least one HIV-positive adult and 503 households without HIV- positive adults on ART (children ages 8-18 and	Downward Not specified	ART initiation among HIV-infected adults decreased labour participation of young boys. Labour participation of girls remained unchanged ART among HIV- positive adults did not	Decline of young boy's labour force participation rates (21.5%) and working hours (by 8.5 hours per week) Not applicable
Tirivayi and	Zambia	Patient records of	Cross-	adults ages 18-65) 112 adult patients	(all adults)	significantly change labour supply of coresiding adults ART and high CD4	HIV-negative individuals
Koethe, 2016	(urban)	clinics and household surveys	sectional	on ART and 199 adults coresiding with patients (ages >17 years)	specified (all adults)	counts among HIV patients led to higher labour force participation of coresiding adults	were 27 percentage points more likely to be in labour force coresiding with an ART patient with CD4 counts > 500 than their counterparts with lower counts
Wagner et al., 2009	Uganda (urban and rural)	Semi-structured interviews	Qualitative	24 HIV-positive adults (age range not stated)	Not specified (all adults)	ART did not substantially lead to a regain of household property that had been sold after HIV- infection ART partially led to regain of self-	Not applicable

		sufficiency among treated adults who had formerly relied on economic family	
		support	

Table S2. Health and health care utilization

Reference	Country	Data source	Design	Sample	Direction of spillover	Key findings	Effect size
Baranov and Kohler, 2018	Malawi (rural)	Malawi Longitudinal Study of Families and Health survey	Quasi- experimental	Up to 4,000 respondents (mean age 36.8 years)	Not specified (all adults)	ART decreased self- reported mortality risk	Reduction of distance to ART facility by 6 km increases subjective life expectancy by 6 years
Baranov et al., 2015	Malawi (rural)	Malawi Longitudinal Study of Families and Health survey	Quasi- experimental	Up to 4,000 respondents (mean age 34.3 years)	Not specified	ART availability reduced subjective mortality risk and improved mental health	'Nearby' ART availability reduces subjective mortality risk by 3 percentage points from 2008 to 2010 and improves an established mental health index by 1.06 points
Bechange et al., 2010	Uganda (rural)	Structured interviews	Longitudinal / cohort	455 HIV-negative adults who coresided with a non-spousal HIV- positive adult on ART (18-69 years old)	Not specified (all adults)	ART provision among HIV-positive adults did not increase sexual risk behavior among HIV- negative household members	Risky sexual behavior decreased from 29% to 15% at 24 months
d'Adda et al., 2009	Kenya (rural)	Socio-economic household survey	Longitudinal / cohort / quasi- experimental	291 children (8- 18 years old)	Downward	Boys in ART households were more likely to seek health care	Not in main text.

					Not specified (all adults)	Adults in ART households sought less health care	Woman living with individual on ART spent about 1 hour per week less time seeking health care (men 1.4 hours respectively)
Hontelez et al., 2016	South Africa (rural)	Longitudinal cohort of Wellcome Trust Africa Centre for Population Health	Longitudinal / cohort	32,319 individuals (ages 15 years or older)	Not specified (all adults)	ART scale-up correlated with HIV- uninfected individuals reporting increasing utilization of public- sector health care in contrast to decreasing use of private-sector health care. The hospitalization rate decreased.	Increase in visits of public sector clinics in last 6 months from 41% to 47%; decrease of visits private sector clinics from 16% to 9%; and hospitalization decreased from 78 to 44 per 1000 person years
Mermin et al., 2008	Uganda (rural)	Home visits and clinical tests	Longitudinal / cohort	466 HIV-infected adults and 1481 HIV-uninfected household members (children <10 years old)	Downward	ART program among HIV-infected adults led to decrease in child mortality	81% reduction in mortality of HIV uninfected children
Mfundisi et al., 2005	South Africa (urban)	Quantitative interviews	Cross- sectional	184 individuals (>14 years old, mean age 28.6 years)	Not specified	Knowing someone on ART increased likelihood to attend HIV counselling and testing	58% of those who knew someone on ART had been tested compared with 48% of those who did not know someone on ART, for woman 68% versus 48% respectively

Table S3. Food security and nutrition

Reference	Country	Data source	Design	Sample	Direction of spillover	Key findings	Effect size
Lucas and Wilson, 2013	Zambia (urban and rural)	Zambian HIV/AIDS services, Demographic and Health surveys	Quasi- experimental	Children (0-5 years old)	Downward	ART availability correlated with reduction in children's malnutrition and increase in weight-for- age	Not in main text.
Patenaude et al., 2018	South Africa (rural)	Longitudinal medical and socio- demographic data from ongoing cohort study	Quasi- experimental	5540 adults (18 years and older) and children (age range not stated)	Downward Not specified (all adults)	ART initiation increased the probability of household food insecurity in the first year and diminished to zero within 1-3 years	ART initiation led to an increase in the probability of children coresiding in surveyed households to have missed a meal in the past month by 8.9 percentage points ART initiation led to an increase in the probability of adults coresiding in surveyed households to have missed a meal in the past month by 15.2 percentage points
Zivin et al., 2009	Kenya (rural)	Socio-economic surveys	Quasi- experimental	41 children (0-5 years old)	Downward	Early ART improved nutritional status of children	Early-stage ART of coresiding adults associated with increase in weight-for-age Z-score and weight-for-height of children by 0.60 standard deviations

Table S4. Schooling outcomes

Reference	Country	Data source	Design	Sample	Direction of spillover	Key findings	Effect size
Baranov and Kohler, 2018	Malawi (rural)	Malawi Longitudinal Study of Families and Health survey	Quasi- experimental	Up to 4,000 individuals (ages 5- 19 years)	Downward	Increase in ART availability increased expenditures on education and improved schooling outcomes	Halving distance to ART facility increases expenditures on children's education by \$US 2.5 and increases years of schooling by 0.33
Jakubowski et al., 2022	Multi- country (rural)	Sustainable East Africa Research in Community Health (SEARCH), socioeconomic household surveys	Randomized controlled trial	34,029 HIV- positive or - negative individuals and their household members Survey with 9412 adults (18-65 years old) and 6755 children (6-17 years old)	Downward	Universal HIV testing and treatment (UTT) led to higher school completion rates for children	Children's primary school completion rate in households with HIV- positive adults in intervention community in comparison to control community was: 7.3% higher for children in households with an HIV-positive adult; 10.8% (0.6–22.7) higher in households with adults with high CD4 cell count; 4.5% (1.5–9.8) higher in households with adults with low CD4 cell count than children in similar households
Lucas et al., 2019	Zambia (urban and rural)	Zambian Demographic and Health Survey	Quasi- experimental	Children in expected grades 1– 7 (primary school aged)	Downward	ART availability for HIV-infected adults improved school outcomes for children	ART availability did not differentially affect the likelihood that coresiding primary school aged children enrolled in school on time, however increased the likelihood to be the appropriate grade-for-age by 49%

20

Thirumurthy et al., 2013	Uganda (rural)	Programmatic data and socio-economic household surveys	Cross- sectional design	179 HIV-positive adults (18 years and older), 107 children (6-18 years of age)	Downward	Higher CD4 cell counts in HIV-infected adults was likely associated with improved school enrolment outcomes of children	Children had a 7% higher probability to be enrolled in school coresiding with adult with CD4≥350 than adult CD4<350
Wagner et al., 2011	Uganda (urban and rural)	Semi-structured interviews	Qualitative	24 HIV-positive adults (spouses, partner, children)	Downward	ART partially enabled children who had dropped out of school to re-enrol	Not applicable
Zivin et al., 2009	Kenya (rural)	Socio-economic surveys	Quasi- experimental	128 children in households with at least one HIV+ adult (8-18 years old)	Downward	ART among adults increased school attendance for children	Within 6 months after ART initiation of coresiding adults weekly school attendance for children increased by 6 hours (20%)

Table S5. Caregiving responsibilities

Reference	Country	Data source	Design	Sample	Direction of spillover	Key findings	Effect size
d'Adda et al., 2009	Kenya (rural)	Socio-economic household survey	Longitudinal / cohort / quasi- experimental	178 adults (18-65 years of age), 291 children (8-18 years old)	Downward	ART and recovery of health among adult household members led to decrease of children doing household chores	ART among adult household members reduced housework of boys on average by 2.4 hours in the past week and time spent on collecting water by 0.86 hours for girls
					Not specified (all adults)	ART and decrease in need of caregiving support provided by family members	Not in main text.
Kakinami et al., 2011	South Africa (urban and rural)	Structured questionnaire	Longitudinal / cohort	4328 HIV-positive adults (> 17 years old)	Not specified (all adults)	ART reduced the burden of HIV-related care for family members	ART among HIV-positive adults reduced the necessity of assistance in instrumental activities of daily living by 17% in the rural cohort and by 41% in the urban cohort
Kaler et al., 2010	Uganda (rural)	Interviews and surveys	Qualitative	110 coresident 'treatment partners' of ART patients (spouses, parents, children and siblings)	Not specified (all adults)	ART enabled household members involved in caregiving to return to former activities	Not applicable
Nalugya et al., 2018	Uganda (urban and rural)	Semi-structured interviews	Qualitative	38 HIV-positive parents (children ages 1-47 years old)	Downward	Children had important caregiving role for HIV positive parents on ART	Not applicable

Table S6. Coresidence and relationships

Reference	Country	Data source	Design	Sample	Direction of spillover	Key findings	Effect size
Anema et al., 2011	Multi- country (urban and rural)	Cohort studies, UNAIDS, UN Population Division, WHO and the US Census Bureau	Modeling study	AIDS orphans (children ages <17 years old)	Downward	Universal ART among HIV+ adults decreased the likelihood of AIDS- related orphanhood	Universal ART may avert over 4 million orphans over next 10 years.
De Neve et al., 2018	Sub- Saharan Africa (urban and rural)	Demographic and Health Surveys, AIDS Indicator Surveys and Malaria Indicator Surveys	Longitudinal / cohort	297,331 older adults (ages 60 years or older)	Upward	Increase in ART coverage was associated with increase in coresidence of working-age with older adults	1% increase in ART coverage associated with reduction of 0.7 percentage point in the probability of an older adult living without working-age adult and 0.2 percentage point in the probability of an older adult living in household with grandchildren and no children household.
Makumbi et al., 2012	Uganda (rural)	Rakai Community Cohort Study	Longitudinal / cohort	Children (ages 0–14 years old)	Downward	Prevalence and incidence of orphanhood declined during the implementation of HIV care	Prevalence: from 17.2% during pre-HIV care roll-out to 12.6% at expanded HIV care period; Incidence: from 2.10/100 person-years during pre-HIV care roll-out to 1.07/100 person years at expanded HIV care period
Mermin et al., 2008	Uganda (rural)	Home visits and clinical tests	Longitudinal / cohort	466 HIV-infected adults and 1481 HIV-uninfected household members (children <10 years old)	Downward	ART program reduced orphanhood	93% reduction in orphanhood

Siu et al., 2014	Uganda (rural)	Observational notes and interviews	Qualitative	26 adults (ages 27- 51 years old)	Not specified (all adults)	ART partly led to recovery of masculine identities with implications for the household e.g., increased tolerance to gender equality and rejection of extramarital relationships	Not applicable
Wagner et al., 2011	Uganda (urban and rural)	Semi-structured interviews	Qualitative	24 HIV-positive adults (spouses, partner, children)	Not specified (all adults)	ART partially restored disrupted social relationships within families	Not applicable