EXAMINING APPROACHES TO ESTIMATE THE PREVALENCE OF CATASTROPHIC COSTS DUE TO TUBERCULOSIS FROM SMALL-SCALE STUDIES IN SOUTH AFRICA

Running title: Estimation of TB-related catastrophic costs

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APPENDIX 1: SUPPLEMENTARY TABLES AND FIGURES

Supplementary Table 1 Details of studies presenting household-incurred costs due to TB in South Africa

Study	Year of cost data collection	Provinces	Interventions	Sample size
Wilkinson (1997) [19]	1996	KwaZulu-Natal	DS-TB treatment: 1) Hlabisa (current strategy); 2) Hlabisa (pre-1991 strategy); 3) Department of Health strategy; 4) SANTA strategy	48
Sinanovic (2003) [20]	1998-9	Western Cape	DS-TB treatment: 1) clinic-based care with community-based observation options; 2) clinic-based care only	200
Mandalakas (2013) [21]	No primary data	Not specified	IPT for young children in close contact with an infectious TB case	
Sinanovic (2006) [22]	2002-3	North West, Free State, Western Cape	DS-TB treatment: 1) DOT in public-private workplace partnerships; 2) DOT in public-private non-government partnerships	120
Fairall (2010) [23]	2003	Free State	Educational outreach to primary care nurses	1,999
Van Rie (2013) [24]	2010	Johannesburg	Diagnosis of smear-negative TB with Xpert MTB/RIF	199
Du Toit (2015) [25]	2013	Western Cape	1) MDR-TB diagnosis with LPA 2) MDR-TB diagnosis with XPERT	153
Ramma (2015) [26]	2013	Western Cape	Treatment of rifampicin-resistant and MDR-TB	134
Chimbindi (2015) [27]	2009	KwaZulu-Natal, Gauteng, Mpumalanga	Treatment of DS-TB	1,219
Foster (2015) [28]	2012-13	Gauteng, Mpumalanga, Eastern Cape, Free State	Diagnosis and treatment of DS-TB	171 (cases); 35 (suspects)
Mudzengi (2016) [29]	2013	Gauteng	Treatment of DS-TB	148

Supplementary Table 2 Cohort model inputs and distributions

	Mean	Std Err	Distribution	Source
Number simulated iterations	10000		static	
GINI index (2014) (G)	0.63		static	[42]
Annual per capita income	10,130.10		static	[15]
Household size	4.65	3.27	uniform	calculated from [16]
Risk of TB infection				
DS-TB Overall				
Annual burden	507,533	101,742	uniform	[17]
Accessed tests	483,912	34,628	uniform	[17]
Diagnosed	417,277	12,639	uniform	[17]
Notified and treated	361,107	3,543	uniform	[17]
Successfully treated	274,441	55	uniform	[17]
HIV-positive DS-TB				[17]
Annual burden	314,491	76,913	uniform	[17]
Accessed tests	305,910	20,849	uniform	[17]
Diagnosed	257,316	7,793	uniform	[17]
Notified and treated	222,678	2,185	uniform	[17]
Successfully treated	164,804	1,674	uniform	[17]
TB prevalence across quintiles				
Quintile 1	0.37		static	[13]
Quintile 2	0.28		static	[13]
Quintile 3	0.18		static	[13]
Quintile 4	0.17		static	[13]
Quintile 5	0.00		static	[13]
Frequency Employed				
Quintile 1	0.27	0.02	uniform	calculated from [16]
Quintile 2	0.38	0.01	uniform	calculated from [16]
Quintile 3	0.47	0.01	uniform	calculated from [16]
Quintile 4	0.57	0.01	uniform	calculated from [16]
Quintile 5	0.64	0.02	uniform	calculated from [16]

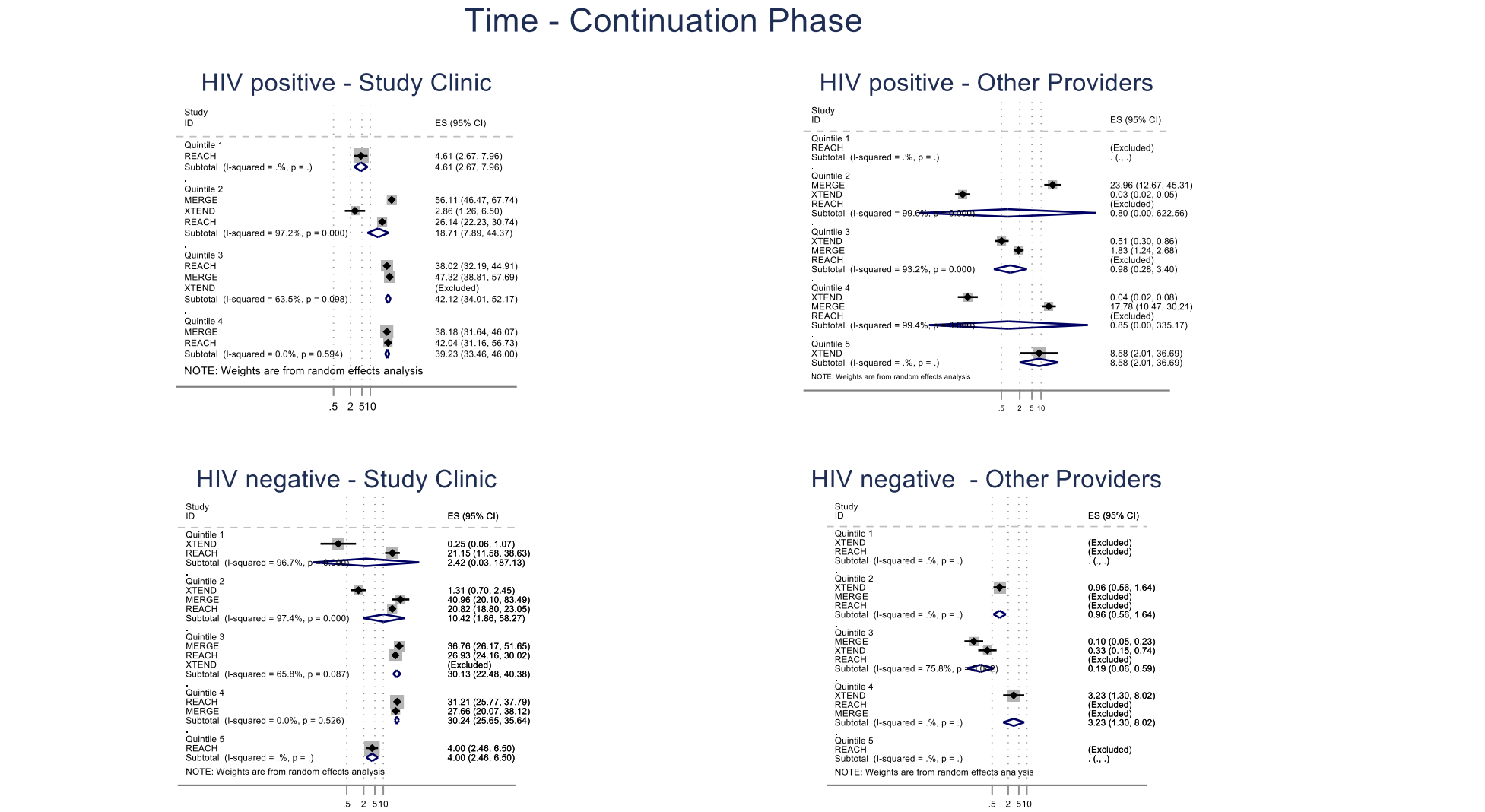
Supplementary Table 3 Mean visits, costs, and time by dataset and treatment phase from the pooled primary data

	Intensive phase				Continuation phase			
	MERGE	**REACH**	**XTEND**	**One-way ANOVA**	**MERGE**	**REACH**	**XTEND**	**One-way ANOVA**
	n = 1	**n = 102**	**n = 172**	**(F statistic)**	**n = 146**	**n = 1021**	**n = 172**	**(F statistic)**
Mean visits per month								
This clinic	2.0	8.3	6.3	1.99	4.3	8.9	0.8	74.39***
Pharmacy	0.0	0.2	0.0	4.03*	0.0	0.4	0.0	9.11***
General Practitioner	0.0	0.1	0.1	0.04	0.0	0.1	0.0	4.36*
Outpatient Hospital	0.0	0.0	0.1	0.60	0.0	0.0	0.0	0.48
Inpatient Hospital	0.0	0.1	0.1	0.01	0.0	0.1	0.0	1.52
Traditional Healer	0.0	0.0	0.0	1.17	0.0	0.1	0.0	2.92
Mean direct medical cost per visit								
This clinic	$0.00	$0.00	$0.00		$0.00	$0.00	$0.00	
Pharmacy		$2.42	$54.13	2.50	$0.22	$1.84	$7.13	5.02**
General Practitioner		$23.23	$110.46	0.62	$23.78	$17.38	$55.18	27.58***
Outpatient Hospital		$7.28	$40.05	0.11	$4.12	$2.87	$4.63	0.45
Inpatient Hospital		$0.00	$104.72	0.15	$18.69	$1.14	$13.46	4.00*
Traditional Healer			$90.37		$439.05	$20.58	$109.76	139.02***
Mean direct non-medical cost per visit								
This clinic	$0.00	$1.65	$0.66	8.27***	$1.00	$2.06	$1.14	1.39
Pharmacy			$3.42		$0.00		$3.29	
General Practitioner			$6.88		$26.56		$4.28	1.91
Outpatient Hospital			$12.66		$9.88		$5.39	0.76
Inpatient Hospital			$24.39		$17.57		$5.43	0.60
Traditional Healer			$14.63		$21.95		$0.00	0.06
Mean travel hours per visit								
This clinic	1.0	0.7	0.6	0.06	1.2	0.6	0.9	55.95***
Pharmacy			0.5		1.9		0.2	3.33
General Practitioner			0.9		1.7		1.1	0.40
Outpatient Hospital			0.2		2.0		1.5	0.30
Inpatient Hospital			1.0		2.7		0.6	5.46*
Traditional Healer			1.0		3.0		0.2	
Mean consult hours per visit								
This clinic	1.0	1.4	1.1	0.15	1.8	0.9	0.4	24.70***
Pharmacy			0.5		1.2		0.3	2.36
General Practitioner			1.1		1.5		0.9	1.97
Outpatient Hospital			2.7		5.3		2.6	7.85*
Inpatient Hospital			126.3		104.0		26.4	3.80
Traditional Healer			0.6		9.0		13.2	
Mean cost of 'special foods' or supplements								
Cost per phase	27.44	4.21	15.60	7.80***	50.83	4.21	15.60	185.70***

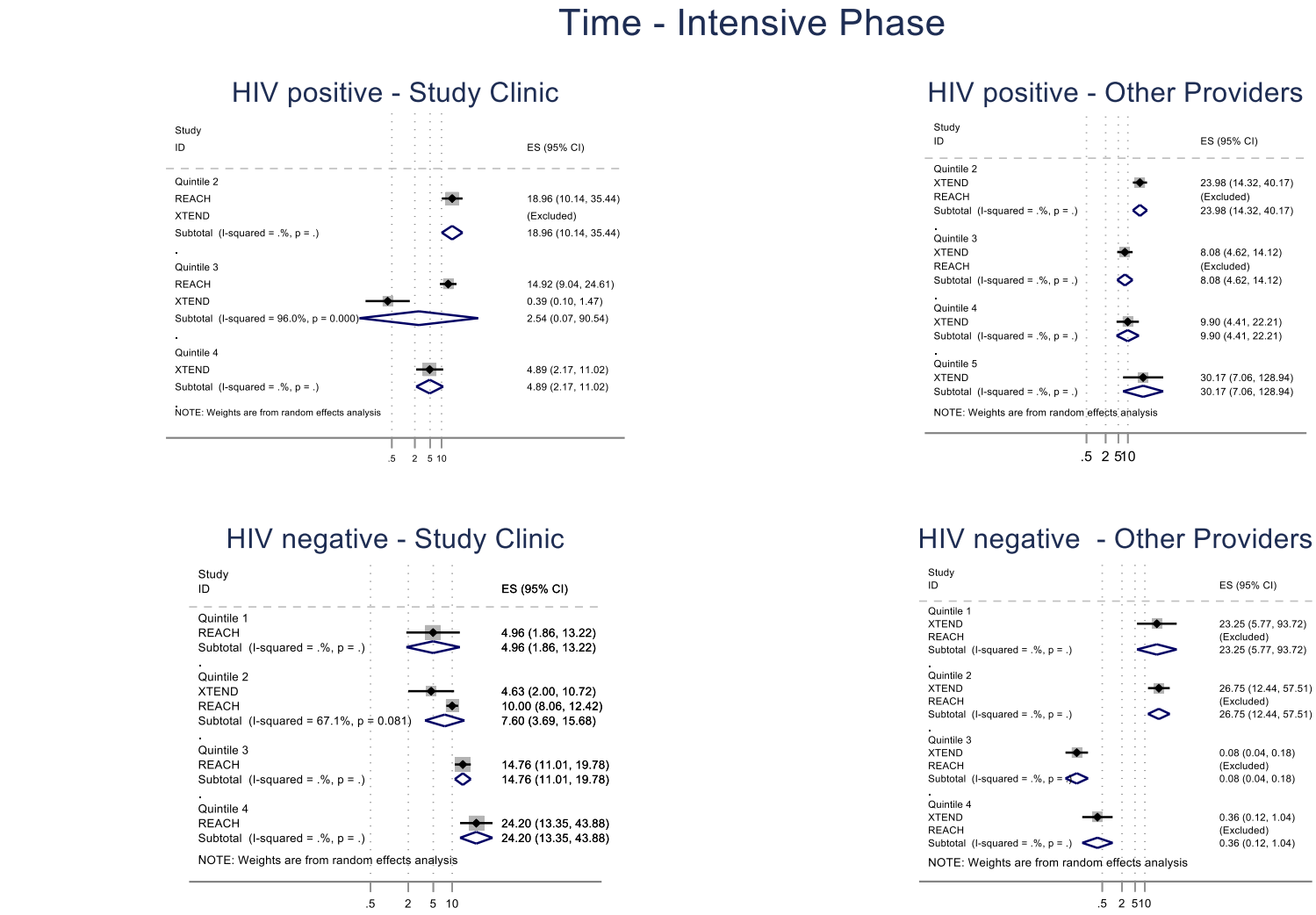
Supplementary Table 4 Number of missing observations by dataset, phase, and provider type

	Intensive phase			**Continuation phase**		
	MERGE	REACH	XTEND	MERGE	REACH	XTEND
Pharmacy						
Direct medical cost	0	0	1	1	0	1
Direct non-medical cost	0	103	0	1	1049	2
Travel time (hours)	0	103	0	2	1049	0
Consult time (hours)	0	103	0	2	1049	0
General practitioner						
Direct medical cost	0	0	0	2	0	0
Direct non-medical cost	0	104	1	0	1047	1
Travel time (hours)	0	104	3	0	1047	1
Consult time (hours)	0	104	1	0	1047	1
Hospital (inpatient)						
Direct medical cost	0	0	0	0	0	0
Direct non-medical cost	0	104	4	0	1050	1
Travel time (hours)	0	104	1	1	1050	1
Consult time (hours)	0	104	0	0	1050	0
Hospital (outpatient)						
Direct medical cost	0	0	0	0	0	0
Direct non-medical cost	0	104	2	0	1050	2
Travel time (hours)	0	104	10	2	1050	3
Consult time (hours)	0	104	1	2	1050	3
Traditional healer						
Direct medical cost	0	0	0	0	0	0
Direct non-medical cost	0	0	0	0	1046	0
Travel time (hours)	0	0	0	0	1046	0
Consult time (hours)	0	0	0	0	1046	0

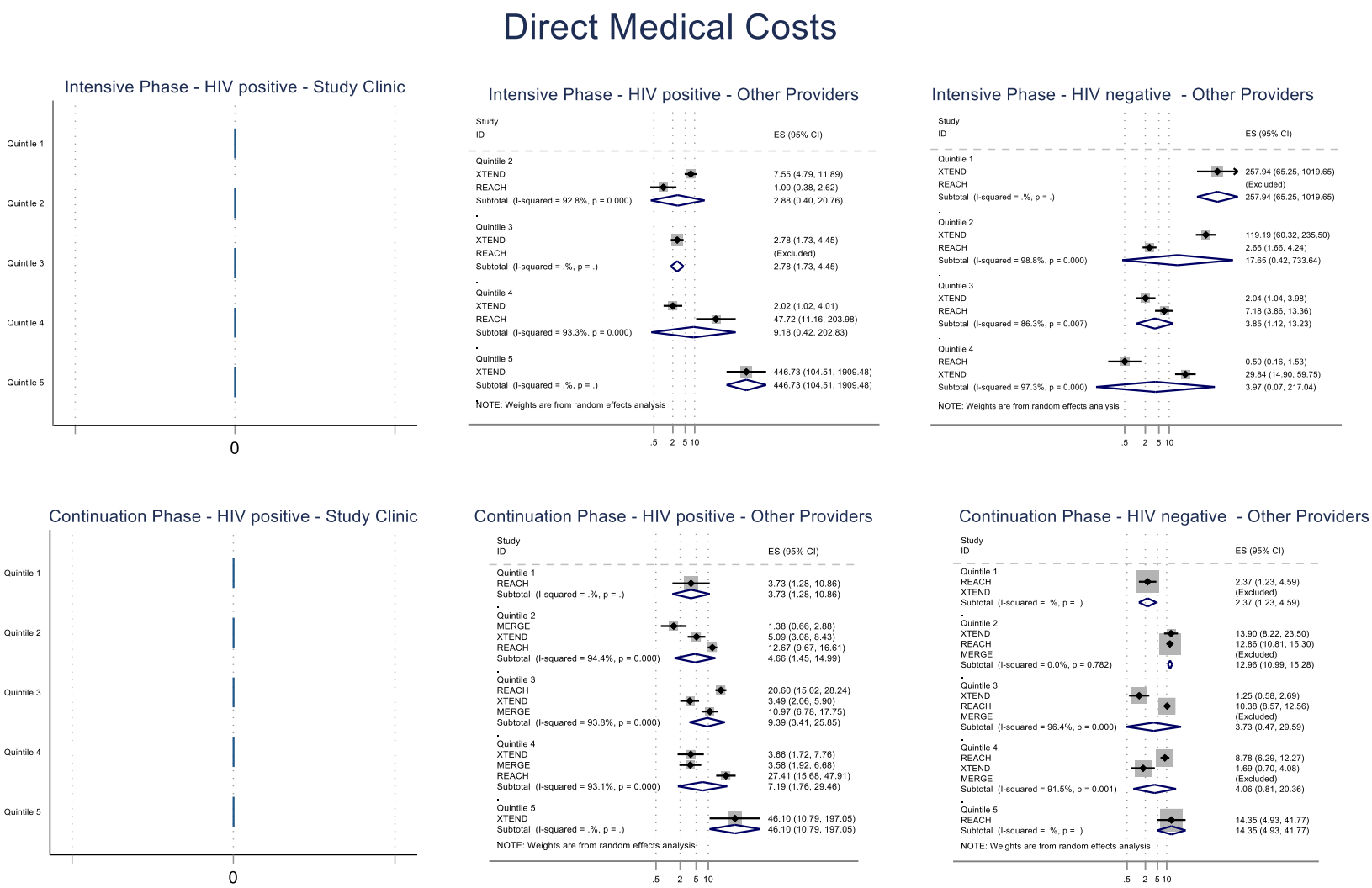
Supplementary Figure 1 Meta-analysis results – total time (continuation phase)



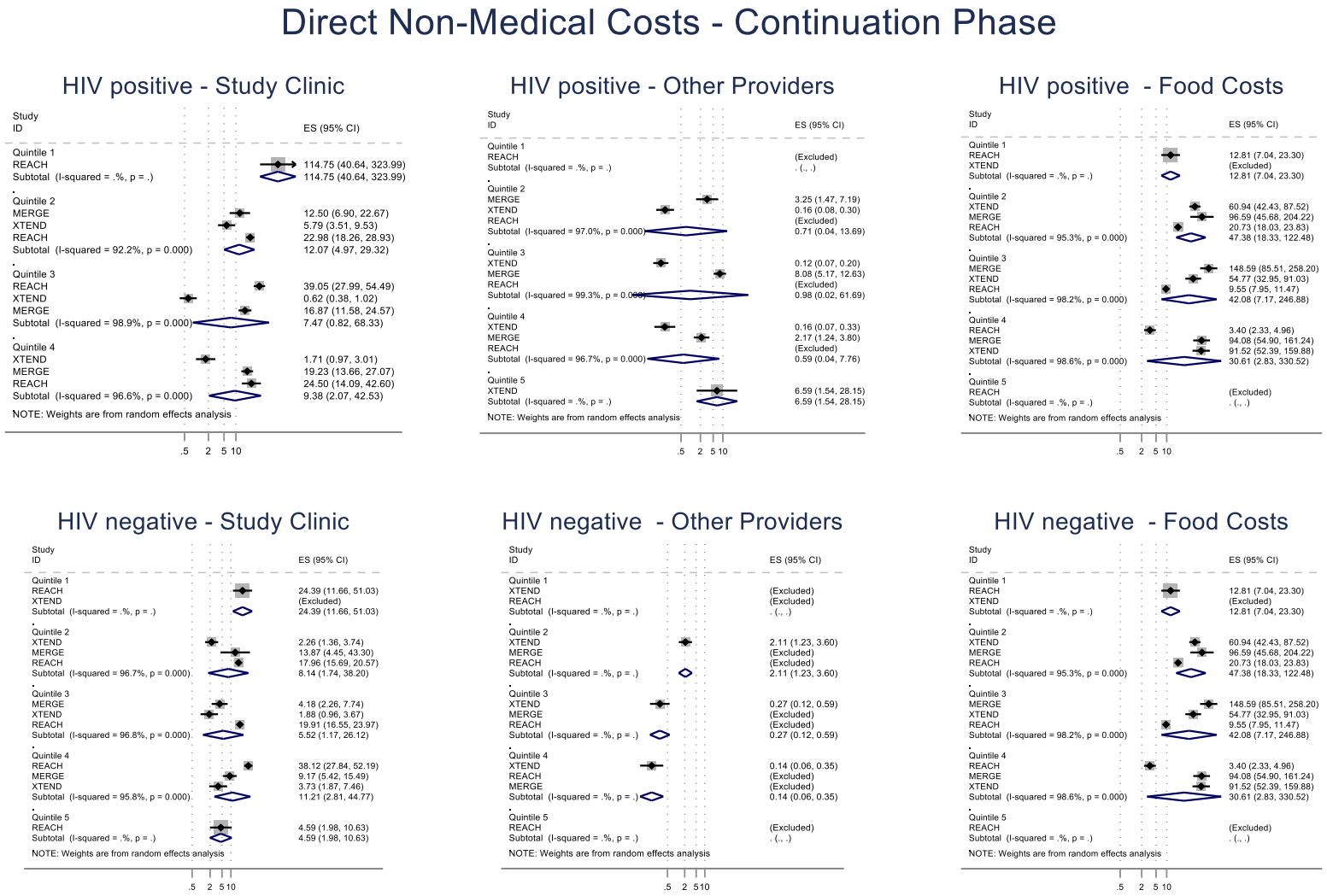
Supplementary Figure 2 Meta-analysis results – total time (intensive phase)



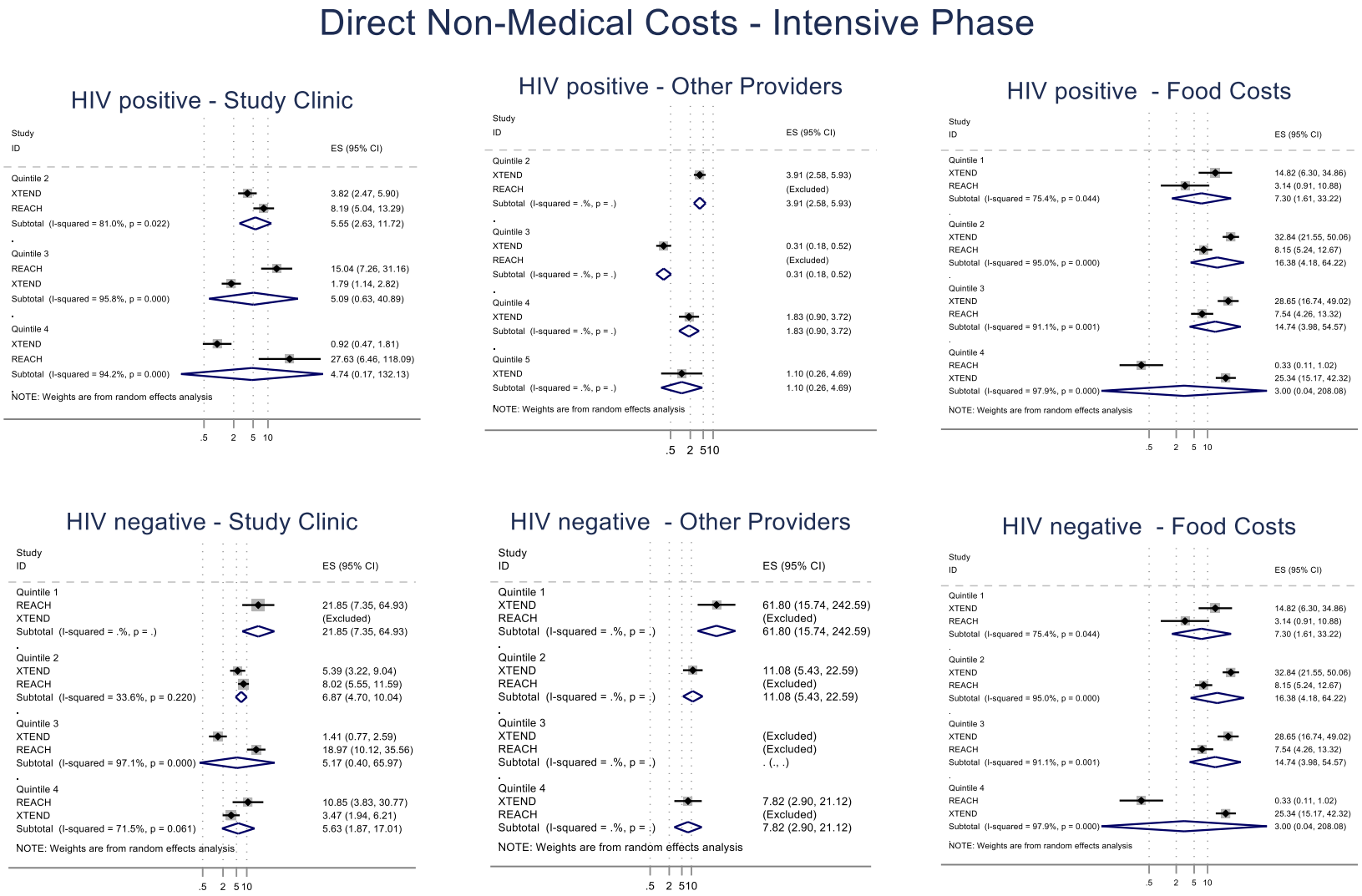
Supplementary Figure 3 Meta-analysis results – direct medical costs



Supplementary Figure 4 Meta-analysis results – Direct non-medical costs (continuation phase)



Supplementary Figure 5 Meta-analysis results – Direct non-medical costs (intensive phase)



Supplementary Table 6 Regression results by dataset (Continuation phase only)

	Total Travel and Consultation Time						
	Study Clinic				Other Providers		
	MERGE	XTEND	REACH	Pooled dataset	MERGE	XTEND	Pooled dataset
HIV positive	0.28 (-0.14)	-0.08 (-0.18)	0.199* (-0.08)	0.203** (0.07)	6.541*** (-1.67)	-12.14 (-13.35)	0.723** (0.28)
Rural		-0.584** (-0.21)	1.224*** (-0.09)	1.190*** (0.09)		-3.90 (-2.87)	0.36 (0.29)
Grade ≥ 8	0.07 (-0.18)	-0.07 (-0.19)	-0.15 (-0.08)	-0.168* (0.08)	0.33 (-1.21)	15.43 (-14.31)	0.39 (0.28)
Unemployed; income quintile (ref: Q1)							
Quintile 2	0.00 ((.)	1.435* (-0.61)	-0.25 (-0.25)	-0.08 (0.23)	0.00 ((.)	5.22 (-13.42)	3.088*** (0.90)
Quintile 3	-0.23 (-0.21)	1.467* (-0.64)	-0.45 (-0.26)	-0.27 (0.25)	0.75 (-1.77)	4.08 (-13.45)	2.848** (0.92)
Quintile 4	-0.639* (-0.29)	1.26 (-0.69)	-0.24 (-0.30)	-0.21 (0.28)	-8.94E+16 ((.)	-2.38 (-13.03)	3.405** (1.04)
Employed; income quintile (ref: Q1)							
Quintile 2	0.28 (-0.43)	1.14 (-0.63)	0.14 (-0.32)	0.17 (0.29)	-78.35 ((.)	1.87 (-13.53)	2.518* (1.08)
Quintile 3	0.00 (-0.22)	1.22 (-0.63)	-0.28 (-0.28)	0.03 (0.27)	-1.04 (-1.18)	1.40 (-13.38)	2.305* (1.00)
Quintile 4	-0.30 (-0.21)	1.793** (-0.69)	-0.619* (-0.31)	-0.29 (0.28)	0.00 (-1.21)	-9.98 ((.)	2.400* (1.04)
Quintile 5		-5.07E+15 ((.)	-2.301*** (-0.54)	-1.702** (0.61)		6.54 (-13.89)	2.72 (1.78)
Constant	3.644*** (-0.26)	-0.67 (-0.58)	2.771*** (-0.23)	2.445*** (0.22)	-4.123* (-1.94)	-3.79 (-13.48)	-1.932* (0.85)
Observations	145	162	968	1539	146	172	1539

Standard errors in parentheses; * p<0.05, ** p<0.01, *** p<0.001

Supplementary Table 7 Regression results by dataset (Continuation phase only; continued)

	Total Direct Non-Medical Costs						
	Study Clinic				Other Providers		
	MERGE	**XTEND**	**REACH**	**Pooled dataset**	**MERGE**	**XTEND**	**Pooled dataset**
HIV positive	0.985* (-0.49)	0.13 (-0.44)	0.41 (-0.21)	0.12 (0.19)	22.52 ((.)	-0.94 (-1.87)	0.08 (0.34)
Rural		-2.099*** (-0.54)	0.14 (-0.21)	0.07 (0.21)		-2.31 (-1.27)	-0.75 (0.39)
Grade ≥ 8	-0.02 (-0.67)	-0.20 (-0.50)	0.19 (-0.20)	0.13 (0.20)	-8.29 (-49.22)	1.34 (-2.22)	0.44 (0.38)
Unemployed; income quintile (ref: Q1)							
Quintile 2	0.00 ((.)	-0.41 (-1.29)	-1.06 (-0.59)	-1.08 (0.62)	0.00 ((.)	2.69 (-2.17)	3.502** (1.08)
Quintile 3	-0.60 (-0.75)	-0.70 (-1.44)	-0.87 (-0.63)	-0.98 (0.66)	6.36 (-49.23)	-21.18 ((.)	3.918*** (1.14)
Quintile 4	5.70E-01 (-1.02)	0.51 (-1.53)	-0.37 (-0.72)	-0.58 (0.74)	-1.52E+16 ((.)	0.10 (-3.11)	4.152*** (1.20)
Employed; income quintile (ref: Q1)							
Quintile 2	1.26 (-1.39)	-1.71 (-1.36)	-0.01 (-0.77)	-0.52 (0.75)	-9.64E+15 ((.)	1.38 (-2.72)	2.10 (1.23)
Quintile 3	0.81 (-0.73)	-1.28 (-1.39)	-0.83 (-0.69)	-0.93 (0.70)	9.11 (-49.24)	1.29 (-2.23)	3.976*** (1.18)
Quintile 4	0.53 (-0.73)	0.19 (-1.52)	-0.56 (-0.75)	-0.97 (0.72)	7.26 (-49.24)	0.36 ((.)	3.189** (1.22)
Quintile 5		-27.43 ((.)	-2.467* (-1.24)	-2.635* (1.26)		5.63 (-3.37)	5.996** (1.93)
Constant	1.537* (-0.77)	2.454* (-1.25)	3.663*** (-0.57)	3.755*** (0.60)	-20.65*** (-1.26)	-1.98 (-2.71)	-1.52 (1.05)
Observations	146	142	1020	1339	146	172	1339

Standard errors in parentheses; * p<0.05, ** p<0.01, *** p<0.001

Supplementary Table 8 Regression results by dataset (Continuation phase only; continued)

	Total Direct Medical Costs Other Providers				Total cost for food or dietary supplements			
	MERGE	**XTEND**	**REACH**	**Pooled dataset**	**MERGE**	**XTEND**	**REACH**	**Pooled dataset**
HIV positive	18.29 (-3133.20)	-13.62 (-3276.40)	0.42 (-0.28)	0.17 (0.25)	0.639* (-0.31)	0.780** (-0.26)	-0.19 (-0.32)	1.433*** (0.21)
Rural		-3.81 (-3.49)	-0.916** (-0.31)	-1.033*** (0.29)		-0.939** (-0.30)	-2.972*** (-0.35)	-0.923*** (0.24)
Grade ≥ 8	-18.59 (-3133.20)	16.58 (-3276.40)	0.23 (-0.27)	0.14 (0.26)	0.07 (-0.41)	-0.01 (-0.30)	0.842** (-0.33)	0.557* (0.22)
Unemployed; income quintile (ref: Q1)								
Quintile 2	0.00 ((.)	6.60 (-3276.40)	1.62 (-0.83)	1.750* (0.83)	0.00 ((.)	0.55 (-0.87)	0.80 (-0.84)	0.27 (0.65)
Quintile 3	-16.12 (-3133.20)	7.11 (-3276.40)	2.035* (-0.88)	2.170* (0.87)	0.01 (-0.47)	0.75 (-0.96)	0.85 (-0.90)	0.36 (0.69)
Quintile 4	-8.75E+15 ((.)	3.87 (-3276.40)	2.146* (-0.99)	2.136* (0.95)	0.77 (-0.63)	1.43 (-0.98)	0.48 (-1.06)	1.20 (0.76)
Employed; income quintile (ref: Q1)								
Quintile 2	-1.23E+16 ((.)	6.94 (-3276.40)	1.89 (-1.07)	1.66 (0.99)	-0.06 (-0.88)	0.77 (-0.90)	0.92 (-1.13)	1.27 (0.78)
Quintile 3	5.644*** (-1.34)	6.51 (-3276.40)	2.158* (-0.94)	2.422** (0.92)	0.28 (-0.47)	1.17 (-0.91)	1.50 (-0.98)	1.17 (0.72)
Quintile 4	3.787** (-1.26)	-7.40 ((.)	1.89 (-1.01)	1.53 (0.93)	0.31 (-0.47)	1.41 (-0.99)	-0.66 (-1.06)	1.42 (0.75)
Quintile 5		9.89 (-3276.40)	2.48 (-1.74)	3.05 (1.64)		1.25 (-1.37)	-6.19E+15 ((.)	-0.38 (1.30)
Constant	-2.34 ((.)	-5.19 (-3276.40)	0.87 (-0.80)	0.84 (0.79)	4.509*** (-0.53)	3.620*** (-0.81)	2.252** (-0.80)	2.509*** (0.62)
Observations	146	172	1050	1339	140	170	1050	1368

Standard errors in parentheses; * p<0.05, ** p<0.01, *** p<0.001

APPENDIX 2: METHODS FOR ESTIMATING INCOME

This supplementary appendix describes in further detail methods for the regression used to predict income for the analysis presented in Chapter 9.

1 CONSTRUCTING THE ASSET INDEX

We first constructed an asset index using information on housing quality and ownership of durable assets [1]. The asset index was designed to reflect the relative socio-economic standing of households within South Africa as a whole, rather than the relative SES of households within the pooled dataset alone. We therefore used the South African National Income Dynamics Survey (NIDS) to draw weights for an asset index [2].

Vyas and Kumaranayake [3] recommend a principal components analysis (PCA) approach to estimate a wealth index, however, PCA was designed for use with continuous, normally-distributed variables and therefore its application to the categorical variables in a wealth index is considered by some to be inappropriate [4,5]. MCA is analogous to PCA but is designed for use with discrete data and was more appropriate to the type of asset data available in the dataset.

Inclusion of variables for the MCA model was tested before model finalization. The final model for the MCA included indicator variables for dwelling type, source of water, toilet type, main wall materials, and ownership of a number of durable assets including: a DVD player, a car, a radio, a television, a refrigerator, a cell phone, and a bicycle. Exploration with the MCA model indicated that inclusion of indicators of ownership of livestock and donkeys reduced the quality of the model rather than improved it; these were therefore left out of the final model. The MCA was conducted separately for rural and urban households, as asset ownership and inequality tend to be different in rural and urban areas [6].

The first dimension from the MCA explained 62.5% of variation in the dataset for rural households, and 73.4% of variation for urban households. Dimension weights were predicted using the Stata 'predict' command; dimension weights are listed in Table 1. Weights were largely positive for ownership of durable goods and indicators of high-quality housing (e.g. flush to sewage toilet, piped water inside dwelling), and negative for indicators of poor housing (e.g. no access to piped water, bucket toilet). Households in the NIDS dataset were classified into five socio-economic groups through splitting the dimension weight into five quintiles.

Coding for asset variables from the pooled dataset was then mapped to coding for the same questions from the NIDS, and weights from the MCA were applied to asset data in the pooled dataset. Using MCA weights, the position of households from the pooled dataset in the country-level SES quintiles were interpolated to reflect nationally-representative socio-economic quintile. The total number of households per quintile for each dataset is detailed in Table 9-1 in the main paper.

2 REGRESSION TO PREDICT INCOME

We then used data from the NIDS dataset to predict coefficients for a number of demographic factors on household income and individual income.

Both household and individual income data were heavily right-skewed. In planning the regression we tested two regression approaches which have been recommended as appropriate for non-normally distributed data: a generalized linear model (GLM) with a gamma distribution and log link, and a quantile regression model [7].

Both regression models for household income were fit on covariates that are commonly included as determinants of income: urbanicity (1 = rural), gender (1 = female), education level (1 = educated to grade 8 and above), marital status (1 = married or cohabitating), employment status (1 = employed); asset quintile (quintiles 1-5, as described above), age group (1 = age 15-29; 2 = age 30-45; 3 = age > 45) and province. Following evidence that the burden of TB falls overwhelmingly on those with lower socioeconomic status [8,9], TB status (1 = current TB) was also included as a covariate in both regression models and the quantile regression model was fit on the log of household income at the 25^{th} quantile. Both regression models incorporated survey weights from the NIDS study calibrated to the corresponding population totals as given in the mid-year population estimates released in 2015 [10].

Robust standard errors were estimated in the quantile regression models to account for skewed data. Normality of residuals for both quantile regression and GLM models were tested using the Shapiro-Wilk normality test. The goodness of fit for a GLM is generally tested using the Akaike information criterion (AIC) and no R^2 is reported for a GLM; direct comparison of the predictive power between the two models is therefore difficult. We report the pseudo R^2 for the quantile regression model and AIC for the GLM.

Regression coefficients for both regression approaches (quintile and GLM) to estimate household income are listed in Supplementary Table 9-5. Coefficients for most covariates were significant, and there was little difference in coefficients across the two approaches. Tests after the quantile regression indicate that coefficients varied significantly across quantiles, suggesting that the quantile regression approach was more appropriate than the GLM approach. Supplementary Figure 9-7 shows the predicted coefficients for each covariate across quintiles. However, the predictive power for the quantile regression approach as indicated by the Pseudo R2 was relatively low (0.18), and the Shapiro-Wilk test indicates that residuals for both approaches deviate significantly from a normal distribution.

Coefficients from both regression analyses were used to predict the household income for patients in the pooled dataset, and correlation of predicted income and self-reported income variables were tested. Each dataset contained different self-reported income variables; correlation coefficients for predicted household income and income data collected in each dataset is listed in Supplementary Table 6. All correlation coefficients are relatively low; this is partly due to poor predictive power of the model, but also because most self-reported income variables were individual, whilst both regression approaches predicted household income. Most correlation coefficients were significant. There was relatively little difference in the size or significance of correlation coefficients between the quantile regression approach and the GLM approach.

The quantile regression approach was chosen as the best model, and income predictions using this model were used to classify households in the pooled analysis into nationally representative income quintiles.

3 Predicted Household Income Quintiles

Coefficients for the regression to estimate household income are listed in Supplementary Table 5. Coefficients for most covariates were significant, and tests after the quantile regression indicate that coefficients varied significantly across quantiles. However, the predictive power for the quantile regression approach as indicated by the Pseudo R2 was relatively low (0.18), and the Shapiro-Wilk test indicates that residuals for the regression deviate significantly from a normal distribution.

Predicted income values were adjusted using a Duan smear factor [11], and households assigned to SES quintiles based on the adjusted predicted income using upper-income thresholds from Statistics South Africa. Only two per cent of observations from the pooled dataset fell into the first quintile, while most predictions fell into the second and third income quintile (46% and 38% respectively). In comparison, it has been estimated nationally that 37% of those with TB fall into the first quintile [8].

Supplementary Table 9 MCA results

	Frequency by Dataset				Urban		Rural	
	AHRI	MERGE	XTEND	NIDS	Dimension 1 Coordinates	Contribution	Dimension 1 Coordinates	Contribution
Stove								
owns a Stove	36%	91%	82%	16%	0.72	0.01	1.18	0.02
does not own a Stove	64%	9%	18%	84%	-0.12	0.00	-0.20	0.00
DVD player								
owns a DVD player	45%	74%	63%	37%	0.92	0.03	1.54	0.05
does not own a DVD player	55%	26%	37%	63%	-0.62	0.02	-0.57	0.02
Motor car								
owns a Motor car	12%	19%	19%	19%	1.64	0.05	2.36	0.06
does not own a Motor car	88%	81%	81%	81%	-0.44	0.01	-0.32	0.01
Radio								
owns a Radio	75%	77%	80%	63%	0.49	0.01	0.53	0.02
does not own a Radio	25%	23%	20%	37%	-0.77	0.02	-0.86	0.02
Television								
owns a Television	69%	86%	84%	81%	0.49	0.02	0.84	0.04
does not own a Television	31%	14%	16%	19%	-2.37	0.08	-2.14	0.11
Refrigerator								
owns a Refrigerator	65%	69%	69%	77%	0.64	0.03	0.93	0.05
does not own a Refrigerator	35%	31%	31%	23%	-2.26	0.09	-1.91	0.10
Cell phone								
owns a cell phone	83%	99%	96%	90%	0.19	0.00	0.27	0.01
does not own a cell phone	17%	1%	4%	10%	-1.64	0.02	-1.82	0.04
Bicycle								
owns a Bicycle	9%	4%	8%	8%	1.65	1.65	1.65	1.65
does not own a Bicycle	91%	96%	92%	92%	-0.13	-0.13	-0.13	-0.13
Toilet type								
Flush to sewage	45%	70%	53%	29%	0.68	0.02	2.26	0.04
Flush to septic tank	2%	16%	1%	24%	0.28	0.00	1.72	0.02
Chemical	1%	3%	2%	2%	-2.99	0.01	-0.58	0.00
VIP	12%	3%	11%	15%	-1.79	0.01	-0.29	0.00
Pit without ventilation	27%	5%	31%	24%	-2.65	0.03	-0.07	0.00
Bucket	5%	1%	0%	3%	-3.21	0.02	-1.13	0.00
None	9%	1%	1%	3%	-4.04	0.03	-2.59	0.03
Other	0%	0%	1%	0%	-4.11	0.00	-0.44	0.00
Main Walls Material								
Mud	5%	1%	3%	3%	-3.65	0.01	-2.60	0.04
Mud/cement	6%	20%	6%	6%	-3.26	0.01	-2.32	0.05
Corrugated iron/zinc	15%	18%	10%	10%	-2.74	0.10	-1.13	0.01
Prefab/wood	6%	1%	1%	1%	-1.68	0.01	-1.25	0.00
Bare brick/cement blocks	25%	22%	78%	78%	0.71	0.03	0.76	0.04
Plaster/finished	42%	37%	1%	1%	0.61	0.00	-1.48	0.00

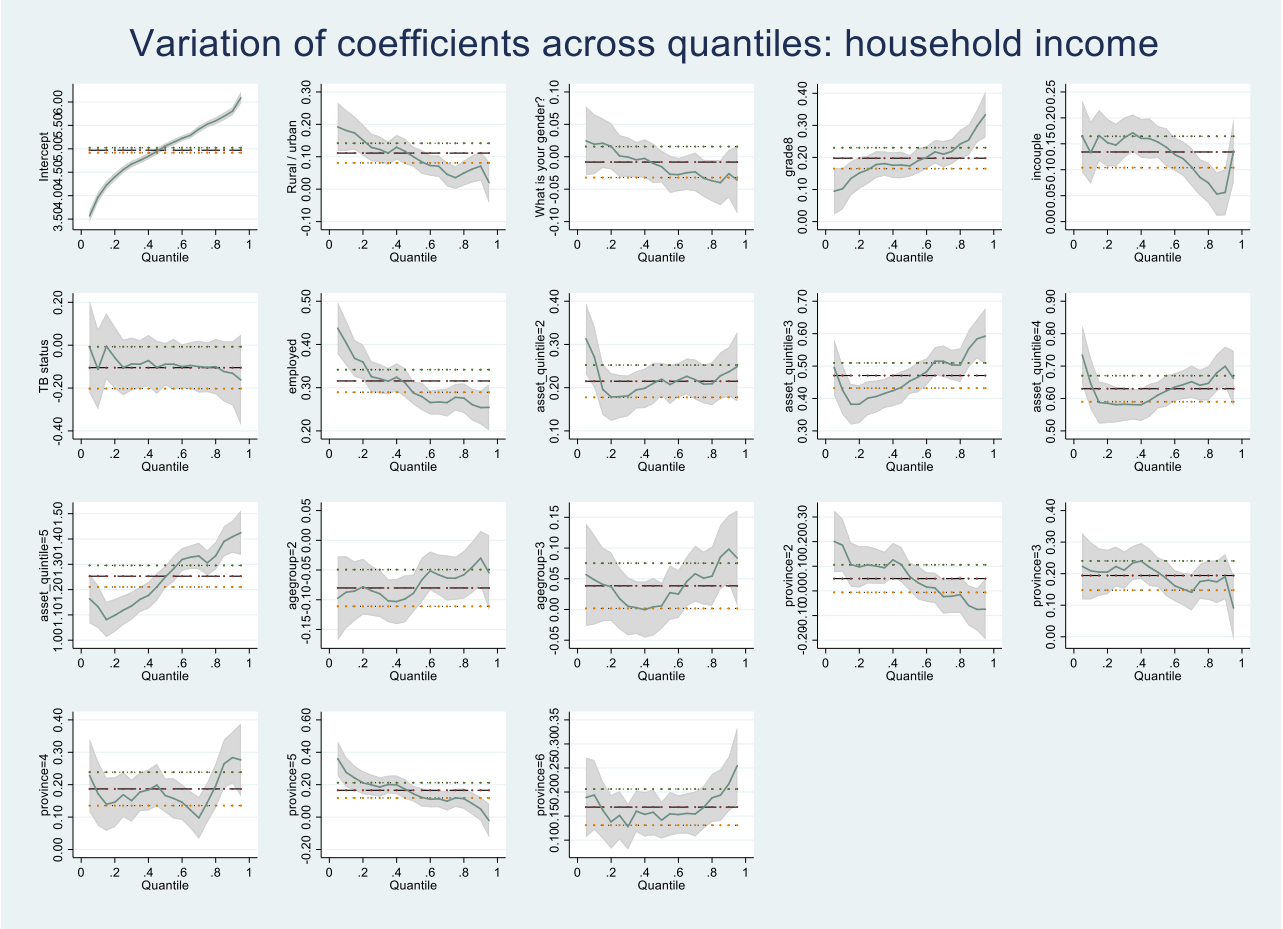
Other	1%	0%	1%	1%	-1.56	0.00	-1.74	0.00
Dwelling Type								
House/concrete block	51%	33%	61%	72%	0.77	0.03	0.73	0.03
Traditional	5%	0%	15%	11%	-1.46	0.00	-2.14	0.08
Flat	17%	3%	1%	2%	0.41	0.00	-0.25	0.00
Cluster house	1%	5%	0%	1%	0.82	0.00	0.23	0.00
backyard dwelling	6%	31%	2%	4%	0.07	0.00	0.15	0.00
Informal	10%	12%	14%	4%	-2.21	0.03	-1.72	0.01
Informal squatter	10%	10%	6%	6%	-3.39	0.09	-1.66	0.01
Room on property	0%	5%	2%	1%	-0.44	0.00	0.24	0.00
Caravan/tent	0%	1%	0%	0%	-0.49	0.00	-2.33	0.00
Other	0%	0%	0%	0%	-1.40	0.00	0.14	0.00
Source of water								
Piped inside dwelling	36%	30%	28%	41%	0.91	0.04	1.80	0.05
Piped inside yard	31%	55%	44%	31%	-0.58	0.01	0.55	0.01
Piped community stand	18%	14%	21%	16%	-3.70	0.09	-0.64	0.01
No access to piped water	1%	1%	2%	3%	-3.78	0.01	-0.87	0.00
Borehole	1%	0%	1%	2%	-3.97	0.00	0.29	0.00
Open source	7%	0%	3%	6%	-2.50	0.00	-1.94	0.04
Other	5%	0%	1%	1%	-4.03	0.01	-0.67	0.00

Supplementary Table 10 Regression coefficients for household income prediction

	Quantile Regression (25^{th} quantile; Log)	**GLM regression (gamma log)**
Constant	4.26*** (0.06)	5.24*** (0.08)
Urban	0.15*** (0.04)	-0.01* (0.04)
Female	0.07* (0.03)	0.04* (0.03)
Educated ≥ grade 8	0.27*** (0.04)	0.31*** (0.04)
Married / cohabitating	0.21*** (0.04)	0.20*** (0.04)
Has TB	-0.28*** (0.04)	-0.27** (0.10)
Employed	0.33*** (0.03)	0.33*** (0.04)
Asset quintile (ref Q1)		
Quintile 2	0.20*** (0.04)	0.25*** (0.03)
Quintile 3	0.48*** (0.05)	0.57*** (0.04)
Quintile 4	0.73*** (0.04)	0.73*** (0.04)
Quintile 5	1.37*** (0.05)	1.66*** (0.06)
Age group (ref age 15-29)		
30-44	-0.09** (0.04)	-0.19*** (0.03)
45 and over	0.10* (0.05)	0.10* (0.05)
Province (ref: Eastern Cape)		
Free State	0.04* (0.07)	-0.19* (0.13)
Gauteng	0.26*** (0.05)	-0.09* (0.13)
Mpumalanga	0.13* (0.06)	0.13* (0.11)
Western Cape	0.26*** (0.05)	-0.08* (0.14)
KwaZulu-Natal	0.24*** (0.04)	0.10* (0.10)
N	16,396	16,396
Pseudo R2	0.18	
AIC		24947.96
Shapiro-Wilk test for normality of residuals	1.00***	0.97***

**** p < 0.001; ** p < 0.01; * p < 0.05*

Supplementary Figure 6 Variation of regression coefficients across quantiles



Supplementary Table 11 Correlation coefficients for predicted and self-reported income

	Quantile Regression	GLM Regression
Self-reported individual income: symptom onset (collected in MERGE dataset)	0.42***	0.33***
Self-reported individual income: diagnosis (collected in MERGE dataset)	0.39***	0.29***
Self-reported individual income: intensive phase (collected in XTEND dataset)	0.24**	0.25***
Self-reported individual income: continuation phase (collected in XTEND dataset)	0.21**	0.23**
Self-reported household expenditure (collected in REACH dataset)	0.33***	0.34***

**** p < 0.001; ** p < 0.01; * p < 0.05*

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