

# Supplemental Information

**SUPPLEMENTAL TABLE 5** Baseline Characteristics of Not Missing Versus Missing Bayley-III Outcomes  
(Among Children With at Least 1 Valid Neurodevelopmental Assessment)  
in the Tshipidi Study, Botswana 2010–2012

	Not Missing, <i>N</i> (%)	Missing, <i>N</i> (%)	<i>P</i> ( $\chi^2$ )
Bayley-III cognitive	658	66	—
HIV exposure status			.34
HIV-exposed	310 (47.1%)	27 (40.9%)	
Sex			.37
Female	337 (51.2%)	30 (45.5%)	
Birth weight			.51
Low birth weight	82 (12.5%)	10 (15.4%)	
Breastfed			.57
Ever breastfed	283 (43.0%)	26 (39.3%)	
Prematurity (<37 wk)			<.01
Premature	73 (11.5%)	16 (25.0%)	
Maternal age			.22
18–24	265 (40.3%)	28 (42.4%)	
25–29	157 (23.9%)	20 (30.3%)	
30–34	122 (18.6%)	11 (16.7%)	
35–39	94 (14.3%)	6 (9.1%)	
40–44	19 (2.9%)	1 (1.5%)	
Maternal education			.67
None	10 (1.5%)	0 (0%)	
Primary	56 (8.5%)	4 (6.3%)	
Secondary junior	330 (50.2%)	32 (50.0%)	
Secondary senior	262 (39.8%)	28 (43.8%)	
Maternal income			.91
None	426 (64.8%)	40 (61.5%)	
<P500	34 (5.2%)	3 (4.6%)	
P501–P1000	87 (13.2%)	9 (13.9%)	
>P1000	110 (16.7%)	13 (20.0%)	
Access to sanitation			.31
Indoor	138 (21.1%)	17 (26.2%)	
Private	443 (67.7%)	38 (58.5%)	
Shared	73 (11.2%)	10 (15.4%)	
Access to electricity			.44
Yes	372 (56.5%)	40 (61.5%)	
Access to water			.43
Home	124 (18.8%)	19 (29.2%)	
Yard	455 (69.2%)	40 (61.5%)	
Communal	68 (10.3%)	6 (9.2%)	
Other	11 (1.8%)	0 (0%)	
Cooking method			.03
Gas, electric	478 (72.6%)	47 (72.3%)	
Wood	5 (0.8%)	3 (4.6%)	
Kerosene	166 (25.2%)	15 (23.1%)	
None	9 (1.4%)	0 (0%)	
Housing type			.67
Formal	650 (98.8%)	65 (100%)	
Informal	6 (0.9%)	—	
None	2 (0.3%)	—	
Bayley-III gross motor	642	82	—
HIV exposure status			.09
HIV-exposed	306 (47.7%)	31 (37.8%)	
Sex			.55
Female	328 (51.1%)	39 (47.6%)	
Birth weight			.20
Low birth weight	78 (12.2%)	14 (17.3%)	
Breastfed			.24
Ever breastfed	279 (43.5%)	30 (36.6%)	
Prematurity (<37 wk)			.04
Premature	73 (11.8%)	16 (19.8%)	
Maternal age			.22
18–24	256 (39.9%)	37 (45.1%)	

TABLE 5 Continued

	Not Missing, <i>N</i> (%)	Missing, <i>N</i> (%)	<i>P</i> ( $\chi^2$ )
25–29	155 (24.2%)	22 (26.8%)	
30–34	121 (18.9%)	12 (14.6%)	
35–39	91 (14.2%)	9 (11.0%)	
40–44	18 (2.8%)	2 (2.4%)	
Maternal education			.19
None	9 (1.4%)	1 (1.2%)	
Primary	56 (8.7%)	4 (4.9%)	
Secondary junior	323 (50.4%)	39 (48.2%)	
Secondary senior	253 (39.5%)	37 (45.7%)	
Maternal income			.67
None	409 (63.8%)	57 (70.4%)	
<P500	33 (5.2%)	4 (4.9%)	
P501–P1000	88 (13.7%)	8 (9.9%)	
>P1000	111 (17.3%)	12 (14.8%)	
Access to sanitation			.95
Indoor	137 (21.5%)	18 (22.2%)	
Private	428 (67.1%)	53 (65.4%)	
Shared	73 (11.4%)	10 (12.4%)	
Access to electricity			.50
Yes	363 (56.5%)	49 (60.5%)	
Access to water			.67
Home	123 (19.2%)	20 (24.7%)	
Yard	440 (68.5%)	55 (67.9%)	
Communal	68 (10.6%)	6 (7.4%)	
Other	11 (1.8%)	0 (0%)	
Cooking method			.07
Gas, electric	469 (73.1%)	56 (69.1%)	
Wood	159 (24.8%)	22 (27.2%)	
Kerosene	5 (0.8%)	3 (3.7%)	
None	9 (1.4%)	0 (0%)	
Housing type			.60
Formal	634 (98.8%)	81 (100%)	
Informal	6 (0.9%)	—	
None	2 (0.3%)	—	

*P*, *p*-value; —, not applicable.

**SUPPLEMENTAL TABLE 6** Baseline Characteristics of Tested Versus Not Tested for Bayley-III Outcomes (Among Those With at Least 1 Valid Assessment) of all Children in the Tshipidi Study, Botswana 2010–2012

Characteristic	Tested ( <i>N</i> = 724), <i>N</i> (% of total)	Not Tested ( <i>N</i> = 133), <i>N</i> (% of total)	<i>P</i> ( $\chi^2$ or <i>t</i> test)
HIV-exposed			<.01
Yes	337 (46.5)	89 (66.9)	—
Sex			.38
Female	367 (50.7)	73 (54.9)	—
Birth weight			<.01
Low birth weight	92 (12.8)	26 (22.0)	—
Breastfed			<.01
Ever breastfed	415 (57.3)	46 (34.6)	—
Prematurity (<37 wk)			<.01
Premature	89 (12.8)	28 (22.2)	—
Maternal age			.33
18–24	293 (40.5)	57 (42.9)	—
25–29	177 (24.5)	35 (26.3)	—
30–34	133 (18.4)	28 (21.1)	—
35–39	100 (13.8)	12 (9.0)	—
40–44	20 (2.8)	1 (0.8)	—
Maternal education			.18
None	10 (1.4)	3 (2.3)	—
Primary	60 (8.3)	10 (7.7)	—
Secondary junior	362 (50.1)	53 (40.8)	—
Secondary senior or tertiary	290 (40.2)	64 (49.2)	—
Maternal income			.11
None	466 (64.5)	73 (56.2)	—
<P500	37 (5.1)	4 (3.1)	—
P501–P1000	96 (13.3)	24 (18.5)	—
>P1000	123 (17.0)	29 (22.3)	—
Access to sanitation			<.01
Indoor	155 (21.6)	47 (36.4)	—
Private	481 (66.9)	65 (50.4)	—
Shared	83 (11.5)	16 (12.4)	—
Access to electricity			.01
Yes	412 (57.0)	89 (68.5)	—
Access to water			<.01
Home	143 (19.8)	46 (35.4)	—
Yard	495 (68.5)	70 (53.9)	—
Communal	74 (10.2)	14 (10.8)	—
Other	11 (1.5)	0 (0)	—
Cooking method			<.01
Gas, electric	525 (72.6)	113 (86.9)	—
Wood	181 (25.0)	2 (1.5)	—
Kerosene	8 (1.1)	15 (11.5)	—
None	9 (1.2)	0 (0)	—
Housing type			.62
Formal	715 (98.9)	128 (98.5)	—
Informal	6 (0.8)	2 (1.5)	—
None	2 (0.3)	0 (0.0)	—

P, *p* value; —, not applicable.

**SUPPLEMENTAL TABLE 7** Unadjusted Mean Bayley-III Neurodevelopment Domain Scores and Univariate Analysis for All Children in the Tshipidi Study (With at Least 1 Valid Bayley-III Assessment), Botswana 2010–2012

	Bayley-III Cognitive			Bayley-III Gross Motor			Bayley-III Fine Motor			Bayley-III Expressive Language			Bayley-III Receptive Language							
	N	Mean	SD	P	N	Mean	SD	P	N	Mean	SD	P	N	Mean	SD	P				
Total	658	53.4	3.3	—	642	52.8	2.7	—	669	37.3	1.8	—	653	25.4	4.2	—	653	20.9	3.4	—
HIV exposure status				<.01				.21				.47				.02				.21
HIV-unexposed	348	53.0	3.3		336	52.9	2.7		358	37.4	1.8		348	25.8	4.1		348	20.7	3.3	
HIV-exposed	310	53.8	3.4		306	52.6	2.8	.25	311	37.3	1.8	<.01	305	25.0	4.4	.03	305	21.1	3.5	.02
Sex				.03																
Female	337	53.7	3.4		328	52.7	2.9		341	37.6	1.7		337	25.8	4.1		337	21.2	3.3	
Male	321	53.1	3.3		314	52.9	2.6		328	37.0	1.9	.12	316	25.1	4.3	.03	316	20.6	3.5	.16
Birth weight				<.01																
Normal	572	53.5	3.3		560	52.9	2.7		582	37.4	1.8		568	25.6	4.2		567	21.0	3.4	
Low birth weight	82	52.4	3.7		78	51.7	3.0		83	37.0	1.7		81	24.5	4.4		82	20.4	3.5	
Ever breastfed				<.01				.45				.75				.02				.41
Not breastfed	283	53.8	3.3		279	52.7	2.8		283	37.3	1.8		280	25.0	4.4		279	21.0	3.6	
Breastfed	375	53.1	3.4		363	52.9	2.7		386	37.3	1.8		373	25.8	4.1		374	20.8	3.3	
Prematurity				.15				<.01				.09				.86				.06
Term	561	53.5	3.4		544	52.9	2.6		569	37.3	1.7		556	25.4	4.2		555	21.0	3.4	
Premature	73	52.9	3.1		73	52.0	3.2		76	37.0	2.2		73	25.3	4.5		74	20.2	3.5	
Maternal viral load				.99				.64				.93				.29				.75
Missing (HUU)	351	53.0	3.3		340	52.9	2.7		361	37.3	1.8		351	25.8	4.1		351	20.7	3.3	
≤400	116	53.7	3.4		112	52.9	2.4		115	37.3	1.7		113	25.2	4.1		114	21.0	3.0	
400–999	28	53.4	3.6		27	52.2	3.5		28	37.3	2.3		28	25.4	4.1		28	21.0	3.1	
1000–9999	72	54.4	3.0		73	52.4	3.2		72	37.3	1.9		71	25.1	4.7		71	21.2	3.5	
≥10000	91	53.5	3.4		90	52.7	2.7		93	37.3	1.7		90	24.5	4.6		89	21.1	4.2	
Maternal CD4				.54				.67				.23				.19				.34
Missing (HUU)	348	53.0	3.3		336	52.9	2.7		358	37.3	1.8		347	25.8	4.1		347	20.7	3.3	
<200	19	53.2	3.0		19	52.7	2.3		19	36.7	2.2		19	24.7	4.2		19	20.7	4.0	
200–349	69	53.6	3.1		68	52.7	3.0		71	37.2	1.6		69	24.9	4.3		68	21.0	2.9	
300–499	116	54.0	3.6		115	52.7	2.6		116	37.3	1.9		114	24.5	4.6		115	20.8	3.9	
≥500	106	53.8	3.1		104	52.5	3.0		105	37.4	1.8		104	25.7	4.1		104	21.4	3.5	
ART				.31				.77				.60				.26				.79
None (HUU)	348	53.0	3.3		336	52.9	2.7		358	37.3	1.8		347	25.8	4.1		347	20.7	3.3	
ZDV	538	53.4	3.4		525	52.8	2.8		550	37.3	1.8		536	25.5	4.2		535	20.9	3.5	
3-drug ART	115	53.1	3.2		112	52.7	2.5		114	37.2	1.8		112	25.0	4.1		113	20.8	3.1	
Maternal age				.02				.17				.90				.72				.14
18–24	265	52.9	3.3		256	52.5	2.9		271	37.2	1.8		263	25.4	4.3		262	20.6	3.8	
25–29	157	53.9	3.4		155	53.0	2.6		160	37.4	1.9		159	25.4	4.2		158	21.1	3.0	
30–34	122	53.4	3.6		121	53.1	2.72		124	37.5	1.9		121	25.9	4.2		122	21.3	3.3	
35–39	94	53.6	3.0		91	52.7	2.46		94	37.0	1.7		91	25.1	4.1		92	20.7	3.1	
40–44	19	54.4	3.0		18	53.4	2.68		19	37.6	1.5		18	24.6	5.1		18	21.6	2.0	

TABLE 7 Continued

	Bayley-III Cognitive					Bayley-III Gross Motor					Bayley-III Fine Motor					Bayley-III Expressive Language					Bayley-III Receptive Language				
	N	Mean	SD	P		N	Mean	SD	P		N	Mean	SD	P		N	Mean	SD	P		N	Mean	SD	P	
Maternal education	10	53.7	2.2	.47		9	52.4	3.5	.02		10	37.0	1.2	.01		10	24.0	4.7	<.01		10	19.9	2.9	.75	
None	56	52.8	3.5			56	51.8	3.0			56	37.1	1.8			55	23.2	4.1			55	20.3	3.2		
Primary	330	53.4	3.3			323	52.8	2.6			333	37.2	1.8			328	25.6	4.2			329	21.2	3.5		
Secondary junior	262	53.4	3.3			253	53.0	2.7			269	37.5	1.8			260	25.8	4.1			259	20.6	3.3		
Secondary senior or tertiary	426	53.1	3.4	<.01		409	52.6	2.7	.04		434	37.2	1.8	.16		423	25.5	4.1	.49		424	20.7	3.3	.20	
Maternal income	34	53.4	3.3			33	53.1	1.9			34	37.2	1.7			33	26.0	4.4			33	22.8	5.1		
<P500	87	54.0	3.2			88	53.0	2.9			88	37.3	1.6			86	24.7	4.5			86	21.1	3.0		
P501-P1000	110	54.0	3.16			111	53.1	2.7			112	37.5	2.1			110	25.5	4.3			109	21.0	3.2		
>P1000	138	53.6	3.4	.60		137	53.0	2.8	.30		143	37.6	1.8	<.01		138	26.0	4.0	.33		138	21.0	3.2	.48	
Access to sanitation	443	53.2	3.3			428	52.8	2.7			448	37.3	1.8			439	25.2	4.3			439	20.8	3.5		
Indoor	73	54.2	3.4	.30		73	52.5	2.7	.17		74	37.0	1.8	.68		72	25.7	4.1	.05		72	21.5	3.0	.47	
Private	372	53.3	3.5			363	52.9	2.8			383	37.3	1.7			373	25.3	4.2			373	20.7	3.5		
Shared	286	53.5	3.2	.70		279	52.6	2.7	<.01		286	37.3	1.9	.12		280	25.6	4.2	.66		280	21.2	3.2	.61	
Electricity	124	53.5	3.2			123	53.0	2.9			129	37.5	1.7			124	25.8	3.8			124	20.7	3.4		
Yes	455	53.3	3.4			440	52.9	2.6			461	37.3	1.8			452	25.4	4.3			452	20.9	3.4		
No	68	53.4	3.3	.30		68	51.6	2.8	—		68	37.0	1.7			66	25.3	4.1			66	21.4	3.2		
Access to water	11	52.2	2.3	.63		11	51.2	3.6	.04		11	36.3	1.4	.42		11	24.2	4.3	.15		11	19.9	2.3	.05	
Home	478	53.4	3.4			469	52.9	2.7			487	37.3	1.8			474	25.6	4.2			474	21.0	3.4		
Yard	166	53.2	3.3	.70		159	52.3	2.7	<.01		167	37.1	1.8	.12		165	25.0	4.2	.66		165	20.4	3.5		
Communal	5	53.4	1.5			5	52.0	0.7			6	37.7	1.5			5	24.0	6.1			5	20.6	3.4		
Other	9	54.7	2.1	.70		9	54.2	2.6	.11		9	37.9	1.3	.11		9	27.8	2.9	.64		9	23.2	1.9	.68	
Cooking method	650	53.4	3.3			634	52.8	2.7			661	37.3	1.8			645	25.4	4.2			645	20.9	3.4		
Gas, electric	6	52.7	2.9	.65		6	50.5	2.9	.02		6	36.5	0.8	.95		6	24.3	4.8	.16		6	19.7	2.9	.90	
Wood	2	55.0	5.7			2	52.0	2.8			2	35.0	0.0			2	27.5	0.7			2	21.0	1.4		
Kerosene	227	53.3	3.5			223	53.0	2.5			233	37.3	1.8			228	25.7	4.1			226	20.9	3.1		
None	146	53.4	3.3	.06		141	52.9	2.9	.31		148	37.3	1.8	.78		146	25.3	4.5	.45		146	20.6	4.1		
Housing type	162	53.8	3.4			161	52.6	2.6			166	37.4	1.9			159	25.5	4.1			160	21.4	3.0		
Formal	122	52.9	2.9	.06		116	52.3	2.9	.02		121	37.1	1.7	.78		119	25.0	4.1	.16		120	20.6	3.3		
Informal	—	—	—			—	—	—		—	—	—			—	—	—				—	—	—		
None	—	—	—			—	—	—		—	—	—			—	—	—				—	—	—		
Food insecurity	—	—	—			—	—	—		—	—	—			—	—	—				—	—	—		
Mild	—	—	—			—	—	—		—	—	—			—	—	—				—	—	—		
Moderate	—	—	—			—	—	—		—	—	—			—	—	—				—	—	—		
Severe	—	—	—			—	—	—		—	—	—			—	—	—				—	—	—		
Depression	—	—	—			—	—	—		—	—	—			—	—	—				—	—	—		
High score	—	—	—			—	—	—		—	—	—			—	—	—				—	—	—		

TABLE 7 Continued

	Bayley-III Cognitive			Bayley-III Gross Motor			Bayley-III Fine Motor			Bayley-III Expressive Language			Bayley-III Receptive Language			
	N	Mean	SD	P	N	Mean	SD	P	N	Mean	SD	P	N	Mean	SD	P
Social support	—	—	—	.06	—	—	—	.11	—	—	—	.76	—	—	—	.49
High score	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Stigma	—	—	—	.17	—	—	—	.82	—	—	—	.63	—	—	—	.23
High score	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Alcohol use	—	—	—	.07	—	—	—	.63	—	—	—	.43	—	—	—	.70
Ever used	45	53.1	2.8	—	46	52.5	2.9	—	45	37.2	1.8	—	45	25.9	3.8	—
Never used	489	53.6	3.4	—	477	52.7	2.7	—	498	37.2	1.8	—	485	25.1	4.2	—
Tobacco use	—	—	—	.43	—	—	—	.55	—	—	—	.02	—	—	—	.23
Ever used	9	54.0	2.0	—	9	53.1	1.5	—	9	36.6	1.2	—	9	26.9	3.2	—
Never used	11	54.0	3.5	—	10	53.1	4.2	—	11	36.3	1.4	—	11	24.3	5.8	—

Percentage of participants missing values for variables: electricity in home: 0.1%, source of water: 0.1%, cooking method: 0.1%, housing: 0.1%, food insecurity: 0.1%, depression: 0%, social support: 5.5%, alcohol use (ever): 55.6%, tobacco use (ever): 58.8. P, *P*; pulla; —, not applicable

**SUPPLEMENTAL TABLE 8** Unadjusted Mean DMC Neurodevelopment Domain Scores and Univariate Analysis for All Children in the Tshipidi Study (With at Least 1 Valid Bayley-III Assessment), Botswana 2010–2012

	DMC Locomotor			DMC Fine Motor			DMC Language			DMC Personal-Social						
	N	Mean	SD	P	N	Mean	SD	P	N	Mean	SD	P				
Total	723	32.2	1.8	—	718	19.3	2.1	—	723	16.5	2.7	—	720	44.8	4.2	—
HIV exposure status																
HIV-unexposed	386	32.2	1.8	.58	382	19.4	1.9	.05	386	16.5	2.7	.92	385	44.5	4.5	.06
HIV-exposed	337	32.2	1.8	.89	336	19.1	2.3	.03	337	16.5	2.6	.12	335	45.1	3.9	<.01
Sex																
Male	357	32.2	1.6	.05	356	19.1	2.1	.67	357	16.3	2.7	.19	355	44.4	4.7	.95
Birth weight																
Normal	626	32.2	1.8		622	19.3	2.1		626	16.5	2.7		624	44.8	4.4	
Low birth weight	92	31.8	1.8	.13	91	19.2	2.0	.11	92	16.1	2.7	.42	91	44.8	3.1	.27
Breastfeeding																
Ever breastfed	309	32.1	1.9		308	19.1	2.2		309	16.4	2.7		307	45.0	4.1	
Not breastfed	414	32.3	1.8	.02	410	19.4	2.0	.08	414	16.5	2.6	.35	413	44.6	4.4	.22
Prematurity																
Term	608	32.3	1.7		604	19.3	2.1		608	16.5	2.7		605	44.8	4.2	
Premature	89	31.8	2.8	.56	88	18.9	2.4	.33	89	16.2	2.9	.86	89	44.2	4.7	.97
Maternal viral load																
Missing (HUU)	388	32.2	1.9		384	19.4	1.9		388	16.5	2.7		387	44.6	4.5	
≤400	126	32.4	1.6		125	19.5	1.8		126	16.3	2.8		125	45.1	3.8	
400–999	29	31.8	1.7		29	18.0	2.6		29	16.7	3.1		29	44.9	3.4	
1000–9999	79	31.8	2.2		79	18.8	2.7		79	16.7	2.2		79	45.0	3.3	
≥10000	101	32.3	1.6	.57	101	19.2	2.2	.89	101	16.3	2.8	.58	100	45.1	4.8	.86
Maternal CD4																
Missing (HUU)	385	32.2	1.8		381	19.4	1.9		385	16.5	2.7		384	44.5	4.5	
<200	23	32.3	1.2		23	18.5	2.0		23	15.8	3.9		23	43.7	8.7	
200–349	77	32.3	1.5		77	19.3	2.2		77	16.7	2.5		77	45.6	3.0	
300–499	125	32.0	1.8		124	19.2	2.1		125	16.2	2.7		123	45.1	2.7	
≥500	113	32.1	2.2	.97	113	18.9	2.5	.44	113	16.6	2.5	.46	113	45.0	4.3	.98
ART																
None (HUU)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
ZDV	596	32.2	1.9		592	19.2	2.1		596	16.5	2.6		594	44.8	4.1	
3-drug ART	121	32.2	1.7	.60	120	19.4	1.9	.32	121	16.3	2.8	.12	120	44.8	4.9	.42
Maternal age																
18–24	292	32.1	1.7		291	19.2	2.0		292	16.5	2.5		292	44.8	3.2	
25–29	177	32.3	1.8		176	19.2	2.3		177	16.7	2.6		177	45.3	3.5	
30–34	133	32.2	2.2		131	19.5	2.0		133	16.2	2.9		130	44.5	5.9	
35–39	100	32.1	2.0		99	19.1	2.3		100	16.2	3.1		100	44.2	5.6	
40–44	20	32.8	1.2	.08	20	20.0	1.8	<.01	20	15.9	2.4	.02	20	45.5	2.5	.82
Maternal education																
None	10	31.4	2.1		10	17.6	2.6		10	16.8	1.9		10	45.6	3.0	
Primary	60	31.9	2.3		60	19.2	2.4		60	15.9	2.3		60	44.9	3.3	
Secondary junior	362	32.2	1.9		359	19.0	2.2		362	16.3	2.8		360	44.7	5.0	
Secondary senior or tertiary	289	32.3	1.7	.12	287	19.6	1.8	.51	289	16.8	2.5	.75	288	44.9	3.4	.49
Maternal income																
None	466	32.1	1.8		462	19.2	2.1		466	16.5	2.7		465	44.7	4.2	



TABLE 8 Continued

	DMC Locomotor				DMC Fine Motor				DMC Language				DMC Personal-Social			
	N	Mean	SD	P	N	Mean	SD	P	N	Mean	SD	P	N	Mean	SD	P
<P500	37	32.3	1.5		37	19.1	2.3		37	16.4	2.7		37	44.7	3.6	
P501-P1000	96	32.3	2.4		95	19.2	2.1		96	16.3	3.1		95	44.9	6.0	
>P1000	122	32.5	1.4		122	19.5	2.1		122	16.6	2.2		121	45.3	2.9	
Access to sanitation				.64				.02				.82				.28
Indoor	155	32.3	2.0		154	19.5	1.9		155	16.7	2.7		154	44.8	5.4	
Private	480	32.2	1.7		476	19.3	2.1		480	16.3	2.8		478	44.7	3.9	
Shared	83	32.2	2.2		83	18.8	2.6		83	17.0	2.1		83	45.7	3.7	
Electricity				.57				.05				.75				.24
Yes	411	32.2	2.0		408	19.4	2.0		411	16.4	2.6		408	44.6	4.4	
No	311	32.1	1.6		309	19.1	2.2		311	16.5	2.8		311	45.0	4.0	
Access to water				.59				.37				.53				.57
Home	143	32.2	2.1		142	19.4	1.9		143	16.6	2.8		142	44.5	5.6	
Yard	494	32.2	1.8		490	19.3	2.1		494	16.4	2.7		492	44.8	3.8	
Communal	74	32.5	1.4		74	18.9	2.3		74	16.8	2.0		74	45.6	4.2	
Other	11	31.6	1.7		11	18.9	1.7		11	16.4	1.7		11	44.7	2.4	
Cooking method				<.01				<.01				.48				.20
Gas, electric	524	32.3	1.8		520	19.4	2.0		524	16.6	2.7		521	45.0	4.4	
Kerosene	181	31.9	1.7		180	19.0	2.2		181	16.1	2.6		181	44.3	3.7	
Wood	8	29.9	4.9		8	17.3	4.0		8	16.6	2.4		8	41.3	7.7	
None	9	32.2	1.3		9	20.2	1.0		9	16.0	0.0		9	45.3	2.6	
Housing type				.41				.16				.16				.37
Formal	714	32.2	1.8		709	19.3	2.1		714	16.5	2.7		711	44.8	4.3	
Informal	6	32.0	1.4		6	18.5	2.2		6	15.7	2.7		6	43.7	3.8	
None	2	30.5	0.7		2	20.5	0.7		2	17.0	1.4		2	47.0	2.8	
Food insecurity				.83				.16				.51				.07
None	252	32.1	2.3		248	19.3	2.0		252	16.5	3.0		250	45.0	5.0	
Mild	163	32.4	1.2		163	19.5	1.9		163	16.5	2.2		163	44.8	2.6	
Moderate	176	32.2	1.4		176	19.1	2.1		176	16.5	2.4		175	44.7	4.4	
Severe	131	32.1	2.0		130	19.1	2.3		131	16.3	2.9		131	44.6	4.2	
Depression				<.01				.16				.07				.03
High score	—	—	—		—	—	—		—	—	—		—	—	—	
Social support				.02				.04				.09				.12
High score	—	—	—		—	—	—		—	—	—		—	—	—	
Stigma	—	—	—	.64	—	—	—	.86	—	—	—	.16	—	—	—	.66
High score	—	—	—		—	—	—	.75	—	—	—	.38	—	—	—	.96
Alcohol use				.80				.75				.38				.96
Ever used	46	32.4	1.8		46	19.9	1.8		46	17.0	2.3		46	45.1	4.6	
Never used	538	32.2	1.6		536	19.2	2.2		538	16.4	2.8		535	44.8	4.4	
Tobacco use				.54				.33				.01				.36
Ever used	10	32.6	1.3		10	19.5	2.0		10	17.0	1.9		10	45.2	2.8	
Never used	13	32.3	2.0		13	19.8	2.0		13	18.3	2.8		13	45.8	3.0	

Percentage of participants missing values for variables: electricity in home: 0.1%, source of water: 0.1%, cooking method: 0.1%, housing: 0.1%, food insecurity: 0.1%, depression: 0%, social support: 5.5%, alcohol use (ever): 55.6%, tobacco use (ever): 58.8%. P, p-value; —, not applicable.

**SUPPLEMENTAL TABLE 9** Sensitivity Analyses of Bayley-III and DMC Neurodevelopment Domain Scores for All Children in the Tshipidi Study (With at Least 1 Valid Bayley-III Assessment), Botswana 2010–2012

Bayley-III Domain	N	Adjusted Difference HEU Versus HUU		Further Adjusted for Birth Weight		Further Adjusted for Prematurity	
		Mean Difference (95% CI)	P	Mean Difference (95% CI)	P	Mean Difference (95% CI)	P
Cognitive	657	0.6 (0.1 to 1.1)	.03	0.7 (0.2 to 1.2)	.01	0.7 (0.1 to 1.1)	.02
Gross motor	642	−0.1 (−0.5 to 0.3)	.63	−0.1 (−0.5 to 0.4)	.80	−0.1 (−0.6 to 0.3)	.56
Fine motor	668	0.0 (−0.3 to 0.3)	.98	0.0 (−0.3 to 0.3)	.89	0.0 (−0.3 to 0.3)	.97
Expressive language	652	−0.6 (−1.3 to 0.1)	.09	−0.5 (−1.2 to 0.1)	.12	−0.6 (−1.3 to 0.1)	.08
Receptive language	652	0.3 (−0.3 to 0.8)	.35	0.3 (−0.3 to 0.8)	.31	0.3 (−0.3 to 0.8)	.36
DMC domain							
Locomotor	723	−0.1 (−0.3 to 0.2)	.66	−0.1 (−0.3 to 0.2)	.77	−0.1 (−0.3 to 0.2)	.67
Fine motor	718	−0.1 (−0.4 to 0.2)	.63	−0.1 (−0.4 to 0.3)	.71	−0.1 (−0.4 to 0.2)	.60
Language	723	0.2 (−0.2 to 0.6)	.43	0.2 (−0.2 to 0.6)	.33	0.2 (−0.3 to 0.6)	.43
Personal-social	720	0.7 (0.1 to 1.3)	.02	0.7 (0.0 to 1.3)	.04	0.7 (0.1 to 1.4)	.02

CI, confidence interval.

**SUPPLEMENTAL TABLE 10** Baseline Characteristics of at Risk (at Risk, Low Score <1 SD Below Domain-Specific Mean, or Invalid) Versus Within Normal Range (Not at Risk, Not Low Score, Valid) Children in the Tshipidi Study, Botswana 2010–2012

	Within Normal Range, <i>N</i> (%)	Low, Invalid, or at Risk, <i>N</i> (%)	<i>P</i> ( $\chi^2$ )
Bayley-III cognitive	549 (81.3%)	126 (18.7%)	—
HIV exposure status			.05
HIV-exposed	266 (48.5%)	49 (38.9%)	
Sex			.07
Female	289 (52.6%)	55 (43.7%)	
Birth weight			.09
Low birth weight	62 (11.4%)	21 (16.9%)	
Breastfed			.06
Ever breastfed	306 (55.7%)	82 (65.1%)	
Prematurity (<37 wk)			.99
Premature	63 (11.8%)	14 (11.9%)	
Maternal age			.03
18–24	207 (37.7%)	67 (53.6%)	
25–29	142 (25.9%)	17 (13.6%)	
30–34	101 (18.4%)	24 (19.2%)	
35–39	82 (14.9%)	15 (12.0%)	
40–44	17 (3.1%)	2 (1.6%)	
Maternal education			.60
None	10 (1.8%)	0 (0%)	
Primary	43 (7.8%)	13 (10.3%)	
Secondary junior	278 (50.6%)	60 (47.6%)	
Secondary senior or tertiary	218 (39.7%)	53 (42.1%)	
Maternal income			.06
None	349 (63.7%)	90 (71.4%)	
<P500	29 (5.3%)	6 (4.8%)	
P501–P1000	72 (13.1%)	16 (12.7%)	
>P1000	98 (17.9%)	14 (11.1%)	
Access to sanitation			.29
Indoor	118 (21.6%)	23 (18.4%)	
Private	364 (66.7%)	92 (73.6%)	
Shared	64 (11.7%)	10 (8.0%)	
Electricity			.98
Yes	310 (56.5%)	71 (56.4%)	
Access to water			.98
Home	105 (19.1%)	23 (18.3%)	
Yard	380 (69.2%)	87 (69.1%)	
Communal	55 (10.0%)	14 (11.1%)	
Other	9 (1.7%)	2 (1.6%)	
Cooking method			.44
Gas, electric	399 (72.7%)	89 (70.6%)	
Wood	136 (24.8%)	36 (28.6%)	
Kerosene	5 (0.9%)	1 (0.8%)	
None	9 (1.6%)	0 (0%)	
Housing type			.79
Formal	542 (98.7%)	125 (99.2%)	
Informal	5 (0.9%)	1 (0.8%)	
None	2 (0.4%)	0 (0%)	
Bayley-III gross motor	542 (81.9%)	120 (18.1%)	—
HIV exposure status			.77
HIV-exposed	254 (46.9%)	58 (48.3%)	
Sex			.30
Female	270 (49.8%)	66 (55.0%)	
Birth weight			<.01
Low birth weight	56 (10.4%)	23 (19.5%)	
Breastfed			.92
Ever breastfed	310 (57.2%)	68 (56.7%)	
Premature			.15
Premature	59 (11.2%)	18 (16.1%)	

**TABLE 10** Continued

	Within Normal Range, <i>N</i> (%)	Low, Invalid, or at Risk, <i>N</i> (%)	<i>P</i> ( $\chi^2$ )
Maternal age			.69
18–24	213 (39.4%)	54 (45.0%)	
25–29	131 (24.2%)	27 (22.5%)	
30–34	105 (19.4%)	19 (15.8%)	
35–39	76 (14.1%)	18 (15.0%)	
40–44	16 (3.0%)	2 (1.7%)	
Maternal education			.98
None	8 (1.5%)	1 (0.8%)	
Primary	42 (7.8%)	14 (11.8%)	
Secondary junior	278 (51.3%)	54 (45.4%)	
Secondary senior or tertiary	214 (39.5%)	50 (42.0%)	
Maternal income			.15
None	341 (63.0%)	84 (70.0%)	
<P500	29 (5.4%)	5 (4.2%)	
P501–P1000	74 (13.7%)	15 (12.5%)	
>P1000	97 (17.9%)	16 (13.3%)	
Access to sanitation			.68
Indoor	118 (21.9%)	24 (20.2%)	
Private	363 (67.4%)	79 (66.4%)	
Shared	58 (10.8%)	16 (13.5%)	
Access to electricity			.33
Yes	311 (57.4%)	63 (52.5%)	
Access to water			.02
Home	109 (20.1%)	20 (16.7%)	
Yard	377 (69.6%)	75 (62.5%)	
Communal	49 (9.0%)	21 (17.5%)	
Other	7 (1.3%)	4 (3.3%)	
Cooking method			.23
Gas, electric	399 (73.6%)	82 (68.3%)	
Wood	129 (23.8%)	37 (30.8%)	
Kerosene	5 (0.9%)	1 (0.8%)	
None	9 (1.7%)	0 (0%)	
Housing type			.06
Formal	538 (99.3%)	116 (96.7%)	
Informal	3 (0.6%)	3 (2.5%)	
None	1 (0.2%)	1 (0.8%)	
Bayley-III fine motor	585 (85.8%)	97 (14.2%)	—
HIV exposure status			.63
HIV-exposed	268 (45.8%)	47 (48.5%)	
Sex			<.01
Female	314 (53.7%)	33 (34.0%)	
Birth weight			.94
Low birth weight	72 (12.4%)	12 (12.6%)	
Breastfed			.79
Ever breastfed	340 (58.1%)	55 (56.7%)	
Prematurity (<37 wk)			<.01
Premature	58 (10.3%)	22 (23.2%)	
Maternal age			.50
18–24	239 (40.9%)	38 (39.2%)	
25–29	134 (23.0%)	28 (28.9%)	
30–34	109 (18.7%)	17 (17.5%)	
35–39	83 (14.2%)	14 (14.4%)	
40–44	19 (3.3%)	0 (0%)	
Maternal education			.42
None	9 (1.5%)	1 (1.0%)	
Primary	47 (8.0%)	9 (9.4%)	
Secondary junior	289 (49.4%)	52 (54.2%)	
Secondary senior or tertiary	240 (41.0%)	34 (35.4%)	
Maternal income			.88
None	378 (64.7%)	66 (68.0%)	
<P500	32 (5.5%)	3 (3.1%)	

TABLE 10 Continued

	Within Normal Range, <i>N</i> (%)	Low, Invalid, or at Risk, <i>N</i> (%)	<i>P</i> ( $\chi^2$ )
P501–P1000	79 (13.5%)	10 (10.3%)	
>P1000	95 (16.3%)	18 (18.6%)	
Access to sanitation			.18
Indoor	126 (21.7%)	19 (19.6%)	
Private	396 (68.2%)	62 (63.9%)	
Shared	59 (10.2%)	16 (16.5%)	
Electricity			.77
Yes	335 (57.3%)	54 (55.7%)	
Access to water			.66
Home	114 (19.5%)	18 (18.6%)	
Yard	405 (69.2%)	65 (67.0%)	
Communal	58 (9.9%)	11 (11.3%)	
Other	8 (1.4%)	3 (3.1%)	
Cooking method			.32
Gas, electric	426 (72.8%)	68 (70.1%)	
Wood	6 (1.0%)	0 (0%)	
Kerosene	144 (24.6%)	29 (29.9%)	
None	9 (1.5%)	0 (0%)	
Housing type			<.01
Formal	579 (99.0%)	95 (97.9%)	
Informal	6 (1.0%)	0 (0%)	
None	0 (0%)	2 (2.1%)	
Bayley-III expressive language	513 (76.2%)	160 (23.8%)	—
HIV exposure status			.04
HIV-exposed	226 (44.1%)	85 (53.1%)	
Sex			.10
Female	272 (53.0%)	87 (54.4%)	
Birth weight			.19
Low birth weight	58 (11.4%)	24 (15.3%)	
Breastfed			.09
Ever breastfed	305 (59.5%)	83 (51.9%)	
Premature			.81
Premature	58 (11.7%)	19 (12.4%)	
Maternal age			.82
18–24	207 (40.4%)	67 (41.9%)	
25–29	120 (23.4%)	42 (26.3%)	
30–34	102 (19.9%)	22 (13.8%)	
35–39	71 (13.9%)	23 (14.4%)	
40–44	12 (2.3%)	6 (3.8%)	
Maternal education			.12
None	6 (1.2%)	4 (2.5%)	
Primary	36 (7.0%)	19 (11.9%)	
Secondary junior	264 (51.5%)	73 (45.6%)	
Secondary senior or tertiary	207 (40.4%)	64 (40.0%)	
Maternal income			.26
None	339 (66.2%)	100 (62.5%)	
<P500	26 (5.1%)	8 (5.0%)	
P501–P1000	59 (11.5%)	28 (17.5%)	
>P1000	88 (17.2%)	24 (15.0%)	
Access to sanitation			.24
Indoor	116 (22.8%)	27 (17.0%)	
Private	337 (66.1%)	116 (73.0%)	
Shared	57 (11.2%)	16 (10.1%)	
Electricity			.81
Yes	294 (57.3%)	90 (56.3%)	
Access to water			.50
Home	107 (20.9%)	23 (14.4%)	
Yard	348 (67.8%)	116 (72.5%)	
Communal	49 (9.6%)	19 (11.9%)	
Other	9 (1.8%)	2 (1.3%)	
Cooking method			.08

**TABLE 10** Continued

	Within Normal Range, <i>N</i> (%)	Low, Invalid, or at Risk, <i>N</i> (%)	<i>P</i> ( $\chi^2$ )
Gas, electric	376 (73.3%)	110 (68.8%)	
Wood	125 (24.4%)	47 (29.4%)	
Kerosene	3 (0.6%)	3 (1.9%)	
None	9 (1.8%)	0 (0%)	
Housing type			.67
Formal	506 (98.6%)	159 (99.4%)	
Informal	5 (1.0%)	1 (0.6%)	
None	2 (0.4%)	0 (0%)	
Bayley-III receptive language	549 (81.6%)	124 (18.4%)	—
HIV exposure status			.95
HIV-exposed	254 (46.3%)	57 (46.0%)	
Sex			.09
Female	290 (52.8%)	55 (44.4%)	
Birth weight			.08
Low birth weight	62 (11.4%)	21 (17.2%)	
Breastfed			.89
Ever breastfed	318 (57.9%)	71 (57.3%)	
Premature			.04
Premature	57 (10.8%)	21 (17.5%)	
Maternal age			.05
18–24	210 (38.3%)	63 (50.8%)	
25–29	138 (25.2%)	23 (18.6%)	
30–34	107 (19.5%)	18 (14.5%)	
35–39	75 (13.7%)	20 (16.1%)	
40–44	18 (3.3%)	0 (0%)	
Maternal education			.38
None	8 (1.5%)	2 (1.6%)	
Primary	45 (8.2%)	10 (8.1%)	
Secondary junior	284 (51.7%)	54 (43.6%)	
Secondary senior or tertiary	212 (38.6%)	58 (46.8%)	
Maternal income			.24
None	349 (63.7%)	91 (73.4%)	
<P500	29 (5.3%)	5 (4.0%)	
P501–P1000	75 (13.7%)	12 (9.7%)	
>P1000	95 (17.3%)	16 (12.9%)	
Access to sanitation			.26
Indoor	119 (21.8%)	24 (19.5%)	
Private	363 (66.5%)	90 (73.2%)	
Shared	64 (11.7%)	9 (7.3%)	
Access to electricity			.29
Yes	308 (56.1%)	76 (61.3%)	
Access to water			.90
Home	104 (18.9%)	26 (21.0%)	
Yard	377 (68.7%)	87 (70.2%)	
Communal	58 (10.6%)	10 (8.1%)	
Other	10 (1.9%)	1 (0.8%)	
Cooking method			.02
Gas, electric	407 (74.1%)	79 (63.7%)	
Wood	129 (23.5%)	43 (34.7%)	
Kerosene	4 (0.7%)	2 (1.6%)	
None	9 (1.6%)	0 (0%)	
Housing type			.51
Formal	543 (98.9%)	122 (98.4%)	
Informal	4 (0.7%)	2 (1.6%)	
None	2 (0.4%)	0 (0%)	

*P*, *p* value; —, not applicable.

**SUPPLEMENTAL TABLE 11** Univariate Predictors of Composite Adverse Bayley-III Outcomes (Low, Invalid, or at Risk) Neurodevelopment Domain Scores for All Children in the Tshipidi Study, Botswana 2010–2012

Bayley-III	Cognitive			Gross Motor			Fine Motor			Expressive Language			Receptive Language		
	P	OR (95% CI)	P	OR (95% CI)	P	OR (95% CI)	P	OR (95% CI)	P	OR (95% CI)	P	OR (95% CI)	P	OR (95% CI)	
HIV exposure status	.05		.77		.63		.05		.95						
HIV-exposed vs unexposed		0.68 (0.46 to 1.01)		1.06 (0.71 to 1.58)		1.11 (0.72 to 1.71)		1.44 (1.01 to 2.06)		0.99 (0.67 to 1.46)					
Sex	.07		.30		<.01		.10		.09						
Male vs female		1.44 (0.97 to 2.12)		0.81 (0.55 to 1.21)		2.24 (1.43 to 3.52)		1.35 (0.94 to 1.92)		1.41 (0.95 to 2.01)					
Birth weight	.09		<.01		.94		.19		.08						
Low vs normal		1.59 (0.93 to 2.73)		2.09 (1.23 to 3.56)		1.02 (0.53 to 1.97)		1.41 (0.84 to 2.36)		1.62 (0.95 to 2.78)					
Breastfed	.06		.92		.79		.09		.89						
Ever vs never		1.48 (0.99 to 2.22)		0.98 (0.66 to 1.46)		0.94 (0.61 to 1.46)		0.74 (0.52 to 1.05)		0.97 (0.66 to 1.44)					
Prematurity (<37 wk)	.99		.16		<.01		.81		.04						
Premature vs term		1.00 (0.54 to 1.86)		1.51 (0.85 to 2.68)		2.62 (1.52 to 4.54)		1.07 (0.62 to 1.86)		1.76 (1.02 to 3.03)					
Maternal age	.03		.35		.50		.82		.06						
0.83 (0.69 to 0.98)		0.83 (0.69 to 0.98)		0.92 (0.78 to 1.09)		0.94 (0.78 to 1.13)		0.98 (0.84 to 1.14)		0.84 (0.71 to 1.00)					
Maternal education	.03		.98		.42		.20		.24						
0.83 (0.69 to 0.98)		0.83 (0.69 to 0.98)		1.00 (0.74 to 1.34)		0.88 (0.64 to 1.20)		0.85 (0.65 to 1.09)		1.20 (0.90 to 1.61)					
Maternal income	.07		.15		.88		.62		.06						
0.85 (0.71 to 1.01)		0.85 (0.71 to 1.01)		0.88 (0.74 to 1.05)		0.99 (0.82 to 1.18)		1.04 (0.90 to 1.20)		0.84 (0.71 to 1.01)					
Access to sanitation	.29		.68		.19		.24		.13						
Indoor vs shared		1.25 (0.56 to 2.78)		0.74 (0.36 to 1.49)		0.56 (0.27 to 1.16)		0.82 (0.41 to 1.67)		1.43 (0.63 to 3.27)					
Private vs shared		1.62 (0.80 to 3.27)		0.79 (0.43 to 1.44)		0.58 (0.31 to 1.07)		1.23 (0.68 to 2.22)		1.76 (0.85 to 3.68)					
Electricity	.98		.33		.77		.82		.29						
No vs yes		1.01 (0.68 to 1.49)		1.22 (0.82 to 1.81)		1.07 (0.69 to 1.65)		1.04 (0.73 to 1.49)		0.81 (0.54 to 1.20)					
Source of water	.99		.11		.75		.60		.95						
Yard vs home		1.05 (0.63 to 1.74)		1.08 (0.63 to 1.86)		1.02 (0.58 to 1.78)		1.55 (0.94 to 2.55)		0.92 (0.57 to 1.51)					
Communal vs home		1.16 (0.55 to 2.44)		2.34 (1.16 to 4.70)		1.20 (0.53 to 2.71)		1.80 (0.90 to 3.62)		0.69 (0.31 to 1.53)					
Other vs home		1.30 (0.25 to 6.69)		2.73 (0.63 to 11.8)		3.17 (0.73 to 13.8)		1.33 (0.26 to 6.82)		0.50 (0.06 to 4.18)					
Cooking method	.89		.52		.82		.32		.07						
Gas, electric vs wood		0.84 (0.55 to 1.30)		0.72 (0.46 to 1.11)		0.79 (0.49 to 1.27)		0.79 (0.52 to 1.16)		0.58 (0.38 to 0.89)					
Kerosene vs wood		0.76 (0.09 to 6.67)		0.70 (0.08 to 6.16)		—		2.66 (0.52 to 13.6)		1.50 (0.27 to 8.48)					
None vs wood		—		—		—		—		—					

CI, confidence interval; OR, odds ratio; —, not applicable.

**SUPPLEMENTAL TABLE 12** Multivariate Predictors of Composite Adverse Bayley-III Outcomes (Low, Invalid, or at Risk) for All Children in the Tshipidi Study, Botswana 2010–2012

Bayley-III	Cognitive		Gross Motor		Fine Motor		Expressive Language		Receptive Language	
	<i>P</i>	OR (95% CI)	<i>P</i>	OR (95% CI)	<i>P</i>	OR (95% CI)	<i>P</i>	OR (95% CI)	<i>P</i>	OR (95% CI)
HIV exposure status							.05			
HIV-exposed vs unexposed	—		—		—		1.44 (1.01 to 2.06)		—	
Sex	.05				<.01				.09	
Male vs female		1.50 (1.00 to 2.23)	—			2.18 (1.38 to 3.44)	—			1.43 (0.95 to 2.14)
Birth weight	.05		<.01							
Low vs normal		1.74 (1.01 to 3.00)		2.09 (1.23–3.56)	—		—		—	
Breastfed										
Ever vs never	—		—		—		—		—	
Premature					<.01				.07	
Premature vs term	—		—			2.60 (1.49 to 4.53)	—			1.68 (0.97 to 2.93)
Maternal age	.03		—		—		—		.04	
		0.82 (0.68 to 0.98)	—		—		—			0.83 (0.69 to 0.99)
Cooking method										
Gas, electric vs wood	—		—		—		—			0.58 (0.38 to 0.89)
Kerosene vs wood	—		—		—		—			1.46 (0.25 to 8.50)
None vs wood	—		—		—		—			—

CI, confidence interval; OR, odds ratio; —, not applicable.